



EDUCATIONAL DETERMINANTS OF ONLINE BANKING ADOPTION IN BOSNIA AND HERZEGOVINA

Original scientific paper

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ABSTRACT

This study aims to empirically investigate the determinants of online banking adoption in Bosnia and Herzegovina. The data presented in this paper was collected via a survey from 321 randomly selected banking users in Bosnia and Herzegovina. The survey was developed based on the Technology Acceptance Model (TAM) framework to test the constructs and their ability to predict consumers' behavioral intentions. All gathered data was processed and analyzed using the AMOS software version 24. We performed the Structural Equation Modeling (SEM) for path analysis to estimate the strength of the hypothesized relationships among the determinants. The findings indicate a significant impact of Attitude, Perceived Usefulness, and Perceived Ease of Use on consumers' Intention to Use online banking services. Further, the research has proven that Perceived Usefulness and Perceived Ease of Use impact consumers' Attitudes toward online banking adoption. The path analysis result suggests that Perceived Usefulness strongly mediates the relationship between Perceived Ease of Use and Attitude.

Keywords: *Technology Acceptance Model, Online Banking, Perceived Usefulness, Perceived Ease of Use, Attitude, Intention to Use*

INTRODUCTION

Online banking is a form of banking done over the internet, which enables users to transact (transfer funds, pay bills), access any of the bank services (apply for a loan, deposit checks, or other services), and manage their bank account via your computer or mobile phone. Online banking appeared for the first time in the 1980s, and its usage increased when internet usage started in homes (Cartwright, 2000, as cited by Sanli & Hobikoğlu, 2015). The first online banking application was developed in the U.S.A in 1996 (Gefen & Straub, 2005, as cited by Sanli & Hobikoğlu, 2015). Such activities started in Bosnia and Herzegovina only in the 2000s by eliminating constraints for the implementation of online banking, such as the high cost of infrastructure (costs of computers, internet, software, security issues, and others) (A. Husejnovic & M. Husejnovic, 2021).

Online banking positively reduces the operational costs of banks. It also improves banking service and boosts customer retention (Couto, T. Tiago, & F. Tiago, 2013; Furst et al., 2000). However, despite all the advantages of online banking, the adoption rate in many countries has not risen as strongly as expected (White & Nteli, 2004). Since many studies worldwide examine the determinants of Online banking adoption, it is essential to replicate this study in Bosnia and Herzegovina. As no current studies are analyzing this topic in Bosnia and Herzegovina, the results will contribute to the theory's advancement and development. On the other hand, the practical contributions of this study are expected to help bank management make more informed decisions concerning their product development, sales, and marketing strategies.

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LITERATURE REVIEW

This study is based on the Technology Acceptance Model (TAM). TAM was proposed by Fred Davis in 1986 and designed to describe consumers' adoption of information systems or technologies. According to his framework, the use of a technology is directly driven by the consumers' intention to use it, which is influenced by users' attitudes toward the system and the system's perceived usefulness.

Different studies replicated this model to test the Adoption of online banking in countries around the world. Hence, to replicate the model, it was necessary to research the following determinants and the relationship between them: Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Attitude (A), and Intention to Use (IU).

Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Attitude (ATT), Intention to Use (IU)

In the following paragraphs, definitions of factors and studies that examined the variables from the current study will be mentioned.

Perceived usefulness (PU) is known as one of the independent constructs in the Technology Acceptance Model (TAM). In this framework, Perceived Usefulness (PU) is defined as "the degree to which a person believes that using a particular system would enhance his/her job performance" (Davis, 1989, as cited by Kim & Hyung, 2014). As per the TAM framework, PU is hypothesized to be the direct predictor of behavioral intention to use a technology (Park et al., 2014, as cited by Hamid et al., 2016). Previous studies indicate that PU positively correlates with the intention to use new technologies such as instant messaging acceptance (Wang, Ngai, & Wei, 2012).

Furthermore, according to Davis (1986), **Perceived Ease of Use (PEOU)** is defined as "the degree to which a person believes that using a technology will be free from effort. "Perceived ease of use can be described as an individual's belief that using a particular IT would be free of effort, both physical and mental (Davis, 1986).

Secord and Bakman (1969) defined **Attitude (A)** as: "Certain regularities of an individual's feelings, thoughts, and predispositions to act toward some aspect of his environment." Furthermore, an attitude can be defined as a predisposition to respond favorably or unfavorably to objects, situations, or persons in our environment. When we like or dislike something, we are, in effect, expressing our attitude toward the person or object (Sackett, Burris, & Callahan, 1989).

Davis (1986) states that **Intention to Use** reflects the strength of the prospective user's intention to make or to support the usage decision in their mind (Lee, 2003). Further, behavioral intention refers to the motivational factors that influence a given behavior where the more substantial the intention to perform the behavior, the more likely the behavior will be performed (Lee, 2003).

Perceived Usefulness (PU) and Attitude (ATT)

A study by Chen et al. (2002) concluded that: "The users' perception of usefulness determines attitude towards using a new information system and that attitude is, in turn, a key determinant of actual usage of the new information system." Moreover, perceived usefulness is believed to affect a person's favorable or unfavorable attitudes towards it (Eriksson, Kerem, & Nilsson, 2005).

Studies conducted by Lai and Yang (2009) concluded that employees in a performance-oriented e-business context are generally implemented for good performance and benefits. Comparably, if users realize the usefulness of online banking systems, it would positively impact their attitudes toward their adoption. Many existing studies have validated the effect of perceived usefulness on attitude (Chen, Gillenson, & Sherrell, 2002).

Perceived Usefulness (PU) and Intention to Use (IU)

People will use a particular application if they feel their performance will be enhanced. Otherwise, they will not tend to use it (Davis, 1989, as cited by Daradkeh & Al-Dwairi, 2017). Different studies found that PU affects users' intention to adopt new concepts, such as e-commerce (Pavlou, 2003; Gefen, Karahanna, & Straub, 2003).

Additionally, many previous studies pointed out that PU positively and significantly impacted users' intention to use s-commerce (Hajli, 2013; Gatautis et al., 2014, as cited by Daradkeh & Al-Dwairi, 2017).

Perceived Ease of Use (PEOU) and Attitude (ATT)

Fishbein and Ajzen (1975) state that "attitude towards actual usage is determined by an expectancy of how easy the user thinks he can use the system." Besides, the complexity of one system will become the inhibitor that discourages the adoption of an innovation (Rogers, 1995).

The existing studies suggest that perceived ease of use significantly determines an individual's attitude towards system usage.

Perceived Ease of Use (PEOU) and Perceived Usefulness (PU)

Davis (1986) advocated that there is a significant relationship between perceived ease of use and perceived usefulness. According to Davis, perceived ease of use directly affects perceived usefulness (Davis, 1986, as cited by Schor et al., 2010).

Studies confirm that the two constructs, perceived usefulness and perceived ease of use, are highly correlated but different. Perceived usefulness directly impacts the intention to use, while perceived ease of use is less important in predicting behavioral intentions but rather contributes to the general consumer attitude towards the technology (Davis et al., 1989).

Attitude (ATT) and Intention to Use (IU)

Behavioral intention is likely to be positive by users with positive attitudes and perceived usefulness towards the new technology, all else being equal (Davis et al., 1989). According to many conducted studies, attitudes are highly associated with behavioral intentions (Mengli, 2008).

As per TAM, attitude involves judgment of whether the behavior is good or bad and whether the user is in favor or against performing it. Attitude directly affects the intention to use internet banking (Jones & Leonard, 2014).

RESEARCH MODEL AND HYPOTHESES

Based on the examined literature and the TAM model, the following hypotheses were constructed to measure the determinants and the relationship among them, and their impact on Online Banking adoption:

H1: Customers’ Attitude has a significant impact on the customers’ intention to use Online Banking.

H2a: Perceived Usefulness has a significant impact on customers’ intention to use Online Banking.

H2b: Perceived Usefulness has a significant impact on customers’ Attitudes towards the adoption of Online Banking.

H3: Perceived Ease of Use has a significant impact on customers’ Attitudes toward the adoption of Online Banking.

H4a: Perceived Ease of Use has a significant impact on Perceived Usefulness.

H4b: Perceived Usefulness mediates the relationship between Perceived Ease of Use and Attitudes towards the adoption of Online Banking.

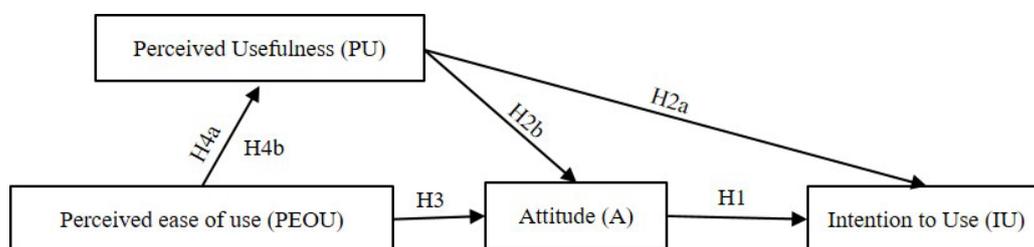


Figure 1: Proposed Research Model

METHODOLOGY

Data Collection

The data for this research was collected from bank users in Bosnia and Herzegovina. We distributed the survey online using Google Forms. The respondents were randomly approached online via social media groups and fan pages of the most famous banks in Bosnia and Herzegovina. Three hundred twenty-one (321) respondents have completed the survey and self-reported their behaviors and intention to use online banking in their daily life.

While constructing a useful measurement instrument for this study, we adopted the measurement tool developed and validated in other similar studies, such as the study by Edwin Cheng et al. (2006).

The survey is divided into two main parts; the first part assesses the demographic profile and business information to ensure data validity. While the second part, divided into five sub-parts, consists of statements that helped determine what contributes to online banking adoption in Bosnia and Herzegovina.

The answers were measured using the Likert scale ranging from 1 (Strongly Disagree) to 7 (Strongly Agree).

Population and Sample Size

While we were able to gather three hundred and twenty-one (321) responses for this study, it is essential to remember that the number of bank customers in Bosnia and Herzegovina is substantially larger.

According to the latest reports of the Central Bank of Bosnia, the number of active users reported in 2020 was 2,170,556.00.

Arguably, this can be considered a small sample size, which could decrease the accuracy and reliability of the collected data. However, this sample size is considered adequate to conduct the statistical analysis and as well as adequate to be manageable.

STATISTICAL METHODS APPLIED

For this study Structural Equation Modeling (SEM) was applied based on the recommendation and procedures proposed by Koufteros (1999) as used by Cheng, Lam, and Yeung (2006).

First, an evaluation at the item level using the tests for convergent validity and item reliability was performed. Once a satisfactory model was achieved, we assessed the model fit and unidimensionality.

Next, we evaluated the data for discriminant validity, composite reliability, and variance extracted to gain confidence in the measurement scales. We tested the structural model by employing Confirmatory Factor Analysis (CFA). Subsequently, we used Baron and Kenny’s test to analyze the mediation. Lastly, we conducted Sobel’s (1982) test to further confirm the mediation analysis.

Validity, Reliability, and Model Fit

Particular items of scales were factor analyzed via CFA using AMOS version 24 to analyze the dimensionality of the study scales. CFA determines how well the study sample supports the factor structure of the scales. The model was re-specified to include correlated errors (Byrne, 2010). Following Cheng et al. (2006), only those error terms were correlated whose factor loading items are higher than and above 0.4, as shown in Figure 2. CFA was performed to analyze the model's suitability (PEOU, PU, ATT, and IU). Which showed the good fit [$\chi^2(556.4)/df(159) = 3.5$, CFI = .95, TLI = .94, RMSEA = .088, RMR = .082] between the measurement and the data collected, only RMSEA and RMR were marginally above the criteria (Fabrigar, MacCallum, Wegener & Strahan, 1999). The results of CFA analysis are summarised in Table 1 below.

Table 1: CFA Model Fit Results

Index	Criteria	Literature	Result
Chi ² / df	< 4	Marsh and Hocevar (1985)	556.4/159 = 3.5
SRMR	< .08	Hu and Bentler (1999)	.082
RMSEA	< .08	MacCallum et al. (1996)	.088
CFI	> .90	Bentler (1990)	.95
TLI	> .90	Bentler and Bonett (1980)	.94

Composite Reliability, Convergent Validity, and Discriminant Validity

Typically, Cronbach Alpha is used to assess the reliability of the measure but owing to the underestimation problem with Cronbach's Alpha there is a need for a more significant estimation of true reliability (Garson, 2012). Such estimation is done through construct/composite reliability (CR). As shown in Table 2, our model adequately met the acceptable values for both Cronbach's Alpha and CR, i.e., > 0.7 for confirmatory purposes (Sarstedt, Ringle, & Hair, 2017). In addition, the factor loadings of our scales were also above the criteria value of 0.7 (Sarstedt et al., 2017). See Figure 2 for details.

Table 2: Construct Validation

	Cronbach's α	CR	AVE	Discriminant Validity (DV) - HTMT			
				PU	PEOU	ATT	IU
PU	.940	.941	.801	-			
PEOU	.930	.931	.771	.790	-		
ATT	.943	.943	.806	.846	.811	-	
IU	.927	.924	.754	.868	.894	.887	-

DESCRIPTIVE STATISTICS

Out of the three hundred twenty-one (321) respondents that submitted the survey, 77.9% were female; 22.1% were male. Most respondents (35.5%) were in the 31-45 age group, 32.7% were 19-30 years old, 23.4% were 46-60, 7.2% were younger than 18, and only 1.2% were older than 60 years.

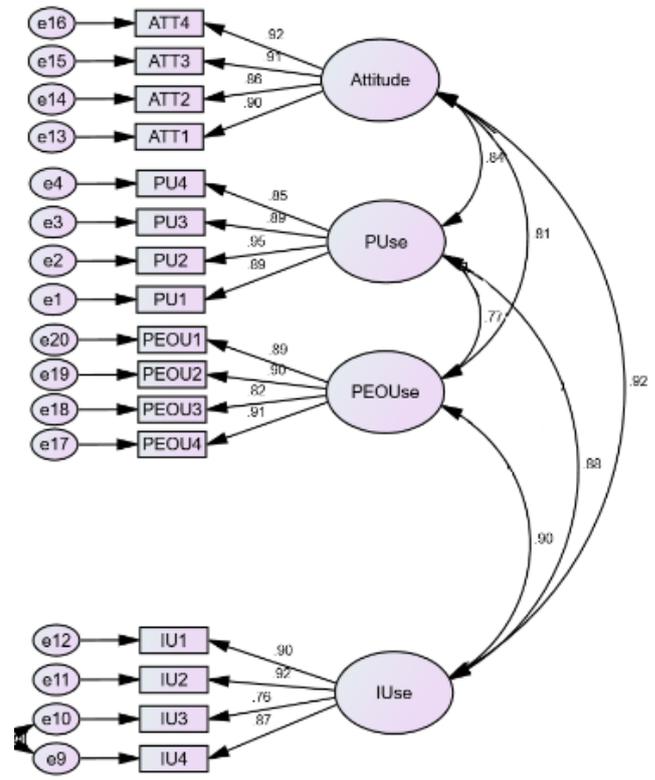


Figure 2: CFA Graphical Model

For convergent validity, the AVE (average variance explained) should be greater than 0.5 (Höck & Ringle, 2006). The AVE values in Table 2 are well within limits to prove the convergent validity of the constructs. Furthermore, discriminant validity (DV) was tested. DV is defined as the degree to which a particular latent construct is dissimilar from other latent variables (Duarte & Raposo, 2010). We used the Heterotrait-Monotrait Ratio (HTMT) of the correlations. Discriminant validity is violated when the HTMT is > 0.90 (Sarstedt et al., 2017). Table 2 indicates that all the HTMT values were less than 0.90.

Table 3: Demographics of the respondents

Gender	Frequency	Percent
Male	71	22.10
Female	250	77.90
Total	321	100.00
Education level		
Vocational Degree	26	8.10
High-School Degree	101	31.50
Bachelor's degree	115	35.80
Postgraduate Degree	44	13.70
Other	35	10.90
Respondent industry		
Academics	68	21.20
Finance	28	8.70
IT related	13	4.00
Retail	34	10.60
Manufacturing	27	8.40
Tourism	8	2.50
Other	143	44.50
Length of using Online Banking services		
1 year	67	20.90
2 years	35	10.90
3 years	31	9.70
I am not using Online Banking services.	119	37.10
More than 3 years	69	21.50
Frequency of using Online Banking services		
1 - 5 times per month	124	38.60
5 - 10 times per month	32	10.00
11 and more times per month	39	12.10
Never	126	39.3

STRUCTURAL EQUATION MODELING (SEM)

Primarily, the fit of individual parameters in the hypothesized model was tested to determine the viability of their estimated values. The results supported that parameter estimates exhibit the correct sign and size. The results indicate that the estimates were normal and acceptable, as shown in Figure 3.

Before testing the study hypotheses, the fitness of the SEM model was checked. It showed satisfactory results on the four-factor path model [$\chi^2(639)/df(162) = 3.95$, CFI = .94, TLI = .93, RMSEA = .096, RMR = .106],

similar to the measurement, CFA model, RMSEA and RMR in our structural model were also marginally above the criteria (Fabrigar et al., 1999), see Table 1, for reference values on these fitness indices.

We utilized bias-corrected bootstrapping with 95% confidence intervals (i.e., lower-level confidence interval or LLCI, and upper-level confidence interval or ULCI) and standardized path estimates to test our hypotheses. The hypotheses' results related to the model's direct effects are presented in Table 4. The results suggest that all five hypotheses related to the direct effects were supported.

Table 4: Hypotheses Testing Results – Direct Effects

Path in the Model	Estimate	LLCI	ULCI	Direct Effect (P-value)	Status
ATT → IU	.466	.269	.680	.000	H1: Supported
PU → IU	.320	.149	.524	.001	H2a: Supported
PU → ATT	.492	.298	.681	.002	H2b: Supported
PEOU → ATT	.331	.121	.511	.008	H3: Supported
PEOU → PU	.793	.714	.852	.001	H4a: Supported

Note 1: *Significant at 95% confidence interval

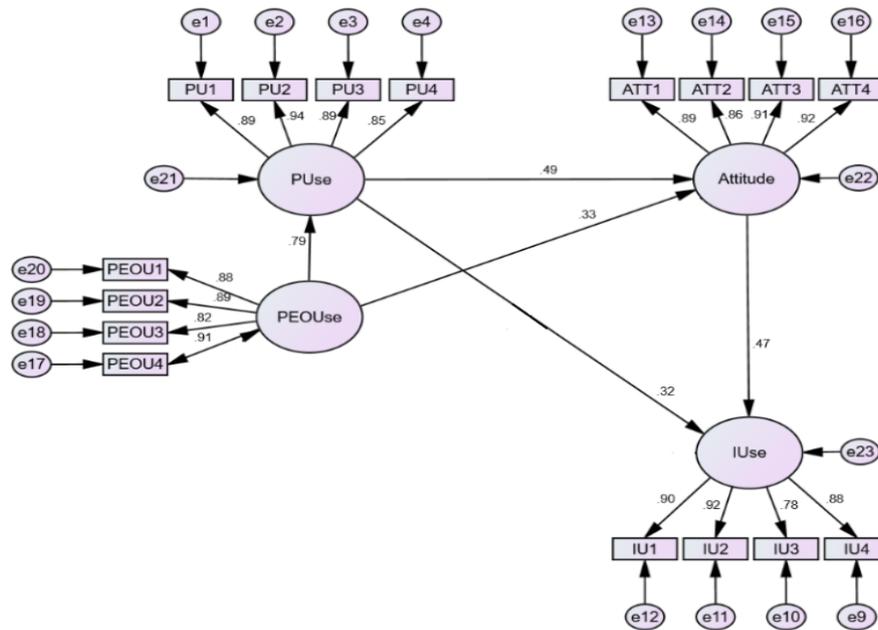


Figure 3: SEM Path Diagram

MEDIATION ANALYSIS – INDIRECT EFFECTS

Results for hypothesis H4b on the mediation role of PU between PEOU and ATT can be viewed in Table 5. The critical ratio value (CRV) of the total effect was 6.95 (>1.96), indicating that mediating effect was significant. Likewise, the CR value of the indirect effect, i.e., 3.00 (>1.96), was also significant.

CR value of direct effect was 3.69 (>1.96), whereas values at lower and upper bounds of bias-corrected bootstrapping CIs contained no zero; their two-tailed p-values were also <.05, so we concluded it as a partial mediation as per the guidelines of Baron & Kenny (1986).

To further confirm the mediation analysis, we conducted Sobel’s (1982) test. The test confirmed the significant indirect effect of PEOU on ATT via PU ($z = 7.47, p < .001$); hence H4b was further supported.

Table 5: Mediation Analysis

PEOU-PU-ATT	Estimate	SE	CRV	Bias-Corrected 95% CIs		
				LLCI	ULCI	p
Total Effect	.667	.096	6.95	.538	.797	.001
Direct Effect	.306	.083	3.69	.114	.480	.007
Indirect Effect	.198	.066	3.00	.214	.536	.001

DISCUSSION

Based on previous studies and the literature reviewed, it was anticipated that all hypotheses from the proposed model would be supported. The focus of the study was to investigate what determinants impact online banking adoption in Bosnia and Herzegovina.

The study results supported all the hypotheses with statistically significant results. The proposed H1 hypothesis: Customers’ Attitude has a significant impact on the customers’ intention to use online banking, was supported. This result suggests that consumers’ attitude toward online banking significantly impact their intention to use it. The result is in line with the study of Davis et al. (1986), which concluded that: “Behavioral intention is likely to be positive by users with positive attitudes towards a new technology, all else being equal.” As well as the study by Mengli (2008) also confirms that “attitudes are highly associated with behavioral intentions.”

Further, H2a: Perceived Usefulness has a significant impact on customers’ intention to use online banking, was also supported. This result is consistent with the studies conducted by Pavlou (2003) and Gefen et al. (2003), which found that PU affects users’ intention to adopt new technological concepts. Additionally, other prior studies supported that PU positively and significantly impacted users’ intentions (Hajli, 2013; Gatautis et al., 2014 as cited by Daradkeh & Al-Dwairi, 2017).

The H2b hypothesis was supported as well: Perceived Usefulness has a significant impact on customers’ Attitudes towards the adoption of online banking. This outcome is coherent with the study by Cheng et al. (2006) that “The users’ perception of usefulness determines attitude towards using a new information system.” Moreover, a study by Eriksson et al. (2005) found that: “It is believed that perceived usefulness affects a person’s favorable or unfavorable attitudes towards a phenomenon.”

Additionally, H3: Perceived Ease of Use has a significant impact on customers' Attitudes towards adoption of online banking, was supported. This result stipulates that consumers' attitudes are also shaped by the perceived ease of use of online banking services. This conclusion is coherent with the conclusions of Fishbein and Ajzen (1975), which state, "Attitude towards actual usage is determined by an expectancy of how easy the user thinks he can use the system." Besides, a study by Rogers (1995) found that: "The complexity of one system will become the inhibitor that discourages the adoption of any innovation."

The study results also supported hypothesis H4a: Perceived Ease of Use has a significant impact on Perceived Usefulness. Indicating that there is a strong impact of perceived ease of use towards perceived usefulness, which is consistent with the study of Davis (1986). The study concluded that there is a direct effect of perceived ease of use on perceived usefulness (Davis, 1986).

Lastly, H4b: Perceived Usefulness mediates the relationship between Perceived Ease of Use and Attitudes towards adoption of Online Banking, was supported. This result shows that perceived usefulness and perceived ease of use play an important role in shaping consumers' attitudes towards Online Banking and their intention to adopt it. These results are aligned with the studies by Elkaseh, Wong, and Fung, (2016), which concluded that: "Attitude is predicted by the determinants - perceived usefulness and perceived ease of use." The study by Davis (1986) and other studies based on it confirm that the two constructs, perceived usefulness and perceived ease of use, are highly correlated. Moreover, perceived ease of use contributes to the general consumer attitude towards the technology (Davis et al., 1989).

CONCLUSION

The focus of this study was to explore the relationship between perceived usefulness, perceived ease of use, attitude, and intention to use Online Banking in Bosnia and Herzegovina. As per the literature reviewed, the hypotheses model with six hypotheses was proposed and tested using Confirmatory Factor Analysis (CFA) and Structural Equation Modelling (SEM) via AMOS. A random sample for this study was taken from existing bank users from Bosnia and Herzegovina.

The questionnaire was distributed to bank customers online using Google Forms. A total of three hundred and twenty-one (321) respondents completed the survey, providing answers to forty-two (42) questions for this study. The sample was well distributed in terms of professional and educational background and other characteristics. The study results were primarily obtained from respondents from a specific region in Bosnia and Herzegovina due to the proximity of the respondents that were willing to take part in the study. It is recommended that a similar study with a larger sample could be conducted in the future.

To ensure validity and reliability of the data, Cronbach alpha and factor loading items were tested before hypotheses testing. Further, confirmatory factor analysis (CFA), composite reliability, convergent, and discriminant validity analysis were conducted to verify the data and proposed model. Lastly, structural modeling equation tests were conducted to test the proposed hypotheses using AMOS version 24. The results indicated that the research model was valid and supported all six hypotheses.

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