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From Theory to Practice: A Theoretical Model for Disruptive ICT Innovations in Developing Economies

From Theory to Practice: A Theoretical Model for Disruptive ICT Innovations in Developing Economies

Benjamin Kiprono[1], Kelvin Kabeti Omieno[2], Jasper Ondulo[3]
[1]*University of Kabianga, Kenya*
[2]*Kaimosi Friends University, Kenya*
[3]*Masinde Muliro University of Science and Technology, Kenya*

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Abstract
The rapid evolution of Information and Communication Technologies (ICT) has transformed economic and social systems worldwide, yet most theories of disruptive innovation remain tailored to developed economies. This paper develops a theoretical model for understanding disruptive ICT innovations in developing contexts, emphasizing the factors that influence their success and socio-economic impact. Drawing on the Theory of Disruptive Innovation, the Technology Acceptance Model (TAM), the Theory of Reasoned Action (TRA), and the Unified Theory of Acceptance and Use of Technology (UTAUT), the study integrates these perspectives to establish a holistic framework linking technological architecture, competitive dynamics, and regulatory environments. Findings reveal that successful ICT disruptions in developing economies depend on three core drivers: adaptable technological architecture, supportive regulatory frameworks, and high user acceptance shaped by cultural and social norms. Empirical illustrations from Kenya's mobile banking revolution, particularly M-Pesa and M-Shwari, demonstrate that context-specific innovations can enhance financial inclusion, stimulate competition, and accelerate digital transformation. The study concludes that tailoring innovation frameworks to local realities enhances sustainability and scalability, offering a pathway for policymakers and practitioners to foster inclusive, ICT-driven economic growth.

Introduction

Innovation in Information Technology (IT) plays a pivotal role in driving economic growth, particularly within developed economies (Kazemi et al., 2015). The journey of adopting innovation typically unfolds in three distinct stages. Initially, countries engage in "buying innovation," acquiring technologies through global trade to incorporate existing innovations into their economic frameworks (Garcia & Calantone, 2002). As nations mature and develop, they transition to "incremental innovation," enhancing and adapting these technologies by borrowing ideas and practices from more advanced economies (Kilkki et al., 2018). This stage signifies a growing capability to improve upon existing technologies rather than merely adopting them. Ultimately, in the most advanced stage of development, countries reach a phase of "radical

innovation," where they innovate independently, creating new technologies that provide a competitive edge on the global stage (Mamasioulas et al., 2020).

The rapid evolution of communication technologies, coupled with the dynamics of international business, underscores the necessity for a deeper understanding of how these innovations influence economic structures and social arrangements (González-Sánchez et al., 2020). Disruptive innovations, defined as processes through which smaller companies successfully compete against established firms, often lead to significant transformations within markets. These innovations challenge the status quo, compelling traditional businesses to adapt or face the risk of obsolescence (Comin & Hobijn, 2008). The essence of disruptive technologies lies in their ability to fundamentally alter how businesses and industries operate. They often begin as inferior products compared to existing solutions, targeting underserved markets with lower costs. This strategy enables broader access to goods and services that were previously exclusive to wealthier consumers(Magnusson et al., 2003). For instance, the introduction of the internet revolutionised communication and commerce, fundamentally changing consumer behaviour and reshaping business models.

Disruptive Information and Communication Technologies (ICT) specifically refer to innovations that rapidly transform existing market landscapes. The swift pace at which ICT evolves necessitates that regulatory frameworks adapt accordingly, ensuring they support rather than hinder innovation (Kilkki et al., 2018). The implications of such disruptions extend beyond mere technological changes; they often reshape societal interactions and economic structures, highlighting the interconnectedness of technology and society (Grieco, 2022).

The banking sector serves as a prime example of the significant transformations driven by technological advancements. From the introduction of paper money in the 17th century to the development of Automated Teller Machines (ATMs) and online banking, each innovation has redefined customer interactions and operational efficiencies within the industry (Lewis, 1981). The rise of mobile banking, particularly in Kenya, exemplifies how disruptive innovations can democratise access to financial services (Ganguly et al., 2010). The shift towards online banking has led to a decreased reliance on physical branches, with many transactions now occurring digitally. This transition enhances operational efficiency while also reducing costs for banks (García-Medina & Tur-Viñes, 2017).

A notable illustration of disruptive innovation in the financial sector is Safaricom's M-Pesa platform, launched in 2007. M-Pesa has transformed financial access for previously unbanked populations by enabling users to conduct transactions on their mobile phones without a traditional bank account (Nyerere et al., 2012). This service has become integral to Kenya's economy, providing financial inclusion to millions. Additionally, digital lending platforms like M-Shwari have emerged, offering quick access to loans and addressing gaps in traditional banking (Ndemo & Weiss, 2017). These innovations cater to individuals and small businesses that may otherwise be excluded from formal financial systems, further illustrating the disruptive nature of ICT in the banking sector (Hwang & Christensen, 2008).

Despite the significant advancements in disruptive innovation, existing theories primarily focus on developed economies, often overlooking the unique economic and social dynamics present in developing nations like Kenya. The case of M-Pesa highlights the inadequacy of traditional models in predicting the trajectory of innovations in these contexts. Researchers argue that

understanding the specific drivers of innovation in developing economies is essential for creating effective frameworks that can guide future technological advancements (C. Christensen et al., 2017).

The primary contribution of this paper is to develop a model for disruptive ICT innovations in developing economies, with a focus on identifying the factors that influence the success of these innovations, assessing their effects in Kenya, and establishing a theoretical framework to understand these dynamics. By addressing these objectives, this research aims to contribute to a deeper understanding of the interplay between disruptive innovations and economic growth in developing regions, ultimately providing insights that can inform policy and practice in the field of ICT.

Literature Review

The literature review provides a comprehensive examination of existing theories, empirical studies, and key debates related to disruptive ICT innovations. By critically analysing prior research, this section establishes the conceptual foundations and highlights the gaps that motivate the development of a new theoretical model tailored to the context of developing economies.

Theory of Disruptive Innovations

The Theory of Disruptive Innovations, introduced by Clayton Christensen, asserts that established companies often struggle to adapt to disruptive changes because they are primarily focused on sustaining innovations that enhance current products for their existing customer base(C. M. Christensen et al., 2018). This focus can lead to a phenomenon known as "overshooting customer needs," where incumbents develop products that exceed the requirements of their customers. As a result, they leave gaps in the market that new entrants can exploit by offering simpler, more affordable alternatives("Disruptive Technologies," 1995). This theory emphasises the importance of distinguishing between sustaining innovations, which improve existing products, and disruptive innovations, which create entirely new markets. Christensen's work highlights that disruptive innovations often originate from smaller, agile companies that are willing to take risks and target underserved segments of the market, ultimately leading to significant market transformations(C. M. Christensen et al., 2018). While Christensen's theory explains why established firms struggle against disruptive entrants, it offers limited insight into how disruptive innovations unfold in developing economies, where institutional and infrastructural challenges can significantly alter market dynamics.

Disruptive Innovation Principles

Several key principles characterise disruptive innovations. First, they are frequently introduced by outsiders, new entrants who are not bound by the same constraints as established firms(Jones et al., 2016). These outsiders can focus on niche markets that larger companies overlook. Second, disruptive innovations tend to target underserved markets, appealing to consumers who do not require the complexity or high performance of existing products(Han, 2017). For instance, innovations in mobile banking often cater to populations that lack access to traditional banking services(Dinçer & Yüksel, 2019). Lastly, these innovations typically start with lower performance levels compared to established products but improve over time, eventually displacing market leaders. This trajectory underscores the dynamic nature of disruptive technologies and their potential to redefine industry standards(Trabucchi et al., 2019). TAM focuses solely on perceived usefulness and ease of use, which may not account for social, cultural, or economic factors

influencing technology adoption in resource-limited or community-oriented contexts typical of developing economies.

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) further elucidates the factors influencing technology adoption. Developed by Fred Davis in 1989, TAM posits that perceived usefulness and perceived ease of use are critical determinants of whether individuals will adopt new technologies(Bhaskaran, 2006). This model has been widely applied across various domains, including software applications, mobile technology, and e-learning. By focusing on user perceptions, TAM provides a framework for understanding how and why technologies gain traction in different contexts(Latzer, 2009). The figure(1) below illustrates the TAM model.

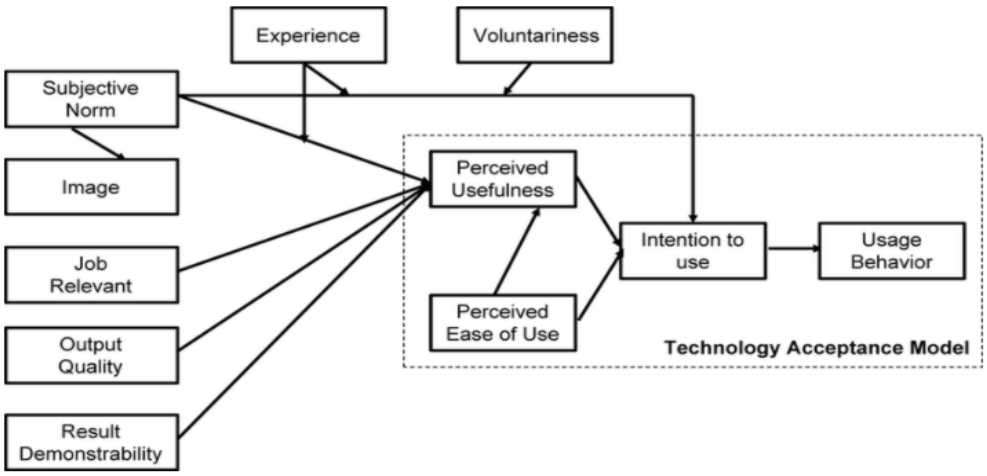

Figure 1: TAM Model

Theory of Reasoned Action (TRA)

Complementing TAM is the Theory of Reasoned Action (TRA), which offers a broader perspective on technology adoption(Zhong et al., 2017). TRA emphasises the role of attitudes and subjective norms in shaping individuals' intentions to adopt new technologies. It suggests that social influences, such as peer opinions and cultural norms, play a significant role in determining whether a technology will be embraced by users(McDermott & O'Connor, 2002). This model highlights the importance of understanding the social context in which technology is introduced. Figure 2 below demonstrates the TRA model. TRA highlights attitudes and subjective norms but does not explicitly consider contextual constraints, such as regulatory barriers or digital literacy gaps, which can affect technology adoption in environments with varying social and economic structures.

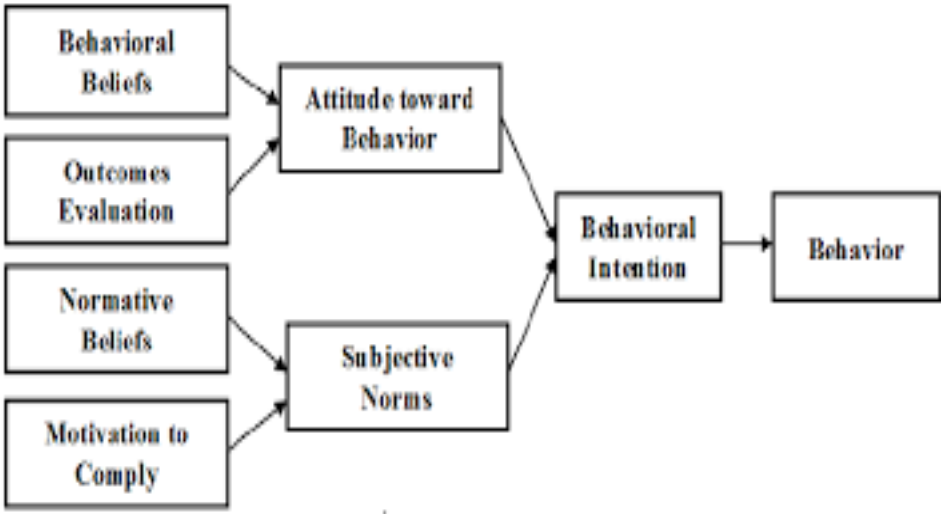

Figure 2: TRA Model

Extended Technology Acceptance Model (TAM2)

The Extended Technology Acceptance Model (TAM2) builds upon the original TAM by incorporating additional factors such as subjective norms and job relevance(Mugo & Macharia, 2021). This expansion provides a more comprehensive understanding of technology acceptance, particularly in organisational settings where social dynamics and job-related considerations can significantly influence user behaviour(Chatterjee & Nath, 2014). Although TAM2 incorporates more variables, it still underrepresents institutional and infrastructural influences, and may not fully capture how collective norms and job relevance interact with broader challenges unique to developing economies

Unified Theory of Acceptance and Use of Technology (UTAUT)

The Unified Theory of Acceptance and Use of Technology (UTAUT) integrates elements from various previous models to predict technology acceptance based on four key constructs: performance expectancy, effort expectancy, social influence, and facilitating conditions(Orjuela et al., 2019). UTAUT has demonstrated strong predictive power across multiple contexts, making it a valuable tool for researchers and practitioners seeking to understand technology adoption patterns. Figure 3 shows the UTAUT model. UTAUT effectively predicts adoption behaviour but lacks specificity regarding the impact of peculiar market structures, resource limitations, and informal institutions that shape the diffusion of ICT innovations in developing countries.

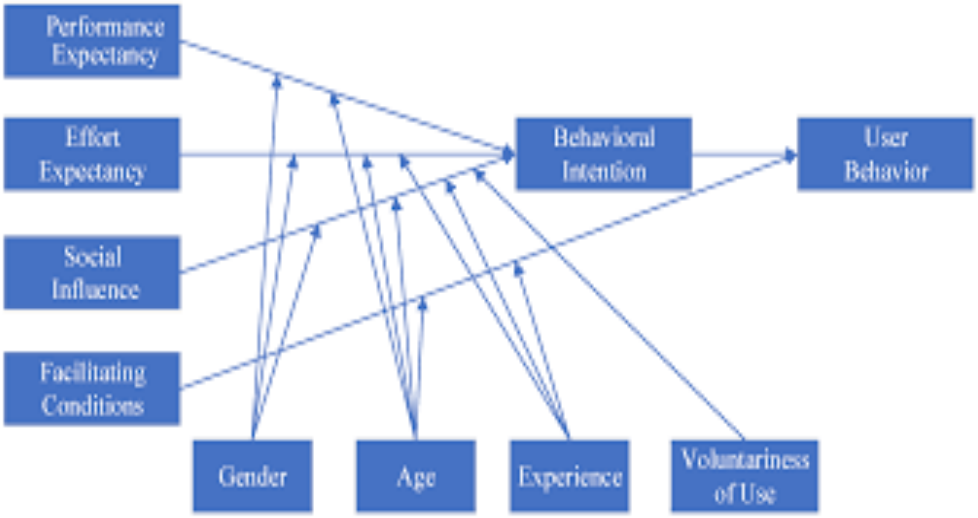

Figure 3.UTAUT Model

Nature of Innovation

Innovation itself can be classified into several categories, including radical and incremental innovations(Kilkki et al., 2018). Radical innovations introduce significant changes that can disrupt entire industries, while incremental innovations enhance existing products and processes without fundamentally altering the market landscape(Muller et al., 2005). Discontinuous innovations create entirely new markets and can lead to the decline of established firms, further illustrating the complex dynamics of innovation(Hauser & Katz, 1998). Existing innovation classifications do not account for hybrid or context-specific innovation patterns observed in developing markets, where unique blends of radical and incremental changes often emerge due to local constraints.

Emerging Disruptive Innovations

Emerging disruptive innovations, such as mobile banking, cloud computing, and autonomous vehicles, exemplify how technological advancements can reshape industries and consumer behaviour(Appelbaum, 1997). For instance, mobile banking services like M-Pesa have transformed financial access in Kenya, demonstrating the potential of ICT to drive economic development and financial inclusion. Models describing emerging innovations, such as mobile money or cloud services, typically rely on examples from developed countries and risk overlooking local adoption mechanisms, informal sector contributions, and government policy roles relevant in developing contexts.

Existing Innovation Models

The literature identifies several existing innovation models relevant to disruptive innovations, emphasising the need for frameworks that accommodate the unique dynamics of developing economies (Srovnalíková & Šúbertová, 2017). Models such as the Innovator's Dilemma and the Disruptive Innovation Model provide insights into how firms can navigate technological changes and market disruptions, particularly in contexts where traditional business practices may not apply(University of Belgrade, Faculty of Organisational Sciences et al., 2018). Mainstream innovation models assume certain market maturity and regulatory environments, missing the

adaptive strategies and informal practices that are widespread in developing countries, thus limiting their explanatory power in these settings.

Theoretical Integration Rationale

The integration of the Theory of Disruptive Innovation, the Technology Acceptance Model (TAM), the Theory of Reasoned Action (TRA), and the Unified Theory of Acceptance and Use of Technology (UTAUT) provides a multidimensional lens for understanding ICT innovations in developing economies. While the Theory of Disruptive Innovation explains the structural and market-level dynamics through which new entrants transform established industries, TAM and TRA capture the behavioural and perceptual determinants that drive user acceptance of new technologies. UTAUT extends these insights by linking performance expectancy, effort expectancy, and social influence on adoption behaviours within institutional contexts. Combining these theories allows this study to bridge the macro-level processes of technological disruption with the micro-level factors influencing user behaviour and policy adaptation.

Methodology

This study adopted a conceptual and qualitative research design aimed at developing a theoretical model that explains the dynamics of disruptive ICT innovations in developing economies. Rather than relying on primary data collection, the research employs an integrative literature review approach systematically synthesising existing theories, empirical studies, and case-based evidence.

A detailed systematic review protocol was implemented, specifying the databases searched such as Scopus, Web of Science, and IEEE Xplore. The keywords used included disruptive innovation, ICT adoption, and technology-driven economic transformation. The study also clearly defined the inclusion and exclusion criteria by selecting peer-reviewed journal articles, focusing on studies published between 2000 and 2023, and targeting research within developing economies.

The analysis combined key theoretical frameworks including the Theory of Disruptive Innovation, the Technology Acceptance Model (TAM), the Theory of Reasoned Action (TRA), and the Unified Theory of Acceptance and Use of Technology (UTAUT). The steps of the analysis included: (1) literature identification and screening, (2) data extraction and coding, (3) thematic synthesis to identify conceptual overlaps, complementarities, and gaps in explaining innovation behaviour in developing contexts, and (4) synthesis of recurring constructs related to technological architecture, competitive landscape, regulatory environment, and socio-cultural influences that shape ICT innovation outcomes.

Thematic synthesis was conducted through a multi-stage process to systematically extract and interpret patterns within the reviewed literature. First, all eligible articles were screened and relevant data were extracted into a spreadsheet. Second, initial coding was performed to identify recurring concepts, constructs, and findings across the studies. Third, similar codes were organised into broader themes reflecting key dimensions such as technological architecture, regulatory environment, competitive landscape, and socio-cultural factors. Fourth, these themes were synthesised and mapped to the framework of disruptive ICT innovation, highlighting conceptual overlaps, complementarities, and gaps. Finally, the synthesised themes were interpreted to reveal underlying mechanisms and contextual influences shaping ICT innovation outcomes in developing economies. This approach ensured a transparent and rigorous analysis of the evidence.

To contextualise the theoretical insights, the choice of Kenya's mobile banking ecosystem specifically the cases of M-Pesa and M-Shwari was made due to their global recognition as pioneering disruptive innovations in financial services for developing economies, and their extensive academic and policy attention. This provides a rich context for validating theoretical insights in actual practice. This case-based reasoning enabled the validation of the proposed model by linking theoretical principles to practical realities in an emerging market. The secondary data which also informed this study include published reports from the Central Bank of Kenya, industry statistics and financial performance data from Safaricom and other mobile network operators, government policy documents on mobile banking and ICT regulation, peer-reviewed academic journal articles, and books examining the impact and development of M-Pesa and M-Shwari. Additional evidence was drawn from sector-specific market research, media coverage, and case analyses of user experiences and adoption trends in Kenya's mobile banking ecosystem. These multiple sources provided a well-rounded empirical and contextual foundation for analysing disruptive innovation in financial services.

Although conceptual in nature, the study acknowledges its limitations, including the absence of empirical testing, which restricts the generalizability of findings. The mapping of diverse developing contexts is indicative rather than exhaustive, and future research should empirically validate the proposed model across other contexts and sectors. Despite this, the study lays the groundwork for future empirical testing of the model across diverse developing economies. Innovation adoption, and how these collectively drive financial inclusion, economic growth, and social transformation in developing economies.

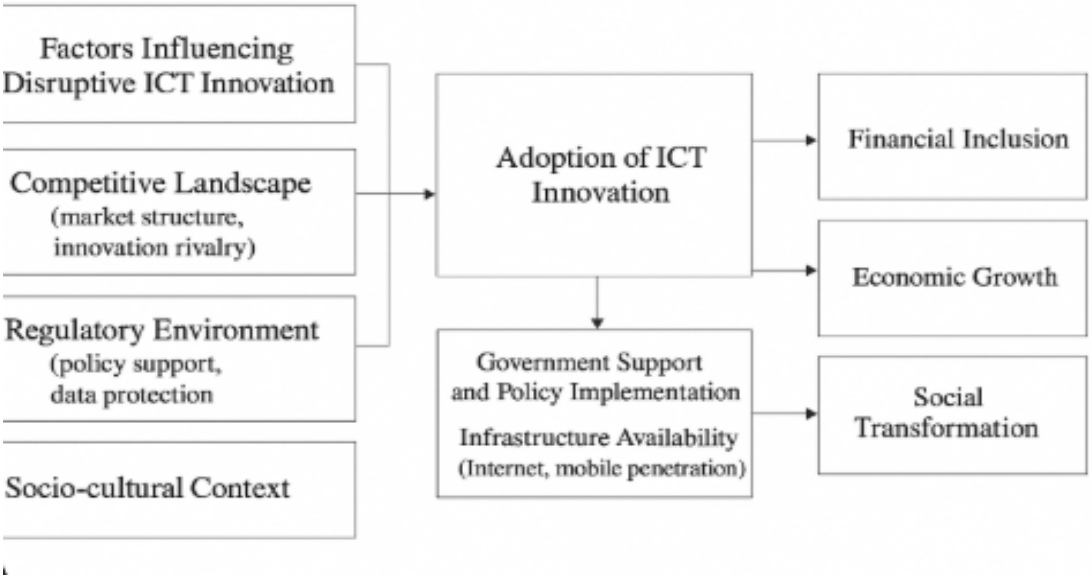

Figure 4: The Conceptual Model

Results

This section presents the findings obtained from applying the conceptual framework developed earlier. The results translate theoretical constructs into practical realities by showing how technological, competitive, regulatory, and socio-cultural factors shape the adoption and success

of disruptive ICT innovations in developing economies. The analysis draws primarily from Kenya's mobile banking ecosystem, particularly the case of M-Pesa, supported by reports from the Central Bank of Kenya, academic studies, and industry statistics.

a) Technological Architecture

Analysis reveals that adaptable, modular, and user-friendly ICT architectures significantly enhance the rate of innovation adoption. In Kenya, M-Pesa's success was largely due to its simple interface, minimal data requirements, and seamless integration with existing GSM infrastructure. The system's flexibility allowed it to operate on basic mobile phones without requiring internet access, making it inclusive for both rural and urban populations. Furthermore, the platform's scalability enabled it to handle millions of daily transactions with minimal downtime, while interoperability with banks and microfinance institutions expanded its functionality. These technological attributes demonstrate how sound architectural design directly contributes to system reliability, accessibility, and long-term adoption.

b) Competitive Landscape

The results indicate that a dynamic and competitive market environment acts as a catalyst for continuous innovation. In Kenya, Safaricom's dominant market share initially gave it a first-mover advantage, but ongoing competition from Airtel, Telkom Kenya, and fintech startups created pressure to diversify product offerings. This competition led to the development of related innovations such as M-Shwari, KCB M-Pesa, and Fuliza, which extended mobile money services into credit and savings. The presence of active competitors not only stimulated technological evolution but also ensured service affordability, product differentiation, and wider market reach. Thus, competitive dynamics were found to play a central role in sustaining innovation cycles.

c) Regulatory Environment

The regulatory environment emerged as a pivotal determinant of ICT innovation success. Evidence from Kenya shows that proactive regulatory support—particularly from the Central Bank of Kenya (CBK)—was instrumental in legitimising and stabilising the mobile money sector. The CBK adopted a flexible, learning-by-doing approach by allowing M-Pesa to operate under a special regulatory window before formal guidelines were in place. This supportive stance fostered trust among users and investors, enabling innovation to flourish while maintaining consumer protection. In contrast, overly rigid regulations in other countries have been shown to slow or prevent ICT innovation diffusion. Therefore, enabling regulation was identified as a core factor linking institutional readiness to innovation outcomes.

d) Socio-Cultural Context

Socio-cultural dimensions were found to be equally influential in shaping adoption behaviour. Kenya's strong community networks, collective trust systems, and reliance on mobile communication created fertile ground for the rapid diffusion of mobile money. Cultural familiarity with group savings (chamas) and social trust enhanced user confidence in digital transactions. Peer endorsement also played a crucial role; individuals were more likely to adopt the technology after observing successful use within their social circles. These results emphasise that, beyond technical efficiency, social acceptance and cultural fit are decisive in determining whether an innovation achieves widespread use.

e) Mediating and Moderating Factors

The analysis further identifies mediating and moderating variables that explain the interaction between drivers and adoption outcomes. Perceived usefulness, ease of use, and social influence mediate the behavioural mechanisms through which technological and environmental factors affect user adoption. For instance, users adopted M-Pesa not only for its convenience but also due to its perceived reliability and social endorsement. Meanwhile, government policy, infrastructure availability, and institutional support act as moderating factors that amplify or constrain adoption. Regions with reliable mobile connectivity and supportive policies experienced higher usage rates, showing the reinforcing role of structural factors.

f) Outcomes of Disruptive ICT Innovations

Empirical evidence confirms that disruptive ICT innovations produce tangible socio-economic benefits. In Kenya, mobile financial platforms have substantially improved access to credit, lowered transaction costs, and empowered marginalised groups such as women and small-scale traders. The diffusion of mobile money services has expanded financial inclusion from less than 30% of adults in 2006 to over 80% by 2020. Moreover, mobile-based payment systems have enabled small businesses to operate efficiently, increased transparency in financial transactions, and stimulated economic participation in rural areas. These results underscore the transformative potential of ICT innovation as a driver of inclusive growth and development.

Discussion

This section interprets the findings presented above in light of the theoretical foundations discussed earlier. It connects empirical evidence from Kenya's ICT ecosystem with established innovation theories, demonstrating how the proposed conceptual framework bridges the gap between theory and practice in developing economies.

1. Linking Theory to Practice

The results validate the relevance of established theories such as Disruptive Innovation Theory, Technology Acceptance Model (TAM), Theory of Reasoned Action (TRA), and Unified Theory of Acceptance and Use of Technology (UTAUT) while highlighting the need for contextual adaptation. Disruptive Innovation Theory explains how M-Pesa's low-cost, accessible model disrupted traditional banking systems. However, TAM and UTAUT provide behavioural insight into why individuals adopted the innovation—primarily because it was perceived as easy to use and socially endorsed. The findings affirm that theoretical constructs developed in advanced economies remain applicable but must be reframed to reflect the structural realities, informal markets, and social behaviours of developing contexts.

2. Technological Implications

The study confirms that technological design is not merely an operational consideration but a strategic enabler of innovation diffusion. Systems that are modular, scalable, and user-friendly, like M-Pesa, align with theoretical constructs of effort expectancy and perceived ease of use. For practitioners, this implies that user-centred design, emphasising accessibility, low data consumption, and compatibility with low-end devices, is essential for achieving large-scale adoption. Technological adaptability thus serves as a bridge between innovation theory and user behaviour.

3. Policy and Regulatory Implications

The discussion underscores the decisive role of the regulatory environment. Kenya's flexible regulatory stance exemplifies the value of adaptive governance in fostering innovation. This aligns with institutional theory, which posits that regulatory legitimacy enhances public trust and market stability. Policymakers should, therefore, balance innovation promotion with risk management by adopting innovation sandboxes, public-private partnerships, and regulatory experimentation. Such mechanisms operationalise theoretical insights into practical frameworks that encourage responsible technological growth.

4. Economic and Competitive Implications

The analysis reinforces the Schumpeterian perspective that competition drives innovation. Market rivalry in Kenya stimulated both incremental and radical innovations, ensuring affordability and product diversity. From a policy standpoint, encouraging open competition and preventing monopolistic practices sustains the innovation cycle. Theoretically, this affirms that market dynamics serve as catalysts for technological evolution, linking competition theory with innovation diffusion outcomes.

5. Socio-Cultural Implications

The study reveals that socio-cultural alignment is critical for ICT innovation success. Trust, community endorsement, and peer influence supported user adoption in Kenya, validating the subjective norm element in TRA and the social influence construct in UTAUT. The implication is that innovation adoption in developing economies is not an isolated individual choice but a collective social process. Innovators must therefore localise their communication and engagement strategies to align with community values and social behaviours.

6. Why Innovations Fail

Despite Kenya's success story, similar innovations such as M-Pesa's expansion into Ethiopia and South Africa faced failure. In Ethiopia, restrictive regulations and a lack of telecom liberalisation hindered adoption. In South Africa, a mature banking system, limited perceived need, and strong institutional competition weakened market uptake. These contrasting outcomes demonstrate that disruptive innovation success is context-dependent; it thrives under enabling regulatory, social, and market conditions but falters in restrictive or saturated environments. Incorporating such negative evidence strengthens the theoretical model by emphasising boundary conditions and contextual variability.

7. Implications for Sustainable Development

From a development perspective, the study affirms that ICT innovations are powerful instruments for achieving Sustainable Development Goals (SDGs), especially financial inclusion, gender equality, and economic empowerment. The success of mobile money in Kenya illustrates how technology can bridge structural inequalities and promote inclusive growth when effectively integrated into policy and practice.

8. Theoretical and Practical Contributions

Theoretically, this study extends global innovation frameworks by integrating technological, institutional, behavioural, and cultural dimensions into a unified model tailored for developing economies. Practically, it provides policymakers with evidence-based strategies for crafting innovation-friendly environments, helps innovators design context-sensitive technologies, and

offers researchers a foundation for future comparative analysis. By linking conceptual insights with empirical realities, the framework transforms theory into actionable understanding.

Conclusion

This study developed a theoretical model to explain how disruptive ICT innovations evolve and succeed in developing economies by integrating key theories such as the Theory of Disruptive Innovation, TAM, TRA, and UTAUT. The model highlights that technological architecture, regulatory frameworks, market competition, and socio-cultural dynamics collectively determine the adoption and impact of ICT innovations. Using Kenya's mobile banking ecosystem as an illustrative case, the study demonstrates that innovation success emerges when supportive policies, adaptive technologies, and social acceptance align. The framework thus bridges the gap between theory and practice by providing a holistic understanding of how ICT innovations drive financial inclusion, economic growth, and social transformation. Future research should empirically test and refine this framework across different sectors and regions to validate its applicability and generalizability. Further studies could explore how emerging technologies such as artificial intelligence, blockchain, and IoT influence the innovation process in developing contexts. Longitudinal and comparative analyses would also help assess the long-term socio-economic impacts of ICT innovations, offering deeper insights into how policy, infrastructure, and culture can sustain inclusive digital transformation.

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