Sustainability: A Challenge for Indian Leather Industry

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Abstract

Rigid environmental regulations, prohibition on numerous chemicals which help in the leather processing, and rising costs due to testing and certification necessities are some issues which are being faced by the Indian leather industry since a long time. Evensustainability is also a big question for all related industries nowadays.The well known literary sources talk about these three pillars of sustainable development –ecological sustainability, economic sustainability and communal sustainability and it looks tough for the Indian leather industry to achieve sustainability in the above three paradigms along with meeting the several challenges.

So, taking into account the criticality of the condition, an attempt has been made to investigate the numerous issues and challenges faced by the above mentioned sector in attaining sustainability and to propose some guidelines to create a model based on previous researches and findings that could suit the Indian leather industry and also can be seen as one of the necessary guidelines for industry towards becoming green.

Keywords: Sustainability,Environmental sustainability, Sustainable development,Indian leather industry.

1. The Indian Leather Industry

The Indian leather industry consisted of around 42000 SSI units accounting for over 75 % of total manufactures and employing over 2.5 million workforces in which 30% are women (Exim Bank Research Brief, 2006). This shows that how many lives are dependent on this sector in terms of earnings.A survey is being done by Central Leather Research Institute (CLRI) every year that estimates the total number of tanneries in India. Leather and production of leather products is mainly centered in southern, northern and eastern India. The biggest leather exporter in the country is Tamil Nadu with a share of 43 % of the total country's share whereas other states which have tanning industry are West Bengal, Uttar Pradesh, Punjab, Karnataka, Andhra Pradesh, Haryana, and Delhi.

In the last few years, industry has not shown encouraging growth as it has recorded an approximate average growth of 6% over last 12 years with leather andof 4.6% over the last 10 yearsin leather products.Growth is almost negligible if we talk in terms of inflation.Among the Indian leather exports, products made from goat contributed to 60 %, from cow 20 %, from buffalo 15 %, from sheep 3%, and from others 2 %.

Indian livestock population consists of 21.9 % buffaloes,35.42% cattle,25.88 % goats and remaining 16.8 % sheep, pigs and others whereas the world'slivestock population is 29.87% cattle, 19.04% goats, 51.09% pigs and others (FAOStat, 2009). In 2010,bovine hides, sheep and goat skins production in developing countries was expectedto increase by 60 to 70% of total global production.Generally bovine hides and sheep and goat skin is used to produce footwear and the rest of the hides, sheep and goat skin is used for the production of garments, furniture and travel goods. Mainly, the consumption of leather products depends upon the price level, income and consumer preferences (FAOStat, 2009) and these factors reflect more because of the rapidly changing ownership during recent years.

2. Purpose of the Study

Instead of having considerable heterogeneity, the Indian leather industry is striving to achieve its best. It is one

of the most unnoticed sectors and very few researches have been conducted in this area till now.Because of the heterogeneity existing in this sector and also due to the fact that sustainability has become an unavoidable factor for any industry nowadays, it becomes essential to analyze the several issues and factors regarding sustainability that can facilitate as well as slow up the attainment of sustainability in the Indian leather industry.

3. Sustainable Development

The word sustainability generally refers to the "sustainable development" which tends towards meeting the needs of the present generation concurrently conserving them for the future. With reference to the above perspective, sustainability can be referred to a firm's environmental, economic, and social activities that help them in making their future better. The idea "sustainability" can be defined as "using resources to meet thecurrent needs without affecting the capability to meet future generation's needs" (Linton *et al.*, 2007, p. 1076). ISO 14000 certification generated obligation towards less deteriorate environment (e.g. Corbett and Kirsch, 2001; Montabon*et al.*, 2000), pollution deterrence (King and Lenox, 2002; Klassen and Whybark, 1999), material's recycling (Montabon*et al.*, 2007; Lexus, 2009) and effortsmadeto reduce waste (Shah and Ward, 2007; Sharma *et al.*, 2007). Population is increasing day by day and is recognised as a major cause behind earth's resources depletion (Tsoulfas and Pappis, 2006). Improved technology related to communication and media makes it easy for everyone to know how to use resources properly. During recent years organisations are also taking this issue seriously in fact as one of their business objectives (Feretti, Zanoni, Zavanella, and Diana,2007). Environmental regulations and legislations are being forced by many countries to make the proscribed use of products, processes and wastes which can be detrimental to the environment (Lee, Kang, Hsu and Hung, 2009). Distinct organisation's management has also started thinking to make it an essential policy (Feretti*et al.*, 2007). Recently the number of those firms is increasing which think that sustainability is also important as much as profitability. They have a un iversal point of view that sustainability helps in creating long-term shareholder value which is a compulsion for companies to increase their profit as well as sustainability (Buyukozkan and Berkol, 2011),whereas raw material and resources are depleting day by day, the increasing awareness and new legislations are constantly putting pressure on the firms to invent new sustainable strategies.

4. Sustainability in Supply Chain

The supply chain considers a product from its preliminary stages like processing of raw materials till the final delivery of the finished goods to the customer. But some issues like product design, manufacturing by-products, production of by-products during product use, extended product life, product end-of-life and then its recovery processes, must be considered under sustainability (Linton *et al.*, 2007).

In the latest years, acceptance of an effective supply chain management is expected from most of the firms. This effective supply chain helps themto preserve their market share as well as to save their names in customer's mind. Market's demand and supply sources are interlinked. Thus, the importance of supply chain management is increased in long term. As the new environmental standards came in light, a greater role waits for the supply chain management in influencing organisational environmental practice (Sarkis, 2003). It is now being important for a firm to coordinate and integrate their business functions with sustainability considerations. For this they need to formulate and adopt new procedures and strategies that are sustainable and help them to gain a competitive edge in the market. Sustainability occupies the synchronized accomplishment of environmental, social, and economic sustainability.

- For social sustainability, products should be designed in a way such that they should satisfy customer's needs and wants.
- For economic sustainability, the firms should look towardsgaining maximum profits but resources and raw materials must be utilized in thebest possible way.
- For environmental sustainability, firm should not rely more on non-renewable whereas available resources and renewable must be utilized optimum.

A sustainable supply chain offers several benefits i.e. it helps to reduce waste created which leads to considerable cost savings across the whole supply chain as well as helps in earning pecuniary profits by each member in the supply chain. New and latest technology is to be used at each and every step of operations. So, it is required to have skilled man force that can put their most positive effort in increasing firm's sustainability. These all above said things are indicating towards inventing and implementing an effective supply chain design.

5. Sustainability and Parameters

Sustainability	Parameters
Economic sustainability	profitability, future competitiveness, economic impact on stakeholder, choice of technology
Environmental sustainability	resource efficiency and harm posed by emissions and waste streams
Social sustainability	Health, safety and improved social conditions for employees and equity within company.

6. Sustainability Implementation Approach

The presented alternatives to organisations for improving the sustainability performance of their SC are more than a few and the righteousness is strongly dependent upon the analyzed cases, sectors or processes. Anyway, at least three ways can be identified in order to help the companies in this reforming process:

- To adopt the models and to follow the guidelines proposed by International Organization for Standardization (ISO) and also by obtaining certifications such as ISO 14000 for the environmental management, ISO 9000 for the quality management, SA8000 for the social accountability. It isa model to be applied to all entities of the SC takingthese certifications; it isa method to uniform into the SC the operations.
- To follow the principles of Total Quality Management (TQM) with respect to environmental and social aspect without requesting any certification but defining a set of rules for suppliers, carriers, employers,and stakeholders in general.
- To select a set of corrective actions to improve the sustainable performance of integrated SC on the basis of indicator framework. This model can be used only with the support of a strong information system able to get, collect and synthesize the information coming from SC operations. The analysis of these measures can guide the manager to choose the actions able to improve the performance of the SC in terms of environmental and social performance.

7. Typology used and Issues

Nowadays typologies are proven to be a wellaccepted-structure. Theoretically typologies are a unique form which isbased on a set of law (Doty and Glick, 1994). So in this paper, uses have been made of a suggested typology by Corbett (2009), which is an inclusion ofcorporate social responsibility and life cycle analysis.The Corporate Social Responsibility (CSR) has been broken down into three dimensions i.e. economic, environmental and social sustainability(Elkington, 1998). The concept behind using this typology is the linkage betweencorporate social responsibility and sustainable development.

There exist four levels for collecting the measures, able to define the righteousness of a sustainable supply chain (Sarkis J, 2003):

- Product lifecycle stages: Introduction, Growth, Maturity, Decline.
- Operational lifecycle: Procurement, Production, Distribution, Packaging, Reverse Logistics.
- Environmentally influential organizational practices: Reduce, Recycle, Remanufacturing, Reuse, Disposal.
- Organizational performance criteria: Time, Quality, Cost, Flexibility.

Life cycle assessment (LCA) is used to forecast the impacts of diverse production alternatives (Corbett, 2009).In fact LCA encompasses the efficient use of resources at each stage of the process for the product or service (Allenby,1995).From raw material extraction through materials processing, manufacture, distribution, use, repair and maintenance, and disposal or recycling are some stages of PLC, those have an impact on environment. A comparison must be done between numerous products according todistinctcategories i.e., energy use, toxicity, acidification, CO_2 emissions, ozone depletion, resource depletion andmany others.With the help of the comparison, designers can make decisions on making the more environment friendly products which helps in minimization of waste and harmful by-products, air pollution, energyoutflow and other factors. LCA (Life Cycle Assessment) with CSR dimensions for sustainable operations makes firm capable to decide the most environment friendly designing to manufacture, distribution, use and end-of-life treatments.

LCA Stages/ Parameters	Design and pre-production	Product manufacture	Product packaging and distribution	Product Use	End-of–life recycling, remanufacturing and disposal
Profitability					
Future competitiveness					
Economic impact on Stakeholders					
Choice of technology					
Resource Efficiency					
Damage posed by emissions and waste streams					
Employee health and safety					
Equity within company					

Source:Adapted from "A typology for sustainable operations management (manufactured product example)" Corbett (2009).

8. Challenges Faced by the Indian Leather Industry

8.2. Due to ownership

- In most of the developing countries it can be easily observed that there are hardly any listed companies and mostly are family-owned, carried out in small to medium scale semi-mechanized units which are located outside residential areas. The sector is quite dominated by mainly those firms which have good capital. Tanners in such units have no formal education and have little or no understanding of the complexities of the leather processing. Generally they acquire their skills from their elders with hardly any knowledge of environmental protection;low waste technologies, etc. so, it is essential to have skilled manpower.Conservative processing should be left and should move forward with better technology.
- Approximately every Indian company related to this sector is trying to capture the market by some of its well known and conventional products. Actual problem occurs when they want to grow because it seemed in developing countries that as factories performing well want to shift to economies of scale, they fall down**.**

8.3. Environmental Impact of Leather Industry

- The polluting nature of tanneries which is evident from the intolerable odour is also a problem which tends to be high because of the presence of organic and inorganic toxic metal salt residues. Treatment technologies are consistently working hard to reduce pollutants in the liquid form and convert them into semi-solid or solid forms.
- Another problem is sludge which can affect the quality of soil and groundwater.Local authorities and governments should concentrate on how sludge and dry wastes should be disposed so that it won't affect the fertility of soil in negative manner.

8.3. Technical Barriers

- By nature, tanners are very conservative but they are not simply inflexible against change. The alteration in the parameters of processing i.e.,changes in process lengths, changing temperatures at the time of processing, proposed volumes, use of chemicals etc. influence the ultimate character of the leather. It is a difficult and complex process to produce leather as a number of expertise steps has to be taken at the time of its manufacturing as it is manufactured in the form of non-uniform natural protein.Therefore any tanner should not apply those processes which may create waste. Tanners are expected to use only that technology in its operations which ensures the reduction of wastes.

8.4. Economic Barriers

- In developing countries, leather industry suffers from often exceedingly high cost of capital or inflation rates, higher inventories of chemicals, machinery spares, etc. Due to thepitiable infrastructure and an often impediment in delivery, it becomes

mandatory forthe tanneries to keep an overstocks of chemicals.

- Another disadvantage is the imposition of import duties on chemicals and machinery. Very few chemicals, necessary for tanning are produced in developing countries, although basic chemicals such as salt, lime, sulphuric acid, sodium sulphate or sodium carbonate may be available indigenously andmost tanning materials like dyes, fat liquors, special auxiliaries, and finishes need to be imported.

8.5. Poor Legislation and Lack of supervising Facilities

- Standards set to identify the level and volume of discharged pollutant standards are rigid by nature and do not pay proper attention to tannery location as well as they do not have skilled personnel to monitor performance of the installed treatment plants. A tanner is under pressure to put up a complete treatment system and meet all discharge limitations at once which is beyond his financial and technical means. However, very few tanners have the obligatory process and effluent treatment control facilities.

8.6. Dependence on the market for meat

- Generally hides and skin ensure the availability of red meat. In leather industry the process opted by firms to supply hides and skin is very flexible in nature. Bovine hides and ovine and caprine skins in bulk are marketed to the leather industry and that's how the number of slaughter houses is increasingwhile in Africa it is seen that hides and skins are also being usedin the form of food, ropes, clothes, tents etc. So, this monopoly affects the total production of hides and skin in that region. Approximately 70 to 80% of the total bovine hides are produced by developed countries that increases the off-take ratio i.e. weight per hide and skin.

9. Proposed Guidelines to Createa Modelfor Sustainable and Collaborative Supply Chain

The idea is to propose a model which is flexible and easily reconfigurable for SMEs if it is necessary to change process workflow both in terms of material and information flow. The reference model is practical in term of company management as it is oriented towards continuous development including continuous monitoring of the system and a continuous update of the indicators' targets. A reference model is composed of a set of general and flexible guidelines which are easy to implement by designers or managers for real cases.The guidelines for development of the reference model are basedon the following steps:

- **Definition of a framework based on innovative actions:**A framework of practices is very often more useful than a single measure.Categories and levels of operations are identified to be implemented whereas the aggregation process results to be very time consuming for the designer and less useful for managers who need to make decision on the basis of the information contained in a single value. By adopting a framework of integrated actions it is possible to identify clearly the areas that need improvements and investments for reaching good performance levels.
- **Process Criticalities:** As the Pareto Analysis shows, very often the greater number of effects is due to a small number of causes. So,it is very important to separate these last variables. Another very useful tool for this phase is the Ishikawa diagram that allows individuating the cause for a limited set of effects related to a problem or a specific operative phase.
- **Processes Analysis:** This is held with European SMEs belonging to the textile, clothing and footwear industry in order to understand the system's characteristics. The analysis is focused on critical processes where two or more enterprises are involved in order toevaluate also the collaborative aspect of their networks. For this step the BPMN tools are used.

With regard to dimensions of improvements, very oftenthe three aspects of sustainability are tackled in separate manners without considering cross effects of undertaken actions. An important gap observed in the literature is thelack of approaches or models able to guide the companies to improve the performance on sustainability when the main indicators are identified. One of this work's objectives is to support the managers in the selection of integrated actions with a multiply effect on all dimensions of sustainability. Some of these possible actions are: LCA tools, business processes reengineering, opti-

mization approach, simulation, technology innovation, incentivesystems.

Hence it is proposed to adopt an integrated point of view inorder to select the best complementary actions to implement a sustainable system including a measuring and monitoring system that can measure and monitor the impact of these actions on all dimensions of sustainability with respect to specific phases of the supply chain.

10. Conclusion

This work aims to put into evidence the difficulties and the opportunities offered by a sustainable collaborative supply chain implementation. This study shows various important and noticeable issues that are working as obstacles for the Indian leather industry in achieving sustainability. Understanding employee rights and spreading awareness about them is also an essential issue. As this industry claims itself as most neglected one by its owners, so further research is required to investigate firm specific issue.

The authors proposed guidelines based on three dimensions able to support the designers in building sustainable models for complex supply chain. Frequently the concept of sustainability is tackled in an abstract way and studies related to sustainability implementation are often stopped at indicators definition level without proposing formalized practices. To managers, this work gives a set of guidelines and proposes tools extrapolated from literature able to support continue development of the sustainability in supply chain for leather industry. The guidelines are mapped according to the dimensions of the reference model defined with companies participating to the work and aim to answer to these research questions: (*i*) how to implement a sustainable supply chain and (*ii*) how to increase the performance of a supply chain in terms of sustainability.

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