A Critical Analysis of Financial Inclusivity to Empower Financial Literacy of Sarawakians in Malaysia

Review of Integrative Business & Economics Research

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ABSTRACT

This paper thoroughly examines the financial inclusion segment in Sarawak, categorising the population into four segments: '*Fully-banked, Unbanked, Underbanked, and Underserved*.' It studies the link between access to financial services and poverty, a pertinent economic issue. The research surveyed 680 individuals aged 18 and above and found that 9.9% are fully-banked. Notably, the most substantial portion of the population falls into the underbanked category, accounting for half of the sample, indicating limited access to and use of formal financial services. This paper also explores the determinants of financial literacy in Sarawak, where only 70.15% of fully-banked individuals display adequate financial knowledge, underlines the importance of financial inclusion to financial well-being. Financial literacy has a significant relationship with the financial inclusion segment. The expected findings will enhance the understanding of financial literacy levels in the region and contribute to better financial decision-making and the need for financial products and services tailored to each segment's unique requirements.

Keywords: Financial Inclusion, Financial literacy, Underbanked, Underserved.

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1. INTRODUCTION

Global Findex Database 2021 release by the World Bank's 2021 report about 1.4 billion adults worldwide need access to banking services (unbanked), and nearly all of them reside in developing nations. The concern about this issue has underscored the importance of financial access or inclusion, which helps them conveniently manage day-to-day

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expenses and be ready for any unforeseen emergencies. For a better understanding, Sarma (2008a) has defined financial inclusion as a process that assures economy members have easy access to and use the formal financial system. Meanwhile, according to Sen and De (2018). Financial inclusion means providing banking services to significant population segments at low or no cost, focusing on underprivileged and low-income groups. The idea is to ensure that all disadvantaged and low-income groups can participate in the financial system's development and increase their status to become an "all-inclusive" society.

Individuals classified as unbanked may require measures to improve access to essential financial services. A comprehensive study that segments the population into distinct categories may facilitate the development of targeted initiatives to alleviate each group's issues. Segmenting the population into unbanked, underbanked, and underserved individuals can address and customize challenges related to financial inclusion.

The initiatives to improve accessibility to banking services, such as ownership of savings accounts, may be necessary for individuals categorized as unbanked. However, the underbanked and underserved segments may need strategies or initiatives to optimize their utilization of financial services. The initiative is essential for personal and economic empowerment, making financial inclusion and financial literacy intertwined elements (Atkinson & Messy, 2013). Financial inclusion focuses on banking, payments, and credit that are necessary for managing money to foster entrepreneurship and absorb financial shocks (Aduda & Kalunda, 2012; Morgan & Pontines, 2014). Financial literacy equips individuals with the knowledge to navigate the financial systems effectively, make confident financial decisions, escape debt traps, and improve wealth by investing wisely (Asari, 2024).

Financial inclusion and financial literacy enhance personal financial stability and overall economic adaptability resilience, facilitating a more equitable allocation of wealth and opportunities in society. Meanwhile, Atkinson and Messy (2012) defined financial literacy as a combination of awareness, knowledge, skills, attitude, and behaviors necessary to make sound financial decisions and ultimately achieve individual financial well-being. At an individual level, financial literacy encompasses the capacity to oversee personal finances and navigate decisions concerning spending, saving, and investments, influencing current and future well-being. Hence, integrating financial knowledge into this context has powerful implications for the welfare of the people and offers insights into initiatives directed at enhancing financial literacy within the population (Lusardi & Mitchell, 2014).

1.1. Financial Landscape of Sarawak

Sarawak, the largest state in Malaysia and one of the two located in East Malaysia encompasses an area comparable to West Malaysia's. Nonetheless, the considerable expanse and ecological richness that render Sarawak exceptional also pose unique challenges, as its limited and largely rural population is spread across the state, where development and infrastructural connectivity fall behind the vibrant progress observed in Peninsular Malaysia.

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Sarawak is the third lowest in poverty but, unsurprisingly is one of the top contributors to the nation’s economy when compared to the other states in Malaysia (Department of Statistics Malaysia, 2021). It is reported that Sarawak's poverty rates have increased primarily due to the country's unequal distribution of wealth, income, educational opportunities, and infrastructure development (Bernama, 2022). This indicates that residents of Sarawak may also be primarily impacted by the general situation of those who lack bank accounts (referred to as the "unbanked") or reside in areas with insufficient access to financial services (referred to as the "underbanked") as the World Bank says. The banked and unbanked customers can feel underserved when not adequately served (Mambu, 2021)

Comprising merely 8% of Malaysia's overall population, with a recorded figure of 2.56 million as per the 2016 data from the Malaysian Department of Statistics, the inhabitants of Sarawak navigate the complex challenges of residing in remote communities, frequently cut off due to the expansive and underdeveloped transportation infrastructure that characterizes this distinctive area.

Malaysia's financial inclusivity rate is 93% in 2021, primarily due to the widespread deposit account. Nevertheless, financial access equality must be achieved despite financial inclusivity's success. Surprisingly, over 55% of Malaysia's adults, who comprise the country's adult population of 21.82 million, are unbanked or underbanked (Yap, 2022). Malaysia should be more concerned about financial inclusion due to the growing number of unbanked people rather than relying solely on ATMs and deposit account ownership as indicators and measurement tools. Studies have shown that even highly developed financial systems are not "all-inclusive". Some populations still lack access to formal financial systems (Sarma, 2012).

Table 1: Total Score of Financial Inclusion Dimension

Year	Adults with Deposit Account (%)	Reported by
2011	92.0	Central Bank of Malaysia
2016	91.0	Central Bank of Malaysia
2017	68.5	Global FINDEX Survey
2018	92.0	Central Bank of Malaysia
2021	93.0	Central Bank of Malaysia

Source: Central Bank of Malaysia (2022)

The World Bank (2019) states on its website that analysing economic activity in a country or region can disclose information about the financial well-being of its population. The report also says that the number of adults who do not own a bank account may also be linked to the number of poor people in the country. As for Sarawak, its economic foundations are solid, which suggests the State’s economy is well-managed. Sarawak remains the most significant contributor to the national economy, accounting for 72.1 per cent of Malaysia's GDP (2019: 72.3 per cent). However, Sarawak is still Malaysia's third-lowest state with low household income (Then, 2019), and this issue has become a concern in Sarawak. Sarawak's poverty rate, which in 2019 and 2020 was 5.6%-8.4%, is higher than the national average of 9.0%-12.9% (Department of Statistics Malaysia, 2021).

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The challenges encountered in Sarawak reflect those experienced in numerous other developing areas globally, where isolated and rural communities struggle with restricted access to financial services and insufficient financial literacy. Similar issues addressed by Hipsher (2020), can be evident in other regions such as Southeast Asia (Chinnnakum, 2023), Sub-Saharan Africa (Atadouanla Segning et al., 2024), and Latin America (Fonseca & Matray, 2024), where infrastructure deficiencies, socio-economic inequalities, and cultural barriers hinder the advancement of financial inclusion (Hipsher, 2020)This raises compelling questions about financial inclusivity. For a substantial number of the population, especially in rural and less developed areas, access to financial services and literacy is not a given, potentially hampering their economic empowerment and participation.

Studying Sarawak, therefore, yields insights into the complexities of financial inclusivity in the context of apparent prosperity. Despite its richness, disparities in financial access and literacy levels persist, possibly perpetuating the cycles of poverty. Academic analysis of this State is critical to understanding and addressing the intricacies of these issues, with implications for policy-making that can foster a more inclusive and literate financial environment. Understanding the financial landscape of Sarawak can yield significant insights for the formulation of customized financial policies in other regions with similar socio-economic characteristics. Furthermore, given that financial literacy represents a worldwide challenge, the insights gained from this study can aid in formulating impactful financial education initiatives relevant across various contexts, particularly in emerging economies that seek to improve financial access and literacy.

2. LITERATURE REVIEW

The United Nations adopted the Sustainable Development Goals (SDGs) on the 2030 agenda also known as the Global Goals. In 2015, the universal call to action was to end poverty, protect the environment, and ensure that by 2030, all people can enjoy peace and prosperity. The discussion of financial inclusion and how it relates to financial growth and society's economic health has gained international attention. Many studies, including those by Sharma (2016) and Van et al. (2021), have emphasized that higher levels of financial inclusion can significantly contribute to overall economic progress.

2.1. Segmentation Approaches – Theory of Vulnerable Groups

The financial inclusion segmentation approach is closely aligned with the Fineman (2010), Theory of Vulnerable Groups. The theory acknowledges that specific societal populations, defined by age, gender, income level, and other demographic characteristic (Kohn, 2014), are more prone to economic disadvantages and financial exclusion (Heltberg et al., 2013). The segmentation approach acknowledges the unique financial needs and challenges encountered by different population segments, including the unbanked, underbanked, and underserved, thus providing a targeted strategy to enhance their specific vulnerabilities and promote financial inclusion (Heltberg et al., 2013). By focusing on vulnerable groups, the theory aims to minimize inequalities and disadvantages within the financial system to integrate marginalized individuals into standard financial services.

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Nonetheless, the vulnerability-based theory of financial inclusion also brings up some limitations and challenges. The theory's implicit belief that women are inherently vulnerable while men are not can perpetuate gender stereotypes and may unintentionally lead to social and financial exclusion among men. One key issue is the possibility of exclusion of non-vulnerable individuals outside the formal financial system, stressing the importance of considering financial inclusion for the entire population. In addition, prioritizing preferential access to formal financial services for vulnerable groups may worsen the economic disparities over time, contributing to societal dissatisfaction and increased inequality. Financial inclusion on an individual level has an extent to the categories such as banked, unbanked, underbanked, and underserved populations to the financial services. Some studies are the research conducted by (The Federal Deposit Insurance Corporation (FDIC), 2021) partnership with (United State Census Bureau, 2021).

2.2 Defining Financial Inclusion

Financial inclusion is often defined as ensuring that all members of society, particularly the disadvantaged, access and use financial services. As according to Sarma (2008b), financial inclusion is a process that ensures all economy members have easy access to and use the formal financial system. The concept stresses various aspects of financial inclusion, including financial system accessibility, availability, and usage. The context in which financial inclusion is defined determines which elements of the economy will be emphasized and how public and private participants will benefit. Consequently, a definition of inclusion is essential for the formulation of strategies.

Damodaran (2013) provides a broader definition of financial inclusion. He argues that an inclusive financial system is more than just assuring the availability of financial services to society; it also symbolizes the formation of knowledge and awareness of financial literacy. Thus, financial inclusion is not restricted to opening a bank account or gaining access to credit. It comprises a vast array of services, including access, consumption, quality, barriers, and other factor that influence financial inclusion (Jin, 2022)

The importance of financial inclusion has been studied in vast amounts of literature worldwide, which highlights from individual and national perspectives. It appears to be one of the most essential strategies in assisting poor people in overcoming poverty and boosting a country's economic progress (Omar & Inaba, 2020; Sharizan et al., 2021). Financial inclusion essentially allows adults to gain access to and efficiently use a wide range of financial services (Demirgüç-Kunt & Singer, 2017).

Financial inclusion can be assessed by examining the ownership and utilization of a bank account at a formal financial institution, which enables the management of funds and other financial transactions. Understanding the significance of financial literacy in determining financial inclusion is crucial for policymakers focused on enhancing financial inclusion (Susan et al., 2024). A well-functioning financial system provides universal access to a variety of financial services, such as savings, payments, borrowing, and risk management, that significantly improve social welfare (Demirgüç-Kunt & Klapper, 2012). For instance, those with access to and use fundamental formal financial services like borrowing and saving can promote beneficial activities like entrepreneurship

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and education. Households could be encouraged to pursue entrepreneurial initiatives through micro-financing. Those who lack access to the formal financial system may only rely on informal financial services such as family, acquaintances, or pawnshops to invest in their economic activities or even their children's education. This situation would make income gaps even wider and slow down economic growth.

3. METHODOLOGY

This study applied a survey and questionnaire to obtain primary data from individuals aged 18 and above in Sarawak, Malaysia. The research employed the minimal sample size recommended by Krejcie and Morgan (1970), that is 384 samples for a population over 1 million. A total of 680 respondents were obtained with a response rate of 100%. Before data collection, the stratification sampling approach was employed based on administrative groupings (Lone et al., 2017). These groups were separated into three districts (Kuching, Samarahan, and Serian) and further stratified into several sub-groups. The next phase was the implementation of a random sample methodology, whereby the selection of communities within each district was conducted randomly. This study employs the Cross-Tabulation Analysis methodology to examine the relationship among the variables in the survey findings.

3.1 Categories of Financial Inclusion

The illustration in Figure 1 above depicts the classification of financial inclusion into many subcategories, demonstrating the organizational structure of persons or groups according to their access to and utilization of financial services. It illustrates the complex processes of financial inclusion and points out the necessity of an elaborate method for ensuring that every individual has the chance to take part in the economic system.

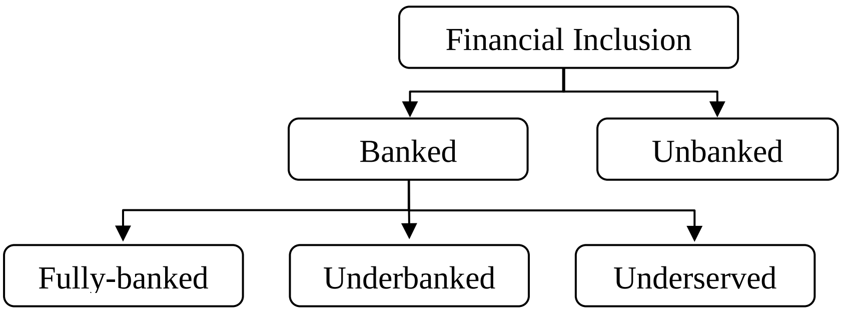

Figure 1: Illustration of Financial Inclusion Segmentation

The figure presents the fundamental concept of financial inclusion, which pertains to the structured goal of assuring that individuals and businesses have a range of valuable and affordable financial products and services that meet their needs. Such offerings include transactions and payments, savings, credit, and insurance, all of which are offered. This allows for an understanding of the different levels of financial inclusion, which extend from individuals fully integrated into the financial system (Fully Banked) to those completely excluded (Unbanked). It emphasizes the importance of customizing financial inclusion initiatives to meet the unique needs of each segment, whether it involves

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promoting the usage of financial products for those with limited access to banking services (underbanked) or improving the availability of banking services (underserved).

Table 2: Description of Financial Inclusion Segmentation

Segmentation	Description	Related Items/ Dimensions
Banked	Individuals who have access to and actively use formal banking services (Sarma, 2008a), such as savings accounts, and have access to online banking	Accessibility
Unbanked	Individuals who do not have access to any formal banking services or do not have access to online banking (Sarma, 2008a).	Accessibility
Fully-banked	The term "Fully-banked segment" pertains to persons who possess a deposit account or can utilize online banking services. These individuals actively use formal banking services mostly due to their extensive access to diverse financial services.	High Accessibility High Availability High Usage
Underbanked	People who own a bank account but do not use it frequently Kempson et al. (2004). • Limited access to formal banking services • Limited Purposes	High Accessibility High Availability Low Usage
Underserved	This segment refers to individuals or communities facing barriers to accessing financial services, including traditional banking and alternative financial products. Mambu (2021) study reveals that banked and unbanked customers feel underserved, indicating that they share a common sentiment.	Low Accessibility Low Availability Low Usage

Table 2 presents the segmentation of financial inclusion based on specific criteria and related dimensions. Each segmentation is accompanied by a brief description outlining the characteristics of individuals within that segment based on particular criteria related to their financial behavior and access to financial services.

Thus, the financial inclusion segmentation approach helps address vulnerable populations' financial needs (Ozili, 2020), but it is essential to consider the broader impact and complexities of financial inclusion strategies. A comprehensive approach that balances needs addresses gender biases, and mitigates unintentional consequences is necessary.

3.2 Variables and Indicators Used for Segmentation Analysis

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Table 3: Dimensions and Indicators to Measure Financial Inclusion Segmentation and Financial Literacy

Dimensions	Sources	Variables	Indicators
Accessibility (ACC)	Sarma (2008a) Sarma and Pais (2011) Sarma (2012) Yorulmaz (2013) Abd Rahman (2015)	ACC1	Ownership of Saving Account/ Current Account
		ACC2	Ownership of Online Banking
Availability (AVA)		AVA1	Nearest Bank Branch
		AVA2	Nearest ATM Outlet
		AVA3	Nearest Post Office
		AVA4	Nearest Bank Agent
		AVA5	Nearest Micro-Financing Services
Usage (USA)		USA1	Saving/ Current Account Usage Frequency
		USA2	Visit Bank Branch/ ATM Outlet Frequency
		USA3	Money Withdrawal from Post Office or Bank Agent Frequency
		USA4	Other Banking Product Hold Eg: Personal loan, home loan, auto loan, credit card, fixed deposits, insurance/takaful, stocks and bonds, microfinance loan, and unit trusts.
Financial Literacy (FIN)	Lusardi and Mitchell (2014)	FIN1	Financial Knowledge of Interest Rates
		FIN2	Financial Knowledge of the Concept of Inflation
		FIN3	Financial Knowledge of the Concept of Bond Price
		FIN4	Financial Knowledge on Home Loans Interests and Tenure

Table 3 summarizes key financial inclusion and literacy elements, including their explanations, linked factors, and specific indicators employed to assess each aspect.

The ACC1 indicator assesses the extent to which individuals have fundamental access to banking services via a savings or current account. The ACC2 indicator evaluates individuals' ability to utilize digital banking services, a vital component of contemporary financial accessibility.

AVA1 measures bank branch proximity, AVA2 shows ATM presence, and AVA3 considers postal services to provide basic financial services. These systems help identify local banking needs. AVA4 is a tool that evaluates the accessibility of bank agents offering essential financial services, particularly in locations that do not have sufficient access to such services. AVA5 assesses the accessibility of micro-finance organizations offering low-income people modest loans and financial services.

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The usage component of financial inclusion concentrates on the active involvement of individuals and communities in utilizing financial products and services. It measures the frequency and effectiveness of these services. USA1 measures the frequency of savings or current accounts usage, USA2 measures bank branch visits, USA3 evaluates withdrawals, and USA4 assesses ownership and utilization of various financial products.

Financial literacy refers to the ability of an individual to understand and manage financial assets effectively, aiming to improve economic welfare. It includes understanding interest rates, inflation, bond price determination, and mortgage loans. FIN1 assesses interest rates and their impact on savings, loans, and investments; FIN2 evaluates inflation and its effect on buying power and financial planning; FIN3 assesses bond price determination and bond investment significance; and FIN4 evaluates mortgage loans based on interest rates and loan duration.

4. FINDINGS: ANALYSIS OF FINANCIAL INCLUSION SEGMENTATION

Table 4 presents the proportion of those who have access to banking services (banked) and those who do not (unbanked) in the context of financial inclusion, explicitly focusing on ownership of deposit accounts. Based on the data collected, 97.4% of the participants in this survey own a deposit account, while only 2.6% do not have a bank account. The finding aligns with the analysis issued by the Central Bank of Malaysia (BNM), as mentioned in Table 1. The report reveals that in 2021, almost 93% of the Malaysian population belonged to the banked segment.

Table 4: Percentage of Banked and Unbanked Population based on Deposit Account Ownership

Segments	N	%
Banked	662	97.4
Unbanked	18	2.6

4.1. Identification of Underbanked, Underserved and Fully-banked Segments

Table 5: Financial Inclusion Segmentation

Segments	N	%
Underbanked	375	55.1
Underserved	220	32.4
Fully-banked	67	9.9
TOTAL	662	97.4

While Table 4 demonstrates a high degree of inclusivity regarding account ownership, Table 5 indicates that this inclusivity is frequently only superficial. A large proportion of the population that has access to banking services is either underbanked or underserved, suggesting that they are not fully utilizing the financial services that are accessible to them. Table 5 summarizes the banked population into more detailed segments: fully banked, underbanked, and underserved. This comprehensive segmentation analysis demonstrates that most of the population (97.4%) falls into the banked segment.

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However, this segment's involvement with financial services varies significantly. The combined proportion of the underbanked (55.1%) and underserved (32.4%) segments comprise 87.5% of the banked population. This implies that although these individuals can use banking services, substantial barriers restrict their engagement with them. Only 9.9% of the population with bank accounts is considered fully-banked, meaning that just a small portion has complete access to and actively uses various financial services.

The wide distribution of the underbanked and underserved categories highlights the urgent requirement for focused initiatives aimed at developing financial literacy, increasing service accessibility, and customizing financial products to better cater to the needs of these populations. Tackling these concerns could enable individuals to transition from the underbanked and underserved categories to the fully-banked category, thereby enhancing financial inclusion.

The comparatively low percentage of fully banked individuals indicates the opportunity for expansion in the efficient use of financial services. Promoting increased participation in the financial system among those who have limited access to banking services and are not adequately supported by financial institutions could significantly improve the effectiveness of efforts to achieve financial inclusion, resulting in enhanced economic results for these individuals.

4.2. Descriptive Analysis

Table 6: Background Characteristics Across Financial Inclusion Segments

Background Characteristics		Unbanked N=680		Fully-banked N=680		Underbanked N=680		Underserved N=680	
	N	N	%	N	%	N	%	N	%
Gender									
Female	412	9	1.32	36	5.29	236	34.71	131	19.26
Male	286	9	1.32	31	4.56	139	20.44	107	15.74
Age (Years)									
18-29	397	7	1.03	36	5.29	226	33.24	128	18.82
30-39	96	3	0.44	11	1.62	56	8.24	26	3.82
40-49	73	2	0.29	4	0.59	36	5.29	31	4.56
50-59	83	1	0.15	14	2.06	43	6.32	25	3.68
60 and above	49	5	0.74	2	0.29	14	2.06	28	4.12
Monthly income range									
No monthly income	171	10	1.47	14	2.06	66	9.71	81	11.91
Less than RM2,500	362	6	0.88	24	3.53	212	31.18	120	17.65
RM2,500- RM3,169	82	2	0.29	23	3.38	39	5.74	18	2.65
RM3,170- RM3,969	33	0	0.00	1	0.15	27	3.97	5	0.74
RM3,970 - RM4,849	6	0	0.00	1	0.15	3	0.44	2	0.29
RM4,850 - RM5,879	19	0	0.00	0	0.00	14	2.06	5	0.74
RM5,880 - RM7,109	10	0	0.00	1	0.15	8	1.18	1	0.15
RM7,110 - RM8,699	9	0	0.00	2	0.29	4	0.59	3	0.44
RM8,700 - RM10,959	6	0	0.00	1	0.15	2	0.29	3	0.44
Highest education level									

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No formal education	42	3	0.44	8	1.18	15	2.21	16	2.35
Primary Education	30	0	0.00	5	0.74	13	1.91	12	1.76
Secondary Education	323	12	1.77	28	4.12	166	24.41	117	17.21
Tertiary Education	303	3	0.44	26	3.82	181	26.62	93	13.68
Residency									
Urban	222	5	0.74	27	3.97	125	18.38	65	9.56
Rural	408	8	1.18	37	5.44	226	33.24	137	20.15
Remote Rural	50	5	0.74	3	0.44	24	3.53	18	2.65
Financial Dependent									
Has no dependent	283	8	1.18	20	2.94	157	23.09	98	14.41
Has at least 1 dependent	397	10	1.47	47	6.91	218	32.06	122	17.94

Table 6 shows the socioeconomic characteristics of those participating in four financial inclusion segments (unbanked, fully-banked, underbanked, and underserved). The data presents surface insights into the population's economic inclusion, including how attributes such as gender, age, monthly income range, highest education level, residency type, and financial dependence relate to different financial inclusion segments.

The data reveals that females typically constitute a more significant proportion in the segmentation than males, especially in the underbanked segment (34.71%). As for the underserved segment, 19.26% of 680 samples are females; when put together, 53.97% of the “banked” segment are women who are underbanked and underserved, perhaps reflecting disparities between men and women in access to and usage of banking services.

The younger generation is highly reported in underbanked segments and older adults in underserved segments (33.24%), highlighting a generational gap in how they use and access financial services (18.82%).

Most underbanked respondents report earning less than RM2,500 per month (31.18%), highlighting the prevalence of lower-income earners in this category. The underserved category also shows a significant proportion of respondents with no monthly income (11.91%) or earning less than RM2,500 (17.65%). The fully-banked group exhibits more income diversity, with respondents spanning across various income ranges, although lower-income brackets (<RM2,500) still dominate (3.53%). This indicates that financial inclusivity correlates with income levels, as higher-income individuals are less likely to be underbanked or underserved, suggesting that income disparities play a role in financial service utilization.

The background characteristics of financial inclusion segments found that higher education levels appear to increase the likelihood of being fully banked, suggesting that educational attainment is a strong predictor of financial inclusion. Out of 680 respondents, the fully-banked segment shows a higher proportion of respondents with tertiary education (3.82%) than the unbanked (0.44%). Nevertheless, a high proportion of underserved with tertiary education backgrounds is a worrying finding. This means that despite owning a banked account, those with high education face other barriers that hold back their ability to use and enjoy banking products and services. On the other hand, individuals with lesser levels of education are more likely to have more excellent rates of being unbanked or underbanked.

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Unlike other findings, the underbanked and underserved segments have a solid rural representation of 33.24% and 20.15%, respectively. While rural and remote areas face challenges, leading to higher rates of underbanked and underserved individuals. From the perspective of geographic location, the unique finding indicates that the person with better financial inclusivity (fully banked) cannot be displayed from where they currently reside. For instance, urban residents are likely to be underbanked (18.38%) and underserved (9.56%). This indicates that even in metropolitan regions, substantial populations are underbanked and underserved, suggesting that having access to financial services does not necessarily result in complete financial inclusion, which may be influenced by other factors such as the availability and usage of banking products and services.

Financial dependence is more common in underbanked and underserved groups, potentially affecting financial stability and access. The highest percentage of respondents is underbanked (32.06%) with at least one dependent. The presence of financial dependents might influence the individuals' financial needs and behaviors, contributing to their segmentation as underbanked or underserved. This indicates potential financial stress or higher demand for tailored financial products.

5. DISCUSSION

Table 7 shows the results of the multiple regression analysis. Significant associations and varied impacts exist between financial inclusion segments (unbanked, fully banked, underbanked, and underserved) and financial literacy (financial knowledge score). Based on the multiple regression analysis above, the equation for all models is obtained from as below:

Unbanked = β_0 - 0.0996 (Financial Knowledge Score) - 0.1835 (Digital Inclusion) - 0.0848 (60 years and above) - 0.1009 (Less than RM2500) - 0.1185 (Primary Education) - 0.1374 (Tertiary Education) - 0.1826 (Rural) - 0.1453 (Urban)

Fully banked = β_0 + 0.0852 (Financial Knowledge Score) + 0.1354 (25-29 years) + 0.1164 (50-54 years) + 0.1243 (60 years and above) + 0.1778 (RM2,500- RM3,169) - 0.0684 (RM4,850 - RM5,879) - 0.1393 (Secondary Education) - 0.1873 (Tertiary Education)

Underbanked = β_0 + 0.0635 (Financial Knowledge Score) + 0.2373 (Digital Inclusion) + -0.0867 (Male) + 0.1716 (Less than RM2,500) + 0.1374 (RM4,850 - RM5,879) + 0.1330 (RM5,880 - RM7,109)

Underserved = β_0 - 0.0876 (Financial Knowledge Score) + - 0.2180 (Digital Inclusion) - 0.1074 (30-34 years) - 0.0983 (Less than RM2500) - 0.1459 (RM2,500- RM3,169) - 0.1111 (RM3,170- RM3,969) - 0.0812 (RM4,850 - RM5,879) - 0.1204 (RM5,880 - RM7,109) + 0.2054 (Tertiary Education)

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Firstly, in Model 1, the coefficient for the financial knowledge score is −0.0996 (p-value = 0.0106), indicating a negative relationship. This suggests that individuals with lower financial literacy are likelier to be unbanked. Other significant factors are digital inclusion (high digital inclusion, lower possibility of being unbanked), age, income, education level, and geographic factors.

In Model 2, the financial knowledge score has a positive coefficient of 0.0852 (p-value = 0.0283), implying that individuals with higher financial literacy are more likely to be fully-banked. Age and education level are other significant factors influencing an individual to be fully banked.

Meanwhile, in Model 3, the coefficient of the underbanked segment is 0.0635 (p-value=0.0991). Although the relationship is positive, it is weaker compared to the Fully Banked segment and only marginally significant. This indicates that while a certain level of financial literacy may increase the likelihood of owning a bank account, individuals may not fully utilize more advanced financial services. The limited engagement with these services could be due to barriers such as low trust, accessibility issues, or inadequate financial education that does not translate into actionable knowledge. Other factors that can cause individuals to be categorized as underbanked are digital inclusion, gender, and income level.

Finally, in Model 4, the coefficient for financial knowledge score in the underserved segment is −0.0876 (p-value=0.0241), showing a negative relationship. This suggests that individuals with lower financial literacy are more likely to fall into the underserved category despite having a bank account. The negative association may stem from their inability to navigate or fully comprehend the available financial products and services, leading to underutilization and dissatisfaction. Other factors include digital inclusion, age, income level, and education level.

Individuals in the fully-banked segment consistently display the most elevated levels of financial knowledge across all categories. More specifically, 76.1% of people in this group comprehend the concept of inflation, and 68.7% are knowledgeable about interest rates. These statistics imply that this group has a firm grasp of fundamental financial ideas. The study reveals that while fully-banked individuals understand basic financial concepts, they can improve their comprehension of complex financial products like bonds. However, only 22.4% of fully-banked individuals accurately understand home loans, indicating potential knowledge or disinterest.

ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

Table 7: Association between Unbanked, Fully-banked, Underbanked, Underserved, and Financial Knowledge Score

	(Model 1) Unbanked N=680		(Model 2) Fully-banked N=680		(Model 3) Underbanked N=680		(Model 4) Underserved N=680	
	Coefficients	P value	Coefficients	P value	Coefficients	P value	Coefficients	P value
Financial Knowledge Score	-0.0996	0.0106**	0.0852	0.0283**	0.0635	0.0991*	-0.0876	0.0241**
Digital Inclusion	-0.1835	0.0001**	0.0450	0.3410	0.2373	0.0000**	-0.2180	0.0000**
Male	0.0332	0.3870	0.0300	0.4339	-0.0867	0.0224**	0.0617	0.1067
18-24 years	-0.1310	0.1326	0.0710	0.4136	0.0512	0.5514	-0.0547	0.5280
25-29 years	-0.0683	0.3746	0.1354	0.0779*	0.0373	0.6235	-0.1025	0.1814
30-34 years	-0.0133	0.8017	0.0656	0.2141	0.0660	0.2076	-0.1074	0.0421**
35-39 years	-0.0484	0.3968	0.1164	0.0412**	-0.0158	0.7791	-0.0407	0.4741
40-44 years	-0.0643	0.1996	0.0322	0.5200	-0.0069	0.8888	0.0089	0.8578
45-49 years	-0.0539	0.2839	-0.0001	0.9982	0.0209	0.6733	-0.0037	0.9411
50-54 years	-0.0877	0.1151	0.1126	0.0428**	0.0261	0.6356	-0.0693	0.2115
60 years and above	-0.0848	0.0875*	0.1243	0.0121**	0.0270	0.5815	-0.0788	0.1110
(Less than RM2,500)	-0.1009	0.0419**	-0.0778	0.1156	0.1716	0.0005**	-0.0983	0.0468**
(RM2,500- RM3,169)	-0.0336	0.4754	0.1778	0.0002**	0.0415	0.3730	-0.1459	0.0020**
(RM3,170- RM3,969)	-0.0520	0.2311	-0.0660	0.1276	0.1608	0.0002**	-0.1111	0.0104**
(RM3,970 - RM4,849)	-0.0400	0.2987	0.0200	0.6026	0.0250	0.5113	-0.0255	0.5051
(RM4,850 - RM5,879)	-0.0620	0.1314	-0.0684	0.0951*	0.1374	0.0007**	-0.0812	0.0473**
(RM5,880 - RM7,109)	-0.0556	0.1744	-0.0029	0.9427	0.1330	0.0010**	-0.1204	0.0032**
(RM7,110 - RM8,699)	-0.0439	0.2913	0.0388	0.3487	0.0533	0.1944	-0.0664	0.1092
Primary Education	-0.1185	0.0162**	-0.0157	0.7492	-0.0058	0.9048	0.0568	0.2463
Secondary Education	-0.1141	0.1316	-0.1393	0.0651*	0.0151	0.8404	0.1119	0.1379
Tertiary Education	-0.1374	0.0791*	-0.1873	0.0165**	-0.0366	0.6352	0.2054	0.0085**
Rural	-0.1826	0.0144**	0.0300	0.6863	-0.0133	0.8568	0.0577	0.4373
Urban	-0.1453	0.0535*	0.0637	0.3959	-0.0167	0.8226	0.0270	0.7183
Financial_Dependent	-0.0585	0.2085	0.0359	0.4388	-0.0093	0.8404	0.0070	0.8792
Intercept	0.0000	0.0000**	0.0000	0.8304	0.0000	0.1434	0.0000	0.0000*

ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

4.3 Financial Inclusion and Financial Literacy Empowerment

Table 8: Comparison of Financial Knowledge Across Different Financial Inclusion Segments

Items	Underserved	Underbanked	Fully-banked	Unbanked
	N %	N %	N %	N %
Financial Knowledge of Interest Rates	50.9	62.4	68.7	22.2
Financial Knowledge of The concept of Inflation	60.5	66.4	76.1	50.0
Financial Knowledge of the Concept of Bond Price	25.5	29.3	46.3	11.1
Financial Knowledge on Home Loans Interest and Tenure	25.5	30.7	22.4	11.1
N	680			
Mean Score	45.0368			

The Underbanked segment demonstrates a relatively strong comprehension of fundamental financial principles, as 62.4% of respondents possess knowledge of interest rates, and 66.4% have a basic understanding of inflation. This implies that although these individuals have minimal involvement with a wide range of financial services, they still have considerable financial knowledge. Surprisingly, people with limited access to banking services perform better than those with full access when understanding house loans. Specifically, 30.7% of the underbanked individuals answered related questions correctly. This may indicate their deliberate usage of particular financial instruments that apply to their need, even if they do not actively participate in the broader financial system. Nevertheless, their limited knowledge of bond prices (29.3%) underlines the difficulties people experience in obtaining or comprehending more complex financial products.

The underserved group, which faces obstacles in accessing a diverse array of financial services, exhibits moderate financial literacy. For example, 50.9% of this group possesses a comprehension of interest rates, while 60.5% have a clear understanding of inflation. These figures suggest a primary degree of financial knowledge that their limited access to services may hinder. Their knowledge of basic financial concepts, such as bond prices (25.5%) and home loans (25.5%), is diminished, indicating the influence of their limited financial involvement on their total financial literacy. The relatively lower percentages observed in all financial knowledge aspects suggest that improving the accessibility of financial services for this demographic could significantly enhance their financial literacy and, as a result, their capacity to make well-informed financial decisions.

The unbanked category constantly exhibits the lowest levels of financial literacy, which indicates their absence from formal financial institutions. Merely 22.2% of individuals in this group possess knowledge of interest rates. Although 50.0% have an essential awareness of inflation, their level of expertise decreases substantially when it comes to

ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

more advanced topics such as bond prices (11.1%) and house loans (11.1%). The findings emphasize the significant lack of financial knowledge experienced by individuals who do not have access to banking services, which probably worsens their financial exclusion. Lacking access to formal financial services reduces the likelihood of these persons encountering or learning about important financial concepts. This highlights the necessity of focused educational activities to close this knowledge gap and encourage more comprehensive financial inclusion.

6. CONCLUSION

While this study provides an in-depth analysis of financial inclusion and literacy in Sarawak, its findings have broader implications for other regions facing similar challenges. Many rural and underdeveloped areas across Southeast Asia, Sub-Saharan Africa, and South America exhibit parallel barriers to financial access, such as geographic isolation, limited infrastructure, and socio-cultural resistance to formal banking.

The data from Sarawak confirms the theoretical framework, emphasizing the financial vulnerability of specific social groupings. The results support the hypothesis proposed by (Fineman, 2010) and other researchers, suggesting that variables such as demography, technological accessibility, and infrastructure substantially impact financial inclusion. The Unbanked, who strongly prefer using cash and lack the necessary skills to use digital technology, and the Underserved, who have significant difficulties accessing and using technology, illustrate these vulnerable groups' difficulties. The underbanked, although with little involvement in financial services, also demonstrate susceptibility resulting from their geographical remoteness from banking facilities and inadequacies in infrastructure.

Overall, Sarawak demonstrates significant involvement with banking and financial institutions. However, there are noticeable demographic trends that indicate differences in financial inclusion. Based on the data, Interventions promoting financial access and literacy prioritize female and younger respondents as critical targets. Future financial educational programs and policies must consider these specific demographic differences to enhance financial inclusion and literacy across all segments of Sarawak's society. Financial literacy enables people and families to effectively allocate funds for necessary expenses and savings, effectively handle their assets and debts, and make wise decisions regarding their savings in financial markets (Sukamo et al., 2024).

The research highlights the importance of policymakers expanding their focus beyond just the population without access to banking services, including those with limited access to banking services and those not well served by the existing services. Adopting a comprehensive strategy is crucial to achieving broad financial inclusion and effectively meeting the diverse needs of all segments within the community.

6.1. Recommendation

Based on the conclusions drawn, the following recommendations are proposed. By implementing these recommendations, policymakers and financial institutions can make meaningful strides toward increasing financial inclusion, reducing economic

ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

vulnerability, and fostering financial empowerment among all societal segments in Sarawak.

Some initiatives can be put into practice to improve financial inclusion. First, comprehensive financial literacy programs should be customized to specific demographics, such as gender-specific financial programs, youth financial programs, and outreach to older generations. While exact financial concepts like inflation and the time value of money are relatively well-understood by the respondents, there is a discernible gap in comprehension regarding investment knowledge and compound interest or returns on their savings or investments.

Second, efforts should be made to extend banking services to underserved areas, using mobile banking units or digital platforms to overcome physical distance limitations. Thirdly, trust-building initiatives, such as transparent processes and consumer protection rules, are critical for instilling confidence in financial institutions among people who do not trust banking services. Finally, inclusive product design is crucial, with financial products tailored to the needs of financially excluded groups, such as flexible paperwork requirements and reducing or eliminating account fees when possible. These techniques aim to increase financial inclusion and close the gap between different population segments.

In conclusion, improving financial inclusivity and literacy in Sarawak warrants a multifaceted research approach. Longitudinal studies are critical, as they can track the progression of financial behaviour over time, gauge the effectiveness of interventions, and assess the interplay between economic fluctuations and demographic trends. Additionally, employing qualitative research methods will yield invaluable insights into the lived experiences of individuals, the influence of cultural values, and the societal norms that shape financial behaviour. Together, these strategies offer a holistic understanding that can inform targeted, culturally sensitive policies and initiatives, potentially transforming Sarawak's diverse communities' financial landscape and well-being. The strategy proposed in this paper, such as customized financial literacy programs, enhanced mobile banking solutions, and inclusive product design, could serve as effective models for these regions. By applying the insights gained from Sarawak's unique context, policymakers in other countries can tailor similar interventions to address their local financial inclusion gaps. Thus, this study's findings offer valuable lessons for the global discourse on financial inclusion, particularly in enhancing access and literacy among underserved populations.

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ISSN: 2304-1013 (Online); 2304-1269 (CDROM); 2414-6722 (Print)

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