Financial inclusion – does digital financial literacy matter for women entrepreneurs?

Rashedul Hasan[1], PhD, ACMA, CGMA
Lecturer in Accounting
Coventry University, United Kingdom
Email: ad6284@coventry.ac.uk

Muhammad Ashfaq, PhD
Wittenborg University of Applied Sciences
Netherlands
Email: Ashfaq8585@hotmail.com

Tamiza Parveen, PhD
Department of Business Administration
International Islamic University Malaysia
Email: mithilaiub@gmail.com

Ardi Gunardi
Faculty of Economics and Business
Universitas Pasundan, Indonesia
Email: ardigunardi@unpas.ac.id

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[1] Corresponding author

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Abstract

Purpose - Women's financial inclusion has become a global research agenda and past studies provide mixed evidence on the determinants of financial inclusion among women entrepreneurs across the globe. However, the impact of digital financial literacy on women's financial inclusion has seldom been addressed in past literature.

Methodology - We perform a cross-sectional analysis of 144 countries using the World Bank Global Findex database.

Findings - Our probabilistic regression results indicate that women entrepreneurs with a higher degree of digital financial literacy are more likely to engage in formal banking channels.

Practical implications - Our findings have practical implications in terms of allowing regulators and banks to draw effective policies to attract women customers. Lack of effective regulatory intervention could lead to women exploring financial crimes, such as money laundering, due to their lack of involvement with the formal banking channel.

Originality – We explore the impact of digital financial literacy on women's financial inclusion. Such evidence is rare in the existing literature.

Keywords: Digital Financial Literacy, Financial Inclusion, Women, Entrepreneurs, Fintech

JEL Classifications: G53, M14, O14

1. Introduction

Financial literacy is a set of skills and knowledge that enables individuals to make appropriate business decisions (Iriobe, Akinyede & Iriobe, 2017). The success of entrepreneurs to access necessary finance has a positive influence on national economic growth (Kim, et al., 2018). Financial inclusion is the process of ensuring that vulnerable groups (such as low-income groups) have access to appropriate financial products and services at an affordable cost (Mohamad & Nasir, 2019; Deka, 2015). Financial inclusion is essential for improving the living conditions of poor farmers (Wang & He, 2020) and rural enterprises led by women entrepreneurs (Goel & Madan, 2019). According to Grilli (2019), there are various obstacles in the process of initiating or expanding a business. Among others, access to finance remains one of the most common barriers among women entrepreneurs in both developed and developing countries (Howell, 2019). Women entrepreneurs prefer debt financing as opposed to equity financing to keep ownership to themselves (Steingold, 2019).

Deka (2015) reports limited access to formal financial services for women living in rural areas. For several reasons, Wasiuzzaman and Nurdin (2019) report that lack of transaction history and collateralised assets are the main challenges women entrepreneurs face while accessing finance from formal banking channels. Hussain, Salia and Karim (2018) indicate higher loan charges and collateral requirements for women entrepreneurs. Women entrepreneurs from rural, poor regions and living in harsh weather conditions often favour informal lending when availing of finance, which includes borrowing from family members, friends, angel investors or moneylenders (Findex, 2019; Lyons & Kass-Hanna, 2019; Shetty & Hans, 2018).

The financial inclusion of women has wider implications for the economy. The success of microfinance schemes in Asian (Afrin, et al., 2010) and African (Halkias, et al., 2011) countries promote a positive association between women empowerment and economic development. However, a lack of access to formal financial services exposes rural women to financial hazards, such as money laundering (De Koker, 2011). Therefore, emerging countries are enforcing regulatory mechanisms to reduce current bias among financial institutions while evaluating loan applications (Adam, et al., 2018). While the Equal Credit Opportunity Act (ECOA) of 1974 in the United States provides a framework to ensure fairness in loan applications, this act does not have a universal appeal and is not followed outside the United States. Women receive a fair assessment

from banks if they either have sufficient financial collateral or a large cash balance (Cowling et al., 2020).

Past studies provide clear evidence that a higher degree of financial literacy has a positive influence on women's saving behaviour (Murendo & Mutsonziwa, 2017). Murendo and Mutsonziwa (2017) also conclude that men have a higher level of financial literacy than women do. Such findings are in line with Klapper et al. (2015) for the global adult population, both in advanced and emerging economies. Financial literacy is a critical factor in encouraging financial inclusion, protecting consumers, and ultimately promoting financial stability and capacity (Iriobe et al., 2017). Here lies the dilemma. To get a favourable financial decision from the formal financial channel, a higher degree of financial literacy among women entrepreneurs would be helpful.

Evidence exists that women experience unfair biases during the credit risk assessment processes. Making women financially literate is also not an easy task due to the lack of freedom women have in emerging countries because of social and cultural restrictions (Baluja, 2016). Baluja (2016) refers to a male-dominated society in India where women often can not make their own financial decisions. The World Economic Forum (2021) reports that the gender pay gap in economic participation and opportunity remains the second largest among the countries under investigation. The country with the lowest progress in reducing the gender gap in economic participation and opportunity and educational attainment in 2021 is Afghanistan.

The United Nations (Rao, 2018) identifies several factors for women's financial exclusion, which include (1) income and property, (2) transaction costs, (3) cultural norms and (4) supply-demand barriers. Women working in the rural agricultural sector find it more challenging to access finance from the formal financial sector. Lack of formal education affects women's ability to maintain relevant documentation that the financial institutions seek during the credit application process which leads to a higher level of transaction cost. Cultural norms also add to the transaction costs by limiting their mobility. Finally, the supply-side often restrict women's ability to own assets. The digital financial revolution allows women to overcome all of the above-mentioned constraints (Molinier & Quan, 2019).

We refer to the findings presented by Hilbert (2011) that information and communication technologies (ICT) can prove to be a great tool to reduce the gender gap and improve the living standards of rural women entrepreneurs. However, there is limited evidence on the impact of

digital financial literacy on women's financial inclusion. The majority of past studies explain the importance of financial literacy on women's financial inclusion. However, there are differences in the definition between financial literacy and digital financial literacy (Lyons & Kass-Hanna, 2021). Therefore, we ask the question: *Does digital financial literacy among women entrepreneurs affect their financial inclusion through the formal banking channel?* Surprisingly, we do not find the answer to our research question in past studies. We identified studies that examine women's financial inclusion (Kofman & Payne, 2021) and digital financial literacy (Azeez & Akhtar, 2021) separately but do not examine the association between these two phenomena.

We perform a cross-sectional analysis of 144 countries using the World Bank Global Findex database (please see Appendix A). Our probabilistic regression results indicate that women entrepreneurs with a higher degree of digital financial literacy are more likely to engage in formal banking channels. Our findings have practical implications for regulators and the banking sector to develop effective policies to attract women entrepreneurs. We divide the rest of our paper into five sections. In section two, we critically review the past literature to identify research gaps. Section 3 describes our research methodologies and we present our results in section four. Finally, we discuss our findings and conclude the study with practical implications in section five.

2. Literature Review and Hypothesis Development

According to Atkinson and Messy (2012), financial literacy is a combination of consciousness, knowledge, skills, attitude and behaviour, which is necessary for making correct financial decisions and ultimately achieving personal financial status. (Staschen & Nelson, 2013) stated that financial literacy means the capability to understand the necessary information on financial products and financial services. Besides, financial literacy can also help to make sound financial decisions at the individual and company level (Kozarević, Jukan, & Džafić, 2016).

According to Hussain et al. (2018), financial literacy can be external or internal. External financial literacy is more than just access to financial knowledge. Managers can combine basic financial knowledge with broader skills, networking, communication and cognitive skills to achieve expected goals. Also, internal financial literacy helps managers optimise the use of scarce resources through an efficient and effective financial management system. Moreover, financial literacy enables managers to be more creative to use credit and debt, budget monitoring, timely

procurement of raw materials, production, fixed and variable costs, and inventory usage (Reich and Berman, 2015).

According to Klapper et al. (2015), the potential benefits of financial literacy are multifaceted. People with strong financial skills will do better in retirement planning and saving. Bire and Sauw (2019) stated that the importance of financial literacy is not only beneficial to society but also to financial institutions. When people understand the products of the financial industry, they will use one of them. For example, those who would have saved their own money by themselves, after understanding financial services, would deposit the money in the bank. Financial literacy has various types of items; including saving practices, credit history, earning methods, financial technology practices and protection practices and interest. The emergence of the internet of things has led to a new version of financial literacy, termed digital financial literacy. Although similar in purpose, there are fundamental differences in the conceptual framework between financial and digital financial literacy. Lyons and Hanna (2021) emphasize the complexities of digital financial literacy as it contains the elements of both traditional and digital literacy frameworks. Irrespective of the type of literacy, there are limited arguments over the importance of both traditional and digital literacy in achieving positive financial outcomes (Lyons & Hanna, 2021).

Setiawan et al. (2022) present evidence of a positive association between digital financial literacy and savings behaviour among millennials. Rahayu et al. (2022) find a similar positive association and conclude that income shapes digital financial literacy among millennials in an emerging country. The systematic review of Goyal and Kumar (2021) documents past studies on financial literacy and identifies the current developments in digital financial literacy. According to Goyal and Kumar (2021), digital financial literacy fulfils an important role to shape future research in the field of financial literacy and its importance as a catalyst for bringing positive change. While financial literacy literature presents evidence of its impact on financial inclusion, such evidence is extant in the context of digital financial literacy.

Sujlana and Kiran (2018) stated financial inclusion as the process of ensuring access to appropriate financial products and services for the general and disadvantaged groups of all sectors of society (especially vulnerable and low-income groups). Globally, about 1.7 billion adults still do not have bank deposits, or accounts at financial institutions or through mobile money providers. Since account ownership is almost universal in high-income economies, nearly all of these adults

without banks live in developing countries. Roughly half of the population lives in seven developing economies: Bangladesh, China, India, Indonesia, Mexico, Nigeria and Pakistan (Demirgüç-Kunt, et al., 2018).

Lyons and Kass-Hanna (2019) state that compared to other regions, the gap between women, youth and the poor in financial inclusion is unusually significant. The World Bank (2020) reports that 72 per cent of men and 65 per cent of women have one account, with a gender gap of 7 percentage points. For example, in Algeria, a developing country, 56 per cent of men have accounts, but only 29 per cent of women have accounts (Demirgüç-Kunt, et al., 2018). All people, especially the world's poor people working in the informal sector, need financial inclusion. This service helps individuals to pay daily expenses reliably. It helps them get credit to invest in their small-scale, income-generating activities. It can also help people save cash for future investments or unforeseen risks (Demirgüç-Kunt et al., 2020). The benefits of financial inclusion can be extensive.

Lyons and Kass-Hanna (2019) stated that more and more research had studied the impact of financial inclusion on entrepreneurs and the economy. In addition, many studies have used Global Findex data to determine the determinants of financial inclusion in a broader global context. Jukan and Softic (2016) affirmed that financial inclusion means that individuals and businesses can access useful and affordable financial products and services that meet their needs responsibly and sustainably, including transactions, payments, savings, credit and insurance. The definition of financial inclusion can have multiple levels, including individual and company levels. For example, at the individual and household levels, economic integration may have a direct impact on outcomes such as health, education, and gender equality. At the national level, financial inclusions are often related to broader macroeconomic indicators - income and wealth inequality, poverty, GDP growth and employment.

According to Bire and Sauw (2019), financial inclusion is expanding access to banking services, especially for low-cost services in rural communities. It includes improving the quality of savings plans, conducting financial education, implementing financial identity codes (FIN), and conducting financial literacy surveys. Grohmann, et al. (2018) state that there are many barriers to financial inclusion, and several studies have discussed many supply-side factors, such as high transaction costs, uncertainty, information asymmetry, or lack of physical access. All of these

factors affect the effective use of financial services. Research on financial literacy often shows the relationship between financial literacy and sound financial decisions.

Amidjono, Brock, and Junaidi (2016) state that financial literacy is a series of processes or activities designed to enhance the knowledge, abilities and skills of consumers and the wider community, which makes them better able to manage their finances. Also, financial literacy refers to a person's ability to obtain, understand and evaluate information related to decision-making by understanding the resulting financial consequences (Bire, and Sauw, 2019).

Grohmann and Menkhoff (2017) report that higher levels of financial literacy have a positive impact on the financial inclusion of developed economic infrastructure. In countries with a low level of economic development, financial support on access to finance depends on the level of financial literacy. Grohmann *et al.* (2018) report that higher levels of financial literacy are associated with better financial inclusion. Besides, with the development of financial institutions, financial literacy can complement existing financial institutions and ensure that people use more business services. Many countries can use these relationships in economic policies, and in addition to developing financial institutions, they can be more active in improving financial literacy (Grohmann & Menkhoff, 2017).

According to Klapper *et al.* (2015), financial illiteracy is not only widespread but there are also significant differences between countries and groups. For example, women, poor people and less educated people are more vulnerable to financial knowledge gaps. Such evidence exists in developing and developed financial markets. People with higher levels of financial literacy, no matter where they live, often have something in common. Grohmann and Menkhoff (2017) argue that in all countries it is a common goal to include everyone as much as possible in financial services. The most basic indicator of financial inclusion is the possession of a bank account. Klapper et al. (2015) affirmed that the people who use formal financial services, such as bank accounts and credit cards, could be seen as having a high level of financial literacy.

Grohmann et al. (2018) statethat to obtain financial services, especially with bank accounts, the marginal benefit of financial literacy decreases as the financial depth increases, indicating that the two are primarily substitutes. Chowdhury et al. (2018) argue that access to and availability of resources are very crucial to both male and female entrepreneurs, they also face the big challenge of industry-related resources and their choice of entry; for example, females are more likely to choose services and retail industry. Cumming and Vismara (2017) show that women also face

challenges in accessing financial resources from formal financial institutions and protecting government authority. Women are unable to own property in many countries of the world, which limits their ability to access financial resources. There are also restrictions on participation in political, labour and business activities (Abdul-Rahman & Nor, 2017).

We find that past studies also explored the nexus between financial literacy and financial inclusion among women entrepreneurs. Younas and Rafay (2021) show that lack of financial knowledge limits women entrepreneurs' access to financial services. Struckell et al (2022) conclude that women with a higher level of financial literacy in the United States are more likely to be self-employed than men. Llados-Masllorens and Ruiz-Dotras (2021) report similar findings and report that financial and numerical skills boost entrepreneurial culture among women. However, the question remains: does digital financial literacy promote financial inclusion for women entrepreneurs? Only a handful of studies (Suseno & Abbott, 2021) provide evidence in such a context.

Recently, Aziz and Naima (2021) advance the importance of digital financial literacy for the financial inclusion of rural women entrepreneurs in Bangladesh under the lens of resources and appropriation theory Van Dijk (2005). Aziz and Naima (2021) also identify the lack of necessary digital skills and ICT infrastructure as impediments to digital financial literacy among rural women entrepreneurs. Barik and Sharma (2019) provide similar findings from the context of Indian entrepreneurs. However, we find limited studies that explore our research question from a global perspective. Therefore, we develop the following hypothesis to reduce the gap in the literature and provide empirical evidence on the importance of digital financial literacy to ensure financial inclusion among women entrepreneurs.

H_1: Digital financial literacy has a positive impact on women's financial inclusion.

Unlike past studies, we take a global approach to provide generalisable findings. Our empirical model follows the propositions of family financialisation theory. Aguiar-Díaz and Zagalaz-Jiménez (2021) explore women's financial literacy in Spain based on the propositions of family financialisation theory. Gudmunson and Danes (2011) introduce family financialisation theory by combining family socialisation with personal finance. Under the lens of family financialisation, financial behaviour is shaped by the teaching and learning that takes place in the family. The theory also acknowledges that financial socialisation happens after marriage when the

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financial behaviour of women is influenced by the men Payne et al. (2014). Hsu (2016) also agrees with Payne et al. (2016) and advances the debate brought forward under the family financialisation theory that women let their husbands handle all financial matters due to a lack of financial education. Such a norm is prevalent in societies where women have limited access to acquire financial knowledge by attending formal education (Rink et al., 2021).

3. Research Methodology

Research design combines all the parts of the research and offers an effective solution to the research problem. We collect data for one hundred and forty-four countries published in the Global Findex database 2017 by the World Bank. The World Bank publishes this index every three years and the previous version is available for 2014. Therefore, we perform a cross-section analysis of countries covered in the Global Findex database. We understand that the sample should represent the population to ensure that the findings of the study sample are summaries as a whole (Etikan, Musa, and Alkassim, 2016). Our sample represents 40 per cent of the poorest population of 144 countries in 2017. Past studies (Grohmann, et al., 2018) also used a similar sample while exploring the global financial inclusion agenda. We develop the following regression model to explore the impact of digital financial literacy on financial inclusion:

$$\text{Financial Inclusion} = \beta_0 + \beta_1 \text{Digital financial literacy} + \beta_2 \text{Controls} + \varepsilon_i \text{----------------(1)}$$

Financial inclusion is the dependent variable in this equation. We use four proxies to examine the extent of financial inclusion of women entrepreneurs, which include account holdings, savings, borrowings and credit card ownership. Demirgüç-Kunt and Klapper (2012) introduce these proxies to measure financial inclusion and have been applied by Cabeza-García, Del Brio and Oscanoa-Victorio (2019) and Asuming, Osei-Agyei and Mohammed (2019). Instead of adopting the absolute values from the Global Findex Survey data from Demirgüç-Kunt and Klapper (2017), we decide to transform the proxies into dummy variables following Azevedo, Inan and Yang (2016). Our rationale for such dummy transformation comes from the findings of Gillespie (1977). Gillespie (1977) introduce three advantages of dummy dependent variable: (1) the ability to accommodate both categorical and continuous independent variables, (2) the possibility to measure both indirect and reciprocal effect of independent variables and (3) the possession of

fundamental properties by the slope of the dummy dependent regression. Detailed definition dummy transformation criteria for all financial inclusion proxies are available in Table 1.

Digital financial literacy is our independent variable. We used two proxies to measure the extent of digital financial literacy among women entrepreneurs. Following Klapper and Singer (2017) and Prasad, Meghwal and Dayama (2018), we measure digital literacy based on the ability to make and receive digital payments. Also, we introduced several country-level controls, which include GDP growth, inflation and six country governance indicators proposed by the World Bank. Such country-level controls are commonly adopted in the empirical models of past financial inclusion studies (Klapper and Lusardi, 2020). β_0 is the intercept, β_1 is the regression coefficient or change in Financial Inclusion influenced by each independent variable, ε_i is the error term.

We use several proxies to measure financial inclusion. The World Bank's Global Findex database provides multidimensional measures to evaluate financial inclusions. Following Koomson, et al. (2020), we identify four proxies for financial inclusion: (1) account holder, (2) savings, (3) borrowings and (4) credit card ownership. However, we do not directly utilise the data available in the Global Findex database. Instead, we develop our variable by transforming the continuous data into a dummy variable, following (Klapper & Lusardi, 2020). Next, we use two proxies for digital financial literacy: (1) made digital payments and (2) received digital payments. Setiawan, et al. (2020) utilise similar proxies while investigating the digital financial literacy on Java island. We report the measurements for all variables in Table 1.

4. Results

We present the descriptive statistics on financial inclusion, digital financial literacy and control variables in Table 1. Our study explores a cross-sectional sample of 144 countries. We report that 47.9 per cent of the countries have achieved equality in bank account ownership. In terms of savings behaviours, only a handful of countries (0.097 per cent) report that half of the customers saving money in financial institutions are women. The situation improves when we review the borrowing behaviour as 43.8 per cent of the countries report that half of the borrowers from financial institutions are women. Finally, we find similar statistics in credit card ownership as 33.3 per cent of countries report that half of the credit card owners are women.

[Please insert Table 1 here]

We use two proxies for digital financial literacy measurement. Table 1 indicates that 43.5 per cent of female customers of financial institutions made digital payments in 2017. We also consider digital payment receipts and find that 37.2 per cent of the women consumers received the money in their accounts via some form of digital platform. The standard deviation of making a receiving digital payment is 0.302 and 0.248, indicating better variation in our data. We proceed with correlation analysis to examine for any multi-collinearity issues in our empirical model. Correlation statistics in Table 2 indicate that independent variables do not exhibit a high correlation with each other and have an acceptable level of correlation with the dependent variable. As such, we proceed with our regression analysis.

[Please insert Table 2 here]

First, we explore the impact of digital financial literacy on financial inclusion using an account holder as a proxy. Due to the dummy nature of our dependent variable, we perform probit regression. Table 3 indicates that both making and receiving digital payments among women have a significant positive impact on account ownership in formal financial institutions. Therefore, women entrepreneurs are more likely to open a bank account if they are comfortable with using digital financial services. We also perform Tobit regression to check the robustness of our findings. Table 3 indicates similar positive significant results for both probit and Tobit regressions.

[Please insert Table 3 here]

We check the robustness of our study findings by using different proxies for the dependent variable. In Table 4, we change the proxy for the dependent variable to savings in financial institutions and report a significant positive association between digital financial literacy and saving behaviour. Our findings are in line with the Norwegian context presented by Seldal and Nyhus (2022) but differ from Bucher-Koenen et al. (2017) in the context of the USA.

[Please insert Table 4 here]

We find similar results in Tables 5 and 6 when we replace the dependent variable proxy with borrowings and credit card ownership. As such, our results indicate that women entrepreneurs are more likely to own a credit card and perform financial transactions via their formal financial

institution channel if they have a higher degree of digital financial literacy. Our findings are in-line with Lingytė et al. (2011) for Lithuanian and Green contexts. Our results are aligned with the past findings for advanced economies. Klapper and Lusardi (2020) highlight that the majority of credit card owners in advanced economies are financially literate. Klapper and Lusardi (2020) also compare the financial literacy statistics between G7 and BRICS countries and indicate the gap between financial literacy.

[Please insert Table 5 here]
[Please insert Table 6 here]

Finally, we investigate whether credit card ownership mediates the impact of digital literacy and financial inclusion. However, we do not find a significant mediation. We present our mediation results in Table 7. Liu and Dewitte (2021) also did not find any mediation role of credit card ownership on financial inclusion.

[Please insert Table 7 here]

Our study findings have strong implications for gender-based research in anti-money laundering (Soudijn, 2010) and empowerment (Siddik, 2017). We agree with Pramod et al. (2012) that banks have a greater ability to implement a framework to prevent money laundering schemes that involve the spouse of the criminal perpetrators (Soudijn, 2010). Our results indicate that a high degree of digital financial literacy could encourage women to engage with the formal banking challenge when performing financial transactions both off and online.

5. Discussion and conclusion

The study found that the credit knowledge of poor people impacts their access to and use of financial products to a huge extent. Credit knowledge includes borrowing any money in the past year or borrowing money for health or medical purposes. Wasiuzzaman and Nurdin (2019) conclude that credit history has a significant impact on the decision to apply for financing. The bank uses the personal credit history of the small business owner to determine the creditworthiness of the borrower because it can accurately predict the repayment prospects of the business. Banks treat borrowers with poor or no credit history as bad customers and often have a very high chance of rejecting their loan requests.

Bakker (2011) reveals that one of the crucial concepts of financial literacy is how to preserve and make informed financial choices responsibly. Atkinson and Messy (2013) stated that workers need access to affordable and sustainable financial services, including credit, savings and insurance, to help them achieve their life goals. They need to know how to use these financial services and be able to make informed choices including saving and improving saving capability.

This study found that these earning behaviours have positively impacted the poor's access to and use of financial services. These findings are in line with those of Odero and Ibrahim, (2018) who revealed that financial exclusion was caused by the high cost of financial services. Poor people living in urban and rural areas are unable to take advantage of important financial services because they think they cannot afford them and are expensive. Even if financial services are available, they are still unused due to the costs associated with them.

This study found that an optimistic, as well as statistically important, correlation exists between financial literacy and financial inclusion among poor people in those 144 countries collected from the Global Findex Database. Financial literacy among low-income people influences the access and use of financial services and products to a great extent. The findings are in agreement with those of some researchers. Grohmann *et al.* (2018) found that in many countries, financial and institutional characteristics, there is a positive and significant relationship between financial literacy and financial inclusion. And from a policy point of view, at all levels of financial depth, improving financial literacy helps to improve financial inclusiveness.

According to Gupta (2015), one of the important factors leading to financial inclusion is financial literacy. The Reserve Bank of India has recognised that financial literacy is a key factor in promoting financial inclusion, protecting consumers and ultimately achieving financial stability. Atkinson and Messy (2013) revealed that financial education could play an important role in helping individuals to acquire and use appropriate and formal financial products, while a low level of financial inclusion is related to a low level of financial literacy. Sharma (2017) suggested policies related to women's empowerment in urban and rural areas to help narrow the gap in financial literacy between the two regions and improve the overall level of financial knowledge (Lal, 2018). The improvement of financial literacy will further enhance financial inclusion.

Koomson et al. (2019) argue that the beneficiaries of financial literacy training are more likely to strengthen their financial inclusion. Also, male and female beneficiary families are more tolerant of the need to strengthen financial training to bridge the gender financial inclusion gap.

Krishnakumare and Singh (2019) stated that financial literacy is the foundation and first step of financial inclusion. It provides knowledge about the advantages and disadvantages of financial products and services. Based on the knowledge gained, individuals can choose the right product for their needs. Financial literacy plays a vital role in financial inclusion, inclusive growth and sustainable prosperity.

Various low-income people around the world lack financial products and financial services; for example, they lack bank accounts and digital payments. Because of that, they rely heavily on cash, which is unsafe and difficult to manage. Therefore, the World Bank makes financial inclusion a top priority in accessing and using formal financial services (Findex, 2019). Wasiuzzaman and Nurdin (2019) revealed that credit history has a significant impact on the decision to apply for financing and on access to financial products and services. Besides, poor people need to know how to responsibly preserve and make informed financial choices including saving and improving saving capability (Bakker, 2011; Atkinson & Messy, 2013). Odero and Ibrahim (2018) revealed that the income level of people had influenced them in accessing and using important financial services. Although financial services are available, they are still unused due to the costs associated with them.

Bazarbash, (2019) stated FinTech credit appears to be a promising solution and a potential leap forward for countries with low financial inclusion. Emerging market economies that are challenged by low financial inclusion can benefit from FinTech lending. FinTech credit can increase financial inclusion by improving credit ratings to extend loans to underserved populations. But this study did not find this kind of result.

Overall, financial literacy has positively impacted the dependent variable of financial inclusion among the poor in those selected 144 countries. Koomson *et al.* (2019) argued that the beneficiaries of financial literacy training are more likely to strengthen their financial inclusion, Grohmann, *et al.* (2018) found that in many countries, financial and institutional characteristics, there is a positive and significant relationship between financial literacy and financial inclusion.

Sharma (2017) suggested policies related to women's empowerment areas improve the overall level of financial knowledge of people, in urban and rural, which can further enhance financial inclusion. Krishnakumare and Singh (2019) stated that financial literacy is the first step in financial inclusion. It plays a vital role in financial inclusion, inclusive growth and sustainable

prosperity. In addition, financial education can play an important role in helping individuals to acquire and use appropriate and formal financial products (Gupta, 2015; Atkinson & Messy, 2013).

We expect our study findings will attract academic interest in exploring the importance of digital financial literacy for women entrepreneurs. While most studies are using the World Bank's Global Findex Survey results, we hope to find alternative tools to measure digital financial literacy that could be used across the globe. Also, there is still room to apply both qualitative and quantitative studies on the issue of digital financial literacy. For example, a case study approach on a successful project that was able to educate women on digital finance matters which led to a higher extent of financial inclusion could be interesting.

6. Policy Implications

We offer policy recommendations based on our study findings. Our current study ensures the positive association between digital financial literacy and financial inclusion among women entrepreneurs. Therefore, policymakers could make reforms in the education policy to ensure women in rural areas have access to digital education content. Such reform needs to align with infrastructure development needs in rural village areas where customers have limited access to quality internet. We also recommend banks maintain credit scores to evaluate the credit risk of women entrepreneurs before rejecting their applications due to a lack of collateral. There is also a need for socio-economic transformation which will begin by educating the male partners to support their spouse toward financial independence.

References

Abdul-Rahman, A. and Nor, S., 2017. Challenges of profit-and-loss sharing financing in Malaysian Islamic banking. Geografia: *Malaysian Journal of Society and Space*, Vol. 12 No. 2, pp. 1-9.

Adam, A. M., Boadu, M. O. and Frimpong, S., 2018. Does gender disparity in financial literacy still persist after retirement? Evidence from Ghana. *International Journal of Social Economics*, Vol. 45 No. 1, pp. 18-28.

Afrin, S., Islam, N. and Ahmed, S., 2010. Micro credit and rural women entrepreneurship development in Bangladesh: A multivariate model. *Journal of Business and Management*, Vol. 16 No. 1, pp. 1-22.

Aguiar-Díaz, I. and Zagalaz-Jiménez, J. R. (2021). Women and financial literacy in spain. Does marital status matter?. *Journal of Women & Aging*, pp. 1-15.

Asuming, P. O., Osei-Agyei, L. G., & Mohammed, J. I. (2019). Financial inclusion in sub-Saharan Africa: Recent trends and determinants. *Journal of African Business*, Vol. *20* No. 1, pp. 112-134.

Atkinson, A. and Messy, F. A., 2012. Measuring financial literacy: Results of the OECD/International Network on Financial Education (INFE) pilot study. *OECD Working Papers on Finance, Insurance and Private Pensions*, Vol. 23, pp. 1-73.

Azeez, N. A. and Akhtar, S. J., 2021. Digital Financial Literacy and Its Determinants: An Empirical Evidences from Rural India. *South Asian Journal of Social Studies and Economics*, Vol. 11 No. 2, pp. 8-22.

Azevedo, J. P., Inan, O. K., & Yang, J. S. (2016). How equitable is access to finance in turkey? evidence from the latest global FINDEX. *Evidence from the Latest Global Findex. World Bank Policy Research Working Paper*, pp. 7541.

Baluja, G., 2016. Financial literacy among women in India: a review. *Pacific business review international*, Vol. 9 No. 4, pp. 82-88.

Bire, A. and Sauw, H., 2019. The effect of financial literacy towards financial inclusion through financial training. *International journal of social sciences and humanities*, Vol. 3 No. 1, pp. 186-192.

Bucher-Koenen, T., Lusardi, A., Alessie, R., & Van Rooij, M. (2017). How financially literate are women? An overview and new insights. *Journal of Consumer Affairs*, Vol. *51* No. 2, pp. 255-283.

Cabeza-García, L., Del Brio, E.B. and Oscanoa-Victorio, M.L., 2019, November. Female financial inclusion and its impacts on inclusive economic development. In *Women's Studies International Forum*, Vol. 77, pp. 102300, Pergamon.

Chowdhury, F., Desai, S. and Audretsch, D., 2018. Entrepreneurship: An Overview. In: F. Chowdhury, S. Desai & D. B. Audretsch, eds. *Corruption, Entrepreneurship, and Social Welfare*. Cham: Springer, pp. 23-37.

Cowling, M., Marlow, S. and Liu, W., 2020. Gender and bank lending after the global financial crisis: are women entrepreneurs safer bets?. *Small Business Economics*, Vol. 55 No. 4, pp. 853-880.

Cumming, D. and Vismara, S., 2017. De-segmenting research in entrepreneurial finance. *Venture Capital*, Vol. 19 No. 1-2, pp. 17-27.

De Koker, L., 2011. Aligning anti-money laundering, combating of financing of terror and financial inclusion: Questions to consider when FATF standards are clarified. *Journal of financial crime*, Vol. 18 No. 4, pp. 361-386.

Demirgüç-Kunt, A., & Klapper, L. F. (2012). Measuring financial inclusion: The Global Findex database. *World bank policy research working paper*, pp. 6025.

Demirgüç-Kunt, A., Klapper, L. F., Ansar, S., & Jagati, A. (2017). Making it easier to apply for a bank account: a study of the Indian market. *World Bank Policy Research Working Paper*, pp. 8205.

Demirgüç-Kunt, A., Klapper, L., Singer, D., Ansar, S. and Hess, J. (2020). The global Findex database 2017: measuring financial inclusion and opportunities to expand access to and use of financial services. *The World Bank Economic Review*, *34*(Supplement_1), S2-S8.

Findex, G. (2019). The Global Financial Inclusion Database. *The World Bank*.

Gillespie, M. W. (1977). Log-linear techniques and the regression analysis of dummy dependent variables: Further bases for comparison. *Sociological Methods & Research*, Vol. *6* No. 1, pp. 103-122.

Goel, N. and Madan, P., 2019. Benchmarking financial inclusion for women entrepreneurship – a study of Uttarakhand state of India. *Benchmarking: An International Journal*, Vo. 26 No. 1, pp. 160-175.

Grohmann, A., Klühs, T. and Menkhoff, L., 2018. Does financial literacy improve financial inclusion? Cross country evidence. *World Development*, Vol 111, pp. 84-96..

Gudmunson, C. G. and Danes, S. M. (2011). Family financial socialization: Theory and critical review. *Journal of family and economic issues*, *32*(4), 644-667.

Halkias, D., Nwajiuba, C., Harkiolakis, N. and Caracatsanis, S., 2011. Challenges facing women entrepreneurs in Nigeria. *Management Research Review*, Vol. 34 No. 2, pp. 221-235.

Hilbert, M., 2011. Digital gender divide or technologically empowered women in developing countries?. *Women's Studies International Forum*, Vol. 34 No. 6, pp. 479-489.

Jukan, M. and Softic, A., 2016. Comparative analysis of financial inclusion in developing regions around the world. *Economic Review. Journal of Economics and Business*, Vol. 14 No. 2, pp. 56-65.

Kim, D. W., Yu, J. S. and Hassan, M. K., 2018. Financial inclusion and economic growth in OIC countries. *Research in International Business and Finance*, Vol. 43, pp. 1-14.

Klapper, L. and Lusardi, A., 2020. Financial literacy and financial resilience: Evidence from around the world. *Financial Management*, Vol. 49 No. 3, pp. 589-614.

Klapper, L. and Lusardi, A., 2020. Financial literacy and financial resilience: Evidence from around the world. *Financial Management*, Vol. *49* No. 3, pp.589-614.

Klapper, L., & Lusardi, A. (2020). Financial literacy and financial resilience: Evidence from around the world. *Financial Management*, Vol. *49* No. 3, pp. 589-614.

Klapper, L., & Singer, D. (2017). The opportunities and challenges of digitizing government-to-person payments. *The World Bank Research Observer*, Vol. *32 No.* 2, pp. 211-226.

Klapper, L., Lusardi, A. and Van Oudheusden, P., 2015. *Financial literacy around the world*, Washington DC: World Bank.

Kofman, P. and Payne, C., 2021. Digital financial inclusion of women: An ethical appraisal. *Handbook on ethics in finance*, pp. 133-157.

Koomson, I., Villano, R. A. and Hadley, D., 2020. Intensifying financial inclusion through the provision of financial literacy training: a gendered perspective. *Applied Economics*, Vol. 52 No. 4, pp. 375-387.

Lal, T., 2018. Measuring impact of financial inclusion on rural development through cooperatives. *International Journal of Social Economics*, Vol. 46 No. 3, pp. 352-376.

Lingytė, M., Valsamidis, S., Mitsinis, N. and Polychronidou, P., 2011. E-commerce behaviour of Lithuanian and Greek women. *Intellectual Economics*, Vol. 5 No. 1, pp. 85-98.

Liu, Y. and Dewitte, S., 2021. A replication study of the credit card effect on spending behavior and an extension to mobile payments. *Journal of Retailing and Consumer Services*, Vol. *60*, pp.102472.

Llados-Masllorens, J., and Ruiz-Dotras, E. (2021). Are women's entrepreneurial intentions and motivations influenced by financial skills?. *International Journal of Gender and Entrepreneurship*, Vol. 14, No. 1, pp. 69-94.

Lyons, A. and Kass-Hanna, J., 2019. Financial inclusion, financial literacy and economically vulnerable populations in the Middle East and North Africa. *Emerging Markets Finance and Trade*, pp. 1-40.

Lyons, A. C. and Kass-Hanna, J., 2021. A methodological overview to defining and measuring "digital" financial literacy. *Financial Planning Review*, Vol. *4* No. 2, pp. 1113.

Molinier, H. and Quan, A. (2019). *Leveraging digital finance for gender equality and women's empowerment*. UN Women. Working paper. https://www. unwomen. org/en/digital-library/publications/2019/09/discussion-paper-leveraging-digital-finance-for-gender-equality-and-womens-empowerment

Murendo, C. and Mutsonziwa, K., 2017. Financial literacy and savings decisions by adult financial consumers in Zimbabwe. *International journal of consumer studies*, Vol. 41 No. 1, pp. 95-103.

Payne, S. H., Yorgason, J. B. and Dew, J. P. (2014). Spending today or saving for tomorrow: The influence of family financial socialization on financial preparation for retirement. *Journal of Family and Economic Issues*, Vol. *35 No.* 1, pp. 106-118.

Pramod, V., Li, J. and Gao, P., 2012. A framework for preventing money laundering in banks. *Information Management & Computer Security*, Vol. 20 No. 3, pp. 170-183.

Prasad, H., Meghwal, D., & Dayama, V. (2018). Digital financial literacy: a study of households of Udaipur. *Journal of Business and Management*, Vol. *5*, pp. 23-32.

Rao, S. (2018). Gender and financial inclusion through the post. *POSTAL SAVINGS*, *226*.

Rink, U., Walle, Y. M. and Klasen, S. (2021). The financial literacy gender gap and the role of culture. *The Quarterly Review of Economics and Finance*, *80*, 117-134.

Seldal, M. M., & Nyhus, E. K. (2022). Financial Vulnerability, Financial Literacy, and the Use of Digital Payment Technologies. *Journal of Consumer Policy*, Vol. *45* No. 2, pp. 281-306.

Setiawan, M., Effendi, N., Santoso, T., Dewi, V. I., & Sapulette, M. S. (2022). Digital financial literacy, current behavior of saving and spending and its future foresight. *Economics of Innovation and New Technology*, Vol *31* No 4, pp. 320-338.

Siddik, M. N. A., 2017. The Does Financial Inclusion Promote Women Empowerment? Evidence from Bangladesh. *Applied Economics and Finance*, Vol. 44 No. 4, pp. 169-177.

Soudijn, M. R., 2010. Wives, girlfriends and money laundering. *Journal of Money Laundering Control*, Vol. 13 No. 4, pp. 405-416.

Staschen, S. and Nelson, C., 2013. The role of government and industry in financial inclusion. *In: The new microfinance handbook*. The World Bank, pp. 1-502.

Struckell, E. M., Patel, P. C., Ojha, D. and Oghazi, P. (2022). Financial literacy and self-employment – The moderating effect of gender and race. *Journal of Business Research*, Vol. *139*, pp. 639-653.

Sujlana, P. and Kiran, C., 2018. A Study on Status of Financial Inclusion in India. International *Journal of Management Studies*, Vol. 2 No. 3, pp. 96-104.

Suseno, Y. and Abbott, L. (2021). Women entrepreneurs' digital social innovation: Linking gender, entrepreneurship, social innovation and information systems. *Information Systems Journal*, Vol. *31* No. 5, pp. 717-744.

The World bank, 2020. Financial Inclusion. [Online], available at: https://www.worldbank.org/en/topic/financialinclusion/overview#1 [Accessed 13 March 2020].

Wang, X. and He, G., 2020. Digital financial inclusion and farmers' vulnerability to poverty: Evidence from rural China. *Sustainability*, Vol. 12 No. 4, pp. 1668.

World Economic Forum, 2021. *Global Gender Gap Report 2021*, Geneva: World Economic Forum, pp. 1- 405.

Younas, K. and Rafay, A. (2021). Women entrepreneurship and financial literacy: The case of female borrowers in Pakistan. *Iranian Economic Review*, Vol. *25 No.* 3, pp. 525-534.

Table 1: Descriptive statistics

Variable Name	Description	Obs	Mean	Std. dev.	Min	Max
Panel A: Financial inclusion						
Account holder	Dummy variable, 1 if more than 50 per cent of the account holders are female, 0 otherwise	144	0.479	0.501	0.000	1.000
Savings	Dummy variable, 1 if more than 50 per cent of the female customers saved money in a financial institution, 0 otherwise	144	0.097	0.297	0.000	1.000
Borrowing	Dummy variable, 1 if more than 50 per cent of the female customers borrowed from a financial institution, 0 otherwise	144	0.438	0.498	0.000	1.000
Credit card ownership	Dummy variable, 1 if more than 50 per cent of the female customers owns a credit card from a financial institution, 0 otherwise	144	0.333	0.473	0.000	1.000
Panel B: Digital financial literacy						
Made digital payments	Percentage of female customers who made digital payment	144	0.435	0.302	0.018	0.999
Received digital payments	Percentage of female customers who received digital payment	144	0.372	0.248	0.013	0.905
Panel C: Control variables						
GDP growth	Annual percentage growth in the gross domestic product	143	4.944	15.964	-1.540	187.85
Inflation	Annual percentage growth in the consumer price index	143	3.787	3.230	-4.710	26.680
Control of corruption	Control of corruption is measured by the exercise of public power for private gain	144	0.471	0.289	0.000	1.000
Government effectiveness	The quality of public services	144	0.508	0.287	0.000	1.000
Political stability	Likelihood of political instability	144	0.429	0.270	0.000	0.990
Regulatory quality	The ability of the government to formulate and implement sound policies	144	0.521	0.291	0.000	1.000
Rule of law	Confidence in and abiding by the rules of society	144	0.486	0.290	0.000	1.000
Voice and accountability	Ability to participate in selecting their government	144	0.482	0.284	0.000	1.000

Table 2: Correlation statistics

No	Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Account holder	1.000													
2	Savings	0.341	1.000												
3	Borrowings	0.355	0.229	1.000											
4	Credit card ownership	0.677	0.464	0.264	1.000										
5	Made digital payment	0.794	0.532	0.428	0.778	1.000									
6	Received digital payments	0.808	0.502	0.450	0.724	0.954	1.000								
7	GPD growth	0.080	-0.046	0.102	0.118	0.112	0.060	1.000							
8	Inflation	-0.079	-0.104	0.047	-0.046	-0.034	-0.045	-0.091	1.000						
9	Control of corruption	0.099	0.161	0.098	0.096	0.132	0.173	-0.195	-0.125	1.000					
10	Government effectiveness	0.054	0.118	0.069	0.067	0.062	0.101	-0.217	-0.131	0.921	1.000				
11	Political stability	0.075	0.152	0.068	0.051	0.061	0.082	-0.196	-0.090	0.778	0.781	1.000			
12	Regulatory quality	0.089	0.128	0.098	0.065	0.089	0.127	-0.212	-0.119	0.900	0.943	0.764	1.000		
13	Rule of law	0.100	0.155	0.115	0.109	0.138	0.167	-0.196	-0.112	0.952	0.948	0.799	0.936	1.000	
14	Voice and accountability	0.175	0.175	0.137	0.130	0.192	0.205	-0.182	-0.119	0.814	0.769	0.749	0.811	0.817	1.000

Table 3: Impact of digital financial literacy on financial inclusion (DV: Account holder)

	Account holder			
	Probit		Tobit	
Made digital payment	7.783***		1.337***	
	(5.193)		(15.186)	
Received digital payment		8.482***		1.642***
		(6.918)		(16.050)
GDP growth	-0.007	0.000	0.000	0.001
	(-1.164)	(0.107)	(-0.154)	(0.564)
Inflation	-0.040	-0.025	-0.008	-0.007
	(-1.139)	(-0.722)	(-1.002)	(-0.859)
Control of corruption	1.293	-0.482	-0.040	-0.245
	(0.673)	(-0.250)	(-0.134)	(-0.851)
Government effectiveness	-0.542	-0.336	0.016	-0.003
	(-0.273)	(-0.162)	(0.048)	(-0.010)
Political stability	1.386	0.859	0.142	0.155
	(1.127)	(0.772)	(0.870)	(0.981)
Regulatory quality	2.302	0.489	0.333	0.226
	(1.337)	(0.319)	(1.124)	(0.790)
Rule of law	-4.225*	-1.525	-0.485	-0.273
	(-2.225)	(-0.766)	(-1.257)	(-0.736)
Voice and accountability	0.180	1.103	0.070	0.149
	(0.177)	(1.141)	(0.404)	(0.890)
Intercept	-3.079***	-2.874***	-0.093	-0.116
	(-4.122)	(-4.736)	(-1.219)	(-1.573)
Observations	143	143	143	143
Wald chi^2/LR chi^2	39.72***	61.73***	53.92***	156.96***
Log pseudo-likelihood	-34.008	-33.318	-2.431	-25.218
Pseudo R^2	0.656	0.664	0.917	0.757

Note: We explore the impact of digital financial literacy on the financial inclusion of women consumers in this table. We use account holders as a proxy for financial inclusion. The account holder is a dummy variable and takes the value of 1 if more than 50 per cent of the account holders are women. Therefore, we begin our analysis using a probit regression and follow-up with Tobit estimation to ensure the robustness of the study findings. We measure digital financial literacy with two proxies, the percentage of women consumers who made and received digital payments. We collect data for both dependent and independent variables from the World Bank Findex survey results for 2017. Our data covers 143 countries. We also control GDP growth, inflation, control of corruption, government effectiveness, political stability, regulatory quality, rule of law and voice and accountability. We collect control variable information from the World Bank database. Data in the parentheses are robust t-statistics. ***, ** and * indicate significance at 1, 5 and 10 per cent respectively.

Table 4: Impact of digital financial literacy on financial inclusion (DV: Savings)

	Savings			
	Probit		Tobit	
Made digital payment	13.441***		0.536***	
	(3.384)		(7.395)	
Received digital payment		9.443***		0.597***
		(4.057)		(6.658)
GDP growth	-0.188	-0.170*	-0.002	-0.001
	(-1.909)	(-2.235)	(-1.384)	(-0.969)
Inflation	-0.058	-0.058	-0.008	-0.008
	(-0.637)	(-0.751)	(-1.267)	(-1.167)
Control of corruption	5.229	-0.663	0.12	0.048
	(1.127)	(-0.248)	(0.49)	(0.191)
Government effectiveness	-6.034	-1.823	-0.04	-0.073
	(-1.400)	(-0.534)	(-0.143)	(-0.257)
Political stability	2.093	2.942	0.167	0.162
	(1.268)	(1.89)	(1.236)	(1.169)
Regulatory quality	4.924	0.375	0.014	-0.034
	(1.278)	(0.112)	(0.058)	(-0.134)
Rule of law	-4.34	-1.103	-0.114	-0.004
	(-0.678)	(-0.266)	(-0.360)	(-0.013)
Voice and accountability	-2.242	0.489	-0.06	-0.015
	(-1.173)	(-0.271)	(-0.419)	(-0.104)
Intercept	-11.023**	-6.284***	-0.127*	-0.117
	(-3.191)	(-3.960)	(-2.027)	(-1.808)
Observations	143	143	143	143
Wald chi^2/LR chi^2	22.09***	24.45***	53.92***	46.22***
Log pseudo-likelihood	-15.516	-20.046	-2.432	-6.281
Pseudo R^2	0.661	0.563	0.917	0.786

Note: We explore the impact of digital financial literacy on the financial inclusion of women consumers in this table. We use savings as a proxy for financial inclusion. Savings is a dummy variable and takes the value of 1 if more than 50 per cent of the women account holders save money in the financial institution. Therefore, we begin our analysis using a probit regression and follow-up with Tobit estimation to ensure the robustness of the study findings. We measure digital financial literacy with two proxies, the percentage of women consumers who made and received digital payments. We collect data for both dependent and independent variables from the World Bank Findex survey results for 2017. Our data covers 143 countries. We also control GDP growth, inflation, control of corruption, government effectiveness, political stability and regulatory quality, rule of law and voice and accountability. We collect control variable information from the World Bank database. Data in the parentheses are robust t-statistics. ***, ** and * indicate significance at 1, 5 and 10 per cent respectively.

Table 5: Impact of digital financial literacy on financial inclusion (DV: Borrowings)

	Borrowings			
	Probit		Tobit	
Made digital payment	1.879***		0.665***	
	(4.739)		(5.086)	
Received digital payment		2.451***		0.862***
		(4.977)		(5.554)
GDP growth	0.022	0.020	0.002	0.003
	(0.793)	(0.758)	(1.024)	(1.260)
Inflation	0.037	0.041	0.012	0.012
	(1.050)	(1.164)	(0.986)	(1.065)
Control of corruption	-0.499	-0.816	-0.171	-0.28
	(-0.381)	(-0.618)	(-0.385)	(-0.641)
Government effectiveness	-0.673	-0.642	-0.226	-0.217
	(-0.452)	(-0.430)	(-0.453)	(-0.442)
Political stability	0.043	0.057	-0.008	0.005
	(0.061)	(0.081)	(-0.034)	(0.021)
Regulatory quality	0.704	0.473	0.225	0.175
	(0.517)	(0.348)	(0.512)	(0.405)
Rule of law	0.690	1.010	0.258	0.345
	(0.408)	(0.585)	(0.450)	(0.615)
Voice and accountability	0.240	0.365	0.068	0.097
	(0.311)	(0.471)	(0.262)	(0.384)
Intercept	-1.470***	-1.546***	0.017	-0.008
	(-3.913)	(-4.122)	(0.154)	(-0.074)
Observations	143	143	143	143
Wald chi^2/LR chi^2	31.51***	34.84***	31.95***	36.11***
Log pseudo-likelihood	-82.519	-80.708	-86.793	-84.714
Pseudo R^2	0.159	0.177	0.156	0.176

Note: We explore the impact of digital financial literacy on the financial inclusion of women consumers in this table. We use borrowing as a proxy for financial inclusion. Borrowings are a dummy variable and take the value of 1 if more than 50 per cent of the women account holders borrow money from the financial institution. Therefore, we begin our analysis using a probit regression and follow-up with Tobit estimation to ensure the robustness of the study findings. We measure digital financial literacy with two proxies, the percentage of women consumers who made and received digital payments. We collect data for both dependent and independent variables from the World Bank Findex survey results for 2017. Our data covers 143 countries. We also control GDP growth, inflation, control of corruption, government effectiveness, political stability, regulatory quality, rule of law and voice and accountability. We collect control variable information from the World Bank database. Data in the parentheses are robust t-statistics. ***, ** and * indicate significance at 1, 5 and 10 per cent respectively.

Table 6: Impact of digital financial literacy on financial inclusion (DV: Credit card ownership)

	Credit card ownership			
	Probit		Tobit	
Made digital payment	5.658***		1.241***	
	(8.342)		(14.373)	
Received digital payment		5.896***		1.386***
		(7.208)		(12.179)
GDP growth	0.004	0.009	0.001	0.002
	(0.515)	(1.639)	(0.604)	(1.252)
Inflation	0.004	0.018	-0.002	-0.001
	(0.120)	(0.488)	(-0.271)	(-0.124)
Control of corruption	-0.499	-1.311	-0.203	-0.371
	(-0.271)	(-0.816)	(-0.695)	(-1.156)
Government effectiveness	2.248	2.366	0.466	0.392
	(1.118)	(1.210)	(1.414)	(1.085)
Political stability	0.277	0.042	0.024	0.013
	(0.273)	(0.045)	(0.147)	(0.076)
Regulatory quality	-2.023	-2.663	-0.230	-0.340
	(-1.000)	(-1.596)	(-0.790)	(-1.068)
Rule of law	0.129	1.117	0.000	0.253
	(0.052)	(0.535)	(0.001)	(0.614)
Voice and accountability	-0.389	0.269	-0.050	0.052
	(-0.371)	(0.275)	(-0.295)	(0.281)
Intercept	-3.169***	-2.981***	-0.212**	-0.190*
	(-6.786)	(-7.047)	(-2.840)	(-2.315)
Observations	143	143	143	143
Wald chi^2/LR chi^2	89.96***	82.60***	136.34***	110.27***
Log pseudo-likelihood	-36.829	-44.526	-27.442	-40.478
Pseudo R^2	0.596	0.512	0.713	0.577

Note: We explore the impact of digital financial literacy on the financial inclusion of women consumers in this table. We use credit card ownership as a proxy for financial inclusion. Credit card ownership is a dummy variable and takes the value of 1 if more than 50 per cent of the women account holders own a credit card from the financial institution. Therefore, we begin our analysis using a probit regression and follow-up with Tobit estimation to ensure the robustness of the study findings. We measure digital financial literacy with two proxies, the percentage of women consumers who made and received digital payments. We collect data for both dependent and independent variables from the World Bank Findex survey results for 2017. Our data covers 143 countries. We also control GDP growth, inflation, control of corruption, government effectiveness, political stability, regulatory quality, rule of law and voice and accountability. We collect control variable information from the World Bank database. Data in the parentheses are robust t-statistics. ***, ** and * indicate significance at 1, 5 and 10 per cent respectively.

Table 7: Digital financial literacy, credit card ownership and financial inclusion

|	Account holder		Borrowings	
Made digital payment	6.720***		2.488**	
	(4.335)		(3.067)	
Received digital payment		7.121***		2.601**
		(5.686)		(2.931)
Credit card ownership	-5.792	-4.843	-0.637	-1.289
	(-1.718)	(-1.431)	(-0.750)	(-1.463)
Made digital payment*Credit card ownership	16.053		0.192	
	(1.937)		(0.148)	
Received digital payment*Credit card ownership		16.259		1.716
		(1.802)		(1.096)
GDP growth	-0.026	-0.018*	0.023	0.019
	(-0.537)	(-1.975)	(0.825)	(0.814)
Inflation	-0.048	-0.037	0.037	0.040
	(-1.284)	(-0.983)	(1.023)	(1.121)
Control of corruption	1.669	0.198	-0.629	-1.088
	(0.867)	(0.102)	(-0.486)	(-0.826)
Government effectiveness	-0.779	-1.077	-0.416	-0.322
	(-0.344)	(-0.419)	(-0.277)	(-0.212)
Political stability	1.483	0.996	0.061	0.048
	(1.155)	(0.838)	(0.085)	(0.066)
Regulatory quality	2.230	0.651	0.661	0.430
	(1.184)	(0.342)	(0.475)	(0.308)
Rule of law	-4.729*	-2.237	0.658	0.898
	(-2.270)	(-1.008)	(0.389)	(0.520)
Voice and accountability	0.661	1.671	0.166	0.376
	(0.602)	(1.571)	(0.219)	(0.483)
Intercept	-2.821***	-2.590***	-1.581***	-1.473***
	(-3.620)	(-4.136)	(-3.891)	(-3.716)
Observations	143	143	143	143
Wald chi^2	42.54***	61.54***	32.95***	36.31***
Log pseudo-likelihood	-31.251	-29.804	-81.537	-79.469
Pseudo R^2	0.684	0.699	0.169	0.190

Note: We explore the impact of digital financial literacy and credit card ownership on the financial inclusion of women consumers in this table. We measure digital financial literacy with two proxies, the percentage of women consumers who made and received digital payments. We collect data for both dependent and independent variables from the World Bank Findex survey results for 2017. We bring an interaction term to check if credit card ownership enhances the financial inclusion of women with digital financial literacy. Our data covers 143 countries. We also control GDP growth, inflation, control of corruption, government effectiveness, political stability, regulatory quality, rule of law and voice and accountability. We collect control variable information from the World Bank database. Data in the parentheses are robust t-statistics. ***, ** and * indicate significance at 1, 5 and 10 per cent respectively.

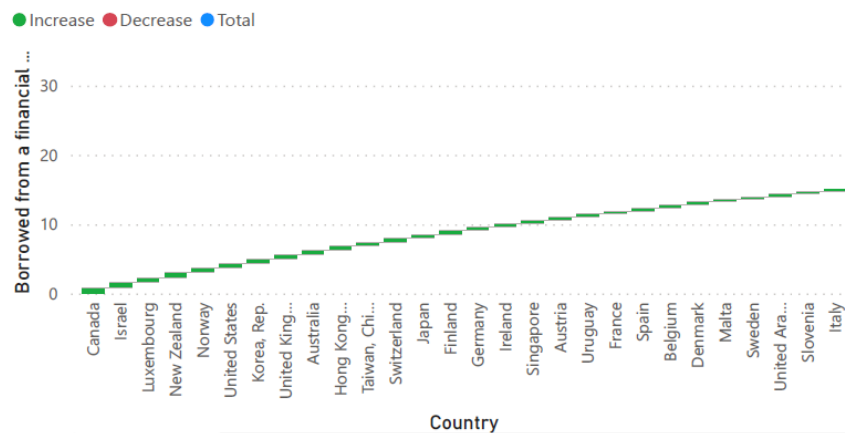**Appendix A – Financial inclusion statistics across the globe**

Borrowed any money, female and Borrowed any money , male by Country
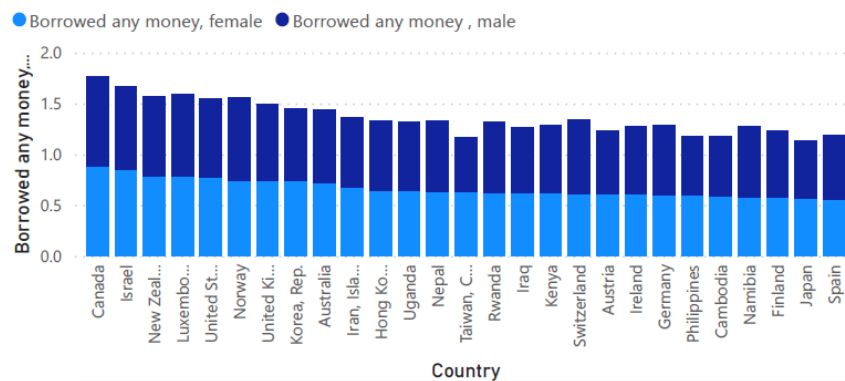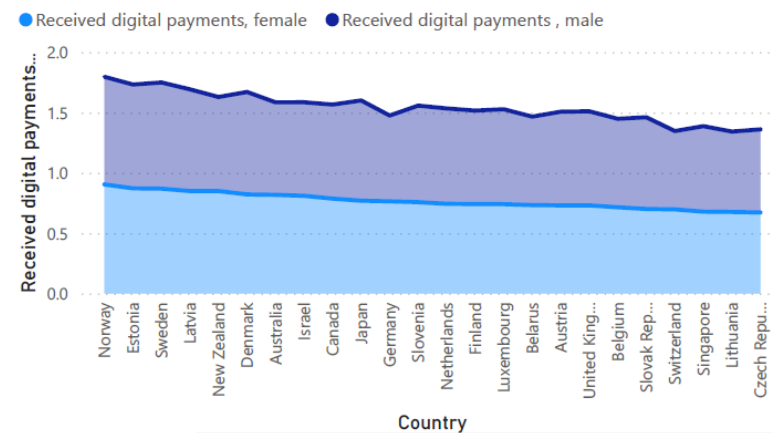

Credit card ownership, female (% age 15+) and Credit card ownership, male (% age 15+) by Country
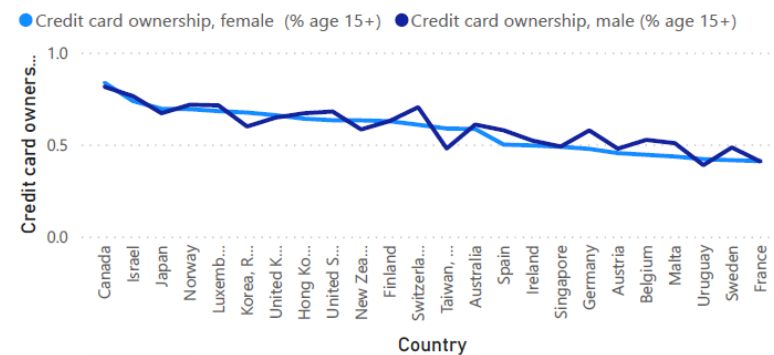
Borrowed from a financial institution or used a credit card, female (% age 15+) by Country

Received digital payments, female and Received digital payments , male by Country

Source: The World Bank (2020)