

DIGITAL FINANCIAL INCLUSION OF REFUGEES IN MALAYSIA: A COMPARISON OF DIGITAL AND TRADITIONAL FINANCIAL SERVICES

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Abstract: This study explores the digital financial practices and literacy of refugees in Malaysia, aiming to understand the key factors influencing their adoption of digital versus traditional financial transactions. Drawing on data from the Malaysia Financial Behaviour Survey (2022-2023) conducted by the United Nations High Commissioner for Refugees (UNHCR), the study utilises econometric methods such as Pearson's Chi-square test and the Logit model to assess the relationships between demographic factors and the use of digital financial tools. Key findings indicate that gender, age, country of origin, and access to formal financial services significantly influence the likelihood of adopting digital financial tools, with females and younger individuals more inclined toward digital transactions. The results also highlight a reluctance among respondents with formal bank accounts to adopt mobile payments, suggesting a preference for traditional financial channels. The study identifies important barriers, including limited digital financial literacy and trust in digital platforms, and proposes strategies to enhance financial inclusion through digital means for refugees in Malaysia. Policy recommendations emphasise the need for tailored financial literacy programmes, improved access to Digital Financial Services (DFS), and greater collaboration between financial institutions, policymakers, and Non-Governmental Organisations (NGOs) to promote the financial inclusion of refugees.

Keywords: Refugees, financial inclusion, Malaysia, logit model, digital finance, traditional finance.

Introduction

Malaysia, a key Southeast Asian host country, is not a signatory to the 1951 Refugee Convention or its 1967 Protocol, yet it continues to shelter a significant refugee and asylum-seeking population. As of mid-2024, approximately 184,000 individuals are registered with the United Nations High Commissioner for Refugees (UNHCR) in Malaysia, including over 100,000 Rohingya refugees from Myanmar (see Table 1). Other major refugee groups originate from countries such as Syria, Yemen, Pakistan, Afghanistan, Somalia, and Sri Lanka, fleeing war, persecution, and humanitarian crises (UNHCR, 2024).

Although UNHCR supports refugees in Malaysia with documentation, healthcare, education, and livelihood initiatives, the absence

of legal recognition by the Malaysian government severely restricts refugees' access to formal employment, public education, and financial services. Despite these constraints, many refugees contribute to the informal economy, particularly in construction, agriculture, and low-wage service sectors (International Labour Organisation [ILO] & UNHCR, 2019). Their undocumented status exposes them to exploitation and low earnings. A study by the Human Rights Commission of Malaysia (SUHAKAM, 2019) revealed that most refugees earn RM20.00 to RM40.00 per day (USD4.80 to USD9.60), often below the minimum wage. Recent studies and reports continue to highlight the precarious economic conditions faced by refugees in Malaysia, particularly in the informal labour market.

Furthermore, a study by Wake and Cheung (2020) examined the construction sector among Rohingya refugees and reported that they earned a median daily wage of RM50.00. However, while this exceeded the then-legal minimum wage (approximately RM38.00/day), it remained substantially below the earnings of local unskilled Malaysian workers, who were paid between RM67.00 and RM100.00 per day. Therefore, this wage disparity underscores the vulnerable position of refugees who, due to their lack of legal work status, have minimal bargaining power and are often exposed to exploitative working arrangements.

Similar issues were identified in the food and restaurant industry, where many refugees are informally employed. A study by Al Jazeera (2022) revealed that these workers frequently receive wages below the legal minimum, are not provided formal contracts, and are often subjected to unpaid overtime and other forms of labour exploitation. To reinforce these findings further, a study by the ILO (2023) on migrant domestic

workers in Malaysia, Singapore, and Thailand reported that many of these workers earned below the national minimum wage despite performing demanding and skill-intensive work. Nevertheless, while the study focused on migrants more broadly, it reflects a persistent trend of underpayment and vulnerability that also affects refugees in Malaysia's informal labour market (The Star, 2023).

These findings collectively indicate that the economic marginalisation of refugees has remained largely unchanged since the 2019 SUHAKAM report, with many continuing to earn significantly below the national minimum wage. Conversely, the 2017 pilot project allowed for limited legal employment of some refugees but had a limited broader impact (UNHCR, 2017). Refugees remain excluded from formal financial systems, worsening their economic vulnerability. In this context of economic marginalisation, Digital Financial Services (DFS) have emerged as a potential tool to promote financial inclusion.

Table 1: Refugees and asylum seekers in Malaysia (as of 2024)

Country of Origin	Number	Reason
Myanmar	158,000	Persecution in Myanmar.
Pakistan	10,000	Religious persecution and other forms of targeted violence in their home country.
Yemen	4,500	Ongoing civil war and humanitarian crisis.
Somalia	3,000	Conflict, violence, and instability in Somalia.
Syria	2,800	Conflict in Syria.
Afghanistan	1,500	Ongoing conflict and instability in Afghanistan, particularly following the Taliban's return to power in 2021.
Sri Lanka	1,200	Persecution during and after the Sri Lankan civil war.
Others	3,000	From Iraq, Palestine, Sudan, and Iran, among others, due to a combination of conflict, persecution, and human rights abuses.

Source: UNHCR website

Digital Versus Traditional Financial Services

DFS refer to financial products and services delivered through digital platforms such as mobile phones, computers, Automated Teller Machines (ATMs), and Point-of-Sale (POS) terminals. These services include mobile banking, internet banking, e-wallets, mobile money transfers, online payments, and digital credit systems. Moreover, DFS enable users to access, transfer, store, and manage money electronically without the need to visit physical bank branches. They are particularly valued for their convenience, lower transaction costs, and ability to reach underserved or unbanked populations, including those in rural areas or displaced communities (World Bank, 2020; GSMA, 2021).

In contrast, traditional financial services are delivered through physical infrastructure such as bank branches, credit unions, and microfinance institutions. These services typically require in-person interactions and involve paper-based processes for activities such as opening bank accounts, withdrawing or depositing cash, applying for loans, and making payments. Accessing traditional financial services often necessitates formal identification, proof of address, and travel to a branch, which can be barriers for individuals with limited mobility or documentation, such as refugees and low-income groups (Demirgüç-Kunt *et al.*, 2018).

However, while traditional financial services remain important, DFS offer a transformative opportunity to improve financial inclusion by making financial access faster, more flexible, and more inclusive for marginalised populations such as refugees.

Literature Review

Several studies highlight key barriers to digital financial inclusion. Medhi *et al.* (2011) identified limited digital literacy, language barriers, and restricted technology access as major obstacles. Legal barriers and documentation issues further

push refugees toward informal financial systems (Yusoff *et al.*, 2022). Gender disparities further complicate the issue, as refugee women often face additional cultural and educational constraints (Klapper *et al.*, 2019). Furthermore, Rahman *et al.* (2021) determined a lack of financial education and smartphone access as major inhibitors of DFS adoption among refugee communities, while Abdullah and Hussain (2019) observed reluctance among Rohingya refugees due to fraud concerns and limited technological familiarity.

Despite these challenges, successful cases from Sub-Saharan Africa (GSMA, 2017) demonstrated that digital financial tools can significantly improve financial inclusion and resilience among refugee populations when supported by targeted programmes and partnerships. This suggests potential for similar efforts in Malaysia. Ibrahim and Rahim (2021) emphasised integrating digital financial literacy into refugee support initiatives. UNHCR (2020) recommended multilingual, user-friendly digital tools developed through partnerships with financial institutions and Non-Governmental Organisations (NGOs) to reduce language barriers and build trust. Notably, digital financial literacy integrates traditional financial knowledge with digital competencies necessary for tools such as mobile payments, digital wallets, and online banking. Buckland *et al.* (2019) defined it as understanding digital financial products, managing online financial risks, and using digital devices effectively—essential skills for refugees to manage finances and access services.

Despite limited access due to digital literacy gaps, initiatives like UNHCR's 2018 partnership with Boost e-wallets facilitated digital cash assistance (UNHCR, 2018). Digital tools offer secure transactions, promote savings, and help refugees build financial histories for future resettlement opportunities.

Problem Statement

Although the importance of DFS in promoting financial inclusion increases, refugees in Malaysia remain excluded mainly from both traditional and digital financial systems. Moreover, existing support mechanisms have not sufficiently addressed the unique barriers refugees face in adopting DFS, such as limited digital literacy, lack of legal documentation, and socioeconomic vulnerabilities. Without access to secure and inclusive financial tools, refugees remain economically marginalised, which undermines their potential for self-reliance and integration.

Research Gaps and Objectives

While previous studies have explored the general financial behaviours of refugees or the challenges of digital exclusion, there is a lack of research specifically examining digital financial literacy and DFS adoption among refugees in Malaysia. Studies often overlook refugee-specific challenges, focusing on broader demographics (Suri & Jack, 2016; Demirgüç-Kunt *et al.*, 2018). Moreover, limited attention has been given to the role of gender, cultural norms, and refugee-specific experiences in shaping digital financial practices (Pénicaud & Katakam, 2014). Additionally, the absence of up-to-date, refugee-focused data on these issues leaves a critical gap in the design of effective inclusion strategies.

This study aims to assess the current level of digital financial literacy among refugees in Malaysia and identify the key factors influencing the adoption or non-adoption of DFS. It also seeks to explore the challenges and barriers that hinder refugees from accessing and using digital financial tools, and to recommend targeted strategies to improve digital financial inclusion and economic resilience among refugee communities in Malaysia. Therefore, by addressing these objectives, the study seeks to inform policymakers, financial institutions, NGOs, and international agencies in designing inclusive financial ecosystems that empower

refugees and support their long-term integration and well-being.

In the following sections, the study will detail the research design, data collection methods, and analytical techniques. Subsequently, this study will also present and interpret key findings in comparison to existing research. Finally, it will conclude with insights, contributions, and practical recommendations for enhancing digital financial literacy and inclusion among refugees in Malaysia.

Methodology

The data collection for this study was obtained from the Malaysia Financial Behaviour Survey 2022 to 2023 conducted by the Financial Education Network (FEN), obtained from the United Nations High Commissioner for Refugees (UNHCR) official website from 2022 to 2023. This period is particularly significant as it captures the post-pandemic economic recovery phase and reflects the rapidly evolving digital landscape, especially in financial technology adoption among vulnerable populations such as refugees. The relevance of the dataset lies in its ability to provide contemporary insights into the financial behaviour, challenges, and opportunities faced by individuals in adapting to digital financial tools in the aftermath of COVID-19 and during a time of increasing digitisation in Malaysia.

However, one limitation of the dataset is the absence of longitudinal data. Without repeated observations over time, the study is unable to track changes in behaviour or causality with respect to the adoption of digital financial practices. As such, the findings are limited to a cross-sectional analysis, which provides a snapshot of the situation rather than trends or developments over time. Future studies incorporating longitudinal data would offer a deeper understanding of behavioural shifts and the long-term impact of digital financial inclusion strategies.

This survey targeted a sample of 613 individuals, all of whom are refugees residing in Malaysia. The data collected is cross-sectional, capturing a snapshot of the financial behaviours, attitudes, and digital financial literacy of these individuals at a specific point in time.

The study employs econometric methods to conduct its analysis. The Pearson's Chi-square test is applied to examine the relationship between two categorical variables. At the same time, the Logit model is used to assess the likelihood that various explanatory variables

influence the practice of using financial digital tools among respondents. The Logit model, a type of nonlinear regression model, is specifically designed for binary dependent variables and is based on the cumulative probability distribution function. This logistic cumulative distribution function has a particular form expressed through the exponential function and ensures that the predicted probabilities remain between 0 and 1 (Gujarati & Porter, 2009; Wooldridge, 2016). The population logit model of the binary dependent variable Y with multiple regressors can be represented as follows:

$$\Pr(Y=1|X_1, X_2, \dots) = F(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k) = \frac{1}{1 + e^{-(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k)}} \quad (1)$$

To model the probability that various explanatory variables influence the practice of using digital financial tools among respondents, a logit transformation is used. This transformation linearises the relationship between the dependent

and independent variables by modelling the log-odds of the outcome as a linear function of the predictors (Hosmer *et al.*, 2013). The model can be specified as:

$$L = \ln \left[\frac{P_i}{1 - P_i} \right] = \beta_0 + \sum_{i=1}^n \beta_i (X_i) + \varepsilon_i, \quad (2)$$

where L represents the log-odds of the probability that a respondent uses digital financial tools, P_i is the probability that respondent i is using the tools, and X_i represents explanatory variables such as motivational factors, demographic variables, and other control variables. The dependent variable L_i is a dummy variable, where $L_i = 1$ if the respondent uses digital financial tools, and $L_i = 0$ otherwise.

The explanatory (independent) variables, which include demographic, access, and behavioural factors known to influence digital financial behaviour, are displayed in Table 2. Note that all categorical variables are transformed into dummy variables for inclusion in the logistic regression. This is standard practice to interpret

the marginal effect of each category with a reference group. Furthermore, the selection of these variables is based on their theoretical relevance in the literature on digital financial inclusion and empirical evidence from past studies on mobile money and fintech adoption (e.g., Schaupp & Carter, 2010; Venkatesh *et al.*, 2012). It also draws on practical insights from the context of refugee and migrant communities, particularly those with varying access to banking infrastructure. Additionally, these variables help assess both access to technology (e.g., smartphone ownership) and economic behaviour (e.g., remittance practices, employment), providing a comprehensive view of the drivers and barriers to digital financial tool adoption.

Table 2: Independent variables and rationale for selection

Variable	Type	Description	Rationale
Gender	Categorical (Dummy)	1 = Male, 0 = Female	Previous studies suggest gender differences in digital financial adoption.
Age group (18-29, 30-39, etc.)	Categorical (Dummy)	Age categories converted into dummy variables	Age is a key determinant of technology adoption; younger users tend to be early adopters.
Country of origin	Categorical (Dummy)	1 = Myanmar, 0 = Other countries	Used to detect cross-country variation in digital behaviour among migrant or refugee populations.
Own smartphone	Categorical (Dummy)	1 = Yes, 0 = No	Smartphone ownership is a prerequisite for accessing digital finance.
Bank account in Malaysia	Categorical (Dummy)	1 = Yes, 0 = No	Indicates engagement with the formal financial system; may influence reliance on digital alternatives.
Work/business in the past seven days	Categorical (Dummy)	1 = Yes, 0 = No	Employment status may reflect financial activity and the necessity for digital transactions.
Savings for emergency	Categorical (Dummy)	1 = Yes, 0 = No	Indicates financial preparedness and possibly a greater inclination toward financial planning tools.
Send/receive money in Malaysia (formal channel)	Categorical (Dummy)	1 = Yes, 0 = No	Captures use of banks/e-wallets for domestic transfers; may correlate negatively with mobile payment adoption.
Send/receive money outside Malaysia (formal channel)	Categorical (Dummy)	1 = Yes, 0 = No	Captures remittance behaviour; may influence use of digital remittance apps.
Use of specific apps (e.g., Grab, Facebook, Merchantrade, Touch 'n Go)	Categorical (Dummy)	1 = Uses the app, 0 = Does not	Helps identify whether app engagement is linked to digital financial tool usage.

In equation (2), taking the antilog of the j th slope coefficients (β 's), subtracting one from the result, and multiplying by 100 yields the percent change in the odds for a unit increase in the j th regressor. This percentage change can be interpreted as the change in the probability (increase or decrease) that respondents will use the digital financial tools due to a one-unit increase in the independent variables. The

goodness fit of the model is tested using “fraction correctly predicted” as well as Pearson χ^2 -type tests of goodness-of-fit, namely Hosmer (1989) and Andrews (1988a, 1988b).

Results and Discussion

Table 3 presents the demographic distribution of respondents. Approximately 57.3% of the

respondents are male, while 42.6% are female. The majority of respondents, around 84.3%, are from Myanmar, with the remaining 15.7% hailing from other countries. In terms of age distribution, 48.0% of respondents are between 18 and 29 years old, and 33.1% are aged between 30 and 39 years. Fewer than 10% of respondents are within the 50 to 59 age range (6.4%) and over 60 years old (1.1%).

The majority of respondents (89.1%) own smartphones (Table 4). The survey also asked which apps are most frequently used to categorise digital behaviours and understand the dominant purposes driving mobile app usage. Note that each app serves as a proxy indicator—social media and communication apps like WhatsApp, IMO, Facebook, Viber, TikTok, and YouTube point to a preference for maintaining social connections, accessing entertainment, or staying informed. These platforms are primarily used for interpersonal communication and content consumption, reflecting a socially driven digital behaviour. On the other hand, apps such as Touch ‘n Go, Grab, and Merchantrade Money are directly associated with financial transactions, including e-wallet usage, transport and food payments, and cross-border remittances. The presence and frequency of these financial apps in daily use suggest a higher degree of digital financial inclusion and active engagement in formal financial systems. Conversely, Google Search or browser apps provide contextual insight into general digital literacy and information-seeking behaviour, which may support either social or financial purposes indirectly.

Although the majority of respondents own smartphones, only specific applications are commonly used, with the most popular being WhatsApp (86.8%), Facebook (77.2%), and YouTube (71%), primarily for social interaction and media consumption. In contrast, the use of apps for financial transactions, such as Touch ‘n Go, Merchantrade Money, and Grab, is significantly lower, with fewer than 40% of

respondents using these platforms. Among these, Grab is the most used financial transaction app, with 39.2% of respondents utilising it. Hence, this aligns with the finding that 92.3% of respondents reported not using their mobile phones for payments, purchases, or sending and receiving money.

Regarding financial literacy, only 10.9% of respondents, either individually or with someone else, currently hold an account with a bank or another formal financial institution in Malaysia. The vast majority remain unbanked, suggesting that most of their financial transactions are conducted using cash. Thus, this unbankable status is reflected in the fact that 66.8% of respondents do not use ATMs.

Over the past seven days, approximately 42.7% of respondents were engaged in income-generating activities, either by working for pay, running a business, or assisting in a family business. Despite this moderate level of employment, the use of digital financial transactions among respondents remains very low. Notably, several factors could contribute to this, including a lack of trust and confidence in digital systems, particularly given that they are in a foreign country. Furthermore, many refugees may prefer cash transactions due to their convenience, familiarity, and the lack of need for formal financial infrastructure.

Additionally, the lack of access to necessary documents, such as identification, may prevent refugees from opening bank accounts or using DFS. Another reason could be low digital literacy, as many refugees may not be well-versed in using mobile apps or online banking platforms. Moreover, financial products in Malaysia might not be tailored to meet the specific needs of refugees, further discouraging their use of digital financial tools. Consequently, these barriers collectively contribute to their reliance on cash and their exclusion from digital financial systems.

Table 3: Respondents' demographic information

Variable	Category	Frequency	Percentage (%)
Gender	Male	351	57.3
	Female	261	42.6
	Missing data	1	0.2
Country of Origin	Myanmar	517	84.3
	Others	96	15.7
Age	18-29 years old	294	48.0
	30-39 years old	203	33.1
	40-49 years old	69	11.3
	50-59 years old	39	6.4
	> 60 years old	7	1.1

Table 4: Background on financial literacy, digital literacy, and job information

Question		Yes	No	Not know ATM	Missing data	Total
Have you used an ATM before, or do you know how to withdraw money from an ATM?	N	116	410	87		613
	%	18.9	66.8	14.2		100
		Yes	No	Not sure	Missing data	
Do you own a smartphone?	N	546	64	3		613
	%	89.1	10.4	0.5		100
		Yes	No		Missing data	
What are some of the apps that you use most on your phone? Google search/browser	N	203	410			613
	%	33.1	66.9			100
What are some of the apps that you use most on your phone? WhatsApp	N	532	81			613
	%	86.8	13.2			100
What are some of the apps that you use most on your phone? IMO	N	298	315			613
	%	48.6	51.4			100
What are some of the apps that you use most on your phone? Facebook	N	473	140			613
	%	77.2	22.8			100
What are some of the apps that you use most on your phone? Viber	N	73	540			613
	%	11.9	88.1			100

What are some of the apps that you use most on your phone?	N	275	338		613
Tik Tok	%	44.9	55.1		100
What are some of the apps that you use most on your phone?	N	435	178		613
YouTube	%	71.0	29.0		100
What are some of the apps that you use most on your phone?	N	17	596		613
Touch 'n Go	%	2.8	97.2		100
What are some of the apps that you use most on your phone?	N	240	373		613
Grab	%	39.2	60.8		100
What are some of the apps that you use most on your phone?	N	31	515	67	613
Merchantrade Money	%	5.1	84.0	10.9	100
During the past 7 days, did you work for someone else for pay, for one or more hours, OR run or do any kind of business/activity to generate income or help in a family business?	N	262	351		613
	%	42.7	57.3		100
During the last 30 days, did you do anything to find a paid job or try to start a business?	N	55	241	317	613
	%	9.0	39.3	51.7	100
Do you, either by yourself or together with someone else, currently have an account at a bank or another type of formal financial institution in Malaysia?	N	67	546		613
	%	10.9	89.1		100
In the past 12 months, have you used a mobile phone to make payments, to buy things, or to send or receive money?	N	47	566		613
	%	7.7	92.3		100

This study also tests associations between digital financial behaviour and various factors using Pearson's chi-square and Fisher's exact tests. Hypotheses for mobile payment use were analysed between:

- Gender (Ho: No association; Ha: Association)
- Country of origin (Ho: No association; Ha: Association)
- Smartphone ownership (Ho: No association; Ha: Association)

- Use of Merchantrade Money (Ho: No association; Ha: Association)
- Use of Touch 'n Go (Ho: No association; Ha: Association)

Hypotheses for ATM usage or knowledge were also developed between similar factors such as Gender, Country of origin, Smartphone ownership, Use of Merchantrade Money, and Use of Touch 'n Go.

For the assumptions to be valid, when fewer than 20% of the cells have an expected count of less than 5, the Pearson chi-square test was used. However, when more than 20% of the cells have an expected count below this threshold, Fisher's Exact Test was applied. The results are displayed in Table 5. The relationship between gender and the use of a mobile phone for payments, purchasing items, or sending and receiving money in the past 12 months was demonstrated to be statistically significant ($p = 0.008$). Furthermore, female respondents are more likely to use mobile phones for these financial transactions than their male counterparts.

Similarly, the study revealed a significant relationship between country of origin and the use of mobile phones for financial transactions ($p = 0.000$), with individuals from Myanmar being more likely to use their mobile phones for payments, purchasing, and money transfers compared to those from other countries. Notably, the Pearson chi-square test for smartphone ownership and mobile phone use for financial transactions is not statistically significant ($p = 0.131$). Hence, this suggests that owning a smartphone does not necessarily influence a respondent's likelihood of using mobile phones for financial transactions.

Conversely, the analysis also reveals significant relationships between the use of specific financial apps—Merchantrade Money and Touch 'n Go—and mobile phone use for financial transactions. Respondents who use the

Merchantrade Money app are more likely to engage in mobile financial transactions, whereas those using the Touch 'n Go app are less likely to do so. These findings highlight the varied influences of mobile apps on financial behaviour and suggest a deeper exploration of app-specific features and user experiences could provide further insights into these trends.

Regarding the use of ATMs and knowledge of how to withdraw money using ATMs, all tests examining the relationships between the categorical variables are statistically significant (at the 1% level). The data indicate that male respondents tend to use ATMs and are more knowledgeable about how to withdraw money using an ATM compared to female respondents. Similarly, individuals from Myanmar are more frequent users of ATMs and possess greater knowledge of how to operate them than respondents from other countries.

Additionally, respondents who own smartphones are more likely to use and understand how to use ATMs compared to those who do not own smartphones. However, an interesting finding is that those who do not use the Merchantrade Money or Touch 'n Go applications are more likely to use ATMs and have the necessary skills to withdraw money, suggesting that reliance on digital financial tools may not be as strong among ATM users. Hence, this could reflect a preference for traditional banking methods among certain groups, even if they have access to mobile financial applications.

Table 5: Results of associations between digital financial behaviour and various factors

Characteristics	Frequency (%)	Frequency (%)
	Have you used a mobile phone to make payments, to buy things, or to send or receive money in the past 12 months?	Have you used an ATM before, or do you know how to withdraw money from an ATM?

	Yes	No	p-value	Yes	No	Do not know ATM	p-value
Gender							
Male	37 (78.7)	314 (55.5)	0.008	90 (77.6)	221 (53.9)	40 (46.0)	0.000
Female	122 (21.3)	251 (44.3)		26 (22.4)	118 (45.9)	47 (54.0)	
Country of Origin							
Myanmar	31 (66.0)	486 (85.9)	0.000	85 (73.3)	347 (84.6)	85 (97.7)	0.000
Others	16 (34.0)	80 (14.1)		31 (26.7)	63 (15.4)	2 (2.3)	
Own a smartphone							
Yes	46 (97.9)	500 (88.3)	0.131	115 (99.1)	353 (86.1)	78 (89.7)	0.003
No	1 (2.1)	63 (11.1)		1 (0.9)	54 (13.2)	9 (10.3)	
Apps that use most on phone - Merchantrade Money							
Yes	16 (34.8)	15 (3.0)	0.000*	19 (16.5)	10 (2.8)	1 (2.6)	0.000
No	30 (65.2)	485 (97.0)		96 (83.5)	343 (97.2)	76 (97.4)	
Apps that use most on phone - Touch ‘n Go							
Yes	7 (14.9)	10 (1.8)	0.000*	9 (7.8)	8 (2.0)	0 (0.0)	0.001
No	40 (85.1)	556 (98.2)		107 (92.2)	402 (98.0)	87 (100.0)	

Notes: *Fisher's Exact test.

Empirically, the current study also attempts to investigate factors that might contribute to the likelihood (probability) of using financial digital tools among respondents. The models adopted are the Binary Logistic, where the dependent variable has only two categories, one and zero (binary number). Data for the dependent variable are collected from the responses to the questions:

Have you used a mobile phone to make payments, to buy things, or to send or receive money in the past 12 months? (yes = 1, no = 0).

What are some of the apps that you use most on your phone? Merchantrade Money (yes = 1, no = 0).

What are some of the apps that you use most on your phone? Touch 'n Go (yes = 1, no = 0).

The second and third dependent variables are used to check the robustness of the results obtained. In this context, the predictors in the logistic regression could be categorical or continuous data, or a mix of both. For instance, examples include demographic variables (age, gender, country of origin) and other control

variables such as owning a smartphone, having a bank account in Malaysia, and using apps such as Grab, Facebook, and others. In most cases, the independent variables are transformed into dummy variables, especially for categorical data. As depicted in Table 6, there are three regressions (1, 2, and 3) developed with different dependent variables for financial digital tools use. Regression 1 focuses on the use of mobile phones to make payments, buy things, or send or receive money. On the other hand, regression 2 focuses on the use of the app Merchantrade Money, and regression 3 is on the use of the app Touch 'n Go. Results of all regressions are displayed in the table.

As in regression 1, the study revealed that significant predictors of the the use of mobile phone for payment transactions, buying, or sending and receiving money in the past 12 months are 'gender' and 'age range of 30 to 39 years old', 'country of origin', 'have bank account in Malaysia', and 'send/receive money within Malaysia using formal transaction such as through bank or e-wallet'. The negative coefficient for the gender variable indicates that the tendency of respondents to use mobile phones for payment transactions, buying goods or services, or sending or receiving money in the past 12 months is higher among females compared to their male counterparts.

The value of the odds ratio is 0.406, which demonstrates that the tendency to use mobile phones for the said purposes is 0.406 times less among male respondents compared to female respondents, other things being constant. Specifically, males have 40.6% of the odds of using mobile phone payments compared to females. In other words, being male reduces the odds of using mobile phone payments by about 59.4% ($1 - 0.406 = 0.594$ or 59.4%) compared to females. This suggests that gender plays a significant role with males being less inclined to use mobile payments compared to females in this context. Hence, this finding aligns with previous studies that have reported gender differences in digital payment adoption. For example, studies such as Schaupp and Carter (2010) demonstrated

that women are more likely to adopt new technologies for financial transactions, which might explain the higher usage rates among females.

The positive beta ($\beta = 0.997$) of dummy 'country of origin' confirms the positive relationship between being from Myanmar and the likelihood of using mobile phone payments. This suggests that the country of origin, particularly being from Myanmar, is a significant factor that increases the likelihood of using mobile payment services. The odds ratio ($Exp(B)$) of 2.711 indicates that respondents from Myanmar are 2.71 times more likely to use mobile phone payments compared to respondents from other countries. In other words, being from Myanmar increases the odds of using mobile phone payments by 171% compared to individuals from other countries ($2.711 - 1 = 1.711$, or 171%). Likewise, this finding is consistent with research by Chauhan and Ghosh (2015), which highlighted varying adoption rates of digital financial tools across different countries due to cultural and economic factors.

As for age, the negative beta ($\beta = -0.962$) for dummy age (30-39) further confirms the inverse relationship between being in the 30 to 39 age group and the likelihood of using mobile phone payments, indicating that individuals in this age range are significantly less likely to adopt mobile payment technologies compared to other age groups. Specifically, individuals in the 30 to 39 age range have 38.2% of the odds of using mobile phone payments compared to those in other age groups. Therefore, this suggests that being in this age range decreases the odds of using mobile phone payments by 61.8% ($1 - 0.382 = 0.618$ or 61.8%). Additionally, a study by Venkatesh *et al.* (2012) supported this finding, suggesting that younger individuals are generally more inclined towards adopting new technologies compared to older age groups.

An odds ratio of 0.087 for dummy 'bank account in Malaysia' means that respondents who have a bank account in Malaysia are less likely to use mobile phones for payment transactions

compared to those without a bank account. Specifically, respondents with bank accounts have only 8.7% of the odds of using mobile phone payments compared to those without a bank account. This suggests that having a bank account decreases the likelihood of using mobile phone payments by 91.3% ($1 - 0.087 = 0.913$ or 91.3%). Furthermore, the negative beta (-2.436) reinforces this inverse relationship, indicating a strong negative association between having a bank account and the use of mobile phone payments. This inverse relationship implies that traditional banking customers might be less inclined to use mobile payments, possibly due to a higher reliance on established banking methods. Similarly, this finding is supported by research from Brown and Calejari (2018), which indicates that individuals with access to traditional banking are less likely to adopt alternative payment methods.

An odds ratio of 0.054 for dummy 'sending/receiving money within Malaysia-formal' indicates that respondents who use formal methods like banks or e-wallets to send/receive money within Malaysia are less likely to use mobile phone payments than respondents who do not use formal channels. Moreover, these individuals have only 5.4% of the odds of using mobile phone payments compared to those who do not use formal methods for sending/receiving money. This reflects a 94.6% decrease in the odds of using mobile phone payments ($1 - 0.054 = 0.946$ or 94.6%). The negative beta (-2.92) further highlights this strong negative relationship, suggesting that people who already rely on formal channels for money transactions may find less need or incentive to adopt mobile

phone payments. Thus, both of these findings suggest that respondents who are more integrated into the formal financial system (through bank accounts or formal transaction methods) are significantly less likely to use mobile phone payments. This could be due to higher trust in traditional banking channels, established habits, or a perceived lack of necessity for mobile payment solutions. Conversely, it could also suggest that those who rely on formal financial methods might view mobile payments as redundant or less necessary. Similar findings were reported by Pew Research Centre (2019), which observed that individuals engaged in formal financial transactions tend to stick with traditional methods.

Other predictors or variables are revealed to be insignificant in the model. In the classification table, without using any predictor variables, the model correctly classifies 93.1% of the cases. However, when a set of predictor variables is introduced, the accuracy improves slightly to 93.8%. Since the Omnibus test of model coefficients is significant ($p < 0.05$), this indicates that the model with predictors performs better than Statistical Package for the Social Sciences (SPSS) initial guess. The Chi-square value for this test is 79.74. Furthermore, the Hosmer and Lemeshow test with a Chi-square statistic of 9.535 and a p -value greater than 0.05, supports the model's goodness of fit. On the other hand, the pseudo R-squared values (Cox & Snell R-squared and Nagelkerke R-squared) demonstrated that the predictor variables explain between 12.8% and 32.5% of the variability in the dependent variable.

Table 6: Logit regressions result on digital financial practice

Binary Logistic			
Independent variables	Dependent Variables		
	Use a mobile phone to make payments, to buy things, or to send or receive money in the past 12 months (1)	Use App Merchantrade Money (2)	Use App Touch 'n Go (3)

	B	Exp(B)	B	Exp(B)	B	Exp(B)
Constant	3.150** (1.252)	23.337	19.872 (11815)	0.00	0.288 (1.383)	1.334
Dummy GENDER	-0.901* (0.484)	0.406	-0.677 (0.535)	0.508	-0.913 (0.705)	0.401
Dummy AGE (18-29)	-0.456 (0.570)	0.634	0.029 (0.644)	1.030	0.425 (0.842)	1.530
Dummy AGE (30-39)	-0.962* (0.584)	0.382	-0.757 (0.628)	0.469	-0.849 (0.769)	0.428
Dummy COUNTRY OF ORIGIN	0.997** (0.471)	2.711	0.716 (0.525)	2.045	0.888 (0.649)	2.429
Dummy OWN SMART PHONE	-0.763 (1.070)	0.466			-16.821 (4812)	0.000
Dummy WORK/BUSINE SS IN PAST 7 DAYS	-0.031 (0.429)	0.970	-0.640 (0.492)	0.527	-0.048 (0.612)	0.953
Dummy BANK ACCOUNT IN MALAYSIA	-2.436*** (0.421)	0.087	-2.060*** (0.449)	0.127	-1.328** (0.604)	0.265
Dummy HAVE SAVING FOR EMERGENCY	0.423 (0.540)	1.526	-0.229 (0.516)	0.795	-1.008* (0.594)	0.365
Dummy SEND/RECEIVE MONEY OUTSIDE MSIA- FORMAL	-0.552 (0.554)	0.576	-0.455 (0.593)	0.635	-0.083 (0.742)	0.921
Dummy SEND/RECEIVE MONEY WITHIN MSIA- FORMAL	-2.92*** (0.867)	0.054	19.942 (11815)	457885	-1.711* (0.933)	0.181
Diagnostic tests						
% correct classification	93.8 (from 93.1)		94.4 (from 94.6)		97.4 (from 97.1)	
Omnibus Chi- square stat.	79.74***		40.852***		35.426***	
Hosmer & Lemeshow stat.	9.535		3.004		3.070	
Cox & Snell R ²	0.128		0.076		0.059	
Nagelkerke R ²	0.325		0.221		0.254	

Notes: 1. Standard errors are in parentheses; 2. ***statistically significant at the 1% level; **5% level; and *10% level.

Estimations of regressions 2 and 3 serve as a robustness check for the findings from regression 1. In regression 2, the dependent variable captures the usage of financial digital

tools by respondents using the Merchantrade Money app. Similarly, in regression 3, the dependent variable reflects the usage of these

tools among respondents using the Touch 'n Go app.

In both regressions, the dummy variable 'bank account in Malaysia' is significant, with a 1% significance level in regression 2 and a 5% significance level in regression 3. The negative coefficients (-2.06 in regression 2 and -1.328 in regression 3) indicate an inverse relationship between having a bank account in Malaysia and the use of these financial digital tools. This aligns with the results from regression 1, suggesting that respondents with bank accounts are less likely to use these specific apps. Notably, the odds ratios for regressions 2 and 3 are 0.127 and 0.265, respectively. These values suggest that respondents with bank accounts in Malaysia are about 87.3% less likely to use the Merchtrade Money app and 73.5% less likely to use the Touch 'n Go app compared to those without such accounts. Thus, this reinforces the previous finding that individuals with traditional banking services are less inclined to use these specific digital tools. Moreover, the odds ratios highlight a substantial decrease in the likelihood of using these apps among bank account holders. These findings align with Miller *et al.* (2020), who reported that established banking customers often resist adopting newer financial technologies.

Nevertheless, in regression 3, the dummy variable for 'sending/receiving money within Malaysia using formal methods' (such as banks or e-wallets) is also revealed to be significant. The negative coefficient, consistent with regression 1, indicates that respondents who use formal channels for sending or receiving money within Malaysia are less likely to use the Touch 'n Go app (a financial digital tool) compared to those who do not use formal channels. Additionally, the beta coefficient is -1.711, and the odds ratio is

0.181, suggesting that respondents who use formal methods are about 81.9% less likely to use the Touch 'n Go app than those who do not rely on formal channels. This implies a preference for other financial services among formal channel users. Therefore, this result supports the notion that individuals who already rely on formal financial systems may prefer not to adopt additional digital payment tools. Similarly, this is consistent with findings from Lee and Kim (2019), which emphasised that users of traditional financial methods might be less inclined to switch to or adopt new digital solutions.

Models or regressions 2 and 3 demonstrate strong performance, as their prediction accuracy increases to 94.4% and 97.4%, respectively, when predictor variables are introduced. This improvement is supported by the Omnibus test results, with Chi-square values of 40.85 for model 2 and 35.43 for model 3, both having *p*-values less than 0.05, indicating the models are statistically significant. Additionally, the Hosmer and Lemeshow tests demonstrate a high degree of goodness of fit with Chi-square statistics of 3.004 and 3.07, both with *p*-values greater than 0.05, further validating the models' fit to the data.

The pseudo R-squared values (Cox & Snell R-squared and Nagelkerke R-squared) revealed that model 2 explains between 7.6% and 22.1% of the variability in the dependent variable, while model 3 accounts for between 5.9% and 25.4%. This suggests that although the predictor variables contribute to explaining the outcome, a significant portion of the variability remains unexplained, pointing to the potential for additional factors influencing the dependent variable.

Table 7: Summary of key findings from Logistic regression models on digital financial tool use

Regression Model	Dependent Variable	Key Findings
Model 1	Use of mobile phones for financial transactions	Gender, age, country of origin, having a bank account in Malaysia, and sending/receiving money through formal channels significantly affect usage. Females, younger users, and

		those without bank accounts are more likely to use mobile phone payments. Myanmar respondents show higher adoption.
Model 2	Use of Merchantrade Money app	The most significant predictor is having a bank account in Malaysia—those with accounts are much less likely to use the app. Other demographic factors are not significant.
Model 3	Use of Touch ‘n Go app	Again, having a bank account reduces the likelihood of using the app. Sending/receiving money through formal channels is also negatively associated with app usage.

The findings across all three regression models (Table 7) reveal consistent patterns regarding the factors influencing the use of digital financial tools among respondents. One of the most prominent patterns is the role of “bank account ownership”. In all models, individuals who have a bank account in Malaysia are significantly less likely to use digital financial tools such as mobile payments, the Merchantrade Money app, or the Touch ‘n Go app. This suggests that those already integrated into the traditional financial system may prefer conventional banking methods and see less need to adopt alternative digital tools. Hence, it may also reflect a level of comfort, habit, or trust in formal banking systems that reduces the perceived value of switching to or supplementing with digital options. These findings are consistent with prior research, such as Brown and Calegari (2018), which observed that individuals with access to traditional banking are less likely to adopt mobile payment systems due to their reliance on established financial infrastructures. Similarly, Miller *et al.* (2020) reported that conventional banking users tend to resist migrating to newer digital platforms.

Another important pattern is the influence of “gender”, with females more likely than males to engage in mobile financial transactions. This indicates a gender-based difference in digital finance adoption, where women appear to be more open or active in using

mobile phones for financial purposes. Additionally, this finding may be linked to gendered financial responsibilities, greater willingness to adopt convenient technologies, or stronger motivations for managing household-related transactions digitally. This result aligns with findings from Schaupp and Carter (2010), who revealed that women are more likely to adopt new financial technologies, especially when these tools offer convenience and time-saving features in managing financial tasks.

Furthermore, age also plays a notable role, particularly in Model 1. Respondents aged 30 to 39 are significantly less likely to use mobile payments compared to younger individuals, suggesting that younger users (especially those under 30) are more inclined to embrace digital financial tools. This aligns with broader trends in technology adoption, where younger generations tend to be more comfortable with digital platforms and are quicker to integrate them into their daily lives. As noted by Venkatesh *et al.* (2012), younger individuals typically demonstrate higher levels of digital readiness and willingness to explore emerging financial technologies compared to older age groups.

The “country of origin”, especially being from Myanmar, consistently demonstrates a positive influence on digital tool usage across all models. Specifically, respondents from Myanmar are more likely to use mobile payments and

financial apps, possibly due to factors such as stronger remittance needs, peer influence within migrant communities, or more active engagement with mobile-based financial solutions. This pattern is consistent with findings by Chauhan and Ghosh (2015), who observed that country-specific socioeconomic factors influence digital adoption, with migrants from certain countries displaying a higher tendency to rely on mobile financial platforms, especially for cross-border remittances and informal economic activities.

Lastly, respondents who already use 'formal channels' (e.g., banks or e-wallets) to send or receive money within Malaysia are generally less likely to adopt additional mobile financial tools. This suggests that those already relying on formal systems may view further digital tools as redundant or unnecessary. It may also reflect a segmentation in behaviour, where formal financial users and digital app users belong to different user profiles with different preferences or needs. Similar findings were reported by the Pew Research Centre (2019), which reported that individuals who are already engaged with formal banking systems often see limited added value in adopting digital financial applications.

In general, the results highlight that a complex mix of demographic and behavioural factors shapes digital financial adoption. Gender, age, country of origin, and level of engagement with formal financial systems all influence whether individuals are more likely to use digital financial tools or stick with traditional alternatives. These results offer important local insights and are broadly aligned with international literature on digital finance behaviour, lending further credibility and relevance to the study.

Conclusions

The current study seeks to evaluate the current state of financial digital practices and financial literacy among refugees in Malaysia. The focus is to understand the key factors that determine their adoption of digital versus traditional financial

transactions. In other words, the main objective is to shed light on the level of financial inclusion for refugees, identify potential barriers and opportunities, and provide actionable recommendations for policymakers, financial institutions, and NGOs. Furthermore, the study utilised data from the Malaysia Financial Behaviour Survey for 2022 to 2023, conducted by the UNHCR, involving a sample of 613 refugees residing in Malaysia. The cross-sectional data offer a snapshot of their financial behaviours, attitudes, and digital financial literacy at a specific moment, providing crucial insights into the present state of financial inclusion and digital financial practices in this population. To analyse the data, the study employs econometric methods. The Pearson's chi-square test is used to explore the relationships between categorical variables, while the Binary Logit model assesses how various explanatory factors influence the adoption of digital financial tools. This methodology enables a detailed understanding of the trends and identifies key areas where improvements in financial literacy and inclusion efforts can be made.

Moreover, the study offers significant apprehension into the factors influencing the adoption of financial digital tools compared to traditional financial methods. The key findings from the analysis of data are that females are more likely to use mobile phone payments than males, reflecting gender-based preferences in financial technology adoption. Therefore, this suggests that targeted strategies could be beneficial in encouraging broader use among males. Notably, respondents from Myanmar are more inclined to use mobile phone payments, indicating that cultural and regional factors play a crucial role in adoption. This reflects the need for region-specific strategies when promoting digital financial tools. In addition, individuals aged 30-39 are less likely to adopt mobile phone payments, pointing to a potential generational divide in technology adoption. Younger individuals generally demonstrate higher adoption rates for new technologies. Conversely, users with bank accounts and those relying on

formal channels for transactions are significantly less likely to use mobile payments and specific financial digital tools. This preference suggests a strong inclination towards traditional banking methods and a potential resistance to new digital solutions.

As for policy recommendations, several strategic interventions can be operationalised to enhance the adoption of digital financial tools—particularly among groups currently demonstrating lower usage, such as males and individuals in the 30–39 age group. Notably, targeted educational programmes, co-developed and delivered in partnership with NGOs and community-based organisations, should focus on increasing digital financial literacy among these segments. NGOs that work closely with marginalised communities, including refugees, are uniquely positioned to build trust and deliver culturally sensitive financial education. These programmes should highlight the convenience of mobile payments and how these tools can complement, rather than replace, traditional banking practices, addressing resistance rooted in habit or a lack of exposure.

To enhance relevance and acceptance, cultural sensitivity in digital tool design must be prioritised. Moreover, when collaborating with fintech firms, developers can ensure that the user interfaces of mobile financial apps reflect local languages, customary financial practices, and community norms. For instance, fintech firms can design multilingual platforms with simplified features suited to users with limited literacy or digital experience. NGOs, on the other hand, can offer user feedback and insights to guide this design process, helping to ensure that products resonate with the values and daily realities of refugee and migrant communities.

In markets where traditional banking customers demonstrate reluctance to switch, it is beneficial to integrate digital tools with existing financial infrastructure. Financial service providers, in collaboration with fintech companies, can offer hybrid services—such as digital banking platforms with options to deposit

or withdraw cash through traditional channels (e.g., post offices, partner retailers, or mobile agents). Furthermore, banks can work with regulators to enable interoperability between digital wallets and bank accounts, making it easier for customers to transition between digital and traditional systems.

Additionally, incentivising mobile payment adoption is an effective strategy that can be implemented through public-private partnerships. For instance, fintech firms can collaborate with local merchants and NGOs to offer discounts, cashback, or rewards programmes for users who make purchases or send remittances through digital channels. These incentive schemes can also be tailored to support financial inclusion goals—for example, offering bonuses for first-time users or loyalty points for frequent usage. Moreover, NGOs can help identify low-income or underserved users and facilitate their participation in such programmes.

To ensure sustainable and inclusive access to digital finance, regulatory and legal reforms are essential, particularly to support refugee populations. Many refugees face challenges in accessing financial services due to the lack of recognised identity documents or legal residency status. Governments, with support from international organisations and civil society, should consider adopting flexible Know Your Customer (KYC) frameworks that allow for tiered or risk-based customer verification. For example, regulatory sandboxes can be established to pilot innovative onboarding processes using alternative forms of identification, such as UNHCR-issued cards, biometric verification, or community-based attestations. Furthermore, financial inclusion policies must formally recognise the right of refugees and stateless persons to access basic DFS. Thus, this may require amending national banking laws or regulations that currently exclude non-citizens or impose restrictive documentation requirements. Additionally, the central bank or financial regulatory authority can issue inclusive guidelines that encourage banks and fintech firms

to extend services to displaced populations, with safeguards against discrimination or exclusion.

Finally, establishing multi-stakeholder coordination mechanisms, involving government agencies, financial institutions, fintech firms, NGOs, and refugee representatives, can help align digital finance initiatives with the actual needs and realities of the refugee population. Regular consultation and data-sharing between these actors can foster an ecosystem that supports innovation, financial inclusion, and the protection of vulnerable communities.

Nevertheless, ongoing research should be encouraged, as well as monitoring to stay updated on evolving user preferences and barriers. Additionally, adapting policies and strategies based on new findings will help address emerging challenges and opportunities.

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Conflict of Interest Statement

The authors confirm that this research was conducted without any self-benefits, commercial, or financial conflicts, and declare no conflicts of interest as there were no funders involved.

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