

Digital Transformation And Inclusive Growth In Tumkur City: Challenges, Opportunities And The Road To Viksit Bharat 2047

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Abstract:

Tumkur, one of Karnataka's prominent industrial and educational cities, sits at a crossroads of urban aspiration and semi-rural reality. Known for its coconut farms, silk production and a growing engineering college cluster, the city is attempting to ride the wave of India's digital economy while several of its wards and surrounding areas remain poorly connected. This paper examines how digital transformation is unfolding at the ground level in Tumkur city as what is working, what is not and what needs to change. The study draws on field visits to twelve locations across different zones of the city, discussions with approximately 160 residents including local traders, Self Help group members, students, auto drivers, construction workers and government staff, complemented by secondary data from Karnataka state reports and national surveys. The findings present a mixed picture: while smartphone penetration is reasonably high among working-age men and youth, meaningful digital use for banking, healthcare, grievance redressal and livelihood improvement remains limited for women, senior people and daily wage workers. Language, digital literacy, trust deficits and uneven Common Service Centres quality emerge as the principal barriers. The paper concludes with practical, city-specific policy suggestions aimed at making Tumkur a genuine model of inclusive digital growth as India moves toward its 2047 development vision.

1.0 INTRODUCTION

Tumkur city is the headquarters of Tumkur district, lying about 70 kilometres northwest of Bengaluru. Over the past decade it has grown steadily as a secondary city, absorbing some of Bengaluru's industrial spillover, developing its own engineering college cluster and attracting small and medium enterprises in manufacturing and logistics. Yet Tumkur has not fully shed its smaller-town character. Many of its older residential areas, particularly in the northern and eastern wards, still function much like semi-urban villages, with limited banking infrastructure, patchy mobile data coverage and populations that rely heavily on informal networks for information and services.

India's vision of becoming a developed nation by 2047, the centenary of independence, places digital connectivity and technology-driven growth at the centre of its plans. But cities like Tumkur illustrate a challenge that is easy to miss when we look only at national averages: the digital divide is not simply a rural-versus-urban story. Even within a city that appears digitally connected by conventional measures, significant portions of the population remain left out, not because infrastructure is absent but because access is unequal, literacy is limited and relevant services are not designed with ordinary users in mind.

This paper examines three questions with reference to Tumkur city. First, what is the current state of digital access and actual usage across different sections of the city's population? Second, what barriers prevent people especially women, older residents and low-income workers from making meaningful use of digital tools. Third, what specific steps can be taken at the city and district level to ensure that Tumkur's digital growth is genuinely inclusive.

2.0 LITERATURE REVIEW

The distinction between owning a device and using it productively has been well established in the digital inclusion literature. Hargittai (2002) described this as the 'second-level digital divide', arguing that raw access statistics systematically overestimate the degree to which marginalised groups participate in the digital economy. The same gap is visible in Tumkur, where high smartphone ownership among men coexists with very limited functional use among women and senior people.

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Warschauer (2003) extended this argument by contending that meaningful digital inclusion requires not just devices and connectivity, but also the human resources of skills and education, the social resources of community networks and supportive governance structures. All three of these dimensions are relevant to Tumkur's situation: digital literacy is uneven, the social networks that would normally diffuse skills across a community are gendered and the governance of service delivery infrastructure such as Common Service Centres is inconsistent.

On the gender dimension, Sambasivan et al. (2010) documented how patriarchal household dynamics in South Asia limit women's access to shared devices and their opportunity to practice digital skills even when access nominally exists. This dynamic was observed directly in the Tumkur field study: women who had attended a digital literacy session still depended on male family members for any digital task because the home environment did not support independent practice.

Vaidehi, R., Reddy, A. B., & Banerjee, S. (2021) found, in a study of rural Karnataka households, that Scheduled Caste households were significantly less likely to own smartphones than comparably poor households from dominant castes, even after controlling for income and location. While Tumkur is an urban setting, the field visits to peripheral wards confirmed that caste continues to shape digital access in ways that income data alone does not capture.

The literature on trust and digital financial inclusion is particularly relevant to the findings on banking use. Afzal, M., Meraj, M., Kaur, M., & Shamim Ansari, M. (2024) showed that fraud experiences and inadequate grievance redressal were major barriers to digital payments adoption in rural areas. The Tumkur field study found very similar dynamics at work: stories of OTP fraud spread quickly through residential networks and created widespread wariness that is rational in its origins even if it becomes a structural barrier to financial inclusion.

Toyama's (2015) 'Law of Amplification' provides a useful framework for the overall argument of this paper: technology amplifies existing social and institutional conditions, for better or worse. In a city where social hierarchies of gender and caste already structure access to economic resources, digital tools will tend to reinforce those hierarchies unless deliberate, equity-focused policy counteracts them.

3.0 OBJECTIVES OF THE STUDY

1. To map the current state of digital access and meaningful usage across different population groups and geographic zones within Tumkur city.
2. To identify the principal barriers that prevent specific groups from participating productively in the digital economy.
3. To analyse local strengths and existing practices within SHG networks, among youth and among small traders that have produced digital adoption without formal training.
4. To examine the contribution level of city in align to the broader Viksit Bharat 2047 framework and propose practical, locally grounded policy interventions for Tumkur Municipal Corporation and Tumkur district administration.

4.0 RESEARCH METHODOLOGY

4.1 Research Design and Approach

This study uses a combination of direct field observation and secondary data review. A purely quantitative approach would be inadequate for the questions at hand because what matters most — why people do or do not use digital tools, what they fear, what they find useful is not captured in subscriber statistics or transaction counts. At the same time, individual field observations need to be anchored in broader data collection. The mixed approach adopted here is consistent with the methodological recommendations of Creswell and Plano Clark (2018) for research on complex, context-dependent social phenomena.

4.2 Field Study Locations and Participants

Between October 2024 and February 2025, the author and a team of students visited twelve locations within Tumkur city and its immediate outskirts. Locations were chosen to represent a mix of income levels, age groups, community types and connectivity conditions. The areas studied are summarised in Table 1 below.

Table 1: Study Zones — Population Character and Connectivity Status

Zone / Area	Population Character	Key Communities	Connectivity Status
Old City / Market Area	Mixed income, traders	Weavers, vendors, households	Moderate
Tumkur (Residential)	Lower-middle income	Daily wage workers, auto drivers	Low to moderate
Industrial Area / Highway Zone	Working class, migrant workers	Factory workers, truck drivers	Moderate to good
Education Hub Area	Students, faculty, middle class	Young adults, educated households	Good
Peripheral Wards (East)	Peri-urban, semi-rural character	Community households, farm workers	Low

Source: Field Observation, October 2024 – February 2025; Author's Compilation

At each location the team held informal group conversations and structured one-on-one discussions with approximately 160 people in total, drawn from a purposive sample including women members of Stree Shakti self-help groups, shop owners and street vendors, young men and women in local factories, retired government employees, construction workers, auto-rickshaw and lorry drivers and ASHA workers. The study makes no claim to statistical representativeness; its aim is to give texture and depth to the aggregate data and to illuminate mechanisms that numbers alone cannot explain.

4.3 Secondary Data Sources

Secondary data was drawn from TRAI's Karnataka teledensity reports (TRAI, 2023), Karnataka Digital Economy Mission Annual Reports (Government of Karnataka, 2023), PMJDY operational data for Karnataka (Ministry of Finance, 2023), NITI Aayog's District Development Index for Tumkur (NITI Aayog, 2022), and MeitY's CSC performance data for Karnataka (MeitY, 2023). Census data for Tumkur district is from the 2011 Census, the most recent with ward-level detail (Census of India, 2011). Karnataka-specific financial inclusion data draws on the RBI's Trend and Progress report (RBI, 2022) and NFHS-5 Karnataka fact sheet (NFHS-5, 2021).

5.0 DATA ANALYSIS AND INTERPRETATION

5.1 Smartphone Ownership: High Numbers, Uneven Use

One finding that cuts across most areas of Tumkur is that smartphone ownership has expanded rapidly over the last five years. Almost every household in the areas visited had at least one smartphone and in households with working-age men or college students, multiple devices were common. This is largely a product of the entry of Reliance Jio into the telecom market in 2016, which brought data costs down dramatically and made 4G affordable even for lower-income households.

However, owning a smartphone is not the same as using it productively. Among the 160 people the team spoke to, roughly 65 percent owned a smartphone. Of these, around 40 percent could be considered confident users, meaning they regularly used applications beyond calls and messaging. The remaining 60 percent used their phones in a limited way, often relying on a younger family member for anything beyond basic functions. Among women above 45 years of age, confident digital use was found in fewer than 15 percent of those spoken to. Phones in this group are used almost entirely for calls, WhatsApp messaging and watching YouTube videos. Use for banking, government services or health information is rare.

5.2 Internet Connectivity: The Coverage Illusion

Seemingly, Tumkur city has good mobile network coverage. All major operators such as Jio, Airtel and BSNL have towers across the city, and 4G connectivity is nominally available in most wards. In practice, several older residential areas with narrow lanes and dense building clusters had poor indoor signal strength. The BSNL network, which serves many government offices and Common Service Centres (CSCs), was reported to have frequent outages and slow speeds at multiple visited locations.

For households that rely on mobile data rather than fixed broadband as most of Tumkur's lower-income family's connectivity is often good enough for video watching but not reliable enough for multi-step digital transactions or government portal access, which require a consistent connection throughout the session. This "coverage illusion," where overall statistics appear satisfactory while the actual ground-level experience remains inconsistent, highlights an important aspect that must be considered in city-level planning.

5.3 Banking and Digital Payments: The Jan Dhan Reality in Tumkur

Nearly all adult residents in the areas visited had Jan Dhan or regular savings bank accounts. However, as with the national picture documented by Allen, F., (2016). and others, account ownership does not translate automatically into active use. Among the SHG members the team spoke to, most had bank accounts but fewer than half had conducted any bank transaction independently in the past three months. Most transactions that did occur were driven by the need to receive government payments such as PM-KISAN amounts or LPG subsidies, which were typically withdrawn as cash immediately upon receipt.

UPI usage through Google Pay or PhonePe was more common among younger adults, particularly men working in shops and small businesses. Auto drivers in Tumkur were notably active UPI users and several had QR codes pasted in their vehicles and used digital payment regularly. This group represents an important model: adoption driven by practical self-interest rather than awareness campaigns, because the tool made their daily work easier and reduced the burden of handling exact change. UPI adoption among senior people and women remained limited, largely due to concerns about making errors, mistrust arising from fraud incidents shared within the community and a continued preference for cash in routine and familiar transactions.

5.4 Common Service Centres: Uneven Quality within the City

A team of students visited four Common Service Centres (CSCs), including two situated in the city centre and two located in peripheral wards. The CSCs in the central areas were comparatively well managed, featuring trained operators, clearly displayed service menus and a moderate number of visitors seeking certificate-related services, Aadhaar queries and printing services. The two peripheral CSCs were a different story: one had an operator who was rarely present during business hours, and another had a working computer but no reliable internet connection most days due to BSNL outages. Residents in those areas said they preferred to travel to the city centre or ask a relative to handle digital tasks rather than rely on the local CSC.

This variation in CSC quality within a single city point to a governance gap. Problems like irregular operator attendance and unreliable connectivity are not structurally complex; they require monitoring, accountability and a reliable broadband connection. But apparently these conditions are not being consistently enforced, resulting in a two-tier service within the same city.

6.0 RESULTS AND DISCUSSION

6.1 Key Barriers: A Summary

Based on the field findings, Table 2 presents a summary of the key digital barriers, existing usage patterns and priority interventions relating to the sample groups identified across the study areas.

Table 2: Digital Inclusion Barriers and Priority Interventions by sample group, Tumkur City

Population Group	Main Digital Barrier	Usage Pattern	Priority Intervention
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Women (35+)	Low literacy, limited device access	Calls, WhatsApp only	SHG-based digital training
Senior People (60+)	Fear of fraud, language barrier	Calls only, avoid apps	Trusted intermediary support
Daily Wage Workers	Limited time, low literacy	Basic UPI, mostly cash	Workplace digital literacy
Community Households	Device access, connectivity gaps	Minimal digital use	Targeted outreach + CSC support
Youth / Students	Minimal barriers	Active digital users	Leverage as peer educators
Small Traders / Vendors	Awareness of advanced tools	UPI active, app use limited	Digital business skills training

Source: Field Study, October 2024 – February 2025; Author's Compilation

6.2 The Language Gap in Digital Services

A barrier that came up consistently across all areas of Tumkur is language. Most government portals, banking apps and popular platforms like Google Pay default to English or Hindi. Tumkur is predominantly a Kannada-speaking city. Although many residents possess basic English literacy through formal education, they often lack the confidence required to navigate government portals or complete online forms in English. For senior people, Hindi poses an even greater challenge.

Several SHG members said they had tried to use the Aarogya Setu or UMANG apps during the COVID period but gave up because they could not read the instructions. The Karnataka government has taken steps to improve accessibility through state-level platforms such as Seva Sindhu, which is available in Kannada. However, many essential national-level applications continue to operate mainly in English and Hindi. This represents a practical and solvable barrier, yet its continued neglect is limiting the effective reach of digital services.

6.3 Digital Literacy: Generation and Gender Gaps

Among younger residents between 18 and 35 years of age who have completed secondary or higher education, digital literacy is reasonably good. They navigate apps, make payments and troubleshoot basic problems. But this group does not represent the full picture of Tumkur's adult population. Senior people, domestic workers, construction labourers and women who left school early constitute a large share of the city's population and for most of them digital literacy is minimal.

The Pradhan Mantri Gramin Digital Saksharta Abhiyan (PMGDISHA) programme has conducted training in Tumkur district, but participants consistently described these sessions as brief, classroom-based and lacking any follow-up support. Learning to use digital tools requires practice and repetition: a two-day workshop has limited long-term impact without ongoing reinforcement. The gender dimension compounds this: in households where the smartphone is primarily controlled by a male family member, women have little opportunity to practice even after attending training. Several women reported attending PMGDISHA sessions but still depending on their family members for any digital task, because the home environment did not support independent practice.

6.4 Trust, Fraud and the Safety Deficit

Fear of fraud emerged as one of the most consistently cited barriers, particularly among senior people and women. Several people had personally experienced or heard about cases where a caller claiming to be from a bank persuaded them to share their OTP, resulting in money being taken from their account. Such stories spread quickly in tight residential communities and create a wariness that is entirely rational in its origin, even if it ends up preventing legitimate and useful digital transactions.

Tumkur's police and local administration have organised digital safety awareness programmes, but these initiatives have been occasional and have not consistently reached the most vulnerable groups. A more structured and locally focused campaign delivered in Kannada through trusted community networks such as SHG meetings, temple committees and school parent gatherings could have a substantial positive impact.

6.5 What Is Working: Local Strengths to Build On

Against this picture of barriers, the field study identified three important local strengths. First, the Stree Shakti SHG network in Tumkur brings women together regularly in a trusted, peer-based setting. Where SHG meetings have included digital financial literacy as a regular agenda item, the results have been encouraging and women who learned to check their account balance at an SHG meeting and repeated the exercise at subsequent meetings retained that skill far better than those who attended a one-off classroom workshop. The SHG format offers what formal training programmes typically do not — regularity, trust and peer-to-peer learning.

Second, the informal role of youth as household digital helpers is widespread and valuable. In almost every household visited, at least one younger family member served as an informal digital assistant, helping parents or grandparents check bank balances, apply for certificates online or navigate government apps. The limitation is that this creates dependency rather than capability. Programmes that build on this relationship to progressively transfer capability to senior people could make the informal system more genuinely empowering.

Third, the high rate of UPI adoption among Tumkur's auto-rickshaw drivers illustrates an important principle: when a digital tool is genuinely useful and simple enough to use without training, adoption happens easily and quickly. These drivers embraced digital payments not because of awareness campaigns but because QR codes made their daily work easier. The design of digital services for other groups should take this lesson seriously, as perceived usefulness drives adoption more reliably than awareness drives alone.

7.0 CONCLUSION

Tumkur city is neither fully digital nor fully excluded. It occupies a middle ground that characterises many of India's second-tier cities: enough connectivity to look good on aggregate indicators, but enough inequality and exclusion beneath the surface to remind us that indicators do not capture the full story.

The Indian government's Viksit Bharat 2047 vision identifies digital transformation as central to achieving developed nation status. Cities like Tumkur are not peripheral to this vision; they are its testing ground. Tumkur has real assets such as industry, education, agriculture, an active SHG network, and a large and digitally capable student population. Digital tools, used well, could help translate those assets into broader-based prosperity: making government services more accessible, helping small businesses grow, connecting workers to better information and giving citizens a more direct channel to engage with local administration.

But that potential will only be realised if Tumkur's digital strategy goes beyond infrastructure to address the human and institutional dimensions of inclusion. The following interventions are recommended based on the field findings:

- (1) Tumkur Municipal Corporation should establish monthly monitoring of all Common Service Centres within city limits, including internet uptime, service delivery counts and user complaints, with network connectivity issues in peripheral wards escalated to Telecom Regulatory Authority of India (TRAI) for priority resolution.
- (2) Digital literacy training should shift from one-off workshops to continuous, community-based learning integrated into regular Stree Shakti SHG meetings, supported by a ward-level 'digital sakhi' drawn from within each SHG cluster.
- (3) Local engineering colleges should be formally partnered to train digital sakhis and provide technical support to Common Service Centres, in a collaboration that also connects students to their city.
- (4) Tumkur district administration should create a simple Kannada-language guide to the most needed digital services, such as checking Jan Dhan balances, applying through Seva Sindhu and registering on PM SVANidhi, distributed through SHG networks, Common Service Centres and municipal ward offices.

- (5) A regular digital fraud awareness campaign should be run in Kannada through trusted community channels, targeting senior people and women specifically.
- (6) Tumkur Municipal Corporation should launch a 'Digital Dost' volunteer programme engaging college students as weekend digital helpers in their home wards, aiming to build both community capability and a sense of civic responsibility among students.
- (7) The Lead District Manager of various bank should work with the district administration to map wards with the least banking coverage and prioritise active Business Correspondent deployment in those areas.

This study has tried to look closely at the people who are to be participants in the digital economy, and to understand what they already know, what they need, what they fear and what support would help them. Doing this for Tumkur, at the city level, is a small contribution to a much larger task. But it is the kind of city-level, people-centred work that will ultimately determine whether the Viksit Bharat 2047 vision amounts to more than an aspiration.

8.0 LIMITATIONS OF THE STUDY

This study is subject to several limitations that should be kept in mind when interpreting the findings. The field component covered approximately 160 people across twelve locations, selected purposively rather than by random sampling. The findings are therefore indicative rather than statistically representative of Tumkur's population.

The study was conducted between October 2024 and February 2025. Tumkur's digital landscape is changing as new towers are being erected, new schemes are being launched, and the behaviour of residents is evolving. Some findings may already be partially outdated. Additionally, the study relies on self-reported data about digital use from field conversations rather than on log data or transaction records, which introduces the possibility of social desirability bias, as respondents may have described their digital behaviour in ways that reflect what they felt they were expected to do rather than what they actually do.

Finally, this study does not capture the experiences of Tumkur's sizeable migrant worker population, whose digital inclusion situation may differ substantially from that of long-term residents. Future research should address these gaps through larger-scale surveys, longitudinal follow-up with SHG groups and specific attention to migrant and tribal communities within the city.

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Authors' Disclosures



The authors declare no conflicts of interest.

Ethics and Consent

This study was conducted in accordance with ethical guidelines for social science research. Informed consent was obtained from all participants prior to data collection.

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