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Developing a Conceptual Model to Sustain Handloom Silk Industry at Sualkuchi, Assam, India

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Abstract
Silk industry in Assam, India is centered at Saulkuchi, Kamrup district. Silk is the protein fiber produced by silkworm for spinning the cocoon. Assam produces three indigenous varieties of silk - Muga, Pat and Eri. The objective of our study is to prescribe a conceptual model using the concepts of distributed economics and sustainability to preserve the unique culture of the area which is diminishing due to lack of the product's demand. The contextual inquiry was carried out for various stakeholders of Assam silk industry at Saulkuchi - cocoon cultivator, weaver and shopkeeper with an objective to understand the channel of material from raw material to the final product, to understand how they use different tools to perform their tasks and to understand their networking among various stakeholders involved in silk handloom sector. Their responses were analyzed and the stakeholder's goals, needs and frustrations were identified using AEIOU and empathy mapping. The major frustration of the stakeholders was the decrease in the demand for their products due to the growth of power loom and not able to reach the elite target population. The prescriptions for a village tourism and an e-commerce platform for selling silk handloom fabrics to targeted buyers was built on the concepts of distributed economics and three pillars of sustainability - environment, economic and social.

Keywords: Silk, Assam, Distributed Economics, Sustainability, Tourism, E-commerce, Small-scale production units

1. Introduction

Silk industry in Assam is significant from the early period of Ramayana where the Assam was known as a country of cocoon rearer. Even in Mahabharata, Assam is called Suvarnakanakanan, which means silk producing province. Rearing, reeling of silkworm and weaving were a daily routine in ancient Assam. Throughout ages, Assam is also called the land of golden silk. It is said that the culture earlier evolved in China and then traveled to other parts. One of the earliest forms of trade was made through Silk Route which connected Asia, Europe and Africa in 2nd century BC. This route was used to transport Chinese Silk to Europe through Central Asia (Mahan, 2012).
Saulkuchi is the center of the silk handloom industry of Assam since the 17th century. Till the 1930s, only Tanti community used to perform the activities which later expanded when Koibortapara and Brahmin communities started showing interest in the silk weaving. The silk industry got a boost during World War II due to growing in demand for fabrics at increasing prices. It also led to set up of commercial weaving factories which hired wage weavers (Mahan, 2012).
The conditions in upper Assam are suited for rearing silkworm. The muga worms - Antheraea *assamensis* are reared outdoor and fed on the Som - *Persea bombycina* and Soalu - *Litsea monopetala* trees. The Eri worms - *Samia cynthia* are reared indoor and fed on Castor

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oil plant - *Ricinus communis*. The Pat worms - *Bombyx textor* are also reared indoor and fed on leaves of Mulberry - *Morus* trees (Mahan, 2012).

As per the Directorate of Economics and Statistics, Assam Planning and Development Department Govt. of India, statistics collected for the period 2012 -13 shows that Assam has a monopoly in the world in respect of Muga production with more than 97% of Muga Silk is produced in Assam. Assam is also the major producer (about 65%) of Eri Silk in the country. The total area under Silkworm Food Plants has been recorded as 26826.5 hectares. As stated by the State Sericulture Department, the state has produced 109.0 MT Muga raw silk, 1934.0 MT Eri raw silk and 25 MT Mulberry raw silk. More than 13 lakh looms in the state and 25 lakh people are amalgamated with weaving activities. The directorate of handloom and textile covers 26395 villages with more than 14 lakh weavers of the state under its 209 handloom demonstration circles. For improving the handloom sector, the Handloom and Textile Department of the state runs 102 Handloom Training Centres, 4 Handloom Training Institutes, 1 Power Loom Centre, 98 Weaver's Extension Service Units, 20 Handloom Production Centres and 1 Handloom Research and Design Sector (economic survey of Assam 2013-14, 2014).

Since past few decades, the handloom sector is facing intensive competition from the power loom industry and also from foreign countries like China and Bangladesh. The handloom industry is not able to target the elite population for increasing their sales. Also, the mass is not aware and assured of the value of the handloom products. There is an absence of reliable information regarding the marketing of handloom products. This sector is also lagging behind in advertising and promoting its products to the mass. This is leading to decreasing in the interest of stakeholders to follow their indigenous culture as they are not able to fulfill the basic needs of their family (Nath, Rao and Vardhan, 2013).

1.1 Distributed Economics

Distributed Economies (DE) could be defined as small-scale production plants, at or at a short distance away from the point of use, where the users are the producers – whether individuals, small enterprises or a local community. If the lilliputian production plants are also associated with each other to share various forms of resources (physical and human knowledge-based ones, e.g. to share the energy surplus), they become a locally distributed production network, which may, in turn, be connected with nearby similar networks (LeNSin, 2016).

Neoclassical economic drivers favored large-scale centralized production units but it increased socio-economic and environmental unsustainability. These production units may provide greater efficiency for mass-production but are inflexible and may not be able to cope up with changing demands. Through distributed economics, production is distributed to various connected regions performing a diverse range of small-scale activities (Johansson, Kisch and Mirata, 2004). A Distributed Economy should has the following goals (Mirata and Emtairah, 2005):

- Wealth distribution among large number of people;
- Value added to accessible resources at the regional level;
- Advancement of technical knowledge and skill;
- Increment in the usage of renewable resources;

● Lesser volume of pollution and waste generated;
● Increment in self-sufficiency of regional systems; and
● Diversification and resilience of production systems.

1.2 Sustainable development through Distributed Economics

Sustainability could be defined as development that meets the requirements of the present without compromising the ability of future generations to meet their own requirements. Sustainability incorporates the notion of fulfilling the indispensable requirements of the world's poor keeping in mind the limitations imposed by the technology and social organization on the environment's ability to meet present and future requirements (Brundtland Commission, 1987).

A functional distributed economics can be incorporated with the three pillars of sustainability:

● Environment
○ Extent of pollution generated
○ Use of renewable resources and bio energy
○ Extent of waste management
○ Extent of leasing and renting
○ Quality of packaging
○ Amount of sustainable material consumption
● Economic
○ Amount of wealth creation for localities
○ Degree of support to small businesses
○ Degree of marketing of produced good
○ Extent of economic contribution to the society
● Social
○ Quality of communication skills
○ Balance between large and small scale activities
○ Degree of distribution of material wealth
○ Extent of installation of Industrial Symbiosis (how a network of organizations can foster eco-innovation and share mutually profitable transactions and improve business and technical processes)
○ Degree of compliance of and number of Laws

2. Methodology

For this study, we interviewed a family of cocoon cultivators, a family of weavers and a shopkeeper selling silk handloom products in Saulkuchi, Assam through structured interviews. The objectives of the interviews were to understand the channel of material from raw material to the final product, to understand how the stakeholders use different tools to perform their tasks and to understand the networking among various stakeholders involved in silk handloom sector. We started the interview by asking them how long they have been practicing the profession, what changes they have seen in these years and how long are they planning to continue the same profession. Then we asked how many of their family members are involved in the profession and how do they help

them. We also inquired on how they learned this profession. Then we discussed how they avail the raw materials and tools for performing various tasks. We were also keen to know how they sell their product to the next stakeholder. We tried identifying the characteristics which could provide uniqueness to the profession. We also inquired about their networks within and outside Saulkuchi. We investigated if they were receiving any kind of government support and how much were they able to save for their household needs. We also asked if they want their children to continue their profession and also do their children wish the same.

3. Observations and Discussions

3.1 Silk industry in Assam, Saulkuchi

From rearing of the cocoon to production of silk fabrics, the process can be divided into three parts. The first part, which includes breeding silkworm, feeding the larva, spinning the cocoon, heating the chrysalis and softening the cocoon, is conducted in Saulkuchi, Assam by cocoon cultivators. The second part, which includes reeling the filament and packaging the skeins is conducted in Khanapara, Assam. The last part, which includes forming silk yarn, degumming the yarn and producing silk fabrics, is conducted in Saulkuchi, Assam by handloom weavers.

3.2 Cocoon Cultivators

We interviewed a cocoon cultivator at his residence, which was also his working place. The cocoon cultivator was fluent in Assamese but not in Hindi. He lives with his wife in a government provided quarter where he also cultivates cocoons and grows plants on which the silkworm and larva feed. He has been working for the government agency for 15 years on a daily wage of Rs. 250. His main task is to monitor the healthy growth of cocoons, and supply the sorted cocoon shells to the government officials who regularly visit to take the orders and provide him with new silkworm seeds. He only kills half of the living cocoons using a setup of a boiler, leaving the other half to complete their life cycle. He takes care that the government officials are satisfied with his work otherwise, he will not only lose his employment but also his accommodation. Apart from his professional routine, he also showed interest in entertaining tourists. He shared with us some experiences he had with German tourists who visited earlier. In a long run, he does aspire increase in wage and improved living conditions as his family will also grow once he will have children.

3.3 Handloom Weaver

We interviewed a handloom weaver at his residence. He studied till higher secondary in a local school and had an experience in weaving for 8 years. He has handloom setup in a room in his house where he works with his family members. Unlike him, his family members were not fluent in speaking Hindi. The weaver receives orders either from the local shops or from the customers with specific designs and deadlines. Due to longer time required to produce silk fabrics, the weaver is mostly busy

throughout the day. He buys tools and raw materials like thread, dyes, graph card, bobbin, charkha, etc from a local shop nearby. These shops sell the products coming from Bangalore which have a higher cost, instead of the ones from Khanapara. Due to trust factor, the weavers of the village insist on buying these high price raw materials only. The tools like a bobbin, charkha, graph card and the loom can be used any number of times. In case a problem occurs in the loom, a mechanic is called from nearby which can cause delays in product delivery.

The weaver receives silk thread in the form of skein from the shops. He initially rotates it over a bobbin, a cylindrical tool, using a charkha. Then the thread is softened by washing in a basic solution and then loom is set up. It takes around three days to prepare a pair of chadar and makhana with a profit of Rs. 200 on each pair. The prepared silk fabrics are packaged with newspaper and supplied to the nearby shops for selling.

The weaver which we interviewed uses WhatsApp in his android smartphone to maintain networks with various customers. He and the customers share new designs for placing an order through images on WhatsApp. The weavers also have the skill to produce unique patterns using a tool named graph card, but only a few of the weavers in the village prepare graph cards. Also, the weavers prefer working individually with their families, rather than collaborating with villagers for large orders.

They believe that collaboration reduces their share of profit. The room in which the weaver works is not properly illuminated. Also, there is a shortage of electricity in the village, which increases strain in the eyes. The weaver also admits that the government officials come for surveys but still he has not witnessed any kind of support from the government.

As there are no standards set for the price of their products, bargaining with the shopkeepers and customers decrease their actual profit. It is also seen that all the profit generated is used up for fulfilling their daily needs with no savings left. The silk handloom weavers are very proud of their occupation and aspire that their children would carry forward and expand their indigenous culture.

3.4 Shopkeeper selling silk handloom fabrics

We interviewed a shopkeeper at his shop. The shopkeeper contacts the customers with the main aim to make profit. On the basis the order, he contracts with the local handloom weavers who prepare the fabrics. The shopkeeper packages the silk fabrics provided by the weaver using polyethylene and loads it into the vehicle to be transported to the customers. Currently, the professional networks of the shopkeeper does not exceed Guwahati and Kolkata. He does use computers and mobile applications to connect with customers. The shopkeeper didn't want his children to continue his business as the demand for handloom is decreasing due to the growth of power loom industry. The shopkeeper is not able to target the elite population that would be interested in buying the handloom silk fabrics. Although the sales increase during the festive seasons of Bihu, but he cannot handle bulk orders due to longer time required for producing handloom silk fabrics.

3.5 Conceptual Model

In this sections, we have prescribed a conceptual model using the concepts of

distributed design and sustainability to preserve the unique culture of the region through tourism and an e-commerce platform. As stated earlier, the stakeholders in the silk handloom industry have an interest in tourism. The prescribed conceptual model is thus based on tourism which is a common interest of both - the stakeholders of silk handloom industry and the regulatory bodies like Assam Tourism and Central Silk Board. The model of e-commerce is also incorporated to increase the market range of the silk fabrics. Currently, the professional network of the stakeholders is restricted till the cities of Guwahati and Kolkata. The e-commerce platform will act as a bridge between the stakeholders in Saulkuchi and the customers in various cities of the country.

The officials of Central Silk Board would provide silkworm seeds and fertilizers to the cocoon cultivators and receive cocoon shells in return. The cocoon cultivators can also share their problems with these officials. Then, the cocoon shells would be transported to Khanapara for the preparation of thread. The thread will then be transported to the Central Silk Board managed government offices established in Saulkuchi, from where the weavers can buy the raw materials at subsidized rates. The weavers can sell the silk fabrics to the shops, customers or the tourists. The shopkeepers would hire a group of weavers for producing the silk fabrics for selling to tourists, direct customers, and customers through an e-commerce platform. A Training Center and a Village Tourism Office would also be established and managed by Assam Tourism in Saulkuchi. The Training Center would train the youth of Saulkuchi to use computers and prepare Graph Cards and teach English at a subsidized rate. All the subsidies will be covered by the overhead of Assam Tourism and the NGO operating the e-commerce platform. As the opportunities of living with the cocoon cultivators and weavers will be provided to tourists, proper electricity and water supply should be provided to each household of the village. Additional parking facilities should also be constructed in the village. For the purpose of safety of villagers and tourists, all the households who are interested in providing the accommodation to the tourists should be registered with the Village Tourism Office. Also, a group of villagers needs to take an initiative to keep the village clean. Village Tourism Office can also incentivise such groups to keep them motivated. Village Tourism Office also needs to monitor that the waste is disposed of properly and the leftover raw materials like dyes do not pollute soil and water.

When tourists visit the village, they need to register in the Village Tourism Office and pay an entry fee. They would be accompanied by a guide who would tour them to the cocoon cultivators and handloom weavers and also act as a translator. Apart from silk culture, tourists can also enjoy other activities like fishing. They can also avail the opportunity of living with a family which must be registered by Village Tourism Office. Impressed by the hospitality and the indigenous silk culture, tourists would be interested in buying the silk fabrics and also carry them back for their friends and families abroad. During the festive seasons of Bihu, tourism workshops can be conducted where tourists can have hands-on experience with the tools. All the tourism activities would be monitored by Village Tourism Office. Tourism would also increase the reach of the Assam silk culture to the elite population interested in buying handloom fabrics.

An e-commerce platform would be developed and managed by an NGO to increase the reach and awareness of unique handloom silk industry to the elite population. The NGO would also be providing with packaging, transportation and delivery services.

Shopkeepers can register on the platform, showcase the products and receive orders. Through the platform, the customers can also share unique designs which they aspire to wear. The shopkeepers can consult with the weavers if they can prepare graph cards for the design and then revert back to the customers with suitable rate and timeline. There will also be a limit to a number of orders as a single shopkeeper cannot handle bulk orders. Once an order has been placed, the shopkeeper would instruct the weavers with the design and timeline. As per the schedule, the transportation team will load the products and they will be sent for packaging and monitor the quality of the product. It will be checked that the product offers the quality as promised on the platform. Then it will be delivered to the customer. The cost of the products can be standardized on the basis of the variables - thread density, dimensions of the product, embroidery, quality and quantity of dye, and type and quantity of thread. An overhead of the cost received by NGO through sales of silk fabrics will be sent to Central Silk Board for providing subsidies on raw material to weavers. The remaining cost will be divided between the shopkeeper and the NGO according to the agreement signed during registration.

Geographic Indication can be tagged with the silk fabrics to convey their value to the tourists and customers. If the silk fabric is purely made of organic material, then another Organic Indication can also be provided to the product. Initially, promotion and advertisements at the railway station, airport, and Guwahati city will be required to make the population aware of the tourism in the village and the e-commerce platform. Assam Tourism and Incredible India can also provide aid for the same purpose.

Fig 1, fig 2 and fig 3 represent the material flow, money flow and information flow respectively of the prescribed conceptual model.

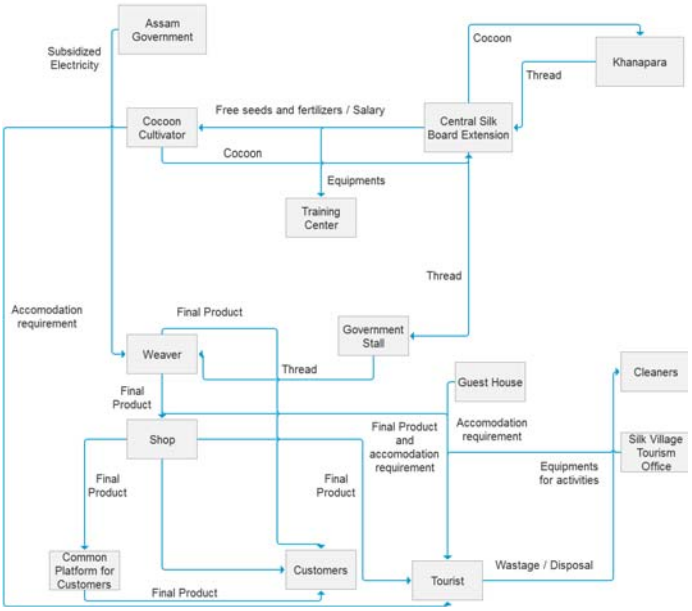


Figure 1. Material flow

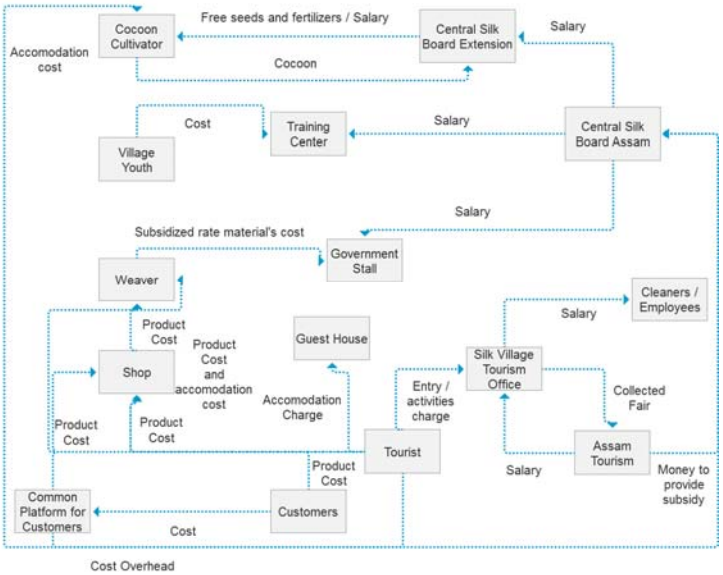
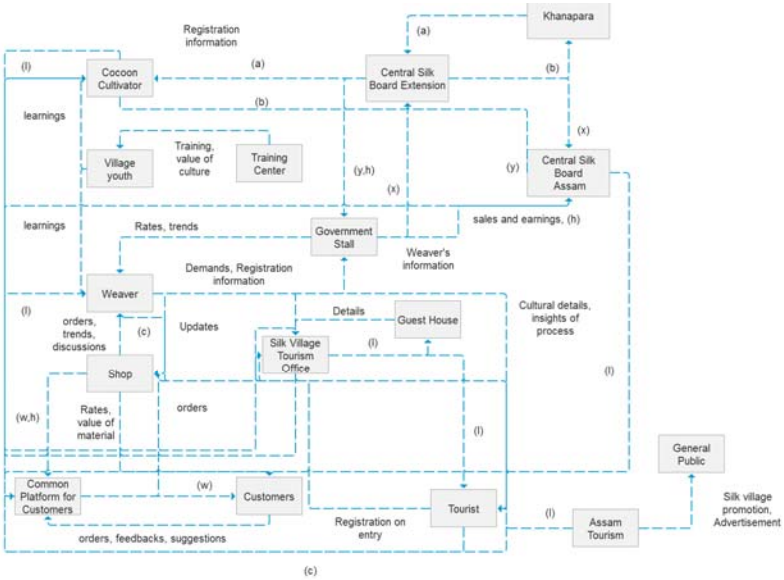


Figure 2. Money flow



(a) : Demand, feedback, solution, new technology
(b) : Problems and needs
(c) : Contacts
(e) : learnings of trained village youth
(h) : new trends
(l) : laws, rules and instructions
(w) : rates, variety and uniqueness
(x) : sales, problems

Figure 3. Information flow

4. Conclusion

The conceptual model prescribed fulfills the goals of distributed economy and preserves the sustainability of the handloom silk industry at Saulkuchi, Assam. To maintain the sustainable growth of the silk handloom industry, the involvement of NGOs with comprehensive planning is required. The increase in the number of small orders to shopkeepers will, in turn, increase the number of orders for individual weavers. This will increase the wealth generation for each stakeholder. Tourism will also improve the living conditions of the stakeholders in the silk industry. The sustainable model for the handloom silk industry required an organizational design with the understanding of the culture prevailing in the region.

5. Further Works

We plan to examine how the implementation of the prescribed conceptual model can help the stakeholders involved in Assam handloom silk industry in increasing generation of wealth, improving living conditions and preserving their indigenous culture. This will require an addition of services as prescribed in the proposed model to the current state. We inspire from the tourism village structure of Mawlynnong, Meghalaya, which is a source of economic wealth for many households. We also intend to promote uniqueness to the handloom silk fabrics by the production of unique patterns using graph cards. We will also try to train the youth of the village to speak English and use computers.

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