Title: The role of policy awareness and incentives in advancing IoT adoption in agriculture: a configurational and structural analysis

Authur names: Hazem Yusuf Osrof, Linying Wang, Na Bai & T. Ramayah

Abastact: Managing IoT adoption remains a persistent challenge in agriculture, particularly when strong policy support coexists with limited uptake. Existing research has largely emphasized individual cognitive drivers and relied on symmetric analytical approaches, offering limited insight into how institutional forces shape heterogeneous adoption conditions. To address this gap, this study extends Meta-UTAUT by integrating Awareness of Government Policies (AGP) and Financial Incentive Policy (FIP) as institutional perception constructs that translate macro-level interventions into farmers' evaluations. Survey data from 438 Chinese farmers were analyzed using a combined PLS-SEM and fsQCA approach. Results show that while core Meta-UTAUT factors remain important, institutional perceptions play a central role in shaping adoption intention. AGP and FIP influence attitudes while strengthening social influence and facilitating conditions, respectively. Configurational analysis further reveals multiple equifinal pathways in which factors that are statistically insignificant on average, such as effort expectancy and facilitating conditions, become decisive when aligned with strong performance beliefs, financial feasibility, and social endorsement. Theoretically, this study advances Meta-UTAUT by modeling institutional perception channels and clarifying the contingent roles of usability and resource feasibility in smallholder contexts. It also demonstrates how integrating symmetric and asymmetric approaches resolves apparent inconsistencies in heterogeneous adoption contexts. Practically, the results suggest that uniform policy interventions are unlikely to be effective, highlighting the need for segmented, configuration-sensitive strategies to accelerate digital transformation in agriculture.

Keyword: Policy Adoption Policy Implementation Policy Formulation Agriculture

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