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A Framework *for* Applying Sustainability Principles *through* Lean Six Sigma

DEVELOPING THE 21ST
CENTURY WORKFORCE

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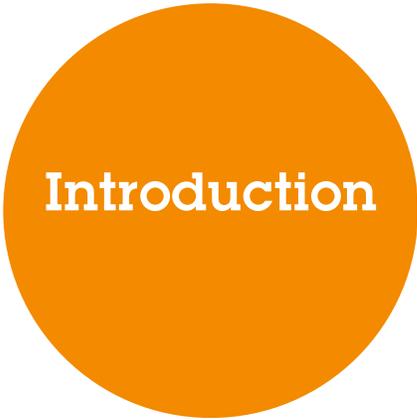
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Introduction

In an effort to gain a competitive advantage, many companies have recently begun examining their corporate structure and comparing that to principles entrenched within sustainability. The three distinctive pillars of sustainability: economic, social, and environmental, are often referred to as the triple bottom line and at times simply referred to as “people, planet, and profit” (Jackson, Boswell, Davis, 2011). The main idea behind corporate sustainability is that organizations will look not extensively at their financial gains, but the impact they have between their environment and stakeholders who are both internal and external.

Though being self aware of other factors can be beneficial, it may be difficult for companies to establish metrics or frameworks that mesh with organizational structures. The purpose of this white paper is to examine how many of the concepts from sustainability can be associated with Six Sigma and establishing a universal framework by combining the two principles that will help companies in the implementation of new improvements. From this framework organizations may see how potential projects fit into the three areas of sustainability—economic, social, and environmental.

Sustainability Within Business

According to the World Commission on Environment and Development (1987), sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. This statement made sustainability a unified concept and idea that countries and organizations were willing to embrace. As time passed, the focus of sustainability began to evolve to what sustainability was and how it could be more widely incorporated. The most common concept has seen sustainability broken down into three major focus areas: economical, social, and environmental.

Several companies and organizations have in recent times shifted reporting from a pure financial perspective to one that gives stakeholders information regarding the involvement of their company in all areas of sustainability. This is often referred to as the Triple Bottom Line (Wang & Lin, 2007). The rise in corporate approach to sustainability has seen several large corporations such as Weyerhaeuser Company, The Boeing Company, PricewaterhouseCoopers, The Procter & Gamble Company, Sony Corporation, and Toyota Motor Corporation, along with others create the World Business Council for

Sustainable Development (WBCSD) (Jackson, Boswell, Davis, 2011). The main focus of this council is creating changes in a varying ways from government structures, economic frameworks, along with other aspects of business and personal behavior.

Six Sigma & Sustainability

Methods and efforts used in Lean, Six Sigma, TQM, ISO, and others share a structure that is similar to sustainability models as they address the pillars of sustainability: environmental, social, and economic. From this it is easy to draw a comparison between the foundations of continuous improvement, specifically using Lean and Six Sigma as examples. For example, one such comparison can be seen in the following chart between Lean's Plan, Do, Study, Act (PDSA), Six Sigma's Define, Measure, Analyze, Improve, Control (DMAIC), and the OECD Sustainable Manufacturing Toolkit, a framework created using a set of common comparable indicators to help organizations measure environmental performance of manufacturing facilities of varying sizes and sectors (OECD 2011).

Six Sigma's DMAIC	Seven Indicators of the OECD PMI	Lean's PDSA
Define – the goals of the existing system	Prepare: Step 1 – map impacts and set priorities	Plan
	Prepare: Step 2 – chose indicators and understand data needs	
Measure – the existing system	Measure: Step 3 – measure inputs used in production	Do
Analyze – the system to identify ways to eliminate the gap between current performance of the system or process and the desired goal	Measure: Step 4 – access the operations of the facility	Study
	Measure: Step 5 – evaluate products	
Improve – the system	Improve: Step 6 – understand results	Act
	Improve: Step 7 – take action to improve performance	
Control – the new system		

Description of DMAIC from The Six Sigma Handbook (Pyzdek, T., Keller, P. 2010).

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As revealed, several similarities exist between DMAIC and the PMI process. Though the descriptions above in DMAIC are somewhat vague, the tools and methods found within each phase can be matched almost exactly to the OECD PMI process. Much like the relationship between DMAIC and the seven steps of PMI, a similar relationship can be made to the cyclical nature of PDSA and PMI as they are presented in that way. Even though there is a cyclical pattern in PDSA and PMI, the relationships shown in the previous table show both PDSA and PMI lacking a counterpart to Control from DMAIC. Control in DMAIC serves the purpose of helping to ensure the implementation of an improvement is a lasting one that could prove to be useful for both the PDSA and PMI methodologies.

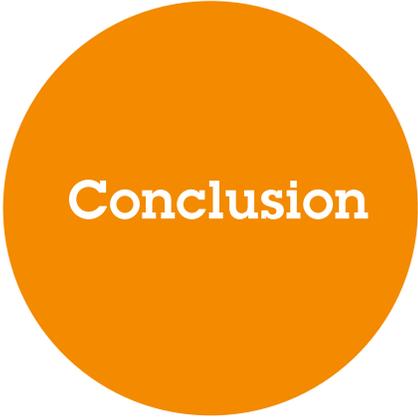
Recommended Framework

Because of the aforementioned similarities that exist between DMAIC and sustainability principles, such as those shown in PMI, it is beneficial to develop a framework using Six Sigma as a foundation that could be used by a multitude of organizations. The attached Appendix A shows a chart that allows organizations to monitor recommended improvements by running the improvement against areas that may be impacted within the three areas of sustainability. Each area of sustainability has several questions that are related to that particular section. For example under Economic, a company may need to answer the question, "Will this project decrease the current number of defects?" This example emphasizes an area of Six Sigma by analyzing the reduction of probable defects, however it can be said that by doing so may increase the profits of the organization thus increasing the economic area of sustainability for the company.

By keeping the questions in a "Yes" or "No" format, it allows organizations to examine the impact each recommended improvement might have in a simpler form. From this, companies should be able to see the differences and similarities that exist between differing improvements. Furthermore, the area of sustainability that is more heavily influenced by each individual improvement should also be noted. This is important because an organization may have an idea of how an improvement should impact the company, however once the improvement has been established against the criteria in the chart

the company may find that an improvement that ideally was to have a heavier focus on environmental aspects of sustainability may actually have more of an impact socially on the company. In essence, companies can gain a better understanding of the projects that are planning to undertake.

As companies continue to examine their organization and evaluate the potential of reporting results based on metrics other than financial, newer frameworks will be created to serve the varying of industry needs. The framework presented here is such a framework because of the ability to examine both continuous improvement metrics along with those found in areas of sustainability. The vitality of the proposed framework is the fact that it can help a varying degree of organizations in multiple fields due to the adaptability. As organizations change over time the questions they ask on the chart may also change as well. Finally, the performance chart allows companies to monitor which areas of sustainability they are focusing the most and least on. This allows companies to create a synergy in all areas of sustainability without maximizing one particular area.

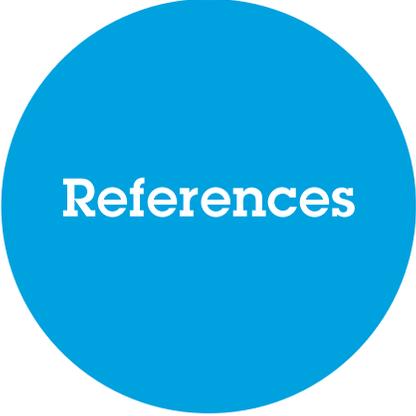


Conclusion

Several companies and organizations have in recent times shifted reporting from a pure financial perspective to one that gives stakeholders information regarding the involvement of their company in all areas of sustainability.

APPENDIX A

Six Sigma Sustainability Project Evaluation	Improvement 1	Improvement 2	Improvement 3	Improvement 4
1. Economic				
a. Will there be a ROI within 3-6 months?				
b. Does this cause a reduction in inventory?				
c. Does this add value to the product for consumer?				
d. Will this decrease the % of current defects?				
2. Social				
a. Will there be an increase in labor personnel required?				
b. Can this project be done in house?				
c. Is there an effect downstream on vendors?				
d. Is there an impact on local community?				
3. Environmental				
a. Is there potential for reduction in carbon footprint?				
b. Will this project increase current consumption?				
c. Does the project include additional energy sources?				
d. Is there a negative impact on waste management?				
TOTAL				



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