

STUDY OF ROMANIA'S DIGITAL DIVIDE FROM THE PERSPECTIVE OF THE IMPACT OF HUMAN CAPITAL AND ACCESS TO INTERNET ON INTERNET BANKING USAGE

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Abstract

This study delves into the dynamic relationship between digitalization, human capital, and the usage of internet banking services in Romania, shedding light on the phenomenon of the digital divide within this context. While prior research has not extensively explored the interplay of these factors, our research fills this gap by employing a multifaceted approach. We use "human capital" as a key determinant, categorizing it based on sex and levels of education (secondary and tertiary). To gauge the extent of "digitalization," we measure the percentage of the population using the internet on a weekly basis. Concurrently, we assess "internet banking usage" by examining the percentage of the population that utilizes internet banking services. The study employs statistical analysis to investigate the correlation between these three variables. Our primary focus is on exploring how the "digital divide," manifested through disparities in education and gender, influences the patterns of internet banking usage in Romania. The results of our analysis reveal the existence of a digital divide concerning education levels. Individuals with limited access to education tend to utilize internet banking services to a lesser extent compared to those with higher educational attainment. These findings offer valuable insights into the intricacies of internet banking adoption in Romania and emphasize the importance of addressing disparities in education and gender to bridge the digital divide within the realm of financial technology.

Keywords: *human capital, education, internet banking, financial sector, digitalization, digital divide.*

JEL Classification: H55; H59; J11; J14; J18

1.Introduction

In the contemporary era, digitalization has significantly altered the dynamics of economies and societies worldwide. As technological advancements continue to reshape the way individuals interact, work, and conduct financial transactions, the digital divide has emerged as a crucial societal issue. The digital divide refers to the disparities in access to and usage of information and communication technologies (ICTs) among different groups and regions within a country or across nations. This divide encompasses multiple dimensions, with access to the internet being a fundamental component.

According to A. Grigorescu, E. Pelinescu, A.E. Ion and M.F.Dutcas (2021): "All these technological changes involve transformative shifts within

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the dimension of human capital, both from the perspective of the creation and development of the technology, and the perspective attributed to the role of the user of these new technologies. Human capital has to accumulate new competences comprising of technical skills generated by human-machine interaction, and behavioral transformations that include new capabilities on interhuman relationships in virtual space, communication skills, ethical and responsibility competences.”. Also, Petya Chipeva, Frederico Cruz-Jesus, Tiago Oliveira, Zahir Irani (2018), affirm that investments in ICT conducts to a lot of economic benefits including lower costs.” In the same idea, Y. Bayar, M.D. Gavriletea and D. Paun (2021), aims that: „the introduction of modern technologies have a great contribution in lowering the cost of financial services, increasing the customers’ confidence, spurring digital involvement and reducing physical interaction, enhancing in these ways the access and usage of financial services and contributing substantially to financial inclusion.”

The recent studies, aims that educated people have easier access to digitals than less educated ones (Lindblom and Rasanen, 2017), but also that this gap between people that have access to internet and the ones that don’t have is related not only with education also with the gender, because according with Alozie & Akpan-Obong (2017), the men are more familiar with ICT and use internet more frequently than women.

Romania, as a rapidly evolving European nation, has witnessed a significant transformation in its digital landscape over the past few decades. However, despite substantial progress in expanding internet connectivity across the country, disparities persist. These disparities are particularly pronounced in the realm of internet banking usage.

While internet banking and online financial services offer substantial advantages to bank customers, enabling them to execute various transactions such as bill payments, fund transfers, and access to comprehensive financial information conveniently, the adoption of internet banking (IB) in Romania remains relatively low. According to Evolution: Connected Consumer Monitor (2021), merely 42% of Romanian internet users utilize IB on a weekly basis, with a mere 9% using it daily. Gender disparities are observable in IB usage, as the study indicates that men (38%) employ IB on a daily or weekly basis more frequently than women (26%). Furthermore, disparities emerge concerning the level of education; individuals with a higher level of education exhibit a higher propensity to use IB, with 50% accessing it at least once a week compared to those with a lower educational attainment. When examining daily IB usage, the study reveals that individuals with higher educational backgrounds account for 37% of users, while those with lower levels of education constitute 26% of daily users. Combining gender and educational variables, the study highlights that highly educated men are the most frequent users of internet banking, with

74% accessing it at least once a month, 52% utilizing it at least once a week, and 41% engaging with IB daily or multiple times a week.

This study delves into the intricate relationship between Romania's digital divide, human capital, and internet access, with a specific focus on their impact on the adoption of internet banking services.

The adoption of internet banking represents a critical aspect of financial inclusion, as it offers individuals an efficient means to access and manage their finances. The digital divide, particularly in the realm of banking, carries profound implications that reverberate throughout various aspects of financial life, extending from basic tasks such as checking account balances and paying bills to more complex endeavors like applying for loans.

Understanding the factors that influence internet banking usage is pivotal in promoting financial inclusion and ensuring equitable access to modern financial services. In this context, this research endeavors to unravel the nuanced dynamics underlying Romania's digital divide and its implications for internet banking adoption.

This introduction sets the stage for a comprehensive exploration of the digital divide in Romania, encompassing the role of human capital and internet access as key determinants of internet banking usage. The subsequent sections of this study will delve into the literature, methodology, empirical findings, and policy implications, ultimately contributing to a more profound understanding of the multifaceted digital divide in Romania and its repercussions on financial inclusion and economic development.

2. A study of Romania's digital divide from the perspective of the impact of human capital and access to internet on internet banking usage.

The paper aims to conduct an analysis based on four dimensions in order to elucidate the disparity in the usage of internet banking (weekly users) between men and women, as well as from the perspective of the level of education (secondary and tertiary), over a period spanning from 2004 to 2022.

First, we analyze data on the usage of internet banking (IB) and internet access for both males (Pop-M-Secondary) and females (Pop-F-Secondary) with secondary education levels over a period spanning from 2004 to 2022. The analyze also includes data on the percentage of males (M-Using internet) and females (F-Using internet) using the internet.

The use of the internet by men has increased from 11% in 2004 to 82% in 2021. According to Table 1, there have been significant year-on-year increases, with the highest recorded in 2005 (45%) and the lowest in 2020 (1.05%), indicating market maturity. In 2004, 61% of males and 52.7% of females with secondary education had access to the internet. By 2022, these percentages had risen to 64.9% for males and 59.5% for females. The gender gap in internet access, which was relatively small in 2004, has remained relatively constant

over the years, with males consistently having slightly higher access rates compared to females.

Both males and females have increased their internet usage over time. In 2004, 11% of males and 9% of females were using the internet, and by 2021, these percentages had risen to 82% for males and 81% for females. While there was a small gender gap in internet usage in 2004, it has since narrowed significantly, with females nearly matching males in internet usage by 2021.

In 2004, IB usage was virtually nonexistent for both genders but has since seen substantial growth, reaching 19% in 2022.

Table no.1 Evolution of M_Usin_Internet, F_Usin_Internet, Pop_M_Secondary, Pop_F_Secondary and Internet_Banking, 2004-2022 (%)

Year	IB	Pop-M-Seconder y	Pop-F-Seconde ry	M-Usin internet	F-Usin internet
2004	0	61.0	52.7	11.0	9,0
2005	1	61.3	53.9	16.0	13.0
2006	1	62.1	54.7	20.0	17.0
2007	2	62.9	55.4	24.0	20.0
2008	2	62.7	55.6	28.0	25.0
2009	2	62.3	54.9	32.0	30.0
2010	3	61.1	53.9	35.0	33.0
2011	4	60.7	53.7	39.0	36.0
2012	3	60.7	53.8	45.0	42.0
2013	4	60.8	53.9	47.0	44.0
2014	4	57.3	51.9	50.0	46.0
2015	5	58.3	52.8	54.0	49.0
2016	5	59.5	54.2	59.0	54.0
2017	7	60.3	55.1	62.0	59.0
2018	7	60.7	55.7	69.0	67.0
2019	8	61.3	56.4	73.0	70.0
2020	12	62.6	57.5	78.0	75.0
2021	15	64.8	59,3	82.0	81.0
2022	19	64.9	59.5	ND	ND

Source: own processing based on data from Eurostat and Unece
ND – no data available

Overall, the table illustrates a substantial increase in internet banking adoption and internet access for both genders with secondary education over the years, with 2021 being a standout year for growth. Additionally, the narrowing gender gap in internet usage is indicative of increased digital inclusion for both males and females.

The provided table (table no. 2) presents data related to internet banking usage (IB), the percentage of the population with tertiary education (Pop-M-Tertiary for males and Pop-F-Tertiary for females), and the percentage of males and females using the internet (M-Using internet and F-Using internet, respectively) over the period from 2004 to 2022.

The table includes data on the percentage of the population with tertiary education for both males and females. These percentages have generally increased over the years. In 2004, 9.0% of males and 8.5% of females had tertiary education, and these figures increased to 15.3% for males and 18.9% for females by 2022. The gender gap in tertiary education has remained relatively constant, with females having slightly lower percentages than males throughout the years.

The table also provides data on the percentage of males and females using the internet. Both genders have witnessed substantial growth in internet usage. In 2004, 11.0% of males and 9.0% of females were using the internet, and by 2021, these percentages had increased to 82.0% for males and 81.0% for females.

Internet banking adoption has shown a consistent upward trend over the years, with the percentage of users increasing from 0% in 2004 to 19% in 2022. The most significant growth in IB adoption occurred between 2020 and 2021, with a rise from 12% to 15%, followed by a further increase to 19% in 2022.

Table no. 2 Evolution of M_Usin_Internet, F_Usin_Internet, Pop_M_Tertiary, Pop_F_Tertiary and Internet_Banking, 2004-2022 (%)

Year	IB	Pop-M-Tertiary	Pop-F-Tertiary	M-Usin internet	F-Usin internet
2004	0	9.0	8.5	11.0	9.0
2005	1	9.3	8.9	16.0	13.0
2006	1	9.7	9.4	20.0	17.0
2007	2	10.0	9.8	24.0	20.0
2008	2	10.7	10.7	28.0	25.0
2009	2	10.9	11.6	32.0	30.0
2010	3	11.8	12.0	35.0	33.0
2011	4	12.6	13.2	39.0	36.0

2012	3	13.0	14.0	45.0	42.0
2013	4	13.1	14.5	47.0	44.0
2014	4	13.5	14,8	50.0	46.0
2015	5	14.2	15.8	54.0	49.0
2016	5	14.2	16.0	59.0	54.0
2017	7	14.2	16,5	62.0	59.0
2018	7	14.3	16.7	69.0	67.0
2019	8	14.8	17.3	73.0	70.0
2020	12	15.0	17.5	78.0	75.0
2021	15	14.9	17.9	82.0	81.0
2022	19	15.3	18.9	ND	ND

Source: own processing based on data from Eurostat and Unece
 ND – no data available

Overall, the table illustrates a notable increase in internet banking adoption and internet usage for both males and females with tertiary education over the years. The consistent gender gap in both tertiary education and internet usage is an important aspect to consider in discussions related to digital inclusion and access to financial services. Additionally, the sharp growth in internet banking adoption in recent years indicates a rising trend in the utilization of digital financial services among the population with tertiary education.

Differences in the level of education can significantly impact the adoption and usage of internet banking (IB). Here are some key differences between various levels of education concerning the use of internet banking:

- adoption rates: individuals with higher levels of education tend to adopt internet banking at higher rates compared to those with lower levels of education. They are more likely to be familiar with technology and comfortable with online financial transactions;
- frequency of usage: people with higher education levels are more likely to use internet banking services more frequently. They may use it for a wide range of transactions, including bill payments, fund transfers, and account management, on a regular basis;
- trust and security: individuals with higher education levels tend to have a better understanding of online security measures and are often more confident in the security of internet banking platforms. They may be more willing to trust online banking systems;

- access to information: (those with higher education levels are more likely to seek out and access information related to internet banking services. They may be more proactive in staying informed about new features and updates offered by their bank;
- resistance to change: people with lower levels of education may be more resistant to adopting internet banking due to unfamiliarity with technology or concerns about its complexity. They might prefer traditional banking methods;
- digital skills: higher education levels often correlate with stronger digital skills. Individuals with more education may find it easier to navigate online interfaces, troubleshoot issues, and adapt to changes in internet banking platforms.
- age considerations: it's important to note that age can also intersect with education level. Older individuals with higher education may have different internet banking usage patterns compared to younger individuals with the same level of education.
- digital inclusion efforts: policymakers and financial institutions may need to take into account the education level of their target audience when designing digital inclusion efforts. Tailoring educational materials and support to different education levels can be beneficial in promoting broader adoption of internet banking.

3. Conclusions

This research contributes to the understanding of the intricate relationship between digitalization, human capital, and the utilization of internet banking services in the Romanian context. The study addresses a significant gap in prior research by adopting a multifaceted approach, considering "human capital" as a pivotal determinant, disaggregated by gender and educational levels (both secondary and tertiary). Furthermore, the study measures the degree of "digitalization" by assessing the proportion of the population engaging with the internet on a weekly basis. Concurrently, it examines "internet banking usage" by evaluating the percentage of individuals who actively utilize internet banking services.

Through rigorous statistical analysis, this study has uncovered noteworthy findings regarding the influence of the digital divide, particularly in relation to education levels, on internet banking adoption patterns in Romania. Specifically, individuals with limited access to education tend to exhibit lower levels of engagement with internet banking services compared to those with higher educational achievements. These outcomes offer valuable insights into the dynamics of internet banking adoption within the Romanian context, underlining the critical significance of addressing educational and gender

disparities to effectively bridge the digital divide within the realm of financial technology.

This study has provided valuable insights into Romania's digital divide, focusing on the impact of human capital and access to the internet on internet banking usage. Several key findings and implications have emerged from this research:

- **Digital Divide Persistence:** Despite significant advancements in expanding internet access in Romania, a digital divide still persists. Certain segments of the population continue to face disparities in terms of internet connectivity and access to internet banking services.
- **Human Capital Significance:** Human capital, as represented by educational attainment, plays a crucial role in influencing internet banking usage. Individuals with higher levels of education exhibit a higher propensity to use internet banking, both in terms of frequency and complexity of transactions.
- **Gender Disparities:** Gender disparities in internet banking usage exist, with men generally using these services more frequently than women. However, the gender gap has been gradually narrowing over the years, indicating progress in digital inclusion efforts.
- **Digital Inclusion Initiatives:** Policymakers and financial institutions should consider the role of education and gender in shaping internet banking adoption. Tailoring digital inclusion initiatives to address these disparities can contribute to a more equitable and inclusive digital landscape.
- **Potential for Future Growth:** The study reveals substantial growth in internet banking adoption in recent years, suggesting that Romania's population is increasingly recognizing the convenience and benefits of online financial services. This growth presents opportunities for financial institutions to expand their digital offerings and for individuals to enhance their financial literacy and capabilities.
- **Data Limitations:** It is important to acknowledge data limitations, such as the absence of data for certain years (e.g., 2022) and potentially incomplete information on internet banking usage among specific demographics. Future research should aim to address these gaps and provide a more comprehensive understanding of the digital divide dynamics in Romania.

In a broader context, this study contributes to the ongoing discourse on digital inclusion and the transformative potential of internet banking services in promoting financial access and economic development. Romania's experience serves as a case study, highlighting the multifaceted nature of the digital divide and the need for targeted interventions to bridge these disparities effectively. Further research in this domain can inform evidence-based policies and

strategies aimed at fostering a more inclusive and digitally empowered society in Romania and beyond.

This research not only extends the existing body of knowledge on digital inclusion and internet banking but also underscores the imperative for policymakers, financial institutions, and stakeholders to develop targeted strategies aimed at promoting digital literacy and enhancing access to internet banking services, especially among underrepresented groups. By addressing these disparities, Romania can move closer to achieving a more inclusive and digitally empowered society, ultimately contributing to broader economic development and financial inclusion.

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