



Do digital natives use mobile payment differently than digital immigrants? A comparative study between generation X and Z

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Abstract

Consumers use increasingly Near Field Communication mobile payment to buy products and services. However, the adoption of NFC mobile payment varies by individual attributes of consumers. This paper aims to study the generational differences in mobile payment acceptance based on the theory of generational cohorts and technology acceptance. Therefore, a research concept and hypotheses were developed. The research methodology included an online survey among Generation Z (digital natives) and X (digital immigrants). A sample of 580 respondents had been analyzed with multi-group Structural Equation Modeling. The comparative analysis revealed that digital immigrants were more influenced by the perceived ease of use, subjective norms, and financial risk of NFC mobile payment. In turn, digital natives intended to use NFC mobile payment to a greater extent if they perceived mobile payment as compatible with their lifestyle. Our research contributes to the understanding of generational patterns of mobile payment acceptance.

Keywords Mobile payment acceptance · NFC · Generational differences · Digital natives · Digital immigrants

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1 Introduction

After the initial low penetration, Near Field Communication (NFC) mobile payment is rapidly growing worldwide [1]. By 2023, eMarketer [2] estimated that 1.31 billion consumers would use proximity mobile payment. The pandemic has accelerated mobile payments even further because consumers prefer cashless payments to prevent the infection. Thus, NFC mobile payment might become an essential payment method that generates a critical mass of users [3].

Mobile payment comprises payments for goods, services, and bills with a mobile device by taking advantage of wireless and other communication technologies [4]. In consumer markets, three technologies are available such as short text messages (SMS), near field communication (NFC), and QR codes [5]. However, the high penetration of smartphones gave rise to NFC technology that enables payment through radio frequency identification [6] at the retailers' POS terminal and results in contactless payment [7].

Mobile payment acceptance has been intensively studied in the academic literature. Most researchers used technology acceptance models to explain the variation in intention to use NFC mobile payment [8]. Previous research explained individual consumer differences of NFC mobile payment acceptance by adding various variables to the models. For example, age [7, 9, 10], prior experience [11, 12]. Furthermore, trust in new technology [6, 13] and the innovativeness of consumers [14–17] are often included in mobile payment models. These variables are often closely related to the characteristics of distinct generations [17]. Generations represent groups of people born within the same period [18], revealing distinct personality traits, consumer behavior [19], and adoption of technology-based services [20]. Despite the information-richness of generational cohorts, the role of generations is underresearched in mobile payment acceptance literature. Only a few studies considered the impact of generation on mobile payment acceptance. For example, Mun et al. [21] studied mobile payment acceptance among Generation Y. Likewise, Dalimunte et al. [22] conducted empirical research about digital wallet acceptance among Generation Z consumers. Thus, previous studies focused on single generations, which is surprising since multiple generations pay by mobile applications. Consequently, the mobile payment acceptance literature lacks studies that compare multiple generations. Moreover, technology acceptance research on digital technologies focuses on the youngest generations, such as Generation Y and Z. As a result, there is a research gap in studying larger generational distances.

Therefore, this paper aims to compare the NFC mobile payment acceptance between Generation X and Z. Drawing on the technology acceptance theory, mobile payment acceptance explains the intention to pay by NFC mobile solution and its driving factors [4]. Generational cohorts such as X and Z have different attitudes toward new technologies such as mobile payment. Zers represent the digital native generation who were born into the digital era. In turn, Generation X members are digital immigrants because they became familiar with mobile technology as an adult. Furthermore, these two generations differ in their financial experiences. By comparing the mobile payment acceptance of the digital native and immigrant generations,

our research helps understand the generational differences in accepting NFC mobile payment.

For that reason, we conducted an online survey among Generations X and Z, which resulted in a sample of 580 respondents. The data analysis was based on multi-group structural equation modeling (SEM) that enabled the comparison of the mobile payment acceptance between Generation X and Z.

The original contributions of our research to the existing mobile payment acceptance literature are twofold. First, our findings move NFC mobile payment acceptance research forward by including generation as a new moderator variable. This is an important addition since Venkatesh [23] pointed out that technology acceptance literature lacks rich moderator variables beyond demographics. Indeed, generational cohorts can behave as rich moderators because they refer not only to the age of the consumers but differences in consumers' social, cultural, and lifestyle [4]. Second, this paper enriches NFC mobile payment research by comparing X and Z Generations while previous NFC mobile payment research focused on single generations [21, 22]. Comparing the digital immigrant (X) and native (Z) generations is insightful because they have distinct attitudes toward mobile technology and payment methods that affect their use of NFC mobile solutions.

The research results have business implications as well. Our findings help financial service companies to understand the generational patterns of mobile payment acceptance. Mobile payment adoption depends on payment habits that are difficult to change [24]. Hence, it is crucial to understand the drivers of NFC mobile payment acceptance. Different factors influence the mobile payment of Generations X and Z. Therefore, marketing managers should develop customized marketing approaches for NFC mobile payment to distinct generations. In addition, generation-based marketing is very actionable for companies because generations can be identified and targeted effectively.

The paper is structured as follows. First, we reviewed the literature related to the research question, including the theory of generational cohorts, mobile payment acceptance, and generational differences in technology acceptance. Second, the research concept was outlined along with the hypotheses. Next, the research methodology and research findings were explained in detail. Finally, we discussed the theoretical contributions and business implications of our research findings, followed by the research limitations and future research directions.

2 Literature review

2.1 The generational Cohort Theory

Generation research roots in sociology. Generations represent cohorts of people born within the same period [18]. The Generational Cohort Theory relies on the idea that cohorts of individuals are exposed to the same historical, cultural, political, and economic events [25]. These events create a collective consciousness [26] and access to specific resources [27] that result in similar values and behavioral patterns such as common identity and lifestyle [28].

Howe and Strauss [29] distinguished four generations based on age cohorts: the Silent Generation (born between 1925 and 1942); the Baby Boomers (born between 1943 and 1960); Generation X (born between 1961 and 1981); and Generation Y (born between 1982 and 2000). A more recent classification developed by McCrindle [30] identified six generations representing today's society: Boomers (1946–1964), Generation X (1965–1979), Generation Y (1980–1994), Generation Z (1995–2010), and Generation Alpha (2010–).

Each generation is unique relative to other generations and varies by lifestyle, values, work habits, and technology skills [18]. Since we focus on Generation X and Z, their generational characteristics were outlined in detail. These two generations were chosen because they were exposed to mobile technology at distinct life stages and had different financial experiences influencing NFC mobile payment acceptance. Furthermore, Generation X and Z represent large consumer groups with substantial buying power. Table 1 illustrates the attributes of the two generations.

Generation X came to the world between 1965 and 1979 [30]. Xers often represent Generation Z's parents who came to the world between 1995 and 2010 [30]. The life experience of Generation X was shaped by economic recessions, a high level

Table 1 Attributes of Generation X and Z. (Source: edited by the authors)

	Generation X <i>Digital immigrants</i>	Generation Z <i>Digital natives</i>
Birthdate	1965–1979	1995–2010
Life experience	Economic uncertainty, recessions, unemployment, inflation, high rate of divorces	Financial crisis and economic recession, instability in families
General values/attitude	Freedom, autonomy, skepticism, risk avoidance	Social consciousness, tolerance, high self-esteem, innovativeness
Information sources	Strong media-orientation Harder to persuade and influence	Strongly influenced by social media Access to a large amount of information
Attitude toward technology	Learned to use technologies at school	Connected to technology all around the clock The smartphone is the most important device
Economic status	Heavy spenders	Entering labor market
Payment methods	Electronic bankcards	Embrace alternative payment methods

of unemployment, inflation, and high rates of divorced parents [31]. These adverse events bred risk-avoidance [32] and a skeptical attitude among Xers [33]. On the other hand, they were the latchkey children of hard-working Boomer parents and became independent at an early age [34]. For that reason, they have a strong desire for freedom and autonomy [35]. Similar to Generation X, Generation Z experienced turbulence and instability in their families due to the financial crisis and the subsequent recession [36]. Consequently, they have a strong desire to feel safe and use digital spaces occasionally to escape reality. This generation is socially conscious, highly tolerant, innovative, and has high self-esteem [37].

Both generations are heavy users of the media. Generation X is an aggressive communicator and reveals a strong media orientation [38]. Generation X consumers prefer honest, straightforward marketing approaches [35], but they are harder to persuade and influence [37]. They use the Internet and traditional communicational channels as well [39]. Generation Z grew up surrounded by digital channels, and their media use is shifted toward mobile channels and social media [40]. The smartphone is considered the most important internet device, and the mobile penetration reaches 98% among Zers [41]. In this way, Zers are connected online around the clock [17] and access more information than any other generation.

Furthermore, Generation X and Z are well-educated [32], revealing high computer literacy [35]. Although both generations show interest in technology [42], there are notable differences in their attitudes toward technology. Generation Z was born into the digital era and had never experienced life before the Internet. Therefore, Zers are called digital natives. In contrast, Generation X learned to use digital technologies at school and grew up as the Internet developed [43]. Thus, Xers are considered digital immigrants [44]. The difference in the attitude toward technology is also visible in technology use. For example, 69% of Generation X owns a computer or laptop compared to 88% of Generation Z. The penetration of mobile phones is above 90% in both generations [41]. However, Zers cannot imagine their life without digital devices [38].

In addition, the two generations differ in their economic status. Generation X consumers are affluent and heavy spenders, making them an attractive target group for the companies [37]. In turn, Generation Z is just entering the labor market or pursuing its higher education study [38].

Finally, Generation Z sees the benefits such as convenience and reduced costs of digital financial services [45]. So, they embrace a broader range of alternative payment methods. For example, 34% of Generation Z has already used a mobile wallet compared to other generations (26%) [46].

2.2 Mobile payment acceptance and generational differences

Mobile payment acceptance has been intensively studied, whereby researchers adopted various theoretical approaches to explain mobile payment acceptance. For example, the theory of innovation diffusion [47] was utilized by Balachandran and Tan [48], Pham and Ho [14], and Johnson, Kiser, Washington, and Torres [49]. Furthermore, Yang, Liu, Li, and Yu [50] and Wu, Liu, and Huang [51] embraced prospect theory [52]. Other scholars [53, 54] applied information system success models

[55] to investigate mobile payment acceptance. However, the most popular theoretical approaches are the technology acceptance model [56] and the unified theory of acceptance and use of technology [57] when researchers study NFC mobile payment acceptance [58].

The technology acceptance model (TAM) explains why employees accept new technology at the workplace [56]. The TAM model proposes that employees are more likely to use new technology if they perceive it as easy to use and practical [56]. Over time, the original TAM model evolved substantially, and new variables were added, giving birth to different TAM models. The various versions of TAM models reflected the evolution of the technology and resulting social responses [59]. Later, Venkatesh and his co-authors [57] reviewed technology acceptance theories such as the theory of reasoned action [57], the theory of planned behavior [9], the theory of innovation diffusion [47], and TAM models [56]. As a result, they created the unified theory of acceptance and use of technology model (UTAUT) that used performance expectancy, effort expectancy, social influence, facilitating conditions to explain the behavioral intention of using new technology and forecast actual use [57].

Moreover, the model included several demographic variables (age, gender, prior experience, and voluntariness of use) that functioned as moderator variables. Researchers recognized the need to adapt the UTAUT model to consumer technology acceptance as the technology penetrated consumers' lives. Therefore, Venkatesh, Thong, and Xu [60] created the UTAUT2 model that took into account new predictors: hedonic motivation, price value, and habit. Further moderators such as age, gender, and experience with the technology modify the strength of the relationships between facilitating conditions, hedonic motivation, price value, habit, and the intention to use.

NFC mobile payment acceptance models include various influence factors that predict the intention to pay by NFC mobile solution. Some influence factors motivate, some others inhibit the acceptance of NFC mobile payment. Thus, perceived usefulness, ease of use, subjective norms, personal innovativeness, perceived compatibility, and hedonic motivation to use the technology [12, 15, 16] encourage consumers to adopt NFC mobile payment. In contrast, perceived risk, security, perceived financial costs [61], anxiety, and anticipated regret [62] function as barriers to NFC mobile payment acceptance. NFC mobile payment models often include moderator variables such as age [9], gender [63], income, and prior experience [11, 64] to explain individual differences in the consumer acceptance of NFC mobile payment technology.

Since mobile payment acceptance research is scarce of empirical studies that consider generational differences, we turned to technology acceptance literature that investigated consumer acceptance of digital technologies. Table 2 summarizes these studies. Some researchers focused on single generations. More recent studies investigated the technology acceptance behavior of Generation Z. For example, Priporas, Stylos, and Fotiadis [65] and Ng, Ho, Lim, Chong, and Latiff [66] researched the user acceptance of smart retailing. Moreover, Dadvari and Do [67] concentrated on adopting ubiquitous media systems. Ninan, Roy, and Cheriyan [68] analyzed social media marketing use among Zers.

Other studies compared the technology acceptance across multiple generations. Generational differences were identified concerning the acceptance of information

communication technology [69], social networks [70], digital assistant [71], mobile shopping [19], mobile commerce [72], mobile banking [73], information security behavior [74], and paying for cloud services [75] by generations.

Cohen [76] contrasted the reaction of Generation Z to Boomers in the context of personalized online advertising. Similarly, Yang and Jolly [20] surveyed Boomers and Generation X regarding mobile data services. They showed that Generation X perceived mobile data services as easier to use but less valuable than Boomers.

Bordonaba-Juste et al. [75] focused on mobile cloud services and pointed to the motivational differences between Boomers, Generation X, and Y consumers. Generation X proved to be strongly influenced by security problems; Generation Y considered privacy a critical factor when subscribing to mobile cloud services. Lissitsa and Kol [19] conducted four-generation research regarding mobile shopping. Their results revealed that openness to experience and personality traits drove the intention to use for Baby Boomers and Generation X. For Generation Y, extraversion had a positive effect on the intention to use. While among Generation Z, agreeableness was negatively correlated with mobile shopping [19].

Although mobile payment targets multiple generations, we found only two studies investigating mobile payment acceptance of specific generations. First, Mun and co-authors [21] researched the member of Generation Y. The authors found that mobile payment acceptance was determined by perceived usefulness, ease of use, perceived credibility, and social influence. Second, Dalimunte et al. [22] focused on the mobile payment acceptance of Generation Z and showed that social influence, performance expectancy, and price-value ratio played an essential role in mobile payment in online channels. In contrast, in-store mobile payment was influenced by performance expectancy, hedonic motivation, habit, and price-value ratio for Generation Z.

3 Conceptual model and hypotheses development

This study aims to compare NFC mobile payment acceptance between Generation Z and X. Therefore, our research concept builds on the theory of technology acceptance [79] and the generational cohort theory [29] reviewed in previous sections. The conceptual model predicts the intention to use the NFC mobile payment technology by influencing factors of technology acceptance such as perceived usefulness [12], perceived ease of use [80], and subjective norms [81]. Furthermore, we included compatibility [1] enjoyment [15] in the model. Finally, NFC mobile payment might be associated with perceived privacy and financial risks [4]. Figure 1 illustrates the relationships between the influence factors and the intention to use NFC mobile payment.

According to the theory of generational cohorts, we propose that technology acceptance factors have different effects on the intention to use NFC mobile payment for the digital immigrant (X) and digital native (Z) generations. These generations are assumed to show differences in mobile payment acceptance because they were exposed to mobile technology at distinct life stages and had diverse financial experiences influencing NFC mobile payment acceptance.

Table 2 Studies regarding technology adoption by generations. (Source: edited by the authors)

Authors	Technology	Methodology/Model	Boomers	Gen- era- tion X	Gen- era- tion Y	Gen- era- tion Z	Genera- tions compari- son
Cohen [76]	Personalized online advertising	Interviews/Reactance theory	X	-	-	X	Differences Similarities
Chen et al. [77]	eCRM	Survey/Media Richness	X	-	-	-	-
Yang and Jolly [20]	Mobile data services	Survey/TAM	X	X	-	-	Differences
Severt, et al. [69]	Info-com- munication technologies	Interviews Survey/n.s.	Professionals		X	-	Differences Similarities
Vadwa et al. [70]	Social Networks	Survey/TAM	X	X	X	X	Differences Similarities
Priporas et al. [65]	Smart retailing	Interviews/n.s.	-	-	-	X	-
Noah & Sethu- madhavan [71]	Digital assistant	Survey/n.s.	-	X	X	X	Differences
Ng et al. [66]	Smart retailing	Survey/SOR	-	-	-	X	-
Lissitsa & Kol [19]	M-shopping	Survey/Personal- ity model, resistance to innovation	X	X	X	X	Differences
Dadvari & Do [67]	Ubiquitous media system	Survey/TR, TAM	-	-	-	X	-
Calvo- Porral & Pesquei- ra-San- chez [78]	Technology	Survey/Gratification	-	X	X	-	Differences
Badillo- Torres et al. [72]	Mobile electronic commerce	Focus Group/ UTAUT2, Culture, Quality	-	X	X	-	Differences
Shams et al. [73]	Mobile banking	Interviews/n.s.	-	X	X	X	Differences
Ninan et al. [68]	Social media marketing	Survey/n.s.	-	-	-	X	-
Debb et al. [74]	Information se- curity behavior	Survey/n.s.	-	-	X	X	Differences
Bor- donaba- Juste et al. [75]	Paying for cloud services	Survey/n.s.	X	X	X	-	Differences
Mun et al., [21]	Mobile payment	Survey	-	-	X	-	-

Table 2 (continued)

Authors	Technology	Methodology/Model	Boomers	Gen- era- tion X	Gen- era- tion Y	Gen- era- tion Z	Genera- tions compari- son
Dalimunte et al., [22]	Mobile payment	Survey	-	-	-	X	-

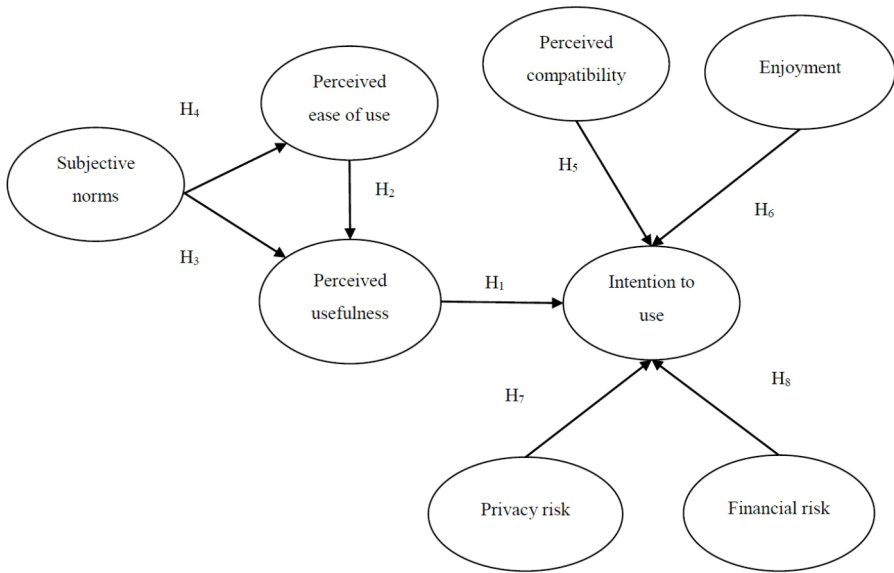


Fig. 1 Research model and hypotheses

3.1 Perceived usefulness

Consumer technology acceptance models define perceived usefulness or performance expectancy “as the degree to which using a technology will provide benefits to consumers in performing certain activities” [60]. Technology acceptance models assume that perceived usefulness positively affects the intention to use [56, 57]. Thus, perceived usefulness might provide a useful, easier, and quicker checkout process by mobile paying. Several researchers showed that perceived usefulness has a strong and positive impact on intention to use mobile payment [5, 64, 82].

Yang and Jolly [20] found that Generation X consumers appreciate usefulness when mobile data services enhance the effectiveness and efficiency of information search. Similarly, Dalimunte et al. [22] found a significant, positive relationship between perceived usefulness and intention to use digital wallets among Generation Z consumers. However, mobile payment literature assumes that younger consumers perceive higher usefulness of NFC payment [9] than older ones. This assumption is supported by the fact that Generation Z was born in the online and mobile era while

Xers adopted it during their adult ages [17]. Therefore, the following hypothesis was formulated:

H₁: Perceived usefulness has a more positive impact on the intention to use NFC mobile payment for Generation Z and X.

3.2 Perceived ease of use

This concept is defined as “the degree to which a person believes that using a particular system would be effortless” [56]. So, perceived ease of use refers to how complicated the consumer considers paying by a mobile phone. Earlier research revealed that perceived ease of use positively impacts perceived usefulness [9, 81, 83]. Hence, perceived ease of use creates confidence and a positive attitude toward the technology, increasing the new technology’s perceived usefulness [20]. The size of the effect, however, can differ by age cohorts. Younger age cohorts tend to perceive the use of new technologies as easier [60]. Similarly, Shams et al. [73] found that Generation Z found mobile banking easier than Generation X because their cellphone is always available. Based on the above, the following hypothesis is proposed:

H₂: Perceived ease of use has a more positive impact on the perceived usefulness of NFC mobile payment for Generation Z than for Generation X.

3.3 Subjective norms

The concept of subjective norms is defined as “a person’s perception that most people who are significant to the person think the person should or should not use the system” [79]. Accordingly, people who are important to the consumer recognize the benefits of NFC mobile payment, and they would recommend it. Positive social influence can increase the perceived usefulness [84] and perceived ease of use of mobile payment technology [5, 82]. In previous research, subjective norms played a more important role for older generations than younger ones in learning mobile technology [85]. For that reason, the following hypotheses are preferred:

H₃: Subjective norms have a more positive impact on the perceived usefulness of NFC mobile payment for Generation X than for Generation Z.

H₄: Subjective norms have a more positive impact on the perceived ease of use concerning NFC mobile payment for Generation X than for Generation Z.

3.4 Compatibility

In the mobile payment literature, Schierz et al. (2010) studied the role of compatibility in accepting mobile payment. They conceptualized perceived compatibility as the reconcilability of innovation with existing values, behavioral patterns, and experiences [83]. If the perceived compatibility is high, it might speed up mobile payment adoption [1] because it overlaps with the user’s lifestyle and payment habits [14]. Consequently, compatibility with NFC mobile payment positively influences the intention to use this payment solution [7, 14]. McCrindle (2014) assumed that digital natives (Generation Z) reveal higher compatibility with mobile technology [30] than

previous generations such as Generation X. Therefore, the following hypothesis was formulated:

H₅: Perceived compatibility has a more positive impact on the intention to use NFC mobile payment for Generation Z than for Generation X.

3.5 Enjoyment

Besides functionality, consumers tend to have hedonic motivations when adopting new technologies [86]. Enjoyment is defined as “the fun or pleasure derived from using a technology” [60]. Paying with the NFC mobile solution is supposed to be funny and joyful. Earlier studies proved the impact of hedonic motivation on the intention to use NFC payment technology [87, 88]. Once consumers gain experience using various technologies, their technology anxiety will diminish, the consumer will feel enjoyment and playfulness using the technology [89]. Boonsiritomachai and Pitchayadejanant [90] proposed that hedonic motivation is the most important factor that motivates the younger generation to adopt mobile banking. Dalimunte et al. [22] found a significant, positive relationship between enjoyment and intention to use digital wallets among Generation Z consumers. Thus, the following hypothesis was formulated:

H₆: Enjoyment has a more positive impact on the intention to use NFC mobile payment for Generation Z than for Generation X.

3.6 Perceived risk

The perceived risk functions as a barrier to mobile payment acceptance since individuals who perceive risk will change their attitudes and behaviors to protect themselves [47]. Using mobile payment, consumers have to deal with financial and privacy risks [91]. On the one hand, financial risk refers to the perception of the possible monetary loss caused by mobile payment usage. On the other hand, privacy risk is the perception of the possible exposure of private information such as phone numbers, social security numbers, pin codes, consumption locations, and shopping records [91]. Both risks had a negative effect on the intention to use mobile payment [10, 14, 87, 88]. The older generation was usually more concerned about the security of mobile banking accounts and usage [73]. Therefore, digital immigrants (Generation X) are assumed to be more aware of the security issues of their financial transactions. In turn, Generation Z is less concerned about privacy and financial risks because they often omit basic security practices and share a large amount of personal information online [74]. The following hypotheses were formulated:

H₇: The perceived privacy risk has a less negative impact on the intention to use NFC mobile payment for Generation Z than for Generation X.

H₈: The perceived financial risk has a less negative impact on the intention to use NFC mobile payment for Generation Z than for Generation X.

4 Research methodology

Table 3 Operational definition of the model components

Model component	Operational definition	Source
<i>Perceived ease of use</i>	It is easy to become skillful at using NFC mobile payment system.	[83]
	Interactions with NFC mobile payment system are clear and understandable. (PEU1)	
	It is easy to follow all the steps to use the NFC mobile payment system (PEU2)	
<i>Perceived usefulness</i>	It is easy to interact with NFC mobile payment system (PEU3)	
	NFC mobile payment system is a useful mode of payment. (PU1)	[83]
	Using NFC mobile payment makes the handling of payments easier. (PU2)	
<i>Subjective norms</i>	NFC mobile payment system allows quick use of mobile applications. (PU3)	
	People who are important to me would recommend using the NFC mobile payment system. (SN1)	[83]
	People who are important to me view the NFC mobile payment system as beneficial. (SN2)	
<i>Compatibility</i>	People who are important to me think it is a good idea to use NFC mobile payment systems. (SN3)	
	The use of the NFC mobile payment system fits well with my lifestyle. (COMP1)	[83]
	NFC mobile payment use is consistent with the way I like to buy products and services. (COMP2)	
<i>Enjoyment</i>	I would appreciate using the NFC payment system over other kinds of payment systems. (COMP3)	
	Using NFC mobile payment is fun. (ENJ1)	[60]
	Using NFC mobile payment is enjoyable. (ENJ2)	
<i>Privacy risk</i>	Using NFC mobile payment is very entertaining. (ENJ3)	
	The privacy information by using an NFC mobile payment could be misused, inappropriately shared, or sold. (PR1)	[91]
	Personal information by using an NFC mobile payment could be intercepted or accessed. (PR2)	
	Payment information by using NFC mobile payment could be collected, tracked, and analyzed. (PR3)	
<i>Financial risk</i>	Privacy could be exposed or accessed when using NFC mobile payment. (PR4)	
	The use of NFC mobile payment would cause the exposure of capital accounts and passwords. (FR1)	[91]
	The use of NFC mobile payment would cause malicious and unreasonable charging occurs. (FR2)	
<i>Intention to use</i>	The use of NFC mobile payment can cause financial risk. (FR3)	
	Given the opportunity, I will use a mobile NFC payment system. (IU1)	[83]
	I am likely to use an NFC payment system in the near future. (IU2)	
	I am open to using NFC mobile payment system in the near future. (IU3)	
	I intend to use an NFC mobile payment system when the opportunity arises. (IU4)	

Our research aims to study the role of generation in accepting NFC mobile payment technology. Therefore, we conducted an online survey among Hungarian mobile phone users of Generation Z and X.

4.1 Operationalization of the variables

Components of the model were measured based on scales used in previous studies (Table 3).

This research adopted the birth years commonly found in most generational studies. Generations were defined based on the classification of McCrindle [30]. Thus, respondents born between 1965 and 1979 are considered Generation X. Respondents born between 1995 and 2010 belong to Generation Z. The influence factors of intention to use NFC mobile payment were measured based on scales applied in earlier studies. We assessed perceived usefulness, perceived ease of use, compatibility, and subjective norms, and intention to use mobile payment with multi-item scales developed by Schierz et al. [83]. Several mobile payment acceptance studies (i.e., Ramos de Luna et al. [5, 92] applied these scales. Enjoyment was measured by the scales created by Venkatesh et al. [60], perceived privacy and financial risks were quantified based on Yang et al. [91]. The items were measured by seven-point Likert scales (1: strongly disagree, 7: strongly agree). The questionnaire was pre-tested, whereby the scales performed well in terms of reliability.

4.2 Data collection and sample characteristics

For estimating the effects of mobile payment acceptance in the two generations, we conducted an online survey between March and June 2019. First, the authors developed the online questionnaire in English. Then, the questions and scales were translated into Hungarian. Subsequently, the online questionnaire was tested on a sample of 10 respondents. Only minor changes had to be made. We inserted a visual illustra-

Table 4 Demographic distribution of the subsamples

	Generation Z <i>Digital natives</i>		Generation X <i>Digital immigrants</i>	
	<i>Number</i>	<i>Percentage</i>	<i>Number</i>	<i>Percentage</i>
Sample size	301		279	
Average age	20.97 years		47.88 years	
Gender				
Male	112	37.2%	90	32.3%
Female	189	62.8%	189	67.7%
Education				
High school	5	1.7%	2	0.7%
Secondary school	164	54.5%	58	20.8%
Vocational	8	2.7%	52	18.6%
College	57	18.9%	66	23.7%
University	66	21.9%	84	30.1%
Post-graduate	1	0.3%	17	6.1%

tion of NFC mobile payment and fine-tuned some items to adjust them more to the Hungarian language. Based on the pre-test of the online questionnaire, we found that the content validity of the measurement tools is ensured. The questionnaire was developed and distributed using the Qualtrics software.

The research population consisted of Hungarian citizens owning smartphones. We used a non-probability sampling technique striving for equal shares for both generations because there was no commercially available database about Hungarian smartphone owners. The link to the Qualtrics questionnaire was shared across university students representing Generation Z and their parents. In sum, 708 respondents filled in the questionnaire. First, we cleaned the database because it included some Generation Y ($n=60$) and Boomer ($n=68$) respondents; they were excluded from the further analysis. After data cleaning, the final sample included 580 respondents. While Generation Z represented 51.9% ($n=301$), Generation X gave 48.1% ($n=279$) of the sample. Table 4 shows the demographic distribution of the respondents in the two subsamples.

In both generations, female respondents were somewhat overrepresented ($Z=62.8\%$, $X=67.7\%$) compared to men ($Z=37.2\%$, $X=32.3\%$). Unsurprisingly, Generation X revealed a higher share of higher education degrees (59.9%) than Generation Z (41.1%). 20.8% of Generation X finished secondary school (Generation Z = 54.5%). A low education level was rather untypical for both the younger ($Z=4.4\%$) and the older generations ($X=19.3\%$).

4.3 Method of data analysis

The authors applied multi-group structural equation modeling (SEM) to test the hypothesized relationships (Fig. 1). SEM models combine the benefits of confirmatory factor and regression analysis. First, the SEM estimates the factor loadings of the items to the constructs (measurement model). Next, the method estimates the regression weights between the constructs (structural model) [93]. Since our primary goal was to test theoretically founded relationships, we used a covariance-based SEM method [93]. Covariance-based SEM models minimize the differences between the observed and estimated covariance matrixes while confirming the proposed relationships [93].

Furthermore, we tested generational differences across models with multi-group analysis. Multi-group analysis in SEM models identifies whether data from subsamples (groups) fit the same or similar models. The authors conducted the multi-group, covariance-based SEM models using IBM AMOS 25 software. AMOS is one of the most advanced statistical packages for multi-group SEM analysis providing all the necessary measures to assess model fit, the measurement, and the structural model.

5 Research findings

The overall model revealed fit measures such as $\chi^2/df=1.859$, $RMSEA=0.039$, $SRMR=0.065$, $IFI=0.961$, $CFI=0.961$, $NFI=0.920$ that suggest a good model fit [94].

The measurement model was assessed by factor loadings, construct reliability, convergent, and discriminant validity of the constructs (Table 5). All items had high factor loadings ($\lambda > 0.7$), and Cronbach alpha measures ($\alpha > 0.7$) proved the high internal consistency of the constructs. Second, Composite Reliability (CR) values indicated high construct validity ($CR > 0.7$). Third, convergent validity was also supported since the average variance extracted (AVE) measures were larger than 0.5 for all constructs [93]. Fourth, AVE values justified the discriminant validity of the constructs since their values exceeded the squared multiple correlations with other constructs [95]. The correlation matrix between constructs (Table 6) indicated discriminant validity as well, as the correlation coefficients between constructs were lower than the square root of AVE values of the constructs [93].

Moreover, the construct items showed higher factor loadings in their own constructs than other constructs (Table 7). Therefore, the model's constructs meet the criterion of discriminant validity [93].

Since this study compares mobile payment acceptance between Generation Z and X, we need to ensure that the factor structure is invariant in both subsamples. For that reason, we used confirmative factor analysis [96], whereby the factor loadings were invariant for the two generations. Constraining the measurement weights for the two groups did not result in a lower fit ($\chi^2 = 25.259$, $df = 20$, $p = 0.192$). Common method variance was examined because single respondents provided data for all constructs [97]. The Harman single-factor method explained less than 50% of the total variance and resulted in an ill-fitted model. The marker variable [98] did result in low correlations with other constructs (Usefulness = -0.020, Ease of use = -0.029, Compatibility = 0.126, Enjoyment = 0.163, Subjective norms = 0.128, Privacy risk = 0.086, Financial risk = 0.114, Intention = 0.096).

The structural models were compared by constraining the regression weights to be equal in the model [99]. The analysis resulted in a significant difference of the constrained from the unconstrained model ($\chi^2 = 288.308$, $df = 56$, $p = 0.000$). Moreover, we tested each parameter by constraining them to be equal. Finally, critical ratios for parameter differences were calculated using a bootstrapping method with a sample size of 2000. The structural models revealed high explained variances. For Generation Z, the explained variance of intention to use was 0.74. and for Generation X 0.68. We assessed the structural model by standardized regression weights, t -values, and their significance levels (Table 8).

First, both generations revealed significant positive relationships ($\beta_Z = 0.209$, $p_Z = 0.000$; $\beta_X = 0.279$, $p_X = 0.000$) between perceived usefulness and the intention to use NFC mobile payment technology. The more valuable the respondents found mobile payment, the higher was their intention to use the new payment method. However, no statistical difference was detected (t value = 0.154) in the effect sizes between the two generations. Consequently, perceived usefulness exerted a similar impact on the intention to pay by NFC mobile technology. Therefore, Hypothesis 1 should be rejected.

Second, the perceived ease of use increased the perceived usefulness of NFC mobile payment in both generations. (The explained variance of perceived usefulness was 0.41 for Generation Z and 0.61 for Generation X.) However, the effect sizes differed significantly between the two generations ($\beta_Z = 0.392$, $p_Z = 0.000$; $\beta_X = 0.569$,

Table 5 Factor loadings, Cronbach alpha, CR, and AVE values of the measurement model

Measurement and items	Factor loadings	Cronbach alpha	Composite Reliability	AVE
Subjective norms(SN)		0.932	0.847	0.834
People who are important to me would recommend using the NFC mobile payment system.	0.886			
People who are important to me view the NFC mobile payment system.	0.929			
People who are important to me think it is a good idea to use NFC mobile payment systems.	0.900			
Perceived ease of use(PEU)		0.940	0.808	0.789
It is easy to become skillful at using NFC mobile payment system.	0.847			
Interactions with NFC mobile payment system are clear and understandable.	0.900			
It is easy to follow all the steps to use the NFC mobile payment system.	0.914			
It is easy to interact with NFC mobile payment system.	0.890			
Perceived usefulness(PU)		0.893	0.763	0.734
NFC mobile payment system is a useful mode of payment.	0.864			
Using NFC mobile payment makes the handling of payments easier.	0.878			
NFC mobile payment system allows quick use of mobile applications.	0.828			
Compatibility(COMP)		0.882	0.703	0.657
The use of the NFC mobile payment system fits well in my lifestyle.	0.778			
NFC mobile payment use is consistent with the way I like to buy products and services.	0.841			
I would appreciate using the NFC payment system over other kinds of payment systems.	0.812			
Enjoyment(EN)		0.937	0.848	0.836
Using NFC mobile payment is fun.	0.872			
Using NFC mobile payment is enjoyable.	0.953			
Using NFC mobile payment is very entertaining.	0.917			
Privacy risk(PR)		0.894	0.713	0.672
The privacy information by using an NFC mobile payment could be misused, inappropriately shared, or sold.	0.894			
Personal information by using an NFC mobile payment could be intercepted or accessed.	0.883			
Payment information by using NFC mobile payment could be collected, tracked, and analyzed.	0.668			
Privacy could be exposed or accessed when using NFC mobile payment.	0.813			
Financial risk(FR)		0.833	0.628	0.559
The use of NFC mobile payment would cause the exposure of capital accounts and passwords.	0.689			
The use of NFC mobile payment would cause malicious and unreasonable charging occurs.	0.710			
Careless use of NFC mobile payment could lead to a surprising loss.	0.738			

Table 5 (continued)

Measurement and items	Factor loadings	Cronbach alpha	Composite Reliability	AVE
The use of NFC mobile payment can cause financial risk.	0.844			
Intention to use(IU)		0.964	0.869	0.861
Given the opportunity, I will use a mobile NFC payment system.	0.933			
I am likely to use an NFC payment system in the near future.	0.918			
I am open to using NFC mobile payment system in the near future.	0.929			
I intend to use an NFC mobile payment system when the opportunity arises.	0.931			

Table 6 Correlation coefficients of the constructs

	SN	PEU	PU	COMP	ENJ	PR	FR	IU
SN	<i>0.913</i>							
PEU	0.467	<i>0.888</i>						
PU	0.551	0.685	<i>0.857</i>					
COMP	0.721	0.337	0.397	<i>0.811</i>				
ENJ	0.631	0.295	0.348	0.803	<i>0.915</i>			
PR	-0.305	-0.143	-0.168	0.380	-0.282	<i>0.819</i>		
FR	-0.209	-0.098	-0.115	-0.334	-0.183	0.769	<i>0.748</i>	
IU	0.652	0.410	0.531	0.813	0.665	-0.379	-0.341	<i>0.928</i>

Note: The values in the diagonal represent the square root of AVEs

$p_X=0.000$). Generation X respondents perceived much higher usefulness if they found the NFC mobile payment method easier to use (t value=2.315). Hypothesis 2 proposed that the effect size will be larger for Generation Z than for Generation X, which should be rejected.

Moreover, subjective norms were assumed to affect positively perceived usefulness and ease of use. In our research, subjective norms had a significant positive impact on the perceived usefulness of mobile payment ($\beta_Z=0.362$, $p_Z=0.000$; $\beta_X=0.286$, $p_X=0.000$). Thus, the optimistic view and recommendation of significant others improved the perceived usefulness of NFC mobile payment without significant difference (t value=0.534) between the two. In consequence, H_3 should be rejected. Similar to perceived usefulness, the subjective norms positively influenced the perceived ease of using NFC mobile payment for both generations ($\beta_Z=0.427$, $p_Z=0.000$; $\beta_X=0.498$, $p_X=0.000$). This suggested that social influence plays a vital role in perceiving how difficult to use mobile payment. (The explained variance of perceived ease of use was 0.65 for Generation Z, 0.61 for Generation X.) However, Generation X revealed a significantly stronger effect size than Generation Z (t value=2.307, $p=0.05$). Thus, the social influence increased the perceived ease of use to a greater extent in this generation compared to Generation Z. For that reason, H_4 could be accepted.

Perceived compatibility was a strong predictor of the using NFC mobile solutions for generation X ($\beta_X=0.505$, $p_X=0.000$) and Z ($\beta_Z=0.884$, $p_Z=0.000$). The differ-

Table 7 Cross-loadings of construct items

	SN	PEU	PU	COMP	ENJ	PR	FR	IU
SN_1	0.886	0.414	0.488	0.639	0.559	-0.270	-0.185	0.577
SN_2	0.929	0.434	0.512	0.670	0.587	-0.284	-0.194	0.606
SN_3	0.900	0.420	0.496	0.649	0.568	-0.275	-0.188	0.587
PEU_1	0.396	0.847	0.580	0.285	0.250	-0.121	-0.083	0.347
PEU_2	0.420	0.900	0.617	0.303	0.265	-0.128	-0.088	0.369
PEU_3	0.427	0.914	0.626	0.308	0.270	-0.130	-0.089	0.375
PEU_4	0.415	0.890	0.609	0.300	0.262	-0.127	-0.087	0.365
PU_1	0.477	0.594	0.867	0.344	0.301	-0.146	-0.100	0.460
PU_2	0.483	0.602	0.878	0.349	0.305	-0.148	-0.101	0.466
PU_3	0.456	0.567	0.828	0.329	0.288	-0.139	-0.095	0.440
COMP_1	0.561	0.262	0.309	0.778	0.625	-0.295	-0.260	0.632
COMP_2	0.607	0.283	0.334	0.841	0.675	-0.319	-0.281	0.683
COMP_3	0.586	0.274	0.323	0.812	0.653	-0.308	-0.271	0.660
ENJ_1	0.550	0.257	0.303	0.700	0.872	-0.246	-0.159	0.579
ENJ_2	0.601	0.281	0.331	0.765	0.953	-0.269	-0.174	0.633
ENJ_3	0.579	0.270	0.319	0.736	0.917	-0.259	-0.167	0.609
PR_1	-0.273	-0.127	-0.150	-0.339	-0.252	0.894	0.687	-0.339
PR_2	-0.270	-0.126	-0.148	-0.335	-0.249	0.883	0.679	-0.335
PR_3	-0.204	-0.095	-0.112	-0.254	-0.189	0.668	0.514	-0.253
PR_4	-0.248	-0.116	-0.137	-0.308	-0.229	0.813	0.625	-0.308
FR_1	-0.144	-0.067	-0.079	-0.230	-0.126	0.530	0.689	-0.235
FR_2	-0.148	-0.069	-0.082	-0.237	-0.130	0.546	0.710	-0.242
FR_3	-0.154	-0.072	-0.085	-0.247	-0.135	0.567	0.738	-0.251
FR_4	-0.176	-0.082	-0.097	-0.282	-0.154	0.649	0.844	-0.287
IU_1	0.609	0.383	0.496	0.759	0.620	-0.354	-0.318	0.933
IU_2	0.599	0.377	0.488	0.746	0.610	-0.348	-0.313	0.918
IU_3	0.606	0.381	0.493	0.755	0.617	-0.352	-0.316	0.929
IU_4	0.607	0.382	0.495	0.757	0.619	-0.353	-0.317	0.931

ence in the effect sizes is significant (t value = 3.077, p = 0.000). In line with the initial assumption (H_5), perceived compatibility exerted a much stronger effect on the intention to use NFC mobile payment for Generation Z than X.

Enjoyment revealed an unexpected effect on the intention to pay by NFC mobile technology. Generation Z seemed to be not influenced by hedonic motivation ($\beta_Z = -0.211$, $p_Z = 0.105$). In turn, Generation X's intention to use this payment method increased slightly but significantly ($\beta_X = 0.186$, $p_X = 0.004$) when NFC mobile payment offers some fun and joy for them. Hence, we proposed that enjoyment has a more positive impact on using NFC mobile payment for Generation Z than for Generation X. Therefore, H_6 should be rejected.

Privacy risk did not significantly affect the intention to use in neither generation. As a result, we had to reject H_7 . In turn, Generation X was affected by financial risk when they used their mobile phones to pay for goods and services ($\beta_X = -0.141$, $p_X = 0.058$). For Generation Z, however, the financial risk did not influence the intention to use NFC mobile payment ($\beta_Z = 0.025$, $p_Z = 0.798$). Accordingly, H_8 could be accepted.

Table 8 Estimated coefficients and t-values of the structural models by generations

Generation	Standardized regression weights (β)		t-values		
	Z	X	Z	X	Comparison
H ₁ : Usefulness → Intention	0.209***	0.279**	4.341	6.083	0.154 ^{ns}
H ₂ : Ease of use → Usefulness	0.392***	0.569***	6.094	9.060	2.315*
H ₃ : Subjective norms → Usefulness	0.362***	0.286***	5.903	5.029	0.534 ^{ns}
H ₄ : Subjective norms → Ease of use	0.427***	0.489***	7.048	7.817	2.307*
H ₅ : Compatibility → Intention	0.884***	0.505***	5.509	6.676	-3.077*
H ₆ : Enjoyment → Intention	-0.211 ^{ns}	0.186**	-1.619	2.846	2.710*
H ₇ : Privacy risk → Intention	-0.133 ^{ns}	0.062 ^{ns}	-1.507	0.825	1.686 ^{ns}
H ₈ : Financial risk → Intention	0.025 ^{ns}	-0.141*	0.256	-1.985	-1.304 ^{ns}

Notes: Significance levels *** (p<0.001), ** (p<0.01), * (p<0.05), ns: non-significant

6 Discussion

The estimated structural equation models pointed to significant generational differences in mobile payment acceptance.

First, we found that perceived ease of use showed a stronger relationship with perceived usefulness for Generation X than Z. The finding suggested that the digital immigrants (Generation X) attached higher usefulness to NFC mobile payment if the usage is clear, understandable and the payment steps are easy to follow. In contrast, the digital natives (Generation Z) were on ease of using mobile technology [66]. This factor seemed to be less critical when Generation Z consumers evaluated the usefulness of a payment method based on mobile technology. A further explanation can be that Zers perceived mobile payment as a matured technology. In this case, perceived ease of use lost its effect on perceived usefulness and behavioral intention [100].

Second, subjective norms had a more positive impact on Generation X's perceived ease of use than Generation Z. Social influence is usually more important to older generations in learning to use mobile technology [9, 11].

Third, the relationship between financial risk perception and intention to use the NFC mobile payment revealed generational differences. While financial risk negatively influenced the NFC mobile payment for Generation X, we could not find the same effect for Generation Z. Digital immigrants (Generation X) were more con-

scious about the exposure of account information or malicious charging. This result can be explained by Generation X consumers being more risk-avoidant [32] and more experienced with financial services such as cashless payment [101]. In turn, digital natives (Generation Z) were not concerned about risks related to using digital devices that corroborates the finding of Debb et al. [74].

In the case of Generation Z, perceived compatibility had the strongest effect on the intention to use NFC mobile payment. The effect size was much larger than for Generation X consumers. This result can be supported by the fact that digital natives prefer to use primarily mobile technology [73]. Furthermore, Generation Z uses their mobile phone as a problem-solving tool [17]. In sum, mobile-based services fit more the lifestyle of Gen Z consumers since they consider the use of mobile applications as spontaneous solutions [73].

Surprisingly, hedonic motivation had a stronger impact on the intention to pay by NFC mobile solution among Xers than Generation Z respondents. This result was in contrast to previous findings that younger consumers pay more attention to the hedonic motivation of the mobile Internet than older age cohorts [60]. Thus, the mobile payment acceptance of Generation X was driven not only by utilitarian purposes [78], but Xers perceived joy and fun regarding this new technology.

Finally, some influence factors had very similar effects on the mobile payment acceptance of the two generations. For example, the impact of perceived usefulness on the intention to use did not vary across Generation X and Z. Consequently, the intention to use NFC mobile payment of both digital immigrants and natives increases to a similar extent if they perceive the technology as more practical. Similarly, Shams et al. [73] identified only minor differences between the two generations in perceiving the usefulness of mobile banking. Moreover, subjective norms affected the perceived usefulness of the new payment technology in both generations to a similar extent. Although earlier research proposed that younger generations are less influenced by their significant others [85], subjective norms had a similar effect on perceived usefulness in both generations.

At last, perceived privacy risk did not affect the intention to use NFC payment for neither generation. This finding was somewhat surprising in the Generation X group since they claimed to be more risk-avoidant [32] and revealed higher perceived risk in mobile banking [73]. The result, however, is less striking for Generation Z because they tend to care less about privacy issues than Generation X [74].

7 Conclusions

This paper aimed to study the differences in the NFC mobile payment acceptance between Generation X and Z. Our research findings had theoretical and business implications.

7.1 Theoretical contributions

Our research took forward existing mobile payment acceptance research in two ways. First, we contributed to the NFC mobile payment acceptance research by including

generational cohorts that help understand and explain the individual differences in NFC mobile payment. Venkatesh [23] pointed out that technology acceptance literature lacks rich moderator variables that go beyond simple demographic attributes [4]. Indeed, generational cohorts can be considered rich moderators because each generation represents complex behavioral patterns [28]. Hence, generation cohorts comprise several factors (i.e., age, attitude toward digital technologies, innovativeness) influencing the consumers' mobile payment acceptance.

In our mobile payment acceptance study, the generational dissimilarities can be traced back to distinct experiences with digital technology and payment methods. On the one hand, Generation Z and X were exposed to digital and mobile technology at different stages of their lives that vary the technology acceptance [102]. Generation Z represents a native digital social group that never experienced a life without digital technologies. They use their smartphones in multiple situations [38]. Consequently, compatibility with their smartphone use had the most substantial impact on accepting NFC mobile payment technology. In turn, Generation X represents digital immigrant consumers who learned to use mobile technology [43]. Therefore, perceived ease of use played a critical role in the perceived usefulness of NFC mobile payment in this generation. On the other hand, the two generations were unlike in their experience with payment methods. Generation X consumers accumulated substantial experience with cashless payments. This explains that digital immigrant consumers were more concerned about the financial risk of mobile payment. For the digital native Zers, financial and privacy risks turned out to be insignificant regarding NFC mobile payment. In sum, Generation X and Z revealed different experiences with mobile technology and payment method that influence their intention to use NFC mobile payment.

Second, this paper adds novelty to the previous research by comparing two generations (X and Z), which is relatively rare in the mobile payment literature because previous mobile payment studies focused on single generations [21, 22]. In addition, broader technology acceptance literature focused on younger generations such as Generation Z and Y. The comparison between more distant generations is sporadic. Hence, we provided evidence about the NFC mobile payment acceptance between the digital immigrant (X) and native generations (Z), representing distinct attitudes toward digital technology and payment methods.

7.2 Business implications

Our research findings have important implications for banks, credit card companies, mobile payment service providers, and retailers. Generation Z and X represent large consumer segments for the mobile payment market. Therefore, understanding the drivers of their mobile payment acceptance leads to more effective marketing strategies. For Generation X, marketing programs should emphasize perceived ease of use leading to higher perceived usefulness and a higher likelihood to use the NFC mobile payment. Digital immigrants will perceive mobile payment as easier to use if mobile payment service companies provide convenient, fast mobile payment applications that make this innovative payment method more user-friendly. Since Xers are more influenced by their significant others' opinion in perceiving technology as easy to

use than Generation Z, marketing programs based on social influence are critical. For example, encouraging reference groups to share their experiences through offline and online word-of-mouth might play a crucial role in convincing digital immigrant consumers [103]. Enjoyment contributed to the adoption of NFC mobile payment to a greater extent for Generation X than Z as well. To increase consumers' excitement and joy about new technology, application developers should come up with a user-friendly interface that is pleasant, fun, and exciting, triggering positive feelings in consumers. Finally, Generation X is more likely to use this new payment method if telecommunication companies, retailers, and banks can reassure consumers about the low financial risk of NFC mobile payment. This might happen if marketing communication includes third-party security certifications and ways to protect mobile wallets, similarly to traditional bank cards [5].

In contrast, the digital native Generation Z can be convinced by emphasizing compatibility with their lifestyle to increase NFC mobile payment acceptance. Thus, mobile payment applications should be well-suited with mobile usage and purchase habits. User-unfriendly and incompatible interfaces reduce NFC mobile payment use [104]. Zers have a strong bond with their smartphones and use them as an everyday problem-solving tool. For that reason, marketing communication should emphasize the high level of reconcilability with their lifestyles that make NFC mobile payment highly convenient for digital native consumers.

7.3 Limitations and future direction of the research

This research has several limitations. First, the data was collected by a cross-sectional survey that is not able to capture the diffusion of NFC mobile payment acceptance among the two generations. Second, the online survey occurred before the pandemic and could not capture the impact of COVID on using mobile payment. Third, our research studied NFC mobile payment for general purchase situations.

Future research might build on longitudinal research that would provide more insights into how the importance of mobile acceptance factors had changed due to higher mobile payment penetration. Thus, comparison before, during, and after the pandemic would enhance understanding of how COVID influenced mobile payment acceptance. A new research avenue could be opened by considering mobile payment as an ecosystem of customers, telecommunication, credit card providers, and retailers. This approach could extend mobile payment acceptance models by factors related to the mobile network, credit card, and retail services. Finally, future research might take into account the relationship between generations that might affect the use of mobile payment. For example, Generation Z and X often represent parent and child relationships that would allow the study of how mobile payment acceptance is diffused within the family.

On behalf of all authors, the corresponding author states that there is no conflict of interest.

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