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An environmentally friendly Cellulose Insulation Technology for Srinagar, India: A Sustainable Business and Social Innovation

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Abstract

Insulating a house decreases energy consumption and creates better living conditions by keeping the inhabitants warm in winters and cool in summers. It is an important choice to be considered while building the houses/ commercial buildings anywhere in the world. While the western countries have been insulating the constructions for several decades now, this concept stays unfamiliar to many Indians living even in the coldest areas of India. This paper attempts to investigate the applicability of cellulose insulation technology to Srinagar, India. The study is based on the analysis of qualitative data acquired through the in-depth interviews with the key stakeholders including structural engineers, construction companies, architects, government officials, printing agencies and retailers in Srinagar, India. According to the results, cellulose insulation business in Srinagar could not only be seen as an opportunity for sustainable business but also as a socially driven innovation. Insulation is essential for comfortable living as it could protect the people from cold and illnesses during harsh winters. Srinagar offers great potential for cellulose insulation business and it would receive great support from the government. The reason for its in-usability is the lack of availability of such technologies in the market. The strengths as well as threats to cellulose insulation business in Srinagar are identified. This study also proposes suggestions for interested investors.

Keywords: energy consumption, cellulose insulation, living conditions, India

1. Introduction

A lot has been discussed about the concept of innovation so far. Today, innovation is discussed in all fields of study be it business, entrepreneurship, design, technology, engineering or sociology. The fact that innovation is being studied from various perspectives gives rise to different interpretations. Today the concept of innovation has expanded and it does not only entail the traditional definitions. One such expansion is the study of social innovations alongside traditional technological innovations (Melkas & Pekkarinen, 2010)

One broad definition of social innovation is that it refers to new ideas that work in meeting social goals. Social innovation is differentiated from business innovation as the latter is generally motivated by profit maximization. (Skoll Centre for Social Entrepreneurship, 2007). Business innovations have always been regarded as tools that could potentially generate high revenues but they are undermined in their nature to meet social goals like social innovations. This

study emphasizes that the business innovations could also to a large extent be socially motivated. This is further explained by proposing a sustainable business solution that could bring about societal transformation.

This study focuses on the coldest northern state of India, Jammu and Kashmir (J&K) that faces harsh winters with temperature dipping as low as -40 degrees Celsius in certain areas and yet the heating facilities available for the people are insufficient. As the government cannot provide electricity throughout the day, the concept of centrally heated constructions is rare. The constructions are not even insulated which makes it much harder for the people to survive the cold. As a result, the houses are very cold inside and people need to wear heavy woolen clothes even when they are indoors. Proper insulation of the houses can make a big difference to the lives of the people of J&K by not only preventing them from cold but also by avoiding the illnesses caused by the chilly winters.

Insulation helps in reducing the amount of energy required to heat or cool a building thus reducing the energy utility bills of consumers. Western countries have experience of using the insulation material in constructions for over several decades now. Today, more environmentally friendly and economically viable insulation materials are being offered in the market. For instance, cellulose blown insulation has a much smaller impact on the environment. "It is one of the greenest products in the world. It is made from recycled newsprint and other paper sources, paper that might otherwise end up in landfills, releasing greenhouse gases as it gets decomposed. Further, its production uses far less energy than any other type of insulation like fiber glass or foam insulation". (Cellulose Insulation Manufacturers Association (CIMA),2012). Thus this cellulose insulation material is suitable for the Indian market as it is produced from waste paper which could be readily found in India.

The process of insulating the houses and buildings in J&K is a new concept and the technologies required for this process are unavailable. The fact that such technologies do not exist in J&K gives an excellent opportunity for the foreign companies to provide their tested sustainable business solutions to the people of J&K. The foreign companies could internationalize and expand their businesses and the people of J&K could have better living conditions. It is argued that the proposed business solution is considered as a social innovation even though it is not a completely new idea as it is an already established solution in the western world but it is a new idea in terms of its applicability to J&K, India and it has the potential to improve the lives of the people by reducing cold and illnesses thereby meeting social goals.

This research is purposeful as it not only supports the concept of sustainable cellulose insulation business but it also recognizes that the business innovations can also be socially driven. The article aims to identify the applicability of sustainable cellulose insulation technology to J&K, India.

The key research questions are: 1) what is the demand for the cellulose insulation in Kashmir and could it be a socially driven innovation? 2) Is cellulose insulation a sustainable business option for Srinagar? 3) What are the challenges and opportunities associated with cellulose insulation business in Kashmir? 4) How can this business be established in Srinagar?

2. Theoretical background

The theoretical background of this research focuses on sustainable development/ sustainable business and social innovation. The cellulose insulation business has been viewed as a sustainable business as it is an environmentally friendly business which also has a social role. It has a potential of reducing the ailments and providing a better life for the inhabitants of Srinagar by protecting them from extreme cold. This business innovation in this city has the potential to act as a social innovation by meeting the pressing unmet needs of people and improving their lives.

2.1 *Sustainable business*

Sustainable development is the term that has been in public domain since mid- 1980s and it reflects three important and interrelated dimensions: social equity, economic prosperity and environmental quality.(Soyka, 2012). It is considered to be a worthy goal; however, there is no common understanding about the way this goal could be achieved. (Gray, 2010; Robinson, 2004). As this mission of achieving sustainable development is becoming important, the role of business sector is considered to be crucial. (Porritt, 2005). Sustainability cannot be regarded as a separate theme that just exists to enhance a firm's reputation. (Fisk, 2010). Instead, it has to be adopted into everyday practices of a business. (Weybrecht, 2010). The issues of sustainability have to be moved from the fringes to the heart of the business. (Fisk, 2010). These notions of sustainability and sustainable development have been further expanded to sustainable business. Sustainable business that is largely understood as environmental business is in fact much more than just mere "green business". It also encompasses the social and economic dimensions that are equally significant in maintaining the sustainability of a business. (Tueth, 2010). These three dimensions represent the three basic pillars of sustainable business. Sustainable business understands how to address economic, social and environmental challenges holistically in order to create a better world. (Fisk, 2010). Sustainable business provides quality of life while considering the environmental resources as well as the economic prosperity. In the search for sustainable business solutions, the social aspect cannot be overlooked and the future generations have to be taken into consideration. After all, businesses make an impact on the humans and the world at large and therefore this impact has to be positive.

For a new and sustainable business world, sustainable innovations are needed. These sustainable innovations can be applied at any level of the organization from the processes all the way to the market or strategy. (Fisk, 2010). Another important element of sustainable business world is collaboration. The global firms today need to avail opportunities from various different parts of the world. The innovation activities are tied to internationalization. (Hautamäki, 2010). Prahalad and Krishnan describe the global innovation environment with the formula $R = G$ meaning resources are global. (2008). Thus collaboration, internationalization and innovation form the pillars of the new sustainable business world.

2.2 *Social Innovation*

In the recent years, social innovation has been gaining visibility in the field of innovation studies although its roots are embedded in social sciences. Social innovation as a concept has been interpreted differently across different fields and it is not restricted to one field of study. (BEPA, 2010). Social innovations originate from many sources and eventually are applied to various fields. The various foundations can include academic research, social businesses, political campaigns and new technologies. Social innovations are continuously looking for answers to the many different social problems by delivering the new services that improve the quality of life of individuals and communities. (SIE Report,2012). All the definitions of social innovation have one thing in common and that is clearly the ability of these new ideas, notions, strategies or concepts to meet the basic social needs that benefit the society. Therefore, as defined in SIE Report, “Social innovations are new ideas, institutions, or ways of working that meet social needs more effectively than existing approaches. Often, social innovation involves the remaking and reuse of existing ideas: the new application of an old idea or the transfer of an idea from one part of the world to another”. (2012). Social innovations do not have to be completely novel in their essence. A tried and tested idea in one part of the world could very well be a completely novel idea in another part of the world and therefore be considered as an innovation.

Social innovation and business innovation have been distinguished by the authors who assume that the business innovation is a mere profit seeking innovation and the whole idea is to help the firm improve its performance and generate revenue. It is also argued that every innovation by a firm that meets a social goal turns out to be a social innovation and thereby every business innovation is a social innovation. (Pol & Ville, 2009). According to Pol & Ville, the distinction between social innovation and business innovation is important because then only the inherent characteristics of social innovations could be studied effectively. (2009).

However, the author argues that there is no special need to distinguish one from the other if the aim of the business is not just profit maximization but quality of life. Although every business needs to make money but the businesses could at the same time be motivated by social goals as well. Improving the quality of life drives the notion of social innovation and if it is the same for any business innovation then it does not make any sense to make a distinction between the two concepts.

The role of new social-innovation businesses is to achieve desired social change by solving the societal problems and at the same time achieving the economic goals. There is no need to separate a social cause from business as the latter is always embedded in the society and therefore cannot be separated from it. Non-profits originated because the firms couldn't address the market failures like poverty, pollution, illiteracy. (Fisk, 2010). If the societal problems are addressed then profits will not hurt.

3. **Research Methods and Context**

The research approach chosen for this study is qualitative as it offers more flexible relationship with the respondent and the data gathered has more depth. The main source of the research data is the primary data. This involves the empirical material collected by the researcher in the target market that is acquired by 22 individual in-depth interviews. Besides, in Finland,

researcher also conducted interviews with the managers of two different cellulose insulation factories to get the important information about cellulose insulation technology, operation and business and also observed one cellulose insulation production plant in Finland.

Cellulose fiber insulation was chosen instead of other insulation technologies because it is environmentally friendly not detrimental to health like some insulation technologies and this product consists of 75-85% of recycled newsprint and therefore helps in waste management. It is least polluting and, most energy efficient insulation. (CIMA 2012)

The researcher conducted semi structured interviews with the representatives of four different categories of people. Each interview lasted for one hour. The respondents were chosen after determining the initial market segments and stakeholder analysis. The researcher divided the stakeholders into four different categories and interviewed representatives from each category. These categories were divided based on the varied roles/responsibilities. Each category was asked different set of questions. These four categories included 1. People who had knowledge of the construction industry like architects, civil engineers, structural engineers, contractors, construction companies and could provide information about the possibility of accommodating cellulose insulation into existing construction style. 2. Decision makers like government officials who could provide information about ways of doing cellulose insulation business with the foreign companies and who were also authority on giving permissions for starting the business. 3. Representatives from printing houses to check the raw material availability 4. Housing material retailers who could be the potential buyers.

The researcher used a model for analyzing the qualitative data called Kolb's learning cycle. The various stages involved in this model are the following. 1) Concrete experience: it starts with interview transcripts, feelings, memories etc 2) Reflective observation includes three activities which are: familiarization- getting to know the data, spending time with the issues and data and reordering- summarizing the data 3) Abstract conceptualization means to extract concepts which the researcher can recognize. 4) Active experimentation: Here the researcher looks where the concepts occur, whether there are any patterns in the data, do the patterns emerge from data or the pattern fits the theories or concepts. (Mayor & Blackmon 2005, 348-49)

While assessing the criteria of the findings like reliability, validity and generalizability, certain things should be noted. Firstly, this research is based on interpretative understanding and qualitative analyses are more or less subjective. Secondly, this research is conducted in Srinagar, the capital city of J&K and the results of the study cannot be generalized to different topographical areas of J&K like Ladakh or Jammu. However, this research could be generalized to the areas of Kashmir valley that have similar climate, construction style and ways of working.

The focus of my research is on the capital city of J&K, Srinagar. J&K is the northernmost state of India. The total area of the state is 222,236 sq. km including 78114 sq km under the occupation of Pakistan and 42,685 sq km under that of China. The State is bounded by Pakistan, Afghanistan and China from the West to the East. J&K ranks 6th in area and 17th in population among the States and Union Territories of India. J&K comprises three climatic regions: temperate Kashmir valley, arctic cold desert areas of Ladakh and sub-tropical region of Jammu. While the winter season in Jammu is moderate, the regions of Kashmir and Ladakh face harsh winters. In winter, the temperature in Ladakh ranges between - 20 to - 40 degrees Celsius in

some regions while in Kashmir the temperature varies between -2 and -8 degrees Celsius. (Government of J&K, 2012)

The population of J&K is around 12,548,926. The languages spoken are mainly Kashmiri, Urdu and Dogri. Jammu and Kashmir is the only state in India with two capitals: summer capital, Srinagar and winter capital, Jammu. (Government of J&K, 2012)

Srinagar is situated in the centre of the Kashmir valley. It is located 1585 metres above sea level. The population of Srinagar is more than one million which is spread over an area of 294 sq km. (Census of India, 2011).

The climate of Srinagar may be described as a humid continental climate with very warm summers and cold winters. The highest temperature falls around 37 °C and the lowest -14 °C. (Government of J&K, 2012)



Figure 1: Map of J&K

(International Blawg 2006)

4. Results

4.1 Demand for Cellulose Insulation technology in Srinagar. A socially driven innovation?

The people of J&K experience very harsh winters because of the fact that there is limited infrastructure to survive the winters. During this period, the temperature in Srinagar varies from -3 to -10 degrees Celsius while in Ladakh areas it can dip as low as -40 degrees. During this period, all the schools close down because of the lack of the facilities i.e. unavailability of heating systems or electricity. Government is unable to provide continuous supply of electricity throughout the day. Unscheduled load shedding for long hours is a daily affair. The air is as cold inside the house as it is outside. As a result, people wear heavy woollen clothes while indoors as well and carry fire pots with them to keep themselves warm. It is not uncommon to see frozen taps in the houses during winters. All the offices are moved to the winter capital of J&K, Jammu as it has moderate winters. The winter is seen as a season of minimum productivity.

The dry cold weather results in cold-related diseases in the entire Kashmir Valley. Ailments like influenza, cough, cold, chest infections are common. However, more serious

diseases like arthritis are also prevalent. Researches have shown that the most common ailment prevalent in the cold regions of J&K is arthritis. (Rehman et al. 2004) and this disease is accentuated due to harsh weather conditions as the cold causes stiffness in the bones.

Centrally heated systems used in the developed world during winters in addition to insulated houses makes life comfortable while indoors. It is rare to see a centrally heated construction in Srinagar or well insulated houses/buildings. There is no particular reason why the houses should not be insulated in Srinagar.

In the past, main building materials included mud, burnt bricks, timber and stones. The mud houses provided insulating properties and kept the structures warm in winters and cool in summers. However, lately people have started to perceive mud as a poor man's material and do not use it anymore in the new constructions. In Srinagar, the concept of modern architecture is borrowed from hot areas of India e.g. New Delhi and they do not complement the cold climate of Kashmir. (Kashmir Forum, 2012)

The new constructions in Kashmir are usually made of bricks and concrete with very little usage of timber. New styles of using marbles and fancy tiles and huge window panes are considered superior than the traditional designs. Most of these modern materials and techniques may be readily accepted in Kashmir but they do not really fulfill the needs of people living in these extreme climatic conditions.

People in Srinagar do not use any thermal insulation materials for keeping their houses comfortable during the changing seasons. The modern materials that are currently used also prevent the houses from being naturally good insulators unlike old times. Therefore, insulation is definitely needed in the houses for comfortable living and the cellulose insulation is a proposed solution that can bring a positive change in the lives of the people.

The application of cellulose insulation into the construction industry in Kashmir will be an innovation in itself as for most people there, it is a completely novel concept and it can provide tremendous benefits to the people. The author argues that the application of this technology in Srinagar is also social in nature as it has the potential to provide a comfortable living experience to most people.

Cellulose is a green product. It is made of 80-85% recycled newsprint. The fiber is chemically treated with non-toxic borate compounds (15-20% by weight) to resist fire, insects and mold. It is a safe product. (Fisette, 2005). Cellulose insulation is sprayed on the walls and roofs of the constructions. It is light and easily distributed to the spaces that would otherwise be impossible to reach. This method of installation makes it possible to effectively insulate even the cramped spaces and cavities. This product is better compared to sheet or roll insulation products as they leave gaps that allow the transfer of air. The R-value (measure of thermal resistance) of cellulose improves during cold weather. Cellulose does not lose its energy saving abilities over time. It does not rot or decay and does not support fungus or mold growth. It also has great acoustic insulation properties and provides great sound proofing. (CIMA, 2012)

Cellulose insulation technology minimizes the transfer of air from inside to outside and vice versa and therefore keep the houses cool in summers and warm in winters. Therefore, very

little energy is needed to keep the houses warm as the hot air will not escape like it does in the constructions today due to lack of any insulation.

Considering the broad definitions of social innovation- “doing public good” (Centre of Social Innovation, 2010) and improving the quality of life (Pol & Ville, 2009), the application of Cellulose Insulation technology in Srinagar very well demonstrates these characteristics as it could potentially provide better and comfortable lives to the people of Srinagar. It can definitely have economic and environmental benefits as well that are further described in the next section.

4.2 Cellulose Insulation - A sustainable technology and business

The cellulose insulation business in Srinagar has the potential to be a sustainable business that could not only bring economic prosperity to the state but also assist in saving energy and solving waste management problems.

4.2.1 Cost-effective business

The cellulose insulation business could be a profitable business that could yield good returns in Srinagar. However, it was observed that the raw material prices in Srinagar were higher than for instance in Finland but the cost of the end product could still be lower due to other cheaper inputs like labor and electricity and if purchased from neighboring state, New Delhi.

During the field research, the raw material availability was examined. The main raw materials for the cellulose fiber insulation are waste newspapers and chemicals. It was observed that in Srinagar the cost of one tonne of paper ranges between €180- €200. For example, in Finland, the waste newspaper tonne that is imported from other countries costs between € 70 - €100. Even though, the raw material prices are high in Srinagar, the cellulose insulation business can still be profitable due to the low costs of labor and electricity. Labor costs less in Srinagar than any western country. Blue collar workers work at the rate of € 6 per day while as for the service sector employees the salary does not exceed € 600 per month. This price is a lot less than labor rate in the western countries. For example, in Finland labour rate varies between €8- €15 per hour. (Työsuojelupiirit, 2012). The tariff of electricity/kWh in industrial estates in J&K is as low as € 0.06 while in Finland, for example it is € 0.14. (Global Energy Think Tank, 2012)

Srinagar city has the potential to offer two tonnes of newsprint per day. The waste newsprint if collected properly from rest of J&K would be enough to run this production unit. Further, raw material costs and availability were also checked from New Delhi and it is also possible to purchase the waste newsprint from there. In New Delhi, the waste newspaper tonne can cost around € 90-100. In addition, the chemicals needed for making cellulose insulation could also be purchased in bulk from New Delhi at low prices.

The following table shows the cost calculation of 1 kg of cellulose insulation as per the prices of raw material found in New Delhi.

Inputs	€	Kg	kg price	€/kg cellulose
Paper 85%	93	1000	0.093	0.07905
Borax 7.5%	780	1000	0.78	0.0585
Boric Acid 7.5%	830	1000	0.83	0.06225
Logistics 10%	30	1000	0.03	0.0054
Bag for cellulose	0.17	14.5	0.011724	0.011724138
Labour	60	6000	0.01	0.01
Rent	1000	1400000	0.0008	0.0008
Electricity (100kwh/tonne) @0.06c /unit	6	1000	0.006	0.006
Total				0.2337/kg

Table 1: Cost calculations for manufacturing 1 kg cellulose based on the prices in New Delhi. (Conversion rate 1€ = INR 65, Source: Forex: 6.9.2012)

It was discovered that even with the high prices of raw materials, 1 kg of cellulose can be manufactured only at € 0.2337. Further, it was found out that if the cellulose insulation is priced at € 0.50 / kg, it is still considered affordable. Therefore, this business has the potential to be profitable in Srinagar. The cellulose insulation business has proven to be quite profitable even with high labor costs in the west. Insulation business in Srinagar or whole Kashmir valley is also potential profitable business that can yield good returns.

4.2.2 Eco-friendly Technology

The government of J&K encourages the use of green products and the fact that cellulose insulation building material is made from recycled newsprint, it can provide this business with great support from the government. The cellulose insulation technology, being very efficient and eco-friendly, suits J&K as it produces billion kilograms of useful cellulose insulation material from waste paper per year and protects the environment at the same time. It is a high performance product that excels in harsh weather conditions and provides excellent fire protection and great acoustic properties. (CIMA, 2012)

J&K like other parts of India faces tremendous waste management problems. More than 380 metric tonnes of garbage are generated per day in Srinagar. The manpower and the machinery of Srinagar Municipal Corporation (SMC) is not enough to cater the requirements for 100% collection of waste. At present only 60% of total waste generated is being collected. (SMC,2012). The untreated municipal and industrial waste is being discharged directly into the water bodies. The cellulose insulation technology could help to resolve the waste management problem in J&K by utilizing tonnes of waste newspapers that otherwise end up in landfills and release greenhouse gases while being decomposed. (CIMA, 2012)

4.2.3 Energy Efficiency

Insulating a house can save 45-55% of heating and cooling energy. Insulation helps in the reduction of energy bills and can save up to 45-55% of heating and cooling energy consumption. Due to the less need to heat or cool the well-insulated house, energy gets saved. (Sustainability Energy Authority Victoria (SEAV), 2012)

Extent of Insulation	Heating	Cooling	Heating and Cooling
Ceiling only (added R2.5)	15–25%	30–45%	20–30%
Ceiling (added R2.5) and walls (added R1.0)	40-50%	40-55%	40-50%
Ceiling (added R2.5), walls (added R1.0) and floor (added R1.0)	45-55%	35–50%	45-55%

Table 2: Typical energy savings due to insulation (Source: SEAV, 2012)

The expenditure on electricity and other forms of energy in Srinagar could definitely be reduced if the houses are insulated. Due to the un-insulated houses or buildings, the hot or cool air in the premises easily escapes through the un-insulated walls/ roof as well as windows. According to the one of the experts interviewed in J&K, the timber generally used in the constructions in Srinagar is not well seasoned which could change the shape and leave gaps. Hot or cool air easily escapes through these gaps. The cellulose fiber insulation is an effective way to improve energy efficiency of a house. Cellulose is an effective air-blocker which provides R value of 3.5 per inch of thickness. It is cost effective, thermally efficient and a comfortable solution. (Fisette, 2005).

4.3 Srinagar, J&K as a market area for Cellulose Insulation Business

Srinagar offers great potential for cellulose insulation business. During the field research, it was observed that all the interviewed experts believed that insulating the houses is a necessity in Srinagar and the fact that they are not currently installing it is because of the lack of availability of such technologies in the market. In addition, they also mentioned about the lack of awareness among the common masses. They pointed out that if they recommend people to insulate their houses, people will consider it. Also, once the awareness increases and people see the benefits themselves, this business will be successful.

Srinagar is the prime target for the cellulose insulation business but it does not limit there. Once the business is established in this area, it will be extended to other districts of Kashmir that possess similar geographical conditions. Ladakh is also identified as a potential market due to the extreme weather conditions.

In Srinagar, there is hardly any competition for the cellulose insulation technology. There is no real insulation business activity going on in the city. Fiberglass plates are available in the market but they are brought from neighbouring states. These fiberglass plates are mostly used as roofing materials rather than insulating agents. This cellulose insulation production unit will be the first in the city.

The government of J&K encourages green businesses and also the construction of small and medium sized industries and offers attractive incentive packages to the local as well as foreign investors. For the development of the industrial sector, government is offering loans at low interest rates that are easy to access. It provides grants and funding, minimal taxes, no VAT on the finished goods, income tax exemption for ten years after starting an industry and so on. (JKSIDCO 2004)

There are also certain weaknesses associated with setting cellulose insulation business in Srinagar. Although the support from the government is strong, the Kashmiri society at large does not have any awareness about the insulation industry. People are not familiar with the insulation industry and the benefits that insulation provides. Although there is a need for insulating the houses, people do not act accordingly because they are unaware of the existence of such products. Awareness has to be generated among the masses regarding the insulation. This knowledge can be disseminated to the common masses by the architects and engineers.

Another finding was that common people cannot afford high prices. The target customers of cellulose insulation could be middle and high income people. For those middle income families that may be willing to spend a portion on insulating their houses, the maximum amount that they spend should not exceed INR 2 lac/ € 3000 for a medium sized house. Therefore, the cellulose insulation product has to be priced as per the affordability of the people.

Another challenge that may be faced while insulating the structures in J&K is that the construction style is different than the countries that deal with cellulose insulation like Europe or USA. The cellulose installers may face some challenges. It is important to check the constructions/ buildings in J&K beforehand in order to avoid any problems. Once the

constructions are properly studied, the experts can adopt alternative ways for installing the insulation. Changes may need to be made to suit the local architecture.

In addition to the strengths and weaknesses of the cellulose insulation business in the valley, there are some threats too like political situation, corruption and weak IPR protection.

First of all, the political situation in J&K can be a threat to the business. J&K has been a flashpoint between India and Pakistan for more than 60 years. India administers approximately 43% of the region. Pakistan controls approximately 37% of Kashmir and China controls 20% of Kashmir. India's official position is that Kashmir is an "integral part" of India. Pakistan's official position is that Kashmir is a disputed territory whose final status must be determined by the people of Kashmir. Certain Kashmiri independence groups believe that Kashmir should be independent of both India and Pakistan. Kashmir has been the cause of three wars between India and Pakistan. Since the 1990s, the Indian administered J&K has been hit by confrontation between Kashmiri separatists, and the Pakistan Armed Forces, and Indian Armed Forces which has resulted in thousands of deaths. (The Washington Post, 2012)

The prevailing political disturbances in the city may hinder the smooth operation of the business. Sometimes, the strikes occur in the valley which disrupts the normal working life.

Banks offer export credit guarantees. It covers political risks related to the foreign markets. The common political risks covered are restriction on transfer of credit currency, rescheduling of debts, expropriation and war or insurrection. (Finnvera,2012). The companies that are interested in doing business in India can apply for such guarantees and save their businesses from political risks.

Secondly, corruption can be a biggest concern while doing business in J&K. J&K is considered as one of the major corrupt states in India. Like other parts of India, the relief released by the central government for the welfare or promotion of certain sectors never reaches the people. The research done by the Central Vigilance Commission in India reported that nearly 50% of Indians who use government services pay bribes. The state officials misappropriate the funds. (Central Vigilance Commission, 2012) The foreign companies should be diligent about such issues. They should comply with Indian anti-corruption guidelines and be familiar with applicable anti-corruption regulations in India and also form trusted relationships with people in India who are familiar with corruption issues.

Lastly, weak IPR protection can also be a concern. India operates a system of registration for IPR and is a signatory to various international IPR treaties. However, small companies may not follow the regulations about IPR and thus India has become a high-risk area for IPR theft. In order to avoid IPR theft, foreign investors should contact IPR regulating authorities in India and make sure that their IPR is protected when they are exposed to the Indian market. Foreign investors should also make specific provisions about this in their joint venture agreements. (Madaan, 2012)

5. Implications for investors

Due to the continuing financial distress in the west, the businesses need to execute market needs effectively on a global scale. Western companies need new ways of doing business and

shift to resilient and sustainable business models. As mentioned previously, insulation industry is not well established in J&K, India but these products are very much needed. The cellulose insulation companies from the west could avail this opportunity and introduce their technologies to J&K, India and those companies that take the lead now will have better chances to succeed.

It is a win-win situation for both India and the west. The western cellulose insulation companies can find new markets for their products, internationalize and grow their businesses while the Indian construction industry will get modernized by utilizing the western environmentally friendly technologies and the thermally insulated constructions can provide comfortable living to the Indian people. Further, the companies with green technologies such as cellulose insulation technology will receive great support from the government of India like attractive incentive packages.

Below are some recommendations for the investors who want to invest in cellulose insulation business in Srinagar.

5.1 Entry Strategy

The company with cellulose insulation technology should develop partnership with a company in Srinagar, India and establish a joint venture company there. The partner needed for the cellulose insulation company should be able to finance this project alongside the foreign company, have expertise in the construction business and already established networks in Srinagar.

After entering into a joint venture with the company in Srinagar, the foreign company can enjoy all the benefits of a local Indian company. Joint venture is considered to be a best entry mode in this case as it will allow both the parties to share the investment costs and risks together. In addition, by working with the local partner, the foreign company can get easier access to the markets in Srinagar. The local partner will have in-depth knowledge of the market and be acquainted with the culture and language.

- *Joint Venture Operations*

The joint venture company established in Srinagar can receive the technology and know-how from the foreign company. Both the partners can together invest in starting production of cellulose insulation in Srinagar. The foreign company will be responsible for providing the technology and marketing know-how and training to the employees in Srinagar and the partner from Srinagar will be responsible mainly for the management and the marketing in Srinagar.

5.1 Production Unit

The foreign company and Indian company together can establish a production unit in Srinagar. As per the article 370 of the Indian constitution, only the people of J&K can own immovable property in J&K. Therefore, only the local partner from Srinagar can purchase the land. It is advisable not to purchase the land but rather lease it from the government. The Industrial Estate in Kashmir division of J&K is a most suitable place for setting up a production unit.

The following table shows the industrial estates and their locations in different districts of Kashmir.

Location of Industrial Estates in Kashmir	
Srinagar	Khonmoh – Industrial Estate
Budgam	Rangreth EPIP Ompora
Pulwama	Lathipora IGC Lassipora- Growth Centre
Baramulla	Doabgah - Food Park

Table 3: Locations of Industrial Estates in Kashmir Division

(J&K State Industrial Development Corporation 2012)

In Srinagar, the company can set up the production unit in one of the Industrial Estates. The government provides many incentives to the members of these industrial estates. Firstly, the land costs are minimal compared to other areas. In order to use the land, one-time payment of € 3000 - € 4000 for 506 sqm has to be made. In addition, annually the company has to pay about € 50. The company can use this land for a period of 90 years. Secondly, the electricity costs are very low in the industrial estate. € 0.06 / unit price is quite low compared to electricity prices in other areas. The building costs of production unit can vary depending upon the materials used. The approximate costs can be € 14,000- € 16,000.

5.3 Target segments

The target segments to market the cellulose insulation product could be classified as primary and secondary segments. The primary segments or buyers are construction companies, government, housing material retailers and individual households. The secondary segments that are equally important as they could highly influence the primary segments include architects, civil engineers and structural engineers. The largest target segment is the middle income group as the majority of the construction volume in Srinagar relies on the constructions of residential houses of middle income people.

According to an interviewee, every year nearly 1000 residential houses are built in Srinagar. In 2006, 15,000 houses were built in Srinagar municipality. The opinions of the experts show that major contributors of the construction volume in Srinagar are the residential houses. Both the existing residential houses and the new ones can be targeted.

The residential houses are built by middle and high income households while the majority of these houses belong to the middle income group. If the company targets this segment, it can automatically reach the high income group

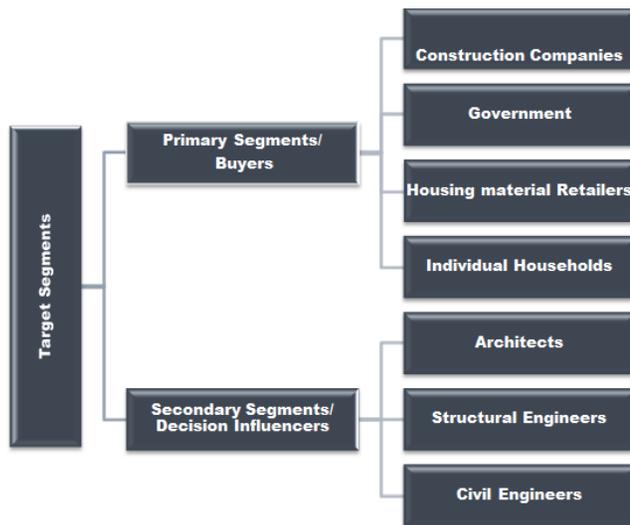


Figure 2: Target Segments for Insulation business in Srinagar

5.4 Pricing Strategy

The company should enter the market with low price. Low price should be set as the income level of the people cannot be ignored. By pricing the product low, the targeted customers can manage to pay and the customer base will be large. The company can also raise barriers against the entry of prospective competitors and increase its market share and obtain large sales.

The affordable price of cellulose for a two storey house that is built on 1500-1800 sq feet is €1500 to € 3000 for the middle income group. If the cellulose insulation is priced at € 0.50 / kg, it becomes affordable as the total material for the entire house will cost in between €1500 to €3000.

5.5 Raw material suppliers

Since the raw materials needed for cellulose insulation are newspapers and chemicals, the researcher interviewed the printing agencies, newspaper collectors and chemical providers. From the printing presses in Srinagar, it was found out that daily circulation of newspapers is around 30,000- 40,000 for big newspaper companies. Small ones sell 4,000 to 5,000 daily. There is not much waste paper availability at the printing presses. 20-30 kg daily can be obtained at one press. They sell it to the waste paper collectors who further sell it at INR 12-15 or € 0.18- € 0.22. The total waste newspaper availability in Srinagar city per day will be around 2 tonnes. As this quantity is not enough to operate a production unit, there are two options for the company.

- a) To organize waste management operation of its own and collect the waste paper from other districts across J&K
- b) To purchase the wastepaper from New Delhi. The wastepaper

prices in New Delhi are much cheaper than in Srinagar and there is enough availability of the paper. It is possible to get the newspaper from Delhi at € 0.093/kg.

The benefit of the first option is that the company may be able to get the wastepaper at only INR 5 /kg or € 0.074 or lower if it collects directly from the people. The disadvantage is that the company has to put a lot of time and effort into this process. The second option also has strengths and weaknesses. The strength is that the company does not have to stress about organizing the wastepaper management and can concentrate on its core business of producing the cellulose insulation. The weakness is that there will be logistics costs involved in the case of transporting the paper from New Delhi to Srinagar.

On the basis of the results of this research, it appears that the second option might be more appropriate as the company can focus on its core business. Besides, 90% of the logistics costs will be reimbursed by the government of India for the first five years from the date of registration of the company. (JKSIDCO, 2004)

The chemicals also are found in limited quantities in Srinagar. Therefore, they have to be purchased in bulk from Delhi or other neighbouring states of J&K. It is possible to get these chemicals at INR 56 /kg or 0.82c/kg from Delhi. However, these are not the standard prices as the prices vary with suppliers. Bargaining with the suppliers is possible.

5.6 Effective Promotion

Effective promotion is the key to the success of the cellulose insulation business in Srinagar. The promotional mix will be comprised of publicity, informative advertising, sales promotions etc. Firstly, an educative session for the experts could be conducted in Srinagar. The purpose of this seminar will be to inform them about the benefits, features and uses of cellulose insulation. If the experts get convinced, it is easier to convince the common masses. Secondly, the company could insulate a structure using cellulose insulation and demonstrate its benefits to the customers. For example, it could demonstrate the changes in the room temperature or humidity level outside and inside the structure so that the customers can really see the benefits of cellulose insulation. This promotion could receive good attention from the people and have a positive impact on them. Thirdly, the demand for the cellulose insulation needs to be created by generating commercially significant news about it in the big newspapers of Srinagar. Getting media publicity by providing press releases to the local media is an excellent way to promote cellulose insulation in a professional manner. Finally, the company should also make a favourable presentation of the product and air it on radio as well as local television channels and cable operators. The company can promote this product by advertising through radio, television and print media. Since the government of India will reimburse all the costs on the brand promotion for the first three years, the company can spend well on the promotion. Government of India can pay up to INR 20 Lac/ € 30,769 in the first year, INR 15 Lac/ € 23,076 in the second year and INR 10 Lac/ € 15,384 in the third year. (J&K, SIDCO, 2012) (Conversion rate 1€ = INR 65, Source: Forex: 6.9.2012)

5.7 Distribution Strategy

In the beginning, the company should directly sell the cellulose insulation from the production unit. Direct selling is recommended as it will help the manufacturers to keep the costs down as the middle men will not be involved and the end product could be cheaper. Further, it will also save the problems of transportation in case of long distribution channels. Once the business starts to grow, it can set up its own retail shops all across Kashmir valley.

5.8 Suggested Business Model

Below is a business model that the foreign cellulose insulation company could follow in order to achieve success in Srinagar. This business model is based on the recommendations described earlier.

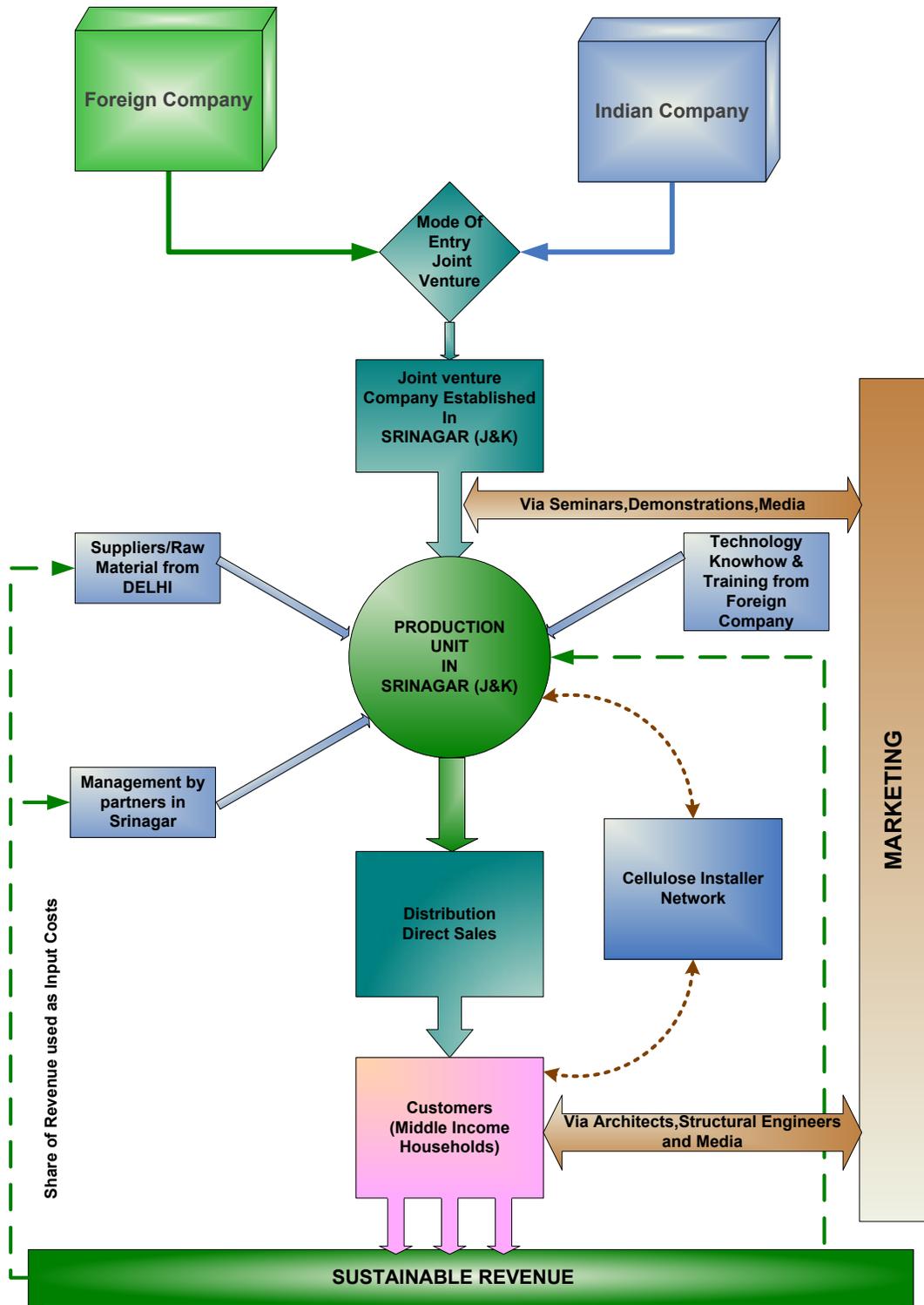


Figure 4: Suggested Business Model

6. Conclusion

This research draws attention to the importance of insulating the houses in the northern regions of India especially the colder regions of J&K. The people living in these areas who have limited facilities to face the harsh winters could also experience comfortable living if their houses are well insulated and warm during winters. The development of insulated structures will not only benefit people but also give an opportunity to the foreign investors to establish insulation business in the cold areas of India. The cellulose insulation technology is viewed as a socially driven innovation as it has the potential to improve the quality of life of the people of J&K by protecting them from cold and illnesses during winters. This technology could meet their needs and address a challenge of uncomfortable living during winters. It is a novel idea for the people of J&K and if turned into practice, it could reshape their lives.

The establishment of cellulose insulation business in this area will prove to be a sustainable business that will not only save energy by reducing the electricity bills of the inhabitants and assist in the waste management but it will also produce economic benefits for the state. It could be a sustainable business that not only brings about environmental benefits but also social and economic prosperity.

The research establishes that there is a huge potential for the insulation business in Kashmir as there is hardly any competition in this sector. Lack of availability of the insulation materials in the valley was the main cause of its in-usability. Today, people do not use insulation products even though they spend generously on other construction material. It is possible to say that if insulation products are available in the city and people realize their importance, people will show willingness to insulate their houses as long as the price of the product is affordable.

The governments of India and J&K offer attractive incentive packages for the industries that plan to set up ventures in Srinagar. The raw material needed for the cellulose insulation product can be obtained from the neighboring states of J&K especially New Delhi or from all the other districts. Some threats to the business are also identified which include the political disturbances in the valley, corruption, weak IPR protection etc. However, these threats could be minimised.

The researcher has made some recommendations for the foreign investors who may be interested to pursue this sustainable business. Firstly, by entering into a joint venture with the Indian partner, the foreign company will get all the benefits and incentives offered by the Indian government. Further, it can delegate the job of marketing and management completely to the Indian partner in Srinagar. In addition, the local partner will have the knowledge of the market in Srinagar and will be acquainted with the culture, language and the way things work in that market. The most important benefit is that there will be resource sharing and both the partners will share the risks and the profits together. Secondly, setting up a production unit in the Industrial Estate in Srinagar instead of any other place is preferred due to the attractive incentives government offers to the members of the industrial estate. Low electricity costs, low land costs, subsidies, tax reductions etc. are some of the benefits.

Thirdly, if the company targets the middle income households who construct residential houses, it will tap the biggest segment. Every year thousands of houses are being built in Srinagar

mostly by middle in-come group. In addition, the company can also target other segments as well. Fourth, the company should enter the market in Srinagar with a low penetration price of cellulose insulation product. The affordable price would be € 0.50 per kg for the cellulose insulation. Keeping the price of the cellulose insulation product down is very important in Srinagar as the low income levels of people cannot be ignored. Fifth, the company should obtain the raw materials from New Delhi instead of Srinagar. It will be better as the company will get the raw materials at cheaper price which will eventually help in keeping the cost of the end product down. Sixth, effective promotion techniques are mandatory for the company as the cellulose insulation product will be a new and unsought product in Srinagar and if it is not promoted in a desired way; its success may be hindered. The best ways to market the cellulose insulation product include conducting educative seminars directed towards technocrats, government and construction companies, insulating test structures and demonstrating its benefits, getting media publicity by providing press releases to the media and also by advertising this product through radio, television and newspapers. It is important to promote the product to the decision influencers like architects and engineers as they have the power to convince the common masses. Lastly, the company in its initial years could sell the product directly from the production unit and later on open its own retail shops instead of selling it to the distributors or retailers. The reason is that as it will save the problems of transportation in case of long distribution channels and can manage to cut the costs of the middlemen and the customer will get the product at a cheaper price.

This research mainly focused on the opinions of the experts like architects, engineers, government and construction companies, how they viewed the cellulose insulation product and what they anticipated about it. Further, it only focused on a single district of J&K - Srinagar. This research did not tap the interests and opinions of the common masses - people who would be the biggest customers for this product. A future study may be suggested that should be directed towards the middle and high income residents and it should be aimed at this group across the whole Kashmir valley and Ladakh area. This research would give a clearer picture of the people's willingness to use this product.

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