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**RESIDENTIAL USE OF DIGITAL FINANCIAL  
SERVICES - BACKGROUND INSIGHTS**

*Theses of doctoral dissertation*

Szeged, 2021

**University of Szeged**  
Faculty of Economics and Business Administration  
Doctoral School of Economics

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## **Table of contents**

1. Justification of the choice of topic and the significance of the research	1
2. Aims, hypotheses and structure of the dissertation	3
3. Methodology and sources of the research	13
4. Scientific results of the dissertation and possibilities of usability	15
5. Future research directions	28
6. Literature used in the thesis booklet	29
7. Own publications on the topic of the dissertation	32

# **1. Justification of the choice of topic and the significance of the research**

In my dissertation, I assessed the residential use of electronic financial services, which may be supported by external technical services and own digital devices. Individuals' personal characteristics related to finances can also foster the usage, and they may be influenced by their demographic characteristics; I examined the relationships between these factors.

One of the elements of an individual's division into a socio-economic environment is realized through the management of his/her finances. The technical revolution of the third third of the 20th century - telecommunications and technology - created a radically new situation in the structure of the financial system.

Clearing, international bank card networks, and the use of the Internet significantly changed the availability, speed, and vulnerability of money and money-related services. Beyond the use of credit cards and electronic banking, further innovations are expected in the money market. More and more Fin-Tech (Financial Technology) companies appear on financial markets worldwide, which makes financial services cheaper, more efficient and more convenient with technological innovations.

In order to increase the competitiveness of the Hungarian economic environment and payment market, the Hungarian National Bank (Magyar Nemzeti Bank - MNB) introduced the immediate payment system (on March 2, 2020, instead of the planned July 1, 2019, when the system's live trial operation started). As a result of the implementation, payment transactions

between domestic accounts can be processed in a few seconds 24 hours a day, and with this infrastructure, market participants can also provide other additional services.

One of the important pillars of innovation is security, which can be implemented by using secondary identifiers (e-mail address, telephone number) (even) without even knowing the bank account number. Innovative transactions can take place directly between parties, without the involvement of a bank. Innovative electronic payment methods, which are becoming more and more widespread, can help reduce today's very large cash flow and can whiten the economy - thus increasing the country's tax revenues.

The products of financial service providers reach the target groups among residential clients if the latter have the appropriate tools, knowledge and competencies. A survey conducted in the summer before the Covid pandemic, which became global in 2020, may demonstrate a condition when fear of infection did not “force” the use of digital services.

The results of the research can help to reveal which levels of financial literacy and digital competencies are worthwhile to be improved and by what means. Also, it can provide an understanding of which social groups are lagging behind and are may lose ground from the market of digital financial services.

## **2. Aims, hypotheses and structure of the dissertation**

In order to use digital financial products and services in an inclusive financial environment, users must not only acquire financial knowledge and skills, but also they need to have digital competencies to the usage of their own devices. In addition, it is important to have a positive financial attitude, a sense of security and trust in technical innovations. Following these is an additional challenge for customers. My aim was to examine the correlations of these factors and to group the respondents based on their results and demographic characteristics, prioritizing the identification of groups at risk of financial exclusion. With this knowledge, the strengths and weaknesses of each segment can be explored, which can provide guidance on possible areas for development.

In my study, I seek confirmation or refutation for the following hypotheses:

International results show that men perform better in financial knowledge tests. In Hungary, this superiority is not realized in all cases, or the gender difference is not significant.

**H1:** Results of respondents about financial knowledge related to services used for financial management (savings, credit, insurance, digital financial products) are higher than their knowledge about those fields which don't need practical application, or less of them (central bank base rate, pension, currency conversion).

**H2:** The combined average level of digital competencies does not reach the level of financial literacy, and there are large

differences between the results obtained in different segments; however, there is a positive correlation between performance in the two main areas.

**H3:** There is no gender gap in the digital competences needed for digital financial services.

**H4:** When choosing digital services, the most important thing for individuals is to trust the service providers i.e. to be able to know their funds and data are handled in a secure way.

**H5:** Larger types of settlements, usually with more developed infrastructure are more likely to use electronic services, as the supply of financial institutions is also higher there. Furthermore, I hypothesized that personal conditions (level of financial literacy and digital competencies) have a stronger influence on the use of digital financial products than technical conditions (banking infrastructure and the ownership of digital assets).

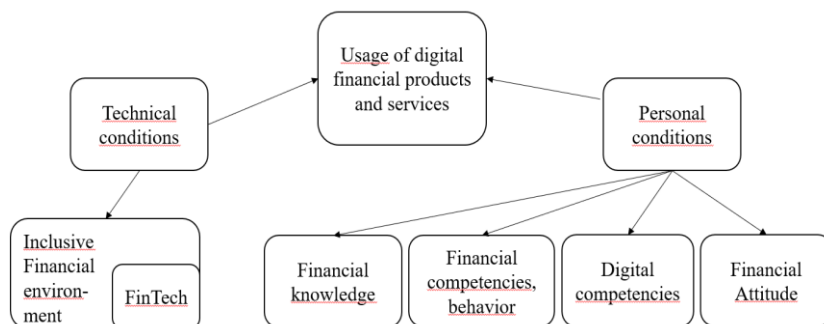
**H6:** Changes in the digital competence level of the population do not keep pace with the level of technical development in the financial field.

**H7:** Individuals included in the study can be distinguished by the method of cluster analysis on the basis of their level of financial knowledge and digital competencies, which can be used to describe the demographic characteristics of the worst performing groups at risk of financial market exclusion.

The theoretical basis of this dissertation is provided by the literature review of the conditions required for the use of digital financial services (Figure 1). The technical background basically the inclusive financial system. As formulated by OECD, financial inclusion is the process of making a wide range of

regulated financial products and services accessible and usable in an affordable, timely and appropriate manner, using innovative approaches that provide existing and even more customized products, including financial awareness and education to promote financial well-being while promoting economic and social inclusion. (ATKINSON – MESSY [2012]).

*Figure 1: Terms of use for digital financial products*



*Source:* Own editing

There are several conditions for using digital financial services: an inclusive financial system, within which the emergence of the fintech phenomenon is important; the level of financial culture in which digital competencies play a key role today (Figure 1.). A review of literature introduces empirical research findings on these topics.

For the overall financial well-being of individuals, the goal is to maximize access and use while minimizing the number and proportion of people excluded from the money market. Income inequalities, macroeconomic imbalances, deficiencies in the financial sector, inadequate institutional quality (ROJAS-SUAREZ [2010]), and insufficient information on financial services all hamper the process of financial inclusion. New



developments in mobile banking and the use of financial services on the Internet open up new channels for access to formal financial services, which in certain circumstances may weaken their effect (CÁMARA - TUESTA [2014]).

By the 2000s, the spread of information technology in the financial market had greatly changed financial services (KOVÁCS – TERTÁK [2016]), the vast majority of transactions are already carried out in the digital space. Digital financial service providers (FinTech, BigTech companies and traditional banks) offer innovative, cost-effective services using the latest technologies and techniques, either by supporting each other or by ousting competitors from part or all of the value chains (MNB [2020], GOMBER et al. [2017]).

In addition to infrastructural conditions, personal characteristics of individuals are also necessary for the execution of transactions: financial knowledge, conscious behavior and positive attitude - these mentioned sub-areas are all part of the financial culture. And I consider the existence of digital competencies to be essential for managing finances in the digital space.

Different definitions have been developed that consider different areas of financial literacy to be of paramount importance. According to theories that focus on understanding financial concepts, these are essential for an individual's daily financial operations (BOWEN [2002]), are related to the quality of financial management (HILGERT et al. [2003]), and they help to understand the consequences of risk and diversification. (KADOYA - KHAN [2019]).

In addition to knowledge, the existence of skills (eg numeracy - LUSARDI [2012]) also plays a significant role. According to MOORE [2003], people can be considered financially educated if they are competent and they can prove that they have used the acquired knowledge.

Among the definitions based on the relationship of several factors, the most common is that of the OECD, according to which financial culture is a combination of awareness, knowledge, skills, attitudes and behaviors that is necessary for a well-founded financial decision-making, thereby achieving individual financial well-being (ATKINSON - MESSY [2012]).

Financial literacy cannot be considered as the ability to read and write the financial language. Rather, financial culture is a concept that needs to be studied because its components or its characteristics vary with time and place (BAY et al. [2012]). The globalization and digitalisation of the financial market make it more and more necessary that, in addition to the conditions required for the use of electronic services, the study of digital competencies facilitating orientation and administration in the digital space also play a key role in financial culture research. The definitions required for participation in the digital space can be grouped around two concepts (GALLARDO - ECHENIQUE et al. [2015]):

Digital Literacy is a complex set of cognitive, motor, sociological, and emotional skills that are essential for users to function effectively in a digital environment. It is a knowledge that is needed in the digital age to understand, produce, and discuss meanings in a culture of strong images, words, and sounds.

Digital Competence is more of a technical aspect: it refers to the use of information and communication technologies (ICT). It includes the acquisition, evaluation, confident and critical use, storage, production, presentation and exchange of information, as well as communication via the Internet and participation in collaborative networks.

I agree that digital competence is the ability to mobilize various “literacy” skills to manage information, communicate knowledge and solve problems in a developing society. This requires four factors:

- information literacy - to manage digital information;
- computer literacy - to manage different data formats;
- media literacy - for analyzing and creating multimedia messages; and
- communication skills - for safe, ethical and civic participation as a digital identity (GALLARDO - ECHENIQUE et al. [2015]).

UNESCO outlines three levels of digital competence:

- functional skills include basic knowledge of how technology works and provide access to technology;
- intermediate general skills essentially mean the intelligent and helpful use of digital technologies, including content creation and security (knowledge of the importance of risks and protection);
- higher-level skills are related to the specific competencies needed by ICT professionals, such as programming skills, critical thinking and innovation (BROADBAND COMMISSION [2017]).

The DigComp2.1 system for measuring intermediate skills, consists of five competence areas:

- basic information literacy
- digital communication and collaboration
- creating digital content
- security
- problem-solving.

Each area has seven skill levels that aim to create a complex structure of what digital competences contain and how to measure the different levels. According to the classification of DigComp (CARRETERO et al. [2017]), the following competencies may be important in conducting financial transactions:

### *1. Basic information literacy*

All three competencies in this category are applicable in the field of finance:

#### *1.1 Browsing, searching and filtering data, information and digital content*

In the financial field, this may include the search for savings methods or the types of loans, with using filters appropriate to your situation, such as the deposit time or the size of the repayment installment.

#### *1.2 Evaluation of data, information and digital content*

Evaluation of the found information - whether it is a favorable investment or a low-risk loan in the current financial situation.

#### *1.3 Management of data, information and digital content*

Grouping the collected data in tables, according to an established priority order before financial decision-making.

## 2. Digital communication and collaboration

In my opinion, three topics from the scope of competence are in connection with the activities related to finance.

### 2.1 Interaction between digital technologies

To store, group and summarize financial information found in various media (radio, television) and Internet platforms (website of a financial institution, news portal, podcast) using a spreadsheet program on a laptop or a mobile application.

### 2.2 Cooperation through digital technologies

Non-cash forms of financial cooperation are becoming more widespread, either in the business sector (such as crowdfunding for an achievable goal) or among the general public. For example, a joint dinner bill of a group of friends is paid by credit card by one of the members, after which the participants send their share directly to him (peer-to-peer payment).

## 3. Security

After the global economic crisis, trust in financial services and institutions was shaken in many cases; globalization and digitalisation have also generated new threats in the field of finance (phishing). Digital competence in finance is related to two areas:

### 3.1 Device protection

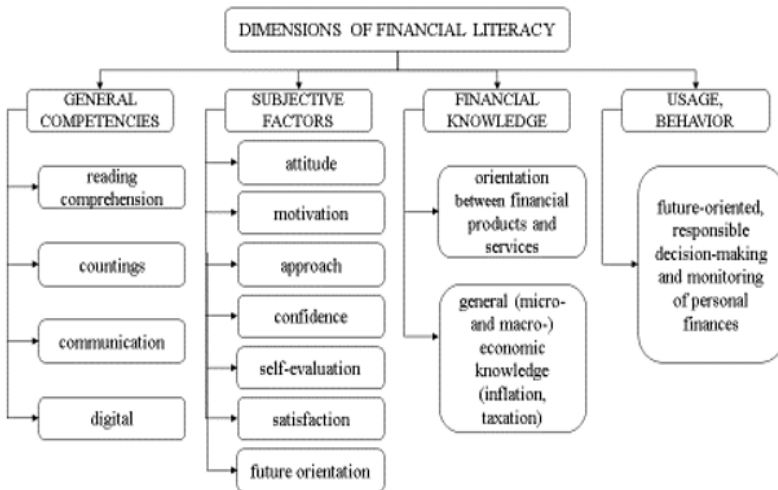
### 3.2 Protection of personal data and data protection

The two sub-areas are closely connected, as the protection of the devices against unauthorized persons also guarantees the security of our data. Personal and financial data (bank account, financial investments) are available on our computers and mobile phones, therefore the protection of

devices against strangers is essential, for protection there are already many ways, such as password, fingerprint reader and face recognition. Separate storage of bank cards and their PIN codes can also provide protection against financial intrusion.

The term digital competence has spread in Hungary as well, and I also used it in my research, when I investigated the competent use of tools. I consider the constant adaptation to new technologies and the ethical application in the financial field to be included in this concept. In my dissertation, I try to assess the achievements in the fields of data and device security, information acquisition and orientation, communication and cooperation from the dimensions listed by DigComp2.1. Also I'd like to outline the connection between financial culture and the use of digital financial services based on my questionnaire.

*Figure 2: The dimensions of financial culture*



*Resource: Own editing*

General competencies help to acquire financial knowledge, but financial behavior is greatly influenced by subjective factors (Figure 2).

New information and communication technologies (such as the Internet) pose challenges to the individual both in everyday life and in the financial field, so I classified digital competencies in the group of general abilities and skills.

### **3. Methodology and sources of the research**

The questionnaire I compiled was filled by the interviewers of the Central Statistical Office (Központi Statisztikai Hivatal - KSH) during the collection of population data. The sample was created from approximately 500 people - who were selected during a group sampling procedure by KSH. The sampling sought to be representative by gender, age, type of settlement and regions. I recorded the information from the paper-based questionnaires with the help of Excel and I used Excel Gretl and IMB SPSS Statistics versions 24, 26 and version 27 to process the data.

Based on the supply level of financial products and digital tools, I characterize the members of the sample with distribution ratios. I examined the correlation of possession and use by demographic indicators using cross-tabulation analysis and chi-square test, and in case of its non-fulfilling condition I examined the existence of the relationships between the factors by Fisher-test. I characterized the closeness of the relationship between two nominal (e.g., gender and own vehicle) and one nominal and one ordinal variable with a Cramer index, which can take up a value between 0 and 1. Zero indicates independence, a higher absolute value shows stronger relation. There is a correlation between data measured on a ratio scale (such as age and the number of digital financial devices used frequently), the strength of which is calculated by SPSS at a significance level of 1 or 5%, and the Pearson's correlation index ranges from -1 to +1. A higher absolute value indicates a stronger connection, the plus/minus sign shows its direction.



I ordered questions related to financial knowledge and digital competencies in various categories. Dividing the number of correct answers by the maximum number of questions in the category, I obtained the achievement rates for the given group, thus making the skills in different areas comparable.

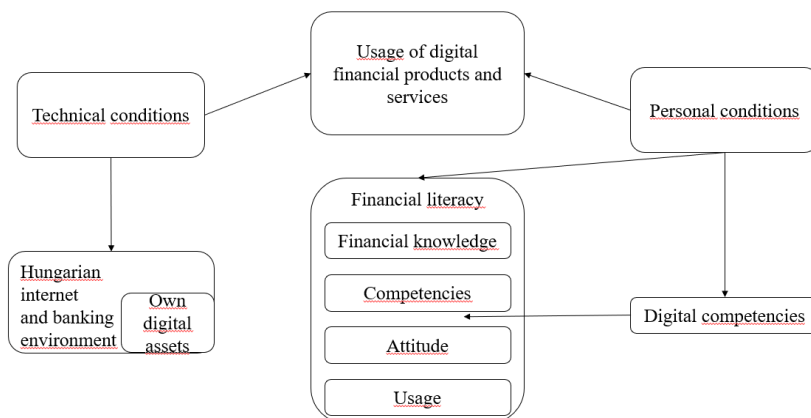
In the case of two criterion variants, I compared the ratios of each group with a two-sample t-test, and in the case of several criterion variants with a variance analysis. The average differences of the group results from the average value were compared by the Levene test, because other results may be significant with different standard deviations. In addition to the standard deviations, which were considered to be the same during the variance analysis, I determined the differences of the group averages with Bonferroni and Tamhane tests, and the SPSS program package also provided the confidence interval for the differences with 95% confidence.

Due to the diversity of the topic, a large number of new variables emerged based on the answers to the questions on financial literacy and digital competences. To reduce their number, I used factor analysis, for which I checked the existence of the necessary criteria for implementation based on the Kaiser-Meyer-Olkin (KMO) and Bartlett tests. Using the factors as new, latent variables, I organized the respondents into groups by implementing cluster analysis. I characterized those in the group according to financial literacy, digital competencies, demographic and supply characteristics, and the use of digital financial devices.

## 4. Scientific results of the dissertation and possibilities of usability

In my research during the detailed analysis of the questionnaire data - in the order of the literature review - I examined the environmental and material conditions necessary for the use of digital financial services. Also, I was focusing on the results achieved by individuals in the field of financial knowledge, competencies and the attitude also in the context of demographic characteristics and its correlations with the use of digital financial products (Figure 3).

Figure 3: Survey conditions and structure of results



Resource: Own editing

### Formulation of research results and theses

The population is generally well equipped with external technical conditions. The penetration of internet services, which is essential for the use of digital financial services, provided 89.0% coverage to customers in Hungary in the summer of 2019 at the time of the population survey, which was then slightly

above the European average (87.7%) (INTERNET WORD STAT [2019]). A larger proportion of people living in small settlements in the countryside are physically away from financial institutions' personal services, and although the branch network of financial institutions has declined somewhat, members of the Hungarian banking system offer their partners, at least partially, digital solutions. The digitization of financial products is facilitated by the emergence of FinTech companies - in 2018 there were more than hundred such companies in Hungary (MNB [2020]) - a significant part of them cooperate with traditional banking players, and most of their existing services are related to various forms of digital payments. 83.5% of respondents possess at least one of the modern digital devices (smartphone, tablet, laptop / notebook); they are more widespread in larger, more developed settlements and in the central and western regions than in the eastern part of the country.

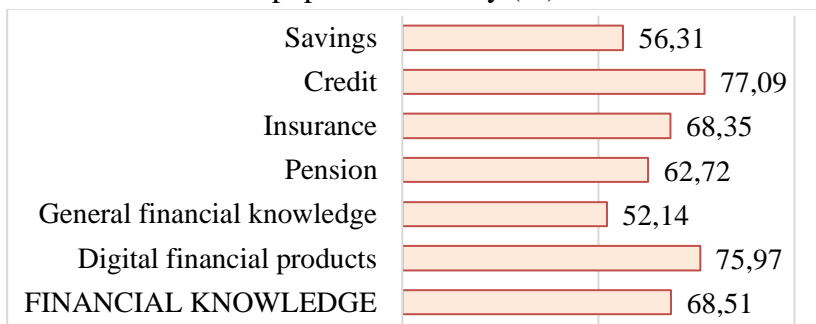
My first hypothesis regarding personal conditions has been partially confirmed, the following thesis can be formulated:

**T1: Among the financial management services, respondents achieved a higher level of financial literacy in credit, insurance and digital financial products than in areas that do not or less often require practical application (central bank base rate, pension, currency exchange). The worst performance can be seen in the area of savings.**

In the area of financial literacy, overall, respondents performed almost at the same level (68.5%) (Figure 4) as the OECD 2010 data (69%). In the 2015 OECD survey, 60% of the Hungarian population did not reach the minimum expected 71%

in the field of financial literacy (POTÓCZKI [2017]), in this current survey this proportion is 55%; the proportion of correct answers varies from area to area according to the respondents' residence.

*Figure 4: Results in the field of financial literacy based on the population survey (%)*



*Resource:* Own research and calculation

The low performance in the area of savings and the not very high performance related to pensions raise the question of **strengthening long-term thinking and self-care of individuals**. Lack of savings in unexpected life situations can cause huge problems. The current form of financing the pension system is becoming increasingly difficult to sustain as the population ages, so **self-sufficiency must play an increasingly prominent role in people's lives**. It is important for individuals to be able to learn about finances, to implement the protection of their data, and to be willing to cooperate in the electronic world, which means that the **development of digital competencies in several areas is extremely important**.

I compared the proportion of correct answers obtained in the financial literacy test and the digital competency test.

Respondents performed almost thirty percentage points lower in the latter area (Table 1).

*Table 1: Average of results achieved in the area of digital competences (%)*

Area of competence	Man	Woman	Together	Sig. (2-tailed)
Communication, cooperation	6,85	6,65	6,80	0,91
Getting information	34,90	30,79	32,60	0,25
Device protection	37,94	34,55	36,20	0,25
Digital privacy	84,44	84,7	84,50	0,91
DIGITAL COMPETENCES	41,05	39,19	40,05	0,27

*Resource:* Own research and calculation

High level of data protection required by financial service providers is very important to customers, outstanding results achieved in the field of data security can be seen as evidence. Using combination of very simple device protection methods (password, shape drawing) is not yet typical of the respondents, this can be further developed. A survey before the outbreak revealed that digital communication and cooperation on finance was barely typical. Respondents tried to solve their financial problems on their own, and if they needed help, they used personal support. The positive synergy between financial literacy and digital competences, with the exception of the communication and collaboration sub-areas, is present in the day-to-day use of electronic financial services, and there is a positive relationship between the results achieved in the two main areas (0.444). Based on the third hypothesis, the following thesis is true:

**T2: The level of digital competencies required to manage finances lags behind the results of the financial literacy test; performance also varies from sub-area to sub-area; and there is a positive, moderate relationship between the level of financial literacy and digital competencies.**

The correlation between **the level of financial literacy and digital competencies** raises the possibility that the two areas **could be developed most effectively simultaneously**, through practical, lifelike examples, with the opportunity to discuss emerging financial problems.

Gender differences are also often highlighted in research, as there are countries where this is justified by religious, ethical or other traditions. In Hungary, the participation rate of women in secondary and higher education has been higher than that of men for decades. Although in many countries women perform worse on financial literacy tests than men, in Hungary this is balanced between genders. Digitalisation affects everyone, and although women are less likely to focus on IT training, they are equally involved in navigating in the digital space. My third hypothesis was confirmed:

**T3: There is no gap between the performance of men and women in the areas of digital competencies required for finance (communication and cooperation, obtaining information, device and data protection), there is no detectable significant difference.**

There is no quantifiable significant difference between the results of the genders regarding digital competencies, either by sub-area or jointly (Table 1).

An important milestone in financial attitude is the trust in service providers and their products; I examined this through the choice motivations of payment methods - digital and cash. Younger and more educated, mostly intellectual workers prefer electronic procedures to a greater extent. Those who prefer to use cash, who trust it better and who are distrustful of digital methods, include in particular older, inactive economic operators. Potential customers can also enter the market of electronic payment methods, as a large proportion of respondents only paid with banknotes and coins because they did not have the opportunity to use digital services. The trust of those who accept digital payment procedures is based on a higher level of financial literacy; they were more than thirty percentage points better on the knowledge test than those who mostly pay in cash.

The respondents to the questionnaire confirmed my fourth hypothesis, on the basis of which the fourth thesis holds true:

**T4: The most important aspect of choosing digital services is security, which means that customers trust that their service provider will provide them secure financial products and that their data will be protected.**

Extensive information, **thorough financial knowledge** - which can be acquired most effectively **with the help of the internet** - **is a breeding ground for trust**, which increases the number of customers potentially entering the digital financial market.

I examined the correlations between the respondents' usage habits related to priority financial services (paypass, netbank,

mobile bank, telebank, mobile payment, mobile wallet) and their living environment (settlement type, geographical location).

People in the eastern regions are lagging behind in the use of electronic financial products (Figure 5). The use of digital financial products by people living in villages is basically related to the lower level of their personal conditions - financial knowledge and digital competencies. In the study, the correspondence analysis showed that the migration of people with higher education is visible in these areas, and the lower level of education influences the phenomenon. The multiple correlation coefficient describing the relationship between the frequency of use of electronic financial services and the technical conditions of individuals and their personal results on tests is significant ( $p < 0.05$ ), there is actually a correlation between the factors.

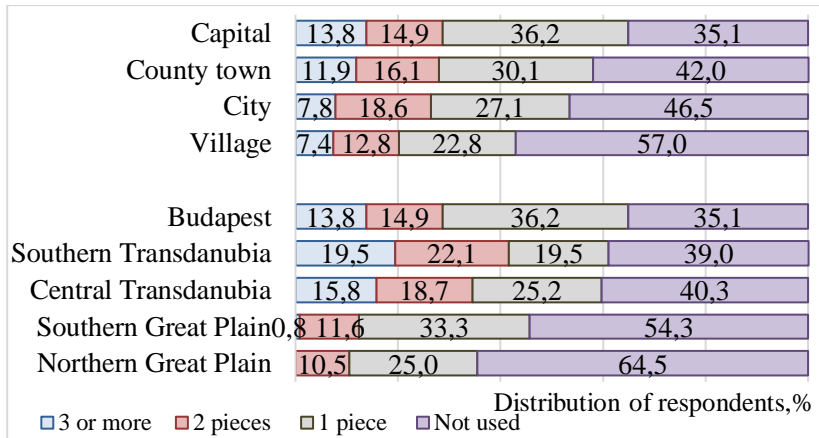
Financial literacy, digital competencies and owning a digital device largely explain the fluctuations in the frequency of use of electronic services - the order of listing also marks the ranking of relationship strength - the banking infrastructure alone is not a significant variable in this case. Based on the summary of the related results, the fifth thesis can be formulated:

**T5: The use of digital financial services depends on the size of settlement. However, the conditions of the banking infrastructure in the place of residence do not always have a significant effect on the use of digital financial services. The frequency of use of electronic financial services is more closely related to the level of financial literacy and digital competencies (personal expectations), than the availability**



**of financial institution infrastructure and the possession of one's own digital device (technical conditions).**

*Figure 5: Distribution of respondents based on the number of used digital financial services by type of settlement and region*



*Resource:* Own research and calculation

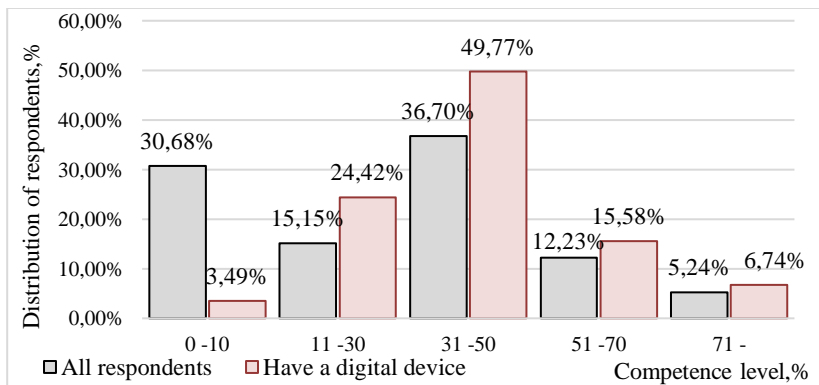
The establishment and strengthening of participation of individuals in the digital financial market must be implemented primarily by **expanding financial knowledge**, and by **developing digital competencies**. Equal opportunities can prevail most when this is already realized **in public education**.

Although Hungary is in a better position than the EU average in terms of Internet access, it is in the middle in terms of residential use, which is largely due to the use of social networking sites. The level of the most basic digital skills of Hungarian citizens has been stagnant for several years according to the DESI (Digital Economy and Society Index) (EC [2020]), which does not help individuals to get to know more complex financial services, their careful selection and frequent use.

In the population survey, the average level of competencies of those with digital devices required to conduct electronic financial transactions responsibly: 40%, while the rate for all respondents is only 33.4%; for more than half of the questions, one-fifth of the respondents could only give an adequate answer (Figure 6). Based on all this, the sixth thesis can be formulated:

**T6: The level of individuals’ digital competences required by the technical development in the field of finance lags behind, the population cannot keep up with the pace of financial-technical progress.**

*Figure 6: Distribution of survey participants based on their level of digital competence related to finance*



*Resource:* Own research and calculation

The range of digital financial services is becoming wider, but the range of substantive users is still quite limited. The penetration of products can be facilitated by raising the low level of digital competencies while gaining a thorough understanding of the essentials of the services.

In the 2015 OECD survey, 60% of the Hungarian population did not reach the minimum expected 71% in the field

of financial literacy (POTÓCZKI [2017]), in this current survey this ratio is 55%, and in the field of digital competences more than nine-tenths did not meet this minimum level (Figure 6); so there is a big gap between groups of individuals in this area as well. Nearly four-tenths of respondents with a digital device have a low level of financial knowledge or competencies or both, required to use electronic products responsibly (Table 2).

*Table 2: Grouping of respondents based on their level of financial knowledge and digital competencies and some characteristics of cluster members*

Items		WORST PERFORMERS	WELL COMMUNICATORS WITH LOW FINANCIAL ACTIVITY	APPROPRIATE FINANCIAL KNOWLEDGE, LOW DIGITAL COMPETENCES	DATA PROTECTORS WITH APPROPRIATE FINANCIAL EDUCATION	WELL-BEING IN A SECURE DEVICE WITH GOOD FINANCIAL EDUCATION	HIGHLY COMMUNICATING HIGHEST FINANCIAL SKILLS
Respondents	number	64	22	118	107	89	30
	proportion	12,43%	4,27%	22,91%	20,78%	17,28%	5,83%
Financial knowledge		40,79	53,59	80,15	78,31	83,5	85,44
Digital competencies		38,06	60,73	43,58	55,67	71,73	66,58
Education	Primary schools	46,88%	22,73%	32,20%	16,82%	5,62%	13,33%
	Higher education	7,81%	18,18%	16,95%	19,63%	40,45%	33,33%
World of work	Intellectual worker	9,38%	18,18%	30,51%	39,25%	56,18%	53,33%
	Manual worker	39,06%	54,55%	44,92%	34,58%	23,60%	23,33%
	Pensioner	21,88%	9,09%	16,95%	7,48%	5,62%	6,67%
Settlement	Village	40,63%	27,27%	31,36%	21,50%	25,84%	13,33%
Residence	Great Plain	53,13%	45,45%	40,68%	20,56%	11,24%	36,67%
More than one digital device		57,81%	68,18%	73,73%	80,37%	93,26%	93,33%
Internet use	Orientation	87,50%	95,45%	94,07%	99,07%	97,75%	100,00%
	Buying	48,44%	77,27%	72,03%	85,05%	95,51%	86,67%
Not use a digital financial service		57,81%	36,36%	47,46%	31,78%	11,24%	33,33%

*Resource:* Own research and calculation

One-sixth of all respondents lack the necessary technical conditions for operating increasingly widespread modern electronic financial services. These respondents' average age is

twenty years higher than those surveyed and they have the lowest income levels, mainly due to the fact that more than ninety-tenth of them attended only primary school as education.

Based on the results of the survey, individuals who are threatened by exclusion from the digital money market have well-defined demographic characteristics, which is formulated by the following thesis:

**T7: The worst performing respondents, who are at risk of financial exclusion, are largely unfamiliar with digital financial services. These people show low level of financial literacy and digital competence - they are typically low-educated and low-income individuals with low levels of digital literacy living mainly in municipalities and in the eastern part of the country.**

A lower level of education makes it more difficult to move up from that level and differences can deepen further. Training older age groups is more difficult and presumably does not have much receptivity to it. For young people, however, it is important to establish financial literacy, preferably in a way that affects all individuals. For this reason, it is (also) important to **strengthen the development of financial culture in public education, together with digital competencies**, embedded in each other, preferably in **practical situations**, based on **playful methods**.

### **Scientific result of the research**

We can witness the unstoppable expansion of digital services in both domestic and international financial markets, which also entails the development of the content of financial literacy.

**General competencies provide a solid foundation for the**

**existence of diversified knowledge, subjective factors and responsible financial behavior, to which, in addition to numeracy, comprehension and communication skills, digital competencies contribute equally.** This is also supported by the results of my research: those who scored higher in digital competencies were also more effective in financial literacy and preferred to use digital financial services.

### **Utilization of results**

The results of the study show that the **target group** of electronic financial services can be considered to be younger individuals living in more urbanized settlements who are open to digital innovations. Financial institutions can acquire more financially experienced customers already possessing other products by thorough information. The **demographic characteristics of groups at risk of exclusion from the digital money market can be well defined**, and the development of their financial literacy is not only their individual interest, but also a social one. Drop-out can be reduced if equal opportunities are ensured to participate in the development of financial culture. In case of the younger generations growing up, public education must be given a significant role, as it reaches all residents, providing an opportunity to help them integrate into the digital money market.

The development of **financial culture** cannot be limited to the transfer of financial literacy; strengthening practicality, the right attitude and digital competencies are all important missions. Individuals need to be prepared for the day-to-day use of digital financial services within educational frameworks, from searching for information to making financial decisions. In

addition to the current compulsory educational level (16 years of age), financial education is definitely needed in primary school. In addition, the ability of independent – preferably digital – search, qualification, comparison, evaluation and use of information must play a major role, also in financial topics. The curiosity, interest and positive attitude about finances of children attending educational institutions, by discussing it could be promoted in simulated financial situations by playfully solving practical issues, either with the help of school computers or the use of mobile phones.

For the implementation, it is expedient to **include financial training supported by digital competencies in the training of future teachers**, and to encourage the further training of existing teachers in this field. In institutions that do not employ financial teachers, for example in more backward small settlements, similarly to teachers for children with special needs, **commuting teachers for digital finance** could provide appropriate financial education through the coordinated provision of several districts.

**The information of the survey can serve as a basis for comparison for future research.** The results can be used to examine the habit changes of the population in the digital money market, the development of the underlying personal (knowledge, competence, attitude) conditions, and the educational results in the long run.

## **5. Future research directions**

The population survey about the public participation in the digital money market and the existence of underlying conditions was conducted the year before the global Covid-19 pandemic that erupted in 2020, when market developments and customer participation took place in their usual way. In the next period, however, fear of the epidemic encouraged many to conduct financial transactions digitally.

The coronavirus epidemic has given an even greater momentum to the already accelerated wave of digitalization in the banking sector, with emerging regulations supporting banking developments.

Wider availability of digital methods and a wider distribution of security knowledge can increase public confidence in electronic financial services. The openness of younger age groups may increase, and a possible increase in the level of trust of older people may help them to participate more actively in the digital financial market.

Continuous monitoring of the results of similar surveys in the coming years may show the motivations for changes in the use of digital services, their correlations with demographic variables, the evolution of the level of financial culture enhanced by digital competencies.

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## **7. Own publications on the topic of the dissertation**

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