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THE INFLUENCE OF MOBILE APPLICATIONS ON CUSTOMER LOYALTY IN OMNICHANNEL RETAIL

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Modern customer loyalty programs are increasingly based on new technologies and forms of rewards, in which sense customer loyalty programs are increasingly implying the use of mobile applications not only as a means of collecting and realizing points, but also as a means ensuring ease of purchase, the personalization of the offer and entertainment through various types of prize games. Based on these facts, the paper explores the influence exerted by mobile applications on customer trust and loyalty in omnichannel retail. The research draws on Self-Determination Theory to explain the influence of autonomy, competence and relatedness as the key needs of people as customers on their trust and loyalty. The empirical research conducted using the survey method and carrying out SEM analysis showed that mobile applications significantly affected customer loyalty, with the moderators such as age and membership duration in the loyalty program playing a significant role in the process. The research results suggest that customers value the mobile applications that provide them with a sense of autonomy, i.e. control over the purchasing process, strengthen their existing competences and enable them to acquire new ones, making possible connectedness and friendship with other members of the program, thus generating their confidence in the quality and reliability of the mobile application and strengthening customer loyalty to the seller.

Keywords: mobile applications, customer loyalty, trust, omnichannel retail, loyalty programs, SEM analysis

JEL Classification: M31

INTRODUCTION

The digitalization process and trade digital transformation have led to significant changes in the business done by retail chains, one of these changes being visible in sale and communication with customers, since - in addition to traditional sales channels (such as physical stores, kiosks, direct mail) - new channels (such as social networks, mobile applications, location-based services and the so-called gaming consoles) are also used in retail chains (Shi, Wang, Chen & Zhang, 2020). All said is indicative of the application of an omnichannel strategy in retail, which attracts a lot of attention from researchers in

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this field. Omnichannel retail is a comprehensive retail strategy integrating all channels across different digital technologies so as to deliver the best customer experience. This is an advancement beyond omnichannel retail, which includes offline and online channels separately, while the omnichannel approach seeks to achieve consistent goals across all channels (Verhoef, Kannan & Inman, 2015). So, full channel integration is the essence of an omnichannel strategy.

Previous research has shown that an omnichannel retail strategy can be effective in building customer loyalty (Hussein & Kais, 2020; Mainardes, Rosa & Nossa, 2020), for which reasons many companies have integrated traditional and new, i.e. offline and online, channels and all have the aim to provide a superior experience to customers (Kocić, Šapić & Sofronijević, 2022). Customer loyalty is the result of the quality of offline and online channel integration (Quach, Barari, Moudrý & Quach, 2020). The very quality of integration in an omnichannel strategy is critical to delivering a superior customer experience and is determined by how it is perceived by customers through the integrated performance of all retail channels. A customer-centric omnichannel strategy enables seamless transitions between different channels throughout the buying experience (Verhoef *et al*, 2015). Synergy effects generation is an anticipated outcome of this strategy since the retailer synchronizes various channels, therefore attaining synergies through combined use of channels (Wang & Lee, 2020).

Research indicates that the attitudes developed in the offline environment are carried over to online platforms. Trust in offline sales has a positive influence on trust in online sales (Bruneau, Swaen & Zidda, 2018) and loyalty towards offline channels is positively linked to loyalty towards online channels (Frasquet & Miquel, 2017). A. Timoumi, M. Gangwar and M. K. Mantrala (2022) point out that previous research has mainly explored the shift from offline to online channels, whereas interest in the influence of online channels on offline is growing. S. A. Neslin (2022) emphasizes that marketing actions may trigger frequent cross-channel effects. This is how the so-called transference theory was born, which is used in marketing and links customer attitudes towards advertising with attitudes towards brands, arguing that the influence of one object can be transferred to another closely related object through a cognitive or unconscious.

The implementation of omnichannel strategies in retail has led a few researchers to identify the factors that lead to customer trust and loyalty in the mobile environment and explore the influence of mobile applications on building customer trust and stimulating repeat purchases. This research study aims to determine if the use of mobile applications enhances customer's perception of autonomy in the shopping process (McLean, 2018; Zhang, Wang, Anjum & Mu, 2022), improves the feeling of competence and information during the purchase (Molinillo, Aguilar-Illescas, Anaya-Sánchez & Carvajal-Trujillo, 2022), and fosters a sense of belonging and friendship within the framework of the loyalty program (Gwinner, Gremler & Bitner, 1998). Additionally, the research aims to examine how these factors are manifested in customer trust in the application and loyalty towards the firm. This research study is aimed at determining the potential moderating effects of age and membership tenure on the relationship between the use of a mobile application and customer trust and loyalty in loyalty programs. The empirical study was carried out based on survey methodologies, and the collected data were analyzed using a structural equation model. The anticipated findings indicate that the use of mobile applications enhances customer confidence in loyalty programs and fosters vendor loyalty. Specifically, younger customers and those with longer membership tenures are expected to exhibit higher levels of trust and loyalty.

The paper is structured into a few sections. After the introductory considerations, a literature review of the specifics and factors of customer loyalty in an omnichannel environment is given, and Self-Determination Theory as the basis for an analysis of the influence customer experience with mobile applications has on their trust and loyalty to the seller. Based on the literature review and previous empirical research, the hypotheses are defined, and the research model is presented. The results of the

empirical research and the key contributions made by the research are summarized in the final part of the paper based on the discussion, and certain limitations are identified as well.

LITERATURE REVIEW

Customer loyalty in an omnichannel environment

The existing literature provides a lot of definitions of customer loyalty. Given the growing digitalization and digital transformation, the question arises as to how customer loyalty is understood in the context of the digital environment. According to one definition, customer loyalty is their favorable behavior towards a company, which is manifested through repeat purchases from the same seller, a preference for a particular brand, and positive recommendations (Zeithaml, Berry & Parasuraman, 1996). Customer loyalty is a crucial concern for retail chains (Rokonuzzaman, Harun, Al-Emran & Prybutok, 2020) and refers to customers' inclination to make repeat purchases and support a specific retailer over an extended period (Liu-Thompkins, Khoshghadam, Attar Shoushtari & Zal, 2022) and reflects customers' readiness to regard one particular seller as their optimal choice, provide favorable reviews, and recommend them to others (Zeithaml *et al*, 1996).

The proliferation of operations in omnichannel business methodologies which facilitate customer-seller communication has added to the intricacy of the purchasing experience and influenced customer loyalty (Gao, Fan, Li & Wang, 2021). According to D. Herhausen, K. Kleinlercher, P. C. Verhoef, O. Emrich and T. Rudolph (2019), effective management of intricate customer activities requires a comprehensive understanding of customer loyalty across different online and offline channels used by customers to engage with the organization. Several studies on online customer behavior have revealed multiple variables that influence client loyalty towards online merchants. Several factors that influence customer experience include customization, interactivity, interface design, the community, information, incentives, a product range, an overall image of the seller (Srinivasan, Anderson & Ponnavolu, 2002), satisfaction, reputation (Gutiérrez Rodríguez, Villarreal, Cuesta Valiño & Blozis, 2020), website quality, usability, ease of use (Purani, Kumar & Sahadev, 2019), and perceived value (Molinillo *et al*, 2022). Furthermore, the study conducted by A. Bleier, C. M. Harmeling and R. W. Palmatier (2019) that investigates the influence of user experience on customer loyalty in both offline and online retail services highlights the comprehensive nature of customer experience, which encompasses customer responses to interactions with a brand or company, irrespective of the attributes of the channel itself. Nevertheless, in an omnichannel setting, the objective should be expanded beyond just considering the influence of user experience on their loyalty towards a specific retail channel (such as a physical store, website, app, social media) to encompass loyalty towards the retailer as an organization or brand.

Prior research examining the correlation between customer experience with mobile apps and their loyalty to the seller has demonstrated a favorable influence of the variables including application engagement (McLean, 2018), the application attitude (McLean, Osei-Frimpong, Al-Nabhani & Marriott, 2020), and application experience (Molinillo, Navarro-García, Anaya-Sánchez & Japutra, 2020). However, no sufficient research has been conducted in the Republic of Serbia with the focus on how the use of a mobile application affects customer trust in the application itself and their loyalty to the seller who develops such loyalty programs, starting from autonomy, competence and relatedness, as people's key needs according to Self-Determination Theory. In this sense, the paper is expected to contribute to overcoming the identified gap and be the basis for future research related to the relationship between customer experience and a mobile application, customer trust and loyalty in the omnichannel environment.

The importance of Self-Determination Theory in the analysis of the influence of mobile applications on customer trust and loyalty

The marketing literature, particularly the literature on customer loyalty research in the digital environment, shows an increasing significance of the self-determination concept pertaining to the beneficial influence on individuals' higher life satisfaction (Purohit, Arora & Paul, 2022). Self-Determination Theory (Deci & Ryan, 2000) posits that an individual's subjective well-being is attained when their fundamental psychological needs for autonomy (their perception of freedom and control over personal actions), competence (their sense of their own ability and skill), and relatedness (the need to integrate into society) are fulfilled. The utility of this theory in comprehending the subjective well-being is demonstrated by its superior predictive ability of human behavior in comparison to other behavioral models. Furthermore, the current body of literature indicates that consumption experiences can have a substantial influence on subjective well-being (Ekici, Sirgy, Lee, Yu & Bosnjak, 2018). Shopping can be characterized as a clearly favorable experience resulting in the broadening of the notion of subjective well-being to encompass the so-called "well-being". This expression of well-being pertains to the documented influence of shopping in shopping malls on contentment in the crucial aspects of life, such as customer life, social life, leisure, and community life, leading to a comprehensive evaluation that a shopping mall makes a substantial contribution to the overall quality of life (El Hedhli, Becheur, Zourrig & Chaouali, 2021). The authors suggest that shoppers' well-being is derived from subjective well-being and various shopping experiences have the potential to evoke emotional reactions enhancing the overall quality of life. The application of Self-Determination Theory can enhance our understanding of the development of *shopping well-being*, which is a distinct domain of life and a substantial outcome of subjective well-being.

The self-determination concept highlights autonomy as an inherent and fundamental need that individuals endeavor to fulfill through their experiences. Autonomy is the conviction that people maintain the freedom to decide on their own actions in each circumstance. In the purchasing context, autonomy refers to the customer's conscious or unconscious perception of having freedom and control over the buying process (Shen, Wan & Li, 2023). Within the realm of the use of mobile applications, autonomy pertains to the way customers perceive their ability to make personal choices while engaging with an application which arises from their perceived level of control. Extending upon this hypothesis, mobile applications are seen to frequently provide customers with an enhanced perception of autonomy in managing their shopping experience. As described by M. Kleijnen, K. D. Ruyter and M. Wetzels (2007), control refers to the degree to which customers may decide on the timing, content, and order of a transaction. This attribute is the fundamental feature of mobile applications and elucidates why their use might enhance customers' sense of autonomy. The evidence indicates that retail applications, i.e. software applications, especially created to provide a positive shopping experience and streamline the buying and selling of goods or services (McLean, 2018), can promote customer independence. This hypothesis is corroborated by the study conducted by L. Zhang *et al* (2022), wherein they found that a significant degree of user pleasure within the realm of mobile payment applications leads to the augmentation of their self-assurance in terms of autonomy.

Competence is another key need according to Self-Determination Theory. It refers to the sense of effectiveness and achievement - the sense of effectiveness in interacting with the environment and support for the development of individual capacities (Deci & Ryan, 2000). It differs from autonomy, which refers to our feeling that we are the source of our actions. Competence is established by an individual's capacity to effectively utilize both environmental and personal resources, in which context mobile applications are an environmentally friendly resource customers can use to improve their competence. In retail, mobile applications allow customers to access information, thus being more informed about the store and its products, which improves their shopping experience (Molinillo *et al*, 2022).

Relatedness is the third key need according to Self-Determination Theory. People's need to connect with other people is related to their biological and cultural evolution and the result of their concern for themselves and their families. As people's environment has changed and become more complex, this need has become more intense over time and the ways of fulfilling it have changed, too. The tendency to connect shows that a social group with a higher level of cohesion provides significantly greater protection to an individual within the group than a social group with less cohesion of members does (Stevens & Fiske, 1995). However, the need for relatedness may conflict with the need for autonomy, in which sense the autonomy of a person (individual integration) and the aspiration to connect (the integration of an individual into society) can be complementary in optimal circumstances; otherwise, they can become antagonistic. In the context of the research in customer experience with mobile applications, relatedness - as a necessity means - that customers join such loyalty programs so as to create a sense of belonging and friendship with other members (Gwinner *et al*, 1998). In accordance with the foregoing, the following hypotheses were defined:

H1: As the dimensions of a mobile application, autonomy, competence and relatedness have a positive and significant influence on customer trust in a mobile-application-based loyalty program.

H2: As the dimensions of a mobile application, autonomy, competence and relatedness have a positive and significant influence on customer loyalty.

Customer trust is the key predictor of customer loyalty - increased customer engagement with mobile applications does not only mean collecting points and realizing them when making purchases, but also participating in creative activities, such as sweepstakes and entertainment (Danaher, Sajtos & Danaher, 2016). Participation in such activities creates a surprise effect and brings intangible rewards, such as obtaining a privileged status or travel. T. Kunkel, D. Lock and J. P. Doyle (2021) confirm that new customer experiences within mobile applications play the key role in the development of customer loyalty. Based on the theoretical conclusions that customer trust leads to greater loyalty, the following hypothesis can be defined:

H3: Trust in a mobile-application-based loyalty program has a positive and significant influence on customer loyalty.

Previous research has found that older customers and those with longer loyalty program memberships often exhibit different behavior patterns compared to younger customers and new members, which affects their perceptions of the benefits offered by loyalty programs, trust, and vendor loyalty (Lambert-Pandraud & Laurent, 2010; Halwani, 2021). Younger customers are more likely to embrace new trends in purchasing and consumption, especially those related to new technologies (Halwani, 2021). Younger customers are more likely to change their shopping habits, as a result of the need to adapt to a dynamic social environment. In particular, their perceptions of the utilitarian and hedonistic benefits they gain from being tied to a particular vendor are different from those of older customers. It has empirically been confirmed that members of different age groups perceive the benefits of loyalty programs differently (Zhang *et al*, 2022), especially when the acceptance of more modern forms of reward realized through mobile applications is concerned (Đukić, Sokolov Mladenović & Stanković, 2023). A survey conducted in Bosnia and Herzegovina showed that the respondents between 26 and 35 years of age expressed a more intense preference for loyalty programs in banking compared to the other age groups (Ozenis & Peštek, 2016).

The starting point for including membership duration in loyalty programs as another moderation variable is the fact that loyalty programs are essentially aimed at rewarding and encouraging the existing customers to make repeat purchases and reinforcing their attitudes towards the seller on that basis. Purchase history is an essential basis for structuring the incentives of conventional loyalty programs. It has been empirically confirmed that advertising the

benefits of loyalty programs has significantly greater effects on customers enrolled in the program for a longer period of time (Maity & Gupta, 2019). Taking into account the previous results of the research, yet another hypothesis was defined:

H4: Age and membership duration in the loyalty program play a significant moderating role on customer trust and loyalty.

Based on the literature review, the analysis of previous research and the established research hypotheses, a conceptual research model can be defined as shown in Figure 1.

RESEARCH METHODOLOGY

In order to test the defined hypotheses and the research models, a questionnaire was made, containing the questions related to *autonomy*, *competence* and *relatedness* as the three dimensions of a mobile application representing the independent variables, as well as the *trust in the loyalty program* and *customer loyalty to the seller* as the dependent variables. In addition, the research model includes age, as the demographic characteristic of the respondents, and membership duration in the loyalty program as the moderating variables. The data used in this paper were collected with the help of an online questionnaire on a random sample. First of all, the questionnaire is structured to contain general data, such as gender, age, education, employment status, as well as the initial questions related to the use of mobile applications, such as whether they are members of the loyalty program including a mobile application and how long they have been members of such a program. The next segment of the questionnaire contains the statements related to the independent and dependent variables rated by the respondents using a five-point Likert scale. The assertions related to autonomy were taken from the paper of C. Raab, O. Berezan, A. S. Krishen and S. Tanford (2016), those related to competence were adapted according to J. Hwang and L. Choi (2020), and those pertaining to relatedness were adapted according to J. So, C. Achar, D. Han, N. Agrawal, A. Duhachek and D. Maheswaran (2015). The statements related to customer trust were taken from the authors P. Gurviez and M. Korchia (2002) and V. Swaen and C. R. Chumpitaz (2008), and the statements related to customer loyalty were taken from A. Chaudhuri and M. B. Holbrook (2001).

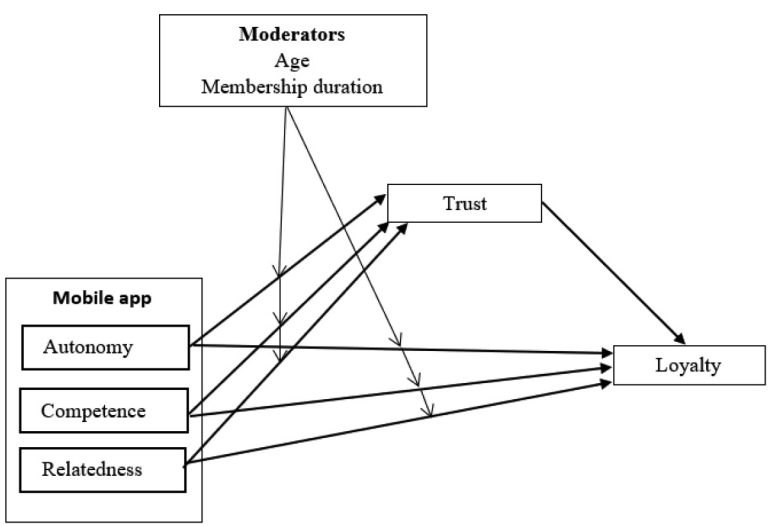

Figure 1 The conceptual research model

Source: Authors

Once the surveys had been collected, statistical data processing was performed in the IBM SPSS and AMOS programs. Descriptive statistics, exploratory factor analysis (EFA), confirmatory factor analysis (CFA), and SEM analysis were used to test the connections in the research models. The moderating influence of age and membership duration in the loyalty program was also analyzed.

The sample characteristics

The empirical research was carried out in the territory of Serbia in the period from January 8th to November 5th, 2023. The sample contained 250 respondents included in the survey using the *Google Forms*. Based upon the analysis of the demographic characteristics of the respondents, it can be concluded that there are more female respondents (76.8%) participating in the sample than the male respondents (23.2%). Regarding

Table 1 The values of the descriptive statistics

Statements	Mean	SD	N of Items/Sorce
Autonomy			3
I feel special about being a member of the loyalty program. (1)	3.68	1.439	C. Raab *et al* (2016)
As a member of the loyalty program, I receive personalized offers. (2)	4.05	1.142	C. Raab *et al* (2016)
As a member of the loyalty program, I receive special discounts and bonuses. (3)	4.06	1.265	C. Raab *et al* (2016)
Competence			3
Loyalty programs allow me to participate in prize games. (1)	3.85	1.120	J. Hwang and L. Choi (2020)
Loyalty programs provide me with creative rewards. (2)	3.85	1.143	J. Hwang and L. Choi (2020)
Loyalty programs provide me with innovative rewards. (3)	4.09	1.040	J. Hwang and L. Choi (2020)
Relatedness			3
Membership in the loyalty program provides me with the same privileges as membership in a social club does. (1)	3.68	1.342	J. So *et al* (2015)
Membership in the loyalty program contributes to my identity. (2)	3.31	1.691	J. So *et al* (2015)
I share information with other loyalty program members. (3)	3.96	1.227	J. So *et al* (2015)
Customer trust			
I believe in the honesty (accuracy) of the information I receive through the loyalty program. (1)	4.13	1.217	V. Swaen and C. R. Chumpitaz (2008)
Loyalty purchases are reliable. (2)	4.35	1.085	V. Swaen and C. R. Chumpitaz (2008)
I have confidence in the loyalty program which I am a member of. (3)	4.28	1.073	P. Gurviez and M. Korchia (2002)
Customer loyalty			4
I am committed to the companies which I have a loyalty program membership with. (1)	4.33	1.066	A. Chaudhuri and M. B. Holbrook (2001)
I would pay a higher price to companies which I have a loyalty program membership with. (2)	4.04	1.355	A. Chaudhuri and M. B. Holbrook (2001)
I will recommend to others the company where I have membership in the loyalty program. (3)	4.37	.976	A. Chaudhuri and M. B. Holbrook (2001)
I intend to continue to buy from companies which I have a loyalty program membership with. (4)	4.43	1.007	A. Chaudhuri and M. B. Holbrook (2001)

Notes: SD - Standard Deviation.

Source: Authors

the respondents' age structure, the largest part of the respondents belonged to the category of those between 20 and 30 years of age (47.2%), while the respondents between 31 and 40 years of age and the respondents over 40 years of age were approximately evenly represented in the sample - 26.8% and 26%, respectively. With respect to the educational structure of the sample, most respondents notably have a university degree (54%), only to be followed by the respondents with a college diploma (27.6%) and the fewest with a high-school diploma (18.4%). The majority of the respondents included in the sample were employed (80%), only to be followed by the students (18%) and the pensioners (2%).

RESEARCH RESULTS

Research tool validation

Homogeneity and heterogeneity between the respondents' attitudes were determined applying descriptive analysis; for each statement included in the research study, the values of the arithmetic mean and the standard deviation were calculated. The internal consistency of the variables, i.e. statements, was checked by calculating the values of the Cronbach alpha coefficient and the values of the factor loadings. In addition, Table 1 contains the results of the confirmatory factor analysis.

By analyzing the values of the descriptive statistics, it can be concluded that all investigated factors (the dimensions of a mobile application, customer trust and loyalty) exert an influence on their behavior when they use mobile application services. The assertion of the *customer loyalty* variable, *I intend to continue to buy from companies which I have a loyalty program membership with*. (4.43) has the highest value of the arithmetic mean, whereas the lowest (3.31) is identified in the assertion of the *relatedness* dimension, *Membership in the loyalty program contributes to my identity*. Based on the value of the standard deviation, it can be said that the respondents' attitudes are the most homogeneous in the assertion *I will recommend to others the company where I have membership in the loyalty program* (the standard deviation .976). The greatest heterogeneity of the attitudes is perceived in the assertion of the *relatedness* dimension, *Membership in a loyalty program contributes to my identity* (the standard deviation 1.691).

The internal consistency of the variables, i.e. the assertions, was checked by calculating the values of the Cronbach alpha coefficient and the values of the factor loadings. Also, the application of exploratory factor analysis was aimed at checking the reliability and validity of the research model (Table 2).

First, the results show that the values of the Cronbach alpha coefficient for each variable in the model exceed 0.7, based on which it can be concluded that there is good internal consistency (Nunnally, 1978). The value of the KMO test for all the variables in the research model exceeds the value threshold of 0.5 and the variables have a statistically significant p value of 0.000 (Harrington, 2009). Given the fact that all the analyzed variables are explained by a single factor,

Table 2 The results of the exploratory factor analysis

Variables	Cronbach's Alpha	KMO and Bartlett's tests	Sig.	Total variance explained
Autonomy	0.862	0.646	.000	78.88
Competence	0.920	0.697	.000	86.41
Relatedness	0.912	0.700	.000	86.11
Customer trust	0.920	0.730	.000	86.61
Customer loyalty	0.908	0.778	.000	80.43

Notes: KMO Test - The Kaiser-Meyer-Olkin Test

Source: Authors

that shows the compatibility of all the findings within the variables (the explanation is shown in the *Total variance explained* column). A higher *Total variance explained* value means that the analysis results are better explained. The results obtained in this way were also confirmed by the Principal Components Method, given the fact that the value of the KMO test was statistically significant at 0.864. After the factor rotation (*oblimin*), five factors were singled out - autonomy, competence, relatedness, customer trust and customer loyalty. They are shown in Table 3. The values of the factor loadings for all the assertions in the model account for over 0.7, except for one assertion (*I receive special discounts and bonuses as a member of the loyalty program*) (Autonomy3), whose value is 0.699.

Finally, the average extracted variance (AVE) and composite reliability (CR) values were analyzed, which are only significant if the AVE value is above the level of 0.5, i.e. the CR value is above the level of 0.7 (Fornell & Larcker, 1981). It can be said that the convergent validity of the model has been achieved considering that the value of the AVE for each variable in this research model is greater than 0.5, whereas the composite reliability value of all the variables in the analyzed model is greater than 0.7.

Measurement Model Evaluation

The research model developed based on the descriptive statistics, reliability analysis and the CFA and EFA is shown in Figure 2.

The created research model implies a validity check. Primarily, the $\chi 2/df$ indicator that should have a value lower than 5 was used (Marsh & Hocevar, 1985). Then, the NFI, IFI, TLI, CFI indicators indicate a better validity of the model the closer the value is to 1; in the research model, they have the following values: NFI (.949), IFI (.945), TLI (.925), CFI (.954). Finally, only the RMSEA indicator is not within the recommended value, but the analysis can be continued considering that deviations of one or two fall within acceptable parameter limits. Therefore, based on the given parameters whose values are within the recommended range, it can be concluded that the research model meets the acceptability level and that the validity assumptions are met.

Table 3 The rotated component matrix

	Component				
	1	2	3	4	5
Autonomy1	.997				
Autonomy2	.822				
Autonomy3	.699				
Competence1		.809			
Competence2		.955			
Competence3		.925			
Relatedness1			.825		
Relatedness2			.935		
Relatedness3			.909		
Customer trust1				.955	
Customer trust2				.964	
Customer trust3				.974	
Customer loyalty1					.944
Customer loyalty2					.893
Customer loyalty3					.971
Customer loyalty4					.956

The extraction method: Principal Component Analysis. The rotation method: Oblimin with Kaiser Normalization. Rotation converged in 9 iterations. KMO= 0.864; Sig. 0.000

Source: Authors

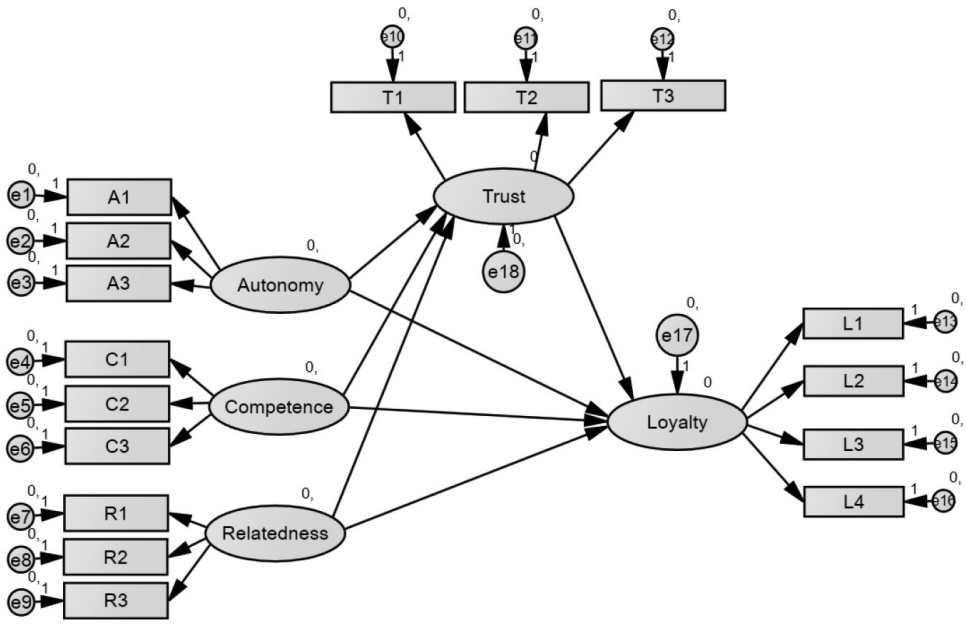

Figure 2 The research model

Source: Authors

Table 4 The results of the confirmatory factor analysis

Variables	AVE	CR
Autonomy	.720	.883
Competence	.797	.922
Relatedness	.794	.920
Customer trust	.930	.976
Customer loyalty	.886	.969

Notes: AVE - the average variance extracted; CR - composite reliability

Source: Authors

Structural model evaluation

The results of the tested connections between the researched variables in the structural equation model are shown in Table 5, based on which certain conclusions can be drawn. By testing the first hypothesis, significant values were obtained showing that the use of a mobile application has a positive effect on customer trust, which indicates that the hypothesis H1 is confirmed. Partly observed, the dimensions of a mobile application have the following values: *autonomy* (B = .888, p < .000), *competence* (B = .966, p < .000) and *relatedness* (B = .914, p < .000). Furthermore, the second hypothesis was related to the research in the relationship between the use of a mobile application and customer loyalty. Based on the results obtained, it can be said that the use of a mobile application has a significant positive influence on customer loyalty, which confirms the hypothesis H2. The dimensions of a mobile application perceived in relation to customer loyalty have the following values: *autonomy* (B = .634, p < .000), *competence* (B = .940, p < .000) and *relatedness* (B = .688, p < .000). The third hypothesis examined the direct relationship between customer trust and loyalty. Based on the in-depth results, it can be concluded that there is a significant and positive direct relationship between customer trust and loyalty (B = .408, p < .003). Accordingly, the hypothesis H3 is confirmed.

The coefficient of determination R2 in the given research model shows that 93.4% of the variability of the *loyalty* dependent variable is explained by the stated research model, while 6.6% is influenced by the other extreme factors not explained by the research model.

The fourth hypothesis analyzed the moderating role of age and membership duration in the loyalty program. The results shown in Table 6 show the moderating effect of age on customer trust, based on which a conclusion can be drawn that the respondents classified into the younger age category have a higher level of trust in the services provided by mobile applications. The identical results are obtained by one-way analysis of variance (ANOVA), in the SPSS statistical program. Furthermore, the moderating effect of membership duration in the loyalty program has a statistically significant effect on the respondents' trust. Namely, if membership in the loyalty program increases by one unit (year), the respondents' trust increases by .038 units. Then, the years of age and membership in the loyalty program have a significant moderating role on customer loyalty because the p value for age is less than .001 and for membership duration, it is less than .005, based on which it can be concluded that an increase in age by one unit (i.e. a year) generates a decrease in customer loyalty towards the use of a mobile application by .512 units, whereas, if membership in a loyalty program increases by one unit (i.e. a year), customer loyalty increases by .487 units. The results are also confirmed by applying the ANOVA analysis - the younger respondents are more loyal, and membership duration proportionally affects customer loyalty. Accordingly, it can be concluded that the hypothesis H4 is confirmed.

Table 5 The SEM analysis

Hypotheses	Observed relationship		Estimate	Statistical significance (p)	Result	R^2
Hypothesis 1	A	Trust	.888	.000	Accepted	0.934
	C	Trust	.966	.000		
	R	Trust	.914	.000		
Hypothesis 2	A	Loyalty	.634	.000	Accepted	
	C	Loyalty	.940	.000		
	R	Loyalty	.688	.000		
Hypothesis 3	Trust	Loyalty	.408	.003	Accepted	

Notes: A - Autonomy, C - Competence, R- Relatedness

Source: Authors

Table 6 Testing the relationship in the model (SEM) - the moderation effects

Dependent	Moderators	Mobile application	
		Estimate	Statistical significance (p)
Customer trust	Age	.614	.000***
	Membership duration	.038	.000***
Customer loyalty	Age	-.512	.000***
	Membership duration	.487	.003*

Notes: p < .000***, p < .001** p < .005*

Source: Authors

DISCUSSION

The conducted empirical research allows for discussion of the obtained results based on the connections established between the analyzed variables in the model. Overall, all the three dimensions of a mobile application have a positive effect on *customer trust* in mobile applications and *customer loyalty* to the seller as the independent variables. Also, the moderating influence shows that age and membership duration in the loyalty program have a significant influence on the independent variables. Accordingly, the hypotheses H1, H2, H3 and H4 are confirmed.

The first hypothesis tested shows that the implementation of a mobile application positively affects customer trust in the loyalty program they are included in, which means that, as the key dimensions of a mobile application, autonomy, competence and relatedness create customer trust in a mobile application. The results obtained are in agreement with the previous research that confirmed the positive influence of the service quality offered by mobile applications on customer trust (Wahyoedi, Saparso, Tecoalu & Winoto, 2021). Similarly to the prior research studies, the research done by C. Y. Li (2018) shows that an increasing number of customers are switching from using conventional loyalty cards to mobile applications, which confirms the assumption of customer trust in them.

The second hypothesis tested confirmed that the use of a mobile application within a loyalty program has a significant influence on customer loyalty. Thus, mobile applications provide customers with a positive experience, strengthen autonomy, increase competence and emotional and social relatedness with other members and the company and/or brand as well, in which way customers perceive the mobile application as a set of interactive and unique incentives capable of making them stay loyal in the long run. The results obtained in this way are in agreement with previous scientific research which shows that, in order for modern customer loyalty programs to succeed, it is necessary not only to have loyalty cards, but also to intensify and diversify more the engagement of customers themselves (Bruneau *et al*, 2018), which is achieved through customer participation in prize and other creatively designed games (Danaher *et al*, 2016) and receiving various rewards based on their connecting with the other members of the program (Rehnen, Bartsch, Kull & Meyer, 2017).

The third hypothesis tested the direct influence of trust on customer loyalty, and the results show a significant and positive influence between these two variables, which means that trust is an important predictor of customer loyalty, which was confirmed by the research conducted (Kolte, Pawar, Sangvikar & Sawant, 2021). The authors B. Lu and Z. Chen (2021) concluded that customer trust in them and the seller itself is important for the use of mobile applications. Also, according to B. Kim, Y. Chen and D. Kim (2023), customer trust has a significant influence on customer loyalty, which means that customer trust is the key factor in the formation of customer loyalty because it enables their positive perceptions of transactions and the other pre- and post-purchase activities that can be carried out through a mobile application.

The moderating influence of age and membership duration in the loyalty program is extremely pronounced in terms of creating customer trust and loyalty. Namely, as a demographic characteristic of customers, age affects the connection between the variables in the model and that difference is evident with the increase in the respondents' age, i.e. they positively affect an increase in customer trust and negatively affect a decrease in customer loyalty. On the other hand, the results related to the moderating influence of membership duration in the loyalty program show that one more year of the membership increases customer trust by .038 units, and customer loyalty by .487 units. The results obtained in this way are in agreement with the results of the research showing that younger respondents have a greater tendency to use the incentives of modern loyalty programs than the older do (Lambert-Pandraud & Laurent, 2010; Halwani, 2021; Zhang *et al*, 2022), while membership duration in the program loyalty has an important moderating role between advertising effectiveness and customer loyalty (Maity & Gupta, 2016).

CONCLUSION

The analysis of the theoretical attitudes and the research conducted enables the elaboration of appropriate conclusions and the formulation of managerial implications for the importance of the modern loyalty programs that integrate the services provided by mobile applications. Namely, the research conducted shows that, as the dimensions of mobile applications, autonomy, competence and relatedness have a significant influence on customer trust and loyalty, thus confirming the hypotheses H1, H2 and H3. Additionally, the hypothesis H4 was confirmed by the moderation effect - age, as a demographic characteristic, and membership duration in the loyalty program exert a significant influence on customer trust and loyalty, which further means that customers perceive the service of a mobile application as reliable and valuable and that establishes a connection between them both and the company, allowing for their satisfaction of their own needs. Structuring the loyalty program through a mobile application also means adapting it to certain generational groups, bearing in mind the fact that younger respondents show a greater inclination towards innovations and novelties, which is in agreement with previous research (Halwani, 2021). On the other hand, it is necessary to differentiate the incentives based on membership duration in the loyalty program because membership determines the level of customer loyalty in retail (Maity & Gupta, 2016).

The key contribution of this research is reflected in the fact that the analysis of the influence of autonomy, competence and relatedness (as the independent variables) on customer trust and loyalty (as the dependent variables) was carried out using different statistical methods to validate the results. The main implications of the research results for omnichannel retail managers include the following assertions

1) The use of mobile applications has a positive effect on customer trust and loyalty.

2) The respondents' age and membership duration in the loyalty program show that there are differences between certain categories of customers in generating customer trust and loyalty,

3) Customers value the mobile applications that provide them with a sense of autonomy, competence and relatedness, which strengthens customer trust in their usefulness and leads to their increased loyalty to the retailer.

The research carried out in the paper has certain limitations. The first limitation refers to the sample size, which reduces the generalization of the conclusions and comparison with previous research. In addition to expanding the sample, recommendations for further research imply carrying out the investigation of additional factors in the analysis in order to do research in the relationships between the variables that were the subject matter of the research conducted in this paper. In that sense, future research studies should include certain incentives within mobile applications as the independent variables and the moderator variables, such as respondents' gender, education and economic power, which would enable a more complete insight into customers' perceptions of the incentive structure of mobile applications and a perception of the differences in customer reaction to them based on their relevant demographic and economic characteristics. Finally, the results of this research study provide significant insights for the managers in omnichannel retail who want to improve customer loyalty through mobile applications, as well as the academic public engaged in researching this issue.

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