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Loucanova, Erika; Olsiakova, Miriam

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COMPARISON OF INNOVATION IN THE ELECTRONIC BANKING SERVICES OF THE LARGEST SLOVAK BANKS

Erika Loucanova, https://orcid.org/0000-0003-0505-3251
Associate Professor, Technical University in Zvolen, Slovakia
Miriam Olsiakova, https://orcid.org/0000-0002-3137-1774
Ph.D., Technical University in Zvolen, Slovakia
Corresponding author: Erika Loucanova, loucanova@tuzvo.sk
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Abstract: *At the time of digitization, the requirements of consumers are constantly increasing. Systematization of scientific sources and approaches and implemented surveys prove that new requirements impact the development of electronic innovations, which have also appeared in the banking sector. The digitization of provided banking services also represents innovations focusing on creating environmentally friendly innovations. Moreover, electronic banking has been used by clients of commercial banks for several years, as it represents easy access to finance, their overview, and other e-banking advantages. The opportunity to use the home environment is irreplaceable for many people. Wasting paper while providing banking operations in a brick-and-mortar branch or spending valuable time standing in a crowd of the bank's clients is an unacceptable idea for many people, especially in the situation caused by the COVID-19 pandemic. This paper compares the electronic banking services of the three largest Slovak banks using the Kano model. The Kano model, through 5 categories of perceived quality by customers, expresses the relationship between their degree of satisfaction and quality attributes. These categories include one-dimensional, attractive, mandatory, reverse, and indifferent attributes of products creating quality. The individual categories of perceived quality change in accordance with the life cycle. They pass from indifferent through attractive, one-dimensional to the category of mandatory quality attributes. This paper focuses on selected types of provided services and innovations in electronic banking, drawing attention to the perception of risk by Slovak bank clients. The authors pointed out the differences among the services offered in individual banks provided within the portfolio of their services and the identification of customer requirements. The findings showed that the customers have not largely mastered the innovations, but they are nevertheless very important from the future perspective. The results of the research could be useful for bank managers to find the best way how to approach clients who approach innovations in banking with distrust and reluctance to adopt them.*
Keywords: electronic banking, innovation, innovation risk, Kano model.
JEL Classification: O33, O39, E59

Introduction. In the current era of the digital world, in a changing environment where consumer demands are constantly increasing, the e-innovation development tempo is also growing. Continuous improvement and comparison with the competition raise the need to bring clients new alternatives. It is the reason why companies strive to innovate and meet their needs (Barbulescu et al., 2021; Molnar and Dupal, 2002).

The term innovation also refers to a product or process, any new type of business-subjective object, which is important not only to invent but also to promote within the company, but also outwardly. It should be noted that this is not just a business-individual novelty. Problems in implementing and enforcing this innovation also play an important role (McKenna and Beech, 2008; Trommsdorff and Steinhoff, 2009).

Entrepreneurs are constantly trying to create value and contribute something new, without considering their motivations, which can be money, the desire for knowledge, and curiosity. Successful companies are not satisfied with just improving or modifying anything that exists. Businesses set high goals and try to create different and new values, variants, and new satisfaction, combine existing resources into a more productive and newer configuration, or transform the material into a resource. High novelty content could be a source of long-term competitive advantage. From this point of view, innovations are characterized as «a change in the profitability of resources or a change in the values and satisfaction that the consumer obtains from a given resource» (Sorescu et al., 2011; Eggert et al., 2011; Cimo, 2010). Cimo (2010) designates many products, services, processes, technologies, processes, and organizational structures that improve the quality of life and those of radical importance as innovative. Also, those that are new or not new but have a new form or are a combination of existing forms.

Concerning the information mentioned above, the paper compares the electronic banking services of the three largest Slovak banks through the Kano model. The study focuses on selected types of provided services and innovations in electronic banking, drawing attention to the perception of risk by Slovak bank customers.
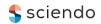
Literature Review. Electronic communication is slowly becoming a common part of people's lives. That is a reason why banks are trying to use this form the best they can, as it saves time, money, and, finally, the environment. Thus, it represents an eco-innovation. Eco-innovation is understood as any innovation aimed at making significant and visible progress towards the goal of sustainable development by reducing environmental impacts or achieving more efficient and responsible use of natural resources, including energy. The definition of eco-innovation by the Maastricht University research group is quite often used. It explains the eco-innovation as the production, application, or use of goods, services, production processes, organizational structures, managerial or business models that are new to the company or users and whose results lead to reducing environmental risks, pollution, and negative impacts of resource use compared to existing alternatives (Carrillo-Hermosilla et al., 2009; Arundel and Kemp, 2009; Egger et al., 2011; Stofkova, 2013). Electronic banking has been used by clients of commercial banks for several years, as it represents easy access to finance, their overview, and other e-banking advantages. The opportunity to use the home environment is irreplaceable for many people. Wasting paper while providing banking operations in a brick-and-mortar branch or spending valuable time standing in a crowd of the bank's clients is an unacceptable idea for many people, especially in the current COVID-19 pandemic. Therefore, electronic banking is a suitable alternative to security and an environmentally friendly administration. With the enormous growth of the possibilities that electronic banking offers to its clients, the threats that represent the security of electronic banking are also growing (Wang et al., 2003; Klimikova, 2008, Stofkova et al., 2014).

The information that is supposed to protect security systems includes especially personal data and funds in accounts, so the threats are high. However, every threat also has its bearer, which can take the form of technical means, people, or natural influences. These are threats that are either caused by intentional action (technical means) or unintentional (human error, technical error). In the case of intentional activity, it is a security incident, and in the case of unintentional activity, it is an attack.

Electronic banking security is an often-discussed area of electronic banking services because there are several risks and threats that not only the bank but also the client has to deal with. There are already many ways to get into a client's account (phishing, pharming, spyware, hacking) (iSafe, 2010, Stofkova et al., 2016). In addition, because electronic banking represents several innovations, these threats are accompanied by innovation risk. The innovation risk exists and represents a potential problem or risk of damage, the possibility of failure, or destruction during the innovation process and in the launching of innovations in the market. It expresses a degree of probability of achieving a result that is different from the expected one.

In most cases, these are mainly the risks accompanying the individual activities of the innovation process of the provided services as risks accompanying the decisions. In the context of the innovation process, these types of risks play a major role: technical, technological, and commercial ones. Technical and technological risks present that the application of innovative principles in practical activities may cause difficulties, or the

time of their application will be very long, or it will manifest itself as a conceptual process risk. Commercial risks include revaluation of the contract, the supplier's ability to innovate, changes in the order, the low adaptation of innovation by customers, etc. (Pfohl et al., 2010; Dupal, 1997). Concerning the information mentioned above, the paper compares the electronic banking services of the three largest Slovak banks through the Kano model. We focus on selected types of provided services and innovations in electronic banking, drawing attention to the perception of risk by Slovak bank customers.

Methodology and research methods. The primary method of the paper is benchmarking comparison based on the Kano model. The Kano model, through 5 categories of perceived quality by customers, expresses the relationship between their degree of satisfaction and quality attributes. These categories include one-dimensional, attractive, mandatory, reverse, and indifferent attributes of products creating quality. The individual categories of perceived quality change under the life cycle – they pass from indifferent through attractive, one-dimensional to mandatory quality attributes. At this moment, customers suppose a certain quality attribute to be attractive, but they may include it among mandatory ones in the future. This rule may not be valid for all types of products. It is important to realize that the perception of each category changes over time. At the same time, attractive quality attributes clearly lead to customer satisfaction. It is important to note that the individual attributes of quality, in their nature, represent the requirements made by customers concerning the product (Loucanova, 2016, Krnacova and Lesníkova, 2012).

The methodology of the Kano model is based on four basic steps:
− Parameters' identification.
− The KANO questionnaire compilation.
− Questionnaire measures.
− Evaluation and subsequent interpretation.

In the first step, the survey parameters were identified. They represented the basic monitored parameters of electronic banking and innovation in electronic banking (Table 2), column Monitored parameters.

Subsequently, the Kano questionnaire was compiled. Based on the methodology of the Kano model, the questions were formulated positively and negatively for each monitored parameter. Respondents had the opportunity to answer on a scale of 1 to 5, thus expressing their strong agreement to strong disagreement with the formulated questions about services in electronic banking they use and which services within internet banking are least necessary. As a part of the questionnaire measures, the survey was applied personally. The total number of respondents reached 1576, so the minimum sample of respondents was met (the confidence interval of 95% and margin of error of 7%).

After the survey implementation through the KANO questionnaire, the KANO model was evaluated. The KANO model evaluates individual questions based on a cross-rule. The specified answer properties were determined, such as attractive (A), mandatory (M), reverse (R), one-dimensional (O), questionable (Q), or indifferent (I) (Table 1.)

Table 1. The Kano model for evaluating specific customer requirements

		Negatively formulated question				
		Strong agreement	Partial agreement	Neutral attitude	Partial disagreement	Strong disagreement
Positively formulated question	Strong agreement	Q	A	A	A	O
	Partial agreement	R	I	I	I	M
	Neutral attitude	R	I	I	I	M
	Partial disagreement	R	I	I	I	M
	Strong disagreement	R	R	R	R	Q

Sources: developed by the authors on the basis of (Ducar et al., 2006; Loucanova, 2016).

The answers were evaluated as follows: if the respondent answered a positively formulated question with a strong agreement and a negatively formulated question with partial disagreement. The property was specified as attractive to the customer. Subsequently, the number or percentage of individual responses is summarized according to the KANO model as an aid to the identification of specific product properties concerning customer satisfaction, where the largest proportions of identified specific product properties determine the final attitude of the monitored group of respondents to identified product requirements. The categories of requirements for the monitored parameters that have an impact on customer satisfaction can be characterized as follows (Ducar et al., 2006; Loucanova, 2016, Loucanova et al., 2021):

− Mandatory (M) – are considered to be natural and automatically expected by customers. They could be marked as primary, respectively, basic, and, therefore, customers deal with them only if they are not met. Their identification is of fundamental importance mainly because their fulfilment is reflected in customer satisfaction, but their deficit and non-fulfilment are immediately reflected in the dissatisfaction of customers. Finally, such a situation manifests in maximum dissatisfaction and the product loses its competitiveness in the market.

− Attractive (A) – those that have a clear effect on customer satisfaction because customers do not expect these requirements. Customers do not indicate dissatisfaction if the attractive requirements are not met.

− One-dimensional (O) – are those requirements in which fulfilment leads to satisfaction and, in case of non-fulfilment, to customers' dissatisfaction. There is a direct linear relationship between meeting these requirements and customer satisfaction. The higher the compliance rate, the more satisfied the customer.

− Indifferent (I) – requirements that are not decisive to customers and their fulfilment or non-fulfilment do not influence their satisfaction or dissatisfaction. These requirements are not decisive for the customers, so they are not interested in their fulfilment.

− Reverse (R) – requirements, where the higher their fulfillment level, the greater the customer's dissatisfaction (Loucanova, 2016).

Furthermore, to perform a benchmarking comparison of results for the three largest Slovak banks – Slovak Savings Bank, General Credit Bank and Tatra Bank (known as Slovenska sporiteľňa, Vseobecna úverova Banka, Tatra Banka on the Slovak market) (Meckova, 2021), the weights were assigned to individual identified categories of requirements, which were determined based on the characteristics of individual requirements, as it is defined in scientific literature as follows:

− mandatory requirements (M) have weight 3;
− attractive requirements (A) have weight 2;
− one-dimensional requirements (O) have weight 1;
− indifferent requirements (I have weight 0;
− reverse requirements (R) have weight 1.

The value for the customer was obtained based on the multiplication by the weight of the relevant requirement. The final sum of all requirements presents the total value of the innovation from the perspective of the client or customer (Loucanova, 2020).

Results. Based on the above methodology, a survey was realized by the Kano model, where the sample consisted of 1576 respondents. Regarding the respondents' sample structure, the study focused on the questionnaire on their gender, age, and the way how they usually communicate with the bank and access their account. In terms of age, the respondents were sorted into four categories. The lowest age category started at the age of 15 years because clients could open their first student accounts at this age. The sample structure consisted of 47.27% men and 57.73% women. Regarding account access and the most common form of communication with the bank, the survey showed that 60.46% of respondents mainly use electronic banking – 50% via internet banking and 10.46% via smart banking. 39.54% of all respondents prefer personal communication in the brick-and-mortar branch.

The respondents' requirements for the monitored parameters were identified based on the obtained data and their processing according to the methodology through the cross-rule applied within the methodology (Table 1). Within the basic monitored parameters, the possibility of payment and tracking the account movements was identified as a mandatory requirement, which the customer takes for granted and automatically expects. Besides, free-of-charge account management was recognized as an attractive requirement that clearly impacts customer satisfaction. The study determined the account's review and payment history, standing orders, and review via mobile or tablet as one-dimensional requirements, which could be characterized as a direct linear relationship between meeting one-dimensional requirements and customer satisfaction. Payment templates, display of balances and product development in graphs and list of branches and ATMs do not affect the satisfaction or dissatisfaction of respondents.

Other monitored parameters had a reverse effect on the respondents. It means that the higher the rate of their fulfilment, the greater the customer dissatisfaction. The final table summarized the above results to compare them for individual banks through benchmarking comparison of electronic banking services of Slovak banks (Table 2). Besides mentioned data, monitored parameters, and identified respondents' requirements for monitored parameters through the Kano model, the weight of each parameter is stated in the given table. It was determined concerning the characteristics of the identified respondents' requests. Suppose the monitored parameter has been identified as mandatory and is important to customers' satisfaction

(customers immediately realize its absence). In that case, it will be reflected in their maximum dissatisfaction, and its value represents the greatest weight 3.

Table 2. Benchmarking comparison of electronic services offered of Slovak banks

Monitored banks			Slovak Savings Bank		General Credit Bank		Tatra Bank	
Monitored parameters	Requirement	Weight	Occurrence	Value	Occurrence	Value	Occurrence	Value
Basic								
Payment and account movements	M	3	1	3	1	3	1	3
Online purchase of products	R	-1	1	-1	1	-1	1	-1
Free-of-charge account management	A	2	1	2	1	2	1	2
Account overview and payment history	O	1	1	1	1	1	1	1
Payment templates	I	0	1	0	1	0	1	0
Standing orders	O	1	1	1	1	1	1	1
Set up SMS and notifications about account movements	R	-1	1	-1	1	-1	1	-1
SEPA transfer	R	-1	1	-1	1	-1	1	-1
Display balances and product development in graphs	I	0	1	0	1	0	1	0
Account statement in PDF format	R	-1	1	-1	1	-1	1	-1
Balance of assets and liabilities	R	-1	1	-1	0	0	1	-1
Online purchase of products - via mobile or tablet	R	-1	1	-1	1	-1	1	-1
Overview and history of payments - via mobile or tablet	O	1	1	1	1	1	1	1
Payment templates - via mobile or tablet	R	-1	0	0	0	0	0	0
Standing orders - via mobile or tablet	R	-1	0	0	1	-1	1	-1
List of branches/ ATMs	I	0	0	0	1	0	1	0
Innovation								
Spending report	R	-1	1	-1	1	-1	1	-1
Push notifications about account movements	R	-1	1	-1	1	-1	1	-1
Contactless payment by mobile	R	-1	1	-1	1	-1	1	-1
Payment by phone number	R	-1	0	0	1	-1	1	-1
Opening an online account	R	-1	0	0	1	-1	1	-1
Facial biometrics	R	-1	1	-1	0	0	1	-1
Barcode scanner	R	-1	1	-1	1	-1	1	-1
QR codes scanner	R	-1	1	-1	1	-1	1	-1
IBAN scanner	R	-1	1	-1	1	-1	1	-1
Fingerprint sensor	R	-1	1	-1	1	-1	1	-1
Withdrawing from an ATM via mobile phone	R	-1	0	0	1	-1	1	-1
Payment by watches	R	-1	1	-1	0	0	1	-1
Recharging credit via Facebook	R	-1	1	-1	1	-1	1	-1
Export transactions to CSV, XML formats	R	-1	1	-1	1	-1	1	-1
Accounting statements	R	-1	0	0	0	0	1	-1
Batch payments	R	-1	0	0	1	-1	1	-1
Deposit management in EUR	R	-1	0	0	0	0	1	-1
Number of innovations			11		13		17	
Value for the customer				-9		-11		-16
The value of innovation for the customer				-11		-13		-17
Value of basic parameters for the customer				2		2		1

Sources: developed by the authors.

Attractive requirements - if they clearly impact customer satisfaction, they are assigned a weight of 2. One-dimensional requirements, the fulfilment of which leads to customer satisfaction and their non-compliance causes dissatisfaction and have a linear character, represent weight 1. Requirements without influence do not weight 0. Reverse requirements (the higher the rate of their fulfilment, the greater the customer's dissatisfaction) weight -1.

Subsequently, the occurrence of the monitored parameters for the monitored banks operating in the Slovak banking market was determined. It describes whether or not the given bank provides the service within electronic banking. The monitored parameter - free account management - occurs in all banks, as each provides such a service under certain conditions. It was determined the number of innovations that individual banks offer to their customers by summing up the incidence of innovations within individual banks. The value of the monitored parameter for the respondents was calculated by multiplying the occurrence of the provided service (monitored parameter) by the weight of the monitored parameter. The final value for the customer perceived by the respondents was figured out by summing up the individual values of the monitored

parameters within the individual banks. The values of innovation for the customer and the value of the basic parameters of electronic banking for the customer were also set up.

Based on the above and the results, benchmarking comparisons of electronic banking services of Slovak banks were processed (see Table 2). It shows that Tatra Bank is the benchmark in electronic banking innovations, as it provides the largest number of innovations in the market (17 together). In internet banking, it excels with its offer of innovations, providing its clients with the widest range of options for handling their accounts. Tatra Bank provides clients with classic payment options and account overview (provided by each bank). Still, it also allows clients to log in using facial biometrics and many other functionalities, which clients consider contradictory. That is why this bank is in last place in terms of value for the customer.

From the benchmarking comparison of electronic banking innovations, it can be stated that the customer has not yet accepted the innovations provided by electronic banking, as it mainly uses basic operations such as standing orders, account overview, payment history, etc. The respondents have not significantly mastered innovation as it results from the overall evaluation, but there are also respondents who use individual innovations. In general, it is assumed that innovations in electronic banking create a reverse requirement, which is characterized by the fact that the higher their compliance rate, the greater the customer dissatisfaction and the resistance to change.

As it is presented by Slavik (1999), Dunphy and Herbig (1995), or Oreg and Goldenberg (2015), resistance to change (innovation) is a natural reaction and is part of the process of adaptation to change (innovation). From a life-cycle perspective, it could be stated that most electronic banking innovations are in the launch phase when customers still get to know them, and only courageous clients use them. The theory of contradiction also confirms the rejection of innovations in the launch phase (Loucanova, 2019). Veber et al. (2016) stated that innovation brings small business benefits in the initial phase. As it is a new product, it is important to gain its place in the market, reach customers, and will gradually bring the desired effect to the company. In terms of risk, there is a high commercial risk, which is largely influenced by the technological risk assumed by both parties during this phase - banks that invest in the innovation process from a technology perspective, as well as customers who are exposed to security risk. However, banks bear a greater risk as they take technological, commercial–economic, and security risks.

These results show that innovation in the banking sector is pushed by technology and not pulled by demand, which also causes their initial lack of interest in offered innovations. This approach to innovation «pushed by technology» suggests that businesses use the knowledge of scientists, inventors, and innovators to increase the added value of products. From a long-term perspective, applying these scientific inventions in practice represents the potential of business leadership, as it is stated by Bacisin (2010) or Dearing and Kreuter (2010). The strategy of such innovations is also based on the needs of internal customers, the needs of the business unit as a manufacturer or a providing subject, and the needs of certain stakeholders.

The needs of internal customers represent the requirements for high technical and economic level, quality, economy, and timeliness of delivered products, semi-finished products, services, and information in follow-up and cooperating internal production, auxiliary, service, administrative, and other processes. They represent the core relations of internal entities as internal customers. Their business behaviour monitors the fulfilment of the mission and basic goals of the business unit as a whole. It means that the needs and requirements of all internal entities, such as internal customers, include eliminating shortcomings and inefficiencies, as well as increasing the technical and economic level of their organizational structures, processes taking place, and outputs from them to achieve maximum values for the customer for all exchanged and cooperated internal products of the company within the mission of all elementary goals of the company. Each of the surveyed banks provides positive values for the customer in terms of basic parameters and functionalities (e.g. Tatra Bank represents value 1 in terms of satisfying the basic parameters of electronic banking for customers). Innovations pushed by technology represent negative values perceived by the customer because they do not represent their needs, and their adaption by customers is essential (Tatra Bank represents a value of up to minus 17 for customers in terms of electronic banking innovations).

A similar balance of basic requirements representing the fulfilment of basic goals of banks (positive values of basic parameters of banking functionalities for customers) and creation of innovations pushed by technology (negative values of perception of innovations of banking functionalities by customers) can be observed at all banks in the Slovak market (Table 2). These needs of internal customers are understood as the needs and requirements of relatively autonomous in-house processes and process-structured production units.

They create a very dense web of internal innovation needs, which are saturated mainly by process innovations. Within the banking sector, the digitization of provided banking services represents these process innovations with a focus on maximizing the elimination of papers and creating environmentally friendly

innovations (ecological innovation representing green banking). The necessity of these ecological innovations pushed by technology is very important, even though they first provoke resistance to change in a customer, which is confirmed by the current situation in which we find ourselves - the COVID-19 pandemic. Nowadays, it is important to avoid personal contact, which is made possible by electronic banking. It is practical to have finances under constant control in the digital environment, which represents not only ecological innovation (paper minimization) but, in this case, also socially responsible innovation in green banking, where we can conduct banking operations in the safety of home (Loucanova et al., 2021).

However, as the survey shows (more than 39 % of respondents prefer a visit to the bank's brick-and-mortar branch), green banking faces barriers (Sita, 2022), as innovation in the banking sector, which is pushed by technology, often encounters the problem of customer acceptance. Their adaptation to customers is longer than demand-puled innovation. Nowadays, many clients do not even have e-mail addresses and have low digital literacy, which represents barriers to green banking.

However, the banking sector is not only a sector that focuses on maximizing paper elimination and transforming these operations into the digital environment in the context of eco-innovation. As Daniel Acs of the Bioeconomy Cluster states, banks are institutions that can support ecologically important projects and this way meet the idea of green financing of projects based on the principles of sustainable development, thus supporting eco-innovation (SITA, 2022). That also points to the fact that green banking, development, and the promotion of ecological innovation have an important place in the world.

Conclusions. Even though market-based innovations in services (this also applies to banking services) do not initially have a credible effect on customers, they still do. It is necessary to introduce them and support their development within their life cycle, as their importance in the future can be high. This statement has been confirmed even today, at the time of the COVID - 19 pandemic, when innovations, which were initially used only by courageous clients, were also common to sceptics and traditionalists at the time of the pandemic. Thus, the use of innovation has increased. In addition, other benefits are expected from introducing innovations in banking, which consist not only in increasing the client's comfort when using banking services but also in creating environmentally friendly innovations, which represent a minimal negative impact on the environment.

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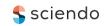
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Еріка Лучанова, доцент, Технічний університет у Зволені, Словаччина

Міріам Ольшакова, PhD., Технічний університет у Зволені, Словаччина

Порівняння інноваційності електронних банківських послуг: на прикладі найбільших банків Словаччини

Стрімкий розвиток цифровізації сприяє постійному зростанню вимог споживачів. Систематизація наукових напрацювань підтверджує вплив нових вимог споживачів на розвиток електронних інновацій у банківському секторі. Автори зазначили, що цифровізація банківських послуг є інновацією, спрямованою на створення екологічно безпечних інновацій. Клієнти комерційних банків вже декілька років користуються послугами електронного банкінгу оскільки він забезпечує легкий доступ до фінансів, їх перевірку та низку інших переваг, зокрема: скорочення витрат паперу під час здійснення банківських операцій у фізичному відділенні банку, віддалений доступ до банківських послуг та збереження часу на очікування в черзі, що є суттєвим в умовах пандемії COVID-19. У ході дослідження застосовано модель Камо з метою порівняння електронних банківських послуг на прикладі трьох найбільших банків Словаччини. Застосування моделі Камо передбачає розподіл сприйняття якості банківських послуг за 5 категоріями залежно від рівня задоволеності клієнтів якістю банківських послуг: одноманітні, привабливі, обов'язкові, реверсивні та індиферентні. Авторами відмічено, що окремі категорії сприйманої якості змінюються відповідно до життєвого циклу банківських послуг: від індиферентних до привабливих, від одноманітних до категорії обов'язкових показників якості. У статті розглянуто окремі види банківських послуг та інновації в електронному банкінгу, аналізуючи сприйняття ризику клієнтами досліджуваних банків Словаччини. Результати дослідження вказують на відмінності в послугах, які надаються окремими банками відповідно до портфеля їх послуг та вимог клієнтів. Автори прийшли до висновку, що попри недостатній рівень освоювання, інновації в електронному банкінгу є важливими для клієнтів в перспективі. Результати дослідження мають практичне значення для керівників банків та можуть бути використані при пошуку оптимального підходу до клієнтів, які мають скептичне відношення до інновацій у банківському секторі.

Ключові слова: Інтернет-банкінг, інновація, інноваційний ризик, модель Кано.