DIGITAL EMPOWERMENT FOR HANDLOOM CLUSTERS: THE CASE OF DIGITAL CLUSTER DEVELOPMENT PROGRAM IN INDIA

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Abstract - The research aims to evaluate the Wireless for Communities (W4C) model that is being implemented by Digital Empowerment Foundation (DEF) and the Internet Society (ISOC) in handloom clusters in India. The W4C makes use of the free spectrum made available by the Government of India to provide internet connectivity to remote village locations By conducting an in-depth action research in these three handloom centers, the study aims to develop a research framework of technology adoption among the rural population and investigate the impact of IT connectivity on well-being of the rural population and its major enablers.

Index Terms – Adoption, Digital Literacy, Internet, Spectrum, Technology

INTRODUCTION - HANDLOOM IN INDIA

Handloom has been defined as textile produced through 'manual intervention' or using 'human energy for production' (Varghese 2015). The Handloom textiles, or the indigenous hand-woven fabric and garment industry, is one of the most labor intensive industries of the world, and a prime vehicle for preservation of the heritage of a people(Goswami and Jain 2014). Indigenous handmade textiles are making significant contribution to economies across the world – such as Ghana, Iran, Malayasia, Bangladesh, and China, to name a few (Legrand 2012). Handloom is also fast emerging as one of the key choices for the fashion industry across the world, offering variety to the mainstream market in terms of fabric, design, colors, and themes.

The Indian handloom industry is over 5000 years old and has been the generator of a staggeringly large variety of textiles down the ages. It is the second largest employment provider for rural population in India after agriculture; it accounts for around 15 per cent of the total cloth produced in the country (excluding wool, silk and yarn), and has the largest infrastructure in the world with 2.3 million weaving looms. As per a 2015 report(Government of India 2015), India has over 43 lakh weavers –who sell their products across the world, USA being the largest importer.

Despite having such significant stretch and impact, most of the Indian handloom sector is unorganized and operates on a small scale through traditional tools and methods. Some of the major programs aimed at providing assistance to the handloom weavers, emphasize modernization of technology, support for raw materials, infrastructure, marketing and collaboration with urban designers for new designs and products, and general welfare schemes for the weavers and their families (Chetty, Gowda and Chetty 2016). However, despite these efforts, the sector faces major challenges owing to ineffective implementation of government policies, high raw material prices, lack of innovation in designs, poor marketing strategies, low wages, price fluctuations, and unfair competition etc.

II. DIGITAL INTERVENTIONS IN THE HANDLOOM SECTOR

Information and communication technologies (ICT), particularly internet connectivity, is likely to be a solution to two of the handloom industry's most pressing problems – namely, lack of awareness and access to market. Much of the handloom production is concentrated in the villages, so the cost of transportation of the products to the major national and international markets is deterring. This limits the variety and increases the cost of the products that reach the mainstream buyers, thus building the perception that the handloom is essentially for those with expensive tastes. Sale of the products online helps the weaver cut down the costs of a brick-and-mortar store and reach out to a much wider array of customers instantly. It also builds a channel of pre-sales and pre-production communication between the weaver and the end user, facilitating customization of design, quality, and prices.

Middlemen and master weavers traditionally have played a crucial role in the handloom industry. Hand-weaving being a strenuous and time-consuming process, weavers usually have little role in the pre- and post-production processes. Middlemen act as the contact between the weavers and the industry – bringing in news of the trending designs and colors, getting orders, and selling the final product to the marketplaces. However, owing to the information asymmetry, middlemen often end up paying a miniscule portion of the profit to the weaver. Lack of profit has brought down the number of weavers in India from 65 lakhs in 1995-96 to 43 lakhs in 2015. Use of information technology is likely to make it

easy eliminating the middlemen from the process as the weaver may access the latest designs and market trends and sell the products without undertaking the hassles of physical travel or the costs of setting up a physical store. Recognizing the importance of information technology in handloom, the Government of India has undertaken a number of important schemes to uplift the sector (Ministry of Textiles 2017). The Ministry of Textiles has signed memorandum of understanding (MoU) with 20 e-commerce companies, aimed at providing a platform to artisans and weavers in different handloom and handicraft clusters across the country for selling their products directly to the consumer (Ministry of Textiles 2017). It has also started promotion of its 'India Handloom' initiative on social media like Facebook, Twitter and Instagram with a view to connecting with customers, especially youth, in order to promote high quality handloom products. Also helpful in this regard is the spread of the National Optic Fiber Network (NOFN) that takes broadband internet to remote locations of the country, and the popularization of the use of data-enabled smartphones even among the less-endowed classes.

However, while there have been progress so far as the availability of information technology is concerned, it comes across as inadequate when seen in the light of the actual requirements of the handloom sector. Many parts of the Indian villages are still lagging behind when it comes to a reliable source of internet connectivity. Further, there is absence of the physical infrastructure needed to exploit IT, such as computers, electricity, and smartphones. According to a World Bank estimate, nearly one billion Indians are not connected to internet, and the vast majority of this population is concentrated in the rural areas – the seat of the handloom clusters (World Bank 2016). The penetration rate of internet connectivity in the rural India is even more dismal – only 8 percent of the total rural population has access to the internet – broadband or mobile (Arora 2016).

Even when technology is accessible, research indicates that psychological barriers to accessing technology might be equally potent in preventing utilization of resources (Mugeni, Wanyembi and Wafula 2012). Key problems in the handloom appear to be lack of openness among the weavers to use technology for designing, marketing and sales of their product. The linguistic barrier is also significant, since most of the resources on the internet are available in English. The present research focuses on the challenges, antecedents and consequences of adoption of information technology in the Indian handloom sectors, and the factors that facilitate the adoption of internet for the growth of this sector. We adopted a case-based approach to study the impact of the Digital Cluster Development Program (DCDP) of Digital Empowerment Foundation (DEF), an Indian NGO, on three different handloom clusters of India (see Appendix). There are several sub-projects under the umbrella of DCDP, however, for the current study we are analyzing projects Chanderiyaan (in Chanderi) and Digikala (in Nuapatna and Barpalli). The project DCDP has three advantages: 1) it is concerned solely with the spread of internet in the handloom cluster, making it focused and relevant to our research objectives, 2) it has been running over a period of over six years, with the projects in different clusters thriving at different life stages – thus providing a longitudinal view of the operating model, and 3) since the focus is on independent revenue generation, it provides an interesting model for sustainable empowerment in the long run.

III. RESEARCH METHOD

To understand how digital literacy would impact the lifestyle and income levels of traditional handloom clusters in India, we did field investigation of three diverse but prominent handloom clusters in India.The numerous cooperative societies established in these regions have failed to have a desired impact. Project DCDP hopes to change the scenario (DEF 2016).

To start with, we conducted 5 unstructured interviews with the founder of DEF and his team. This helped us to develop a preliminary understanding of their challenges, and various stages through which their project DCDP has progressed. These interactions also helped us in identifying the key stakeholders in the ecosystem - weavers, master weavers, middlemen, trainers, technical architects, shopkeepers, handloom co-operatives, funding organizations, nongovernmental organizations (NGOs), government agencies, and designers. This background information guided our project execution strategy.

We conducted 55 semi-structured interviews across 45 respondents between July 2016 to March 2017: 7 at DEF (Founding members, network specialists, technical architect, and operation manager), 3 officials from government agencies, 2 from funding organizations representatives, 3 trainers, 3 center managers, 10 weavers, 5 master weavers, 4 ICT engineers and students at various digital training centers. Interview guides were developed for each stakeholder capturing their objectives, challenges, strategy, activities and technologies adopted in different stages. We further investigated how their actions impacted the success of DCDP, how the economic and social status has changed over time.

IV. ANALYSIS

Besides having different geographies and art form, all these clusters have been facing similar challenges for several decades (DEF 2016), such as lack of education, exploitation by middleman and master

weavers, extremely low wages and inaccessibility to direct market, lack of inadequate working capital, poor living conditions, infrastructure, and institutional framework, unorganized and dispersed structure, disassociation from modern technologies including digital and ICT, reluctance of younger generation to engage in their traditional arts and handicrafts, rapid decline of the art form due to low wages and competition with power looms. The demographics of these clusters are shown in Table 1.

On the basis of project timelines and their progress, we observed that each project is undergoing a staged progression. However, none of them have achieved the status of self-sustaining. We have divided the entire DCDP project lifecycle into 4 stages and the objectives of all 4 stages are discussed as follows:

Stage 1 objectives were to organize funding, provide internet connectivity, establish digital literacy center, run train the trainers program, and motivate weavers to visit the center for learning.

Stage 2 expanded the service to larger community, focus on arranging more funds, and identify new ways of generating income, training youth as 'Core master Digital Designers' & improve employability, enhance livelihood and living conditions.

Stage 3 extended to inform weavers about the new markets and designs, market their hand woven fabrics, setting up a design library, capacity building and tertiary skill development to encourage self-sustainability & employability.

Stage 4 is to make each center a self-sustainable entity. However, this phase is yet to be reached in each of them.

Project Name	Digikala	Digikala	Chanderiyaan
Handloom Cluster	Tie & Dye	Posapalli , Ikat	Chanderi
Life Stage	Stage 1 (Nascent)	Stage 2 (Intermediary)	Stage 3 (Tertiary)
Students trained (approx.)	>700	>750	>5000
Location City / State)	Nuapatna, Odisha	Barpali, Odisha	Chanderi, Bundelkhand, Madhya Pradesh
Project Inception Year	2016	2015	2010
Number of Weaver families (approx.)	1000	5000	4500
Average size of family	6-10 members	6-10	6-10
Average Monthly Income (INR)	2000-5000	8000	4000-8000
Revenue Realized by DEF	-----NA----	-----NA----	FY16 US$ 45,000 with CAGR of 20%

Table1 Demographics of Weavers

It is important to mention here that the internet infrastructure was minimal in all these locations. Considering the huge investments and low ROI, telecom companies were least interested to cater the needs of the region. To fulfil their responsibilities, the government has however laid fiber optic cables, but they lacked service oriented mechanism. Therefore, DEF decided to establish the last mile connectivity by utilizing available resources optimally. As one of the founding members of DEF said, "In Chanderi, if I take the connectivity, it doesn't work for months and nobody bothers. So we took our network to the household, and local stores,and it worked very-very well. That was in 2009-10, when we started in Chanderi,our first wireless experiment, the first in India as well."

V. THEORETICAL FRAMEWORK

Considering the diversity and variety of challenges, we analyzed DCDP through the lens of SCALERS framework (Bloom and Chatterji 2009). This is appropriate, given the limited extant knowledge on ICT-enabled ecosystem evolution and the exploratory nature of the study (Jha, Pinsonneault and Dubé 2014). The SCALERS framework helped to understand how DEF has carried out its project of internet adoption in the various handloom sectors.

SCALERS Parameters	DEF Process (DP) & DEF Indicators (DI)
Staffing (recruit staff inspired and motivated to work for the organization)	DP: DEF wanted to recruit people from a certain socio-economic background who are highly motivated and wanted to serve their community, hence they approached local schools and governing bodies for the recruitment. DI: At each location initially they hired 1 centre manager, 1 trainer and 1 designer

Communicating (idea advocacy, communicating effectively with all stakeholders)	DP: Building Credibility, Working on mind-set and behaviour change among society members DI: DEF has hired local trainers so that communication & trust can be established amongst the weaving community.DEF runs 'train the trainer' program where they select high performers from weaver's community to further train and manage their centres.DEF also engages advocacy workers to go out to the field for presentations and convincing their peer group.
Alliance building (forging partnerships with organizations having shared goals)	DP: Developed Strong Partner Network DI: DEF alliance with Ministry of Communications and Information Technology, Internet Society (ISOC), Media Lab Asia and pioneer IT and Telecom organizations such as Microsoft and Ericsson.
Lobbying (advocating for government and other developmental agencies actions)	DP:Conduct conferences, presentations, fairs and writing research papers for policy development. DI: Managed to rope in government and developmental agencies such as Internet Society, Indian Artisans and Craft Workers Welfare Association, DEF has sought to remove the key hurdle of ensuring last mile connectivity in rural areas.
Earning generation (generating a stream of revenue)	DP: Form marketing and designing team, Establish in-house display unit. DI: The recorded revenue for Chanderiyaan in FY16 US$ 45K which is growing exponentially YOY.
Replication (facilitating that its programs can be copied or extended)	DP: DEF prepared guidelines on 'How to establish digital literacy centres' in rural area, Approached corporates for funding under CSR activities. DI: In 2015, after experiencing the success of Chanderiyan, DEF replicated the model in six different locations which include Nuapatna and Barpali.
Stimulating market forces (ability to create incentives so that people and institutions participate in and endorse its programs)	DI: After witnessing the success of Chanderiyan, organizations like Microsoft, Mphasis and Ericsson have come forward to sponsor the other initiatives of DEF. Digikala in Nuapatna and Barpali is in association with Microsoft, India.

Table 1 Analyzing DCDP through SCALERS

DISCUSSION

DEF through its project of DCDP has taken an incremental approach to create a sustainable engagement and collaboration model for handloom workers. The ICT-enabled ecosystem started out with facilitating sharing of information and basic digital literacy; the next stage was to build capacity among the weaving community through 'train the trainer' programs; in stage 3, alignment happened between the digital literacy programs and community requirements such as automation of design and identifying markets for their products, and weavers were also encouraged to use infrastructure provided by DEF to reduce their overheads and improve income; in stage 4, the mission is to develop each center as a self-sustaining entity.

The case studies of the weaving clusters of Chanderi, Nuaptna and Barpali suggest that ICT platforms can be effectively utilized to design and develop an ecosystem that can create integrated solutions for resolving complex challenges such as rural poverty alleviation through creation of small entrepreneurship and e-business, spread of education and social empowerment, and reinventing core competencies to better leverage them with more impact in changing times. DEF's model of DCDP is a connected network that goes beyond the notion of single economic actors "doing well by doing good" (Porter and Kramer 2011). The framework enables each stakeholder to create value for themselves, while contributing at the same time to enhance the resources at the level of the organization and carry out the mission to create sustainable prosperity also known as "convergent innovation" (Jha, et al. n.d.). The development pattern of DCDP ecosystem is a testimony to how the different aspects evolve, correlate with, and reinforce one another.

The present study also provides much opportunity for further research into what are the factors that affect

the sustainability, scalability, and the vital ability to broaden the scope of such ecosystems? Are the goals of creating social impact and scaling up the organization mutually exclusive or synergistic for a social venture? How do ICT platform-enabled ecosystems maintain creativity and innovation at every level of the value chain over a longer period of time?

Overall, the current research has implications as much for platform developers as for organizations and policy makers in conceiving and implementing electronic communities of practice (CoP).

APPENDIX

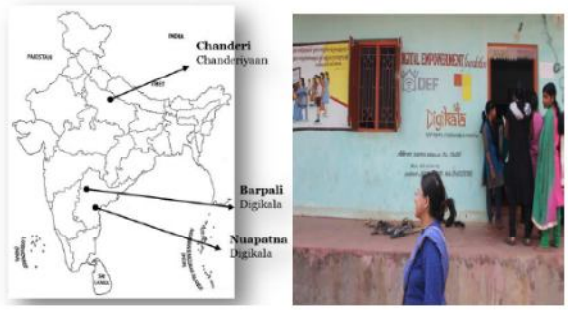


Figure 1 DCDP Locations on India Map and the Digikala Center
Source: The images shown in Figure 1 are created and taken by the authors only.

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