

Fintech Revolution's Impact on Financial Behavior and Education

Alexey Upravitelev^{1*}

Abstract

This paper explores the impact of digitalization of finance on consumers of financial services and the role of financial education in this context. The advantages of digital finance include reduced transactional costs, enhanced speed, security, and transparency. However, the paper focuses on how fintech changes financial behavior and the emergence of vulnerable groups due to the unequal distribution of benefits from digitalization. The paper critiques existing approaches to financial education, arguing that they are insufficient in addressing the challenges posed by digitalization. It identifies vulnerable groups, including the elderly, low-income individuals, and those with limited access to technology, who may face greater risks in the fintech revolution. The paper concludes with suggestions for effective methods of financial behavior change and financial education programs. By addressing the challenges and opportunities of digitalization, financial education can empower consumers to make informed financial decisions and reduce vulnerability.

JEL Classification: D14, G53, I24

Keywords

financial literacy — digitalization — nudge — boost

¹ University of Trento

*Corresponding author: a.a.upravitelev@gmail.com

Introduction

The digitalization of finance significantly transforms the financial sphere. According to the recent report of the World Bank, one of the most significant advantages that businesses gain from digitizing finance is the reduction of transactional costs (Feyen et al., 2023). The technology eliminates geographical limitations, allowing consumers to access services from anywhere with an internet connection. Furthermore, it enhances the speed, security, and transparency of transactions.

Although this process of digitalization of finance has a substantial impact on business and society in general, this paper aims to focus on the impact that it has on consumers of financial services. According to another report of the World Bank, fintech has altered the ways in which people pay, save, borrow, manage risks, and receive advice (Berg et al., 2020).

The objective of financial education is to change financial behavior through knowledge. However, the effectiveness of different approaches to financial education is disputed, and digitalization of finance creates new challenges for financial education programs.

As the ability to use new financial technologies is influenced by various factors, some individuals reap the benefits of digitalization while others perceive greater risks. This dichotomy gives rise to vulnerable groups.

The paper has six sections. In second section I describe the change of financial behavior that has been happening now. In third section I provide existing approaches to financial education

and provide my critics from digitalization perspective. In fourth section I write about vulnerable groups in terms of fintech revolution. In fifth section I share suggestions about the effective methods of change of financial behavior and of programs of financial education. Sixth section concludes the paper.

How Digitalization Has Changed Financial Behavior

Financial technologies are reshaping financial services, with the key technologies being connectivity and computing power. While computing power refers to the development of technology, connectivity implies the elimination of barriers between consumers and financial service providers, reducing the cost of information transfer and remote interactions. This increased connectivity and reduced costs of remote interactions are the primary determinants of behavioral changes in consuming financial services.

According to the World Bank, fintech changed five types of consumer financial behavior: it changed how people pay, save, borrow, manage risks, and get advice (Feyen et al., 2023).

Here, I want to provide my examples of behavioral change from the table above.

- Pay. Traditionally, people needed to go to a particular office to pay for the utilities or send money to their peers. Today, these transactions can be conveniently

Table 1. Evolution of Financial Services to Suit User Needs (Berg, 2020).

User needs	Traditional Model	Fintech Solutions
Pay	Cash/ATM	Virtual currencies
	Check	Remittances
	Wire/MTO's	Mobile payments
	Debit/Credit	Mobile PoS
	Centralised Settlement	P2P payments
		B2B transactions
Save		DLT-based settlement
	Bank deposits	Virtual currencies
	Mutual funds	Mobile market funds
Borrow	Bonds Equities	Blockchain bonds
	Bank loan	Credit modeling platform lending
	Bonds	Crowd-funding
	Mortgages	Blockchain bonds
Manage Risks	Trade credit	Auto-underwriting
	Brokerage underwriting	Regtech
	Structured products	Smart contracts
	Trading regulatory	Suptech
	Compliance KYC	Crypto-asset exchanges
Get Advice	Financial planner investment advisor	eKYC, Digital ID
		Robo-advising
		Automated wealth management

completed through various applications provided by banks, transferring systems, or utility companies.

- **Save.** Previously, people would open special savings accounts at banks, but now they can easily set up such accounts through mobile banking applications. Additionally, individuals now have the option to invest in cryptocurrencies and other digital currencies as a form of savings.
- **Borrow.** Traditionally, borrowing money for entrepreneurial projects used to involve loans from banks. However, with the rise of digital platforms, some entrepreneurs now have the opportunity to run crowd-funding campaigns to raise funds. It is important to note that while crowdfunding offers transparency and wide audience attention, it may not be suitable for all types of projects.
- **Manage risks.** Instead of relying on notary services and bank account transfers, people can now sign smart contracts that automate the ownership change process. This shift simplifies and streamlines real estate transactions.
- **Get advice.** In the past, individuals would consult human financial advisors, but now robo-advising services powered by artificial intelligence algorithms analyze

the market and provide investment ideas. These automated services have made investment decisions more accessible and convenient.

These advancements in financial services are made possible by technologies such as mobile phones, artificial intelligence, machine learning, cloud data platforms, distributed ledgers, and cryptocurrencies (Berg, 2020). Most of these fintech services are available as smartphone applications, but can also be accessed through desktop computers.

These new patterns of financial behavior create different risks to consumers of digital financial services. I want to focus on the problem that I call the *problem of agency*, which I offer to define as *a substantial change in financial behavior that occurs when consumers need to interact with digital financial services without the assistance of a manager*. Traditionally, individuals would visit a bank branch and rely on the help of a manager to access the services they require. The manager acted as a mediator between the consumer and the institution. However, within the digital environment, financial behavior necessitates that consumers interact with the institution directly through an application without human interaction.

I argue that the significance of this problem rests upon several reasons. Firstly, it creates a more significant information asymmetry between the consumer and the financial service provider. In traditional settings, individuals who were unsure

about the specifics of a service could seek information from a consumer help manager. However, in a fintech application, consumers must find information themselves.

Secondly, it impacts the independence of financial behavior. In the past, a consumer could present their needs to a manager who would then guide how to address their interests. In a fintech environment, consumers must make independent choices, which can be subject to biases. At the same time, traditionally it could create a conflict of interests, as regularly in these situations managers could sell some types of services that are in the sales plan, but not fitting the clients' needs perfectly.

Thirdly, the transition to fintech means that consumers must possess skills previously only required by financial managers. For instance, bank account details often consist of numerous numbers, and a simple mistake can have significant consequences. Therefore, consumers must spend more time ensuring they correctly enter these details, whereas an experienced manager would have done this efficiently.

As fintech pushes consumers to independent decision making without financial institution manager, some services can nudge consumers to less rational decisions, it is called dark patterns or dark nudges. People can become victims of unethical fintech services. Usability engineers use digital nudges in designing financial apps for more spontaneous financial decision-making, designers can create interfaces that nudge users toward the most desirable option by utilizing different ways of visualizing content, or tracking users' behavior (Weinmann et al., 2016) define such methods to build user interfaces that lead a person to a worse decision as "dark patterns".

The problem of these digital nudges lies in the sphere of ethics and clash of interests: while firms want consumers to spend more, consumers want to save more. Digital nudges make the process of decision making more spontaneous and impulsive. The complexity of financial technology services creates great information asymmetry between firms and consumers that can be very important for people from vulnerable groups. According to the classification of dark patterns, in fintech services consumers can face these: 1) forced continuity of subscription, when the free trial period ends and it is difficult to cancel the membership. 2) misdirection, when design purposefully focuses user's attention on one thing in order to distract attention from another. 3) price comparison prevention, when design makes it hard to compare the price of an item with another item. 4) confirm shaming, the act of guiltting the user into opting into something, the option to decline is worded in such a way as to shame the user into compliance (Gray et al., 2018).

So, financial education programs should on different risks that appear due to the digitalization of financial services.

Financial Literacy, Capability, and Education

So, we see that digitalization of finance fosters the change in programs of financial education. I aim to highlight the

ways of such change, but before doing that I need to make an overview of existing approaches to financial education.

Typically, the goal of financial education is to increase levels of financial literacy. However, there is often confusion in the definitions used. Haupt (2021) notes that the terms "financial literacy" and "financial knowledge" are often used interchangeably in related research. On the other hand, the OECD's definition of financial literacy is much broader, encompassing not only knowledge but also awareness, skills, attitudes, and behaviors necessary to make sound financial decisions and achieve individual financial well-being (Atkinson and Messy, 2012). Additionally, Lusardi and Mitchell (2011) introduce the term "financial capability," which refers to the ability to make ends meet, plan ahead, choose and manage financial products, and possess the skills and knowledge to make financial decisions.

Kass-Hanna and Lyons (2021) propose a digital financial literacy approach that defines financial literacy in terms of the digitalization of finance. Their framework includes aspects of financial literacy and digital literacy, as well as specific features and risks associated with digital financial services. The framework consists of five dimensions: basic knowledge and skills, awareness, practical know-how, decision-making, and self-protection. These dimensions are further divided into traditional finance and digital financial services sub-dimensions. While this framework provides a detailed overview of the components of financial literacy in the context of digitalization of finance, it offers limited information on the measurement of this type of literacy and education.

According to a meta-analysis conducted by Kaiser et al. (2022), approaches to financial education can be classified as traditional or nontraditional.

Traditional approaches are:

- Workplace financial education, specific "benefits fair", where benefits officers are usually available to answer questions and provide information.
- School-based personal finance coursework, which includes parental education paired with student classroom learning.
- One-on-one financial coaching.
- Educative nudge, where the intervention just provides information.

Besides that, there can exist many different untraditional approaches to financial education. They can be even more efficient than traditional, but it strongly culture/context specific. Some of the untraditional approaches are:

- extension agents, who engaged in one-on-one and group meetings once every two to three weeks for a few hours per village, they were available to answer questions and provide information.

- a workshop that shaped financial education around motivational content.
- inclusion of personal finance messages in mainstream television, a storyline of soap opera.

The effectiveness of various approaches to financial education is still a subject of debate. The World Bank document "Building a Financial Education Approach: A Starting Point for Financial Sector Authorities" suggests that conventional approaches, such as financial-literacy events, training sessions, seminars, workshops, and classroom-based lectures, have had limited success in sustaining behavioral change (2021, p. 1). Academic researchers also discuss the impact of financial education on financial behavior. Fernandes et al. (2014) argue that such education has diminishing effectiveness over time and a weaker impact on low-income populations. However, Kaiser et al. (2022), in a more recent meta-analysis, show that financial education has positive causal treatment effects on financial knowledge and downstream financial behaviors. The World Bank document also highlights the challenges posed by the rapid expansion of digital finance, which introduces new risks and manifestations of existing risks. However, it fails to give sufficient attention to the changes in day-to-day behavior resulting from digitalization.

Although there are various traditional and nontraditional approaches to financial literacy, their effectiveness remains a topic of debate. The digitalization of finance presents an even greater challenge to these programs as it dramatically and rapidly changes financial behavior. Further research is needed to develop effective financial education programs that adapt to the digitalized financial landscape.

Vulnerable Groups in Terms of FinTech Revolution

As new applications and types of services continue to emerge, they are shaping new patterns of financial behavior. The ability to recognize and adopt these patterns is influenced by factors such as age, gender, education level, and other demographics. Consequently, this inequality directly contributes to the rise of social injustice, as individuals with limited understanding of financial technologies are less equipped to seize opportunities and more susceptible to risks within the fintech industry.

An Ernst&Young (EY) study identifies three vulnerable groups in terms of adopting various financial technologies: those without higher education, individuals residing in rural areas, and women. For instance, the utilization of savings and investment services is 27% for women compared to 40% for men (Hwa, 2019). Chen et al. (2023) also found a significant fintech gender gap across 28 countries, with 29% of men utilizing fintech products and services compared to only 21% of women. Although smartphone accessibility may seem like a potential facilitator of financial inclusion, differing perceptions hinder adoption (Sioson and Kim, 2019). Additionally, various studies have highlighted age disparities in technology adoption, with older individuals being less inclined to

embrace new technologies when compared to their younger counterparts (Meyer, 2008; Berkowsky et al., 2017).

Furthermore, Carlin et al. (2017) discovered that Millennials and Generation X members benefit from technological advancements by incurring fewer financial fees and penalties, whereas Baby Boomers do not experience the same advantages.

Currently, the adoption of financial technologies among households is uneven worldwide. Consequently, the variations in digital fintech product adoption between countries exacerbate the existing inequality among the aforementioned vulnerable groups. Strikingly, developing countries display more promising results compared to developed nations. For example, EY's research (Hwa, 2019) reveals that China has an adoption index of 87% while the USA stands at only 46%. Enhanced financial education programs can play a crucial role in increasing global financial inclusion.

Ways to Change Financial Behavior

So, we see that even when financial education programs are focused on financial capability, that don't deal with behavioral changes that occur due to the digitalization of finance. This digitalization also creates specific vulnerable groups, which financial education programs must address. I propose a comprehensive analysis to address these challenges.

Financial education recipients, particularly vulnerable groups, exhibit significant diversity, including older adults, rural residents, migrants, and others. These groups may encounter unique difficulties with digital financial services, making it challenging to develop a one-size-fits-all financial education program.

To tackle this issue, initial measures should prioritize behavioral public policy interventions aimed at resolving specific problems faced by vulnerable groups. According to the Organisation for Economic Co-operation and Development (OECD), financial decision-making is a critical area for applying behavioral insights due to the profound impact of financial behavior on well-being (IOSCO and OECD, 2018).

Behavioral public policy approaches, such as nudges and boosts, can effectively influence behavior. Nudges are non-regulatory, non-monetary interventions that guide people toward specific choices while preserving their freedom of choice. Conversely, boosts aim to enhance people's competence to make their own choices (Thaler and Sunstein, 2008); (Grüne-Yanoff and Hertwig, 2016).

Recent experimental studies indicate that nudges or boosts can be effective interventions in various financial decision-making contexts (Franklin et al, 2019; Bradt, 2019). For instance, research by Hertwig and Grüne-Yanoff (2019) reveals that boosts are effective in improving financial literacy among economic agents in heuristic-based accounting training and understanding financial risks during investment decisions.

Since financial behavior problems are often context-specific, behavioral change measures should be customized for

each program. The standard methodology for behavioral interventions, known as BASIC, involves five elements: behavior, analysis, strategies, interventions, and change (Hansen, 2019). This methodology has been successfully employed by various nudge units in different countries, regions, and contexts. I argue that this methodology should be applied to address fintech adoption challenges. The development of general financial education programs to help overcome various financial behavior risks in digital environments is a topic for future research.

Conclusion

In conclusion, the digitalization of finance has had a significant impact on financial behavior, resulting in changes in how individuals pay, save, borrow, manage risks, and seek advice. This transformation has also created vulnerable groups who face unique challenges when it comes to navigating digital financial services. While financial education programs primarily focus on financial literacy, the need for financial capability is becoming increasingly important in the digital era. To address these challenges, the implementation of behavioral public policy measures, such as nudges and boosts, through the BASIC methodology can effectively address specific issues related to fintech adoption. However, further research is required to develop comprehensive financial education programs that assist consumers in mitigating risks associated with the digitalization of finance.

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