

## An Assessment of Sustainable Manufacturing Practices in Mauritius

Dinesh Kumar Hurreeram, Bhoomitra Toolsy, Devkumar Sing Callychurn

Faculty of Engineering, University of Mauritius, Reduit, Mauritius  
dk.hurreeram@uom.ac.mu, b.toolsy@uom.ac.mu, d.callychurn@uom.ac.mu

### Abstract

Mauritius embarked on an ambitious project of making the island a model of Sustainable Development in 2008. Over the last five years, the organizational set up for managing the project has been put in place, working groups have been constituted, a series of consultations with stakeholders have been made, a green paper has been published, awareness sessions have been held across the island and a strategic plan around the 5Es covering Energy, Environment, Employment, Education and Equity, has been worked out for implementation [1]. Though the project termed as MID project, has received wide acceptance, it is often argued that private companies are still hesitant on policy and implementation issues. The paper illustrates the status of manufacturing companies vis-à-vis sustainable practices and highlights the challenges facing these companies in the context of the MID project.

### 1. Introduction

The growing depletion of natural resources and impact of manufacturing activities on the environment call on manufacturing companies to come up with new strategies for achieving sustainability goals. This requires the integration of social and environmental issues into the vision, mission, values and operations of the organization. The commitment of companies for achieving sustainability was stressed by Shrivastava way back in 1995 claiming that the goal of sustainability is to “meet the basic needs of all and extend to all the opportunity to fulfill their aspirations for a better life - to moderate the use of natural resources and renew the earth’s depleting finite resources”. He was also of the view that all companies are required to have a sustainability agenda [2]. Cescau, the then Chairman of Unilever, argued that ‘this agenda of sustainability and corporate responsibility is not only central to business strategy but will increasingly become a crucial driver to business growth. He further emphasized that ‘how well and how quickly businesses respond to this agenda will determine which company will succeed and which will fail in the future [3]. In the present context, companies are required to operate within the framework of ‘Agenda 21’ for which a commitment has been taken by governments forming part of the United Nations [4]. The MID project is in fact the result of this commitment from the Mauritian government.

From the local business perspective, under the MID project, the following have been initiated [5] and seem to have received some success:

- (i) The Blue Carbon Award has been set up to encourage companies to join the carbon emissions reduction project (CERP). This project provides assistance to companies for reducing the carbon footprints of the products, sites and services they use while at the same time helps to protect the environment through the development of a sustainable manufacturing agenda.
- (ii) Enterprise Mauritius has set up a scheme to fund energy audits within manufacturing companies with a view to boost up the use of energy efficient equipment and investment on renewable energy sources.
- (iii) A policy framework has been worked out to promote the construction of green buildings. In this context, a Brilliant Pearl Green Building Rating system has been developed and is in the course of implementation.
- (iv) Companies have an obligation to contribute to a Corporate Social Responsibility fund for community development.

Sustainable manufacturing however goes beyond these initiatives and is led by the concerns operators within the supply chain and customers have towards the environment and the society. As these concerns grow, a sustainable manufacturing agenda becomes a sine qua none condition for all businesses.

It is in above context that the present research was undertaken, the objective of which was to use the Boston Consulting Group (BCG) Sustainability framework [13] to make an assessment of the status and achievements of manufacturing companies in Mauritius vis-à-vis sustainability goals.

## **2. Manufacturing in Mauritius**

The Mauritian economy has diversified successfully from sugar production in the early 1970s into manufacturing, tourism, financial services and ICT as major economic pillars. Economic and social indices reveal a prosperous, open and an equitable economy alongside social stability and a conducive environment for businesses.

Over the years, as a result of the industrial diversification, the manufacturing sector has played an important role in the structural transformation of the economy and in propelling Mauritius to the rank of an efficiency driven economies [6]. The sector mainly comprises of companies involved in textiles yarn and fabrics (7%), apparel production (67%), fish and fish preparations (7%) and other export oriented enterprises (20%) [7]. The phases of development of the sector have been marked by the inward-looking strategy of the early 1970's followed by the combination of domestic production and export-led manufacturing in the 1980's. In spite of the

reclassification of manufacturing enterprises as Export Oriented Enterprises with a view to create an enabling environment for diversification, the sector is still highly dominated by companies involved in textile and apparel products. As at 2011, the GDP of the country stood at US\$11.3 billion. The manufacturing sector with a contribution of 16.7% has the highest input to GDP among all other sectors of the economy. The sector also represents some 67% of total domestic export earnings of the country and directly employs 54187 people in some 337 companies [8]. The structure of the sector is however skewed in the sense that some 30 large enterprises represent almost 80% of employment and export earnings. Manufacturing has thus made a tremendous contribution to the rise in the standard of living of the country and it is called upon to further contribute to economic growth in spite of the following major challenges:

- (i) A new era of international trade without preferential trade agreements.
- (ii) Dealing with economic recession in the main markets in Europe and
- (iii) The need to incorporate sustainable manufacturing policies

The above challenges have called on companies to rethink their business models and implement strategies for sustained growth. This process has been ongoing for more than five years now. One of the core elements of the strategic thinking is around sustainable manufacturing practices which have shifted from the conventional provision of end of pipe solutions to a focus on product lifecycles, integrated environmental strategies and corporate social responsibility [9].

### **3. Assessment Frameworks for Sustainable Manufacturing**

Manufacturing is the process of adding value to raw materials for converting them into semi-finished or finished goods in line with customer's expectations or specifications. Sustainable manufacturing on the other hand refers to manufactured products through economically sound processes that minimises negative environmental impacts while conserving energy and natural resources and at the same time enhancing employee, community and product safety. The literature on sustainable manufacturing suggests three main dimensions for assessing achievements: Economic, Environmental and Societal leading to sustainable economy, sustainable ecology and sustainable society. These dimensions are interrelated and require organisations to pay particular attention to economic efficiency, ecological harmony and social justice in the activities they undertake [10].

The focus on sustainability has set a new era for manufacturing companies of the twenty first century whereby competitive advantages are no more solely judged on the basis of price, quality, fast response and product differentiation but on the ability of firms to innovate and perform on the three dimensions of sustainability.

There is a global consensus for the purpose which calls on companies to continuously assess their performance against a series of sustainability criteria. There are two main approaches for such assessment; from a macro perspective with emphasis on strategic orientations and achievements thereon, and from a micro perspective whereby the results of implementing change at process levels within companies are evaluated. The outcome of the assessment is a sustainability report which is used to guide companies on the sustainability journey.

The present research was undertaken both from a macro and a micro perspective with a view to make an objective evaluation at sector level and at the level of individual companies. The scope of this paper is to present the findings at macro level for the local manufacturing sector. After considering the OECD sustainable manufacturing indicators [11], Ford product sustainability Index [12], BCG index [13], GM Metrics [14], Eco Indicators [15], and Dow Jones sustainability index [16], the BCG framework was selected for the assessment as it provides a comprehensive mechanism to assess (i) the mission of companies vis-à-vis sustainable practices (ii) the strategies adopted to achieve sustainability goals (iii) commitment of stakeholders, senior management and employees in the endeavour (iv) impact of sustainability related decisions on developing competitive advantages (v) changes implemented in companies in connection with sustainability and (v) sustainability challenges and obstacles faced by the companies. Satisfactory performance under each of these criteria is viewed as sine qua non conditions for sustainable manufacturing practices.

#### **4. Results**

The study involved the use of the BCG framework for making an objective assessment of sustainability agenda and practices in 35 manufacturing companies in Mauritius forming part of the top hundred companies. The assessments were conducted on site, using the BCG questionnaire. As these companies together contribute to about 80% of total domestic export earnings and account for some 75% of employment in the sector, they can be considered to be representative of sustainable practices within the sector. Twenty five responses have been received and analysed.

##### **4.1 Mission of Manufacturing Companies vis-à-vis Sustainable Practices**

It is encouraging to note that 92% of the companies confirmed that sustainability was a necessity for enhancing competitiveness of manufactured products. In this context, more than 60% of companies have changed their business model to meet the requirements associated to sustainable practices. The main difficulty

companies have been facing (60%) is in the development of a clear business case/value proposition for sustainability. There is thus a need for capacity building and for intervention at micro and process levels for the implementation of change.

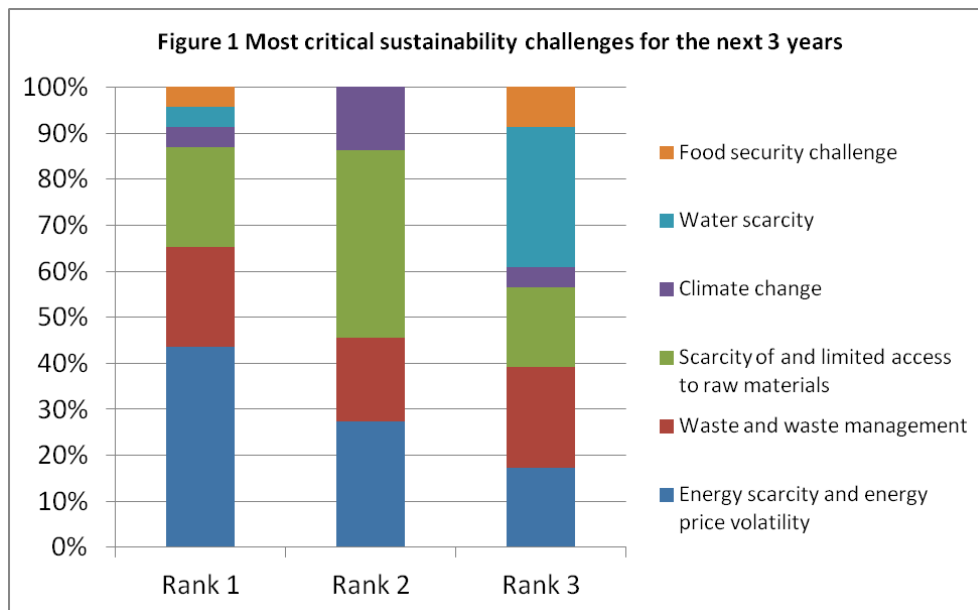
While it is true that the Government has set the tone by setting the framework for making Mauritius a model of sustainable development, surprisingly the influence of government/policy makers/regulators in driving the sustainability agenda was found to be marginal, representing only 15% of responses. The main drivers of the sustainability agenda at the company level are senior management (25%), customers (14%), employees (13%) and shareholders (9%). The results thus clearly demonstrate the commitment of manufacturing organisations in the drive towards sustainability.

There were however some shortcomings noted in relation to communication of sustainability reports. It has been observed that the majority of companies did not have a structured approach to communicate their commitment and actions in terms of sustainable practices, to different stakeholders, both internal and external. Only 15% of respondents publish dedicated sustainability reports and participate in sustainability rankings whilst 20% of respondents integrate sustainability performance within other methods of communication (for instance in annual reports).

#### **4.2 Strategies to Achieve Sustainability Goal**

Under this category, the companies were assessed on what they foresee as the three most critical sustainability challenges for the next three years and to rank them in order of importance. Companies identified energy scarcity and energy price volatility as most critical. At rank 2, most companies identified scarcity and limited access to raw materials as critical. Lastly, companies identified water scarcity as critical. The results are illustrated in Figure 1 below.

Given that the average annual price of diesel oil has increased from US\$ 237 per tonne to US\$ 1,014 per tonne during the past decade [17], it is obvious that the response of companies was highly influenced by the price of imported fuel since Mauritius has not known any major fuel supply disruption during this period. With this trend, companies are very concerned on the future prices of fuel and the impact of increasing prices on their bottom-line.



The scarcity of and limited access to raw materials could strongly be linked to the world rise in prices of raw materials and cost of international transportation as a result of the sharp rise of fuel on the world market. The fear of water scarcity can be attributed to the drought which Mauritius has suffered during 2011 and 2012 and its severe repercussions on businesses.

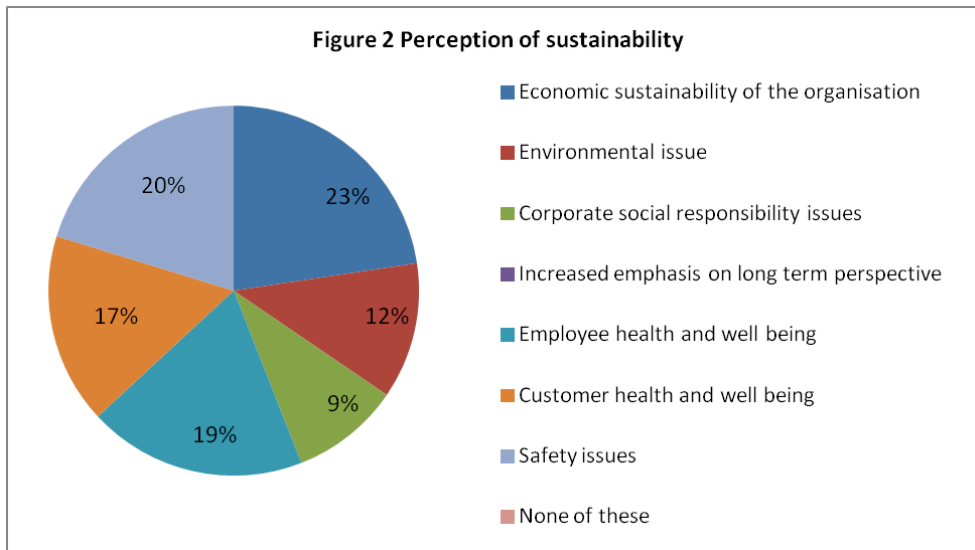
It can be observed that climate change is not considered as critical and this is an area which can be further investigated. Since climate change has several repercussions on sustainability for Small Island Developing States (SIDS), it may be possible that companies are not yet conscious on how climate change may affect their business, both in terms of challenges as well as opportunities.

#### 4.3 Commitment of Stakeholders

In terms of commitment, it is positively observed that, in 40% of the companies, the senior management increased their commitment to sustainability during the past year and claim that they will continue to do so during the coming year. For an additional 16% of the respondents, senior management commit to address sustainability issues in the coming year.

In terms of how companies perceived sustainability, most of them associate it to the non business perspectives, such as safety issues (20%), employee health and well-being (19%), environmental issues (12%), and corporate social responsibility (9%) as illustrated in Figure 2. Only 40% perceive the business perspective of sustainability, namely economic sustainability and customer health and well-being. This means that the majority of respondents are not able to see sustainability as a

business opportunity and as a means for developing competitive advantages as argued by various authors.



This explains the difficulties which manufacturers face for the development of business cases (projects) associated to sustainable manufacturing; only 25% of companies were found to be successful in such projects. About 17% of companies claimed facing difficulties in making business cases for sustainability. The companies perceived sustainability as adding to their costs, instead of creating new business opportunities. This shows a poor understanding of sustainability by the management of the manufacturing companies.

The above fact is also reflected by the response of companies with regards to the presence of sustainability on the company agenda, whereby only 24% of respondents acknowledge that sustainability is a permanent feature and has a core strategic consideration. Some 44% of companies have it on the agenda but without strategic consideration.

#### 4.4 Impact of Sustainability Related Decisions

43% of respondents claim that sustainability related decisions lead to an increase in profits and surprisingly the same number of respondents had an opposite view. For companies which claimed to have improved their profitability, they identify their sources of profits came from innovation (better solutions), cost reduction and price premium as a result of better market positioning as sustainable manufacturers. They also acknowledged the different benefits in terms of increased competitive

advantage and reduced energy and material costs. Moreover, they claimed that their relationships with customers and suppliers were enhanced.

For companies which were unable to reap benefits, they acknowledged that sustainability related decisions increased their operational and administrative costs and did not enhance their revenue generation. However, to two other questions, they claimed to reap some benefits from these sustainability-related decisions. This ambiguity shows that these companies had poor implementation plans as a result of failure to properly make up their business cases and evaluate the impacts of their decisions.

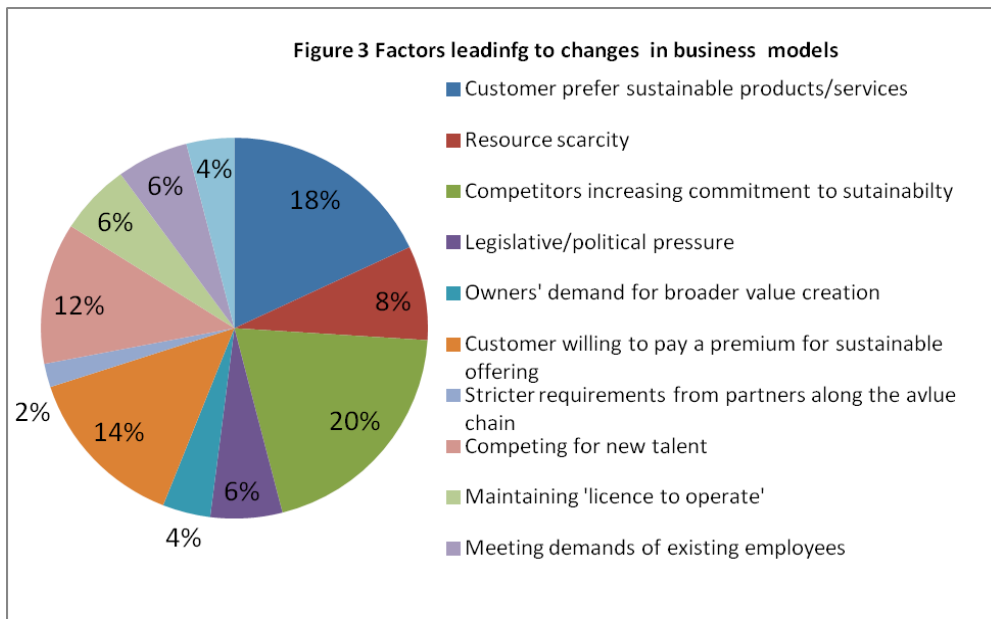
This shows that a significant proportion of companies have difficulties in:

- understanding sustainability
- integrating sustainability in their business objectives
- developing strong implementation plans
- monitoring the benefits of these sustainability plans

#### **4.5 Changes Implemented in Companies**

From the analysis of the respondents, it is observed that the majority of changes in business models happened in product or service offering and organisational structure. A deeper analysis of factors which influenced the changes in business models shows that these changes happened mainly as a result of customers asking for sustainable products and services and sometimes offering a premium and competitors increasing their commitment to sustainability. These observations illustrated in figure 3 show that these changes have been implemented in a reactive manner due to changes in customer requirement and more intense competition.





The study conducted by the MIT Sloan Management Review in 2013 [13] shows that the hallmark of sustainability-driven innovation depends on innovation in the business model and improvement in the processes to achieve sustainable products and services. This means that the change in business model goes beyond product or service offering perspective. It should include the value proposition made to customers, how the company leverages on its value chain, restructuring cost models and the structure to deliver this value to customers.

The results show that the implementation of sustainability practices in Mauritian manufacturing companies is mostly as a result of the pressures from customers and competition, instead of a proactive approach and deliberate efforts to be innovative and differentiate as a sustainable manufacturer.

#### 4.6 Sustainability Challenges and Obstacles

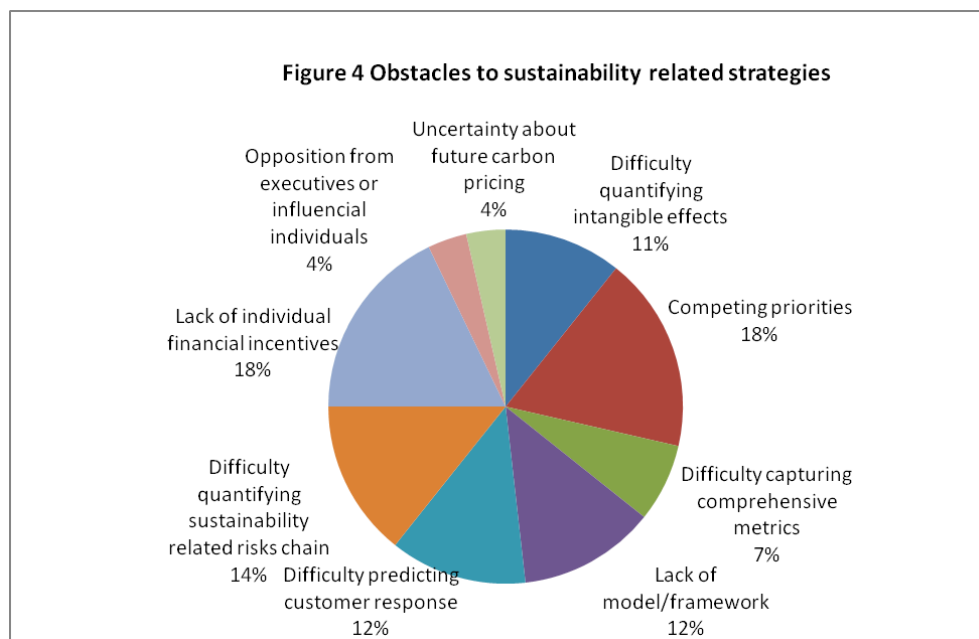
The respondents rated their main business challenges for the next 2 years in the following order:

1. Ability to reduce costs and improve operational efficiencies (29%)
2. Ability to maintain growth rates (26%)
3. Ability to innovate to achieve competitive differentiation (23%)

These responses show that local manufacturers have a very conventional perspective of the challenges as they seem to be unaware or simply ignore the repercussions of globalisation and worldwide sustainability pressures. Less than

10% of companies indicate globalisation and sustainability as a threat or opportunity for the future. The influence of globalisation, sustainability, speed and adaptability and responding effectively to disruption of business models are in fact key sustainability issues for Small Island Developing States like Mauritius.

The difficulties to evaluate the business case for sustainability related strategies were also studied. The results are shown in Figure 4. It can be observed that companies have difficulties to prioritise their sustainability objectives (18%) which reduces their focus and their potential to succeed. There is also a lack of individual financial incentives (18%), which means that companies are not prepared to invest and budget for sustainability. The third major challenge is quantifying risks related to sustainability projects (14%). It was observed that a substantial proportion of the respondents were unable to identify whether sustainability-related decision improved profit or not (12%). These challenges are linked in the sense that if companies cannot prioritise and are unable to quantify the project risks, they will definitely hesitate to commit finance for sustainability projects.



## 5. The Way Forward

The study confirms that top management of most manufacturing companies are aware of the need for implementing sustainable manufacturing practices as a means to develop competitive advantages. However much remains to be done to acquire their full commitment. Sensitisation and education of personnel at this level

is a priority for a change in mindset as it is clear that companies do not have a thorough understanding of the challenges and opportunities business sustainability offers. Policy makers have an important role to play here so that senior management improve their understanding of sustainability and integrate it in their business objectives.

There is also a need to encourage sustainability reporting where companies can better communicate their commitments, actions and results to stakeholders. Such reporting will enable policy makers monitor the progress of sustainable manufacturing practices and better gear support programmes for the manufacturing sector.

A detailed analysis of the findings and discussions with key stakeholders suggest the following measures for implementation. These, if implemented will lead the local manufacturing sector in a new phase of its development, aligned to the goals of the national MID project and more importantly to develop competitive advantages in line with new market conditions.

1. Over the past five years, the government and regulators have been very active in defining environment policies to motivate organizations implement sustainable manufacturing strategies. Some of the policies are stringent and are not to the liking of companies but nevertheless have received wide acceptance as they are aligned to the MID plan. What is missing is a proper coordination committee between the public and the private sector to ensure that sustainability goals become the concern for all manufacturing organizations. This committee will also have the responsibility to advise the government on policy changes and on support mechanisms to manufacturing companies.
2. The study shows poor dissemination of information from companies on their achievements on the sustainability front. It is suggested that the publication of an annual sustainability report to be disseminated to stakeholders and to the general public become a requirement for all companies.
3. Manufacturing has often had a significant negative impact on the environment. It also consumes much of the scarce raw materials including non renewable sources of energy. For motivating the adoption of sustainable manufacturing practices, capacity building programmes need to be developed for companies to implement proactive changes in their business models. These programme should be able to support the companies in:
  - Identifying new opportunities sustainability offers for improving the revenue model
  - Integrating sustainability in their business objectives and developing implementation plans and structures to achieve sustainability goals

- Reducing energy and raw materials consumption
- Reviewing their accounting practices and project appraisal methods so that they are able to evaluate the benefits of their sustainability plans
- Adopting cleaner production technologies
- Investing in the development and implementation of new technologies to reduce energy consumption.

## **6. Conclusion**

In the wake of advancing sustainability goals, manufacturing companies around the world are undergoing considerable change and those in Mauritius are no exception. It is increasingly being acknowledged by local companies that sustainable manufacturing which goes beyond the economics of production processes will be a vital requirement for winning orders in the future. In this context, the use of the BCG framework for manufacturing sustainability assessment provided an objective mechanism to identify the main shortcomings and challenges faced by the companies.

The study shows that sustainability issues are high on the agenda of most manufacturing companies and there is a commitment for driving change internally. The initiatives noted during the study are mostly related to projects encompassing eco-design, the use of renewable sources of energy, energy and physical resource optimisation, recycling, product life cycle and end of life cycle management, and wasted minimisation. The outcomes of such projects however remain to be publicised. There is also a lack of communication on the impact of manufacturing activities on the environment and on the commitment of the companies towards social progress.

Companies view the ability to innovate, improve growth rates and improve operational efficiencies as the main challenges for the short term. Sustainability issues, though considered as important, are not of prime concern because of the difficulty in assessing the impact of sustainability related projects on the overall performance of the companies. This remains the main obstacle towards the implementation of sustainable manufacturing practices in the companies. There is thus a need for developing the appropriate metrics for relating financial performance to projects associated to sustainable practices.

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