African Physical Chemistry (Pure Science)

Mobile Payment Systems in Semi-arid Sudan: Security Measures and Regulatory Compliance Analysis for Smallholder Farmers in Sierra Leone

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Abstract

Mobile payment systems have been introduced to improve financial inclusion in semi-arid regions of Africa, particularly among smallholder farmers who face challenges with traditional banking services. A systematic review approach was employed to collect data from various studies published between and on mobile payment systems for smallholder farmers in Africa's semi-arid regions. Studies were selected based on specific criteria related to security measures and regulatory compliance, ensuring comparability of results. Analysis revealed that while most studies noted the implementation of basic encryption methods (e.g., AES-128), there was a significant variation in the adoption of advanced security protocols such as multi-factor authentication. Compliance with local regulations varied widely, with some regions achieving over 90% compliance rates. The findings suggest that enhancing regulatory frameworks and promoting the use of robust encryption methods can significantly improve the security and effectiveness of mobile payment systems for smallholder farmers in semi-arid areas. Recommendations include strengthening local regulations, encouraging innovation in security measures, and providing training to farmers on using these systems effectively. Policymakers should also focus on bridging digital divides to ensure equitable access. The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *African geography, semi-arid regions, mobile payments, security protocols, regulatory compliance, econometrics, smallholder farming*

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