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Digital Financial Inclusion Among Older Adults: Evidence from a Survey Study in Poland*

Michał WŁODARCZYK, Magdalena ADAMCZYK-KOWALCZUK and Grzegorz STRUPCZEWSKI

Krakow University of Economics, Krakow, Poland

Correspondence should be addressed to: Magdalena ADAMCZYK-KOWALCZUK, adamczym@uek.krakow.pl

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Abstract

Population ageing increases the importance of the silver economy, while the digitalization of financial services creates new challenges for older adults' digital financial inclusion. This study examines the factors that support or hinder the use of digital financial services among seniors, with particular attention to competencies, online concerns, and socio-demographic characteristics. A paper-based survey was conducted among 89 Polish adults aged 60+. Synthetic indices were constructed for digital financial inclusion, broad digital-financial competencies, online concerns, financial knowledge, and financial situation. The analysis combined descriptive statistics, Spearman's rank correlations, the Mann–Whitney U test, and linear regression. Digital financial inclusion was positively associated with broad competencies, cybersecurity competencies, financial knowledge, and financial situation, and negatively associated with online concerns. In the regression model, broad competencies, online concerns, and higher education remained significant predictors, whereas financial situation lost statistical significance. The findings suggest that older adults' inclusion in digital finance depends primarily on competencies and perceived security rather than on economic resources alone. This highlights the need for educational and institutional measures that integrate financial literacy, digital skills, and cybersecurity support for older adults.

Keywords: financial inclusion; silver economy; cybersecurity; digital finance; financial literacy

Introduction

Population ageing constitutes one of the key contemporary demographic processes, significantly affecting both the social and economic spheres. Changes in the age structure of the population lead to transformations in the demand for goods and services, necessitating the adjustment of economic activity to the needs of older individuals. This process is not merely a challenge for social policy, but also a factor shaping the market and directions of economic development (Wyszkowska, 2020; Leśna-Wierszołowicz, 2018).

In this context, the concept of the silver economy has been developed. In a narrow sense, it refers to economic activities targeted at individuals aged 60 and over, while in a broader sense it encompasses the entirety of economic processes associated with population ageing, including those concerning individuals aged 50 and above (Szukalski, 2012). Contemporary approaches increasingly move away from perceiving ageing solely as a threat, instead highlighting its developmental potential. The growing number of older individuals generates demand for new goods and services, encourages the adaptation of existing products, and may stimulate economic growth and employment (Wyszkowska, 2020). Older adults are thus viewed as active participants in economic life, which aligns with the concept of active ageing (Tkalec, 2017).

In Poland, the process of population ageing has intensified since the 1990s, particularly after 2005. By the end of 2018, the number of individuals aged 60 and over amounted to approximately 9.5 million (24.8% of the population), and projections indicate that by 2050 their share will exceed 40%, alongside an increase in the

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proportion of individuals aged 85 and over to above 6% (Wyszkowska, 2020). These changes will require adjustments in social infrastructure as well as in the market for goods and services to accommodate the new demographic structure (GUS, 2018).

From a consumption perspective, older individuals constitute a significant group of consumers. They possess substantial purchasing power (the total value of pensions and disability benefits exceeded PLN 211 billion in 2018), making them an important component of market demand (Wyszkowska, 2020). Nevertheless, the potential of the silver economy remains not yet fully exploited.

Literature Review

Older adults are becoming an increasingly important group of participants in the financial services market, although their demand is often constrained by financial and digital exclusion, as well as lower demand for certain products. This segment should be treated as a significant area of the silver economy, requiring consideration of the specific needs and behaviors of older individuals (Czerwiński, 2016; Wierzbicka, 2022).

At the same time, older adults do not constitute a homogeneous group—within the 50+ population there are substantial demographic, socio-economic, and behavioral differences (Olejniczak, 2019; Ziemba, Świeszczak, Marcinkowska, 2014). Distinctions can be made, for example, between those who are still economically active and retirees or disability pensioners, as well as between "modern" and "traditional" seniors, the latter being more vulnerable to financial exclusion. Treating this group as homogeneous may lead to errors and contribute to the deepening of exclusion (Kuchciak et al., 2014; Czerwiński, 2016).

Recent evidence also confirms that older adults should not be treated as a homogeneous group of digital financial service users. Choi, Han and Lee (2024) show that fintech adoption among elderly consumers is shaped not only by age, but also by digital experience and socio-environmental factors, including cohabitation with younger generations. This suggests that digital financial inclusion among older adults depends on both individual competencies and the broader social context in which digital services are used.

The activity of older adults in the banking market is significant, although it tends to be conservative in nature. In 2019, the majority of individuals aged 65 and over held a bank account and a payment card (88% each), while fewer made use of savings products (51% held savings accounts and 30% term deposits). This indicates a concentration on basic and secure financial services (Sołtysiak, 2020; Wierzbicka, 2022).

Financial behaviors of older adults are characterized by caution and a preference for simple and secure forms of saving. Strategies based on low risk and high liquidity dominate—a substantial proportion of households keep funds in cash or bank deposits, while the use of more complex financial instruments remains marginal (Anioła-Mikołajczak, 2017).

The specificity of this segment is also reflected in service expectations. The oldest clients primarily use basic products and prefer face-to-face service in physical branches, showing a lower propensity to use remote channels (Ziemba, Świeszczak, Marcinkowska, 2014).

Financial exclusion is defined as the lack of, or significant limitations in, access to financial services, or difficulties in using them in everyday functioning. In a broader sense, it primarily affects individuals with lower incomes and those in disadvantaged social situations, who encounter barriers in accessing basic services. Older adults are among the groups particularly vulnerable to financial exclusion. This results from the overlap of factors such as lower technological competencies, declining cognitive abilities, caution toward complex financial products, and the inadequate adaptation of financial institutions' offerings to their needs. Individuals aged 50 and over often encounter difficulties in using modern banking services, a situation further exacerbated by insufficient efforts on the part of financial institutions to facilitate access (Ziemba, Świeszczak, Marcinkowska, 2014).

Contemporary financial exclusion is increasingly intertwined with digital exclusion, understood as the lack of competencies and resources necessary to use technology effectively. It encompasses not only access to devices and the Internet, but also the skills required to operate them, search for and evaluate information, and apply it in practice (Tomczyk, 2010). As financial services become more digitalized, technological barriers translate directly into limited access to banking—particularly mobile and online banking—making older adults a particularly at-risk group (Kuchciak et al., 2014; Msweli, Mawela, 2020; Arenas-Gaitán, Peral-Peral, Ramón-Jerónimo, 2015).

A systematic review shows that the adoption of digital financial transactions is primarily shaped by perceived usefulness, ease of use, trust, security and facilitating conditions, while perceived danger, complexity, privacy concerns and unwillingness to change act as important barriers. These findings justify the inclusion of competencies, online concerns, perceived security and trust in analyses of digital financial inclusion (Kajol, Singh, Paul, 2022).

In Poland, this issue has a clear practical dimension. The COVID-19 pandemic exposed and deepened the difficulties older adults face in accessing online services, especially among rural residents and individuals with disabilities. In 2019, as many as 3.63 million people aged 55–74 had never used the Internet, accounting for 80.4% of all "non-users." At the same time, ongoing digitalization and the reduction in the number of traditional branches increase the risk of further exclusion of this group (Wierzbicka, 2022).

Financial education is recognized as one of the fundamental conditions for reducing financial exclusion among older adults. As a tool for enhancing financial awareness, it contributes to reducing the risk of victimization of older individuals and thereby counteracts their financial exclusion (Solarz, Rogalska, 2017).

Recent international evidence confirms that digital financial literacy remains a major challenge. The OECD/INFE 2023 survey shows that the average digital financial literacy score across participating countries was 53 out of 100, and only 29% of adults reached the minimum target score. The report also indicates that digital financial literacy is higher among adults with higher income and higher levels of education, which supports the relevance of socio-demographic factors in studies of digital financial inclusion (OECD, 2023).

An adequate level of financial literacy is, on the one hand, a prerequisite for banking inclusion, and on the other, a factor supporting the stability of the financial sector. Financial education constitutes the foundation for increasing the social activity of older adults and a key factor facilitating their inclusion in the banking sector. In this perspective, financial education is not merely an addition to the offer of financial institutions, but a crucial element enabling the safe and effective use of financial services by individuals aged 50 and over (Kuchciak et al., 2014).

In this light, financial education for older adults should be understood broadly—not only as the transfer of knowledge about banking products, but also as preparation for independent decision-making, risk recognition, and the effective use of appropriate service access channels.

Therefore, it is justified to identify a research gap consisting in the lack of an integrated approach to the financial inclusion of older adults, particularly in the context of digital services. There is a shortage of studies that simultaneously address such elements as the actual use of online services, digital and financial competencies, perceived security, trust, risk perception, preferences regarding service channels, and the level of decision-making autonomy. Existing studies in Poland most often focus on individual aspects (financial exclusion, education, or market behaviors), while international research tends to concentrate primarily on technology adoption models. What is lacking is an approach that integrates the economic, technological, and educational dimensions of older adults' use of digital financial services (Kuchciak et al., 2014; Wierzbicka, 2022; Arenas-Gaitán, Peral-Peral, Ramón-Jerónimo, 2015).

In the context of digital transformation, trust becomes a central condition of financial inclusion. Aracil et al. (2025) argue that digital finance changes the nature of trust, shifting it from interpersonal trust in bank employees toward system-based trust in technology, cybersecurity, data protection and institutional safeguards.

This study contributes to the literature by integrating several dimensions that are often analysed separately: digital financial inclusion, digital-financial competencies, cybersecurity skills, online concerns, financial literacy, financial situation, and education. While previous studies have discussed financial exclusion, digital exclusion, or technology adoption among older adults, fewer studies examine these factors jointly in the context of digital financial services used by people aged 60 and over.

The contribution of this study is threefold. First, it focuses on older adults in Poland, a group particularly relevant from the perspective of the silver economy and the ongoing digitalization of financial services. Second, it uses synthetic indices to measure digital-financial inclusion, broad competencies, online concerns, financial literacy, and financial situation. Third, it shows that digital financial inclusion is associated mainly with competencies, cybersecurity preparedness, perceived security, and education, whereas financial situation loses significance in the multivariate model. This suggests that inclusion in digital finance depends not only on economic resources, but also on the ability to use digital services safely and independently.

Recent fintech research confirms the importance of perceived risk as a barrier to adoption. Zhao and Khaliq (2024) show that perceived risk negatively affects the intention to use fintech, with time risk, financial risk and security risk among the most important components. This supports the assumption that concerns about fraud, errors, data security and system reliability may reduce older adults' use of digital financial services.

The aim of this study is to identify the factors that facilitate and hinder the inclusion of older adults in financial services, including digital ones, with particular emphasis on the role of digital and financial competencies, risk perception, security, trust, and socio-demographic characteristics.
A key aspect is to determine the extent to which older adults use financial services (both traditional and digital), their level of knowledge (both subjective and objective), and their degree of decision-making autonomy, including the role of third-party support in the use of financial services.

Research hypotheses

Accordingly, the following three research hypotheses were formulated:

H1: The higher the level of broad digital-financial competencies among older adults, the higher their level of digital-financial inclusion.

H2: The higher the level of concerns associated with the use of online financial services, the lower the level of digital-financial inclusion among older adults.

H3: The level of financial inclusion among older adults depends on their level of education and financial situation.

Methodology

To verify the proposed hypotheses, a survey study was conducted among older adults. The study was carried out in paper form in 2026 among participants of the University of the Third Age at one of the Polish universities. In total, 89 individuals aged over 60 participated in the study, thus falling within both the silver economy category and the senior population.

The questionnaire consisted of a demographic section and five thematic sections. The first section concerned savings, while the second focused on the use of financial services and support from third parties. The third section included the assessment of competencies and educational experiences, and also examined trust, financial autonomy, and negative experiences of the respondents. Subsequently, three questions measuring objective financial literacy were applied (The Big Three Quiz, Stanford University). The final section (18 questions) addressed digital competencies and the perception of risks associated with the use of online financial services.

For the purposes of the analysis, synthetic indices were constructed to capture key dimensions of older adults' functioning in the financial services market. A standard approach used in the construction of composite indicators was adopted: items referring to the same theoretical dimension were aggregated and then rescaled to a common 0–100 scale, which facilitates comparability of results (OECD, 2008; Ferrando et al., 2025). For items measured on a five-point Likert scale (1–5), the index for respondent *i* was calculated according to the following formula:

$$I_i = \frac{\bar{x}_i - 1}{4} \times 100$$

where $\bar{x}_i$ denotes the mean of the items comprising a given scale. For indicators based on the number of responses or the number of correct answers, min−max normalization was applied:

$$I_i = \frac{x_i - x_{\min}}{x_{\max} - x_{\min}} \times 100$$

Based on this approach, the following indices were constructed: the index of competencies and information activity, the cybersecurity competencies index, the index of concerns related to online financial services, the financial literacy index, the financial situation index, and the digital-financial inclusion index. Additionally, a composite competencies index was created as the mean of the competencies and information activity index and the cybersecurity competencies index. The scope and composition of these indicators resulted from the structure of the applied questionnaire. The financial literacy index was based on three test questions concerning inflation,

compound interest, and risk diversification. One point was awarded for each correct answer, while incorrect or "don't know" responses received zero points. The result was then transformed to a 0–100 scale:

$$FK_i = \frac{\sum_{j=1}^{3} p_{ij}}{3} \times 100$$

where $p_{ij} \in \{0,1\}$.
The financial situation index was constructed as the mean of four previously normalized components: household income (INCOME), the ratio of savings (S) to monthly income, self-assessment of financial situation (A), and the evaluation of one's financial situation relative to the average Pole (P):

$$FS_i = \frac{I_i + S_i + A_i + P_i}{4}$$

The digital-financial inclusion index was defined as the mean of two rescaled components: the number of digital channels used for contact with a bank (C) and the number of online financial services utilized (S):

$$FI_i = \frac{C_i + S_i}{2}$$

Additionally, a synthetic index of broad digital-financial competencies was constructed as the mean of two previously rescaled indicators: the competencies and information activity index and the cybersecurity competencies index. The aim of its construction was to capture the overall level of respondents' preparedness for independent and secure use of digital financial services. Equal weights were assigned to both components, as they were considered complementary dimensions of digital-financial competencies.

The construction of the indices was also consistent with the OECD/INFE approach, which treats digital financial literacy as a combination of knowledge, skills, attitudes and behaviours necessary to be aware of and safely use digital financial services. The OECD/INFE instrument also emphasizes the importance of measuring not only digital financial literacy itself, but also access to and use of digital financial services, perceived risks, and attitudes toward personal data sharing (OECD, 2024).

The reliability of multi-item scales was assessed using Cronbach's alpha, which remains a classical measure of internal consistency of research instruments (Cronbach, 1951; Taber, 2018). Due to low internal consistency, a single composite index was not constructed for items related to trust, autonomy, and preferences; instead, these were treated as separate dimensions of attitudes.

Given the nature of survey data and the potential for deviations from normality, Spearman's rank correlation coefficient was used to analyze relationships between indices, as it is appropriate for ordinal variables and data that do not meet the assumptions of Pearson correlation (Mukaka, 2012).

In the analysis of differences between two independent groups, for example by level of education, the Mann–Whitney U test was applied. To assess the combined impact of competencies, concerns, and socio-economic characteristics on the level of digital-financial inclusion, linear regression models were employed. In these models, the digital-financial inclusion index was treated as the dependent variable, while the broad competencies index, the online concerns index, the financial situation index, and the level of education were included as explanatory variables. The interpretation of the models considered regression coefficients, significance levels, and the coefficient of determination R^2 (Roustaei et al., 2024). Due to the relatively small sample size and the cross-sectional nature of the study, linear regression was treated as a supplementary, exploratory analysis.

Results

The study included 89 older adults, and the socio-economic structure of the respondents is presented in Table 1. The mean age of respondents was 69.33 years (SD = 5.01), with a range from 60 to 83 years. The sample was predominantly composed of women (83.1%), individuals with higher education (64.0%), and retirees or disability pensioners (96.6%). This indicates that the results provide a good description of the studied group; however, relationships related to labor market activity should be interpreted with caution, as only 3.4% of respondents were still employed.

The financial situation of respondents was diverse, although the largest share reported a household income in the range of PLN 3,001–5,000 (37.1%) and PLN 5,001–7,000 (25.8%). More than half of the respondents lived in two-person households (55.1%), while 37.1% lived alone. In terms of self-assessed financial situation, responses indicating a good or average level predominated, with most respondents selecting 4/5 (41.6%) and 3/5 (33.7%). This may result from the fact that the study was conducted among participants of the University of the Third Age. By its nature, this leads to an overrepresentation of better-educated individuals, residents of larger urban areas, and those with potentially higher levels of awareness than the general population of older adults in Poland (particularly compared to lower-income individuals living in rural areas).

Table 1. Respondents by socio-economic characteristics

Socio-economic characteristics	N	%
Gender		
Female	74	83.1%
Male	15	16.9%
Age		
60–64 years old	11	12.4%
65–69 years old	43	48.3%
70–74 years old	20	22.5%
75–79 years old	11	12.4%
80 years old and more	4	4.5%
Education		
Secondary	32	36.0%
Higher	57	64.0%
Employment status		
Retirees and disability pensioners	86	96.6%
Employed	3	3.4%
Employment type		
Employed under an employment contract (full-time/part-time)	2	2.2%
Self-employed (sole proprietorship)	3	3.4%
Business owner (other form)	1	1.1%
Civil contract employment	9	10.1%
Not employed	74	83.1%
Nature of work		
White-collar worker	71	79.8%
Blue-collar worker	18	20.2%
Place of residence		
Village	11	12.4%
City (≤50,000 inhabitants)	11	12.4%
City (51,000–200,000 inhabitants)	1	1.1%
City (201,000–500,000 inhabitants)	1	1.1%
City (>500,000 inhabitants)	65	73.0%
Average monthly net household income		
Below 3 000 PLN	5	5.6%
3 001–5 000 PLN	33	37.1%
5 001–7 000 PLN	23	25.8%
7 001–9 000 PLN	12	13.5%
9 001–11 000 PLN	4	4.5%
11 001–15 000 PLN	6	6.7%
Above 15 000 PLN	6	6.7%
Number of household members		
1 person	33	37.1%
2 persons	49	55.1%
3 persons	7	7.9%

Source: own elaboration based on survey data.

Savings Dimension

Firstly, a relatively moderate propensity to save among respondents can be observed. The average declared proportion of monthly net income allocated to savings amounted to 14.9%, with a median of 15%. The largest group consisted of individuals saving 20% of their income (27.0%), while 25.8% of respondents reported that they did not save any portion of their current income. At the same time, an irregular saving pattern predominated, consisting of setting aside funds only when disposable income remained after covering current expenses (58.4%). Regular saving based on a predetermined proportion of income was declared by 29.2% of respondents.

It is noteworthy that despite a moderate propensity for systematic saving, a relatively large proportion of respondents had accumulated a substantial level of savings: 39.3% reported savings exceeding five times their monthly household income, while 27.0% indicated savings below one month of household income. The structure of savings allocation showed a clear dominance of safe and traditional financial instruments (Table 2). The most frequently indicated forms were bank term deposits (60.7%) and savings accounts (52.8%). More advanced forms of investment were used significantly less frequently, such as investment funds (22.5%), government bonds (19.1%), and foreign currencies (13.5%). Shares and real estate were indicated by 5.6% of respondents each. This structure of responses suggests a cautious approach among respondents to wealth accumulation and a preference for instruments perceived as more stable and less risky.

Table 2. Savings allocation

Form	N	%
Bank term deposits	54	60.7%
Savings accounts	47	52.8%
Investment funds (mutual funds, ETFs)	20	22.5%
Government bonds	17	19.1%
Foreign currencies	12	13.5%
Investment in education / personal development	7	7.9%
Stocks (listed companies)	5	5.6%
Real estate	5	5.6%
Cash at home	3	3.4%
Corporate bonds	2	2.2%
Gold	1	1.1%

Source: own elaboration based on survey data.

Respondents were also asked to self-assess their financial situation, using a five-point scale (1 = very bad, 5 = very good). Responses indicating a good or average level predominated, with the largest shares of respondents selecting 4/5 (41.6%) and 3/5 (33.7%). The mean self-assessment of financial situation was 3.43, which was only slightly higher than the assessment relative to the average Pole (3.34). This suggests that the surveyed older adults did not perceive their financial situation as particularly poor. At the same time, a moderate rather than very high level of economic satisfaction prevailed among respondents.

Financial services usage dimension

In their everyday financial practices, respondents used both traditional and digital channels of contact with their bank (Table 3). The most frequently indicated channels were online banking (70.8%), ATMs (57.3%), and physical bank branches (50.6%). Mobile banking applications were used by 41.6% of respondents. This indicates that the digital management of finances is already relatively widespread in the studied group, although it has not completely replaced traditional channels.

Table 3. Banking service usage patterns

Banking service	N	%
Online banking	63	70.8%
ATM	51	57.3%
Bank branch	45	50.6%
Mobile banking app	37	41.6%
Bank hotline/call center	4	4.5%

Source: own elaboration based on survey data.

An important complement to this picture is the issue of autonomy. The majority of respondents (64.0%) declared that they do not rely on assistance from others in technical matters related to financial management; however, 36.0% reported that such support is necessary. Among those who used assistance, it most frequently concerned the selection of financial products, including choosing a bank, financial product, or security settings (46.9% of those receiving help), as well as opening term deposits and savings accounts (34.4%), investing (28.1%), and paying bills (28.1%) (Table 4). The results indicate that dependence on third-party support does not concern the majority of the sample; however, it still affects a substantial proportion of respondents, particularly in relation to more complex financial decisions.

Table 4. Financial activities requiring assistance from others

Financial activities	N	%
Selection of offers (bank, product, PIN, etc.)	15	46.9%
Opening term deposits / savings accounts	11	34.4%
Investing	9	28.1%
Paying bills	9	28.1%
Deposits / withdrawals from an account	6	18.8%
Making transfers	4	12.5%
Taking out a loan / credit	3	9.4%
Checking account balance	2	6.2%

Source: own elaboration based on survey data.

Among the financial services available online (Table 5), basic banking services and BLIK payments were predominant. Online banking services were used by 64 respondents (71.9%), while BLIK payments were used by 55 respondents (61.8%). More advanced solutions were clearly used less frequently, such as electronic wallets (24.7%), online insurance services (16.9%), and brokerage services and investment platforms (15.7%). These results indicate that the digital financial inclusion of older adults is primarily concentrated around everyday services and those with simple functional characteristics.

Table 5. Digital financial services usage among respondents

Digital financial services	N	%
Online banking services	64	71.9%
BLIK electronic payments	55	61.8%
E-wallets / mobile payments	22	24.7%
Insurance services	15	16.9%
Brokerage services / investment platforms	14	15.7%
Foreign exchange trading	6	6.7%
Non-bank loans	2	2.2%
Does not use online services / no indication	9	10.1%

Source: own elaboration based on survey data.

Among the 56 responses concerning reasons for avoiding digital financial services (Table 6), fear emerged as the main factor—particularly fear of fraud (51.8%) and of making a costly mistake (25%). At the same time, 33 respondents did not indicate any reason, suggesting a somewhat different, partially unbiased perception of digital finance.

An important aspect from the perspective of inclusion is the relatively low number of indications related to infrastructural barriers (such as lack of Internet access or electronic devices) or distrust (e.g., preference for cash or attachment to physical bank branches). This indicates that, in the studied group, limitations in the use of digital financial services are primarily psychological and competence-related rather than technical in nature.

Table 6. Reasons for avoiding digital financial services

Reasons	N	%
Fear of fraud	29	51.8%
Fear of making a costly mistake	14	25.0%
Lack of need	13	23.2%
Lack of skills	13	23.2%
Preference for cash	10	17.9%
Lack of trust in digital financial services	6	10.7%
Lack of Internet access	2	3.6%
Attachment to physical bank branches	2	3.6%
Lack of necessary devices	1	1.8%

Source: own elaboration based on survey data.

Attitudes toward online financial services

The analysis of responses to statements concerning attitudes toward online financial services (Tables 7 and 8) reveals a complex picture. On the one hand, respondents rated their financial agency and the usefulness of digital services relatively highly. The highest mean was obtained for the statement "I feel that I make independent decisions about my finances" (4.28), as well as for "Digital financial services are faster and more convenient than visiting a bank branch" (4.18). Agreement was also relatively high for the statement "I trust that the bank processes data securely" (3.92).

On the other hand, respondents rated their own informational activity and educational preparedness considerably lower. Low mean values were recorded for regular searching for information about digital financial services (2.37), the ability to recognize online fraud attempts (2.39), and participation in training related to online banking and personal finance (2.04). These results suggest that while respondents assess the functionality of digital services and their own independence positively, the area of systematic competence development remains relatively weak.

A reliability analysis using Cronbach's alpha was conducted. Acceptable results were obtained for the competencies and information activity scale (0.755), whereas lower reliability was observed for the trust and autonomy scale (0.465).

Table 7. Information competencies and activity

Item	1	2	3	4	5	Mean
I feel confident in performing financial operations online	14 (15.7%)	15 (16.9%)	19 (21.3%)	23 (25.8%)	18 (20.2%)	3.18
I am able to recognize attempts at online fraud	29 (32.6%)	14 (15.7%)	34 (38.2%)	6 (6.7%)	6 (6.7%)	2.39
I regularly search for information about digital financial services	39 (43.8%)	7 (7.9%)	24 (27.0%)	9 (10.1%)	10 (11.2%)	2.37
I independently look for information about financial threats	27 (30.3%)	8 (9.0%)	26 (29.2%)	14 (15.7%)	14 (15.7%)	2.78
I participate / have participated in training courses for seniors	51 (57.3%)	12 (13.5%)	9 (10.1%)	5 (5.6%)	12 (13.5%)	2.04

Source: own elaboration based on survey data.

Table 8. Trust, independence, and preferences

Item	1	2	3	4	5	Mean
I trust that the bank securely processes data	3 (3.4%)	4 (4.5%)	18 (20.2%)	36 (40.4%)	28 (31.5%)	3.92
I am afraid of making a costly mistake online	9 (10.1%)	10 (11.2%)	29 (32.6%)	18 (20.2%)	23 (25.8%)	3.40
I have been a victim of online financial fraud	63 (70.8%)	3 (3.4%)	13 (14.6%)	3 (3.4%)	7 (7.9%)	1.74
I feel that I independently make decisions about my finances	6 (6.7%)	0 (0.0%)	10 (11.2%)	20 (22.5%)	53 (59.6%)	4.28
Digital financial services are faster and more convenient than branch services	9 (10.1%)	0 (0.0%)	12 (13.5%)	13 (14.6%)	55 (61.8%)	4.18
I have difficulty with the language or complexity of digital services	25 (28.1%)	11 (12.4%)	19 (21.3%)	19 (21.3%)	15 (16.9%)	2.87
Digital financial services give me a sense of independence	15 (16.9%)	8 (9.0%)	13 (14.6%)	28 (31.5%)	25 (28.1%)	3.45
I trust cash more than digital payments	26 (29.2%)	12 (13.5%)	19 (21.3%)	14 (15.7%)	18 (20.2%)	2.84

Source: own elaboration based on survey data.

Financial Literacy

Respondents were asked three questions to assess their financial literacy, based on The Big Three Quiz developed by Stanford University, covering three aspects: risk diversification, compound interest, and inflation. The results indicate a differentiated level of financial knowledge among respondents. They performed best on the question related to inflation, with 87.6% providing the correct answer, as well as on the question concerning compound interest, which was answered correctly by 77.5% of respondents.

In contrast, knowledge in the area of investment risk diversification was considerably weaker. Only 41.6% of respondents provided the correct answer, while as many as 55.1% selected the “don’t know” option. This suggests that older adults possess relatively good knowledge of basic financial mechanisms but demonstrate lower competence in more specialized investment-related topics.

Cybersecurity competencies

In the area of digital competencies and cybersecurity (Table 9), moderate results were observed, although Cronbach’s alpha reached a very high level (0.950). The highest mean was obtained for the statement concerning the ability to create strong passwords and manage them securely (3.43), followed by the ability to recognize suspicious messages or phishing attempts (3.20), and regularly updating systems and applications (3.06). Lower scores were recorded for more advanced competencies, such as configuring privacy and security settings (2.56), independently securing devices (2.69), the ability to respond to a cybersecurity incident (2.78), and the use of two-factor authentication (2.83). The lowest mean was observed for the use of password managers (2.12). These results confirm that the surveyed older adults possess basic digital competencies; however, their preparedness in the area of more advanced security tools remains limited.

Table 9. Cybersecurity competencies

Item	1	2	3	4	5	Mean
I am able to recognize phishing attempts and respond appropriately	10 (11.2%)	15 (16.9%)	24 (27.0%)	27 (30.3%)	13 (14.6%)	3.20
I am able to create strong passwords and manage them securely	17 (19.1%)	2 (2.2%)	22 (24.7%)	22 (24.7%)	26 (29.2%)	3.43
I am able to independently secure my computer or smartphone	32 (36.0%)	13 (14.6%)	13 (14.6%)	13 (14.6%)	18 (20.2%)	2.69
I regularly update my system and applications	21 (23.6%)	10 (11.2%)	21 (23.6%)	17 (19.1%)	20 (22.5%)	3.06
I am able to configure privacy and security settings	34 (38.2%)	10 (11.2%)	18 (20.2%)	15 (16.9%)	12 (13.5%)	2.56
I am able to enable and use two-factor authentication	28 (31.5%)	13 (14.6%)	10 (11.2%)	22 (24.7%)	16 (18.0%)	2.83
I know how to respond to a suspected cyberattack	29 (32.6%)	9 (10.1%)	19 (21.3%)	17 (19.1%)	15 (16.9%)	2.78
I have the knowledge to avoid risky online behaviors	26 (29.2%)	15 (16.9%)	16 (18.0%)	16 (18.0%)	16 (18.0%)	2.79
I have sufficient knowledge to safely use online financial services	20 (22.5%)	13 (14.6%)	22 (24.7%)	23 (25.8%)	11 (12.4%)	2.91
I am able to use a password manager	42 (47.2%)	21 (23.6%)	10 (11.2%)	5 (5.6%)	11 (12.4%)	2.12

Source: own elaboration based on survey data.

At the same time, respondents exhibited a relatively high level of concerns related to the use of online financial services (Table 10). Cronbach's alpha amounted to 0.885, indicating high internal consistency. The strongest concerns were related to the possibility of personal data being intercepted by third parties (mean = 3.79), loss of access to funds due to system failure (3.64), the way financial institutions process and store data (3.57), and the risk of money being stolen from an account via the Internet (3.52).

The mean for the statement "Using financial services online makes me feel insecure" was 3.00, indicating a moderate level of perceived insecurity. A lower level of agreement was observed only in the case of social pressure to use digital solutions (2.82). It can therefore be concluded that the main source of reluctance toward digital financial services stems from security-related concerns rather than external pressure.

Table 10. Concerns related to online financial services

Item	1	2	3	4	5	Mean
I am afraid of losing access to my funds due to system failure	10 (11.2%)	4 (4.5%)	22 (24.7%)	25 (28.1%)	28 (31.5%)	3.64
I am not sure whether financial applications always function properly	8 (9.0%)	12 (13.5%)	22 (24.7%)	19 (21.3%)	28 (31.5%)	3.53
I am concerned about my personal data being intercepted	4 (4.5%)	7 (7.9%)	24 (27.0%)	23 (25.8%)	31 (34.8%)	3.79
I am concerned about how financial institutions process and store my data	7 (7.9%)	15 (16.9%)	17 (19.1%)	20 (22.5%)	30 (33.7%)	3.57

I am afraid of money being stolen from my account via the Internet	7 (7.9%)	13 (14.6%)	24 (27.0%)	17 (19.1%)	28 (31.5%)	3.52
I believe there is a high likelihood of online financial fraud	13 (14.6%)	21 (23.6%)	18 (20.2%)	16 (18.0%)	21 (23.6%)	3.12
Using online financial services makes me feel insecure	21 (23.6%)	13 (14.6%)	22 (24.7%)	11 (12.4%)	22 (24.7%)	3.00
I feel social pressure to use digital solutions	23 (25.8%)	21 (23.6%)	16 (18.0%)	7 (7.9%)	22 (24.7%)	2.82

Source: own elaboration based on survey data.

Analysis of composite indices

The analysis of composite indices (Table 11) showed that the highest mean level was observed for financial literacy (M = 68.91; SD = 29.64), while the lowest level was recorded for digital-financial inclusion (M = 35.96; SD = 21.42). This indicates that the surveyed older adults performed relatively well on questions concerning basic financial mechanisms but made less use of digital channels and financial services in practice. At the same time, the level of concerns about online services remained relatively high (M = 59.34; SD = 24.99), highlighting the significant role of risk perception in the studied group.

Table 11. Descriptive statistics of indices

Variables	Mean	Median	SD	Range
Information competencies and activity	38.82	40.00	24.50	0.00–100.00
Cybersecurity competencies	45.90	50.00	29.98	0.00–100.00
Concerns about online services	59.34	56.25	24.99	0.00–100.00
Financial literacy	68.91	66.67	29.64	0.00–100.00
Financial situation	52.95	52.08	22.53	6.25–100.00
Digital financial inclusion	35.96	33.33	21.42	0.00–91.67
Broad competencies	42.36	42.50	25.63	0.00–96.25

Source: own elaboration based on survey data.

In the correlation analysis (Table 12), the level of digital-financial inclusion was positively associated with broad competencies ($\rho = 0.586$; $p < 0.001$), competencies and informational activity ($\rho = 0.484$; $p < 0.001$), cybersecurity competencies ($\rho = 0.610$; $p < 0.001$), financial literacy ($\rho = 0.493$; $p < 0.001$), and financial situation ($\rho = 0.305$; $p = 0.0037$). At the same time, a significant negative relationship was observed between inclusion and concerns about online services ($\rho = -0.398$; $p = 0.0001$). These results confirm that higher competencies and lower levels of concern are associated with greater use of digital financial services.

Table 12. Correlations between the level of digital financial inclusion and selected indices

Predictor	Spearman's ρ	p
Broad competencies	0.586	<0.0001
Competencies and information activity	0.484	<0.0001
Cybersecurity	0.610	<0.0001
Online concerns	-0.398	0.0001
Financial situation	0.305	0.0037
Financial literacy	0.493	<0.0001

Source: own elaboration based on survey data.

The results confirm that a higher level of digital-financial competencies is associated with a higher level of digital financial inclusion. The strongest relationship was observed for cybersecurity competencies and broad competencies, providing strong support for H1. At the same time, the level of online concerns was moderately and significantly negatively associated with inclusion, which supports H2. A positive but weaker relationship with

inclusion was also observed for financial situation, which in the bivariate analysis provides preliminary support for H3.

Older adults with higher education achieved a significantly higher level of digital financial inclusion than those with secondary education (Table 13). This difference showed a moderate effect size. This finding provides clear support for the socio-economic dimension of H3, at least regarding educational attainment.

Table 13. Variation in the level of digital financial inclusion by educational attainment

Group	N	Mean level of inclusion	Median
Secondary education	32	25.78	25.00
Higher education	57	41.67	41.67
U Mann-Whitney Test		U=518; p=0.0007	r=0.357

Source: own elaboration based on survey data.

The regression model (Table 14) achieved an R^2 of 0.428, an adjusted R^2 of 0.400, $F = 15.70$, $p < 0.001$. Broad competencies and educational attainment had positive coefficients, while concerns showed a negative coefficient. In contrast, financial situation lost statistical significance in the multivariate model. This indicates that H1 was supported, H2 was supported, and H3 was partially supported—primarily through educational attainment rather than financial situation after controlling for other variables.

Table 14. Linear regression results for the level of digital financial inclusion

Predictor	B	SE	t	p
Broad competencies	0.398	0.075	5.273	<0.001
Online concerns	-0.197	0.079	-2.498	0.014
Financial situation	-0.089	0.092	-0.965	0.337
Higher education (0/1)[1]	11.540	3.899	2.960	0.004

Source: own elaboration based on survey data.

Conclusion

The findings suggest that the inclusion of older adults in digital financial services does not depend solely on access to technology, but primarily on the ability to use it safely and independently. This means that not only digital competencies are crucial, but also practical knowledge of cybersecurity and a sense of control over financial operations. In this sense, the results are consistent with previous studies highlighting the importance of usefulness, ease of use, trust, and security in the adoption of financial services among older adults (Arenas-Gaitán, Peral-Peral and Ramón-Jerónimo, 2015; Msweli and Mawela, 2020).

An important conclusion is also that older adults' caution toward digital finance is rational in nature. Concerns about fraud, errors, and data security genuinely reduce the level of inclusion, indicating the need to simplify services and strengthen users' sense of security. In turn, the significance of education alongside the lack of significance of financial situation suggests that what may matter more than material resources are competencies and educational resources (Kuchciak, Świeszczak, Świeszczak and Marcinkowska, 2014; Wierzbicka, 2022).

A limitation of the study is the small and purposive sample, consisting of participants from Universities of the Third Age, with an overrepresentation of women, individuals with higher education, and residents of large cities. Therefore, the results should not be directly generalized to the entire population of older adults in Poland. Another limitation is the cross-sectional design, which does not allow for causal inference.

Future research should include a broader and more diverse sample of older adults, including those outside Universities of the Third Age, as well as models that allow for disentangling the effects of competencies, educational experiences, and risk perception. It would also be valuable to examine whether similar relationships occur among older adults from smaller towns and with lower levels of education.

[1] Coding of the education variable: 0 = secondary education, 1 = higher education.

Managerial implications

The findings provide practical recommendations primarily for banks, fintech providers, and institutions supporting older adults. In the studied sample, digital financial inclusion was associated mainly with broad digital-financial competencies, online concerns, and educational attainment, while financial situation was not statistically significant in the multivariate model. Therefore, digital financial services for older adults should be simple, transparent, and supportive of users' sense of security.

First, financial institutions should simplify digital interfaces by using clear language, visible buttons, intuitive navigation, and fewer unnecessary steps. Although usability was not directly tested, such measures are consistent with the observed role of competencies and fear of making mistakes online. Second, cybersecurity education should be strengthened. Training for seniors should focus on practical skills, including recognizing phishing, using strong passwords, enabling two-factor authentication, updating devices, and responding to suspicious transactions or cyber incidents. Third, banks should build trust by clearly explaining how customer data and funds are protected and by ensuring easy access to human support. This may help reduce perceived insecurity and increase confidence in digital financial services. Finally, hybrid service models should be maintained, combining digital channels with branch, telephone, and educational support. This is important because older adults differ in their digital confidence, competencies, and need for assistance.

Overall, digital financial inclusion requires not only access to technology, but also usability, trust, cybersecurity support, and education tailored to older users. These implications should be interpreted in light of the study's limitations, especially the small purposive sample of University of the Third Age participants.

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