Indigenous Knowledge, Inclusive Innovation And Entrepreneurial Success Of Sambalpuri Handlooms: An Analysis

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Abstract - Indian economy demands different solutions for economic growth, the solutions that are 'people centric' - people not as consumers but as human beings – a solution that generates new employment opportunities utilizing the existing skills and knowledge of the people, improves the standard of living while preserving the values of traditional society. Indigenous Knowledge System (IKS) has directly and indirectly played a role in community development by providing social capital for the poor, ensuring livelihood, and maintenance of social orders. The astounding indigenous knowledge system present in India which can be instrumental for innovative designs and merchantable products; and thereby helped in creating entrepreneurial success and sustainable livelihood for the poor populous. These could provide a vital direction to Indian economy to transform into an innovation-driven inclusive economy.

Sambalpuri handlooms of Odisha, the vivacious example of indigenous knowledge innovations, has played a strategic role in generating new business ideas to transpire into successful entrepreneurial accomplishments, which ultimately transformed into inclusive economic growth. The present research endeavours to outlines these accomplishments to innovate the indigenous knowledge and skills by the Sambalpuri handloom artisans to improve the productivity and marketability of the produces. Much is known about the innumerable innovative practices, but poor artisans' needs are broader than these few while transferring them into marketable capabilities. Further the research paper tries to harness some suggestive "cost-effective and collaborative efforts" to reinforce these "few" creative efforts of the poor artisans into sustainable marketable capabilities and productive income-generating opportunities.

Key Words: ***Indigenous Knowledge, Innovation, Entrepreneur, Sambalpuri Handloom, Artisans.***

I. INTRODUCTION

Across the world, as one model of modern education and means of mass communication spread, newer generations of traditional peoples are simply not imbibing indigenous knowledge in way that their parents or ancestors did. As growing demand for natural resources from a greedy global economy touches every community, elements of indigenous knowledge that managed to maintain sustainable levels of produce become redundant or sidelined, and soon forgotten. Most of all, as the people in such communities themselves get amalgamated into urban-industrial sectors, they no longer have a need for indigenous knowledge, at least not for a while till many of them find themselves cast out of the economy and adrift, but now without even their indigenous knowledge or without any natural resources to fall back on (Apte, 2006[1]).

Subjugated by the grandeur and potentials of contemporary science and technology, indigenous knowledge systems and its efficacy for inclusive development in the developing world have been disregarded and marginalized, until recently (Gorjestani, 2004[2]). While philanthropists, social scientists and development agencies are only beginning to acknowledge their significance in comprehensive inclusive growth, their enduring role as the backbone of sustainable livelihood in the developing countries like India cannot be questioned. The developing world, in this regard, cannot be isolated. Even in western industrialized nations, indigenous knowledge accrued across generations continues to play an ultimate role in feasible and industrious uses of localized resources, knowledge and skill whether they be handicrafts or handlooms or food production or so on so forth (Twarog & Kapoor, 2004[3]).

1.0. INDIGENOUS KNOWLEDGE, INNOVATION AND SUSTAINABLE LIVELIHOOD

"*Indigenous people make an enormous contribution to our world, including through their spiritual relationship with the Earth. By helping indigenous peoples regain their rights, we will also protect our shared environment for the benefit of all.*"

– UN Secretary General, Ban Ki Moon

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The Convention on Biological Diversity, since the 1992 UN Conference on Environment and Development, has increased the recognition of the contributions that indigenous knowledge can make to global poverty eradication, sustainable livelihood development, inclusive growth and conservation of natural eco-system objectives. The World Conference on Science, organized by UNESCO and the International Council for Science (ICSU), in its Declaration on Science and the use of Scientific Knowledge, explicitly recognized the importance of TK and the need to respect and encourage its use for various forms of human endeavour (ICSU 2002[4]). The UN Declaration on Indigenous Peoples, June 2006[5] also endorsed the same.

Addressing the Constituent Assembly on 22 January 1947, in the opening debate on 'The Resolution of Aims and Objects', Jawaharlal Nehru opined that, *the first task of this Assembly is to free India through a new constitution, to feed the starving people, and to clothe the naked masses, and to give every Indian the fullest opportunity to develop himself according to his capacity*' (Corbridge & Harriss, 2000[6]). This notable proclamation is also advocated by Amartya Sen in his concept of development as freedom. He said "*people should be free to develop their capabilities to lead lives that they have reason to value, being able to engage in reflexive life planning. If they are to be able to do this then freedom, in both negative and positive senses, is essential, and it is both means, and end, of social and economic development*" (Sen, 1999[7], 2009[8]). Thus, the fullest opportunity to develop oneself is according to his capacities.

As neo-liberalism remains persuasive in Indian policies, many social legislations designated inclusive growth. But the success of these policies has remained moderately modest. The failure to deliver a tangible benefit has attributed to deficiency in customization of the policies for the widespread diversities. In such a situation, the indigenous knowledge is an integral part of the development process of local communities (Davies and Ebbe, 1995[9]) which has been shared within and across the communities to help in enhancing cross-cultural understandings, promoting the cultural dimension of development and ultimately, an inclusive growth (Mwantimwa, 2008[10]; Nakashima, 2000[11]; Allen & Davina, 2001[12]; Hamel, 2004[13]; Elisabetsky, 1990[14]; Gorjestani, 2005[15]; Pie and Mandhar, 1987[16]).

Most commonly accepted is the role of indigenous knowledge in the "traditional" or primary sectors of the economy: agriculture, forestry, fisheries, water, and the products made from natural resources such as handlooms, handicrafts, furniture, housing, and so on (Posey, 1999[17]). The emerging role for it is a natural progression as the most outstanding biodiversity rich provinces of India are the motherlands for theses traditional and indigenous peoples. Currently, this is no simple coincidence, as the rising trends persists in this third world countries to integrate the process of modernization and industrialization with these traditional knowledge system, the diligence of traditional knowledge and skill has gone hand in hand with the maintenance of inclusive economy and perseverance of the livelihood pattern of the poor populous, thereof (Chatterjee, 2011[18]).

Indigenous knowledge systems and the indigenous populous are interdependent. The latter strives to be adaptive to the changes in the natural environment surround them, through a wide range of intra and inter-household survival strategies. Thus the indigenous knowledge system have reductionist elements. Where efficacy and effectiveness of resource-usages have increased to adjust the variation in the population growth, environmental fluctuations, scarcity or other contingencies, a blending of formal knowledge and informal indigenous knowledge is needed (Pastakia, 1995[19]). The blending of knowledge takes place through innovations over a period of time as this informal knowledge system evolves, adapts and transforms dynamically with time with materials, process and skill. Thus the inclusive economic development of a particular sector of populous depends not only on the traditional knowledge but also the degree of adoptability and practices of the contemporary innovations (Posey et.al, 1995[20]).

Innovation is central to economic development and sustainable livelihood. (Edquist, 1997[21], Freeman, 1987[22], Hall et al., 2003[23], Lundvall, 1992[24], Spielman[25], 2005). Of particular, the indigenous knowledge innovation happened in developing countries as it housed the most of the poor (UNDP, 2004[26]). Though the Indian pro-poor developmental initiatives have focused on agriculture, pro-poor innovation is more likely to occur through small-scale ventures and entrepreneurs, instead. Most poor are entrepreneurs out of necessity and therefore unlikely to have the capacity or willingness to take the risks associated with these scaling up to make a real impact on their sustainable livelihood in particular and the Indian inclusive economy in general (Lingelbach et al., 2005[27]). Poor innovate due to necessity, changing environments and inquisitiveness, doing informal experiments on new ideas either from their own, and learned from other people and from other information sources like the mass media (Reij and Water-Bayer 2005[28]). As these opportunity entrepreneurs pursuing a profitable business venture based on traditional knowledge, have always trying to innovate and a consequent growth, thereof. These growths are likely to have a large indirect effect on economy by providing employment opportunities as well as improved goods and services (Lazonick, 2005[29]).

Schumpeter's early work saw the entrepreneur as an individual disrupting existing equilibrium by creating new combinations of existing resources through the process of innovation (Schumpeter, 1944[30]; Schumpeter, 1934[31];

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Schumpeter and Opie, 1961[32]). Studies on handloom businesses have shown that entrepreneurial success is the result of innovation, i.e., economic changes derived from the creativity of the artisans (Lazonick, 2008[33]). Thus, when the product characteristics, business and competitive strategies are insufficient for the market, product innovation determines the profit. As the product and process innovation depend on what the owners of the business believe will sell or work, or in accordance with seasonal considerations, the innovation is either necessity induced, or profoundly absent (Hernández and et al, 2002[34], 2004[35], 2008[36]).

II. RESEARCH SCOPE AND SIGNIFICANCE

In a poor and industrially backward state like Odisha, these traditional industries hold considerable promise for economic empowerment and provide a gainful employment to the technically little qualified, less educated and emaciated poor in the rural non-farm sector. It is found that next to agriculture (62%), handloom sector (18%) is the major provider of employment to the people of this region. Apart from that, handloom products of Sambalpur are appreciated all over the country and outside because of its exquisite designs, natural motifs and superb colour combination. While the handloom sector in the whole country has experienced a downsize due to the arrival of powerloom and fortification of the competition in the market, the Sambalpuri handloom sector has retreated the meltdown. The major factors of this trend reversal is the refining of the indigenous knowledge without substantial alteration of the skill and education through adaptation of innovation in the business, which eventually lead to an entrepreneurial success. Thus, it become pertinent to study and analyse the phenomenon of trend reversal entrepreneurial success of the Sambalpuri handloom sector. The present study aimed to analyse the nature and practices of innovations in the business acumen of Sambalpuri handloom sector, apart from studying the association and impression of the innovation on entrepreneurial performances.

2.0. RESEARCH OBJECTIVES

With the above backdrop, the present study was undertaken with the following dual-objectives:

1. To study the present status of the Sambalpuri Handloom Innovation.
2. To study the status and impact of innovation on the entrepreneurial development of the Sambalpuri artisans.

III. METHODOLOGY ADOPTED

Field of Study and Sample Selection: Firstly, identification of artisans in the handloom clustered districts like Sambalpur, Sonpur, Bargarh, Baodh, Bolangir and Kalahandi in Odisha who had undertaken various innovative practices for the analysis of current research. An initial list of 570 artisan HHs was slowly whittled down to a handful of representative samples. While many on the long list proved to be fundamentally unsustainable, or lacked the potential to achieve scale, about 180 (10 HHs from each of 18 clusters) were sufficiently promising to merit for further research. The samples were selected on the basis of the following:

1. Representatives of all the six districts with an assumption that each of the 18 craft clusters in 6 districts have homogeneous characteristics,
2. Adaptation of innovative practices since 2010,
3. Must be a registered unit under DIC with maintenance of minimum books of accounts,
4. The innovative activities undertaken has a visibility i.e., each activities must have potential for replication/ imitation, and
5. Convenience to the time and cost of the study

Data Collection, Quantitative Data Analysis: The present study had included various secondary sources like accounts and books of the handloom units, DIC figures, Govt. departmental reports, books, journals and web sources to collect the published information. The primary data was collected through a pilot studied schedule administered on the respondents by the researchers personally. The questions included in the schedule are objective and based on Likert scales. The primary information regarding innovations and its technical details were also collected through personal interviews with the staff members of the intervening agencies, and through focus group discussion (FGD) with the stakeholders, groups and associations etc. and by personal observations. The analysis of impact of the innovation on the development of entrepreneurial success was undertaken in the following two steps:

a. Analysis of the data for both rounds of the survey had called for a set of descriptive tables for data from Rounds 1 (in 2009) and Round 2 (in 2016), plus statistical analysis –ANOVA. In addition, other forms of cross-section and longitudinal analyses were carried out. The quantitative analysis tested the core hypotheses about impact of innovation on different the business acumens, on the basis of Secondary data collected from the accounts and books of the handloom units.

i. **Model for the analysis** :

1. *Entrepreneurial Success (ES) = f(Innovation)*
2. *Null Hypothesis H_o: Innovation does not induced the entrepreneurial success among the Sambalpuri Handloom Artisans.*
3. *Factors to be tested: Sales Volume, Production Volume, Profit Margin, Income of the HHs, Employability,*

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Acquisition of assets, Market Expansion, and Loan Fungibility)

b. The factors that influenced the overall levels of entrepreneurial success of the Sambalpuri artisans, the four orthogonal factors, viz., Product Innovation, Process and Technology Innovation, Innovation with Machinery and Raw Materials used and Innovation with Marketing and Distribution activities, were used in a multiple regression analysis. The multiple regression procedure was employed because it provided the most accurate interpretation of the independent variables. The four independent variables were expressed in terms of the standardized factor scores (beta coefficients). The significant factors that remained in the regression equation were shown in order of importance based on the beta coefficients. The dependent variable, the overall levels of entrepreneurial success of the Sambalpuri artisans, was measured on a 5-point Likert-type scale and was used as a surrogate indicator of the overall levels of entrepreneurial success of the Sambalpuri artisans. The equation for the overall levels of entrepreneurial success of the Sambalpuri artisans was expressed in the following equation:

i. **Model for the analysis** :

1. $Y_{ES} = \beta_0 + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4$
   Where X_1 = Product Innovation, X_2 = Process and Technology Innovation, X_3 = Innovation with Machinery and Raw Materials used, and X_4 = Innovation with Marketing and Distribution activities
2. *Null Hypothesis H_o: there is no relationship between the innovation and the Overall Entrepreneurial Success of the Artisans,* i.e., *Product Innovation, Process and Technology Innovation, Innovation with Machinery and Raw Materials used and Innovation with Marketing and Distribution activities do not impact on the entrepreneurial success among the Sambalpuri Handloom Artisans.*

3.0. SAMBALPURI HANDLOOM SECTOR – ANALYSIS OF PRESENT STATUS

The foundation of textile development in Odisha was laid by the fishermen community long before the industrialization (ibid 2000, Rao, 1990[37]). The wonderful craft called "IKAT" which gives dyed design on fabrics. In India "Ikat" is known as *Bandha* in Odisha, *Bandhani* in Rajasthan, *Pochumpali* in Andhra Pradesh, *Patola* in Gujrat and so on. Out of different types of Ikat, *Bandha* of Odisha stands apart. Not only in respect of its design but the process, its expression and so on can be summed up as poetry on the loom. It is also unique to find two different sets of community in two different regions of Odisha could develop this art independently keeping in tune with tradition of the land reflecting the religious sentiments like *Jaganath* cult as well as environmental reflections. The art is limited to *Bhulia* and *Kostha* communities of Western Odisha (includes Sambalpur and other districts of western part) and *Gaudiaya Patra*, *Asini Patra* and *Sarkha* of eastern Odisha (includes Cuttack and other districts of eastern part) (Meher, 1995[38]; Gosh & Ghosh, 2011[39]; Das, 1978[40]). So far as designing and techniques are concerned, it varies from double *ikat* (tie and dye) involving highly intricate designs woven by the *Bhulia Meher* weavers of undivided Sambalpur, Bolangir, Kalahandi and Phulbani districts (such as *Pasapalli*, *Bichitrapuri*, etc.) to single *ikat* woven by *Saraka Tanti* in Maniabandha, Nuapatna area of Cuttack district (*Khandua* designs) to extra warp and weft designs like *Bomkai*, silk of Berhampur, cotton of Khurda district, vegetable dyed fabrics of Kotpad (Koraput district), fine count sarees of Jagatsinghpur and Tassar fabrics of Gopalpur, Fakirpur in Kendujhar district. However, the tie and dye handloom fabrics for which Odisha is famous all over the country is mainly woven by the *Bhulia Meher* weavers of Odisha in double ikat (warp & weft design) and the *Gaudia Patara*, *Asani Patara*, *Kostha*, *Saraka* and *Dera* in single ikat (weft design).

Sambalpuri fabrics reflect an original style of craft known as *Baandha*. Traditionally, craftsmen created *Baandhas* with images of flora or fauna or with geometrical patterns. *Baandha* fabric is created using a tie-dye technique. The yarns are tied according to the desired patterns to prevent absorption of dyes, and then dyed. The yarns or set of yarns so produced is called '*Baandha*'. The unique feature of this form of designing is that the designs are reflected almost identically on both side of the fabric. Once the fabric is dyed it can never be bleached in to other colour[41]. This versatile technique enables a craftsman to weave colourful designs, patterns and images into a fabric capable of inspiring a thought or conveying a message. It is believed that this art migrated to Western Odisha along with the *Bhulia* community who fled Northern India in the year 1192 AD after the fall of the Chouhan Empire at the hands of the Mughals. Since then and up to the year 1925 it flourished in Western Odisha in a limited number of designs and in vegetable colours and consisted mostly of saris used by the womenfolk of the Odisha. These saris were known as '*Bhulia-Kapta*' (Ranjan and Ranjan, 2009[42]).

Today the *Baandha* fabric is popularly known by its geographical and cultural name Sambalpuri owing to the pioneering efforts of Sri Radhashyam Meher, who brought about a radical improvement in the skills of the craftsmen and the quality of the products. Other master craftsmen who contributed to the development of Sambalpuri textiles were Padmashree Kailash Chandra Meher, Padmashree Kunja Bihari Meher, Padmashree Chatrubhuja Meher and Padmashree Krutharth Acharya. Sambalpuri textiles today include furnishing materials, dress materials and sarees in

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silk, cotton and mercerized cotton in a variety of colours and many different designs.

Roughly 16 km from the district headquarters of Sonepur, Sagarpali is a large village hosting around 500 *bhulia* (weaver) families. This is one of the largest weaving villages in Kosal, a bastion of the Sambalpuri sari. Other areas affluent with handloom weavers are Barpali, Tarbha, Bijepur, Patnagarh and Bargarh. Apart from that the following clusters are situated at different places and specialized in the following Sambalpuri handicraft products:

Table – 01: Sambalpuri Items, Producing Handloom Clusters and Districts of Odisha

Districts	Clusters (18)	Items produced
Bargarh	Attabira, Bargarh, Bheden, Barpali, Bijepur, Padampur, Sohela, Bhatli	Bed cover, dress materials, cotton tie & dye saree, silk sambalpuri saree, coarse cotton saree & others
Sonepur & Boudh	Birmaharajpur, Sonepur, Ulunda, Binika, Boudh	Silk Bomkai saree, tie & dye cotton saree, furnishing & silk tie & dye saree
Kalahandi	Khariar (Sinapali)	Habaspuri saree, coarse cotton saree & others
Balangir	Patnagarh, Agalpur, Bangamunda	Tie & dye cotton saree & furnishings, silk tie & dye saree, coarse cotton saree & others
Sambalpur	Rengali	Coarse cotton saree & other

IV. FORMS OF INNOVATION BY THE SAMBALPURI ARTISANS

Innovation is the engine for growth and national competitiveness of the country. It will turn out to be a key element in providing aggressive top-line growth and for increasing bottom-line results of the organization, the cumulative effect of which will boost the innovation performance of the country. Innovations can take shape by extensive research and development, from practice and even by chance. Innovations which are happening in the textile sector are helping in increasing the efficiency of operations, developing specialized products, bringing technical up-gradation in the industry and improving the life of workers. Innovations may be broadly categorised as Product innovation, Process and Technology innovation, Innovation of machinery and raw materials used, and Innovation of Marketing and Distribution.

4.1. Innovations Undertaken by the Sambalpuri Handloom Sector

a) **Product Innovation:** The product innovations has taken up the following innovation with respect to the product lines and ranges (Table 02)

Table 02: Product Innovation undertaken by Sambalpuri Handloom

Areas	Indigenous Knowledge	Innovation adopted
Product Line and range	Sarees / dress materials for women, male shirting clothes Product range included garments (both constructed and unstitched) for women for personal uses only	Sarees / dress materials for women, male shirting and pant pieces, readymade garments for both, and contemporary products like suit pieces, shawl / scarf /stole, bed sheet/ pillow covers, curtains for door and window, decorative items like wall hangings, table cloths, towels etc. Product range included garments (both constructed, unstitched, and stitched), personal and interior accessories and home furnishings.
Types of Fabrics	Cotton and silk	Cotton and silk, mixed fabrics, various types of textile fabrics like bamboo fibers, jute fibers, woolen etc.
Design Techniques	*Baandha* or plain	*Baandha* or plain, Embroideries, Kantha knitted, combining Kantha & Batik, Baandha & block print etc. Uses of embroider, mirrors, coins, shells, pattern darning, cross stitch, patchwork and quilting techniques.
Colours	Vegetable colours and uses only primary colours	Changing combinations of colours, vegetable and chemical colours, micro-organism colours
Design Motifs	Phula (Flowers), *kalasa* (pots), amba (mango), *shankha* (shell), *chakra* (wheel), floral garlands, fish, the lion, peacock, lotus, and deer, **Total of 38 designs**	Animals, Birds, Fish, Conch shell, human figures, Wheel, Flower, Landscape, Chess Board & many geometrical patterns, peacock feather, *Gajagamini*, *Sudarsani*, *Bhanupriya*, *Sujata*, *Rajeshwari*, *Padmalaya* and *Kabita*. **Total of 287 designs**

Process and Technology Innovation

a. Uses of High Speed Charkha in lieu of Traditional conventional charkhas which limits the productivity of handloom workers.

b. Uses of improved Frame Loom which is ergonomically designed to provide a comfortable sitting position to the weavers.

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c. Uses of Multiple Box Loom: As soon as the first shuttle stops, the second shuttle automatically starts without stopping the loom. In the meantime, the empty shuttle can be refilled and reloaded in the loom. This technology intervention has significantly minimised the wastage in time during changeover, which has resulted in high utilisation of the loom.
d. New and Improved Cross bar Horizontal Loom which is better ergonomics and visibility to the weaver so that workers can work continuously for longer hours.
e. The longer process of Art ➔ "*Yarn →Warping →Sizing (Optional)→ Drawing-in →Beam Gaiting →Pick-density setting → Weaving →Transported to Garments Factories → Fabric Inspection →Layering →Cutting → Bundling → Stitching on Sewing Machine → Post Production /Finishing i.e. attaching accessories, washing, creasing etc."* was replaced by a short process of *"Yarn →Warping → Drawing-in → Beam Gaiting →Pick-density setting → Post Production/Finishing i.e. attaching accessories, washing, creasing etc."*
f. Derivation of new colours and Computer Colour Matching System through a software called 'Kothari Colorist', a match prediction software, developed to eliminate the colour matching problems of the industry. It works in conjugation with a spectrophotometer. Target colour is read using the spectrophotometer and the recipe based on the stock colours in predicted.
g. Enzymatic preparatory of cotton textiles to save water, caustic soda, peroxide and peroxide stabilizer consumption in preparation of cotton textiles and to reduce the discharge of pollutants from industries.
h. Extraction of colourants from micro-organisms
i. Efficient energy management process to reduce fuel consumption in the multi-end silk reeling unit

Machinery and Raw Material Innovation

a. Waste minimization by the use of Rapier Loom
b. Power driven winding machine to replace conventional machines which have slow speed and require more effort to operate.
c. Uses of Ergonomic workstation for hand embroidery and pregnant workers
d. Uses of Horizontal warping machine and new beaming process
e. Uses of Jacquard weaving with harness to improve the traditional *jala* weaving technique used for jacquard weaving and remove inconsistencies like faulty shedding.
f. Cabinet dyeing of yarn to improve the process of yarn dyeing for achieving better quality. Cabinet dyeing machine has replaced the crude method of open vat dyeing process.
g. Uses of Self-Lubricating Nylon (SLN) loom parts
h. Uses of Bi-Fab Handloom for weaving two fabrics simultaneously
i. Uses of Korvoi Sley which eliminates extra persons for weaving contrast border
j. Uses of Loom with take-up motion for automatic winding of woven cloth
k. Hydrophobic Textiles with Plasma Technology
l. Uses of Water Repellent Geotextiles with Natural Eco-Friendly Additive as a raw material
m. No Salt, Low Alkali Dyeing of Cotton Textiles replacing the traditional Reactive Dyes
n. Blended Fabric from a Natural Fiber like Corn Husk and Cotton/Polyester/ Acrylic Fiber
o. Low Cost Printing Thickeners from Natural Sources like gaur seeds and tamarind kernels
p. Eco-Friendly Stain Remover as a Replacement for Carbon Tetra Chloride (CTC)
q. Eco-Friendly Technical Textiles from Banana Yarn, bamboo yarns etc.

Marketing and Distribution Innovation

a. Knowledge on strengthening the market links and networking with resource agencies.
b. Development of website (www.themecrafts.in) and videography of the events
c. Web enabled marketing and engagement of high end designers
d. Buyer seller meet (BSM) for promotion of handlooms
e. India International Garment Fair for showcasing latest trends and fashions in the apparels
f. Set up of Sambalpuri Bastralaya, a chain showroom, by the Sambalpuri Weavers' Cooperatives in various cities in India
g. Selling through weavers' cooperative or through SHGs to eliminate middlemen in the distribution channel.

4.2. Analysis of Innovative Practices

This study found that most of respondents had used the innovations in the last five years. More than 80 percent of the respondents have used at least three types of innovations. The survey also shows that type of innovation that carried out by less than 40 percent of artisans is only innovation in raw materials and machinery (35%), meanwhile product innovation (86%) is carried out by most of the producers (Table 03). This finding is in line with the case of traditional furniture industry in Jepara (Van Geenhuizen & Indarti 2005[43]) and bamboo handicraft industry in Sleman regency (Brata 2009[44]) that the product innovation is the most important type of innovation, adopted by the indigenous artisans.

Table – 03: Type of Innovation

Types of Innovation	Raw Materials & Machinery	Marketing	Process	Products
Responses	35%	46%	31%	86%

Source: Primary data collected in the year 2017 and analysis thereafter

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Innovation always reflects through the adaptation of new product, process etc. Table 04 indicates that, artisans classified the newness of their innovation at moderate level for all types of innovation. It indicates that he is aware about the practices of other producers and his imitating and less risk-taking behaviour. As expected, product innovation shows a higher degree of newness.

Table – 04: Degree of Innovation

Degree of Innovation	Raw Materials & Machinery	Marketing	Process	Products
High	8%	30%	29%	33%
Moderate	23%	60%	61%	65%
Low	69%	10%	10%	2%

Source: Primary data collected in the year 2017 and analysis thereafter

The basic objective of the respondents under study is to preserve and progress the business, with a varied degree of innovative practices, as majority of them don't have in any other secondary occupations and practices. Table - 05 shows that more than 50 percent of producers choose product innovation as the provider the highest benefits for the business.

Table – 05: Degree of Benefits from the types of Innovation

Degree of Innovation	Raw Materials & Machinery	Marketing	Process	Products
High	43%	38%	42%	51%
Moderate	50%	60%	48%	47%
Low	7%	2%	10%	2%

Source: Primary data collected in the year 2017 and analysis thereafter

Do social networks play an important role in the process of innovation? To get the answer, first, we analyze who are the actors of innovation, and then identify the sources of information or knowledge used in innovation. As shown in table - 06, the main actor of innovation in the product innovation is the artisan himself and it is producer-driven innovation. The analysis of the literatures indicates that the social networks contribute significantly in the indigenous knowledge innovation. Based on the sources of information, weavers' experience in trials and errors was the main source of information in product innovation (78.2%) and raw material and machinery innovation (42%) (Table 07). The family and close friends are the major information source in market innovation and product innovation. It should be mentioned that six of nine information sources are categorized as social networks. They are family or close friends, business partners, association of producers, buyers, suppliers and exhibitions.

Table – 06: Actors of Innovation

Actors of Innovation	Raw Materials & Machinery	Marketing	Process	Products
Artisans	12%	20%	22%	73%
Buyer	8%	13%	8%	5%
Supplier	12%	10%	8%	7%
Others	68%	57%	62%	15%

Source: Primary data collected in the year 2017 and analysis thereafter

Table – 07: Sources of innovation (Figures are in %age)

Sl. no.	Sources of Innovation	Raw Materials & Machinery	Marketing	Process	Products
01	***Self (Trial and error)***	***42.0***	***16.1***	***4.5***	***78.2***
02	Family/close friends	16.0	**28.7**	5.5	**27.3**
03	Business partners	18.0	18.3	5.8	20.0
04	Producers association	8.0	8.7	6.5	5.5
05	Buyers	10.0	1.7	2.9	**45.5**
06	Suppliers	**20.0**	10.0	**13.2**	11.8
07	Exhibitions	8.0	**45.7**	**19.4**	**32.7**
02-07	***Social Networks***	***36.0***	***50.2***	***28.0***	***48.35***
08	**Government agencies**	**70.0**	**57.4**	**72.9**	**31.8**
09	**Non-government agencies**	**35.0**	**32.2**	**23.2**	**10.0**

Source: Primary data collected in the year 2017 and analysis thereafter

However, 36% of the respondents opined that social networks plays a significant role in raw material and machinery innovation, 50.2% in marketing, 28% in process and 32.7% in product innovation. The government agencies and non-government agencies are instrumental for a major innovation in this age-old traditional process. 70% of the respondents opined that the govt. agencies played a major role in raw material and machinery innovation whereas 57.4% opined for marketing innovation, 72.9% for process innovation and 31.8% for product innovation.

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4.3 IMPACT OF INNOVATION ON HANDLOOM BUSINESS OF SAMBALPURI ARTISANS – AN ANALYSIS OF SECONDARY DATA

The innovations adopted by the Sambalpuri Handloom Artisans not only increases the volume of sales and production between the study period, i.e., 2012 and 2017 but also the profit margin of the units. Table – 08 shows that in increase of 38.43% in sales was seen in the handloom produces within 5 financial years, ranging between 48.17% in maximum to 28.72% in minimum. The most important aspect of the data is that no responding artisans has recorded a negative growth. The average increase in the production volume in these two periods was 28.19% which can be attributable to the innovation in the process, which ranges between the highest of 43% and the lowest of 18%. The profit changes in the absolute terms at 77.79% with a highest of 80% and 62% as the lowest. The profit margin increased from 23.26% in 2012 to 29.87% in 2017. The ANOVA test shows the change in average annual sales volume, average annual production volume and profit between these two periods of survey are statistically significant at 5% significant level (Table 09).

Table – 08: Changes in various Parameters Surveyed during Two Rounds in 2012 and 2017

Units	Financial Performance of the Business	Amount / Units
Rs.	Average Sales Volume in 2012	2,13,375
Rs.	Average Sales Volume in 2017	2,95,378
Rs. /%	Increase in Average Sales Volume	82,003 (38.43%)
Nos.	Average Production Volume in 2012	337
Nos.	Average Production Volume in 2017	432
Nos./%	Increase in Average Production Volume	95 (28.19%)
Rs. /%	Average absolute Profit and profit to sales % in 2012	49,625 (23.26%)
Rs. /%	Average absolute Profit and profit to sales % in 2017	88,230 (29.87%)
Rs. /%	Increase in Profit Margin	38,605 (77.79%)
Units	**Income of the HH**	**Amount / Units**
Rs.	Nominal Avg HH Annual Income in 2012	2,24,590
Rs.	Nominal Avg Annual Income in 2017	3,69,800
Rs. /%	Nominal Increase in Average Annual Income	1,45,210 (64.66%)
Rs.	Deflated Avg HH Annual Income in 2012	2,24,590
Rs.	Deflated Avg HH Annual Income in 2017 (GDP Deflator – 125.4)	2,94,896
Rs. /%	Deflated Increase in Average Annual Income	70,306 (31.30%)
Units	**Employment Generation for Self, Family members & others**	**Amount / Units**
Days	Average Man-days Employed in 2012	195
Days	Average Man-days Employed in 2017	310
Days/%	Increase in Average man-days of Employment	115 (58.97)
Days/%	Avg. Man-days of employment foregone due to involvement in handloom	72 (62.61%)
Days/%	Difference between increased & foregone Avg. man-days of employment	43 (37.39%)
Units	**Creation of Fixed Assets**	**Amount / Units**
Rs.	Average Value of Total Fixed Asset on 01.01.2012	12,13,320
Rs.	Average Value of Total Fixed Asset on 01.01.2017	17,22,120
Rs. /%	Average Value of Total Fixed asset created during 2012-16	5,08,800 (41.93%)
Units	**Coverage of Markets**	**Nos.**
Nos.	Average Local Markets in terms of Districts on 01-01-2012	15 districts
Nos./%	Average Local Markets in terms of Districts on 01-01-2017 & changes	30 districts (50%)
Nos.	Average State level exhibitions attended in 2012	9
Nos./%	Average State level exhibitions attended in 2017 & changes	23 (155.56%)
Nos.	Average National level exhibitions attended in 2012	6
Nos./%	National level exhibitions attended in 2017 & changes	16 (166.67%)
Nos.	Average International exhibitions attended in 2012	1
Nos./%	Average International exhibitions attended in 2017 & changes	3 (200%)
Units	**Loan Fungibility**	**Amount / Units**
Rs.	Average Annual Loan Availed during 2012	1,18,250
Rs. /%	Average Business Uses of the Annual Loan Availed during 2012	85,140 (72.00%)

 DOI : 10.18231/2454-9150.2018.0329

Rs.	Average Annual Loan Availed during 2017	1,62,000
Rs./%	Average Business Uses of the Annual Loan Availed during 2017	1,49,000 (91.98%)
Rs./%	Changes in Annual Loan Availed	43,750 (37.00%)
%	Changes in Average Business Uses of the Annual Loan Availed	19.98%

Source: Primary data collected in the year 2017 and analysis thereafter

Table 09: Test of ANOVA of the Changes in various Parameters surveyed during Two Rounds of Surveys in 2012 and 2017

Changes in the Parameters	F Value	p	Significance
Average Annual Sales Volume	133.997	.002	Significant at 5% level
Average Annual Production Volume	4.230	.000	Significant at 5% level
Average absolute Profit Margin	89.502	.001	Significant at 5% level
Average Annual Income per HH (Absolute)	15.877	.000	Significant at 5% level
Average Annual Income per HH (Deflated)	9.892	.000	Significant at 5% level
Average Annual Employability in Man days	5.317	.001	Significant at 5% level
Average Values of Fixed Assets Acquired	12.567	.001	Significant at 5% level
Loan Fungibility	9.146	.000	Significant at 5% level

Source: Primary data collected in the year 2017 and analysis thereafter

With less reliable and unaudited financial information, unlikely the corporate practices of disclosures, these small scale organisations, under present study, causes a serious impediment in providing the real data for research activities (Gunawidjaja & Hermanto, 2010[45]). Even if some groups don't opt for window dressing or doctored accounting data for official submission to avail bank loans and government subsidies, only reliant on the financial and production figure collected for a final conclusion on impact of innovation cannot be impeccable. The change in the revenue is the outcome of the adaptation of the innovative practices which provide assistance to enterprises to increase their profit and too improvements in household income as well the employability. It is also observed that the profits are reinvested in the business, leading to growth of the enterprise and an increase in enterprise net worth (fixed asset) too (Jena et. al., 2012)[46]. The primary data showed a growth of 64.66% in the nominal average annual income of the household whereas deflated increase in average income shows a growth of 31.30% between to sample period of 2012 and 2017 (Table – 08). The increase in the income is within a range of 78% to 48%. The change in the income level between these two periods is also statistically significant.

Table 08 provided a picture of development of employability due to the innovation driven changes in the business environment. According to the pooled data, the days of employment has gone up by 115 man-days (58.97%) from 195 man-days in 2012 to 310 man-days in 2017. The man-days of employment foregone comes to 72 (62.61%) whereas the actual increase in the man-days employed, due to the NERGS, PMRSY etc. taking all sample households into account. It can be concluded that the change in employment is statistically significant (Table – 09).

Respondents whose main economic activity was running a handloom unit used only small quantities of fixed capital in those enterprises. In Round 1 of the survey, these fixed assets averaged only 12,13,320 rupees in value. By Round 2, fixed assets averaged 17,22,120 rupees in real terms, with an increase of 41.93%. These differences is due to the assets created by the acquisition of innovative machine tools and technologies.

The Sambalpuri handlooms enjoy a good national and international market but more needs to be done on upgrading quality and design, as well as in the marketing network. The current marketing scenario is not very encouraging. The artisans, used to sell their products in local market, door-to-door selling, local exhibitions. Sometimes the local businessmen directly contact these artisans and purchase their items at a low price. The local market place does not fetch much money and it is only the NGOs and visitors from outside who purchase items at a fair price, rarely. Few of the Artisans had also participated in the Ekamra Haat Exhibition, Adivasi Exhibition at Bhubaneswar, Khurda Mahotsav, District level Cultural melas, Handicraft Exhibition at Vishakhapatnam at Andhra Pradesh, exhibitions in Chhattisgarh and Delhi Haat etc. These exhibitions and melas stimulate the artisans to come out of their limited rural scenario and become market-savvy. They pick up new ideas from other more experienced exhibitors and direct interaction with customers provides them with valuable feedback. Basically, the handloom market includes the local markets, exhibitions, fares and showrooms in the large cities. As the middlemen or the shop owners of the cities and the NGOs purchased the products from the artisans at the place of production, the study failed to take those factors into consideration under the market coverage, due to lack of written records. As the percentage of the sales in the exhibitions constituted a larger share of the total sales volume of the handloom sector, the present study of market

 DOI : 10.18231/2454-9150.2018.0329

coverage is based on the data - "number of exhibitions and fairs attended by these organisations" which was collected from the records of various NGOs, and cluster development agencies like ORMAS, DIC, DRDA, DH & CI, UNIDO, and national level organization like NABARD. The table 08 indicates an increase of 50%, 155.56% and 166.67% had been registered with respect to the participation in the local, state and national level exhibitions respectively.

It would normally be expected that an effective innovation would raise the revenues, fixed assets, and employment of that particular enterprise. Indeed, majority of the impact studies look no further than these primary entrepreneurial factors for impact. There are, however, more important reasons for searching more widely. The first important reason is loan fungibility. Entrepreneurial credit is considered a fungible addition to household resources that can be allocated to the activity (or activities) considered most important by the individuals within the household who control the credit allocation decision. Although loans are taken for particular stated purposes can lead to a number of potential uses. Once the organisation sustainably provide adequate return to the household then the diversified usages of loan will be reduced. For this reason, as well as because we believe that entrepreneurship is as important as credit in general, this study evaluates the loan fungibility as a factor for entrepreneurial success. The higher is the credit fungibility, the lesser is the development of the craft activities as the usability and diversification of credit ruin the basic objectives of credit. From the Table 08, the study concluded that the loan fungibility decreases (around 4% from 38%) along with increase in the activities of the craft activities.

The above changes recorded between two survey period, 2012 and 2017 and the analysis made subsequently inferred that the adaptation of innovation in the traditional knowledge based enterprises like Sambalpuri handloom sector lead to significant increase in entrepreneurial parameters like production, sales, profit, market coverage and employability as well as instrumental in increasing the HH income and reduction in loan fungibility. Thus the first null hypothesis set up for the study is rejected and it will be concluded that innovation induces the entrepreneurial success among the Sambalpuri Handloom Artisans.

4.4 ANALYSIS OF FACTORS OF INNOVATION & ENTREPRENEURIAL SUCCESS

The overall entrepreneurial development is an outcome of innovative practices undertaken by the weavers of Sambalpuri handloom. The development of entrepreneurship was analysed through the factors viz., Sales Volume, Production Volume, Profit Margin, Income of the HHs, Employability, Acquisition of assets, Market Expansion, and Loan Fungibility. The data collected from the books and accounts of the artisans and those submitted to the District Industry Centre (DIC) were used for the study. For the present study, the overall entrepreneurial development was calculated through the following process –

i. Each of the above 8 factors were given weightage in a 7 point scale (1 to 7) on the basis of the change experienced in 2017 over 2012, as per the Table 09. The weightages were assigned to each of the 8 factors accordingly.

Table 10: Weightage to the Factors Describing Entrepreneurial Development

Weightage assigned	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Percentage of Change	0-15	15-30	30-45	45-60	60-75	75-90	90-100

ii. The overall entrepreneurial success was calculated by averaging the total weightage calculated for each respondents.

$$Y_{ESn} = \Sigma\,(Weightages\ assigned\ to\ all\ 8\ factors)/_{8}$$

Where Y_{ESn} = Overall Entrepreneurial Success of n^{th} Artisan.

iii. Each respondents were asked questions about various types of innovations and the degree of their adoptability in their organisation and activities, which was recorded through 5-point Likert scale. For studying the 4 independent factors, a total of 35 questions included.

Table 11: Correlation between Overall Entrepreneurial Success and Four Factors

Dependent Factor	**Four Factors →**	**Product Innovation (Factor 1)**	**Process and Technology Innovation (Factor 2)**	**Innovation of Machinery & Raw Materials used (Factor 3)**	**Innovation of Marketing & Distribution (Factor 4)**
Entrepreneurial Success	**Karl Pearson Correlation**	0.577**	0.482**	0.386**	0.382**
	Sig. (2-tailed)	0.002	0.001	0.003	0.001
	N	100	100	100	100

Source: Primary data collected in the year 2017 and analysis thereafter

*Note: ** $p < 0.01$*

In the present study, the correlation coefficient was calculated to measure the strength of the linear relationship between the Overall Entrepreneurial Success of the respondents and four factors (Product Innovation, Process Innovation, Innovation of Raw Materials and Machinery Usages, and Innovation of Marketing and Distribution

 DOI : 10.18231/2454-9150.2018.0329

Activities). The correlation between Overall Entrepreneurial Success and four factors was positive and was significant at the 0.01 level (2-tailed). The correlation between overall entrepreneurial success and Product Innovation (Factor 1) was 0.577 (p =0.002); the correlation between overall entrepreneurial success and Process Innovation (Factor 2) was 0.482 (p =0.001); the correlation between overall entrepreneurial success and Innovation of Raw Materials and Machinery Usages (Factor 3) was 0.386 (p =0.003), and the correlation between overall entrepreneurial success and Innovation of Marketing and Distribution Activities (Factor 4) was 0.382 (p =0.001) (Table 11). Therefore, the study indicated that the correlation between Overall Entrepreneurial Success and Product or Process Innovation was higher than that between Overall Entrepreneurial Success and Innovation of Raw Materials and Machinery Usages or Innovation of Marketing and Distribution Activities. These results revealed support for the result we derived from the previous section that there seems a moderately higher correlation between Overall Entrepreneurial Success and the attributes concern to product and process innovation.

In order to further reveal support for hypothesis, the factors that influenced the overall entrepreneurial success of the Sambalpuri Artisans, the four orthogonal factors were used in a multiple regression analysis. The multiple regression procedure was employed because it provided the most accurate interpretation of the independent variables. The four independent variables were expressed in terms of the standardized factor scores (beta coefficients). The significant factors that remained in the regression equation were shown in order of importance based on the beta coefficients. The dependent variable, Overall Entrepreneurial Success of the Artisans, was measured on a 7-point scale and was used as a surrogate indicator of Overall Entrepreneurial Success. The equation for Overall Entrepreneurial Success of the Artisans was expressed in the following equation:

$$Y_{ES} = \beta_0 + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4$$

Where X_1 = Product Innovation, X_2 = Process and Technology Innovation, X_3 = Innovation with Machinery and Raw Materials used, X_4 = Innovation with Marketing and Distribution activities, and B_1 … B_4 = regression coefficient of Factor 1 to Factor 4 respectively.

Table 12 showed the results of the regression analysis. To predict the goodness-of fit of the regression model, the multiple correlation coefficient (R), coefficient of determination (R^2), and F ratio were examined. First, the R of independent variables (four factors, X_1 to X_4) on the dependent variable (Overall Entrepreneurial Success of the Artisans or Y_{ES}) is 0.589, which showed that the artisans had a positive and high Overall Entrepreneurial Success levels with the four attributes. Second, the R^2 is 0.332, suggesting that more than 33% of the variation of artisans' Overall Entrepreneurial Success was explained by the four factors.

Table 12: Regression Results of Overall Entrepreneurial Success

Model Summary		**R**	**R^2**	**Adjusted R^2**	**SE**
		0.589	0.332	0.294	0.8802
Analysis of Variance (ANOVA)					
	SS	**df**	**MS**	**F**	**p**
Regression	43.461	4	10.865	14.024	.000
Residual	34.875	45	0.775		
Total	78.336	49			
Regression Analysis (p<0.05)					
Independent Variable	**B**	**SE**	**Beta (β)**	**t**	**p**
Constant	5.365	0.78	-	64.679	.000
Factor 1	0.329	0.79	0.304	3.879	.000*
Factor 2	0.299	0.79	0.294	3.812	.000*
Factor 3	0.287	0.79	0.282	3.682	.000*
Factor 4	0.282	0.79	0.276	3.612	.001*

Source: Primary data collected in the year 2015 and analysis thereafter

Last, the F ratio, which explained whether the results of the regression model could have occurred by chance, had a value of 14.024 (p = 0.00) and was considered significant. The regression model achieved a satisfactory level of goodness-of-fit in predicting the variance of Overall Entrepreneurial Success of the Artisans in relation to the four factors, as measured by the above mentioned R, R^2, and F ratio. In other words, at least one of the four factors was important in contributing to Overall Entrepreneurial Success of the Sambalpuri Handloom Artisans.

In the regression analysis, the beta coefficients could be used to explain the relative importance of the four dimensions (independent variables) in contributing to the variance in Overall Entrepreneurial Success of the Artisans

 DOI : 10.18231/2454-9150.2018.0329

(dependent variable). As far as the relative importance of the four dimensions of the innovation practices is concerned, Factor 1 (Product Innovation, B_1 = 0.329, p = 0.000) carried the heaviest weight for the Entrepreneurial Success of the Sambalpuri Handloom Artisans, followed by Factor 2 (Process Innovation, B_2 = 0.329, p = 0.000), Factor 3 (Innovation with Machinery and Raw Materials used, B_3 = 0.287, p = 0.000), and Factor 4 (Innovation with Marketing and Distribution activities, B_4 = 0.282, p = 0.001).

In conclusion, all underlying dimensions are significant. Thus, the results of multiple regression analysis reject the null hypothesis under study, that *there is no relationship between the innovation and the Overall Entrepreneurial Success of the Artisans*. So, there is a relationship, which is what we expected.

V. CONCLUDING REMARKS

The indigenous knowledge has travelled along with socio-political history of India and seen many ups and down with cultural forces. It also developed along with these changes and the patronages received in the history. With this creative variation, the art has survived through ages. The innovation in the design, products, raw materials and machinery, and marketing and logistics lead to improved business acumen in the Sambalpuri handloom sector of Odisha too. For a combination of economic and social reasons, these artisans have very low income levels and are subject to a number of binding constraints in their search for economic welfare and enhanced economic security for themselves and their families. Due to the high illiteracy and non-existence of formal technical knowledge, the introduction of sophisticated innovation and changes in traditional knowledge and process is a catastrophe. Given the circumstances in which they endure, their achievements are indeed remarkable. In the current scenario of the aggressive marketing and high competitive world of business, indigenous knowledge should adopt innovations to keep the art, technique and pride alive. What Sambalpuri handloom industry needs now is better marketing strategies and design, apart from regular upgradation of indigenous knowledge and skill.

To conclude, innovation in indigenous knowledge plays an important part in artisans' financial landscape but it does not offer a ready means to escape from the poverty. As such, it plays a limited but important role in helping them to cope with their myriad and daunting economic challenges, through a viable entrepreneurial success and growth.

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