Enhancing Financial Inclusion Using Fintech: Development Scenario for the Bank Card

Salma Rhanoui¹

¹ Faculty of Law, Economics and Social Sciences, Cadi Ayyad University, Marrakech, Morocco Correspondence: Salma Rhanoui, Faculty of Law, Economics and Social Sciences, Cadi Ayyad University, Marrakech, Morocco.

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Abstract

Financial technology, or Fintech, refers to the allocation of financial services to customers and businesses through digital technology. This tool can improve financial inclusion by granting affordable access to various financial products and services. Fintech can also be used to fight financial exclusion in order to support economic development. In this respect, the present paper investigates a forecast scenario for the evolution of the bank card as a Fintech instrument to identify the Fintech industry's potential contributions to greater financial inclusion. In particular, we used the Mayer method of linear adjustment to generate a plausible evolution scenario of bank cards in circulation for six years, together with commentary and analysis, in order to determine how Fintech could promote financial inclusion through bank cards. The findings showed that Fintech is on the right track to promote financial inclusion, even though it also faces several challenges that must be overcome.

Keywords: bank card, development scenario, financial inclusion, financial technology, Fintech

1. Introduction

It is well known that companies in emerging economies face numerous barriers to accessing formal banking services, resulting in significantly lower firm financial inclusion than in advanced economies (Beck & Demirguc-Kunt, 2006). In recent years, rising levels of digital adoption by companies and the introduction of financial technologies, or Fintech, have resulted in a rapid and intense increase in the number of Fintech mediators, whose business model uses numerical technologies to provide financial services with fewer barriers than traditional banks.

However, little is known regarding the effect of the evolution in the number of Fintech intermediaries for economy-wide firm financial inclusion in the operation and stability of the traditional banking system (Finkelstein Shapiro et al., 2022). That is why policymakers and academics are debating the importance of Fintech and financial inclusion for economic progress. Fintech refers to financial services provided by banks and other financial institutions to their clientele through the integration of digital technologies like the internet and debit or credit cards with secure digital payment systems (Gomber et al., 2017). In contrast, financial inclusion entails involving public in financial institutions, leading to having benefits.

While banks play a key role in the economy, Fintech promotes individual financial inclusion through active financial services (Beck, 2020). Easier access to financial services allows people to manage their money, including their spending, savings, and investments. Moreover, traditional financial services are seen as an effective tool for fostering financial inclusion since they require considerable funds to establish financial service in a region, but Fintech provides society with better access to financial services (Anikina et al., 2016).

It is assumed that the adoption of Fintech can alleviate persistent economic problems because digitization can influence and increase the level of financial inclusion while also providing numerous benefits such as lower financial costs for financial institutions and Fintech providers, appropriate and secure financial services, an increase in gross domestic product and a positive long-term effect for banking performance (Scott et al., 2017).

It is important to study this topic because it is crucial to understand the extent to which Fintech can intervene in improving financial inclusion so that Fintech and financial inclusion can help economic growth and reduce the informal economy. However, as far as we know, no study has been undertaken on the evolution of the bank card, which is the Fintech tool to be studied in this paper, or has tried to analyze scenarios in terms of financial inclusion.

Therefore, this paper seeks to achieve the following objectives:

i) Demonstrate the link between Fintech and financial inclusion;

ii) Create a future scenario for developing a Fintech instrument, namely the bank card, using the Mayer method, with comments and analysis to draw lessons that can help improve financial inclusion.

Based on these objectives, this paper will address the following research question: What would a future scenario of local bank card development look like, and what lessons can be drawn from it in terms of Fintech's role in facilitating financial inclusion?

The paper is structured as follows: Section 2 provides a literature review of the subject. Section 3 clarifies the research methodology and data. Section 4 presents and discusses the results. Section 5 concludes the paper.

2. Literature Review

2.1 Literature on Fintech and Financial Inclusion Definitions

The term Fintech was coined by combining the words "financial" and "technology". It refers to Internet-based technologies associated with business activities in the banking sector (Gomber et al., 2017).

Fintech is rapidly expanding. However, opinions differ on whether a new technology-based financial company can be classified as Fintech or whether entities may be considered Fintech if they renovate an older technology-based product or service (Rhanoui, 2022). It is unclear whether there is a market capitalization criterion that can be used to distinguish Fintech from traditional financial intermediaries. Notwithstanding these differences, it is generally agreed that Fintech refers to companies that improve financial services and products through the noticeably more prevalent use of information technology.

Arner et al. (2015) have identified three different phases of Fintech (Arner et al., 2015): Fintech 1.0 (1866 -1967) refers to the period in which financial services and technology were first linked. However, the connection was not noticeable because the technology was less advanced and exclusive then. Fintech 2.0 (1967 -2008) established a robust foundation for this alliance. Financial institutions at this time recognized technology's potential to offer their customers better service. Fintech 3.0 (2008 -present) started with a new wave of startups and technology corporations.

Maier (2016) specified that Fintech combines finance and technology to create more innovative solutions and sustainable business models (Maier, 2016). Dorfleitner et al. (2017) defined Fintech as a collaboration among various corporations to provide technical assistance in the delivery of financial services (Dorfleitner et al., 2017). According to Leong and Sung (2018), Fintech is a pioneering notion that enriches financial service operations by providing solutions through the support of technology that is tailored to a business scenario (Leong & Sung, 2018).

In summary, Fintech refers to technology-based financial solutions that optimize a financial service. From a purely banking point of view, Fintech can intervene in the banking system at several levels, as illustrated in Figure 1 below.



Figure 1. Banking and Fintech integration stages Source: (Rubanov, 2019)

The definition of financial inclusion is still imprecise, and several researchers offer different lenses through which to assess financial inclusion. Leyshon and Thrift (1995) define financial inclusion as the integration of an excluded population into the official financial structure (Leyshon & Thrift, 1995). Sinclair (2001) views financial inclusion as the ability to access to basic financial services (Sinclair, 2001).

Leeladhar (2006) describes it as the provision of banking services at a reasonable cost to large numbers of poor and low-income people (Leeladhar, 2006). Unrestricted access to public goods and services is the sine qua non for an open and competent society. According to Hannig and Jensen (2010), financial inclusion is about attracting unbanked elders into the financial system so that they can use several accessible financial services such as savings, payment, investment, transfers, and credit payments (Hannig & Jansen, 2010).

According to Sarma (2012), financial inclusion is a process that grants all actors in the economy easy access to and acquisition of the benefits of the formal system. Therefore, it can be established that inclusion is the effort to improve access for society, particularly the unbanked, by reducing barriers (Sarma, 2012).

According to Terada and Vandenberg (2014), financial inclusion is the provision of universal access to financial services. Wealthier households and large businesses typically have substantial access to these services, so efforts to expand access target low-income households, which tend to be concentrated in rural areas, as well as small farmers and micro and small business owners (Terada & Vandenberg, 2014). Furthermore, access means that the services are available to the public at a reasonable cost (for example, transaction fees and interest rates) and are easily accessible (for example, close proximity and reasonable documentation requirements). Finally, financial services cover a range of functions, from lines of credit and deposits to more diverse services, including insurance, pensions, investment products, and leasing.

Bruhn and Love (2014) stated that financial inclusion entails increasing the number of generally poor people who have access to formal financial services, primarily through formal bank accounts, which drives poverty reduction and economic development (Bruhn & Love, 2014). People who were previously financially excluded will be able to capitalize on education, save, and promote businesses as a result of improved financial inclusion.

According to Awad and Eid (2018), financial inclusion is the process of providing low-income groups with convenient and affordable financial services (Awad & Eid, 2018). Lenka and Barik (2018) proposed a more specific definition of financial inclusion as a process that grants financial access to financially excluded groups in terms of financial services such as savings, payments, credit, and internet banking (Lenka & Barik, 2018).

Therefore, most definitions refer to financial inclusion as the provision of unconditional access to various financial services regardless of area and social class.

2.2 Literature on the Relationship between Fintech and Financial Inclusion

In addition to studies that addressed Fintech and financial inclusion separately, others have focused on the possible link between them. For example, Ozili (2018) addressed the impact of digital finance on financial inclusion and stability. He asserted that Fintech positively impacts financial inclusion in both developing and advanced economies and that the availability of digital finance for low and variable-income people is frequently more important to them than the higher fees they would pay to access such services from traditional banks (Ozili, 2018).

Haider (2018) examined the potential of advanced financial technologies to improve individuals' livelihoods. Access to digital technology, particularly cell phones, internet networking, and biometric authentication, enables a broader range of financial services for the unbanked, such as online banking and digital loaning (Haider, 2018). Numerical financial services may be more appropriate and affordable than traditional banking services, allowing low-income and disadvantaged people in developing countries to capitalize, borrow, and profit from the traditional financial system.

Allmen et al. (2020) moved beyond subjective evidence to provide empirical evidence that Fintech promotes financial inclusion. They developed a novel indicator of digital financial inclusion based on digital payment services data from mobile phones and the internet, as well as a traditional financial inclusion index for financial services provided by traditional financial institutions (Allmen et al., 2020). Their original metric proposes that digital financial inclusion increased significantly in the years preceding the COVID-19 crisis, primarily in Africa. The improvement in financial inclusion has been completely driven by Fintech in eight countries. They also demonstrated how Fintech has contributed to closing the gender gap in financial inclusion.

In contrast, Chen et al. (2021) used an individual-level survey dataset from 28 countries that uncovered a tenacious Fintech gender gap that could stymie financial inclusion (Chen et al., 2021). They also discovered that the gender gap was smaller between products that supplement traditional banking services and those that are

substitutes. Women are more likely to embrace Fintech products that supplement traditional services. This deduction proposes that the disparity in the use of Fintech is thoroughly connected to differences in attitudes toward technology and price sensitivity.

Finally, Kumar Gujra and Kumar (2021) stated that financial inclusion is a win-win situation achieved through digital finance (Kumar Gujra & Kumar, 2021).

3. Methodology and Data

For this research, we used **the Mayer method** of linear adjustment, a forecasting technique commonly used in finance to project the future behavior of a financial instrument, such as bank cards. The method uses historical data to develop a statistical model that captures the trends and patterns of the instrument over time. This model is then used to forecast the instrument's future behavior (Falguerolles, 2009). The Mayer method has the advantage of being relatively simple to implement and can provide valuable insights into the future trajectory of financial instruments, and it is widely used in both academia and industry.

Although there are more efficient projection methods than Mayer's, such as time series or data projection using Python, it was impossible to use these two methods due to the small number of figures serving as the basis for the projection. Indeed, creating scenarios by a time series and by the Python language requires a large number of numerical values (background) to create a plausible scenario.

The Mayer method divides a data distribution into two groups of equal numbers (or nearly equal if the number of observations is odd) and then calculates a mean point for each. This method is used to predict the value of y for a given value of the variable x.

We chose a bank card – as a Fintech-based instrument – for this study for two reasons:

- It is an instrument that accurately reflects the level of inclusion of the individual because if they have a bank card it means they have a bank account with a formal institution and are able to carry out all the necessary operations to promote financial inclusion (e.g., demand for loans, carrying out investment operations, or savings);
- In terms of numbers, the bank card was the only instrument with quantified values available from 2004 (the date of **the first official** value accessible for use) to 2021 (the date of the **last official** value accessible for use), the other indicators linking Fintech and financial inclusion, such as electronic payment, were available for a period that was shorter than the period that served as the basis for the study's projection.

Table 1 below displays real bank data in terms of the number of bank cards, in millions, in circulation (Note 1) from 2004 to 2021. Those values were forecasted to predict a future scenario for this Fintech-based tool.

Years	Number of bank cards in circulation (in millions)	Years	Number of bank cards in circulation (in millions)
2004	2.2	2013	9.8
2005	2.85	2014	10.9
2006	3.5	2015	11.8
2007	4.4	2016	12.9
2008	5.2	2017	14.1
2009	6.3	2018	15.1
2010	7.1	2019	16.2
2011	8	2020	17.2
2012	9.2	2021	17.9

Table 1. Actual bank data used for forecasting

Source: (Bank Al Maghrib, 2005-2021)

4. Results and Discussion

4.1 Divide the Data Series into two Sub-Series with an Equal Number of Years and Calculate the Double Average of Each Sub-Series

Because we had a total of 18 observations (years ranging from 2004 to 2021 and the number of bank cards corresponding to each year), we divided the series into two sub-series, with nine observations in each. It should be noted that for the sake of simplification, the years 2004, 2005, 2021 were replaced by years 1, 2, 18.

Table 2 below shows the first split sub-series and the calculation of the averages:

Table 2. Highlighting of the first sub-series and calculation of its mean

Years (X ₁)	1	2	3	4	5	6	7	8	9
Number of bank cards in millions (Y ₁)	2.2	2.85	3.5	4.4	5.2	6.3	7.1	8	9.2
Calculation of averages	$\mathbf{\bar{X}}_{1} = 5$		$\mathbf{\bar{Y}}_{1} = 5.416$						

Source: Author

The two averages were calculated as follows:

$$X_1 = (\Sigma Xi)/n = (1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9)/9 = 5$$

 $Y_1 = (\Sigma Yi)/n = (2.2 + 2.85 + 3.5 + 4.4 + 5.2 + 6.3 + 7.1 + 8 + 9.2)/9 = 5.416$

Similarly, Table 3 below displays the second split sub-series and the calculation of the averages.

Table 3. Highlighting of the second sub-series and calculation of its mean

Years (X ₂)	10	11	12	13	14	15	16	17	18
Number of bank cards in millions (Y ₂)	9.8	10.9	11.8	12.9	14.1	15.1	16.2	17.2	17.9
Calculation of averages	$\mathbf{\bar{X}}_{2} = 14$			TY ₂ =13.98					

Source: Author

The calculation of the averages was performed as follows:

 $X_2 = (\Sigma Xi)/n = (10 + 11 + 12 + 13 + 14 + 15 + 16 + 17 + 18)/9 = 14$

 $Y_2 = (\Sigma Yi)/n = (9.8 + 10.9 + 11.8 + 12.9 + 14.1 + 15.1 + 16.2 + 17.2 + 17.9)/9 = 13.98$

4.2 Solve the System Composed of the two Equations Formed by Y = aX + b for Each Sub-Series in order to Have Values of a and b

We set Y = aX + b

From table 2, we had 5.416 = 5 a + b (1)

From table 3, we had 13.98 = 14 a + b (2)

By subtracting (2) - (1), we obtained 8.564 = 9 a, so a = 0.951

We replaced a in one of the two equations:

5.416 = (5 * 0.951) + b

5.416 = 4.755 + b therefore **b** = 0.661

We thus had the equation Y = 0.951 X + 0.661

4.3 Make Forecasts for Future Years from the Equation Y = aX + b as Found

To establish the forecast for the year 19 (i.e., the year 2022 in concrete terms), X was replaced with 19, resulting in Y = (0.951 * 19) + 0.661 = 18.73. The forecast for the volume of bank cards for the year 2022, therefore, amounted to 18.73 million.

Similarly, in order to establish the forecasts for the years 2023, 2024, 2025, 2026 and 2027, we replaced X, respectively with 20, 21, 22, 23 and 24. The obtained results are represented in Graph 1 below:



Graph 1. Forecasts from 2022 to 2027 obtained by the Mayer method

Source: Author

4.4 Comment and Analyze

According to Graph 1, the overall volume of local bank cards would reach 23.485 million by 2027 after achieving positive development throughout the projection period.

Apart from the uncertainties inherent in any projection method and the fact that this number does not include the number of bank cards held by foreign tourists and workers residing outside the country and which are used during their stay in the country, this development demonstrates the role that Fintech can play in promoting the process of financial inclusion. It should be noted in this regard that the customers of banking establishments, by 2027, would be well aware of the following facts:

- The multiplication of bank cards would constitute an undeniable contribution to the development and influence of financial inclusion in the country's banking system by encouraging bank customers to invest more in banking digitalization and Fintech;

- The increased circulation of these cards and their public use will undoubtedly have an impact on those who do not possess one;

- The bank card provides security to its holder insofar as it prevents them from physically keeping their money by requiring the opening of an account linked to this card where the assets are kept securely;

- Finally, in addition to the security of operations guaranteed by the bank card (in online transactions), it currently allows these operations to be carried out from any ATM (automated teller machine) at any banking institution. Indeed, this convenience was only made possible a few years ago. Previously, bank customers could only obtain cash from ATMs owned by the same bank.

At the same time, it should be noted that this reinforcement can only be obtained through the deployment of certain means, the most relevant of which can be presented as follows:

- **Communication resources** by reserving sufficient budgets for the promotion of this segment of banking activity;

- **Human resources** by assigning, at the level of bank branches, sufficient staff dedicated to the reception of customers interested in opening an account and, by extension, establishing a bank card linked to this account. Indeed, it was observed on various occasions that these means were insufficient and that the opening of a bank account and the preparation of a checkbook and a bank card required waiting at least one week;

- Means of good governance, both upstream and downstream in opening accounts and issuing bank cards. Upstream, it was found that some agencies require new clients, candidates for opening an account, the domiciliation of their monthly salaries if they are public or private sector employees and the prior mobilization of substantial sums if they operate in the liberal sector. These requirements are not consistent with the desired financial inclusion in this area. Other obstacles to this financial inclusion have been criticized downstream, particularly the clumsy management of accounts and associated bank cards. In fact, on the accounting side, the audio-visual and written press and social networks (social media) regularly report complaints from bank customers who, disgusted by the proliferation of fee charges without their consent, are unable to settle their accounts easily, despite the existence of clear and precise directives from the central bank. As for bank cards, recovering the sums diverted by fraudulent use of these tools is near impossible, even when their holders prove their lack of responsibility, a stunning example of this bad governance has been publicly cited on this subject.

This is the refusal by the agencies with ATMs that withhold returning a customer's card without the presentation of the customer's ID (identification card). In this case, the current regulations require the delivery of the card to the issuing bank rather than directly to its holder.

5. Conclusion

The rise of Fintech, which has stimulated the dominant position of incumbent financial institutions, is closing the gap between unbanked, under-banked and developed civilizations, opening the door to the universal digital economy, bringing a long-term societal change for the financially excluded and underserved, and leading to comprehensive economic growth (DemirgüçKunt et al., 2015). Indeed, Fintech is destined to play an integrative role in the development of essential value schemes, advanced financial services, and products adapted for underbanked and unbanked economies (Richardson, 2016).

This paper has created a scenario for the evolution of a Fintech instrument represented by the bank card. Using Mayer's method, the scenario in question covered 2022 to 2027 based on the actual values of 2004 to 2021. The article concluded that the number of bank cards in circulation would reach 23.485 million by 2027. Our work has also tried to identify the reasons likely to explain this appreciable evolution of this Fintech tool and the main challenges that must be overcome to improve financial inclusion in the country.

More generally, this paper concludes that Fintech-based services positively impact financial inclusion and that this effect is greater when digital financial inclusion procedures are used instead of traditional ones.

Our results also highlight the importance of leaving no one behind when endorsing Fintech services so they can promote financial inclusion. While Fintech has shown some promise in closing the rich-poor gap, more effort is needed to disseminate and scale up financial inclusion internationally in a responsible and workable manner; there is still a number of barriers to overcome, such as continuously developed technological innovations, financial education, and financial literacy in terms of appreciating the value proposition of these financial applications and easing their implementation, as well as the content applicable to different locations universally.

The global public is gradually accepting innovative financial inclusion models. In this respect, financial inclusion must be viewed holistically and not only from a top-down point of view. This step necessitates widespread and methodical collaboration in order to grow and build accurate financial tools, models, and regulatory policies to change current financial behavior and enable a vibrant ecosystem for advanced financial inclusion (Salampasis & Mention, 2018). From a regulatory standpoint, in particular, appropriate KYC (know your customer), transparency and tangible rules that protect financial integrity must be established. In this context, financial inclusion should allow financial health to flourish and grow within a safe and stable framework (Friedline, 2016).

It is critical to understand the end-user and provide directly applicable solutions that are carefully calculated to embrace but also assemble and further develop the valued customers' contextual, educational, and technical literacy (Buckley & Webster, 2016). In this regard, financial inclusion is likely to become a critical prerequisite for social and economic development, resulting in unrestricted and universal access to basic financial services, including banking services.

Based on the findings of this research, future researchers could add considerable value to the interaction between Fintech and the financial inclusion agenda by examining the supply side of Fintech in the financial system, allowing the industry to improve financial inclusion. New Fintech corporations combine behavioral economics, artificial intelligence, financial literacy, and money management strategies. Understanding emerging practices in Fintech, money management and financial health could provide valuable information for consumer public education, particularly for financially excluded individuals who cannot use Fintech-based services due to their complexity.

Moreover, Fintech and financial inclusion appear to receive little attention at the policy level. A review of beneficial policies for Fintech and financial inclusion, as well as emerging performances and challenges, could aid in understanding the policy aspect of financial well-being. Fintech and digital financial services will continue to play critical roles in developing and supporting innovative solutions for responsible and sustainable financial inclusion and financial health in general, and additional research will lead to a better understanding of the nuances of this relationship.

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Notes

Note 1. Cards officially issued by banks to their customers, the activities of which can be tracked and monitored by their issuing institutions.

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