

# Why do customers value m-banking apps? A stimulus-organism-response perspective

M-banking  
apps

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## Abstract

**Purpose** – Integrating the theory of consumption value into the stimulus-organism-response framework, this study aims to analyse the influence of external and internal factors on the customers' perceptions of utilitarian, hedonic, social and epistemic values as drivers of the overall perceived value and customers' continuance use of mobile banking (m-banking).

**Design/methodology/approach** – An online survey was conducted with 252 actual m-banking users, and the partial least squares structural equations modelling was applied to analyse the data.

**Findings** – The results reveal that ubiquity and gamification positively influence the perceived usefulness and entertainment, that is the utilitarian and hedonic perceived values. Furthermore, users' self-congruence and innovativeness affect subjective norms and novelty-seeking, representing social and epistemic values. Except for the hedonic value, each value element impacts the overall perceived value, which in turn incites clients' intention to continue using m-banking services.

**Originality/value** – By exploring the simultaneous effect of service-related and personal factors (stimuli) on different elements of perceived value (organism), this study contributes to the existing knowledge of consumption reactions (response) in the context of m-banking. The research of the Macedonian m-banking offers a closer insight into Western Balkan mobile commerce.

**Keywords** Perceived value, Stimuli, Mobile banking, Intention to use, Stimulus-organism-response, Theory of consumption value

**Paper type** Research paper

**¿Por qué los clientes valoran las aplicaciones de banca móvil? Una perspectiva de Estimulo-Organismo-Respuesta**

## Resumen

**Objetivo** – Integrando la Teoría del Valor de Consumo (TCV) en el marco Estimulo-Organismo-Respuesta (S-O-R), este estudio pretende analizar la influencia de factores externos e internos en las percepciones de valor

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utilitario, hedónico, social y epistémico de los clientes, como impulsores del valor percibido global y del uso continuado del m-banking por parte de los clientes.

**Diseño/metodología/enfoque** – Se realizó una encuesta en línea a 252 usuarios reales de banca móvil y se aplicó el modelo de ecuaciones estructurales por mínimos cuadrados parciales (PLS-SEM) para analizar los datos.

**Resultados** – Los resultados revelan que la ubicuidad y la gamificación influyen positivamente en la utilidad y el entretenimiento percibidos, es decir, en los valores utilitarios y hedónicos percibidos. Además, la autocongruencia y la capacidad de innovación de los usuarios afectan a las normas subjetivas y a la búsqueda de novedades, que representan el valor social y epistémico. A excepción del valor hedónico, cada elemento de valor influye en el valor percibido global, que a su vez incita a los clientes a seguir utilizando los servicios de banca móvil.

**Originalidad** – Al explorar el efecto simultáneo de factores personales y relacionados con el servicio (estímulos) sobre diferentes elementos del valor percibido (organismo), contribuimos al conocimiento existente sobre las reacciones de consumo (respuesta) en el contexto del m-banking. La investigación del m-banking macedonio ofrece una visión más cercana del comercio móvil de los Balcanes Occidentales.

**Palabras clave** Valor percibido, Intención de uso, Banca móvil, Estímulos, Ubicuidad, Gamificación, Autocongruencia, Innovación, Utilidad, Entretenimiento, Normas subjetivas, Búsqueda de novedades

**Tipo de artículo** Trabajo de investigación

客户为何重视移动银行应用程序？刺激-组织-反应视角

## 摘要

**目的** – 本研究将消费价值理论 (TCV) 纳入刺激-组织-反应 (S-O-R) 框架, 旨在分析外部和内部因素对客户感知功利价值、享乐价值、社会价值和认识价值的影响, 这些因素是客户整体感知价值和持续使用移动银行的驱动因素。

**方法** – 对 252 名实际移动银行用户进行了在线调查, 并采用偏最小二乘法结构方程模型 (PLS-SEM) 分析数据。

**研究结果** – 结果表明, 普遍性和游戏化对用户的有用性和娱乐性感知, 即功利性和享乐性感知价值有积极影响。此外, 用户的自我一致性和创新性也会影响主观规范和新奇寻求, 这代表了社会价值和认识价值。除享乐价值外, 每个价值要素都会影响整体感知价值, 进而激发客户继续使用移动银行服务的意愿。

**独创性** – 通过探索服务相关因素和个人因素 (刺激) 对感知价值不同要素 (有机体) 的同时影响, 我们为现有的有关移动银行背景下消费反应 (响应) 的知识做出了贡献。通过对马其顿移动银行的研究, 我们可以更深入地了解西巴尔干移动商务。

**关键词** 感知价值, 使用意向, 移动银行, 刺激, 无处不在, 游戏化, 自我一致性, 创新性, 有用性, 娱乐性, 主观规范, 追求新颖性

**文章类型** 研究型论文

## 1. Introduction

In the past decade, banking services have dramatically changed because of the intense implementation of new technologies, from the internet and mobile banking (m-banking) through virtual assistance to functioning entirely without any physical presence of offices or staff. M-banking has been described as “a product or service offered by a bank for conducting financial and non-financial transactions, using a mobile device” (Shaikh and Karjaluoto, 2015, p. 3). This channel offers extended interactivity between the entity and the customer, providing banking services ubiquitously, immediately, securely, safely and conveniently adapted to customer preferences and location (Prodanova *et al.*, 2015). Based on these advantages, customers are moving rapidly from retail to m-banking, so recent m-banking studies are opening a promising research avenue (Patel and Siddiqui, 2023).

Consumers worldwide primarily engage with banks through mobile devices, especially in Europe, where over 70% of users prefer mobile banking (comScore, 2022), a trend also visible in Macedonia, a developing country, where mobile phones account for 56.4% of Web traffic (Hootsuite, 2021). The banking sector in Macedonia is focused on technological

advancement, while mobile payments have been consistently increasing, with a 24% monthly growth rate from 2016 to 2020 [National Bank of the Republic of Macedonia (NBRM), 2020].

Previous research has demonstrated that people use mobile payment services for utilitarian and hedonic purposes, as status symbols or to satisfy the desire for novelty (Boden *et al.*, 2020; Yu *et al.*, 2023). Similar usage applies to m-banking activities, where m-banking applications offer utilitarian benefits (e.g. convenient and easy money transfer and bank account check-out), hedonic (e.g. gamification and entertainment), social (e.g. social status) and benefits related to the desire for innovation (Rejman Petrović *et al.*, 2022).

Accordingly, this study builds upon the theory of consumption values (TCV) (Sheth *et al.*, 1991) by incorporating utilitarian, hedonic, social and epistemic values as critical value dimensions of m-banking. Furthermore, we integrate the TCV into the stimulus-organism-response (S-O-R) framework (Mehrabian and Russell, 1974) to describe the process of environmental stimuli determining customers' actions and, finally, their precise responses. Thus, we contemplate external (m-banking setting) and internal (m-banking users' personality) factors as environment-related stimuli (S); utilitarian, hedonic, social and epistemic values as organism perceptions related to the overall perceived value of the service (O); and customers' continuance intention to use m-banking services as a response (R). In this way, we address the research gap by exploring the simultaneous effect of service-related and personal factors on the perceived value and, consequently, on the clients' intention to continuously use m-banking while contributing to the m-banking context, focusing on post-adoption.

Responding to the call for continuous analyses of the development of the banking system in the Western Balkans (Kozarević *et al.*, 2017), this study contributes to expanding the limited knowledge on this topic. Referring to the identified lack of research on the post-adoption phase (Tam and Oliveira, 2017), the present study examines the continuance intention to use m-banking services rather than analysing the initial adoption (Karjaluoto *et al.*, 2019). Attention has been put on the consequences of m-banking value dimensions, limiting the observation of the antecedent elements inciting the perception of value in m-banking (Pura, 2005). In addition, this study overcomes the restrictions of the unidimensional investigation of the perceived value, validating the multidimensionality of the perceived value perspectives in the m-banking setting. Namely, the present study digs deeper into re-examining TCV in the m-banking context (Karjaluoto *et al.*, 2021). It tackles the priority for further research on "customer value at all touchpoints during the omnichannel customer journey" (Marketing Science Institute, 2020).

## 2. Literature review

### 2.1 Conceptual framework

By proposing the integrative viewpoint of the TCV and S-O-R frameworks, we develop a more comprehensive understanding of the factors influencing users' perceptions of the value of m-banking services and their responses.

Laying on TCV's proposition (Sheth *et al.*, 1991) that consumer choice is a function of multiple consumption values (social, emotional, functional, epistemic and conditional), which determine the overall perceived value, this study extends the dyadic understanding of utilitarian and hedonic value, usually applied in technology-acceptance models. By integrating the epistemic and social values, we offer a broader overview of the m-banking value perception, where social value refers to the status derived from using the service, while epistemic value is related to the service variety and the user's search for novelty (Kim and Han, 2009). The utilitarian and hedonic aspects of value are associated with the

functional and experiential utility of the product/service, respectively (Voss *et al.*, 2003). The conditional value refers to “the perceived utility acquired by an alternative as the result of the specific situation or set of circumstances facing the choice maker” (Sheth *et al.*, 1991, p. 162). This study does not analyse the conditional value, as it might be derived from temporary functional or social values (Sheth *et al.*, 1991). M-banking usage is primarily a deliberate decision, with users being fully aware of the buying process of m-banking services (Hafez, 2022). Therefore, we focused on the functional, epistemic, social and emotional values of m-banking, as they are more closely aligned with the core benefits that mobile banking provides to customers, which is in line with the previous research (Karjaluoto *et al.*, 2021; Chaouali *et al.*, 2020).

The S-O-R model is applied as an underpinning theory, well-established and previously applied in researching human–computer interactions and online shopping consumer behaviours (Wu and Li, 2018). Although relatively scarcely used in the m-banking literature, the S-O-R model has been validated as applicable to this context (Lee and Chen, 2022). The S-O-R framework explains how consumers perceive contextual stimuli and how they react and respond to them (Mehrabian and Russell, 1974). Regarding this term, stimuli refer to environmental and other elements comprising the “package”, which are further processed by individuals/organisms, and internal state impact is made (Islam *et al.*, 2020). Besides environmental inputs initially applied in S-O-R studies, previous findings suggest that consumer stimuli are crucial factors that incite internal reactions and different responses (Li *et al.*, 2012). We find it necessary to study the duality of the stimuli and their antecedent simultaneous influence on different value elements that depict the overall perceived value by applying the S-O-R model to describe m-banking continuance use (Figure 1).

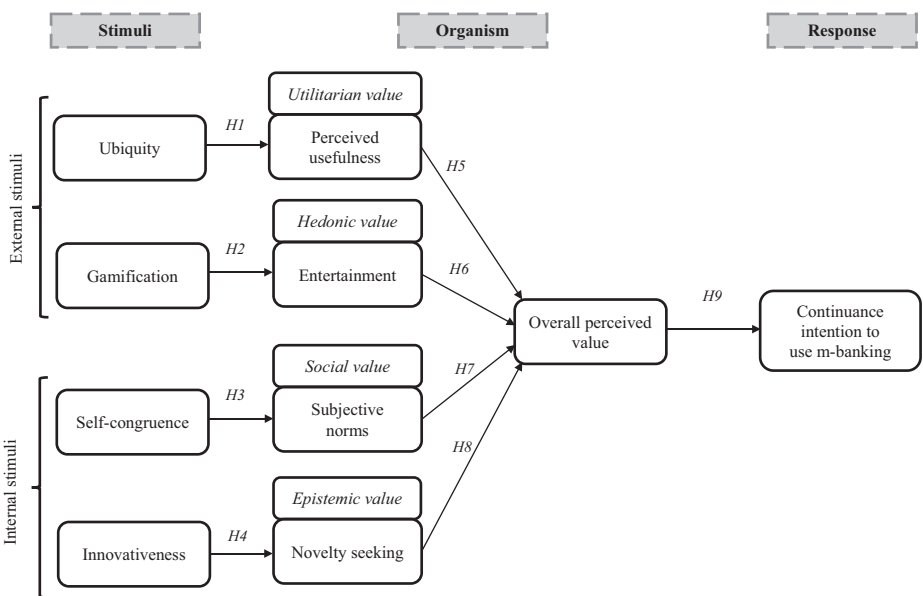


Figure 1.  
Conceptual model

Note: “→” = direct relationships

The external and internal stimuli act as inputs to the S-O-R model, influencing the user's perception of the service value and impacting their response to the service. The stimuli can be considered factors that activate the user's cognitive and affective processes and shape their behaviour towards the service (Li *et al.*, 2012). Ubiquity and gamification represent the external elements, while self-congruence and innovativeness describe users' internal aspects, altogether forming the stimuli. These stimuli were chosen based on their relevance to designing m-banking services in correspondence with users' personal characteristics. Ubiquity is one of the vital attributes of m-banking services (Prodanova *et al.*, 2019), while gamification has a crucial impact on continuous intention to use m-banking (Baptista and Oliveira, 2017). Regarding internal stimuli, we have used self-congruence and innovativeness, which holistically influence consumer response (Hepola *et al.*, 2016). We assume that an m-banking app that can be used anywhere and anytime and at the same time provides entertainment, enhances the sense of self-congruence and the need for innovativeness and influences users' response towards m-banking (Karjaluoto *et al.*, 2019; Prodanova *et al.*, 2019).

The organism represents the internal process through which consumers convert the stimuli into perceptions, emotions or experiences (Li *et al.*, 2012). Namely, organism refers to humans' affective and cognitive states, such as perceived quality, perceived value or similar, influencing their responses (Wu and Li, 2018). Perceived value is a psychological state comprising both cognitive and affective aspects of internal consumer processes in terms of mental contemplation and emotional experiences and feelings (Li *et al.*, 2012). Perceived value is previously analysed as an organism component that mediates the relationship between stimuli and customer responses (Molinillo *et al.*, 2021).

Based on the S-O-R model, continuance intention is considered a response because it is a subsequent behaviour (Lee and Pan, 2023) that reflects users' motivation and willingness to use the service, influenced by the perceived value of m-banking (Karjaluoto *et al.*, 2019). Beyond the initial adoption, the continuance intention to use m-banking is a vital consumer response in the m-banking context (Ciunova-Shuleska *et al.*, 2022). Continuance intention to use m-banking is analysed here as a response to a high level of value perceived in m-banking service.

*2.1.1 Stimuli – external and internal.* In m-banking, ubiquity, as an external stimulus, refers to the combined time and spatial flexibility (Okazaki *et al.*, 2009), allowing users to “access mobile banking anytime from anywhere” (Zhou, 2012, p. 30). In addition, gamification, emerging as a new phenomenon, refers to game elements in non-game contexts (Rodrigues *et al.*, 2014). As Baptista and Oliveira (2017) recommended, banks should balance both utilitarian and hedonic features in their service offer, using gamification as an effective tool for enhancing the hedonic value (Bidar, 2018).

Moreover, the internal self-congruence refers to “a psychological comparison between the image of the typical product user and the individual consumer's self-concept” (Shaikh and Karjaluoto, 2016, p. 1498), and it is closely related to the social aspect of the perceived value. Furthermore, personal innovativeness delivers an internal motivation for trying new things and accepting novelty (Hepola *et al.*, 2016), described as a personal characteristic referring to one's willingness “to adopt products or ideas that are new in the context of their individual experience” (Aldás-Manzano *et al.*, 2009, p. 740).

*2.1.2 Organism.* Concerning perceived value as an organism component, this study advances its understanding by analysing it as cognitive-affective in nature, ahead of the usual focus on affective reactions (Sahoo and Pillai, 2017). Having in mind that m-banking can provoke curiosity and increase interest among customers, bringing entertainment, excitement, novelty and variety desired by them, as well as enhancing the social image as a supplement to the basic utilitarian value (Çera *et al.*, 2020; Karjaluoto *et al.*, 2019), we

comprise utilitarian, hedonic, epistemic and social values as organism components in this study.

Utilitarian value is conceptualised as the usefulness derived from the product's perceived quality and expected performance, referring to the easiness, practicality and promptness of the used m-banking application (Kim *et al.*, 2010). In addition, perceived usefulness has been considered as a perceived relative advantage in the m-banking context (Munoz-Leiva *et al.*, 2017).

The "hedonic value is considered non-instrumental, experiential and effective, resulting from the pleasure and fun derived from [the] use [of the m-banking service]" (Karjaluoto *et al.*, 2019, p. 2). Perceived entertainment implicates pleasurable and fun elements of value, referring to the emotional (hedonic) value (Pura and Gummerus, 2007).

Social value refers to social acceptance, social reputation and status among other people (Pura, 2005; Karjaluoto *et al.*, 2021) and corresponds to subjective norms, as Bauer *et al.* (2005) observed regarding one's belief that others approve of their behaviour. In other words, when the referent groups important to customers demonstrate favourable attitudes towards mobile financial services, the latter will show receptivity to these choices and will follow this positive trend (Flavián *et al.*, 2020).

Epistemic value relates to novelty-seeking, which is considered an individual's preference for technology and is assumed to be one of the pillars of this value dimension (Bettiga and Lamberti, 2017; Pura, 2005).

Considering Sheth *et al.*'s (1991) proposition for multiple consumption values, previously elaborated aspects of value (utilitarian, hedonic, social and epistemic) are regarded as elements of the overall perceived value.

*2.1.3 Response.* Based on the S-O-R perspective, we analyse users' continuance intention to use m-banking as a response to their perceived value (organism) derived from the stimuli. Referring to the conceptualisation of intention as to future planned behaviour (Ajzen, 1985), we analyse it as an expected outcome of the perceived m-banking value (Prodanova *et al.*, 2019). Individual internal evaluation processes (organism) are anticipated to lead to a subsequent response, i.e. behavioural intentions.

## 2.2 Hypotheses development

Based on the previous conceptualisation of each construct and its role in the S-O-R model, we first hypothesise the relations between each stimulus and the respective organism component, thus proposing *H1–H4*. Namely, these stimuli are expected to activate users' cognitive and affective internal processes regarding users' perception of different value attributes of m-banking service, represented by perceived value as the organism (O).

Reflecting the flexibility in the interaction of mobile services usage at any place and any time (Pura, 2005), ubiquity refers to the utilitarian aspect of perceived value in terms of service usefulness (Pihlström, 2008). By allowing users to perform their tasks easily and promptly, ubiquity significantly enhanced customer evaluation of m-banking service (Prodanova *et al.*, 2019) in terms of perceived usefulness (Kim *et al.*, 2010). Based on this, we propose the first hypothesis:

*H1.* M-banking ubiquity is positively related to perceived usefulness.

Gamification elements such as a sense of control, reward, competition, social interaction, autonomy and absorption initiate a pleasant experience and enhance the perceived hedonic value (Ciunova-Shuleska *et al.*, 2022). Integrating game attributes into a mobile app creates an entertaining and fun-filled setting, leading to excitement about new features and ongoing usage of m-banking (Çera *et al.*, 2020). Perceived gamification enhances the clients' perceived



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value (Tan and Hsueh, 2017), mainly through experienced entertainment and hedonic benefits (Bidar, 2018). Therefore:

*H2.* M-banking gamification is positively related to perceived entertainment.

Self-congruence, which is an underlying psychological factor of perceived social value (Hosany and Martin, 2012), is associated with the social aspects of m-banking (Shaikh and Karjaluoto, 2016). By using m-banking as an innovative service, customers can gain social status and a feeling of belonging, thus enhancing the m-banking social value (Bettiga and Lamberti, 2017), which relates to subjective norms (Bauer *et al.*, 2005). Consequently:

*H3.* Self-congruence of m-banking users is positively related to subjective norms.

A higher level of consumer innovativeness is expected to result in acceptance of novelty (Thakur *et al.*, 2016). By accepting an innovative product, such as m-banking, one satisfies the desire for surprise and arousing curiosity, which enhances epistemic value (Sheth *et al.*, 1991). Novelty-seeking, which is considered a tendency to accept and further use new technologies, is one of the underlying aspects of epistemic value (Bettiga and Lamberti, 2017). Thus:

*H4.* Innovativeness of m-banking users is positively related to novelty-seeking.

Furthermore, internal processes are explained by hypothesising the influence of each value dimension on the overall perceived value of m-banking. Both cognitive and emotional assessments are necessary because they provide a comprehensive understanding of an individual's behaviour and psychological response to their environment (Lee and Pan, 2023). Specifically, cognitive and affective overall evaluation of m-banking service is assumed to be provoked by perceived utilitarian, hedonic, social and epistemic values. We explain the complex and multidimensional nature of perceived value through *H5–H8*.

M-banking users are primarily motivated by utilitarian benefits and are interested in completing the transactions efficiently and timely, with no or minimum irritation (Nysveen *et al.*, 2005). In addition, it is acknowledged that utilitarian value in m-banking is the primary driver of mobile transactions (Nysveen *et al.*, 2005), while usefulness is positively related to the perceived value of m-banking (Kim *et al.*, 2007). Hence:

*H5.* Perceived usefulness is positively related to the overall perceived value of m-banking.

According to Llach *et al.* (2013), the hedonic features or the emotional value positively influence the perceived value of the service and the customers' constancy. Dabholkar and Bagozzi (2002) suggested that fun in using technology-based self-services, such as m-banking, has a significant effect on their acceptance and value. Correspondingly, given that the entertainment-related characteristics and fun perceived in the service usage, as elements of hedonic value, are highly appreciated by the users of m-banking services (Karjaluoto *et al.*, 2019; Kim *et al.*, 2007), we propose that:

*H6.* Perceived entertainment is positively related to the overall perceived value of m-banking.

Mobile banking services make people feel more accepted in society and enhance the user's social status or image (Barnes and Corbitt, 2003). The social impact of using the product, i.e. social value, is tightly related to the concept of perceived value (Karjaluoto *et al.*, 2021), and

more precisely, the perceived social value of m-banking positively influences the perceived value (Pura, 2005). Accordingly:

*H7. Subjective norms are positively related to the overall perceived value of m-banking.*

Epistemic value is a significant predictor of m-banking use, which implies that the novelty effect can create curiosity and trigger usage behaviour, thus creating value for the customers (Prodanova *et al.*, 2019). Given that mobile banking adopters have favourable attitudes towards change, i.e. are more prone to keep up with technological advances compared to non-mobile banking users (Sulaiman *et al.*, 2006), we assume that:

*H8. Novelty-seeking is positively related to the overall perceived value of m-banking.*

While interacting with an m-banking app, customers formulate their perceptions towards service, and if the experience is positive, the response will be positive too (Shahid *et al.*, 2022), indicating that the users' responses to the m-banking service, i.e. continuance intention is determined by perceived value. Turel *et al.* (2010) empirically proved that multidimensional perceived value primarily influences purchase intentions. Moreover, it was found that perceived value drives continuance intention towards m-banking services (Shaikh and Karjaluoto, 2016), as well as that perceived value positively influences post-purchase intention in mobile value-added services (Kuo *et al.*, 2009). Then:

*H9. Perceived value is positively related to customers' continuance intention to use m-banking.*

### 3. Research method

#### 3.1 Data collection

At the beginning of the study, a pre-test was performed with academic and business specialists in marketing, along with current users of m-banking services. Once the final inquiry was completed, data collection was performed by purposive sampling. A filter question ensured that only current users of m-banking apps would be included. A sample of 252 actual users of m-banking apps in Macedonia was obtained using personal questionnaires. The demographic and socioeconomic characteristics indicated that the sample is composed mainly of women (59.1%). The majority of respondents are aged 25–34 years (35.7%) and commonly possess a university degree (56.3%), evidencing the high education level of the participants. The monthly home income totals 15,000–45,000 denars (50.4%) [1].

#### 3.2 Measures

The scales used for this research were adapted to the context of m-banking services from previously validated literature: ubiquity (Zhou, 2012); gamification (Rodrigues *et al.*, 2014); self-congruence (Shaikh and Karjaluoto, 2016); innovativeness (Aldás-Manzano *et al.*, 2009); perceived usefulness (Kim *et al.*, 2010); entertainment (Nysveen *et al.*, 2005); subjective norms (Bauer *et al.*, 2005); novelty-seeking (Al-Somali *et al.*, 2009); overall perceived value (Shaikh and Karjaluoto, 2016); and continuance intention to m-banking use (Zhou, 2012).

#### 3.3 Common method bias

Keeping in mind the risk of common method bias (CMB) when applying a single-source study, we addressed this issue in designing and administrating the research instruments. A high level of caution was taken for concise, clear and unambiguous wording of the questions/items



comprising the questionnaire, as well as to scale format and randomisation. In addition, anonymity, confidentiality and genuine interest in their opinion were emphasised for the respondents, thus ensuring the consistency of their responses (Podsakoff *et al.*, 2003).

In addition to *ex ante* activities, we also applied *ex post* methods, which suggested no CMB issue in this study. The correlation matrix of the measurement variables indicated that all the coefficients were below 0.90. Harman's single-factor test revealed that the unrotated factor solution explains 28.33% of the shared variance, being below the threshold of 50% (Fuller *et al.*, 2016).

#### 4. Analyses and results

For data analysis, we used partial least squares structural equations modelling as the recommended methodology for observing complex models that include several constructs, indicators and model relationships (Hair *et al.*, 2019). Following the established procedure, the scales' reliability and validity were first measured to evaluate the measurement model's robustness. Secondly, the structural model's explanatory and predictive power was estimated to finally explore the proposed relationships' significance and relevance. For the statistical analysis of the data, we used the SmartPLS3 software.

The estimation of the measurement model confirmed that all constructs have acceptable values for their corresponding item loadings (95% confidence level) (Table 1). Only two items were deleted due to a non-significant *t*-value, one from the gamification construct and another from the entertainment construct. The reliability and internal consistency of the scales [Cronbach's alpha  $\alpha > 0.7$ ; composite reliability (CR)  $> 0.6$ ] and the convergent validity (average variance extracted AVE  $> 0.5$ ) were corroborated (Hair *et al.*, 2019).

In Table 2, the values of the heterotrait–monotrait (HTMT) ratio between the variables (HTMT  $< 0.9$ , Henseler *et al.*, 2015) and the correlations between constructs (AVE  $>$  squared correlations, Fornell and Larcker, 1981) confirm the discriminant validity of the constructs.

Subsequently, the  $R^2$  of the dependent variables was estimated, revealing values above 0.1 for all constructs, ranging from 0.16 to 0.51 (Table 3). As per the predictors in the model, the results of Cohen's  $f^2$ , whose values of 0.02, 0.15 and 0.35 show small, medium and large effect sizes, respectively, demonstrated the following: ubiquity ( $f^2 = 0.27$ ), gamification ( $f^2 = 0.19$ ), self-congruence ( $f^2 = 0.26$ ), innovativeness ( $f^2 = 0.25$ ), perceived usefulness ( $f^2 = 0.32$ ), perceived entertainment ( $f^2 = 0.01$ ), subjective norms ( $f^2 = 0.16$ ), novelty-seeking ( $f^2 = 0.09$ ) and overall perceived value ( $f^2 = 0.34$ ). These findings show that the highest impact is observed by perceived usefulness on the overall perceived value, which in turn largely impacts the continuance intention to use m-banking.

The predictive relevance of the model's endogenous constructs was confirmed with  $Q^2$  values larger than zero, ranging from 0.12 to 0.35 (Table 3).

Finally, eight out of the nine proposed hypotheses were supported. The good fit of the model was validated with a standardised root mean square residual value of 0.06, surpassing the recommended threshold of 0.08 (Hair *et al.*, 2019). The detailed data can be observed in Table 3.

The results reveal that ubiquity and gamification are positively related to perceived usefulness and entertainment, with ubiquity being more related to usefulness ( $\beta = 0.46$ ) than gamification to entertainment ( $\beta = 0.40$ ). These findings are in accordance with previous literature exploring the impact of utilitarian and hedonic values in the m-banking sector (Rejman Petrović *et al.*, 2022). However, although m-banking ubiquity and gamification are relevant factors shaping perceived values (Tan and Hsueh, 2017;

| Construct name and measurement items   | $\lambda$ |
|--|-----------|
| <i>Ubiquity</i> ( $AVE = 0.87$ ; $\alpha = 0.92$ ; $CR = 0.95$ )                               |           |
| I can use m-banking apps from anywhere   | 0.93      |
| I can use m-banking apps at any time   | 0.94      |
| If needed, I can use m-banking apps at any time from anywhere                                  | 0.92      |
| <i>Gamification</i> ( $AVE = 0.77$ ; $\alpha = 0.90$ ; $CR = 0.93$ )                           |           |
| Learning how to use m-banking during a game on an m-banking app would be nice                  | 0.79      |
| I feel pleasure in the use of an m-banking app with features of games                          | 0.93      |
| I feel good while playing a game on an m-banking app   | 0.93      |
| I think that an m-banking app with content and animated elements is secure                     | 0.85      |
| <i>Self-congruence</i> ( $AVE = 0.74$ ; $\alpha = 0.83$ ; $CR = 0.89$ )                        |           |
| People similar to me use m-banking apps  | 0.71      |
| I identify with people who prefer m-banking apps to other forms of banking                     | 0.91      |
| The image of a typical user of m-banking apps is highly consistent with how I see myself       | 0.93      |
| <i>Innovativeness</i> ( $AVE = 0.75$ ; $\alpha = 0.89$ ; $CR = 0.92$ )                         |           |
| I think . . .  |           |
| . . . I am the first in my circle of friends to know where I can use m-banking apps            | 0.88      |
| . . . I am the first in my circle of friends to use m-banking apps                             | 0.90      |
| . . . I know more about m-banking apps than my circle of friends                               | 0.89      |
| . . . I would use m-banking apps even if I did not know anyone who had done it before          | 0.79      |
| <i>Perceived usefulness</i> ( $AVE = 0.74$ ; $\alpha = 0.89$ ; $CR = 0.92$ )                   |           |
| Using m-banking apps enables me to pay more quickly  | 0.86      |
| Using m-banking apps makes it easier for me to conduct transactions                            | 0.88      |
| I find m-banking apps a useful possibility for paying  | 0.86      |
| M-banking apps appear to be practical  | 0.84      |
| <i>Perceived entertainment</i> ( $AVE = 0.80$ ; $\alpha = 0.92$ ; $CR = 0.94$ )                |           |
| Using . . .  |           |
| . . . m-banking apps help me relax   | 0.85      |
| . . . m-banking apps help me entertain   | 0.93      |
| Using m-banking apps provides me with something to do when I am alone                          | 0.92      |
| <i>Subjective norms</i> ( $AVE = 0.80$ ; $\alpha = 0.87$ ; $CR = 0.92$ )                       |           |
| When I use m-banking apps, most of the people who are important to me regard me as . . .       | 0.85      |
| . . . clever   |           |
| . . . useful   | 0.94      |
| . . . valuable   | 0.90      |
| <i>Novelty seeking</i> ( $AVE = 0.74$ ; $\alpha = 0.82$ ; $CR = 0.90$ )                        |           |
| I am interested to hear about new technological developments                                   | 0.88      |
| Technological developments have enhanced my life   | 0.90      |
| I feel comfortable when using m-banking apps   | 0.80      |
| <i>Overall perceived value</i> ( $AVE = 0.73$ ; $\alpha = 0.81$ ; $CR = 0.89$ )                |           |
| Using m-banking apps is a pleasant experience  | 0.87      |
| The overall value of my experience using m-banking apps is outstanding                         | 0.89      |
| M-banking apps represent a good use of my time and money                                       | 0.80      |
| <i>Continuance intention to use m-banking</i> ( $AVE = 0.89$ ; $\alpha = 0.94$ ; $CR = 0.96$ ) |           |
| Given a chance, I will intend to use m-banking apps  | 0.93      |
| I expect my use of m-banking apps to continue in the future                                    | 0.96      |
| I have the intention to use m-banking apps to conduct payments                                 | 0.93      |

**Table 1.**  
Measurement model  
estimation

**Table 2.**Latent variables  
correlation matrix  
versus heterotrait–  
monotrait ratio

|  | U    | G    | SC   | Heterotrait–monotrait ratio |      |      |      | NS   | OPV  | IR   |
|--|------|------|------|-----------------------------|------|------|------|------|------|------|
|  |      |      |      | I                           | PU   | PE   | SN   |      |      |      |
| <i>Correlations</i>                    |      |      |      |                             |      |      |      |      |      |      |
| Ubiquity (U)                           |      | 0.13 | 0.28 | 0.32                        | 0.50 | 0.18 | 0.24 | 0.35 | 0.47 | 0.51 |
| Gamification (G)                       | 0.12 |      | 0.21 | 0.14                        | 0.11 | 0.43 | 0.41 | 0.16 | 0.20 | 0.16 |
| Self-congruence (SC)                   | 0.22 | 0.20 |      | 0.57                        | 0.49 | 0.23 | 0.48 | 0.52 | 0.71 | 0.43 |
| Innovativeness (I)                     | 0.29 | 0.12 | 0.49 |                             | 0.36 | 0.35 | 0.51 | 0.54 | 0.43 | 0.42 |
| Perceived usefulness (PU)              | 0.46 | 0.10 | 0.39 | 0.32                        |      | 0.09 | 0.24 | 0.42 | 0.69 | 0.60 |
| Perceived entertainment (PE)           | 0.16 | 0.40 | 0.22 | 0.32                        | 0.05 |      | 0.59 | 0.23 | 0.18 | 0.26 |
| Subjective norms (SN)                  | 0.22 | 0.36 | 0.45 | 0.45                        | 0.22 | 0.52 |      | 0.31 | 0.52 | 0.37 |
| Novelty seeking (NS)                   | 0.31 | 0.14 | 0.42 | 0.46                        | 0.36 | 0.20 | 0.26 |      | 0.57 | 0.44 |
| Overall perceived value (OPV)          | 0.41 | 0.18 | 0.60 | 0.36                        | 0.59 | 0.15 | 0.45 | 0.47 |      | 0.58 |
| Continuance intention to use m-banking | 0.47 | 0.15 | 0.37 | 0.38                        | 0.54 | 0.24 | 0.34 | 0.39 | 0.50 |      |

**Notes:** Top diagonal values refer to the heterotrait–monotrait ratio between the variables; bottom diagonal values (*italic*) present the values of the correlation matrix

| Hypothesised relationships   | $\beta$ | <i>t</i> -value    |
|--|---------|--------------------|
| H1: M-banking ubiquity is positively related to perceived usefulness                           | 0.46    | 8.03***            |
| H2: M-banking gamification is positively related to perceived entertainment                    | 0.40    | 6.77***            |
| H3: Self-congruence of m-banking users is positively related to subjective norms               | 0.45    | 8.68***            |
| H4: Innovativeness of m-banking users is positively related to novelty-seeking                 | 0.46    | 9.43***            |
| H5: Perceived usefulness is positively related to the overall perceived value of m-banking     | 0.44    | 5.96***            |
| H6: Perceived entertainment is positively related to the overall perceived value of m-banking  | −0.10   | 1.44 <sup>ns</sup> |
| H7: Subjective norms are positively related to the overall perceived value of m-banking        | 0.34    | 5.15***            |
| H8: Novelty-seeking is positively related to the overall perceived value of m-banking          | 0.24    | 2.95***            |
| H9: Perceived value is positively related to customers' continuance intention to use m-banking | 0.50    | 6.93***            |
| Constructs   | $R^2$   | $Q^2$              |
| Perceived usefulness   | 0.21    | 0.15               |
| Perceived entertainment  | 0.16    | 0.12               |
| Subjective norms   | 0.20    | 0.15               |
| Novelty seeking  | 0.21    | 0.15               |
| Overall perceived value  | 0.51    | 0.35               |
| Continuance intention to use   | 0.25    | 0.21               |
| Ubiquity   |         |                    |
| Gamification   |         |                    |
| Self-congruence  |         |                    |
| Innovativeness   |         |                    |
|  |         | $f^2$              |
|  |         | 0.32               |
|  |         | 0.01               |
|  |         | 0.16               |
|  |         | 0.09               |
|  |         | 0.34               |
|  |         | /                  |
|  |         | 0.27               |
|  |         | 0.19               |
|  |         | 0.26               |
|  |         | 0.25               |

**Table 3.**  
Causal model  
estimation

**Notes:** \*\*\* $p < 0.001$ ; ns = not significant; SRMR = 0.06

Prodanova *et al.*, 2019), the results provide additional proof for their impact on perceived m-banking usefulness and entertainment.

Furthermore, self-congruence and innovativeness correspondingly affect subjective norms and novelty-seeking with similar intensity ( $\beta = 0.45$  and  $\beta = 0.46$ , respectively). Even though the social and epistemic values' impacts have been previously explored (Bettiga and Lamberti, 2017; Shaikh and Karjaluoto, 2016), this study delves deeper into the investigation of antecedents and identifies the role of consumers' self-congruence and innovativeness.

Moreover, except for the perceived entertainment, each value element impacts the overall perceived value, which incites the continuance intention of m-banking services use ( $\beta = 0.50$ ). More precisely, utilitarian value is the most strongly related to the overall perceived value of m-banking ( $\beta = 0.44$ ), followed by the social value ( $\beta = 0.34$ ) and epistemic value ( $\beta = 0.24$ ). Finally, the role of different perceived values in the construction of an overall value has been largely evidenced (Pura, 2005). Nevertheless, the structure of the separate values expressed through the experience of using m-banking apps and their characteristics offers a further understanding of the elements that take part in the continuous use of m-banking apps.

## 5. Discussion

While conceptualising a groundwork for explaining the antecedents and consequences of perceived value in providing m-banking services, this study builds on an integrative model combining the TCV (Sheth *et al.*, 1991) and the S-O-R framework (Mehrabian and Russell, 1974). The research addresses customers' external and internal factors (S) as incentives for perceiving multiple values in the m-banking service (O), further triggering a continuance response of using m-banking apps (R). The perceived value is analysed through utilitarian, hedonic, social and epistemic values, while their respective antecedents present the m-banking ubiquity and gamification (external stimuli) and the users' self-congruence and innovativeness (internal stimuli). Thus, an extended S-O-R model is developed, distinctively involving personal features as stimuli, found especially important in exploring mobile service offerings.

The results suggest that overall perceived value significantly reinforces the continuance intention to use m-banking (H9). As expected, customers who perceive m-banking as valuable have a higher level of continuance intention to use this service. This is in line with the previous studies that suggested the crucial role of perceived value in choosing m-banking (Karjaluoto *et al.*, 2019; Prodanova *et al.*, 2019). Regarding the underlying aspects of overall perceived value, the results reveal that the utilitarian and social value, represented through the perceived usefulness (H5) and the subjective norms (H8), have the most decisive role in the formation of overall perceived value, followed by the epistemic value portrayed by novelty-seeking (H7). On the contrary, the m-banking entertainment describing hedonic value proved to be non-significant in explaining the overall perceived value (H6). These findings correspond to previous suggestions implying that the utilitarian aspect of the delivered m-banking service is one of the crucial drivers of m-banking perceived value (Nysveen *et al.*, 2005; Prodanova *et al.*, 2019). Although some previous studies suggested that aside from the utilitarian benefits, customers also expect entertainment and pleasure in using m-banking services (Karjaluoto *et al.*, 2019), the present research revealed that this is not applicable in a context of m-banking in a developing economy. The utilitarian-hedonic dyad proved irrelevant in this context because customers are more concerned with the functional benefits of m-banking in terms of money transactions, account information or practicality. Aside from utilitarian benefits, the aspects related to social and epistemic value propositions proved to be more critical in this precise setting. Namely, in an emerging economy where m-banking has not reached its full potential, customers still perceive it as a novelty (epistemic value). Therefore, its innovativeness and technologically advanced features significantly enhance the perceived value. At the same time, customers are highly concerned about how their usage of m-banking is perceived and evaluated by others (social value), which is expected in a society with a high level of collectivism, such as the Macedonian society (Hofstede Insights, 2022).

All these evaluation processes in individuals are driven by external and internal factors that act as stimuli. As proposed, ubiquity in terms of temporal and spatial flexibility has a

significant positive relation to perceived usefulness as a utilitarian value element of m-banking (*H1*). Although the hedonic dimension proved not to be a significant predictor of overall perceived value, it is significantly determined by gamification features of m-banking, which positively influence perceived entertainment (*H2*). These results could be explained by the notion that gamification elements can cause users' entertainment (hedonic value) (Bidar, 2018), which is not a must-have benefit in m-banking services. Therefore, its contribution to the overall perceived value is surpassed by the more relevant value attributes, i.e. utilitarian, social and epistemic value.

In addition, self-congruence and innovativeness are applied as internal (personal) factors of m-banking users, which entice the formation of social value and epistemic value, respectively. Namely, when a customer feels a higher level of congruence with the m-banking app, a higher level of social value is expected to be perceived (*H3*). At the same time, innovativeness as a personal characteristic proved to be related to novelty-seeking, i.e. the epistemic value of the m-banking service (*H4*).

### 5.1 Theoretical implications

Regarding the theoretical implications, by explaining the continuance intention to use m-banking, this study contributes to the existing m-banking literature, which has been mainly focused on explaining the initial adoption of m-banking, while neglecting the post-adoption phase (Tam and Oliveira, 2017). In addition, the focal variable in this study is perceived value, and besides exploring its outcome, this study aims to analyse its antecedents, as well. Hence, a further theoretical contribution is provided, by comprising both antecedents and consequences of perceived value. In this way, we add to the limited scientific evidence of the continued use of m-banking services (Karjaluoto *et al.*, 2019; Ciunova-Shuleska *et al.*, 2022). The empirical evidence of this study complements the multidimensional notion of the TCV (Sheth *et al.*, 1991), suggesting that utilitarian, social and epistemic values are the crucial antecedents of perceived value in the context of m-banking in a developing country.

More specifically, a research model, which comprises a unique combination of constructs, was developed and empirically validated in the present study. Namely, ubiquity proved to be significantly related to the perceived usefulness of m-banking service, which contributes to understanding the utilitarian aspects of perceived value (Pihlström, 2008). Gamification is related to entertainment and hedonic aspects of perceived value (Bidar, 2018), although the hedonic value is not conducive to the overall perceived value. This outcome might be because m-banking operations are often considered high-involvement services, requiring greater reflection and evaluation. Provided the higher risk perceived in services comprising money transactions, utilitarian value aspects might prevail over hedonic value elements related to the service (Prodanova *et al.*, 2019). Nevertheless, gamification characteristics have been proven to enhance customer relationships with the brand and raise positive behavioural responses and engagement, which is why it might be important for m-banking users' perception of the m-banking app environment as relaxing and entertaining (Čera *et al.*, 2020). Subjective norms and novelty-seeking are significantly related to self-congruence and innovativeness, respectively, thus explaining the social and epistemic aspects of the perceived value in the m-banking context.

Furthermore, when it comes to high-involvement services, where customers are exposed to bigger time- and money-related sacrifices, the environment where the purchase is completed may be critical (No and Kim, 2015). By offering an integrative S-O-R model, we comprise customers' personal in addition to contextual stimuli affecting different aspects of perceived value that determine an actual continuance use of m-banking apps. Lastly, this study complements the limited research of m-banking services provision in the context of a

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developing Western Balkan country, thus responding to the call for an amplified investigation of the Western Balkan banking system (Kozarević *et al.*, 2017).

### *5.2 Implications for management*

The main managerial implications of this study can be summarised as follows: banks should focus their effort on maintaining users who are prone to using innovative technologies and try to evoke customers' identification as m-banking users; the m-banking universal usage should be emphasised as a unique opportunity for customers so that the practicality of the service could be acknowledged; games and animation elements should be used with caution, given that the implementation of entertainment features might contribute to greater criticism of the service; and banks' actions should address users interested in new technologies who need social recognition related to these preferences.

It is essential to pay attention to the role of the perceived emotional value in providing m-banking services. Namely, gamification should be used only to the point that makes the experience with the m-banking app entertaining and distracting because the hedonic aspects are not considered effective for achieving overall perceived value. Thus, entertaining elements as part of the app's characteristics are not of such importance, and they could even be limited. In this way, entities would avoid creating a perception of informality, unwelcome for the high-involvement services such as m-banking.

Referring to the external setting, banks should accentuate the practical benefits of using m-banking apps in terms of flexibility in place and time, which will further lead to perceived usefulness and continuance intention to use. At the same time, personal factors should not be neglected, thus focusing on aspects of the marketing offers that refer to users who are open to new experiences and identify with the app, thus enhancing the epistemic and social value of m-banking services.

Regarding the delivered service, banks should consistently provide the primary functional benefit of m-banking, i.e. the opportunity to use the service anytime from anywhere as the main contributor to the overall perceived value and the continuance intention to use the m-banking app. These aspects of the service could be highlighted in the bank's marketing communication activities, thus building the brand personality of the m-banking app as ubiquitous, innovative and socially desirable.

All these recommendations can be adopted through a variety of actions. To address innovative technology users, banking entities should offer early access to new features and functionalities to users who demonstrate a willingness to adopt innovative technologies, provide personalised recommendations based on users' preferences and usage patterns or even offer exclusive benefits, such as discounted fees or special promotions, to encourage continued usage. To show ubiquitous service convenience, apps can deliver features such as mobile check deposits, bill payments and fund transfers to demonstrate the time-saving and hassle-free nature of m-banking and provide user-friendly interfaces with intuitive navigation and quick access to frequently used features. Furthermore, by incorporating subtle and non-intrusive gamification features, such as achievement badges or progress tracking, banks will enhance engagement without compromising the perceived professionalism of the service. To boost the social value of the service, m-banking services could collaborate with technology influencers to promote the app's innovative features and benefits or organise events or competitions targeting users interested in new technologies while offering rewards and recognition for their participation. For underpinning the practical benefits of m-banking apps, functional steps would include real-life scenarios where m-banking provides flexibility, such as managing finances while travelling or during non-business hours or personalised alerts to keep users informed about important account



activities and upcoming financial deadlines. Lastly, to achieve a long-term stable relationship with their customers, m-banking brands could incorporate social proof elements, such as customer testimonials or ratings, to build trust and credibility and engage in social responsibility initiatives and partnerships to enhance the app's perception as a socially desirable service. As discussed, the suggested managerial implications apply in an emerging economy context where m-banking usage is still growing.

The conclusions and theoretical and managerial implications of the study can be summarised in the following [Table 4](#).

### 5.3 Limitations and future lines of research

Some of the *limitations* of this research lay in the improvable generalisability of the study. Namely, the study is conducted on a limited sample obtained in a developing country, limiting the generalisability and comparability of the obtained results. Providing possibilities for future research regarding sample extension, using a probability sampling method could strengthen the application of the implications. In addition cross-country research would suggestively enrich the outcome of the results on a regional level in the Balkans or broader. Also, the lack of qualitative analysis, as in the exploratory phase of this study, limits the understanding of possible relevant constructs in conceptualising the model. In the future, we believe that using a mixed-methods approach will significantly improve the quality of the research output.

Moreover, provided that the respondents expressed their opinion regarding the mobile app they used at the moment, a distinction might appear in their value perceptions because of the app's characteristics. In future research, we could observe the users of only one m-banking app or even perform a multi-group analysis to check for significant differences among users of diverse apps. In addition, clients' socio-demographic and economic traits might be helpful in distinguishing among subgroups of the respondents, which could help us identify specific descriptions of precise segments of the m-banking users in Macedonia, so the personalisation of the service could be more valuable.

Furthermore, m-banking user personality could be more thoroughly explored to cluster different types of users to personalise the service to their particular preferences. More precisely, personal innovativeness could be used to segment users based on the stage of the

| Conclusions  | Theoretical and managerial implications   |
|--|---|
| Internal and external stimuli affect different aspects of perceived value that influence the continued use of m-banking apps | An integrative S-O-R model is developed, incorporating personal aspects in addition to the external setting as stimuli of m-banking perceived value (organism), which draws customers' continued intention (response) |
| Ubiquity and gamification have a positive impact on respective utilitarian and hedonic perceived values                      | The focus should be on m-banking universal usage while gamification should be approached carefully  |
| Self-congruence and innovativeness correspondingly influence social and epistemic values                                     | Banks should prioritise innovative attributes and the way customers identify with a typical m-banking user  |
| Utilitarian, social and epistemic values are the most important factors of perceived value                                   | In addition to providing essential utilitarian benefits, m-banking perceived value is elevated by its technologically advanced features, as well as by customers' sense of belonging                                  |

**Table 4.**  
Conclusions and  
theoretical and  
managerial  
implications

technology adoption lifecycle they belong to and to further analyse the differences in the value attributes they perceive as influential to continuous intention to use m-banking. Also, the Big Five or Eysenck's personality traits could be used to analyse users' personal characteristics further. Lastly, the moderating effect of the device used to access m-banking or customers' previous experience with similar apps might be valuable assets for future research on the subject.

## Note

1. To facilitate comparison to € and \$, the average exchange rate at the moment of writing this study was considered: €1 = 61.86 MKD, \$1 = 56.94 MKD.

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