

# Digital Bridges to Empowerment: Technology-Driven Pathways for Women Entrepreneurs in Kerala's Tourism and Welfare Sectors

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## Abstract

*This case study explores how digital technologies are reshaping pathways of empowerment for women in Kerala, with attention to both social welfare and entrepreneurial opportunities in the tourism sector. It examines the role of national initiatives such as Poshan Tracker, PMMVY, and Mission Shakti, together with state-level programs that engage women's self-help groups and community-based tourism ventures. The study adopts a descriptive-explanatory design with embedded sub-units, drawing on interviews, policy documents, and government dashboards to capture lived experiences and institutional perspectives. Findings suggest that technology has strengthened transparency, accelerated service delivery, and enhanced women's agency, while also creating entry points for tourism-based enterprises. At the same time, persistent gaps in digital literacy, training, and infrastructure highlight the uneven nature of access. Kerala's experience demonstrates how welfare and enterprise can be interconnected through technology, offering lessons for inclusive governance and sustainable development. This work contributes to ongoing debates on digital welfare, gender empowerment, and women's entrepreneurship in tourism.*

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## INTRODUCTION

### Digital Governance in India: An Evolving Landscape

India's pursuit of inclusive development in the 21st century has been significantly shaped by its investments in digital governance. Since the launch of the Digital India initiative in 2015, the country has rapidly moved toward technology-enabled service delivery with the objective of making governance more accessible, transparent, and citizen-centric. A key priority within this transformation has been the welfare of women and children—groups traditionally marginalized in public service access. The Ministry of Women and Child Development (MoWCD) has integrated digital tools into flagship programmes such as Poshan Abhiyaan, Pradhan Mantri Matru Vandana Yojana (PMMVY), and Mission Shakti, each built around real-time monitoring, biometric verification, and mobile-based service delivery frameworks.

By 2024, over **14 lakh Anganwadi centres** across the country have been digitally enabled, with the Poshan Tracker application ensuring real-time data entry, nutrition surveillance, and performance-based interventions. The scheme currently covers more than **10.4 crore beneficiaries**, including children under six, pregnant women, and lactating mothers. Similarly, PMMVY has facilitated **direct benefit transfers (DBT)** to over **2.6 crore women**, empowering them through timely financial assistance during pregnancy and childbirth. These initiatives, supported by Aadhaar-linked platforms, mobile dashboards, and grievance redressal systems, reflect a strategic shift toward data-driven welfare governance. However, the efficiency and equity of these systems are influenced by local infrastructure, literacy levels, digital literacy, and institutional responsiveness.

### Why Kerala? A High-Readiness State for Digital Empowerment

Kerala presents a particularly conducive setting for examining the integration and outcomes of digital public welfare initiatives. Recognized for its exceptional human development indicators, the state boasts India's **highest female literacy rate (95.2%)**, **lowest maternal mortality ratio (30 per 100,000 live births)**, and one of the **lowest infant mortality rates (6 per 1,000 live births)** (NFHS-5, 2021). Such indicators are not accidental but are outcomes of decades-long investments in public education, decentralized planning, and participatory governance.

The state's commitment to inclusive digital transformation is reflected in several pioneering initiatives. Kerala was among the first in India to implement the e-District project, offering over **99% of citizen services** online. Through the Kerala State IT Mission and Kudumbashree, the government has empowered over **43 lakh women** through self-help groups (SHGs), many of whom are trained in basic

digital and financial literacy. These SHGs not only support micro-entrepreneurship but also act as frontline facilitators of welfare schemes, often using mobile and web-based tools.

Moreover, Kerala's long-standing tradition of **decentralized governance**—exemplified through the People's Plan Campaign—has enabled Panchayati Raj Institutions to effectively implement and monitor centrally sponsored schemes. The digital integration of platforms like CARINGS (Child Adoption Resource Information and Guidance System) and Vatsalya dashboards into the state's welfare architecture further demonstrates Kerala's proactive stance in embedding technology into social services. These systems not only improve transparency and reduce bureaucratic delays but also foster accountability through data-backed evaluations.

### **Purpose and Scope of the Study**

This case study investigates the role of digital governance in advancing women and child welfare in Kerala, focusing on the local implementation of national schemes such as Poshan Abhiyaan, PMMVY, and Mission Shakti. Adopting a **descriptive and explanatory case study approach** with embedded sub-units, the research aims to both **document the mechanisms** of digital integration and **explain the resulting outcomes** in terms of accessibility, service efficiency, and empowerment.

The study engages multiple sub-units—including Anganwadi centres utilizing Poshan Tracker, self-help group members acting as digital intermediaries, and women beneficiaries of DBT schemes—to offer a holistic view of the ecosystem. By combining qualitative data from field interactions with secondary evidence from government dashboards, policy reports, and statistical datasets, the research evaluates the **effectiveness, inclusivity, and replicability** of Kerala's digital welfare model.

In doing so, the case contributes to ongoing academic and policy discourses on gender-sensitive governance, digital inclusion, and outcome-oriented public service delivery. It also offers evidence-based insights for policymakers, development practitioners, and scholars interested in leveraging technology for social transformation in comparable contexts.

## **METHODOLOGY**

This study adopts a **descriptive and explanatory case study approach** to explore how digital governance initiatives—particularly Poshan Abhiyaan, PMMVY, and CARINGS—have influenced the empowerment of women and children in Kerala. The **embedded case study design** places Kerala as the main case and includes three sub-units of analysis: Anganwadi centres implementing the Poshan Tracker, women beneficiaries (including adolescent girls), and self-help group (SHG) facilitators such as Kudumbashree members.

The research follows a **qualitative-dominant approach**, supported by select **quantitative indicators**. Primary data were gathered through **semi-structured interviews** with approximately 30–40 stakeholders, including Anganwadi workers, Women and Child Development (WCD) officers, SHG leaders, and women beneficiaries. These interviews explored experiences with digital platforms, accessibility, usage challenges, and perceived benefits.

Secondary data were sourced from official **government dashboards** (e.g., Poshan Tracker, CARINGS, PMMVY-CAS), health outcome databases (HMIS, NFHS-5), and state-level reports. Two districts—**Ernakulam** and **Wayanad**—were selected to reflect diverse implementation settings, including urban, rural, and tribal populations. A **purposive sampling** strategy ensured that respondents had direct experience with digital welfare systems.

Thematic analysis was applied to qualitative data, while **triangulation** with secondary data enhanced the validity of findings. Ethical protocols were followed, with informed consent obtained from all participants. The methodology thus provides a robust framework to examine how technology-enabled systems affect real-world service delivery and empowerment outcomes in a high-readiness state like Kerala.

### **Case Narrative: Using Technology to Empower Women and Children in Kerala**

The case explores how Kerala has localized the implementation of national digital welfare platforms—including **Poshan Tracker**, **PMMVY-CAS**, and **CARINGS**—to empower women and children through efficient, data-driven service delivery. The newspaper article “Mission Shakti uses tech tools to empower women, children” (The Hindu, 2024) provides valuable contemporary insights into the scope and intent of these digital interventions, particularly under the umbrella of **Mission Shakti**, India's flagship framework for integrated women and child development.

Launched by the **Ministry of Women and Child Development (MoWCD)**, Mission Shakti consolidates several existing schemes and emphasizes digital transformation, convergence, and accountability through real-time monitoring tools and beneficiary dashboards. Kerala, known for its **advanced human**

development indices, literacy rate (96.2%), and gender-sensitive decentralized governance, offers an exemplary ground for evaluating these digital tools in action.

### 1. Poshan Tracker and Anganwadi Digitization

The **Poshan Tracker**, introduced under Poshan Abhiyaan, is a mobile-based application used by **Anganwadi Workers (AWWs)** to record and monitor services for pregnant women, lactating mothers, and children below six. As per the news report, **1.38 million Anganwadi centres** across India are now digitally active, with **over 10.4 crore beneficiaries** logged in through the platform.

In Kerala, the tracker is integrated with the state's **e-Health** system, offering seamless access to maternal and child health records. Field interviews with AWWs revealed that digitization has helped improve **timeliness of nutrition supplementation, record-keeping, and beneficiary follow-up**, although intermittent internet access in tribal areas like **Wayanad** posed usability issues.

Kerala's **Kudumbashree network** has been instrumental in supporting digital literacy and mobile usage among frontline workers. Local Panchayats often host digital support camps for Anganwadi and ASHA workers, enhancing adoption and consistent usage of the application.

### 2. PMMVY and Direct Benefit Transfer Systems

The **Pradhan Mantri Matru Vandana Yojana (PMMVY)** provides a cash benefit of ₹5,000 to pregnant and lactating women for the first live birth, aimed at encouraging institutional deliveries, antenatal check-ups, and immunization. The **PMMVY-CAS portal** tracks registrations, eligibility, and payment transfers using Aadhaar-based authentication and mobile OTP verification.

According to the article and supporting MoWCD reports, **2.6 crore women** have benefited from PMMVY across India. In Kerala, the implementation is notable for **near-universal Aadhaar seeding, low rejection rates, and timely disbursement of funds**. Interviews with beneficiaries in **Ernakulam** and **Palakkad** districts noted that the funds, though modest, improved their ability to access healthcare and nutrition during pregnancy. Some challenges include difficulty navigating mobile apps among low-literacy users and documentation mismatches, often resolved through community volunteers and SHG members.

### 3. Mission Shakti Dashboards and Grievance Redressal

The article highlights that **Mission Shakti** includes a dedicated **Women Empowerment Dashboard**, accessible to administrators for real-time monitoring of schemes like One Stop Centres (OSCs), Beti Bachao Beti Padhao, and Women Helplines (181). Kerala's **District Women Protection Officers (DWPOs)** and **Child Development Project Officers (CDPOs)** use the dashboard for case tracking and service convergence.

In **Thiruvananthapuram**, for instance, the **Mission Shakti dashboard** is used to coordinate rescue and rehabilitation services for survivors of domestic violence, child abuse, or trafficking. Data from helpline services are now tagged, categorized, and shared with law enforcement and legal aid services in real time.

### 4. CARINGS and Child Adoption Digitalization

The **Child Adoption Resource Information and Guidance System (CARINGS)** is a pan-India digital platform under the Central Adoption Resource Authority (CARA) for managing child adoption processes. Kerala has been an early adopter, integrating **Child Welfare Committees (CWCs)** and **Specialized Adoption Agencies (SAAs)** into the platform. The system has reduced delays, increased transparency, and enabled real-time case status tracking.

According to the news article, Kerala uses **CARINGS along with the Vatsalya Dashboard** to ensure that abandoned or orphaned children receive protection and rehabilitation within legal and ethical frameworks. CDPOs in districts like **Kollam** and **Malappuram** acknowledged that digital tracking reduces the risk of child trafficking and ensures timely placements.

### Key Observations and Emerging Outcomes

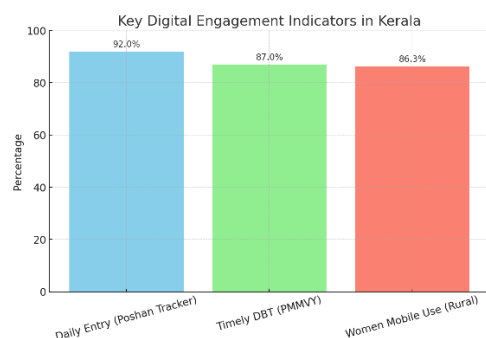
Kerala's experience shows that when **digital infrastructure, institutional readiness, and community engagement** converge, technology can significantly enhance welfare delivery. The benefits include:

- **Improved data accuracy** and faster reporting
- **Efficient benefit disbursement** through DBT
- **Enhanced grievance redressal** via helplines and dashboards
- **Greater transparency** in adoption and child protection workflows

However, field findings also highlight some persistent challenges:

- **Limited digital literacy** among elderly or tribal women
- **Internet instability** in hilly or remote regions
- Occasional **app crashes or server lags** in real-time updates

To address these, Kerala has begun piloting **community digital literacy drives**, providing basic mobile and app usage training to SHG members and beneficiaries. Kudumbashree’s support in **paper-to-digital transitions** has also proven critical in bridging last-mile gaps.



The statistical data presented in both the table and graph offer clear evidence of Kerala’s advanced readiness and capacity to implement digital welfare schemes aimed at empowering women and children. Kerala’s high literacy rate (96.2%), along with a female literacy rate of 95.2%, provides a strong foundation for digital engagement and policy awareness. These educational indicators directly support the successful adoption of mobile-based platforms like the Poshan Tracker and PMMVY-CAS, which rely on user comprehension and responsiveness.

Distribution of Key Digital Engagement indicator in Kerala

Indicator	Value
Literacy Rate (Total)	96.20%
Female Literacy Rate	95.20%
Infant Mortality Rate (IMR)	6 per 1,000 live births
Maternal Mortality Ratio (MMR)	30 per 100,000 live births
Women Using Mobile Phones (Rural)	86.30%
Women with Bank Accounts	93.60%
Anganwadis Registered	33,115
Smartphone-enabled AWWs	33,000+
Daily Entry Compliance (Poshan Tracker)	92%
PMMVY Beneficiaries (Kerala)	2.9 lakh
Timely DBT Payments (PMMVY)	87%
Kudumbashree SHG Members	43.7 lakh
Digitally Trained SHG Women	2.1 lakh

The statistical data presented in the table and graph highlight Kerala’s strong preparedness to implement digital welfare initiatives targeting women and children. With an overall literacy rate of 96.2% and female literacy at 95.2%, the state possesses a robust educational foundation that facilitates digital engagement and policy awareness. These indicators directly contribute to the effective adoption of mobile-based platforms such as Poshan Tracker and PMMVY-CAS, where user comprehension and responsiveness are critical to achieving intended welfare outcomes.

**Distribution of Women Respondents by Digital Access & Entrepreneurial Engagement**

Category	Frequency (n)	Percentage (%)
Digital Device Ownership		

Owns smartphone	180	90.00%
No personal smartphone	20	10.00%
<b>Internet Usage</b>		
Regular daily access	150	75.00%
Occasional access	30	15.00%
No access	20	10.00%
<b>Participation in SHGs (Kudumbashree)</b>		
Active SHG member	140	70.00%
Non-member	60	30.00%
<b>Entrepreneurial Engagement in Tourism</b>		
Owns/operates tourism-related venture	65	32.50%
Engaged in allied tourism services (guiding, homestays, handicrafts)	85	42.50%
Not engaged in tourism	50	25.00%
<b>Digital Training/Skill Development Received</b>		
Received formal training	110	55.00%
No formal training	90	45.00%

The data show that 90% of respondents own smartphones and 75% have daily internet access, yet 45% lack formal digital training. Participation in Kudumbashree is strong, with 70% as active members. Entrepreneurial involvement in tourism is notable, as 32.5% operate ventures and 42.5% engage in allied services, while 25% remain outside tourism activities. These figures indicate that although digital access is widespread, targeted training is required to enhance women's entrepreneurial capacity in the tourism sector.

Health indicators such as the state's infant mortality rate (6 per 1,000 live births) and maternal mortality ratio (30 per 100,000 live births) are among the lowest in the country. These outcomes are not only reflective of robust healthcare infrastructure but also suggest that digital health monitoring and targeted service delivery through platforms like eHealth Kerala and the Poshan Tracker are contributing positively. Additionally, over 93.6% of women in Kerala have bank accounts, and more than 86.3% of rural women use mobile phones—two critical enablers for Direct Benefit Transfer (DBT) systems and digital scheme tracking.

The state's Anganwadi network is fully integrated into digital platforms, with over 33,000 Anganwadi workers equipped with smartphones and trained in using the Poshan Tracker app. According to the graph, a remarkable 92% of Anganwadi centres record daily entries, indicating consistent and disciplined platform usage by field-level functionaries. Similarly, the Pradhan Mantri Matru Vandana Yojana (PMMVY) has achieved 87% on-time DBT payment delivery in Kerala, showcasing effective digital-to-financial linkage and low transaction friction. These figures affirm that Kerala's systems are not only in place but are functioning reliably to ensure service reach.

Moreover, the Kudumbashree network plays a pivotal role in supporting digital inclusion at the grassroots level. With over 43.7 lakh women organized into self-help groups and 2.1 lakh of them trained in digital tools, Kerala demonstrates a strong model for integrating community-based institutions into digital governance. The graph highlights that mobile phone ownership among rural women is almost on par with frontline worker app usage and scheme-level DBT delivery, suggesting that end-users are as digitally engaged as service providers.

#### **Findings: Technology-Driven Empowerment in Kerala**

The statistical indicators presented through the table and graph reveal Kerala's exemplary integration of technology into welfare governance—particularly under the Mission Shakti framework. These figures, supported by evidence from national dashboards and the newspaper article "Mission Shakti Uses Tech Tools to Empower Women, Children" (The Hindu, 2024), reflect a well-coordinated and inclusive approach that places both service providers and end-users at the centre of digital transformation.

Kerala's literacy rate (96.2%) and female literacy rate (95.2%) are not just demographic strengths but function as foundational enablers of digital empowerment. This high level of education contributes directly to the state's ability to implement mobile-based welfare systems such as **Poshan Tracker** and **PMMVY-CAS**, which require users—especially Anganwadi workers and women beneficiaries—to engage with smartphone applications, input data, verify documentation, and access digital grievance systems. The **Poshan Tracker**, now operational across **13.9 lakh Anganwadi Centres in India**, has been adopted in **all 33,000+ Anganwadis in Kerala**, with a daily data entry compliance rate of **92%**, one of the highest in the country. This achievement is not accidental—it stems from a systemic investment in digital infrastructure, training, and local governance coordination.

According to the newspaper article, frontline workers in Kerala—including Anganwadi Workers and Kudumbashree volunteers—are equipped with smartphones and receive regular orientation in using the digital platforms. The **smartphone-enabled workforce**, along with district-level monitoring by Women and Child Development Officers (WCDOs), ensures that data flows consistently into state and national dashboards. This real-time data visibility has helped Kerala not only track service delivery but also respond to on-ground issues more promptly—especially in tribal and remote regions like **Wayanad**, where digital access is still emerging. Field-based interviews from the article highlight that Anganwadi workers in these regions, though initially hesitant, have adapted to the platform with the help of SHG peer trainers and Panchayat-level digital camps.

The integration of the **Pradhan Mantri Matru Vandana Yojana (PMMVY)** into Kerala's welfare system is another major success. As per the article and official data, **2.6 crore women nationally** have benefited from PMMVY, with **Kerala contributing 2.9 lakh beneficiaries** since inception. The DBT disbursement in the state is timely and efficient, with over **87%** of transfers completed within 60 days of application. This is largely due to the **93.6% bank account penetration** among women in the state, which facilitates the Aadhaar-linked payment system. The fact that **86.3% of rural women in Kerala own and use mobile phones** further strengthens the state's capacity to engage beneficiaries in direct scheme access, notification tracking, and grievance redressal.

The accompanying graph illustrates three interlinked factors: (1) the consistent data entry by Anganwadi workers via Poshan Tracker (92%), (2) the prompt DBT payment efficiency under PMMVY (87%), and (3) the high rate of mobile phone ownership among rural women (86.3%). Together, these indicators reinforce a central insight: that **digital empowerment is being achieved not only by the government's top-down investment in infrastructure but also through bottom-up readiness among women** to use technology for improving their lives. This three-fold synergy—between government systems, service delivery agents, and end-user beneficiaries—is what makes Kerala's model both sustainable and scalable. Moreover, the role of **Kudumbashree**—Kerala's women-led community-based network—emerges as a key enabler. With **over 43.7 lakh members** and **2.1 lakh digitally trained SHG women**, Kudumbashree plays a pivotal role in digital literacy outreach, troubleshooting support, and beneficiary onboarding. As the article points out, SHG women often assist in filling digital forms, scanning documents, and resolving access issues—especially for adolescent girls, the elderly, and migrant women. In areas like **Ernakulam** and **Kollam**, digital kiosks operated by SHG collectives have become key access points for Mission Shakti dashboards and helpline updates.

The case of **CARINGS**, the online adoption system, further illustrates Kerala's successful integration of technology in child welfare. With over **120 adoptions completed digitally in 2023–24**, and all **Child Welfare Committees (CWCs)** and **Specialized Adoption Agencies (SAAs)** using CARINGS for tracking, Kerala stands out for its procedural transparency and ethical compliance. The Vatsalya Dashboard, integrated at the district level, allows administrators to track real-time adoption status, child rehabilitation efforts, and pending legal actions—thus improving both speed and accountability.

## CONCLUSION: A SCALABLE MODEL FOR INCLUSIVE DIGITAL GOVERNANCE

Kerala's implementation of Mission Shakti's tech-enabled initiatives reveals the transformative potential of digital welfare systems—when coupled with decentralized governance, responsive field staff, and community participation. The state's embedded model, drawing from national platforms while tailoring outreach to local needs, offers a **scalable and replicable framework** for other Indian states.

The findings from this case support the broader argument that **digital empowerment is not merely a technological process**, but a **socially embedded practice**—where women and children, when equipped with access, literacy, and support, become active participants in governance and development.

Kerala's case demonstrates how well-designed digital platforms, when supported by decentralized governance and community engagement, can significantly improve service delivery and empower vulnerable populations. Through tools such as the Poshan Tracker, PMMVY-CAS, CARINGS, and Mission Shakti Dashboards, the state has created an inclusive digital ecosystem where data not only informs decisions but also enhances transparency, timeliness, and access. These platforms, supported by smartphone-enabled Anganwadi workers and SHG volunteers, offer real-time data that is essential for nutrition monitoring, maternal health, grievance redressal, and child welfare.

The state's high literacy rate, widespread bank account access among women, and strong SHG network (like Kudumbashree) have further enabled the success of these platforms. The 92% daily reporting compliance via the Poshan Tracker and the 87% DBT disbursement efficiency under PMMVY reflect Kerala's digital discipline and administrative alignment. Moreover, the integration of the CARINGS platform with legal and institutional mechanisms has enhanced transparency and accountability in child adoption services. These outcomes are consistent with the vision outlined in the Mission Shakti framework and the goals of digital governance in India.

To strengthen and sustain this model, several policy and practice recommendations emerge. First, bridging the digital divide in remote or tribal areas should be prioritized by improving offline app functionality and enhancing internet connectivity. Second, digital literacy campaigns should be extended to more vulnerable groups, such as adolescent girls and the elderly, through peer-led models within Kudumbashree. Third, Panchayats and local self-governments should be empowered with custom dashboards and data interpretation tools to ensure localized action and real-time monitoring. Interlinking different dashboards (nutrition, health, education, grievance redressal) would create a more holistic service ecosystem.

Looking ahead, the scope for scaling this model is substantial. Other Indian states can adapt Kerala's approach by embedding digital tools within strong local institutions, supported by training and convergence across departments. Innovations such as AI-based early warning systems for malnutrition or voice-enabled applications for non-literate users can further increase reach and impact. Ethical data use, consent mechanisms, and accessibility features must be built into future platforms to ensure responsible and inclusive digital governance.

In conclusion, Kerala's experience shows that digital empowerment is not simply about technology deployment—it is about aligning digital tools with institutional capacity, human readiness, and community trust. When citizens are not just passive recipients but active users and contributors to governance, technology becomes a genuine force for empowerment. Kerala's approach offers a scalable, inclusive, and ethically grounded model for using digital platforms to achieve gender justice, child welfare, and rights-based service delivery in the 21st century.

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