Analyzing the impacts of the digital payment system on financial inclusion in the Philippines

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Abstract

The emergence of the Coronavirus disease prompted health measures that promote collective health and safety, highlighting the need for accessible, reliable, and convenient electronic payment services. However, there have been impediments that prevent the Philippines from fully leveraging on the digital wave. To explore and understand these barriers, this study employed Principal Components Analysis (PCA) to evaluate and analyze the relationships between financial inclusion (FI) indicators and the Financial Inclusion Index (FII). Significant findings include the following: digital finance-related indicators have an influence on the FII; there is a low negative correlation between FII and number of active mobile money accounts (r = -0.370); and FII is highly correlated with conventional indicators, such as number of ATMs (r = 0.983), number of banks (r = 0.964), number of commercial bank branches per 100,000 adults (r = 0.978), and number of ATMs per 100,000 adults (r = 0.981). Conclusively, these results suggest that the digital payment system has the potential to promote FI in the Philippines subject to the implementation of supportive policies and regulations.

Objectives

The study aims to investigate the factors of financial inclusion and to understand their implications on the overall level of financial inclusion in the Philippines with the use of digital payment indicators as the main factors for the index. Specifically, the study's goal is to determine possible correlation among the financial inclusion index and digital payment indicators by conducting PCA with the use of quantitative data. Results from PCA output such as the correlation matrix, scree plot, and correlation circle would relay the correlations and relationships of the variables. Likewise, trends, changes, and inconsistencies in time-series data would be explained as the research also seeks to reveal areas for improvement in the financial ecosystem by recommending actions to be taken by public and private stakeholders.

Methodology

1. **Collection of Data:** Main source of data was BSP from their quarterly published financial inclusion reports.

2. **Data Cleaning:** This was done to create a cleaner, more accurate, and more appropriate data set that is well designed to answer research questions.

3. **Conducting PCA through XLSTAT:** PCA was conducted through XLSTAT as the software provides simplicity to the process being a useful tool for performing multivariate analysis.

4. **Interpretation of Results:** The correlation matrix, eigenvalues, factor loadings, and the correlation circle were interpreted.

5. **Discussion of Implications:** Findings were related to the past literature and policy recommendations were specified.

Results

Variables	ATM	BANK	E-MONEY	VOL-IN	VOL-OUT	VAL-OUT	VAL-IN	REA	AEA	CBB	ATMP	FII
ATM	1	0.981	0.733	0.811	0.959	0.907	0.905	0.598	-0.429	0.976	0.996	0.983
BANK		1	0.708	0.901	0.990	0.952	0.951	0.725	-0.350	0.932	0.961	0.964
E-MONEY			1	0.441	0.656	0.539	0.536	0.185	-0.754	0.697	0.728	0.638
VOL-IN				1	0.925	0.960	0.963	0.951	0.008	0.723	0.761	0.812
VOL-OUT					1	0.962	0.961	0.774	-0.246	0.902	0.932	0.950
VAL-OUT						1	1.000	0.851	-0.092	0.855	0.877	0.909
VAL-IN							1	0.857	-0.090	0.850	0.873	0.905
REA								1	0.278	0.496	0.535	0.613
AEA									1	-0.433	-0.460	-0.370
CBB										1	0.986	0.978
ATMP											1	0.981
FII												1

ATM: Number of Automated Teller Machines (ATMs), **BANK:** No. of Banks (head office, branches, and other offices), **E-MONEY:** Number of active mobile money agent outlets, **VOL-IN:** Volume of E-money transactions (inflow), **VOL-OUT:** Volume of E-money transactions (outflow), **VAL-OUT:** Value of E-money transactions (outflow), **VAL-IN:** Value of E-money transactions (inflow), **REA:** Number of registered mobile money accounts, **AEA:** Number of active mobile money accounts per 100,000 adults, **CBB:** Number of commercial bank branches per 100,000 adults, **ATMP:** Number of ATMs per 100,000 adults, **FII:** Financial Inclusion Index
NOTE: Values in bold are different from 0 with a significance level alpha=0.05

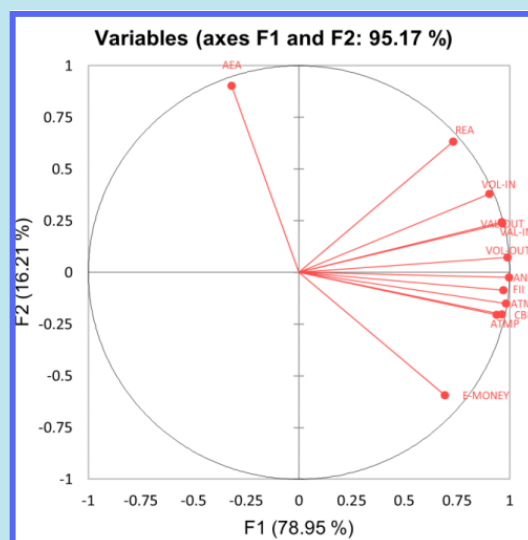**Table 1.** Pearson's correlations values between financial inclusion indicators

Figure 1. Correlation circle; Plot of the loadings of the variables

	F1	F2	F3	F4	F5	F6	F7	F8
Eigenvalue	9.474	1.946	0.375	0.138	0.039	0.015	0.012	0.001
Variability (%)	78.954	16.214	3.125	1.146	0.327	0.123	0.103	0.007
Cumulative %	78.954	95.168	98.293	99.440	99.767	99.890	99.993	100.000

Table 2. Eigenvalues of factors

Discussion

Table 1 exhibits the the linear matrix of the Pearson correlations between the variables. The coefficients reflect the strength of the correlation of the variables. As shown in the table, the **conventional indicators in the table namely ATM, BANK, CBB. and ATMP all had a very high correlation with FII**. This would mean that financial inclusion is highly correlated with conventional indicators. Another significant value from Table 1 is the correlation between **AEA and FII (r=-0370)**. This finding reinforces the report of BSP that the Philippines lack the necessary digital infrastructure and has poor mobile connectivity. The other two representations practically validates the findings discussed earlier,

Conclusion

The digital payment system has the potential to promote financial inclusion the Philippines subject to implementation of supportive policies and regulations.