

Digital Empowerment and Indian Handlooms

Case-based Policy Recommendations

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Mere access to the internet does not guarantee progress; end users must be equipped to draw tangible benefits. This study explores the digital access and education initiatives in the handloom clusters of India and attempts to arrive at policy interventions for the sustainable digital empowerment of workers in indigenous trades such as handlooms. In-depth case research was conducted in three project sites, at various stages of maturity, of the Digital Cluster Development Programme by the Digital Empowerment Foundation in India. The physical infrastructure of digital connectivity needs to be accompanied by vocation-specific digital interventions for connectivity to be used productively and for digital empowerment to take place. A three-pronged social policy intervention model based on access, education, and engagement involving public–private partnerships, which may substantially enhance digitalisation of indigenous business models and digital empowerment of communities engaged in such professions, is recommended.

In South Asia, the manufacture and trade of indigenous handmade textiles, or handlooms, constitute one of the largest generators of the gross domestic product (GDP) (Sikdar and Pereira 2019) and rural employment (Koulagi 2015). Handlooms form part of the cottage industry, articulate the land's culture and history, and provide livelihoods to the marginalised. Given the wealth and complexity of its “knowledge, skills, and social relations,” the handloom sector is recognised as a potent area for sustainable socio-technological innovations such as digitalisation (Mamidipudi et al 2012: 41).

Digitalisation aids businesses by eliminating the physical barriers between suppliers, sellers, and buyers, thereby creating new services and products, expanding market reach, and making the value chain efficient (Loebbecke and Picot 2015; Rachinger et al 2019)—all crucial for the handloom business. Recent years have seen multiple interventions to digitalise the handloom business, improve profitability, and upgrade the living standards of the handloom workers (Mamidipudi 2019; Suri and Payyazhi 2019).

Each 10% increase in internet penetration in emerging economies raises the per capita GDP by 1.2% (WEF 2015); however, access to the internet does not immediately lead to productive use because the target groups lack awareness and motivation. The spread of internet connectivity is impeded by demographic factors (Chen and Wellman 2005), the shortage of human capital and lack of demand (Park 2017), a lack of skills (Bornman 2016), poverty (Eisenman 2018), and attitudinal issues (Van Dijk 2017). Digital empowerment drives among the marginalised fail because they do not know the productive uses of connectivity to the internet or how it can improve their welfare or business, and because the language is a barrier (Scheerder et al 2017). The gap between internet access and effective usage shows that digital empowerment depends crucially on policy-level educational interventions that aim to build digital competency.

This paper provides a policy framework for the digital empowerment of handloom workers and the digital transformation of the handloom trade. It draws upon the Digital Cluster Development Programme (DCDP) of the non-governmental organisation (NGO) Digital Empowerment Foundation (DEF) in three handloom clusters in India. The DCDP provides the handloom community low-cost wireless internet access and supplementary training in digital education and business. Extending and improvising on the DCDP model, this paper arrives at public policy interventions to ensure the self-driven and

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sustainable digital empowerment in niche businesses such as the handloom industry.

Typically, handloom clusters are located in rural and semi-urban areas and the end buyer in urban centres. Digital interventions in the handloom sector help modernise offerings, enhance sellers' reach, and eliminate intermediaries. In India, the fifth largest economy of the world (*Business Today* 2020), the handloom trade is the second largest generator of employment (Mamidipudi 2019), and the potential for the digital transformation of indigenous business models is remarkable.

The "digital economy" is "that part of economic output derived solely or primarily from digital technologies with a business model based on digital goods or services" (Bukht and Heeks 2017: 1). The digital sector (information and communications technologies) forms the core of the digital economy, and it is projected to generate \$435 billion, or 10% of India's GDP, a year by 2025 (Kaka et al 2019). Public policy reforms in digital technology are crucial for empowerment and social inclusion, and India has witnessed several reforms (Selwyn 2002). The National Optical Fibre Network, presently BharatNet, provided broadband access to 1,21,100 Indian gram panchayats by 2018, and 1,52,356 gram panchayats are connected as of January 2021 (BBNL 2021). Some of the key objectives of BharatNet were to provide universal broadband connectivity at 50 mbps (megabits per second) to every citizen, provide 1 gigabits per second (gbps) connectivity to all gram panchayats by 2020 and 10 gbps by 2022, connectivity to all uncovered areas, and train one million people in new age skills (Deloitte 2018). The set-up costs of BharatNet are high, however, and attention has turned to the open spectrum—the 2.4 gigahertz (GHz) and 5.8 GHz spectrum bands that the Government of India (GoI) keeps unlicensed for free use (Ponappa 2011)—to inexpensively boost last-mile connectivity in remote rural areas using Wi-Fi networks.

The programmes that seek to improve access to the internet are supplemented by programmes in e-governance (Digital India, which facilitates access to government services, grievance cells, and citizenship records online); education (National Knowledge Network); and entrepreneurship (Startup India, which facilitates access to start-up loans and incubators) (Ministry of Commerce and Industry 2020; UNCTAD 2019). The growth rate of internet users in India is three times the world average; 835 million Indians are expected to have internet access by 2025 (Kaka et al 2019). Of the new internet users in India, 75% are from rural areas, the seat of the handloom trade (NASSCOM 2016). India ranks ninth worldwide in e-commerce (the volume is \$400 billion) (UNCTAD 2019).

E-commerce is particularly suitable for popularising digital marketplaces for indigenous art. However, 88.7% of the households in the handlooms sector are located in rural areas, while the end buyer mostly resides in urban centres (Ministry of Textiles 2019b); and internet use in rural India is the highest for entertainment (60%), as opposed to financial transactions (15%) and online services (14%) (Internet and Mobile Association of India 2017). The ground is set for the digital

transformation of the handloom business, but connectivity needs to be supplemented with training in productive uses of the internet.

The Handloom Sector

Handloom art typically flourishes in specialised geographical clusters, using locally available raw materials and promoting local motifs, folklore, and traditions. South Asian countries specialise in a variety of handloom art, such as the Muslin and Tant in Bangladesh, handwoven silk in Nepal, Kishuthara silk art in Bhutan, cotton and silk Longyi of Myanmar, the Feyli Viyun handloom of the Maldives, or the woolen handloom art in Pakistan. The handloom industry in India dates over 2,000 years, currently employing around 4.33 million weavers and 3 million rural households and registering a 4.8% year-on-year growth (Export-Import Bank of India 2018). Indian handloom mainly utilises cotton and silk, yielding garments, such as handloom sarees, dress material, shawls, dhotis, sarongs, *angavastrams*, towels and handkerchiefs, household products, such as bedsheets, blankets, carpets, rugs, and curtains; and utilities such as surgical bandages (Ministry of Textiles 2019b).

The Export Scenario

India is the second largest exporter of handlooms in the world (Export-Import Bank of India 2018); handlooms contribute about 15% of its total exports (Jiwani 2020). India's handloom exports were valued at \$343.69 million in 2018–19, and data available until November 2019, show exports worth \$226.05 million in 2019–20 (IBEF 2020). In 2019, the top importers worldwide were the United States (US), United Kingdom (UK), Spain, Italy, and Germany; in Asia, the biggest importers were the United Arab Emirates (UAE), Japan, Thailand, and Sri Lanka (Handloom Export Promotion Council nd). The maximum revenue is generated from the export of national flags (\$64 million) (Iyengar 2018), followed by rugs and carpets, other woven cotton, wool, or animal hair fabrics, and sarees.

Handloom exports declined from \$369.11 million in 2013–14 to \$343.69 million in 2018–19. The decline has been attributed to the lack of positioning in international markets and the competition from the handloom products of China and Bangladesh (Export-Import Bank of India 2018). Handloom exports are vulnerable to changing conditions in international markets. A slowdown in the US and European markets in 2016 led exports to fall 30%. The European Union (EU) removed India from the preferential duty list, and the territory opened to other Asian players such as Pakistan, Bangladesh, and Sri Lanka (Srivastava 2018). The US removed the Generalized System of Preferences in 2018, which enhanced the import duties on Indian handlooms (Iyengar 2018).

The GoI has adopted several schemes and programmes to encourage handloom exports (Ministry of Textiles 2019c). The Market Access Initiative Scheme provides financial assistance for the marketing, capacity building, and trade promotion of select handloom products in focus countries. The National Handloom Development Programme (NHDP) facilitates cultural exchange by assisting weavers in travelling overseas. Trade promotions for export are aided chiefly by the Handloom

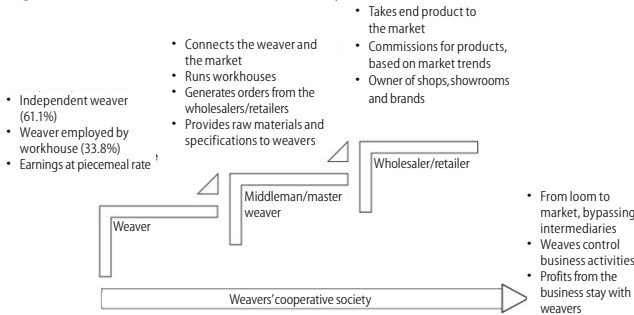
Export Promotion Council, which organises buyer–seller meets, international exhibitions, and other publicity measures to promote the sale of Indian handlooms abroad. The Merchandise Exports from India Scheme and the Remission of Duties and Taxes on Exported Products Scheme exempt handloom exports from customs and excise duties. The textile and apparel industry receives a boost from free trade agreements (FTA) with members of the Association of Southeast Asian Nations (ASEAN) and from foreign direct investment (FDI); the GoI allows 100% FDI in the industry (Ravi 2020).

The US and EU, the top exporters of Indian handlooms, are among the worst-affected by the COVID-19 pandemic; extensive order cancellations led India’s handloom exports to fall 35% in March 2020 and to a loss of \$8–\$10 billion (Ravi 2020). To address these issues, the GoI formulated a package of financial measures: it reduced the rates for tax deducted at source, offered small businesses loans without collateral worth \$51.35 billion,¹ infused \$9.8 billion² into non-banking financial institutions, including microfinance institutions, and took measures to increase liquidity in the domestic market and, thereby, boost consumption (*Hindustan Times* 2020).

The Handloom Ecosystem

The core unit of the labour-intensive handloom trade is the weaver, who typically depends on other agents in the environment for sourcing raw materials and designs, soliciting orders, and selling the products. Handloom products reach the end customer through a three-tier system (Figure 1). The handloom trade is unorganised, and it is far from profitable for handloom workers.

Figure 1: The Three-tier Handloom Ecosystem



The handloom ecosystem is tiered, and subcontracting is one of its chief problems. Handloom workers overwhelmingly reside in rural and semi-urban areas, while the end buyer typically resides in urban areas. The handloom trade is labour-intensive, and the weavers depend on external agents for managing both the supply and demand side of their businesses.

This is where subcontractors or intermediaries step in. Intermediaries interact with urban retailers and gather information on customer demands and market trends, obtain orders for products, commission weavers to make the products, and supply the raw materials and infrastructure needed to the weavers. The intermediary maintains a margin of profit at each stage of the ecosystem, thus raising the price of the end-product for the customer; the core handloom worker, distanced from the end buyer, receives only a meagre portion of

the end value. Weavers are disconnected from the market and depend on intermediaries for sustained income.

The handloom ecosystem has other problems too: the implementation of government policies is ineffective (Bhowmik 2019), demand fluctuates, modernisation and economies of scale are absent, and innovation to keep up with changing customer demands is low (Soundarapandian 2002). The occupation of weaving involves specialised skills handed down from generation to generation, and it is based on family heritage and valued, but the competing power loom products are cheaper, and handloom products stand to lose the competition unless new ingenuities—whether in designs, weaving, or marketing—are added to current methods (Kumar 2016).

The industry is unorganised and the weavers financially weak. Most weavers survive on low wages—about 67% of households earn less than \$65.82 per month— they supplement their income with alternate vocations—and they often abandon their traditional livelihood to become construction workers, vendors, or rickshaw pullers (Bhattacharya and Sen 2018). Few weavers are aware of the various government schemes and initiatives for the handloom sector, and 23.3% of them have never attended school, as per the Handloom Census 2019–20 (Ministry of Textiles 2019b).

The Handloom Export Council and the National Handloom Development Corporation (NHDC) monitor the handloom trade in India. The NHDP of 2011 provided for waiver of overdue loans, subsidised credit for upgrading technology, support for marketing, handloom census, weavers service centre, and Indian Institutes of Handloom Technology (Ministry of Textiles 2019a). In 2016, the NHDC launched the mobile app, E-Dhaga, to facilitate the supply of yarn to the weavers. The GoI signed a memorandum of understanding with 21 e-commerce companies to provide handloom workers an e-commerce platform. Handloom products worth ₹0.17 billion were sold online in 2017. The GoI launched the Handloom Mark, a trademark for authentic handlooms, and started the India Handloom branding initiative on social media to connect with customers, especially the youth, and promote high-quality handloom products (Ministry of Textiles 2019b).

The Digital Cluster Development Programme

Established in 2002, the DEF utilises the free/unlicensed spectrum of 2.4 GHz and 5.8 GHz to provide wireless internet connectivity to remote locations in India. The DEF is present at more than 14 locations across India and abroad. The DEF collaborates with entities such as the GoI, United Nations organisations, World Bank, EU, Bill and Melinda Gates Foundation, Intel Foundation, Sir Dorabji Tata Trust, Google Inc, Vodafone Foundation, and Microsoft Inc (Majumdar et al 2018).

The DCDP is one of the flagship initiatives of the DEF. The DCDP aims to empower the handloom clusters of India through digital transformation. The DCDP incorporates a low-cost, last-mile internet connectivity programme, called Wireless for Communities (w4c), and a digital literacy and inclusion programme, the Community Internet Resource Centre (CIRC), which supplements the w4c programme.

This study aims to make policy recommendations based on evidence drawn from innovative empowerment models practised in the relevant sector, and the case study approach was perceived to be relevant and appropriate to investigate the research questions. The study was carried out in three DCDP centres in India: Chanderi (Madhya Pradesh, central India), Barpali, and Nuapatna (Odisha, eastern India).

Chanderi, a small township, lends its name to the famous Chanderi handloom, characterised by intricate handwoven designs on textiles, generous use of colours and traditional themes. Barpali is a small town famous for *Pasapalli* and “tie-and-dye” ikat handloom. Ikat consists of printed designs relating to folklore and religious symbols on handwoven clothes. Nuapatna, around 280 kilometres from Barpali, is the centre for the ikat handloom in silk, and home to several national award-winning handloom artisans.

The shortlisting was done to capture projects at different developmental stages based on the number of activities carried out at a cluster. The aim was to explore the evolution of the model and the problems faced at each stage. At the nascent stage, the DCDP is engaged only in value-added activities such as digital education and design. At the intermediate stage, the DCDP supplements education with engagement through community-building activities. At the mature stage, the project is self-sustaining and it generates revenue through value-added digital services (Table 1).

Table 1: Classification of the Three DCDP Clusters—Nuapatna, Barpali, and Chanderi

Cluster	1	2	3
Location	Nuapatna, Odisha	Barpali, Odisha	Chanderi, Madhya Pradesh
Average monthly household income	₹1,500–₹3,000	₹6,000–₹8,000	₹1,000–₹1,500
Average family size	6–10 members	6–10 members	6–10 members
Number of weavers (approximate)	5,000	2,000	11,000
Handloom specialisation	Ikat on silk	Posapalli, ikat on cotton	Chanderi on cotton and silk
Project name	Digikala	Digikala	Chanderiyaan
Inception year	2015	2015	2009
Project life stage	Nascent (1)	Intermediate (2)	Advanced (3)
Revenue realised by DEF	----NA-----	----NA-----	FY 2016 \$45,000, compound annual growth rate of 20%

Source: Adapted from Jain et al (2017), interview data, and DEF websites and brochures.

“Lived experiences” are useful in gaining the perspectives of stakeholders and in designing innovations (McIntosh and Wright 2019). This study was conducted in two phases, background research and field studies, to capture the lived experiences of the stakeholders as closely as possible. Phase 1 comprised a review of the relevant literature and interviews and focus group discussions (FGDs) with the key stakeholders—Osama Manzar (founder and director of the DEF) and the project head, accounts officer, marketing officer, and chief technicians of the DEF. The discussions focused on the evolution of the project, perceived impact, managerial problems, and future directions.

Phase 2 comprised field visits to Chanderi for 15 days and Barpali and Nuapatna for two days each. Each project site was visited twice. At each project site, the research team closely

observed the project facilities: handloom workshops and store, technical set-up for wireless internet services, classrooms, and the public and private institutions subscribing to the low-cost internet of the DCDP. Interviews and FGDs were conducted with the technicians, support staff, salespersons, trainers, and fieldworkers of the DEF and with the community members (handloom workers, master weavers, and project beneficiaries). Overall, 55 semi-structured interviews were conducted with 45 respondents across the three project sites, and in New Delhi, the project headquarters.

To capture the major themes that emerged out of the interviews conducted, the data were subjected to content analysis and followed by thematic analysis. The analysis helped to understand the government initiatives, success stories, challenges of broadband implementation, and internet adoption.

Wireless Connectivity and Allied Services

Rural segments, particularly the remote and underdeveloped segments, are unattractive for internet service providers (ISPs), owing to the lack of economies of scale, high entry barriers, and linguistic and cultural barriers to online content. In this case, the DCDP addressed the issue of last-mile connectivity by using the open spectrum and low-cost Wi-Fi equipment.

We also learnt from our international experience that there are many alternative technologies—there is wireless technology, there is mesh technology, there is spectrum technology. So we started our first experiment with licensed spectrum and how can we use it for providing connectivity in our operations in a place called Chanderi—we were already working there with the weavers. (Manzar 2017)

Table 2 shows the significant initiatives in the clusters. Some dynamics common to the clusters had important implications for the sustainability of the DCDP model.

Table 2: Major Initiatives in the Three Handloom Clusters

	Nuapatna (Nascent Stage)	Barpali (Intermediate Stage)	Chanderi (Advanced Stage)
Digital education	English, digital skills (approximately 30 students)	English, digital skills, digital designing (approximately 100 students)	English, digital skills, digital designing (approximately 750 students)
Digital designing	Design competitions, to encourage local talent	Digitally archiving over 500 ikat designs	Low-cost services of CAD/CAM (computer-aided design/computer-aided manufacturing)—for intricate handloom designs
Self-help groups (SHG)		SHGs for handloom workers to collectively manage handloom supply chain	SHGs for handloom workers for managing supply chain
Digital connectivity		Low-cost internet services	Low-cost internet service; Low-cost internet cafes and digitally enabled services
Online selling of Chanderiyaan products			Selling handloom products in-store and online at www.chanderiyaan.net
Women empowerment			Wireless women for entrepreneurship and empowerment programme (W2E2): providing digital training to aspiring women entrepreneurs

Lack of quality control and trademark: The Handloom Mark was not adopted here, and buyers were often duped by the cheaper power loom products. Handloom products have a wide variety of prices, and that affected sales. Participants reported the need to standardise handloom prices and quality, and one interviewee observed:

People face the challenge from powerloom. Because the cost of labour is much lower there, they sell for a much lower price, for example, ₹1,000 as opposed to ₹5,000. Buyers do not see any difference between the two kinds of clothes. (Ahmad 2017)

Access to design technology and hardware: The interviewees reported that digital adoption was deterred by poor access to digital devices, electricity, and high-speed internet, and they recommended collaboration with national-level training and fashion institutes for innovations in design.

Location: Low footfall at the Digikala centres in Barpali and Nuapatna were attributed to the distance from the village. The project sites should be centralised, and portable set-ups, such as mobile schools and internet cafes, are needed too.

Faculty training programme: The need for a standardised staff-training plan was reported in Nuapatna to maintain homogeneity in the quality of educational interventions. The trainers at Barpali, too, reported the need for training in spoken English.

Certification: The interviewees reported that certification from recognised educators might be useful for generating interest. Many trainees also looked for post-training placement opportunities in the DCDP.

Cross-centre communication and knowledge-sharing: The DCDPs are not connected, and the opportunity to learn from each other's experiences does not exist. The interviewees said that establishing communities of practice would help them share knowledge easily.

Self-sustainability: The interviewees in all the clusters were uncertain about funding in the future. A self-sustainable institutional model, with low dependence on external funding, is important.

In digital empowerment interventions, standardisation helps maintain the quality of interventions across clusters, while customisation helps the interventions satisfy the unique needs of a cluster; and standardisation and customisation need to be balanced.

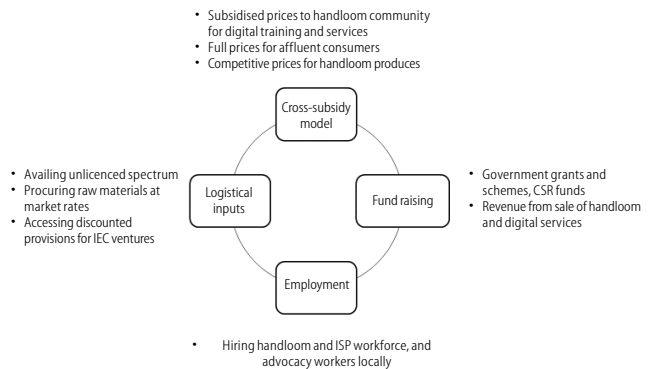
Ours is a programme. It is not a project, because projects are usually short-term. Programme has a holistic approach in that it is not supposed to be dependent on funding ... we have to take a long run approach and make the model self-sustainable ... It is born out of a necessity that access is the most important thing, and it will always be for next several decades in India. (Manzar 2017)

The Rise of a Hybrid Social Enterprise

Unless social interventions generate revenue, they remain externally driven, powered by philanthropic tendencies rather than community-generated survival and growth drives (Majumdar et al 2018). Social entrepreneurship is an effective alternative

for bringing about social change (Austin et al 2006; Murphy and Coombes 2009). Traditional ventures aim to maximise economic value, but social entrepreneurial venture have a social purpose at their core, along with the purpose of generating wealth (Austin et al 2006; Mair and Marti 2006). Community wealth enterprises, or “entrepreneurial hybrids,” address the causes of a social problem by generating revenues and profits and, ultimately, bringing about social change (Shore 1995). In “bottom-of-the-pyramid” markets in developing economies, entrepreneurial hybrids effectively meet needs that are ignored by conventional business models (Prahalad 2009). Notable examples of social entrepreneurship are the microfinance model of Grameen Bank, Bangladesh (Yunus 2008); JEEVIKA, India (Kumar 2019); Goodweave International, India; and the Amazon Conservation Team, Brazil. The hybrid model addresses social causes in each of these cases by encouraging community participation, market orientation, and professionalism in operations. Through the social enterprise model of the DCDP—which combines technology, digital education, and public-private partnerships—the DEF attempts to empower the handloom community and transform the business (Figure 2).

Figure 2: Social Enterprise Paradigm Offered by DEF



The SCALERS framework (Bloom and Chatterji 2009) proposes seven levers or organisational capabilities a social enterprise can use to scale successfully: (i) staffing (recruiting competent and motivated staff); (ii) communication (idea advocacy and stakeholder management); (iii) alliance-building (forging partnerships with organisations having shared goals); (iv) lobbying (influencing governments for action); (v) earnings generation (generating a stream of revenue); (vi) replication (facilitating the reproduction of successful models); and (vii) stimulating market forces (incentivising people and institutions to join and endorse its programmes).

The SCALERS framework can be used to analyse the DCDP's approach of holistic digital inclusion and to investigate how, through a variety of channels, the DEF achieves social equity, maximises social impact, and gains credibility (Figure 3, p 57).

Need for Vocation-specific Digital Interventions

Social investment in building human capital is superior to simple compensatory schemes (Busemeyer and Garritzmann 2019). In-depth analyses of the DCDP, too, reinforce the notion that digital competencies are needed to effectively utilise the digital infrastructure at handloom clusters. India has various

Figure 3: SCALERS Model and the Digital Cluster Development Programme

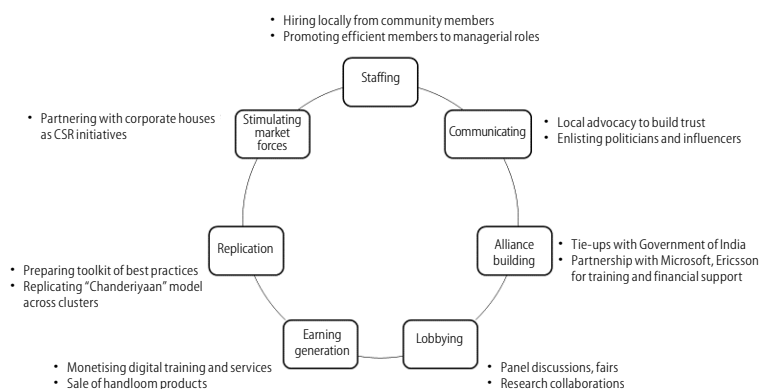
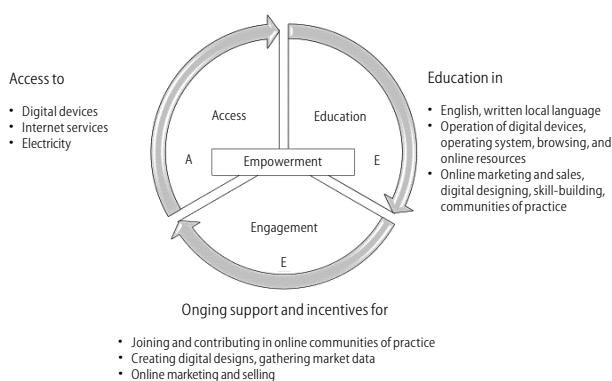


Figure 4: The Path to Digital Empowerment—Vocation-specific Digital Interventions for Handloom Clusters



private and government-run digital education schemes, but their content is generalised, and these lack vocational connect. The trainees are digitally literate but incapable of executing digital business transformations.

Infrastructure, competencies, and provisions affordable service drive the adoption of technology. All the rural areas of India have electricity supply (Chaudhary 2018), but the supply of electricity needs to be uninterrupted as well as affordable to encourage the adoption of technology. Additional interventions are needed, such as last-mile electrification, free/low-cost charging points at public places, and focus on alternate energy. To provide uninterrupted, affordable access to data services, additional interventions are needed to make available high-speed and secure broadband, wireless internet services and digital devices (computers, smartphones, and tablets) through subsidised prices and shared access points.

How can technology be used to multiply the impact of the effectiveness of digital literacy, access to new markets, business and revenue generation, and new product development? That is the key question from the policy viewpoint. More than 50% of handloom workers feel the need for support in design, market information, packaging, marketing (e-commerce and exhibitions), and export procedures, according to the report of the Fourth All India Handloom Census, 2019–20 (Ministry of Textiles 2019b). Digital interventions are likely to be crucial in connecting the core handloom worker to the end buyer through e-commerce marketplaces and eliminating the need for subcontractors. The engagement with technology

must be beneficial economically, socially, and developmentally (North et al 2008). To ensure that the engagement with technology is economically, socially, and developmentally beneficial (North et al 2008), educational interventions are needed (Figure 4).

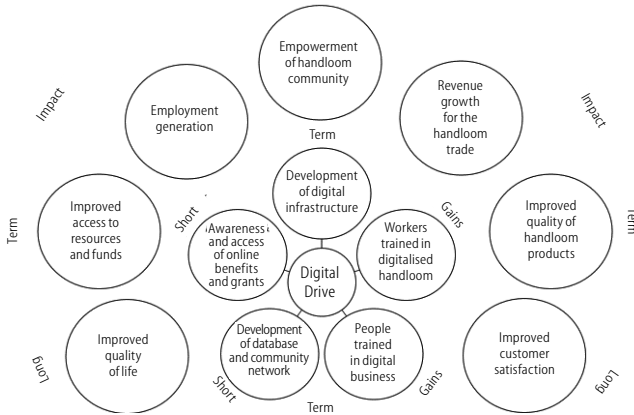
Educational programmes may be delivered in schools or as open certification programmes by the National Skill Development Corporation, governmental and non-governmental educational institutions, self-help organisations, and corporate houses. Standardised master trainer programmes are recommended for the training of resource persons. A critical requirement for empowerment is self-efficacy, the belief that one can execute an action effectively (Bandura 2009). Trainees need, along with mentoring, real-life opportunities to utilise their knowledge, and these opportunities may be ensured by building online communities of practice, collating digital designs and market trends, and online marketing and selling.

Online communities of practice would let handloom workers across India share best practices, employment opportunities, and news of benefits, grants, and handloom-related updates. These communities would make the Handloom Mark certification popular, and adoption would address the issues of quality (Grover and Bansal 2019). Collating digital designs and market trends through specialised digital enablement teams

Table 3: Digital Interventions—Implementation Stages

	Digital Access	Digital Education	Digital Empowerment
1	Assessing the need for digital infrastructure, through observation, surveys, and FGDs	Assessing need for digital and allied business education through surveys and FGDs	Assessing business needs through surveys and FGDs
2	Identifying potential ISPs and retailers of digital hardware	Developing teams of master trainers and curriculum developers	Developing support teams of website developers, digital marketers, fashion designers, photographers, technicians, and content developers
3	Building infrastructure for internet connectivity and digital services	Developing educational materials	Building infrastructure for digital design, marketing, and sales; and online community portals
4	Providing training and incubation to local suppliers of digital product and services	Training of trainers	Incentivising community members to join online portals and use digital business interventions
5	Launching and marketing digital services to the local community; ongoing support to the service providers	Building training infrastructure in the handloom clusters	
6		Registering participants across categories	Pre-training assessment
7		Training for knowledge, skill, and attitude; post-training assessment; application of learning	
8		Annual refresher's training	

Figure 5: Short-term Gains and Long-term Impact of the Digital Interventions in the Handloom Clusters of India



would develop digital designs and provide handloom workers the latest market fashion trends. Individual- or government-managed e-commerce, social media marketing, and publicity initiatives would support handloom sales and exports.

The Vocation-specific Digital Intervention for Handloom Clusters Programme has three prongs, and it should be implemented in a phased manner (Table 3, p 57). Large-scale social changes require “broad-sector collaborations” (Kania and Kramer 2011), involving businesses, NGOs, and governments (local and central) to work together around a common agenda to achieve collective impact. The digital empowerment of the handloom community requires policy efforts by the government and public–private partnerships for execution. The collective co-creation of public services has many potential advantages, such as reciprocity, community involvement, and

sustainability (Bovaird et al 2015; Flemig and Osborne 2019). Digital empowerment policies should focus where the intervention is intended and build the capacity as trainers, ISPs, and managers. Co-creation, or the curation of services to the specific needs of a community, ensures the buy-in of community members (Bovaird et al 2015; Kumar 2019) and the sustainability of services in terms of the flow of human resources, revenue, and social capital (Deekor 2019). The digital interventions are expected to affect infrastructure-building, skilling, database development, and business transformations in the handloom sector in the short term. In the long term, the programme is expected to empower handloom workers and improve their quality of life and sustainability (Figure 5).

Conclusions

This study attempted to capture, through the case studies, how having access to technology is not an end in itself and how it has to be supplemented with the ability to use technology for macro benefits such as rights and entitlements, education and skilling, and business and commerce. This study records the digital interventions in the handloom clusters in India, of value to researchers and practitioners in the areas of digital connectivity and indigenous art and business worldwide. Additionally, it enlists a comprehensive policy intervention protocol to enhance digital empowerment in the rural sectors of a country. Future research into digital policy could build on this to consider aspects emerging out of technology adoption, such as peer group learning, aspirational behaviour, understanding of cultural heritage, and assets for rural and urban citizens, especially for young people.

NOTES

- ₹3 lakh crore converted to dollar at the rate of ₹1 = \$0.013 as on 14 June 2020.
- ₹75,000 crore converted to dollar at the rate of ₹1 = \$0.013 as on 14 June 2020.

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