Sustainability as a strategy incorporated in decision-making at supply chain management – case study of General Motors

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Abstract: Sustainability as a strategy has been incorporated in decision-making process at General Motors – an automotive manufacturing company. It has helped General Motors to overcome financial crisis. In today’s environment, incorporation of sustainability factors particularly in supply chain management is critically important when governments all over the world are working to arrest climate change and reduce emission levels. Therefore, sustainability incorporation at an organisational level is a way forward. Case study was undertaken via a questionnaire to collect and evaluate the decision criteria from the middle and top level executives of General Motors. The authors also attempted to examine sustainability reports of the General Motors formulated using GRI guidelines. Study concludes that getting sustainability incorporated into DNA of a company requires top management commitment and is associated with organisations where there is history of societal, community work and responsible business practices. It helped General Motors to write off debt and come out of bankruptcy. The study is also relevant for manufacturing organisations in other sectors as the research instrument is developed using GRI guidelines. The research instrument and study can support researchers and practitioners to adopt sustainability-based strategy and practices for responsible development which is sustainable.

Keywords: decisions making; supply chain management.


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1 Introduction

Climate change is for real and the world is waking to the realisation with sustained efforts from governments, NGOs, various stakeholders across the world working to mitigate it by reducing emission levels, etc. Countries, governments are working together for sustainable development through concrete goals and practices as seen with negotiations at United Nations Climate Change Conference, COP-21, 22 or CMP 11 (Rudd, 2015; COP-21, 2015).

Globalisation, population growth, rapid urbanisation and a growing middle class, all are driving competition for increasingly scarce resources – energy, water and raw materials (IBM, 2009). The physical environment now is becoming more unpredictable and a more interconnected global economy is altering social conditions. Further technological innovation is transforming the nature of consumption and production. Newer methods and solutions are emerging to cater to the needs of stakeholders and customers (WCED, 1987; IBM, 2009; COP-21; 2015).

Organisations, governments, other stakeholders realise the importance of sustainability as a business issue (Berns et al., 2009; Schwarz et al., 2002). The awareness is enhancing for sustainability as most businesses realise that their sustained success depends upon the economic, social and ecological contexts in which they operate and its stability and maintenance cannot be taken for granted (WCED, 1987; Carter and Rogers, 2008; Kiron et al., 2015). There is an increased need for adopting sustainability-based practices particularly in supply chain management to reduce carbon footprint and to develop not at the cost to environment and the society. Supply chain management is involved in host of activities from souring of raw materials to conversion at various touch points of material and capital to the final delivery, usage by the customer. This necessitates the importance of sustainable development which is economically sustainable taking into consideration the environment sustainability and social sustainability (Kumar and Rahman, 2016; Diabat et al., 2014; Flynn et al., 2015).

Economic downturn accelerated greater shift towards corporate focus on sustainability issues particularly those which have impact on bottom-line profits of an organisation. So organisations that represent single biggest threat to society and the natural world are also the greatest allies for sustainable development which is equitable for society (Marsden, 2000; Dunphy et al., 2006).

The manuscript is a case study for sustainability as a strategy incorporated in decision-making process particularly in supply chain management at General Motors (GM) – an automotive manufacturing company. GM through its decades of legacy business was facing downturn and had been bankrupted as well. Sustainability as a strategy incorporated at GM particularly in supply chain management helped it to overcome financial crisis. For the case study

- Data was collected via a questionnaire to evaluate the decision criteria from the middle and top level executives of GM.
Sustainability reports of the GM formulated using GRI guidelines were also evaluated.

In the manuscript Section 2 is the literature review of sustainability and supply chain management, Section 3 is the brief about GM adopting sustainability as a strategy followed by Section 4 for research methodology and data collection. Section 5 describes the assessment of sustainability at GM followed with conclusions and future direction of research in Sections 6 and 7 respectively.

2 Sustainability and supply chain: a literature review

Gibson (2006) asserts that post Brundtland Commission Report [WCED, (1987), p.8] sustainable development gained wider attention. He points out that “continuing environmental degradation was leading not only to local, regional resource depletion and damage to essential ecological functions, but also it led to cumulative global effects.”

At the onset sustainability efforts were focused on environmental standards, degradation concepts and acts of philanthropy. Growing business complexity made it imperative for organisations to adopt new environmentally and socially conscious approaches to enhance profitability and reduce risks (Agnihotri and Tripathi, 2015). Inclusion of sustainability initiatives has been gradually enhancing and is further fuelled by fiscal disorder and turmoil in the economies. Sustainable development is becoming a way forward to development for sustaining, preserving and maintaining the resources for future use (Goodland and Daly, 1996; Ahi and Searcy, 2015; WECD, 1987).

For mitigation and adaptation of sustainability-based practices the product designing, product sourcing, producing and distribution in global markets play a pivotal role. Supply chain activities account for a bulk of the resources consumed. Supply chain accounts for the product from the initial processing of raw materials to the end user delivery. Therefore, a focus on supply chains is a step towards a wider adoption and development of sustainability (Ashby et al., 2012; Ahi and Searcy, 2015; Asefeso, 2015).

Literature identifies sustainable supply chain management through many approaches through the integration of triple bottom line concept (Elkington, 1999), where economic development is through equitable distribution is not at the cost of environment. But there are challenges particularly for supply chain management due to complexities as there are multiple channels, linkages and various partners. Different competencies of partners, channels and dynamic, agile characteristic of supply chain adds to complexity for adopting sustainability-based practices in organisations (Ahi and Searcy, 2015; Hassini et al., 2012).

Adoption of sustainability-based practices in supply chain management is an important step to mitigate climate change and resource depletion through addressing the root cause of these changes. This requires new ways of doing business, including developing long-term strategies to drive low-carbon economy and collaborating on best practices for reducing greenhouse gas (GHG) emissions, for resource usage across industries (CDP, 2014; Kumar and Rahman, 2016; Gupta and Palsule-Desai, 2011; Ivanova and Wolmuth, 2014).

Literature identifies that large global organisations across the globe are transforming themselves and their supply chain for greater stakeholder engagement (Schoggl et al., 2016). Adoption of sustainability-based practices across an organisation is challenging
Sustainability as a strategy incorporated in decision-making

enough, and then extending it to supply chain increases the complexity and requires
greater understanding, collaboration, innovation and correct technical tools (Schoggl
et al., 2016; Hassini et al., 2012; Kiron et al., 2013).

Sustainable supply chain management requires the integration, management of three
pillars of sustainability in line with various customer and stakeholder requirements
through material and capital flows across the entire value chain which also integrates
partners, different supplier downstream and upstream the chain (Seuring and Muller,
2008). The decision-making to integrate sustainable practices become tedious due to
these layers and often organisations find themselves lacking the mechanism for
governance across the entire value chain (Gong et al., 2016).

The governance issue also becomes an important or a critical challenge for integration
and adoption of sustainable-based practices particularly in supply chain management.
Literature identifies that integration of three aspects of sustainability has challenges and
there is lack of research and examples for a winning business model which shows/depicts
simultaneous integration of three aspects of sustainability (Gong et al., 2016).

Economic sustainability and focus on economic performance can hinder the
environment and social aspects (Schuler and Cording, 2006). Focus on economic
sustainability across the value chain will need cooperation instead of competition (Gong
et al., 2016), and thus economic sustainability while focusing on other two aspects is
becoming a challenge for organisations.

Literature also identifies that organisations are taking concrete steps to reduce
environmental affects through waste management, reduction of emissions, better resource
usage and so forth (Hassini et al., 2012) and there is a greater inclusion of social
sustainability-based practices through inclusive and sustainable labour practices,
trainings, skills development, respect for human rights and so forth (Hutchins and
Sutherland, 2008), but a winning model to encompass the three aspects need more
research and practice from researchers and practitioners.

Kiron et al. (2013) also summarise that some organisations are addressing important
issues of sustainability but they found disconnect between thought and action on the part
of many others. In the report the authors found that nearly two-thirds of respondents rate
social and environmental issues, such as pollution or employee health, as ‘significant’ or
‘very significant’ among their sustainability concerns. Yet, only about 40% report that
their organisations are largely addressing them. Even worse, only 10% say their
companies fully tackle these issues. Further, Kiron et al. (2013) also summarise that
organisations that perceive sustainability issues as significant and thoroughly address
them share some distinct characteristics namely, those organisations have developed a
sustainability strategy, sustainability practices and governance has support from top
management and thus is a business case.

Sustainability-based practices particularly in supply chain management are mostly
used by organisations with global operations as a risk mitigating strategy (Dauvergne and
Lister, 2012). Organisations with global supply chains have multiple complexities with
respect to partners, other stakeholders and the flow of capital and material flow and thus
confront a broad range of sustainability issues.

In this scenario it has become increasingly important to understand, how and why the
organisations which are addressing sustainability issues and are adopting sustainable
practices are benefitting from them to make it a viable business case for adoption.
3 GM Corporation: sustainability as a strategy

GM is a global company headquartered in Michigan, that designs, manufactures, markets and distributes vehicles and vehicle parts and sells financial services is an ideal case for adopting sustainability-based practices not only as a business case but as a strategy to sustain, improve, innovate and at the same time to be efficient and productive.

GM produces vehicles in 37 countries under 13 brands (General Motors, 2014a) and has taken significant measures to address sustainability concerns. GM was founded in 1908 and consequently worked to develop a size and capability in design, manufacturing, innovation to go beyond transportation and become statements and aspirations in their own right. GM’s commitment to innovation continued with newer designs which were fuel and cost efficient in newer markets (General Motors, 2014a).

General Motors (2014a) lists down that it continued to usher in new markets with new innovative designs and models with great partnerships but the competition from other players continued to push it to the hilt. GM found it difficult to regain share from its offshore competitors, and legacy cost from GM’s decades as a larger, less efficient company continued to weigh heavily on financial results.

After decades of financial burden, GM was finally brought to its knees by the recession and frozen credit markets, forcing the company into the arms of the federal government (Bloomberg Business Week, 2009). General Motors Corporation filed for bankruptcy on June 1, 2009. The filing reported US $82.29 billion in assets and US $172.81 billion in debt (Bloomberg Business Week, 2009).

Following this, a new competitive General Motors Company was formed which acquired many of the strongest assets of the old company. It was created on July 10, 2009, with the US Treasury, Canadian Governments, and the UAW Retiree Medical Benefit Trust as its major shareholders (Bloomberg Business Week, 2009). The deal had tight strings attached with a complete restructure strategy for the organisation. This ushered responsibility and stakeholder involvement meant that organisation started looking at the business with responsibility embedded in it. And gradually for transparency and for greater stakeholder’s preference, it started having sustainability as a strategy for its business case (Buss et al., 2014).

GM is now debt free. The company had completed its reorganisation in 2010. And today, the new GM is smaller, leaner company which continues to grow rapidly with more than 70% of its sales now coming from outside the USA (General Motors, 2014). The history and complete turnaround of GM demonstrates that there had been focus on innovation and technology always and in spite of financial troubles it continued to create state of the art vehicles. GM continues to have significant research and development capacities along with philanthropic works in conservation projects, education programs, charitable causes, children welfare, etc. (General Motors, 2014).

The turnaround and inclusion of responsible business using sustainability as a strategy is verified in MIT Sloan Management Review (Berns et al., 2009) as well. The authors claimed in their research report that following 2008 economic downturn there is a corporate shift toward a greater corporate focus on sustainability – particularly toward sustainability-related actions that have an immediate impact on the bottom line. The report further elaborates that at the same time, several survey respondents in their research lamented for having to meet higher than normal criteria for sustainability investments.
GM seeks to be more responsible, and thoughtful in their business strategies following the filing of bankruptcy in 2009. The statement is verified by the CEO of GM Ms. Mary Barra who points out that “GM wants to focus on customer driven sustainability and as an organisation it wants to be honorable, thoughtful and responsible in everything it does from the product design, manufacturing, safety, quality, the environment, customer care and a host of other areas” (General Motors Sustainability Report, 2013).

In the process to become more honourable, thoughtful and responsible towards stakeholders, GM developed its sustainability strategy (through innovation, integration, transparency through public reporting and employee engagement) that aims to create long-term stakeholder value to align corporate policies, positions and sustainability initiatives; focus efforts on areas of significant impact; and be executed within every function by every employee (General Motors, 2013).

Adams and McNicholas (2007) elaborate that detailed ‘objectives’ and ‘targets’ to the clarification of goals, while the process of engaging internal and external stakeholders, setting targets, and monitoring outcomes might be likened to determining ‘the path to the goal’ and the ‘strategy of action’. The stakeholder’s involvement through the corporate sustainability report and the sustainability reporting process then might themselves be a catalyst for change towards improved sustainability performance.

At GM, sustainability is a business approach which creates long-term stakeholder value and is a core strategy. This approach is executed by every function at every level in the company. The top leadership of the company is committed and clearly outlines the customer driven sustainability in the General Motors (2013).

According to General Motors (2014a, 2013), sustainability is a value proposition that takes into consideration environmental, social and economic opportunities and supports the long-term success of the company. Value is created through top-line growth opportunities, bottom-line improvements and risk mitigation.

According to Cullum (2006), GM has adopted a corporate-responsibility framework that combines social responsiveness with corporate values and business goals. Despite its financial difficulties, GM recognises that social and environmental responsibility is critical to its long-term survival. In addition to incremental energy and environmental improvement goals, GM has developed a strategy for reducing fuel consumption and emissions by successive adoption of new propulsion technologies.

To further understand sustainability-based practices adopted at GM, a research focusing particularly in supply chain management as described below was conducted.

4 Research methodology and data collection

Employee engagement is a pivotal step to encourage sustainability initiatives across organisations. According to Gibson (2006), a ‘failed’ organisational change project might be one where there is a lack of communication between individuals in the sustainability reporting team, other organisational members and stakeholders external to the organisation. The author asserts that it means that improvements in sustainability performance are not identified or not implemented throughout the organisation. Gibson (2006) claimed that the first step in the sustainability assessment processes must force decision-makers contemplating potentially significant initiatives to give serious attention
to sustainability requirements. And to do this, the processes must apply decision criteria that establish meeting the core requirements for progress to sustainability as the main test of proposed purposes, options, designs and practices. The processes must put application of these sustainability-based criteria at the centre of decision-making.

Hence, it is pivotal to have a robust employee engagement at every level and the decisions should have a business case for sustainability strategy. The supply chain assumed an important paradigm. General Motors (2014b) also claim that “71% of invited suppliers participated in CDP supply chain initiative, a voluntary program to help increase engagement with suppliers about environmental performance and disclosure.”

For understanding the decision-making of supply chain involving sustainability at GM, a quantitative research was designed using a questionnaire. Also, an extensive review of Sustainability Reports was carried out to understand philosophy of operations at GM. The questionnaire was developed and designed using GRI framework involving the three sustainability factors viz., the economic, environment and social factors. GRI reporting elaborates that “Sustainability impacts create both opportunities and risks for an organization. The ability of an organization to recognize opportunities and risks, and act effectively in relation to them, will determine whether the organization creates preserves or erodes value.” Using this elaboration of globally accepted GRI reporting principles, materiality issues describing the sustainability through economic, social and environmental factors were chosen and is depicted as denoted below.

4.1 Economic factors
- economic performance
- market presence
- indirect economic impacts.

4.2 Environment factors
- materials
- energy
- water
- biodiversity
- emissions
- effluents and waste
- products and services
- compliance
- transport
- overall
- supplier environmental assessment
- environmental grievance mechanisms.
4.3 Social factors

4.3.1 Labour practices and decent work
- employment
- labour/management relations
- occupational health and safety
- training and education
- diversity and equal opportunity.

4.3.2 Human rights
- investment
- non-discrimination
- freedom of association and collective bargaining
- child labour
- forced or compulsory labour
- security practices
- society
- local communities
- anti-corruption
- public policy
- anti-competitive behaviour
- compliance
- supplier assessment for impacts on society
- grievance mechanisms for impacts on society.

4.3.3 Product responsibility
- customer health and safety
- product and service labelling
- marketing communication
- customer privacy.

For development of questionnaire, questions were framed using the GRI defined factors/variables on a five-point Likert-scale (attached in Appendix) (Saraswat and Tewari, 2015; GRI, 2002, 2015).
Also, to ascertain the content validity for generated items, a small focus group pilot test was conducted. In the focus group, interviews were taken with two academicians and six sustainability practitioners to comment on clarity and appropriateness of the questions framed (Yang, 2013). Once the goal and the method for research was clear, which was communicated to them, the focus group were shown 2–4 statements on small cards for each question. Basis their feedback and response the questions were framed as deduced and listed in Appendix.

In order to ascertain the sustainability assessment process, a survey was conducted to understand if sustainability has started affecting decisions at the operational level for supply chain in GM. A survey can generate lot of information for the researcher to use Kerlinger (1986 cited in Yang, 2013), hence, the questionnaire was sent to respondents in middle and senior level at GM. The respondents were chosen from their profile after research on social corporate platforms such as Linked-in (Breitbarth, 2011). The executives were requested for their response on sustainability initiatives through an online survey (Google Form, n.d.). Middle and senior level executives responses were obtained by sending the questionnaire to about 70 people from, which 40 validated/complete responses were collected in two months after regular perusal.

The profile of respondents from GM is also depicted in Table 1. The decision makers particularly had the complete knowledge about the sustainability efforts/business practices of their organisation. The respondents were senior management people with the title of Vice President, Manager-Manufacturing, etc.

The responses were collected from GM in India (38 responses) and USA (two responses).

<table>
<thead>
<tr>
<th>Classification</th>
<th>Number of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job title</td>
<td></td>
</tr>
<tr>
<td>Senior representative</td>
<td>2</td>
</tr>
<tr>
<td>Manager-manufacturing</td>
<td>4</td>
</tr>
<tr>
<td>Manager-others</td>
<td>3</td>
</tr>
<tr>
<td>Manager-quality assurance</td>
<td>5</td>
</tr>
<tr>
<td>Manager-purchase</td>
<td>8</td>
</tr>
<tr>
<td>Manager-sales/marketing</td>
<td>5</td>
</tr>
<tr>
<td>Manager-finance/accounting</td>
<td>4</td>
</tr>
<tr>
<td>Manager-transport</td>
<td>5</td>
</tr>
<tr>
<td>Manager-logistics</td>
<td>4</td>
</tr>
</tbody>
</table>

Table 2  Reliability statistics for data

<table>
<thead>
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<th></th>
<th>Cronbach’s alpha</th>
<th>N of items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic factor</td>
<td>0.84</td>
<td>8</td>
</tr>
<tr>
<td>Environment factor</td>
<td>0.92</td>
<td>9</td>
</tr>
<tr>
<td>Social factor</td>
<td>0.886</td>
<td>22</td>
</tr>
</tbody>
</table>
5 Sustainability assessment at GM: a survey

The survey was administered to executives at various levels to ascertain their views respecting sustainability in decision-making at GM. Replies were analysed and results drawn.

The data collected was also tested for reliability using Cronbach’s alpha (0.83). Overall reliability is 0.83.

5.1 Findings of the survey

5.1.1 Economic performance

- 80% respondents strongly agree to the fact that economic performance, market presence is of highest value when taking decisions at any level.
- Only 30% respondents partially agreed that in decisions related to economic performance particularly for supply chain management, they also consider sustainability with respect to natural resources and the society.

5.1.2 Environmental performance

- 60% disagreed that for the decisions related to materials, products and services they also consider sustainability with respect to natural resources and the society and its impact on the environment in supply chain decisions. And 40% chose not to answer this.
- And for the decisions which are related to energy, biodiversity, water, emission, effluent, compliance and transport 60% to 80% respondents agreed and strongly agreed that they consider sustainability with respect to natural resources and the society and its impact on the environment in supply chain decisions.

5.1.3 Social performance

- 60% to 80% of respondents agree that GM has a good social performance with respect to sustainability. And it follows fair labour practice rules and regulations in relation to employment, labour/management relations, occupational health and safety, training and education, diversity and equal opportunity, non-discrimination, freedom of association and collective bargaining.
- All agreed that whilst taking decisions at GM’ anti-corruption practices, compliance with law and grievance mechanism is addressed explicitly.
- There was a fragmented response to the question of supplier assessment for sustainability. Majority of executives disagreed that they completely assess their suppliers for their sustainability initiatives.
- 60% to 80% of respondents agreed or strongly agreed to the fact that customer’s health and safety is considered for decisions involving product in supply chain.
• Majority of respondents chose to remain neutral to the question that they consider the aspect of local communities with respect to social performance in sustainability and to the question marketing communication is done with respect to product responsibility.

• Majority of respondents disagreed to the fact that customer privacy is considered as a product responsibility in their organisation.

5.2 Way forward for sustainability at GM

The organisation is following reduce and recycle policy and declares in the General Motors (2013) that 95% of its vehicles are recyclable. The organisation has enhanced its zero landfill sites and is committed to reduce its carbon dioxide emissions from 15% to 28% by 2020 and enhance the usage of alternative energy usage and reduce/recycle the consumption of water.

5.3 Critical challenges at GM

• Technology is expanding but consumer acceptance is not growing as rapidly as predicted. There is a lack of clarity on customer acceptance and willingness to pay for more fuel-efficient technologies.

• There is a high level of uncertainty and complexity in the changing regulatory landscape, which dampen the efforts towards sustainability in organisations.

• Due to climate change, there is a need for secure, affordable and sustainable energy sources, which is a concern due to energy volatility.

• And the biggest challenge is to offer an affordable product, while maintaining sustainability imperatives and maintaining a competitive market position.

• Setting global product commitments is a critical challenge.

• The organisation asserts that reporting fleet fuel economy and carbon emissions performance should be done in a manner that can be easily compared with other automakers’ reporting.

All these challenges will be worth to work upon in academia and corporate research due to finding of a recent research report. A research report on the analysis of S&P 500 companies finds that corporations with sustainability strategies outperform others on the index (CDP, 2014). The report further states that S&P 500 companies that build sustainability into their core strategies are outperforming those that fail to show leadership. The report concludes that specifically, corporations that are actively managing and planning for climate change secure an 18% higher return on investment (ROI) than companies that are not – and 67% higher than companies who refuse to disclose their emissions (CDP, 2014).

Sustainability thus, is the need of the hour and a perfect business case via involving the stakeholders to achieve greater partnerships for the sustainable development.

Sustainability a necessity is eventually becoming strategy for the business in GM. This case study provides a broad overview of how sustainability is implemented in a leading manufacturing automotive organisation. It talks about how responsible business
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is becoming the heart of efforts in GM. There is still a long way to go and it is necessarily just the first step, but the first step has been taken and eventually with stakeholder’s preference, sustainability shall be a necessary strategy, which will help GM to better its functions and enhance profitability.

6 Conclusions

The survey response and the case history of GM elucidates that GM has taken pivotal steps in applying and utilising sustainability in its core strategy. GM has been able to adopt sustainability as:

- The organisation has a rich history of innovation, research and development, and this has helped GM to further work and develop environment friendly technologies and vehicles.
- The organisation has always been a leader since its inception and hence this legacy held true as GM is in the front runners to adapt, improvise, and implement sustainability.
- The organisation has always been a world class to deliver state of the art vehicles for customer satisfaction and contentment, and this trait still helps the organisation to deliver solutions and technologies for automotive industry which take into consideration the concerns of the present time.
- The organisation has been involved in multiple of community works, philanthropic causes and social responsibility projects that enhanced the vision of an organisation to be more responsible and honourable to the community and society.
- The financial troubles of the organisation made it imperative for the organisation to look inwards. The organisation had to work to demonstrate its commitment.

7 Future scope for research

This case study on GM has limitations with respect to sample size along with representation of participants from countries across the world, and can be a source of bias. We suggest that for future research authors can enhance the scope of data collection from respondents across the world. Multiple countries, locations and respondents with varied roles and experiences can help to enhance understanding on how GM sustainability strategy is helping the organisation. We also suggest researchers to explore the correlation between sustainability strategies and market performance of the organisation. The correlation of sustainability strategy and the ecosystem in which it operates can also be an important proposition to further investigate through research responsibility towards all stakeholders and because of which it has been able to write off debt quickly to become healthy again.

There is a long journey for the sustainability initiatives of GM to establish and create a sustainable way of development. There are initiatives, and there is a greater internal stakeholder engagement at GM. The executive decisions weigh in favour of economic
performance and the organisation is doing a lot of work on environmental and social aspects.

Getting sustainability incorporated into the DNA of a company requires commitment and can be associated with organisations wherein there is history of societal, community work and responsible business practices. Implementing sustainability is important due to greater shake-holder preferences. Sustainability incorporation can get better whilst considering factors such as being explicit about sustainability and its importance: top level management commitment; eliminating trade-offs between performance, value and sustainability and by having clear goals.

The study is also relevant for organisations in other sectors particularly manufacturing industry as the questionnaire has been developed using GRI reporting, and with a focus on automobile industry. The questionnaire can be used by researchers and practitioners to adopt and research sustainability-based strategy and practices for responsible and sustainable development. Sustainable supply chain management through effective decision-making of the executives can help organisations to become sustainable encompassing the triple aspects of sustainability which will be economically viable with a focus on environment and social aspects.

Acknowledgements

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## Appendix

### Sustainability in supply chain management

**Sustainability**: Sustainability is the preservation of natural resources for future use. And is measured in terms of economic, environmental and social issues

#### Economic factors and supply chain

*Economic performance* is direct economic value generated and distributed, including revenues, operating costs, employee compensation, donations, other community investments, retained earnings, payments to capital providers and governments.

When taking decisions, economic performance is of highest value in our organisation.

In decisions related to economic performance, we also consider sustainability w.r.t natural resources and the society.

We measure the economic performance of our supply chain.

#### Market presence

When taking decisions, market presence is of highest value in our organisation.

In decisions related to market presence, we also consider sustainability w.r.t natural resources and the society.

The market presence of supply chain and the market presence of the whole organisation is different.

*Indirect economic impacts* viz. development and impact of infrastructure investments and services provided primarily for public benefit through commercial, in-kind, or pro bono engagement.

When taking decisions, *indirect economic impacts* are of highest value in our organisation.

In decisions related to *indirect economic impacts*, we also consider sustainability w.r.t natural resources and the society.

#### Environmental factors

For the decisions related to *materials in supply chain* we also consider sustainability w.r.t natural resources and the society and its impact on the environment.

For the decisions related to *energy in supply chain* we also consider sustainability w.r.t natural resources and the society and its impact on the environment.

For the decisions related to *water in supply chain* we also consider sustainability w.r.t natural resources and the society and its impact on the environment.

For the decisions related to *bio-diversity in supply chain* we also consider sustainability w.r.t natural resources and the society and its impact on the environment

For the decisions related to *emission in supply chain* we also consider sustainability w.r.t natural resources and the society and its impact on the environment

For the decisions related to *effluent and waste in supply chain* we also consider sustainability w.r.t natural resources and the society and its impact on the environment

For the decisions related to *products and services in supply chain* we also consider sustainability w.r.t natural resources and the society and its impact on the environment

For the decisions related to *compliance in supply chain* we also consider sustainability w.r.t natural resources and the society and its impact on the environment

For the decisions related to *transport in supply chain* we also consider sustainability w.r.t natural resources and the society and its impact on the environment
Appendix (continued)

Social factors (labour practices and decent work, human rights, society and product/service responsibility):

Employment, grievance, compensation, labour/management relations, occupational health and safety, training and education, freedom of association and collective bargaining, child labour, forced or compulsory labour, security practices, indigenous rights, anti-corruption, public policy, anti-competitive behaviour

We follow the fair labour practices rules and regulations for the decisions related to employment in supply chain.

We follow the fair labour practices rules and regulations for the decisions related to labour/management relations in supply chain.

We follow the fair labour practices rules and regulations for the decisions related to occupational health and safety in supply chain.

We follow the fair labour practices rules and regulations for the decisions related to training and education in supply chain.

We follow the fair labour practices rules and regulations for the decisions related to diversity and equal opportunity in supply chain.

We consider human rights for the decisions related to investment in supply chain.

We consider human rights for the decisions related to non-discrimination in supply chain.

We consider human rights for the decisions related to freedom of association and collective bargaining in supply chain.

We consider human rights for the decisions related to child labour in supply chain.

We consider human rights for the decisions related to forced/compulsory labour in supply chain.

We consider human rights for the decisions related to security practices in supply chain.

Society

We consider local communities for the decisions in supply chain

We consider anti-corruption practices for the decisions in supply chain

We consider anti-competitive behaviour for the decision in supply chain

We consider compliance of laws for the decisions in supply chain

We consider supplier assessment for impacts on society in decisions for supply chain.

We consider grievance mechanisms for impacts on society in the decisions for supply chain.

Product responsibility

Customer and health and safety is considered for decisions involving product in supply chain.

Product and service labelling is considered for decisions involving product in supply chain

Marketing communication is done w.r.t product responsibility in supply chain.

Customer privacy is considered as a product responsibility in our organisation