

## Review Article

### **Digital Literacy for Rural Women: Pathways to Empowerment and Socioeconomic Inclusion**

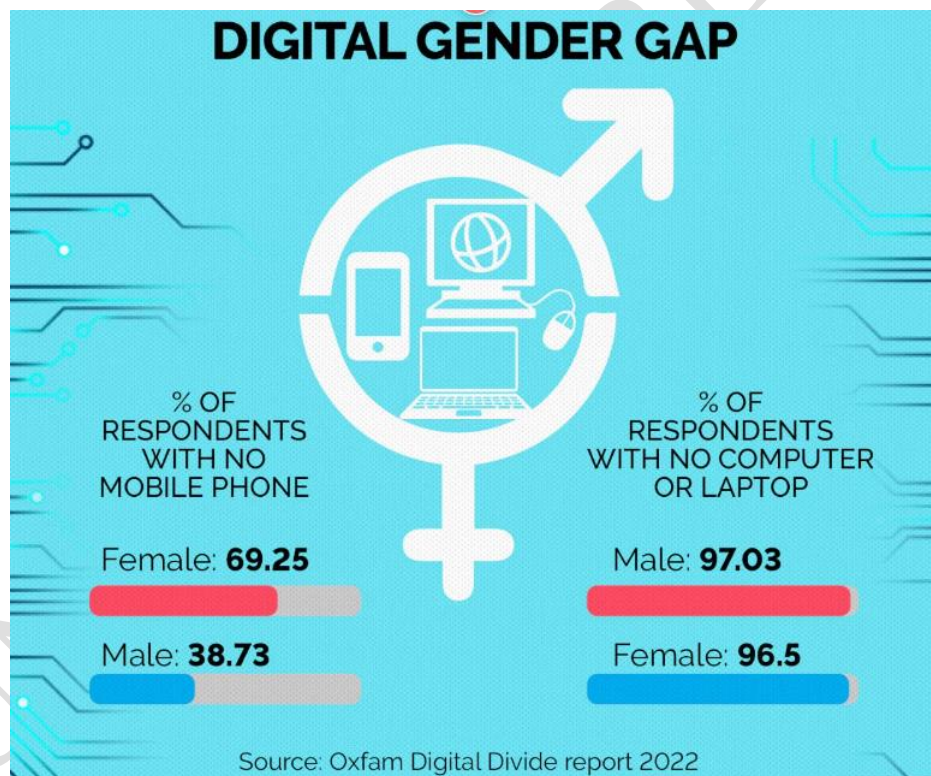
#### **Abstract**

This review paper explores the line of how digital literacy can give rural women power, addressing the hurdles those women face and what innovations might be needed to bring inclusion and economic advancement. This paper aims to look at what has been done so far to promote digital literacy among rural women through existing literature on digital literacy initiatives for rural women and to determine the best way to enhance digital skills to meet their needed. It aims at circumventing some of the barriers rural women encounter in accessing digital resources, evaluating the effectiveness of the existing training models to propose scalable, culturally innovative methods of improving digital literacy. **The study examines how digital literacy efforts affect rural women by using a thematic analysis of secondary data, such as surveys, case studies, and program evaluations. The analysis finds important routes to socioeconomic inclusion and empowerment by combining knowledge from multiple sources.** It also appraises need-based training modules focused on local language content, peer support and low-impacting technological demands. Results show that rural women's economic independence, social engagement and community participation are positively impacted by digital literacy. Nevertheless, consistent gaps remain in policy support and allocations of resources for sustaining the digital literacy program. Finally, the paper recommends pursuing this effort on the basis of collaborative ground-up efforts at the borders of policymakers, educational institutions and organizational entities for the development of the accessible and sustainable initiative of digital literacy geared towards a broader empowerment and development goal.

**Keywords:** Digital literacy, empowerment, inclusion, rural women, training module

## Introduction

The ‘digital divide’ in India has led to a huge disparity in the opportunity to access technology; in particular rural areas where women are more affected than men. Although urban areas have seen progress in digital connectivity, many rural areas remain high on the number of the internet lacking disciplines and digital gadgets. Limited rural women’s opportunity to take advantage of the socioeconomic opportunities from digital literacy and the ability to utilize online resources has also been due to this divide. For instance, “Digital India” seeks to bridge this gap but its implementation has been uneven especially since women in remote areas face structural and cultural barriers to access, and use of technology (Sinha, 2018).



*Figure 1: Digital Gender Gap in India*

*Source: (News18, 2022)*

What is limited also keeps rural women from digital access further marginalizing them so as to be unable to take part in economic participation and educational advancement.

Studies suggest that lack of technological infrastructure, lack of financial resources and of course cultural norms just add to this gap leaving a lot of women digitally excluded (Singh, 2017). In addition, rural women in India are placed in roles which limit their involvement with digital tools and have low levels of digital literacy based on socio-economic inequalities, lack of digital resources and inadequate supportive policies (Kumar 2015).

Rural women need to be literate in the digital world because it can empower them economically, socially, as well as personally. Digital skills access can help rural women participate in the economy, connect with greater communities and access information, all for the goal of broader gender equality and social inclusion [20-22]. Digital Literacy is highly related to financial independence as it enables skills that are important for the participation of both employment and self-employment as well the access to government welfare schemes which are nowadays becoming more and more digitized (Dhanamalar et al., 2020).

However, these benefits remain inaccessible to rural women due to the ongoing gender-based digital gaps, which compounded economic and cultural barriers (Tisnawati et al., 2020). These disparities need to be addressed while digital literacy not only helps reframe gender parity but also helps in supporting sustainable development and inclusivity at the community and the national level. **The study according to Aslam et. al. (2024) shows that women's access to health care, political participation, educational attainment, and economic possibilities are all greatly impacted by computer literacy (Aslam et al., 2024).**

### **Objectives**

The aim of this review is to consolidate findings from available literature on the digital divide for rural Indian women, the constraints facing them, innovations to fill this digital divide, and the digital literacy literature gap. This review explores these themes to draw out the value of need-based, culturally sensitive, digital training models and to identify areas for improvement in existing approaches. And ultimately, this paper aims to give us

what we need to know about how to effectively develop digital inclusion programmes that would help rural women, and aid in sustainable development through digital literacy.

### **Scope and Methodology**

The primary aim of this review paper is to analyse an area of secondary research that was recently reported on both digital literacy and its potential for rural empowerment in India, taking the studies published from 2015 onwards since there has been a new development in digital issues. It scopes to assess the influence of digital literacy on rural women, to identify thorny aspects of digital inclusion for rural women, and to explore novel, need-based interventions within rural settings. To that end, the research synthesizes insights from peer-reviewed studies, government reports, and case studies of digital empowerment projects to offer a holistic study of the topic.

This review uses thematic analysis which identifies the main themes and group findings under these themes including digital barriers, effective training models and the socio-economic benefit of digital literacy among rural women. The paper analyses the impact of cultural and economic factors in limiting rural women's access to digital devices and offers insights into how these factors impact their socio-economic stand. Successful strategies to address these challenges are illustrated through particular case studies, like "Internet Saathi" (Soni & Mitchell, 2021). This review aims to inform policymakers and development organisations on how to promote digital literacy among rural women in India, and how to advocate for a more inclusive and gender-sensitive framework for digital transformation in India.

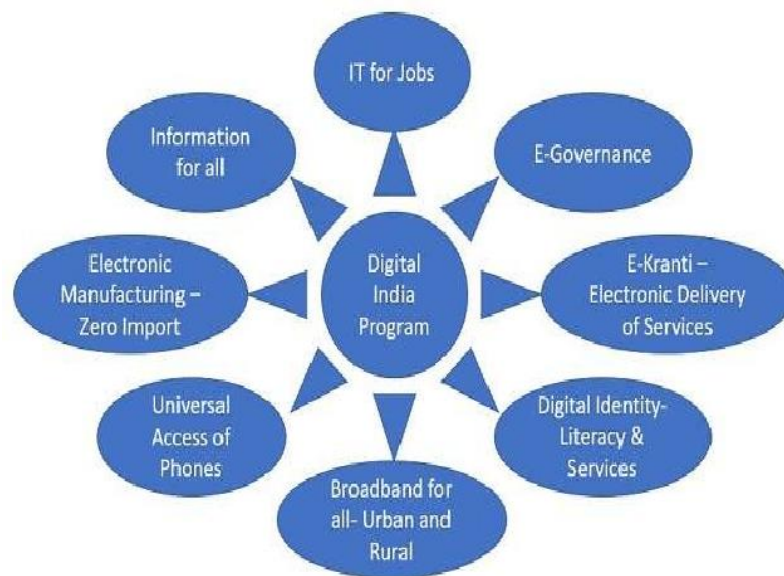
## **Literature Review**

### **Challenges in Digital Literacy for Rural Women**

#### ***Access Barriers***

In many rural areas of India, digital infrastructure like good internet connection,

digital devices and supply of power is still poor. While initiatives such as Digital India seek to address this disparity, rural women persistently suffer from large gaps in technology-based infrastructure—such as access to computers, smartphones, and solid internet connectivity (Kumar et al., 2017). However, this lack of infrastructure is only compounded by poor quality internet services in remote areas, where unreliable electricity for powering digital devices is a constant barrier barring sustained use of such devices.



*Figure 2: Digital India Initiative*

*Source: (Heer, 2011)*

In addition, devices accessible are usually shared among households and women do not have personal access to them. While this communal usage pattern diminishes women's independence with regard to their exploration of digital skills and platforms, women's digital proficiency diminishes too (Islam & Manchanda, 2023). A digital inclusion study indicated that many women spend limited time and freedom with regard to digital engagement because they must share mobile phones, thereby creating an association between digital exclusion and dependence on others for digital access.

Resource scarcity only makes things worse. Because rural women have limited money to begin with, they have them often spend it on immediate family needs, it is often

hard to accommodate the spending on digital tools or internet subscriptions. Also, government devices or cheap Internet programs have made just a little distance in the rural areas. An example is the Digital India initiative, whose realization has not yet tackled rural-specific challenges such as intermittent connectivity and digital illiteracy resulting in low utilisation of the internet when present (Sood & Saxena, 2017). To allow rural women to more fully harness and benefit from digital platforms, this infrastructure and access barrier needs to be bridged.

### ***Socioeconomic and Cultural Barriers***

The digital literacy of rural women is limited by socioeconomic factors. That leaves many rural families, in particular those at or below the poverty line, without adequate means to acquire personal digital devices or pay for internet services that leave them dependent on other community sources of limited accessibility and privacy. Moreover, rural women also face the cultural barrier of encouraging technology use as traditional gender-based roles have discouraged rural women in involved with digital activity. For instance, women tend to be perceived to 'have' careers as caregivers and homemakers, but with little acknowledgement that the dispensation of digital knowledge is required in those roles (Singh et al., 2018).

However, cultural norms are often reinforced by a lack of financial autonomy among rural women, and a lack of autonomy to independently invest in digital learning or get offline tools (Potnis, 2016). In addition to our inability to purchase digital resources, the economic disparity prevents them from participating in or attending digital literacy programs because it is too expensive to get to and participate in the programs. When financial decisions in households are dominated by male members, women's requests for technology investment are most of the time deprioritised and declined.

Additionally, technological tools are often unwelcome, or even seen as unnecessary or inappropriate to women, which in turn can dishearten them and discourage them from

using digital tools. For these women in these communities, the social stigma or scepticism from their families or community leaders when they try to engage with or learn about digital platforms also becomes a barrier towards ending digital exclusion and preventing this cycle from continuing. Socioeconomic and cultural barriers to addressing these need a community-based approach which includes local cultural values and gender equity in digital literacy programs (Singh, 2017).

### ***Educational and Skill Gaps***

The prevailing gap between foundational education and technical skills represents a major issue in digital literacy promotion among rural women. There are many rural women with low levels of formal education, and as such, they cannot read much of the digital content, especially when much of it is written in formal English/Hindi (not their first language), which of course may be another thing they do not understand (Rasekaba et al., 2022). It becomes difficult for women who are not fluent in reading and writing to move forward in the process of acquiring digital skills, due to the fact that digital interfaces are complicated for them.

Also, digital literacy is limited by language barriers. Digital resources and training programs that are not localized for dialects or regional languages are the majority of resources and training programs and are inaccessible to a great many rural women in the developing world. Additionally, the digital literacy curriculum is not, oftentimes, patterned with learners' skill levels, further alienating and discouraging them from learning digital tools (Nedungadi et al., 2018).

Furthermore, even with the availability of digital literacy training, the spotlight does not lie in teaching children comprehensive digital skills capable of giving women economic or social empowerment. Such limited exposure to technology at a very young age makes rural women less comfortable, and less confident employing technology independently. To

close these educational/benefit gaps, there needs to be a contextualised approach to digital training which focuses on local languages, and accessible content, and starts to build confidence with foundational literacy and skill-building exercises.

## **Existing Digital Literacy Initiatives for Rural Women**

### *Overview of Current Initiatives*

To help make the digital world more accessible to rural populations, especially women, India has initiated a number of programs to improve digital literacy. Since 2015, the Digital India initiative has been pivotal in helping promote digital inclusion across the country. Program key components are establishing high-speed internet connectivity in rural areas, building digital infrastructure, and digital literacy in the community through community-based initiatives (Patankar et al., 2017). Pradhan Mantri Gramin Digital Saksharta Abhiyan (PMGDISHA) operates within Digital India and specifically focuses on enhancing the digital literacy of rural households with an emphasis on the marginalised population of women, minorities and economically disadvantaged. The aim of this initiative is to provide basic digital skill training, including how to operate devices, how to use online services or how to interact with digital platforms to achieve productive outcomes (Gahlot & Gahlot, 2020).

Organisations such as the Digital Empowerment Foundation (DEF) too have been organizing programmes to inculcate digital literacy among rural women. Coming to the initiatives, Under DEF, it include Digital Sarthak and GOAL (Going Online As Leaders) which are the community-centric models which can support the women through digital skills training and technology enable mentoring through digital platforms. A combination of digital training with social support systems was DEF's approach and showed to help women increase their engagement and confidence with digital tools (Manzar & Srivastava, 2022). These programs reflect a growing realization that contextual, accessible training can bridge

the digital gap successfully for women, giving them more say in the digital economy.

### ***Case Studies and Successful Models***

And from India's successes in promoting digital literacy in rural women, several successful models have emerged. This includes one notable program – the Bhartiya Model of Digital Literacy (BMDL) instituted by Banasthali Vidyapith in Rajasthan. Under its corporate social responsibility (CSR) initiative, this program, together with local organisations is training more than 10,000 women in rural Rajasthan in digital literacy. Culturally relevant training modules and strong community-embedded focus to build up digital skills for women in an open and sustaining environment (Purohit et al., 2015).

The second case, the Digital Knowledge Project in Hyderabad Karnataka, has been successful in empowering rural communities to acquire digital literacy resources in the local language namely Kannada. Digital tools and information are accessible to rural populations without the need for personal internet access because this program uses public libraries to create hubs for digital literacy. The initiative digitizes local language content to ensure that, with the language barrier removed, digital knowledge is more accessible to non-English speaking rural women so that they can acquire digital skills too (Jange&Chittaranjan, 2018).

The Digital Empowerment Foundation also has another impactful program named GOAL or Going Online As Leaders. An online mentorship program for urban professionals that connects them with rural women, through which they are trained in skills like digital and social skills, and are offered social support. The outcomes of simply showing such a mentorship model to rural women have been higher interest in education and education, among others. Data from the GOAL program showed significant improvement in communication skills, self-confidence and digital awareness among the participants (Manzar & Srivastava, 2022).

Under the Digital India initiative, Pradhan Mantri Gramin Digital Saksharta Abhiyan

(PMGDISHA) is designed to reach out to 60 million rural households. This program provides training of basic digital literacy courses including internet navigation, banking online, and government e-services. While this is its most impactful feature, in the sense that it is able to reach and scale to rural women across remote areas (Gahlot & Gahlot, 2020).

Finally, the community network model is shown through the Digital Sarthak program on how digital literacy can catalyze local economic development. DEF trained rural women to train other women on digital, creating a multiplier effect in digital education and local economic participation through Digital Sarthak. This peer training approach enables women to be more self-sufficient and enables access to digital tools to help them do their small business and access government resources (Manzar & Srivastava, 2022).

### ***Challenges and Limitations***

However, digital literacy program implementation for rural women continues to be challenging. However, as the citizens of this country are highly mobile and information infrastructure is constrained by infrastructure limitations, such as unreliable internet access and the number of digital devices, program reach and effectiveness are also very limited (Patankar et al., 2017). Along with physical barriers such as mobility and rejection of digital tools, cultural and social barriers such as modesty, limited mobility, and scepticism for the use of new technology, translate into low engagement among rural women (Islam & Manchanda, 2023). In addition, many of the programs lack local language content and context-specific curricula which reduces their reach. Challenges are to be overcome by sustained support, localized strategies and enhanced infrastructure to guarantee digital literacy to all.

### **Effective Training Models for Rural Women's Digital Literacy**

#### ***Need-Based and Vernacular Training Modules***

A very successful way to empower rural women was to tailor digital literacy training

programs to local needs and languages. However, many of the digital content in India is in English or Hindi, which does not mirror the local dialects, resulting in many rural communities facing the barriers because of this. To address these problems, vernacular training modules have now also been introduced in programs like the Pradhan Mantri Gramin Digital Saksharta Abhiyan (PMGDISHA). Using regional languages and culturally contextualized examples, these programs have made digital literacy training much more accessible for rural women (Gahlot & Gahlot, 2020).

Bhartiya Model of Digital Literacy (BMDL), Rajasthan implemented, is an example of this approach. This program supports both local languages and interactive, context-based curricula to train women to use digital tools for personal and community benefit. Often, training materials are tailored tutorials on how to access government schemes, how to use the internet and mobile applications, etc. in their native language, which makes the learning more reflective and impactful (Purohit et al., 2015).

A further level of engagement can be achieved by incorporating multimedia learning tools such as videos and audio instructions. In fact, the Digital Sarthak program of the Digital Empowerment Foundation teaches rural women through visual aids and gamified learning how to become digitally literate in basic digital skills. The program keeps interest and practical application of the skills higher by aligning the content with women's daily lives, for instance, teachers are teaching women how to use digital tools for farming and small business (Manzar & Srivastava, 2022).

The vernacular and need-based models show the importance of contextualized training in adaptation to rural and linguistic and cultural nuances in delivering digital literacy.

### ***Community-Centered and Peer-Supported Approaches***

Community-driven models of digital literacy training use groups in a community as a

source of collective strength and familiarity to enhance both the efficacy and accessibility of learning. One peer-supported approach that has great success is teaching and mentoring other women from your own community on digital skills. One example of this model is programs such as GOAL (Going Online As Leaders) that bring urban mentors to serve the needs of rural women through technology-enabled platforms (Manzar & Srivastava, 2022).

The second feature of the Integrated Self Help Group (I-SHG) model shows how community-based networks can spearhead digital literacy efforts. This model brings local SHGs together with digital training programs to enable women to share advice among themselves to participate in their own learning journeys. These programs create a safe, familiar place for learning from which women can gain confidence and begin to use digital tools (Kochukalam & Joseph, 2015).

Likewise, these community-centred approaches scale the scaling of digital literacy programs. Women trained as facilitators multiply outreach and create a sustainable learning ecosystem. This model creates individual capacity as well as contributes to building community cohesion and collective empowerment.

### ***Low-Cost and Minimal IT Approaches***

Our research has found that low-cost digital literacy training models have been critical in resource-limited settings. In particular, programs such as PMGDISHA or initiatives by the Digital Empowerment Foundation use smartphones and affordable technology to deliver training. Pre loaded apps and video tutorial are offline resources that lowers the dependency on continuous internet access which is possible to learn in places where there is no connectivity (Gahlot & Gahlot, 2020).

Outreach further decreases the cost while further maximizing the efforts by utilizing existing community infrastructure, such as libraries or community centres. These are cost-effective ways to make digital literacy available to and affordable for even the most

marginalized groups.

## **Synthesis of Findings: Gaps and Opportunities**

### **Gaps in Current Research**

There remain huge gaps between digital literacy initiatives serving rural women in India, despite numerous efforts to close the digital divide. The primary gap is in the absence of sustainable funding models. PMGDISHA is an example of many digital literacy programs that heavily rely on government funding, and on interruption if the budget is delayed or cut. It restricts their long-term impact and scalability, even in underserved areas (Gahlot & Gahlot, 2020).

The biggest challenge yet is no post-training support schemes. Even though many programs successfully teach digital skills, usually they have no in-built follow-up mechanisms to ensure the use of digital tools. However, rural women lose their newly acquired skills with very few people applying their newfound skills without sustained engagement or when digital platforms rapidly change (Patankar et al., 2017). Furthermore, there is little research on how to build programs that are flexible to changing digital technologies and to the particular needs of rural women.

There are also a few ongoing engagement models. Often, current initiatives are limited to a fixed duration, leaving participants without access to updates, advanced training, or a source of support to overcome problems they run into as they use digital tools. While programs like DigiSarhthak try to fill some of the gaps by training rural women to become trainers themselves, they are less the rule and more the exception (Manzar & Srivastava, 2022).

Lastly, there is very little data on the long-term socioeconomic impact of digital literacy programs specifically for rural women especially on their capacity to generate measurable changes in rural women's empowerment, income levels and social participation

(Dhanamalar et al., 2020). Assessing these gaps is paramount in getting the most out of future efforts in digital literacy.

### **Opportunities for Innovation**

Innovative and scalable approaches can create big opportunities for digital literacy efforts on behalf of rural women in India. One area of research is the use of community-based models such as self-help group (SHGs) and women-led training. Programs including GOAL (Going Online As Leaders), have proven that pairs of rural women paired with urban mentors lead to the development of confidence, leadership skills, and sustained engagement with digital tools (Manzard & Srivastava 2022).

Another area of innovation is mobile applications designed for low-resource settings. Offline or low bandwidth apps can also train in areas where rural women in remote locations do not have reliable internet access. A good example is of SkillBot, a self-learning chatbot offering interactive digital literacy training programs which can help overcome connectivity barriers (Manzar & Srivastava, 2022).

In addition, digital literacy can be linked up with other forms of skill development, including financial literacy, e-governance training, or vocational skill development thereby increasing the impact of such programs. This integration also enables rural women to start applying their digital skills on the ground, where their motivation and confidence are boosted. One area of great success in supporting economic empowerment has been programs teaching rural women to utilize e-commerce platforms to sell local goods, like handicrafts (Dhanamalar et al., 2020).

Apart from that, it is possible to expand partnerships with private sector entities and non-governmental organizations (NGOs) to expand resources and expertise in digital literacy programs. Collaborations in social responsibility under the Bhartiya Model of Digital Literacy have successfully mobilised resources and expertise for training rural women

(Purohit et al., 2015).

Devoid of addressing these existing gaps and instead utilizing these innovative approaches, digital literacy programs have the potential to play a transformative role in making rural women 'literally' and socially empowered, and inclusive development in general.

## **Discussion**

### **Implications for Rural Women's Empowerment**

Rural women have become a digitally literate force to be reckoned with, especially in how they use digital literacy to change their social, economic and personal circumstances. Digital skills help women gain access to computer-based information and resources that were unattainable otherwise — including healthcare services, government schemes and educational opportunities. Digital literacy in courses like PMGDISHA and GOAL (Going Online As Leaders) definitely augments women's confidence, and ability to use technology and helps them break away from a dependence on family members for accessing the platforms of digital innovation (Manzar & Srivastava, 2022).

Digital literacy means that women have the tools to do business on the Internet, manage finances on the Internet, and they can explore their entrepreneurial talents on the Internet. For instance, through programs such as Digital Sarthak, women using these trainings have begun micro businesses and can sell their products on digital marketplaces, expanding economic freedom (Manzar & Srivastava, 2022). Digital skills also empower women to better utilise e-governance platforms to get subsidies, benefits, employment opportunities and financial aid schemes on offer by the state.

Personal digital literacy helps increase self-esteem and the ability to make decisions. In rural areas, where the cycle of isolation is frequently suffered, women who become proficient in digital gain feeling more in control of handling household responsibilities, of

participating in community affairs, and yet they are also more empowered to transition to other fields (Dhanamalar et al. 2020). Similarly, younger generations are exposed to digital tools and get accustomed to that, so even if they don't have digital tools on the ground, they're accustomed to using technology, which is an intergenerational shift toward the ability to be increasingly digitally included.

### **Linking Digital Literacy to Broader Development Goals**

Digital literacy, in its wider sense is a strong enabler for the achievement of broader development goals, such as gender equality, economic empowerment, and social inclusion. It begins to bridge that digital divide and gives women the same opportunities that people have always had, addressing longstanding gender disparities. For instance, digital tools allow rural women to participate in education and employment on equal footing with their urban counterparts, a key step toward achieving Sustainable Development Goal (SDG) 5: Gender Equality (Islam, & Manchanda, 2023).

Digital literacy is important for meeting the following SDG 8, decent work and economic growth. By showing women how to manage sales, track business trends, and even take orders through cell phone rather than word of mouth, these programs offer them a range of e-commerce and digital financial services, thereby helping women diversify income sources, gain access to formal markets, and seek credit facility. Utilizing women in the digital workforce gives rural economies economic inclusion and contributes to general community development (Dhanamalar et al., 2020).

Socially, digital literacy promotes SDG 10: By connecting rural women to wider networks and information ecosystems, rural women diminish divisiveness and inequity and reduce inequalities. This connectivity enables rural communities from marginalization and helps them to social cohesion and participate. For example, programs like Digital Sarthak that focus on community-based learning bring together like-minded women, allowing them

to work together, learn from each other, and fight for collective growth (Manzar & Srivastava, 2022).

Moreover, digital literacy aligns with SDG 4: Quality Education: Access to online platforms, and educational resources for women to have lifelong skills learning opportunities. Digital literacy programs serve a role as a catalyst to multiple developmental goals, placing women at the forefront of change-makers in their communities. Investing in women isn't just about empowering them — it is also about accelerating progress towards more sustainable, inclusive growth.

### **Conclusion**

Digital literacy has been shown to be a game changer in the ability of rural women to become empowered socially and economically as well as personally. While there has been significant progress on such tools as PMGDISHA and GOAL, the analysis shows there are still important challenges to overcome — such as infrastructural barriers, lack of access to resources, and cultural constraints. Positive outcomes have been shown by programs that emphasize vernacular and community-centred training in order to empower women to seek, access, buy and sell via e-commerce and participate in governance processes.

What our findings underscore in an urgent way, together with information from field experiments, is the need for scalable, sustainable digital literacy programming designed specifically to fit the particular needs of rural women. To remain in conversation, these initiatives need to plug infrastructure deficits, provide post-training support, and align digital literacy with broader efforts to build skills. It is hoped that future research will evaluate the long-term effects of these programs and perhaps explore the long-term effects in areas such as economic independence, social inclusion and gender parity.

As we move to develop digital literacy as a cornerstone of rural development, policy frameworks must acknowledge that it is a necessary component for greater sustainability

beyond its rural context. Collaboration between government agencies, private sector entities and NGOs helps policymakers create an ecosystem where all rural women can be digitally included and flourish. Further investment in research and innovation will refine these strategies and make them more effective and more adaptable to changing digital landscapes.

### **Policy Recommendations**

To support and scale digital literacy programs for rural women, policymakers, organizations, and educational institutions should implement the following recommendations:

- **Digital Training Programs with Subsidies:** Propose free or subsidized digital literacy courses that can serve marginalized groups and more specifically rural women. Additional funding to incentivize further reaching outreach comes in very handy for programs like PMGDISHA which aims to ensure digital inclusion across the remote parts of the country.
- **Infrastructure Investments:** Build up infrastructure to ensure that connectivity, electricity and access to digital devices are improved in rural areas. Building broadband networks and providing affordable devices can be done through leveraging public-private partnerships.
- **Localized and Vernacular Content:** Overcome literacy and language barriers with training modules developed in regional languages. Training content should be contextualized for rural women as per their needs, e.g. e-governance, e-commerce, and financial literacy with practical application.
- **Community-Based Learning Models:** This will encourage women to form self-help groups (SHGs) or community-driven initiatives where women learn and can help each other. The Peer-to-peer learning method is shown in programs like Digital Sarthak to scale digital literacy.

- **NGOs and CSR Initiatives Collaboration:** Look to partner with NGOs and Corporate entities involved with CSR programs to provide additional resources and expertise aid in digital literacy campaigns. Collaborations of this kind demonstrate their effectiveness, as models such as the Bhartiya Model of Digital Literacy show how to use such to train great numbers of rural women.
- **Integrating Vocational Training:** Digital Literacy with Vocational Skills Training can be a means for creating economic empowerment opportunities. For instance, educating a woman about how to use e-commerce platforms will help her sell her products and earn an income.
- **Producing Post Training Support and Monitoring:** Set up channels to give continuous after the training support and updates. There could be helplines, mentorship programs and advanced training modules to ensure sustained engagement with the digital tools.
- **Digital Inclusion Policy Framework:** Integrate digital literacy with national strategy for other rural development goals such as poverty reduction, agricultural development, harnessing the power of information and communication and cultural exchange. This strategy should stress the narrowing of the gender digital divide, grappling with gender-sensitive technologies and allowing for equitable access to digital resources.

Stakeholders by implementing these recommendations can build sustainable and scalable digital literacy programs for rural women and generate inclusive development resulting in acceleration towards sustainable development goals.

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UNDER PEER REVIEW

## References

1. Abraham, K. C., & Joseph, J. (2015). Integrated Self Help Group (I-SHG) - The Potential Maximized Through a Sustainable Social Business Model. *IBMRD's Journal of Management & Research*, 4(1), 10. <https://doi.org/10.17697/ibmrd/2015/v4i1/60339>
2. Aslam, A., Abidi, S. N. M., & Rizvi, S. S. A. (2024). Digital Literacy and Women's Empowerment: Bridging the Gender Gap in Technology for Achieving Sustainable Development Goals (SDGs). *Pakistan Journal of Gender Studies*, 24(2), 93-106.
3. Dhanamalar, M., Preethi, S., & Yuvashree, S. (2020). Impact of Digitization on Women's Empowerment: A Study of Rural and Urban Regions in India. *Journal of international women's studies*, 21, 107-112.
4. Gahlot, A., & Gahlot, S. (2020). Changing the state of literacy in the Digital Age in India. , 3, 98-107. <https://doi.org/10.29007/QBPR>.
5. Islam, A., & Manchanda, P. (2023). *Gender Inequalities in Digital India: A survey on digital literacy, access, and use*. <https://doi.org/10.20919/mcuu2363>
6. Jange, S., & Chittaranjan, K. (2018). *Rural Empowerment through Digital Knowledge Project in Hyderabad Karnataka, India : Regional Content, Access and Impact to Reach the Unreached*. <https://doi.org/10.1109/ettlis.2018.8485204>
7. Kumar, H., Poonia, S., & Iliyas, M. (2017). *A Step Towards Empowerment and Digital Inclusion of Rural Public in India*. 375–383. <https://doi.org/10.1145/3047273.3047283>
8. Kumar, N. (2015). The gender-technology divide or perceptions of non-use? *First Monday*, 20(11). <https://doi.org/10.5210/fm.v20i11.6300>
9. Manzar, O., & Srivastava, S. (2022). Presenting START, GOAL, Digital Sarthak, SkillBot and Maker's Space: Inspiring Innovations for an Empowering, Democratic

- and Inclusive Technological Society. *Tenth Pan-Commonwealth Forum on Open Learning*. <https://doi.org/10.56059/pcf10.9404>
10. Nedungadi, P. P., Menon, R., Gutjahr, G., Erickson, L., & Raman, R. (2018). Towards an inclusive digital literacy framework for digital India. *Education + Training*, 60(6), 516–528. <https://doi.org/10.1108/et-03-2018-0061>
11. Patankar, R., Vyas, S., & Tyagi, D. K. (2017). *Achieving Universal Digital Literacy for Rural India*. <https://doi.org/10.1145/3047273.3047325>
12. Potnis, D. (2016). Culture's consequences: Economic barriers to owning mobile phones experienced by women in India. *Telematics and Informatics*, 33(2), 356–369. <https://doi.org/10.1016/j.tele.2015.09.002>
13. Purohit, H., Bharti, N., & Joshi, A. (2015). Partnering for Promotion of Digital Literacy Among Women in Rajasthan Through Bhartiya Model of Digital Literacy. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.2665736>
14. Rasekaba, T. M., Pereira, P., Rani, G. V., Johnson, R., McKechnie, R., & Blackberry, I. (2022). Exploring Telehealth Readiness in a Resource Limited Setting: Digital and Health Literacy among Older People in Rural India (DAHLIA). *Geriatrics*, 7(2), 28. <https://doi.org/10.3390/geriatrics7020028>
15. Singh, S. (2017). Bridging the gender digital divide in developing countries. *Journal of Children and Media*, 11(2), 245–247. <https://doi.org/10.1080/17482798.2017.1305604>
16. Singh, S., Singh, S., & Kumar, A. (2018). Women and ICT: A Study on Access and Perceptions in North India. *Indian Journal of Human Development*, 12(3), 401–419. <https://doi.org/10.1177/0973703018818588>

17. Sinha, S. (2018). Gender Digital Divide in India: Impacting Women's Participation in the Labour Market. *Reflecting on India's Development*, 293–310. [https://doi.org/10.1007/978-981-13-1414-8\\_14](https://doi.org/10.1007/978-981-13-1414-8_14)
18. Soni, S., & Mitchell, A. M. (2021). Women and digital government in rural India: Extending TAM with user assisted service. *Information Polity*, 1–20. <https://doi.org/10.3233/ip-200302>
19. Sood, S., & Saxena, N. (2017). *Moving Beyond Digital Literacy and Towards e-Governance in Rural India*. <https://doi.org/10.1145/3055219.3055243>
20. Tisnawati, N. M., Ashar, K., Pratomo, D. S., & None Susilo. (2020). *Digital Divide and the Livelihood Strategy of Female Informal Sector Workers in Rural Areas*. <https://doi.org/10.2991/aebmr.k.200606.039>
21. Hufad A, Purnomo NS, Rahmat A. Digital literacy of women as the cadres of community empowerment in rural areas. *International Journal of Innovation, Creativity and Change*. 2019;9(7):276-88.
22. Irfan T, Salam MT. Kaarvan Crafts Foundation: Embracing digital literacy for women empowerment. *Emerald Emerging Markets Case Studies*. 2020 Dec 1;10(4):1-34.
23. Debbarma A, Chinnadurai AS. Empowering women through digital literacy and access to ICT in Tripura. *Research Journal of Advanced Engineering and Science*. 2023;9(1):5-9.
24. Heer T, Garcia-Morchon O, Hummen R, Keoh SL, Kumar SS, Wehrle K. Security Challenges in the IP-based Internet of Things. *Wireless Personal Communications*. 2011 Dec;61:527-42.