

Advancing ICT Adoption in Developing Economies: Policy Barriers and Opportunity Frameworks

Ramya¹ & Prof. Rani Tiwari²

Student, M.B.A. Banking and Finance, S.S.B.F., Symbiosis International University, Pune, India
Dept. of English, S.S.V. (P.G.) College, Hapur, U.P., India

Received: 20 Jan 2026, Accepted: 25 Jan 2026, Published with Peer Reviewed on line: 31 Jan 2026

Abstract

The endorsement of Technology and system of information has paved the way to the outstanding socio-economic development of the developing economies. This uplift, however, is driven by the adoption and practice of disruptive ICT technologies. The major reasons behind these limitations are the policy formulation and implementation, the socio-economic and geo-political infrastructural gaps, and levels of social digital-literacy in these economies. This research, thus, in its main area of interest of developing economies. It advocates ICT policy formulation in developing economies and it seeks to close the gaps of socio-political systems. The focus is on the issues like data regulatory policies lost in space, high personnel staff and costs to implement ICT systems and less organizational and weaker systems of the public sector. The paper draws on academic research, public and private sector policy papers, and public and private sector case study research to explore ICT policy formulation gaps and gives a close look at the opportunities. The study concludes that the problem lies in undeveloped infrastructure and digital illiteracy of public and private sectors. The study promotes advanced social digital literacy, strategic ICT adoption in social-political system and ICT policy reform so that advanced ICT is adopted smoothly in emerging economies.

Keywords: ICT adoption, emerging economies, infrastructure barriers, cyber literacy, mobile technology, IoT.

Introduction

In a more digitalized world, Information and Communication Technology (ICT) has brought great transformation. This has brought change to how economies develop, how people govern and interact socially, and how people learn and educate one another. In growth economies, Infotech is not only an opportunity but also a challenge. In the first case it can help close development gaps, improve public sector service delivery, and promote newness. Besides, its far-reaching importance tends to be ignored because of a lack of basic infrastructure, high costs of deployment and access, low digital abilities, and a lack of adequate institutions. The digital economy makes understanding the most relevant constraints to adoption of ICT in developing economies a necessity. With all the literature on the adoption of ICT in the developed world, the unique and varying governance, low income, and high rural population economies, create an urgency to study the adoption of ICT. The more the digital divide widens, the more important it is to understand the variables that hinder or promote the adoption of ICT in low resource economies.

The focus of this research is on overcoming significant challenges associated with the adoption of Infotech in the low income nations, while also studying the potential opportunities that could mitigate these challenges. This research aims to answer the following questions- Which of the structural, economic, and social barriers most constrict the adoption of Infotech in the low income nations? Which of the technological, institutional, or social opportunities could aid the diffusion and integration of ICT?

Review of Literature

The diffusion of Information Systems and Computer Technology has been the subject of research across multiple fields including development studies, economics, and information systems research. Information and Communication Technology includes altogether technologies that enable the communication, processing, and distribution of information electronically via the cyberspace and the net, wireless networks, and transmission. In the evolving part of the world, ICT is recognized as not only an engine of economic growth, but also an agent of broader social change. There are numerous theoretical constructs that help understand the adoption of ICT. Technology adoption is primarily determined by the understanding of comfort in use and the utility of technology.

On the other hand, Rogers' *Diffusion of Innovations Theory* focuses on the community system, the medium, and the factors of duration as primary determinants of the dissemination of an innovation. Diffusion is "the process by which an innovation is communicated through certain channels over time among the members of a social system"¹. While the relevance of these models is acknowledged, it is recognized also that they may need to be modified to the context of developing countries in which the structural, economic, and institutional constraints often dominate the individual choice.

The study of Al-Samad and his associates offer IoT's impact on supply chain management and decision-making. The study's contribution is in showing the value of more sophisticated technologies in increasing efficiency, value, and adaptability in manufacturing. They observe, "IoT is one of the key technologies that will define the future state of managing manufacturing supplychains."² But this study only considers the organizational and technological readiness factors in more developed environments. The study's frameworks ignore the more systemic issues in most developing countries such as poor infrastructure, lack of regulatory frameworks, and low work-force skills. While the study is useful in describing the opportunity frameworks, it lacks insights on the policy and management issues that limit the adoption of advanced technologies in less developed countries.

Donner reviews, "studies of mobile (cellular) phone use in the developing world."³ His work documented the first instance of scholarship that engaged with the mobile adoption and adaptation within the context of the developing world. This work disputes the technology determinism arguments and brings to the foreground the contextual situated social and cultural dimensions of the use of mobile ICT. This study is a product of its time and the time is at the beginning of the diffusion of smart phones, mobile internet, and platform based economies. Although it includes valuable conceptual frameworks it is not particularly fit for purpose in the current ecosystem of ICT characterized by instrumental rationality, data governance, and digital platforms. It does, however, create the foundations for theory to explain why the adoption of grassroots ICT is so slow.

Current research underlines the continued obstacles to the adoption of ICT in low and middle income economies. Some basic infrastructure such as irregular internet supply, little broadband availability and poor digital tools, are large impediments. Costs of digital tools, as well as internet subscriptions, are disproportionately high in rural and low income households. There are also obstacles of under digital literacy, as well as the absent integration of the training of ICT within educational systems. Lack of access to technology also amplifies these gaps. Some of these challenges are due to poor and absent digital policies. For example, inadequate regulation, and low or absent government engagement, incoherent ICT strategies, and poor coordination of ICT initiatives hinder progress. Meanwhile, social issues such as gender imbalance, lack of a common language and an unfavorable attitude towards change further deepen exclusion.

Emerging opportunities have recently started to gain attention within research circles. The expansion of wireless, new private market entrants, and novel rendering of services, including e-banking, systems of digital identification, and e-health services, showcase the transformative potential of ICT. Other instances, including M-Pesa in Kenya and Aadhaar-enabled services in India, have received the most attention in

literature and showcase the value of digital innovation. The literature, however, still has considerable gaps. Most of the literature is descriptive in nature and some focuses on single technologies in isolation as opposed to attempting to describe systems. In addition, there have been very few studies that have tried to fill this gap empirically by documenting the experiences of ICT- excluded groups. This research aims to bridge the gaps in the literature by documenting well-known obstacles and less popular avenues associated with the sustainable and inclusive adoption of ICT.

Methodology

This paper aims to describe the obstacles and opportunities of ICT adoption in developing countries. A mixed methods approach in this instance is helpful to describe both measurable patterns as well as the context, which is necessary for understanding ICT adoption in different socio-economic scenarios. The examination of the academic literature, policy documents, development reports (World Bank, ITU, UNDP), and surveys of ICT in the region enables to consolidate the main themes and patterns, and helps to pinpoint research deficits for various developing areas. The study's findings cannot be generalized to any setting, especially considering the differences between regions in terms of infrastructure, policies in place, and varying socio-economic factors.

Key Challenges in the Adoption of ICT

It is the established fact that ICT has a place in every socio-economic sector within a nation. However, even within the study's context, most low and some middle-income economies are characterized by the absence of vital elements that support the effective use of ICT like supportive infrastructure, affordability, digital competence, and even various institutions. The lack of infrastructure is even more pronounced in rural and remote locations, as these places suffer from unpredictable power supply, low availability of high speed, and even good quality broadband, and poor economic status.

Financial factors still resist extensive digital technology adoption within individuals as well as organizations. E. Idowu observes, "High costs associated with ICT are a major deterrent for both users and providers."⁴ Consider the cost of acquiring a smart phone, a computer, and the associated data for the internet. For governments and service providers, the expense of deploying ICT such as fiber-optic lines or mobile towers is considerable and, in under populated or poorer regions, the economic prosperity predictions are modest as well. As such, a huge number of people are left behind with no digital contact. Emmy J. Kipsoi says that "the biggest obstacle faced by Indonesia regarding ICT is the economic crisis."⁵

One of the most significant barriers to the adoption of Infotech in growing countries is a lack of digital literacy. A good portion of the population does not have the most elementary skills to use a digital device or to effectively navigate the internet. This problem is especially noticeable in the countryside and in the older age brackets, where the experience with technology is very minimal. Moreover, in a large number of developing countries, the educational system does not sufficiently teach the use of ICT, which results in a large and growing gap between what skills graduates possess and those that are needed in the growing digital economy. Absence or minimal efforts to offer basic digital skills training means that large segment of the population will not be able to fully engage with and benefit from ICT-related development. Weak or non-existent policy frameworks also make the adoption of ICT more challenging. A large number of countries do not have coherent national ICT policies, or those that do exist are either poorly structured or remain unimplemented. Policies regarding ICT-related technologies such as mobile money, cloud computing, artificial intelligence, and data protection are often non-existent or far too outdated. Also, a lack of political stability and bureaucratic corruption can undermine efforts to develop ICT in a coordinated manner. These challenges make it more difficult for public and, especially, private actors to invest with more certainty in the development of ICT infrastructure and ICT-related innovations.

Absence of Infotech can be due to social norms and cultural perspectives. S.Kumar et.al observe that social influence is one of the, “pivotal factors shaping the decisions of MSMEs regarding ICT adoption.”⁶In certain areas, communities are distrustful of technology, seeing it as a social disruptor or as a challenge to long-held beliefs and customs. There are especially wide gaps in gender. On the social and economic levels, women in many developing communities are the most constrained in their ability to obtain digital devices, participate in training, and access the internet. By itself, the digital divide between the genders reinforces the inequities in education, employment, and civic engagement. All these social and cultural impediments create a highly differentiated environment in which the benefits and access to ICT are highly unequal. The socio-economic challenges are arguably some of the most important factors for the digital economy and the adoption of ICT in developing countries (as illustrated by the inter-connected constraints).

The Ways to Overcome Challenges for the Aquisition and Utilization of ICT

This section focuses on the ways to overcome these challenges for the digital economy and the acceptance and operation of Infotech in developing nations. Optimally, developing countries should be able to overcome the more than formidable challenges to the adoption of ICT and digital economy offered by Public Innovation partnerships, Policy innovation, and the Innovation Demand offered by the more educated and digitally literate users in many developing countries. One of the most dominant and rapid changes in the developing countries and especially sub-Saharan Africa has been the growth of mobile technology. The affordability, portability, and decreased need for fixed broadband infrastructure for mobile phones, especially smart phones, which has made them the most common ways for accessing the Cyberspace in many developing countries. Many innovative mobile services have been offered in developing countries which include mobile banking (M-Pesa in Kenya), digitized agricultural advisory services), mobile health (mHealth), and several digital learning services (mLearning). These have extended the benefits of ICT to many people who, because of geographical, infrastructural, or economic barriers, have been excluded. World Bank in World development report 2021 advocates “data literacy of the general public.”⁷

Collaborative arrangements have been instrumental in the ICT Infrastructure development and digital inclusiveness. Provision of broadband internet, subsidized digital devices, and ICT training has been made possible. It has been made possible due to collaboration of government and private entities as well as NGOs and international development organizations. Microsoft’s Air band Initiative and Google’s Project Loon are aimed at providing affordable connectivity to rural areas at a low cost. These collaborations deploy their assets, know-how and affordable technology in ICT solutions to address all the challenges in the ICT sector.

“When governments make use of information and communication technologies to improve their services, they might also contribute to social development”⁸ Governments in developing areas are looking to improve public service and are digitizing service delivery. E-Government Services are varied and include; digital ids and e-filing tax systems to e-procurement and e-voting systems. Digitization creates numerous benefits to service delivery including; reduced administrative and bureaucratic barriers, provides state-citizen engagement processes and formalized controlled governance to enhance lost trust in public institutions. Digitized governmental systems create familiarity and stimulate demand for ICT systems. Examples are India’s digital India program and Rwanda’s Digital platform called Irembo. Both provide public digital services that enhance access to services, reduce bureaucratic processes and improve public service delivery. These initiatives improve service delivery to millions and are testament to the overall potential of digital governance. Across developing countries, there are attempts to address the financing gaps with various innovative methods.

One of the innovative methods includes the use of pay-as-you-go mobile data, micro financing to purchase ICT devices, and community internet hubs that allow users to share low-cost access. These methods lower financial constraints by allowing the payment of consumer cost over the numerous payment periods and

lowering the high cost to the consumer at the beginning of the payment plan. Digital technologies can be used by the poorer, marginalized groups who are supported by donor subsidies and financial incentives to slowly make use of the digital technologies. The youth, who make up a large portion of the population, are the digital transformation of the countries, specifically, South Africa, Asia, and Latin America as they are the ones developing new technologies, mobile applications, and digital platforms. The youth are developing solutions to domestic problems as they are the ones participating in the coding boot camps. Digital entrepreneurship is supported by mentoring and funding from tech hubs and incubators as Nairobi's iHub and Lagos Co-creation Hub, which encourage offering employment locally. Localizing the ICT tools and the digital content in different indigenous languages has significantly enhanced digital access. People who speak different languages can use digital platforms, e-governance, education, communication resources, and other tools if they are translated, which helps broaden access and improve digital inclusion in greater socio-linguistic gaps. This is particularly relevant in areas with diverse and multilingual populations. Increased usage of digital resources is inclusive and helps in achieving socio-linguistic equity. That translates to the fact that, even with challenges, an inclusive and integrated approach with an emphasis on collaboration, co-creation, and novel policy initiatives will help to make progress on the challenges of ICT adoption. This is accompanied with practical illustrations which show the different ways in which this can be done within the different developing spheres.

The Findings and Recommendations

The results from this study confirm that the structural barriers and the potential for future opportunities from the adoption of technology within the settings of growing nations is a complicated phenomenon. Even though there is a lack of infrastructure and the cost of connectivity is high it still exists and can provide mechanisms for inclusive digital transformation. A primary observation is the lack of portals to digital incorporation like mobile technology. The International Telecommunications Union (ITU) provides digital development and connectivity insights through an authoritative, data-driven report. Digitally driven insight, the comparative metric of use, access, and digital skills across countries remains a notable strength of the report. It reports that the gap between the income groups of urban and rural areas varies significantly. "People living in urban areas are nearly three times more likely to use the Internet. That shows that the digital divide across income groups is magnified in rural areas."⁹

Financial, educational, healthcare services can be provided to isolated geographies by providing access to technology which can fulfill its functions. However, the functionality of the technology is reduced by power, services, connectivity, and the lack of capacity for digital access. International actors such as organizations, donors, and private sector representatives are increasingly concerned with and investing in community-level affordability and digital capacity building. Digital youth entrepreneurship is showing that digital transformation is possible with top-down and bottom-up, institutional and ecosystem, innovations. While these simultaneous digital transformations are underway, efforts to transform and adopt ICT are further complicated and hindered by the digital gender gap, the scarcity of vernacular matter and the endurability of benefactor driven projects. Digital development is not limited to the ICT realm, but rather, development in the digital realm is predominantly social, socio-cultural, and economic and requires comprehensive and tailored solutions. Aker and Mbiti have conducted some of Africa's first and most mobile technology development impact analyses. They examine how mobile phones decrease information asymmetries and improve welfare through greater efficiency in markets. Their study remains relevant to digitally integrated ecosystems of broadband, data, and AI powered applications. They find that in countryside Africa, "mobile phones have represented the first modern telecommunications infrastructure of any kind."¹⁰ Considering the need of digital transformation, UNDP started its initial digital roadmap to "harness the power of digital technology and innovation to respond more effectively to development challenges"¹¹ The vision proposed by the UNDP

emphasizes the need for the inclusive values, digital public resources, and reforms in governing. These values will help to achieve the broader objectives of incorporating ICT into sustainable, equitable, and human rights-based development.

Conclusion-

The discussion recognizes the need for specific ICT development initiatives to address the diverse actors in the ecosystem. There is a need for balanced hybrid solutions that integrate infrastructure investment with human capacity and institutional strengthening to create community-solution ecosystems. Closure of the digital divide and integration of ICT for development in poorer economies is possible through balanced hybrid solutions and partnership with the private and civil sectors.

References-

1. Rogers, Everett M. *Diffusion of Innovations*. 5th ed., Free Press, 2003, pp. 05.
2. Al-Samad, Khaled&Sufian, Mohammad &Haque, Shariful&Faruq, Omar &Hossain, Mir Abrar&Talukder, Tughlok&Shayed, Uddin.Leveraging IoT for Enhanced Supply Chain Management in Manufacturing.10.62127/aijmr.2024.v02i05.1087
3. Donner, Jonathan. "Research Approaches to Mobile Use in the Developing World: A Review of the Literature." *The Information Society*, vol. 24, no. 3, 2008, pp. 140–159. <https://doi.org/10.1080/01972240802019970>.
4. Idowu, Emmanuel. *ICT Adoption in Developing Economies: Barriers and Opportunities*. Preprints, 2025.
5. Kipsoi, Emmy, John Chang'ach, and Hellen Sang. "Challenges Facing Adoption of Information Communication Technology (ICT) in Educational Management in Kenya." *Journal of Sociological Research*, vol. 3, no. 1, 2012, <https://doi.org/10.5296/jsr.v3i1.1882>.
6. Kumar, Shailendra, UtkarshGoel, Parikshit Joshi, and Amar Johri. "Factors Affecting Information and Communication Technology (ICT) Adoption among MSMEs." *Journal of Open Innovation: Technology, Market, and Complexity*, vol. 10, 2024, article 100205, <https://doi.org/10.1016/j.joitmc.2023.100205>.
7. World Bank. *World Development Report 2021: Data for Better Lives*. World Bank, 2021, <https://www.worldbank.org/en/publication/wdr2021>.
8. Qureshi, Sajda. "Social and Economic Perspectives on the Role of Information and Communication Technology for Development." *Information Technology for Development*, vol. 15, no. 1, 2009, pp. 01-03. <https://doi.org/10.1002/itdj.20117>.
9. International Telecommunication Union. *Measuring Digital Development: Facts and Figures 2023*. ITU, 2023.
10. Aker, Jenny C., and Isaac M. Mbiti. "Mobile Phones and Economic Development in Africa." *Journal of Economic Perspectives*, vol. 24, no. 3, 2010, pp. 207–232. <https://doi.org/10.1257/jep.24.3.207>.
11. United Nations Development Programme. *Digital Strategy 2022–2025*. United Nations Development Programme, 2022, <https://www.undp.org/digital>.