The Digital Transition: Assessing the Impact of ICT Adoption on India's Sectoral GDP Growth and Financial Inclusion

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Abstract:
The adoption of ICT by India to enter the digital age is certainly one of the most extensive structural changes that have occurred within the developmental path of a developing nation in contemporary times. The emergence of ICT since the beginning of the new millennium until December 2017 through mobile telephony, internet access, digital IDs, and financial transactions has led to a transformation in terms of market operations, governance capacity, financial dealings, and modes of production across various sectors. The present research explores the link between ICT penetration and growth of sectoral GDP as well as financial inclusiveness in India. ICT adoption helped boost productivity of service activities, increased collaboration in manufacturing enterprises, expanded market reach in agriculture, and facilitated quick proliferation of formal finances among disadvantaged groups. Nonetheless, the impacts varied across geographies, industries, and demographics owing to issues related to infrastructure deficits, digital illiteracy, bureaucratic constraints, and inadequate access to technological tools. The paper analyzes the findings regarding the digital revolution in India using a systematic approach derived from growth theory and finance and technology literatures. The analysis further presents a conceptual framework that depicts the relationship between the level of information communication technologies (ICT) adoption and economic output growth. According to the results, it is evident that while the impact of ICT on India's growth process was positive, it was also divergent. Digitalization will not spur development unless accompanied by investments in infrastructure, human capability, regulation and institution building, says the author.

Keywords: ICT, India, digital transition, sectoral GDP, financial inclusion, digital payments, productivity, development

1. Introduction

Information and communication technologies have brought about a transformation in the structure of modern economies, by decreasing the cost of transactions, increasing information flows, increasing productivity, and increasing access to markets and services. This developmental potential of ICT has particular relevance in developing economies because digital frameworks can partly surpass and address previously existing problems such as geography, informality, weak institutions and financial exclusion. India is a prime example. As one of the world's largest developing economies, India emerged into the twenty-first century with a deep structural dualism: a fiercely competitive global services sector existed alongside low agricultural productivity, disparate industrial progressions, and widespread exclusion from the formal banking system. Yet by December 2017 India had experienced a remarkable digital transformation characterized by rapid mobile acceptance, increasing internet penetration, the diffusion of digital identity via Aadhaar, and large policy efforts to facilitate the uptake of digital payments and financial inclusion. The research question in this paper is to what extent did ICT adoption impact sectoral GDP growth and financial inclusion in India during this transition? Sectoral growth matters as the benefits of digitalization are not typically shared across agriculture, industry and services. Financial inclusion is important because increasing access to savings, credit, insurance and payment systems can change household welfare, business investment and the efficiency of welfare delivery. They are also closely related, since financial inclusion can amplify growth through the allocation of capital and participation in formal economic systems, while sectoral growth can create demand for advanced

ICT and financial services. The Indian case is analytically fertile for a number of reasons. First, the IT and business process outsourcing industries in the country are emerging as strong growth engines, reflecting how digital capabilities have the potential to be productive. Secondly, the mobile networks and cost-effective communication technologies introduced had an impact not only on urban consumers but on rural households and micro-enterprises. Third, state-directed digital programs like Jan Dhan Yojana, Aadhaar and mobile-linked payments forged a new architecture of inclusion. Fourth, the period that concluded in December 2017 featured disruptive or controversial policy episodes, particularly the demonetization of November 2016, which both sped up the adoption of digital payments and exposed the uneven bases of the cash-driven economy. This article has an integrated perspective, rooted in development economics, structural change theory and the economics of information. The objective is to analyse channels of ICT adoption with respect to sectoral GDP growth and financial inclusion in India, highlight constraints that constrained these advancements and develop policy insights on inclusive digital development. The paper consists of eight sections: introduction, methodological approach, literature review, conceptual framework, India's digital transition until December 2017, analysis of ICT and sectoral growth and financial inclusion, discussion and policy implications and conclusion.

2. Methodological Approach

This paper adopts a qualitative-analytical and interpretive research design that is underpinned by trends in secondary data and established literature. This study does not intend to estimate any new econometric model from raw data; instead, its intention is to conduct a holistic and research-based analysis of the impact of ICT adoption on economic sectorial GDP growth and financial inclusion in India till December 2017. Triangulation will form the research strategy for using a variety of sources including the literature, policies, official statistical data, and institutional reports. In total, four methods will be used. First of all, the paper will use historical-institutional approach in order to provide the evolution of ICT adoption in India. Telecommunications reforms, proliferation of mobile telephony, Internet expansion, creation of digital ID, and financial inclusion programs will be discussed. Such an approach can be a useful one in analyzing the use of ICTs by situating it within certain policies and institutions instead of viewing it merely as a technological innovation. Secondly, the paper will use sectoral development analysis to discuss possible impacts of ICT adoption on agriculture, industry, and services. Because the use of information, coordination, logistics, capital, and labor varies across different industries, the productivity impacts of ICT need to be understood with respect to industry-specific conditions. Third, the economic context is used to place our discussion, linking ICT capital, human skills, and institutions to production and inclusion. One can write a production function in this simple manner:

$$Y_s = A_s(K_s, L_s, ICT_s, H_s, I_s)$$

Y_s stands for the output of sector s, while $K_s$is the stock of physical capital, $L_s$represents labor, ICT_s refers to the intensity of ICT utilization, H_s is the level of human capital, and I_s refers to institutional development or supporting infrastructure.

A more explicit productivity formulation can be written as:

$$Y_s = A_s \cdot K_s^{\alpha} \cdot L_s^{\beta} \cdot ICT_s^{\gamma}$$

where α, β, and γ are output elasticities. The value of γ being positive implies that ICTs are beneficial for sectoral output, though its size varies from one sector to another.

Fourth, financial inclusion is defined in relation to four factors, namely:

$$FI = f(MOB, INT, ID, ACC, PAY, LIT)$$

where FI is the level of financial inclusion, MOB stands for mobile connectivity, INT represents internet connectivity, ID refers to digital identification, ACC represents bank account possession, PAY indicates digital payment connectivity, and LIT means financial and digital literacy. The partial derivatives are expected to be positive, although the marginal impact of each variable is conditional on infrastructure and utilization.

In order to facilitate interpretation, the financial inclusion elasticity of ICT can be represented as:

$$\frac{\partial FI}{\partial ICT} > 0$$

However, this positive relationship exists conditionally and not absolutely, since in situations where literacy rates are low and/or connectivity is poor, the impact achieved might be minimal.

The period for which the analysis was done stretches from the start of the 2000s to the end of December 2017. This makes it possible to determine not just long-term trends but also the status quo of the digital world as of the period before 2018. The limitation of the study is that while some impacts of institutional reforms might become visible after 2017, the period of December 2017 is significant.

3. Literature Review

The literature about ICT and development further expanded since the late 1990s, as it paid closer attention to the influence of information infrastructures on productivity, institutional modernization, and poverty alleviation. Cross-country studies (in early 2000s) found positive contribution of telecommunications and digital networks to economic growth by enhancing market efficiency, minimizing coordination costs, and enabling knowledge spillovers. Roller and Waverman (2001) noted that telecom infrastructure, especially when significant network thresholds have been reached, can bring a material growth effect. Jorgenson and Vu (2005), for instance, highlighted the contribution of information technology investment to growth in various economies (although, as with any development, such gains rely heavily on complementary capabilities and organizational transformation). As the context of emerging countries grew, the literature increasingly emphasized that ICT is not just a consumption, but a productive, good. According to Waverman, Meschi, and Fuss (2005), mobile telephony contributed positively to economic growth in developing economies, often more strongly than in advanced economies because mobiles compensated for poor fixed-line infrastructure. Jensen (2007) in fisheries in Kerala found that mobile phones decreased the dispersion of prices and waste through better information flow between fishermen and markets. In his 2010 study using African evidence, Aker also found that mobile phones raised the efficiency of the market by lowering costs of searching and reducing asymmetries. Another key literature stream focused on productivity paradox and the notion of 'complementary' factors. Brynjolfsson and Hitt (2000) posited that information technology increases productivity in conjunction with organizational innovation and skilled labor. This insight is invaluable in India, where digital systems tended to deliver the highest benefits in sectors or areas with more substantial institutional and human capital base. ICT is not its own determinant of productivity improvements but is only reconstituting production when integrated into larger transformations at the organizational and market levels. This is due to the fact that when it comes to financial development, the body of literature has long acknowledged that financial inclusion and deepening facilitate growth by mobilizing savings, putting in place capital allocation mechanisms, and managing risk. Levine (2005) compiled evidence suggesting that financial development is linked positively to long-term growth. By the 2010s there was growing interest in digital finance to address the widening of people's access to financial services. Demirguc-Kunt, Klapper, and Singer (2013) noted a global scale of financial exclusion, but also the possibilities for technology-enabled accounts. In a study of mobile money in Kenya, Jack and Suri (2011) demonstrated how the digital financial system can reduce costs of remittances and foster household resilience. While India's path differs from Kenya's, the lesson that technology can alter the economics of inclusion more broadly is one of relevance. Several themes are evident in the literature dedicated to India. First, scholars noticed that India's growth acceleration was disproportionately driven by services specifically ICT-enabled services and knowledge-intensive sectors. Gordon and Gupta (2004) focused on the peculiar service-led character of India's growth. In addition, Bosworth, Collins, and Virmani (2007) also focused on the structural changes in output composition. The studies rarely brought ICT adoption into the broader economic picture, though they did contribute to setting the stage for digital capability as a unique growth driver. Secondly, the studies on access to rural information in India indicated the promising potential of ICT to enhance welfare on three fronts: market information, governance, and service delivery. Information kiosks, e-governance platforms and mobile services had a mixed but sometimes positive impact depending on the quality of local implementation. Cecchini and Scott (2003) suggested that ICT applications could be used to help rural development, although they also referred to sustainability and capacity of users. Heeks (2002) indicated that many such e-governance initiatives in developing countries have failed because their technological design is not commensurate with administrative real life and user requirements. Third, the literature of financial inclusion in India documented recurring exclusion even though banking has grown. Burgess and Pande (2005) found that expansion of rural branches had historically helped alleviate poverty in India. By the 2010s, however, the need focused not solely on physical presence in a branch, but also on account usability, cost decrease in the transaction costs, and identity verification. The Pradhan Mantri Jan Dhan Yojana (PMJDY), as well as Aadhaar authentication programs

launched in 2014, became focal points for efforts to overcome obstacles to account opening and direct benefit delivery. Findings of Suri and Jack related to Kenya gained increased popularity as a means of comparison, although the Indian initiative was a bank-driven scheme with its own specificities. Fourthly, research into digital identity and welfare technology in India produced both optimistic expectations and criticism. Supporters believed that Aadhaar might facilitate leak-proofing, targeting, and inclusiveness by reducing uncertainties in know-your-customer practices and direct benefit delivery. Some of the criticisms included problems of authentication, risks of exclusion, privacy issues, and technological determinism. From this discussion, it can be noted that one core issue with the digital transformation in India was the potential for such efficient systems to become exclusionary if infrastructure or institutional checks were weak. In 2016-2017, the body of literature and policy papers on digital payments appeared to have been on an increasing trajectory. In some payment systems, digital transaction volume saw significant growth after the demonetization move. Analysts found an emergent pattern of behavior around the use of cashless payment instruments; however, sustained behavioral change needed the buy-in of merchants, access, consumers' confidence, and affordability of digital devices. In conclusion, the above literature makes three broad points. First, ICTs have the ability to foster economic growth and inclusion through reducing transaction and information costs. Second, the impact of ICTs varies with different industries and groups within society. Third, it is complementing institutions that determine whether adoption of technology leads to transformation.

4. Conceptual Framework

ICT adoption and its linkages to sectoral GDP growth and financial inclusion have been conceptualized along four key channels, namely, productivity enhancement, market integration, institutional efficiency, and access expansion.

The first linkage is productivity enhancement. ICT enhances communication, data processing, logistics coordination, inventory management, and decision-making processes. For the services sector, productivity impact will most likely be significant because the use of ICT is directly linked to the production process in sectors such as software, telecommunications, finance, and business services. For the industrial sector, there will be an enhancement in supply chain management, quality control, and integration into domestic and international value chains. In the case of agriculture, ICT can deliver weather data, price data, agricultural extension services, and buyer connections, although the impact of the latter on productivity enhancement will be indirect and contingent upon supporting infrastructure.

The second linkage is market integration. ICT mitigates informational asymmetries and search costs. There will be access to price data for producers, comparative data for consumers, coordination for firms, and responsiveness for labor markets. The savings in transaction costs can be symbolically captured by:

$$TC = TC_0 - \theta ICT$$

where TC stands for transaction costs, TC_0 represents the basic level, and $\theta > 0$ is an indicator of efficiency resulting from ICT use. With increased ICT, transaction costs fall, leading to possible increases in output and participation rates.

The third mechanism refers to institutional efficiency. Digital identity, electronic documentation, user interface, and payment infrastructure may lead to improvements in government efficiency and reduce obstacles in provision of welfare services, taxation, registrations, and enforcement. This was particularly true in India with respect to Aadhaar, direct benefit transfers, and digital payment systems. Institutional efficiency can impact both economic growth and inclusion as reductions in administrative costs and leakages result in more effective economic interactions.

The fourth mechanism relates to access expansion due to ICT. By using ICT, the costs associated with accessing difficult-to-reach populations are minimized. Digital onboarding, biometric identification, mobile banking, and digital payments may assist in making it easier to access formal financial services for the poorer population that finds it expensive to conduct business transactions within a bank branch environment. Inclusion can be expressed in the following manner:

$$FI_i = \lambda + \delta ICT_i + \varphi X_i + \varepsilon_i$$

Here, FI_i represents inclusion for household/region i; ICT_i represents digital access or use; X_i represents vector of socio-economic/institutional characteristics; and ε_i represents error terms. The parameter δ captures the relationship between ICT and inclusion.

The proposed approach considers constraints. First, digital divide may limit the inclusive benefits of ICTs. If access to devices, electricity, literacy, or network differs between connected and marginalized groups, the digital solutions will favor the former. Technological exclusion may also take place when identity authentication does not work, there are poor interfaces, or lack of trust in technologies prevails.
Thus, the net developmental effect of ICT may be expressed as:

$$Net\ Impact = Positive\ Productivity\ Effects + Inclusion\ Gains - Exclusion\ Costs - Adjustment\ Frictions$$

This framework implies that ICT adoption is neither inherently inclusive nor uniformly growth-enhancing. Its effect is conditional on capabilities, governance, infrastructure, affordability, and the degree of institutional integration.

5. India's Digital Transition up to December 2017

India's digital evolution to December 2017 was influenced by the sequential evolution of telecoms expansion, internet, state-led digital architecture and modernization of a payment system. The first major pillar was on the liberalization of telecommunications and the swift expansion of mobile telephony. Telecom sector reforms and fierce competition brought down tariffs and enabled access to mobile to a wider swath of the population. With the dawn of the 2010 decade, mobile phones had come into wide usage, both in rural India as well as across the nation at large, causing disruption to the conventions of communication in the domestic space as well as in business, trade and work spaces. This mobility paradigm was significant insofar as it created a ready medium of communication without the slow evolution of legacy telecommunications infrastructure. The second critical element of infrastructure involved the growing availability of the internet although Internet connectivity did not yet enjoy the same ubiquity as mobile connectivity. Internet penetration rates were higher in the urban context as well as smartphone internet usage while in rural India, internet was available through an Internet connection and only in poorer regions with lower income levels and poor digital literacy. Nevertheless, net use had risen significantly and data was becoming cheaper in readiness for greater Internet engagement by 2017. The third critical aspect of the infrastructure involved established digital public infrastructure including Aadhaar which was established in 2009. It sought to provide each resident with a unique ID that would have been tied to a particular biometric identifier. Jan Dhan, Aadhaar and Mobile, together, form the three pillars of the JAM Trinity framework for inclusion. The fourth pillar includes the increased access to banking services through the PMJDY framework. The PMJDY framework was launched in 2014 with the objective of ensuring universal accessibility to bank accounts by all the unbanked population of the country. This framework led to the development of an account base framework but issues of inactive accounts, lack of transactional utility, and the difference between nonsubstantial access and meaningful inclusion have been raised in respect to this scheme. However, PMJDY proved to be a landmark step in the domain of inclusion as it helped in establishing a new account-based framework which later supported digital transactions. The fifth important component is modernizing the payment mechanism framework. Integration of retail payments was an important task which was done by the NPCI of India. The launch of Immediate Payment Service (IMPS), RuPay, AePS, and UPI in 2016 resulted in an integration framework for electronic payments. UPI was highly significant as it sought to make bank-to-bank transfers easier and reduce the barriers to making digital payments. The sixth one was policy push towards the "digital India initiative" which started in 2015 as policy push under Digital India. Its objectives were to enhance digital infrastructure, deliver e-services to government organizations, improve infrastructure and digitization, and improve digital skills and knowledge. However, there has been inconsistent execution, but the initiative signified a shift from separate e-governance operations to an overarching digital strategy. One of the critical milestones occurred with demonetization that took place in November 2016 through withdrawal of high value currency notes. This move led to a shock that was significant in magnitude; not only did it lead to a massive cash shock across the country but accelerated the uptake of digital payment tools even if temporarily. Individuals and businesses resorted to digital wallets, cards and use of UPI payments in response to lack of cash. Nevertheless, by December 2017, it was apparent that at least some of these trends remained despite permanent substitution from using cash still being disputed. Yet very important challenges remained. There were wide variations in broadband quality between different states. There was inadequate power supply and access in many rural areas. Digital literacy in some key segments of the population was still poor. There was a gender gap regarding the access to the Internet and phones. Small businesses were often not motivated enough and lacked

infrastructure to stay committed to digitalization. At this point, it became apparent that India had undergone a truly successful digital transformation by December 2017; however, it could not tackle all the issues associated with it.

6. ICT, Sectoral GDP Growth, and Financial Inclusion in India

The effects of the ICT adoption on the sectoral GDP growth of India have been differentiated between agriculture, industry and services. The effect was most pronounced within the service sector. The software industry, IT services, telecommunications, information technology, and finance were the direct beneficiaries of ICT development. Naturally, such sectors rely on information, so it was easier for them to convert ICT investments into output increases. ICT improved scalability, communication costs, outsourcing, and global market connectivity for Indian firms. The significant contribution of the service sector to GDP that increased even further over time cannot be attributed solely to ICT domestic applications, but it is undeniable that ICT played a crucial role in driving the sector's development. Besides ICT-intensive export-driven industries, the efficiency of internal processes in other service sectors – finance, retail, transport, and telecommunications – improved due to ICT. ICT had a positive effect on industries, although somewhat one-sided. ICT played an important role in providing ICT manufacturers with logistical advantages, supply chain coordination, enterprise management, and access to markets. Large corporations and export-oriented organizations were more capable of reaping the benefits because they were the ones with capital and managerial capabilities to inject the digital tools in their production process. For small corporations, the lack of cost, skills, and fragile infrastructure was a constraint. Thus, the use of ICT has an influence on the industrial productivity, although its total effects are tempered by India's industrial structure problems, including the existence of an informal sector, infrastructure constraints, and production fragmentation. ICT usage in agriculture had indirect yet important influences. The farmers relied on their mobile phones for market information, forecasted weather reports, input access, trade links, and communication between themselves and traders/intermediaries. ICT could mitigate the risks involved in the process, resulting in a more favorable bargaining environment as suggested by the existing literature on market information. However, the ICT influence in agriculture is hampered by the literacy level, local languages, inconsistent coverage of the networks, and access to physical markets, irrigation, storage, and extension services. Simply put, ICT benefited agriculture significantly only as a coordination mechanism and source of information rather than substitute for the basic agricultural investment. A stylized GDP equation could be:

$$GDP = Y_A + Y_I + Y_S.$$

where $Y_A$is the agricultural output, Y_I is the industrial output and Y_S the services output. As we can see, due to this, the elasticity of output with respect to ICT is likely highest in services, moderate in industry, and lower but positive for agriculture one gets:

$$\gamma_S > \gamma_I > \gamma_A > 0.$$

This order reflects the difference in digital impact along the spectrum over sectors. ICT and financial inclusion in India has been very important too. Large swaths of the population had no access to formal banking before the 2010s especially in rural or low-income areas. Branch-led growth in the way that had always been used has been constrained; the cost of servicing low-balance clients was exorbitant. ICT lowered these barriers in multiple ways. For one, digital identity made customer verification easier and open an account at scale. Aadhaar-connected e-KYC minimized the documentation cost for numerous users and cut the cost of onboarding users for banks. Second, PMJDY allowed for widespread account ownership. Third, mobile connectivity facilitated transactions, balances, and communication across multiple networks. Fourth, digital payment systems upped the functionality of accounts by making them vehicles for accepting federal transfers, remittances and payments. The causal chain can be described as follows:

$$ICT\ adoption \rightarrow Reduced\ transaction\ costs \rightarrow Increase\ in\ Access\ and\ Use\ of\ Account$$
$$\rightarrow Increase\ in\ Financial\ Inclusion \rightarrow Increase\ in\ Economic\ Participation$$

Financial inclusion may promote growth via savings mobilisation, consumption smoothing, credit access and formalization. If household h has access to a transaction account, its effective involvement in the formal economy may be represented simply as:

$$EP_h = \psi_0 + \psi_1 FI_h + \psi_2 ICT_h + \psi_3 Z_h$$

where $EP_h$is economic participation, FI_h financial inclusion, ICT_h digital connectivity, and Z_h other household characteristics. Assuming certain scenarios, $\psi_1 > 0, \psi_2 > 0$. India had already been making

enormous strides in expanding account ownership and ability to conduct digital transactions by December 2017. Yet significant differences remain between access, use and empowerment. Most newly opened accounts were not even registered, or at best, lightly consumed. Women and poorer users relied often on intermediaries to transact. Friction emerged from connectivity disruption and biometric failures. Urban and semi-urban areas had a higher prevalence of digital payments compared to remote rural areas. So ICT had indeed expanded the architecture of financial inclusion, but its depth and extent were uneven. Direct benefit transfers were among the most significant positive impacts of ICT-enabled inclusion in India. If welfare payments, subsidies or wages were routed into bank accounts and verified digitally, leakages could be minimalised and recipients could be given stronger leverage in transfers. Nevertheless, the effectiveness of this mechanism was conditional on account performance, local cash-out, verification compliance and user confidence. Demonetization provided for a more enriched and nuanced narrative about inclusion. This in itself has created grounds for many families and business owners to engage with digital transactions, resulting in increased transaction activity in many cases. It has caused certain businesses to develop habits around and adopt digital technologies like UPI. Others have moved back to cash once they have gained liquidity. So demonetization can also be looked at as an adoption shock rather than a necessary precondition for further inclusion. Overall, from what we observe, the use of ICTs has contributed positively towards growth in various sectors as well as the inclusion of people in terms of access to financial services. However, the reasons have been different for both of them. While digitalization directly contributed to services, the benefits for industries came only when the companies had complementary capabilities. In agriculture, there was not much change observed in availability of data. Financial inclusion saw rapid progress but usability still depended upon ecosystem participation.

7. Critical Discussion and Policy Implications

The case of India's digital transition shows that ICT can act as an engine both for growth and inclusion. But that same experience also demonstrates that technology does not eliminate structural inequalities by itself. Three core takeaways are thus: For one, digital growth has been uneven sectorally and spatially. Output gains were highest in services and particularly in the ICT-intensive sectors, with no significant positive or limited impact found in manufacturing and agriculture. That strategy threatens to contribute to reinforcing a developmental model of high-productivity digital sectors that expand without creating broad-based job-creation or rural transformation. If digitalization is focused on rapidly evolving regions and sectors, there may not be less aggregate growth but higher inequality. Second, formal financial inclusion in digital systems can rapidly increase access; however, meaningful financial inclusion entails active utilization (regular use), trust (trust is about knowing what you are getting right and your money), ability to access (ability to use their knowledge), and redress of grievances (redressal for what happened). Having an account set up under a government program is not being fully-informed financially. Inclusion must be assessed in terms not solely on account ownership, but also of transaction frequency, savings behaviour, credit use, payment behaviour, and access to data and user autonomy. A gap between access and effective usage was one of the important elements of inclusion landscape in India until 2017. Third, while digital public infrastructure is powerful, it is not free from bias. Systems such as Aadhaar, DBT, or digital payment can save money and improve efficiency, but they can also promote exclusion when authentication is not successful, databases are faulty, or users do not have the experience to do so. Indeed, this is especially relevant in countries which have social inequalities, multiple languages and weak states. Hence, technological sophistication becomes just as important as good institutional arrangements. These remarks imply several lessons for policy. One is the provision of robust and ubiquitous digital infrastructure. It will be crucial for ICT to deliver its benefits on a large scale. If not provided, the advantages of digitalization would go to those people who already have the access to ICT more readily. Second, it will be imperative to invest in people. To benefit from ICT, one has to be digitally, financially literate and have interfaces in the native language. This way, they can learn to make safe usage of the Internet and assess various possibilities and find solutions. Lastly, there should be policies tailored to specific sectors. For instance, agriculture must combine ICT and extension services with irrigation and logistics services. Manufacturing will require assistance with modernizing enterprises within this sector. The service industry must foster innovation, competition and skills development. Implication number 4 relates to inclusion statistics. Beyond merely counting accounts or transactions, policymakers need to view the issue not just from the one-dimensional perspective of adoption rates, but also that of its reliability, cost, and equity.

Digital payments' increased usage signifies progress only if exclusivity falls and well-being rises. Fifthly, institutions must change. As digital government becomes a reality, privacy and security systems, informed consent systems, consumer protection policies, and redressal mechanisms become imperative. Technology deployment does not automatically lead to trust. Instead, it is trust that comes from safeguards and responsiveness. Finally, implication number six relates to interoperability. Having reached by 2017 the level of interoperability of payment systems in India, digital identity could have huge network benefits. The more people, organizations, companies, banks, and government agencies can freely communicate using digital tools, the greater their value and utility. It effectively means fewer costs and easier scaling. One final note is that innovation and resilience lie somewhere in between. Over-reliance on digital systems and poorly conceived backup plans can have adverse consequences for vulnerable populations during service breakdowns, operational errors, or authentication problems. Inclusive digital economies need to reserve non-digital options.

8. Conclusion

Now there is finally an unambiguous evolution of innovation, growth, and inclusion in regard to India's digitalization until December 2017. Adoption of ICT contributed not only to GDP growth in sectors due to higher productivity, lower transaction costs, improved coordination, efficiency and promotion of new activity types, but also helped transform the domain of financial inclusion through mass account creation, identification, direct transfer, and payments made digitally. The effects were most noticeable in the sphere of services, followed by industry, and least felt in agriculture. On top of that, the article stated that positive, although conditional, effects of ICT were obtained during India's development. When complementing conditions, including infrastructure, institutions, human resources, and interoperability were present, the results were best. Otherwise, they were rather superficial and risked fostering exclusion. Thus, India's experience challenges both optimism about technology and technological skepticism. ICT is neither a silver bullet nor a marginal factor. It is a transformative instrument whose effects will depend on policy design, social capability and structural context. By December 2017, India had developed the architecture for a digital economy: widespread mobile access, expanding internet use, digital identity, mass banking outreach, and modern payment rails. And architecture is not the same as an equitable transformation. Whether in the long run the digitalisation is successful ultimately hinges on whether the benefits of ICT extend beyond dynamic urban sectors to rural producers, informal workers, women, small firms, and low-income households. This includes acknowledging that the digital transition does not only need to be a technological shift but should also be a process of development, built upon the principles of inclusion, reliability, rights and institutional trust.

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