ASSESSING SUSTAINABILITY IN ENVIRONMENTAL MANAGEMENT SYSTEM FOR MALAYSIAN INDUSTRY

ASMADIANATASHA BINTI ASMANIZAM

Report submitted in partial fulfillment of the requirements
for the award of the degree of
Bachelor (Hons.) of Engineering in Manufacturing Engineering

Faculty of Manufacturing Engineering
UNIVERSITI MALAYSIA PAHANG

December 2016

ABSTRACT

The scarcity in measuring the sustainability accomplishment has been restrained most of the companies in Malaysian industry. Currently, there are variety types of the measurement tools of the sustainability assessment that have been implemented. However, there are still not achieving the inclusive elements required by the worldwide claim. In fact, the contribution to the sustainability performance are only highlighted on the nature, financial along with society components. In addition, some of the companies are conducting their sustainability implementation individually. By means, these process approaching type is needed to be integrated into a sytematic system approach. This research objectives are focussing on investigating the present sustainability tools in the environmental management system for Malaysian industry along with the quantification of the parameters needed to be pivoted with the Green Project Management (GPM) P5. Hence, the parameters of the sustainability will be evaluated then in order to accomplish this project thesis. By reviewing on the methodology of this research it comprises of three phases where it starts with the analyzation of the parameters in environmental management system according to the Malaysian context of industry. Moving on to the next step is the quantification of the criterion and finally the normalisation process will be done to determine the results of this research either it is succeeded or vice versa. As a result, this research has come to the conclusion where the level of the sustainability compliance does not achieving the standard level of the targeted objectives though it has already surpassed the average level of the sustainability performance. In future, the understanding towards the sustainability assessment is acquired to be aligned unitedly in order to integrated the process approach into the systematic approach. Apart, this research will be able to help to provide a measurable framework yet finally bestowing the Malaysian industry with a continuous improvement roadmap in achieving excellence in environmental management system.

ABSTRAK

Kekurangan dalam mengukur pencapaian kemampanan telah dihalang kebanyakan syarikat dalam industri Malaysia. Pada masa ini, terdapat pelbagai jenis pelbagai alat pengukuran penilaian kemampanan yang telah dilaksanakan. Walau bagaimanapun, masih terdapat tidak mencapai elemen inklusif dikehendaki oleh tuntutan di seluruh dunia. Malah, sumbangan kepada prestasi kemampanan hanya menekankan pada sifat, kewangan bersama-sama dengan komponen masyarakat. Di samping itu, beberapa syarikat sedang menjalankan pelaksanaan kemampanan mereka secara individu. Dengan cara, ini proses jenis menghampiri diperlukan untuk diintegrasikan ke dalam pendekatan sistem sytematic. Ini objektif penyelidikan yang memberi fokus kepada menyiasat alat kelestarian di dalam sistem pengurusan alam sekitar bagi industri Malaysia bersama-sama dengan kuantifikasi parameter perlu berpaksikan dengan P5 Green Pengurusan Projek (GPM). Oleh itu, parameter kelestarian akan dinilai maka untuk mencapai tesis projek ini. Dengan mengkaji pada metodologi kajian ini ia terdiri daripada tiga fasa di mana ia bermula dengan analyzation parameter dalam sistem pengurusan alam sekitar mengikut konteks Malaysia industri. Bergerak ke langkah seterusnya adalah kuantifikasi kriteria dan akhirnya proses pemulihan yang akan dilakukan untuk menentukan keputusan kajian ini sama ada ia berjaya atau sebaliknya. Hasilnya, kajian ini telah datang kepada kesimpulan di mana tahap pematuhan kemampanan tidak mencapai tahap standard objektif yang disasarkan walaupun ia telah pun melepasi paras purata prestasi kemampanan. Pada masa akan datang, pemahaman terhadap penilaian kemampanan itu diperolehi untuk diselaraskan bersatu untuk bersepadu pendekatan proses dalam pendekatan sistematik. Selain itu, kajian ini akan dapat membantu untuk menyediakan satu rangka kerja yang boleh diukur tetapi akhirnya penganugerahan industri Malaysia dengan peningkatan pelan tindakan yang berterusan untuk mencapai kecemerlangan dalam sistem pengurusan alam sekitar.

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LIST OF SYMBOLS

%	Percentage
μ	Mean/Average
σ	Standard Deviation
n	Number of sample

LIST OF ABBREVIATIONS

USL	Upper Specification Limit
LSL	Lower Specification Limit
C_p	Process Capability
C_{pk}	Process Capability Index
Min	Minimum value
Max	Maximum value
Diff	Difference value
STDEV	Standard Deviation

CHAPTER 1

INTRODUCTION

1.1 RESEARCH BACKGROUND

The idea of sustainability or sustainability development has grown rapidly into many levels of society over the last decade. Brundtland Commission specifies sustainability development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987). Recently, the growth in demand for the manufacturing products with the sustainability conditions are keep increasing. Most of the companies in Malaysia must extremely zealous to compete each other in producing a sustainable product without neglecting their financial side. In addition, our Malaysian industry are experiencing an utterly rapid improvement in the engineering phase of bringing forth a good quality goods. However, the assessment of the sustainability requirements in the environmental management system in our country are not comprehensively covers the elements needed in the green practices.

Views from the Bursa Malaysia is clearly justified that they are strongly committed to support the sustainability practices in our Malaysia industries. They are

really devoted in creating the green environment practices in the industries all over our country. Therefore, all of the registered companies that have been patronage under the Bursa Malaysia must have the elements of the sustainability practices in their working area comprehensively.

In order to fulfil this current requirements, the application of the Green Project Management (GPM) P5 Standard is the most desirable tool that will act as our guideline in encouraging the sustainability assessment in the environmental management system for Malaysian industry. Hence, an exhaustive sustainability report surely can be prepared by the firms itself as required in the Bursa Malaysia.

1.2 PROBLEM STATEMENT

Equally important in this topic is the sustainability assessment in the environmental management system is the utmost important issue since it will measured the fulfilment of the criterions needed in the integration of the sustainability endeavours. The convergences of this process will then followed by the preparation of the sustainability reports. However, the existed sustainability practices and reports are only concern on the environment, social and financial.

Thence, to overcome the dearth in the reports, the Green Project Management (GPM) P5 Standard is taken to be as a guideline in order to measure the level of the sustainability practices extensively in the management system in the manufacturing field including the process and the product in the environmental of manufacturing industry itself. This effectual measurement tool will guides the management system on how to

gain a sustainability environmental waste management especially in our Malaysia context of manufacturing industry.

1.3 PROJECT OBJECTIVES

The main objective regarding to this proposed project is to appraise the sustainability awareness level in Malaysian manufacturing industry and measuring the level of sustainability practices that have been implemented by the consumers. Referring to the explicit target in our purposed project are as follows:

1. To investigate the level of sustainability compliance using GPM P5 standard.
2. To quantify sustainability parameters related to the environmental management system for Malaysian industry.
3. To contrive a new sustainability assessment tool that will be able to compute the level of the sustainability compliances.

1.4 PROJECT SCOPE

The scope of this project emphasize on the Sustainability in Environmental Management System regarding to our Malaysian industry. It will be focussing on the environmental management of manufacturing in the context of Malaysian industry. In addition, this study will help in providing the correct integration guidelines when implementing the sustainability practices by hence able to demonstrate the level of the sustainability implementation. Thus, it will surely give the industry such a positive implication to be practiced.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

Here in this chapter, it is mainly about on how to converse and to collate the previous methods or tools that have been used in the sustainability endeavour in our Malaysia industries. Those related review of study which can be referred to our main topic of study is collected and compared to show the disparities between those existed tools in order to improve the development of the sustainability in environmental waste management in Malaysia context.

2.1.1 UN GLOBAL COMPACT

United Nations (UN) Global Compact is generally known as an outstanding corporate citizenship which is a very inventive towards sustainability by coordinating effectual strategies and performances. In order to sustain such a green environment company, the UN Global Compact is designed to help those companies all over the world by preparing the policy platform and guiding them with a productive practical framework.

Apart from that, it will involve in promoting the advancements in a company by enacting those universal principle of human rights, labour standards, environment and anti-corruption. It is a trusted organisation that will ensure those business corporates to practice the sustainability practices by adding the values to social, planets and communities.

In addition, they are guaranteeing that the implemented practices on a part will give a good implications without harming another parts. The UN Global Compact is functioning by generating on the importance of sustainability and bringing it upward to summoning an events relating to the sustainability practices also helping to discover the best strategy to be best applied until our goals are achieved.

2.1.2 P5 INTEGRATION MATRIX

Over the years, various sustainability evaluation tools has been invented to fulfil the needed of solving the engineering issues in the sustainability judgements. It gives us such a hint that there are several deficiency occurs in the measurement tools of the sustainability practices. However, the existed method are not comprehensively covered those important aspects when referring to the sustainability practices in any sectors.

To overcome this hurdle, we have expected to implement the Green Project Management (GPM) P5 Standard which is one of the UN Global Compacts' member. It comprises of the people, profit, planet together with the improvement addition of process and product. The GPM P5 Standard is operates to collaborates the current issues of the

deterioration of our environment quality together with the economic growth alongside with the continuality of our mother of earth.

Apart from that, this method is ensuring the less damaged to the natural surrounding by providing the most effective guidelines towards the companies. Therefore, when these good implications can be achieved, surely it will help the business longevity and profitability increments to be performed.

2.2 SUSTAINABILITY METHODS AND TOOLS

Nowadays, as we are approaching from the green practices into the sustainability concept in our sector of automotive industry, we can see the differences where the previous methods do not covers comprehensively as it only keep stressing on the environmental issues only. Those methods that have been developed and practised by the companies are as follows:

2.2.1 Triple Bottom Line

Triple Bottom Line (TBL) or generally known as 3P's Principles are one of the sustainability practices that have been implemented by most of the companies which auspices under the Bursa Malaysia. The word of "sustainability" itself can be derived as how the advancement of today generations fulfils their requirements without affecting the source of the future generations' essentials according to the World Commission on Environment and Development (WCED) (1987). This kind of method is concerning on the aspects of environments, social and economic responsibilities or the profit gain,

Kleindorferetal. (2005). It is usually implemented in the business area and also in the government sector due to its effectiveness in achieving the sustainability goals.

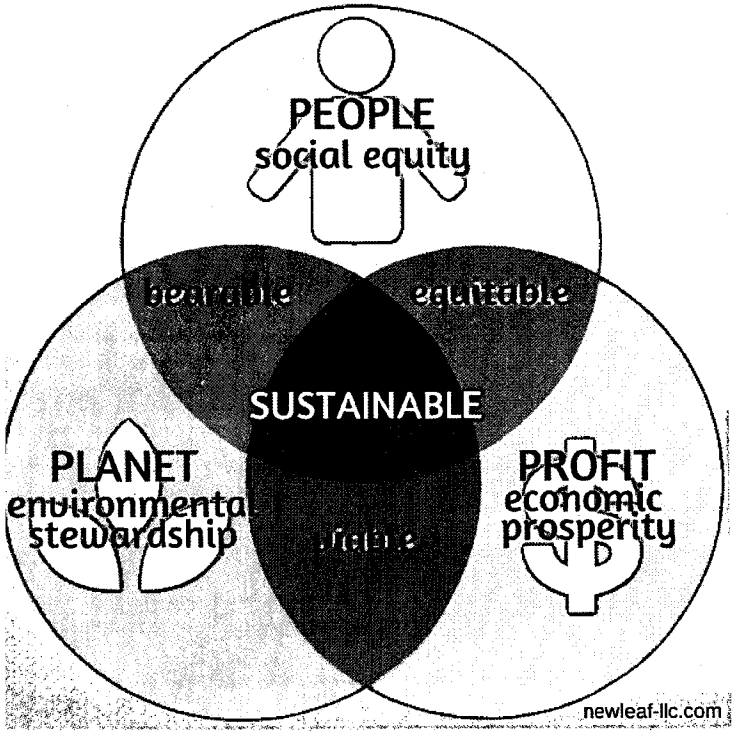

Figure 2.1: Triple Bottom Line. (Bailey, 2012)

2.2.2 Global Reporting Initiative (GRI)

Global Reporting Initiative (GRI) is one of the sustainability reports that have been widely used to achieve the goal of measuring the sustainability of the level of sustainable reporting in terms of quality, analyzing, accuracy and utility. GRI is designed to evaluate the performance of profitability and sustainability by collecting quantitative and qualitative data which is focusing on environmental, economic and social It helps the company to measure and understand the language of the financial, social and

environmental much better when they are integrating the sustainability practices in their manufacturing production.

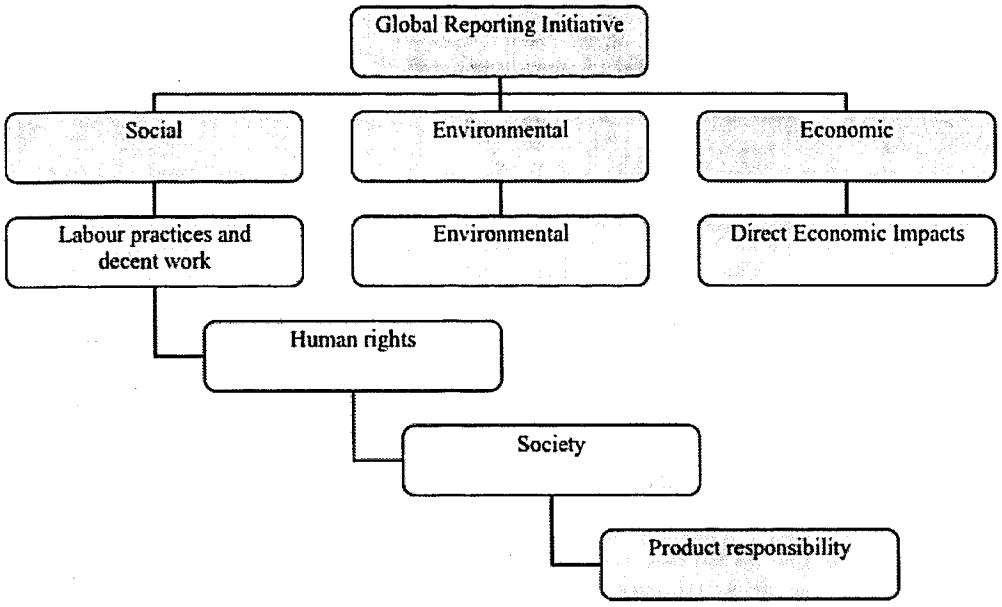

Figure 2.2: GRI Framework.

Source: Rajesh Kumar Singh, H.R.Murty, S.K.Gupta, A.K.Dikshit (2011)

Figure 2.3: GRI logo.

Source: Global Reporting Initiative website, 12th April 2016,

https://www.globalreporting.org/Pages/default.aspx

2.3 ENVIRONMENT INDICATORS FOR INDUSTRIES

2.3.1 Ecodesign

During the product design process, Ecodesign is usually used due to its effectiveness to design as the design that will follow the sustainability specifications (McAloone, 2000; Pighini et al., 2002; Books, 2006). This design framework is how the integration of a normal design occurs to transform into a "greener" design by injecting the environmental elements along with the reduction of bad implications of its product life cycle into our planet.

2.3.2 Life cycle assessment (LCA)

This method is one of the earlier tool that have been invented to suits the sustainability requirements in our industries. It focused more on product itself and our mother of nature. LCI analysis includes design a system's movement and organizing the input and output data for all the activities within the system perimeter. Thus, these aspects help LCA users to adapt and practice the method to a specific system. It helps the consumers to understand more about the product but it cannot reach the financial elements like the cost of the products.

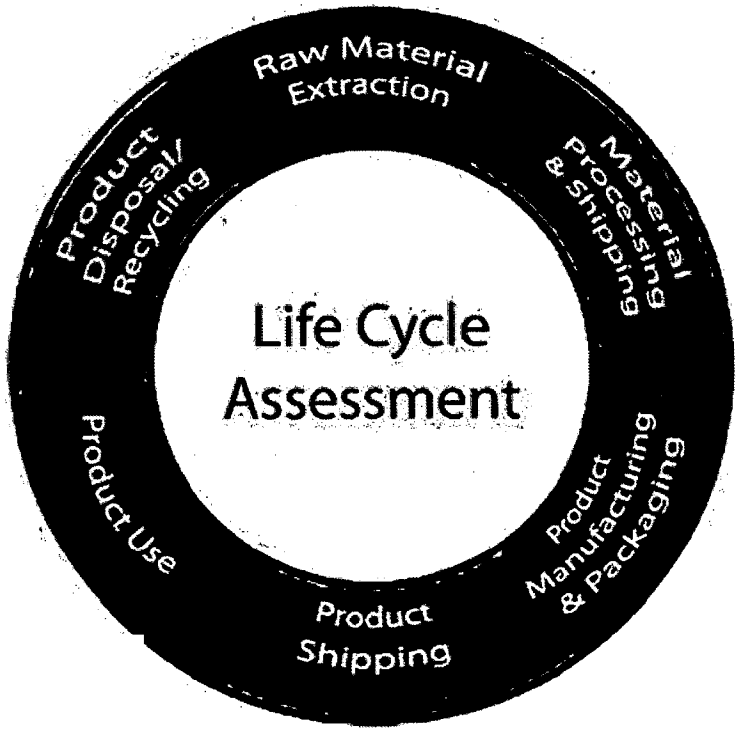

Figure 2.4: Life cycle of a product according to LCA.

Source: Sustainable Solution Corporation website, 12th April 2016,

http://www.sustainablesolutionscorporation.com/lca.html

2.3.3 Eco-indicator 99

This tool is the successor of the Eco-indicator 95 where it is also originated from the LCA method. It does emphasizes on the human health, the quality of the ecosystem and it also will measure the implications that might encountered from the materials and process of a certain product. It is able to provide an overview for the whole evaluation because of its capability to gather the results to become one single score. However, Eco-indicator 99 does not concern the cost and technology aspects.

2.3.4 Design Management for Sustainability (DMS)

DMS is a design framework that will guides the users during the design process that will yields a sustainable product. By implementing this, it will ensure to fulfil the requirements of the customers, social pressure and the environmental development during the stage of creating a product design. DMS is being used when designing a product by keep balancing it environmental aspect with the societal element.

2.3.5 Sustainable Manufacturing Practice (SMP)

This tool are practically used in the Malaysia industries when they are going to reduce the environmental effects during the manufacturing of the products. The target is to reduce the usage of energy, water, and/or waste.

Figure 2.5: Green Circle that will verify the users that have implement the SMP.

Source: Green Circle Certified website, 12th April 2016,

http://www.greencirclecertified.com/smp.html

2.3.6 Fuzzy Evaluation

This is one of the sustainability assessment that represents the numerical style of method by providing a multi-criteria decision making. It does is amended by an imputation procedure to fill in missing data, rule bases are compiled algebraically, and sustainability thresholds are defined so as to reflect expert opinion and international agreements and norms.

In addition, this method will help the designers to rank all of the design candidates to choose the preferable design. It also uses fuzzy logic reasoning and basic indicators of environmental integrity, economic efficiency and social welfare, and derives measures of human, ecological, and overall sustainability. However it has the limitations since it did not covers the all of the elements like the GPM P5.

2.3.7 Green Innovation Initiatives (GII)

The sustainability innovation technique like Green Innovation Initiatives (GII) has a greatly impact on the automotive industry as its ability to provide both environmental positive effects and able to improve the financial element in the industry. It helps to prepare the company to become such a competitive competitors within the business sectors when adopting the environmental and "greener" products and processes. By referring to the literature, this method enables the automotive companies to understand how to produce a good automotive product accordance to the adoption of the green practices elements during the manufacturing process until the marketing stages. (Suhaiza Zailani, Kannan Govindan, Mohammad Iranmanesh, 2015). The benefits of GII can be seen from the product development and business processes: increased efficiency in the use of resources, return on investment, increased sales, development of new markets, improved corporate image, product differentiation, and enhanced competitive advantage (FrajeAndre et al., 2009; Pujari et al., 2003; York, 2009; Dangelico and Pujari, 2010). Chen et al. (2006). In addition the companies can boosting up their financial parts as they will becoming more competitive due to the improvement of their reputations and images in green products generation along with the contribution to the social development.

CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

This chapter explains the research method that will be used in order to complete the case study. Research methodology portrays on how the techniques or procedures that have been implemented during the flow of the process to complete it. The flow cart in Figure 3.1 illustrates the strategy plan that have been and will be taken in conducting this research of study in Malaysian context of industry.

3.2 EXPLANATION OF PROCESS FLOW CHART

3.2.1 Field Research

At this stage of the field research, this part is the utmost important thing needed to be fulfilled by the student before proceeding to the next steps. This is because, student need to get the real deal of the industry difficulties which is the main requirement entail in order to access all the valuable values of data that can help to propose a better solution to solve the problems.

Student are acquired to make some fact-finding, research fieldwork at several companies in Malaysia and also walk through over the industrial site by asking them to response with a set of printed or written questions with a choice of answers that related to the field of research. Malaysian industries has been selected as research area since Malaysia has grown up with a lots of new companies especially for the manufacturing area that will direct or indirectly interact with the environmental issues. In other words, the environmental side and the Malaysian industries are always correlated to each other.

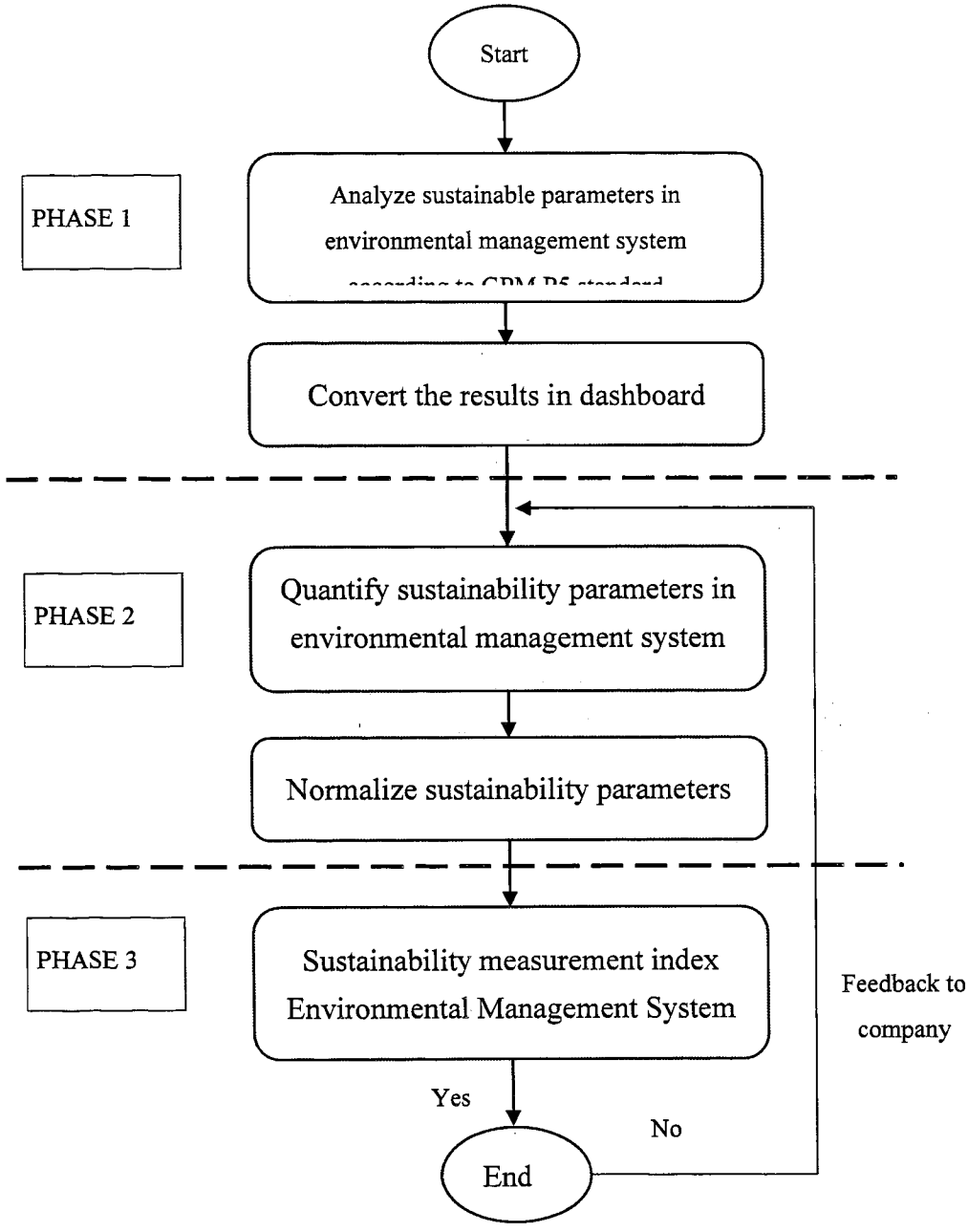

Figure 3.1: Flow Chart of the Project Study

3.2.2 Phase 1

To go deep through into the real complication that might be faced by the industries, the distinguishing of the root cause of the problems is the predominant step to be taken out before proceeding to the next level. Thus, five companies from the manufacturing sector that covers in Nilai, Shah Alam, Pekan, Kuantan and Port Klang.

By reviewing to the targeted companies, the problem that have been encountered by them is the limitation that occurs during the implementation of the sustainability assessment where most of the existence measurement tools are only emphasize on the environmental, economy and governance aspects. Some of the companies also implementing different of sustainability indicators to evaluate the performance of economy, social and environmental separately.

Moving on to the next step is where the collection of data is being carried out by some of the research questions. The scale between -3 to +3 was developed to ease the respondents' group for rating the evaluation criteria, before it is then being converted into the scale of 0 to 6 rating value as depicted in Table 3.1 and Table 3.2. Equally important in this method is where the questions are generated by using the GPM P5 Standard that serves as a reference. The P5 concept integration matrix is describes below:

a) Product impacts – objectives and efforts, lifespan and servicing
b) Process impacts – maturity and efficiency
c) Society (People) – labor practices and decent work, society and customers, human rights, ethical behavior

d) Environment (Planet) – transport, energy, water, waste

e) Financial (Profit) – return on investment, business agility, economic simulation

Numerical Rating	Descriptions
3	Negative Impact High
2	Negative Impact Medium
1	Negative Impact Low
0	Neutral
-1	Positive Impact Low
-2	Positive Impact Medium
-3	Positive Impact High

Table 3.1: Scale of "Weighting criteria" from -3 to +3.

Numerical Rating	Descriptions
0	Negative Impact High
1	Negative Impact Medium
2	Negative Impact Low
3	Neutral
4	Positive Impact Low
5	Positive Impact Medium
6	Positive Impact High

Table 3.2: Scale of "Weighting criteria" from 0 to 6.

3.2.3 Phase 2

Subsequently at this phase, the research study continue to the point of quantifying and normalizing the data gathered according to the "Functional Based" and "Criteria Based". For the "Functional Based", the data is being summarized according to the 3P's elements which are People, Planet and Profit that is correlated to the Product

and Process factors. In addition, the normalization of the results is illustrated using the pie chart (refer Appendix).

Moving on to the next is the "Criteria Based" where the statistics of data is being interpreted according to each of the criterions. The minimum, maximum and average values of each criteria part is computed in order to discover the deviation gap of the sustainability compliance level in the companies. As a result, the degree of sustainability assessment can be measured either it is comprehensively implemented or not by referring back to the five elements of the society, nature and financial correspond with the product and process parts in the environmental management system.

3.2.4 Phase 3

Result of sustainability compliance ratio of each sustainability parameters are proposed to be ranked as shown in Table 3.3. The outcomes of the project of study is returned back to the companies to get their feedback according to the measured statistics data.

Ranking	Description
80 – 100%	Complied (Accepted)
50 – 79%	Partially complied (Conditionally accepted)
0 – 49%	Not complied (Not accepted)

Table 3.3: Proposed ranking of sustainability compliance.

According to above ranking, engineer and project manager can do their self-assessment on the critical element of sustainability compliance and take necessary actions to improve the practice.

CHAPTER 4

RESULT AND DISCUSSION

4.1 INTRODUCTION

This chapter includes all the accumulated data that has been computed from the raw data answered by the correspondents until the finalization part of the interpretation data. Data collection is the supreme ingredients during the conduction of this project study since it will be discussed further before making an improvement towards the current problems that occurs in the Malaysian context of industry. Consequently after gathering the data, it will be quantified using the method of "Weighting scale", "Functional Based" and "Criteria Based". By using this calculation technique, the results then will be tabulated on the line graph.

4.2 DATA COLLECTION

The process of gathering the data has been conducted in several departments of the companies using the same research questions. The research questionnaire has been distributed at the listed departments where the results is the transmitted into the scoring board that has used the GPM P5 standard as the guideline. The correspondents are chosen

from several departments that is related to the manufacturing sector in the Malaysian industry.

The "Weighting scale" (refer Appendix) is used during the distribution of the research questionnaire where the -3 value alluding to the highly positive impact meanwhile the + 3 rating scale will shows the highly negative impact of the sustainability compliance level in those companies. The departments involved in this field of study are:

i. Department Of Production
ii. Department Of Production (Assembly)
iii. Department Of Technical
iv. Department Of Environmental Quality
v. Department Of Quality

4.2.1 Overall Project Sustainability Score at Each Department

The main point of results at this part is where the research feedback at the company is being mapped on the scoring board which has been injected by the GPM P5 Standard as the guideline. It can be seen on the scoring board (refer Appendix) where it comprises of the five sustainability elements which are correlated to each other. Apart from that, the relation of the environmental, social and financial elements with the product and process part in the waste management system are being illustrated in the pie chart at each of the departments.

Production department and the department of quality shows the result of the sustainability assessment where it is still at the partially complied level. Here, the overall percentage result of the research survey of the both departments marks on the 53.67% only which are not quite a good compliance level of sustainability appraisal. In addition, the division percentage of the three elements that parallel to the other two parts of Product and Process for production department are also being illustrated in the pie chart as Figure 4.1 and Figure 4.2 below.

Eventually, for the department of Quality, the percentage outcomes from the pie chart (refer **Appendix**) of the 3P's factor (People, Planet and Profit) when interconnected to Process aspect are 32%, 35%, and 33% subsequently. Aside from that, the relation of the 3P's factor (People, Planet and Profit) with the Product itself comprises of 34%, 33% and 33% respectively.

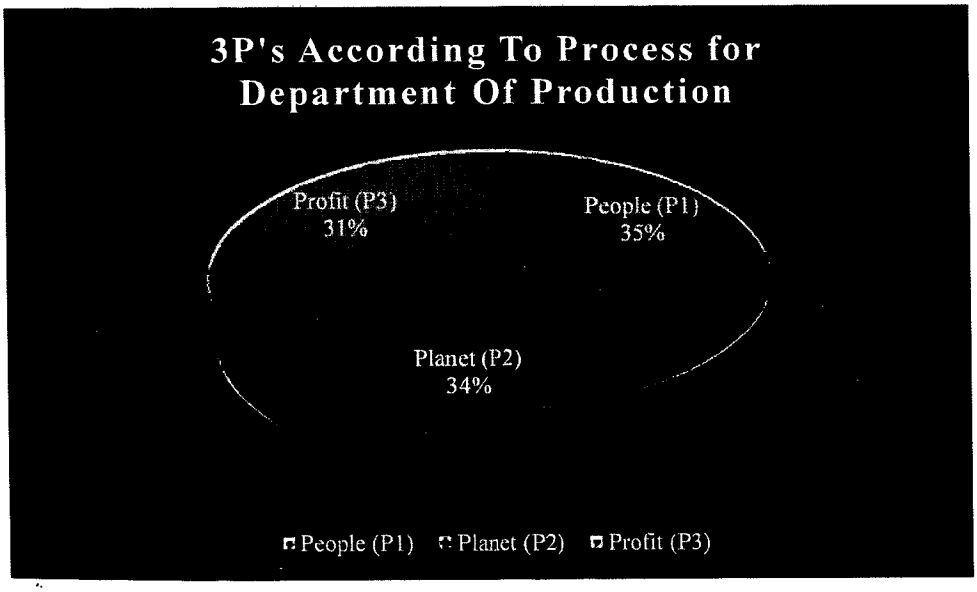

Figure 4.1: Percentage division of 3P's element according to Process element.

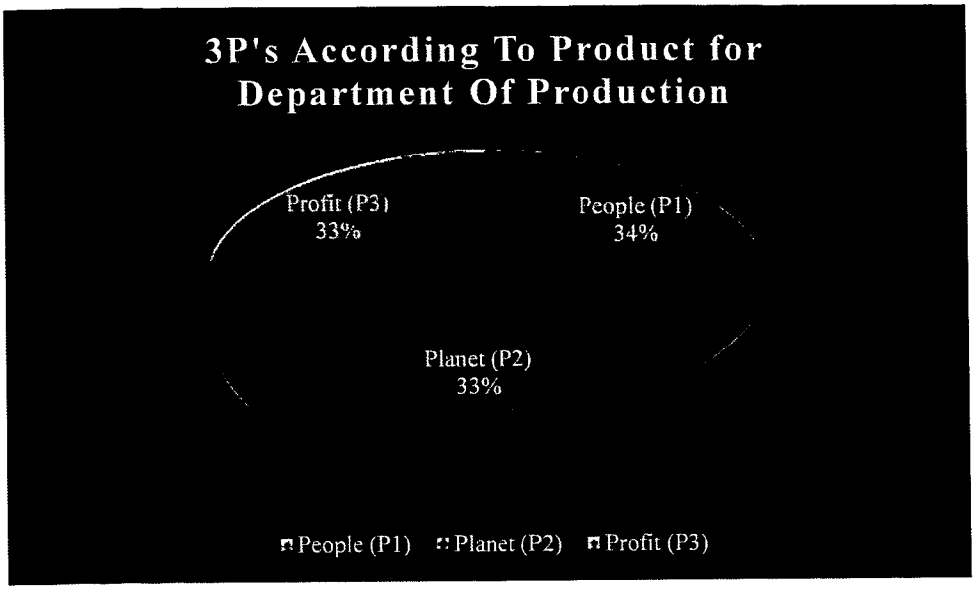

Figure 4.2: Percentage division of 3P's element according to Product element.

Moving on to the next point is the departments of the Production (Assembly) and the department of Technical which have shown the moderate level of the sustainability compliance in their assembly line of the production. Their implementation degree of the "green" assessment that covers those five elements is only at 53.33%. This situation displayed us that the assessment performance is does not thoroughly practiced.

For the Technical department, the results exhibits the society, nature and economical aspect to be 34%, 35% and 31% correspondingly when connected to the Process component. In addition, the yielding results of those elements when being mapped into the pie chart diagram (refer **Appendix**) shows the percentage of the society to be 37%, nature to be 30% and economy to be 30% when interconnected to the Product factor. The figure of the pie chart that embraces the relation of all sustainability constituents (refer **Appendix**) shows that the relation of Process part to the 3P's components which are People, Planet and Profit lies on the 35%, 34% and 31%

respectively. Meanwhile, the calculated percentage that associated to the Product part along with the People, Planet and Profit are 35%, 34% and 31% respectively.

Consequently, the highest level of the overall project sustainability score is only 53.8% which also resembles the moderate level of the sustainability assessment only. It can be clearly seen when the figure of the percentage division (refer Appendix) for human, earth and the financial earning related with the Process constituents marks on 35%, 35% and 30% correspondingly while the three elements when being interconnected with the Product will show the reading of 35% for human, 33% for our earth nature and 32% for the financial side.

4.2.2 Functional Based

Each of the departments are having the three elements of people, planet and profit that are being distinguished by the process and product factor only. However, each of the 3P's elements are having their own criterion that are related to the waste management system in most of the Malaysian industry. The research data from the companies are being quantified and formulated in the scoring board to get through the results that will gives a clearer view of the sustainability assessment level.

Firstly, the outcomes from the department of the production from the view of the product aspect will shows there are 76.67% for people along with 75.33% for planet and profit. Furthermore, the relation of the 3P's factor with the process are also showing quite a similar value which are 79.17% for the society and environmental part whereas the

result for the profit lies on the 72.22% only which is a slightly lower than those than the rest of it.

Moving on to the next department is the division of the production assembly in the company. Here, at this section the results for the process group describes that the people are having the highest percentage value among others which is 77.08% followed by the planet which is 76.67% and 68.06% for the financial side. Aside from the process is the product element in the environmental management system itself. The computed data describes that the people aspect is having the topmost value amongst the all of the factors. It is then followed by the planet with 73.33% and 68.89% value of the economical part.

By the same token, the department of technical are also illustrating quite a good results of each of the factor regarding to both constituents of product and process. For instance, the normalisation data of the 3P's components (People, Planet and Profit) by referring to the Process are 78.13%, 80.83% and 70.83% respectively. This is can be clearly seen that the environmental part is marking on the highest percentage value of the sustainability compliance level at this department. Apart from it is the Product side of element where the value of those three aspects comprises of 77.50% for the social, 70.67% for the nature and 64.45% for the profit part of the factor.

Environmental quality department is the section that is already implementing the existed environmental policies of sustainability assessment which means, they are being exposed more towards the sustainability issues. Thus, the outcomes from the collecting data method also showing quite a good level of percentage for both elements of process

and product. By referring to the product, the interpreted data are demonstrated by the ascending order of its value which are People, Planet and Profit which are 79.17%, 76.67% and 72.22% correspondingly. Meanwhile, the viewed result from the process element are 82.30% for people, 82.50% for planet and finally 72.22% for profit.

As for the final section of the department is the Quality division where surprisingly, the results for the 3P's element (People, Planet and Profit) that have been associated with the product part are having the same value of the percentage level which is 76.67% for all of them whereas for the three elements according to the perspective view of the process are 75% for the profit and people together with the planet aspect that lies on 80% valued data.

4.2.3 Criteria Based

Here, at this section the data discussion will continue to be emphasized on the criterion based towards the sustainability compliance in the environmental management system for Malaysian context industry. By referring back to the formulated data that has been normalised earlier, the gap difference of the human's perception can be integrated to the sustainability assessment level of compliance by finding the value of the standard deviation from the raw data collected.

The data result has been sorted according to the each of the criteria that will interconnected to the Product and Process elements. It will demonstrate on how the data being normalised to get the spreading tendency of the data. This outcome is the utmost

important peak point that will help to understand more about the relation of the sustainability assessment in the environmental management system.

i. Process

The value of the data that covers from the five departments that have been mentioned earlier are being sorted according to the twelve criterions. The maximum and minimum value of the data can be determined directly from the categorised element meanwhile the average number at each of the criteria are being computed too (refer Appendix). These calculated value indicates that the lower the value of the difference between the maximum and minimum value, the better the result is and vice versa.

Referring to the graph below, it show that the gap difference of the maximum rating value of the Society and Customers that is from the People group is on the uppermost rank amongst all of the criterion which marks on 1.0 value. It shows that, this part of element is essentially needed the enhancement of improving the understanding of the sustainability concept in the environmental management system. Meanwhile, the zero value of the disparity between the maximum and minimum number of the rating values are from the Planet element which are (Water) and (Waste). It demonstrates that these parts are having no gap difference of understanding among the twelve criterion listed.

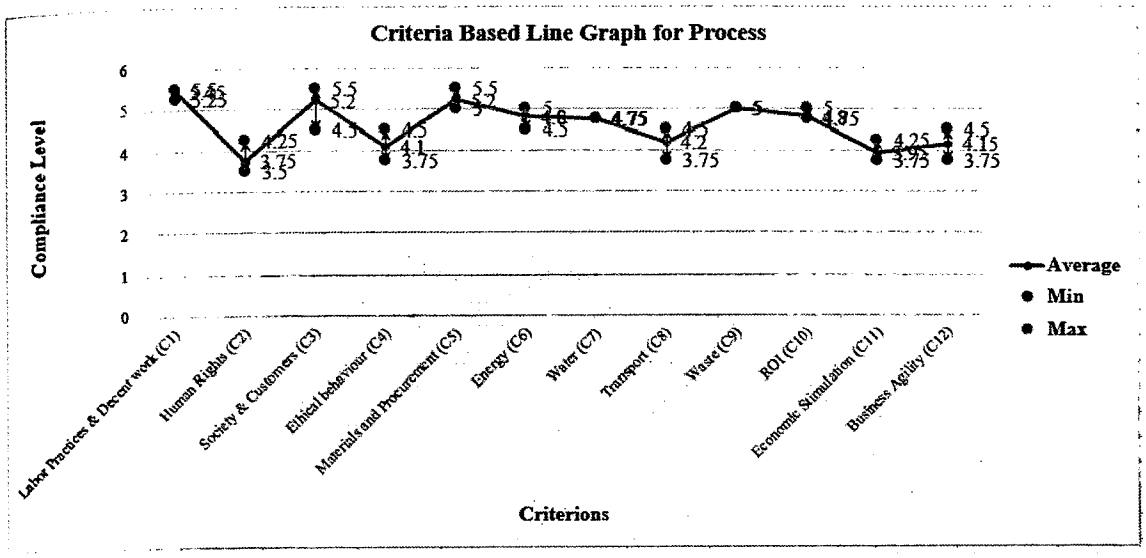

Figure 4.3: Process Line Graph

ii. Product

Graphically, the result in Figure 4.4 shows that there are several criteria having the same value of the gap difference of the understanding about the sustainability assessment in their company scope of the environmental management system. The value of the Ethical & Behaviour from the People portion, Energy from the Planet division and Return of Investment (ROI) along with the Economic Stimulation from the Profit part is 0.8 which is similar to each other.

In contrast from the Process line graph, the gap distinction of understanding in the terms of Product is the superlative one which is zero value by means there is no variance of ideas in the sustainability concept in the Malaysian context industry. Thus, this situation will make the process of reaching the main goals of this research study to be

easier where the lower the gap difference of understanding variation, the better the results of the project study will be achieved.

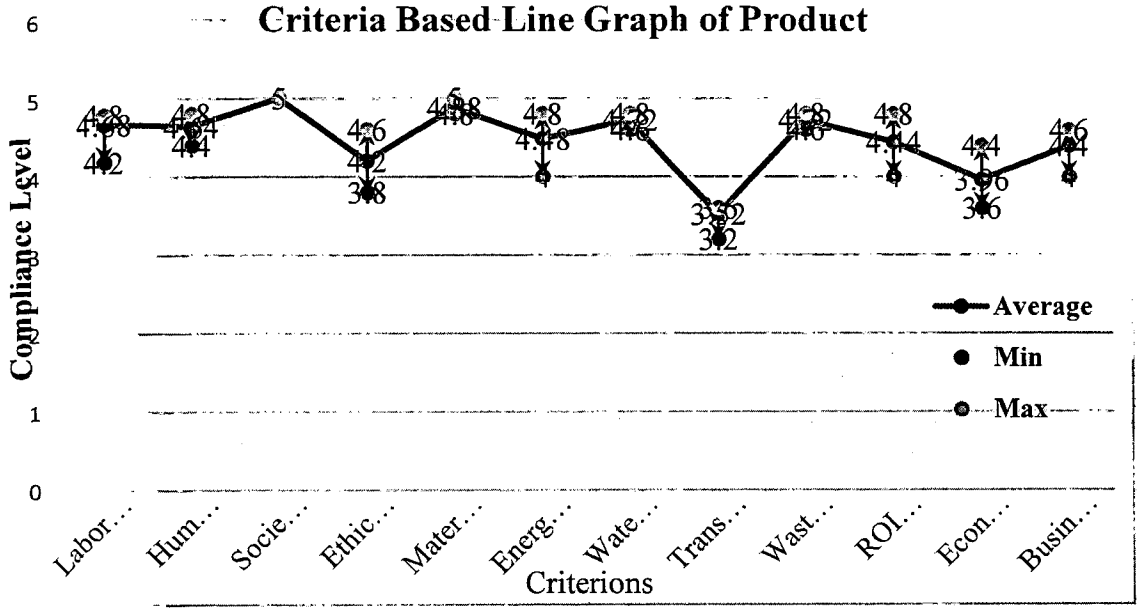

Figure 4.4: Product Line Graph

Moving on to the next part of this topic is the significant value of the standard deviation. The standard deviation can be defined as a numerical value in the units of the observed values that measures the spreading tendency of the data. Hence, the greater the value of the standard deviation at each of the criterion, it will indicates the challenging task in aligning them to the targeted objectives of this study will become harder and vice versa.

Concerning to Process bar graph in the Figure 4.5 below, it represents the standard deviation value according to each criteria from those elements in the sustainability assessment in the declining order. The highest value of the spreading tendency goes to the Society and Customer from the People group by 0.41 which is the highest rate among

others. In addition, there are two types of the criteria from the Planet element which are Water and Waste that are having similar value of the dispersion of the data which indicates zero value. This situation shows that the outcomes from this part are showing such a good quality of sustainability measurement.

In contrast, the overall dispersion of the cumulative data is showing quite an enormous divergence in their understanding level of the sustainability compliance. It can be clearly seen when the disparity between the first highest value of the criteria which are Society and Customer along with the Transport part in the Planet group with the last two criterion which are previously stated is quite a huge difference value. 0.41 value marks that this restraint is compulsory to be reduced or even removed in the future.

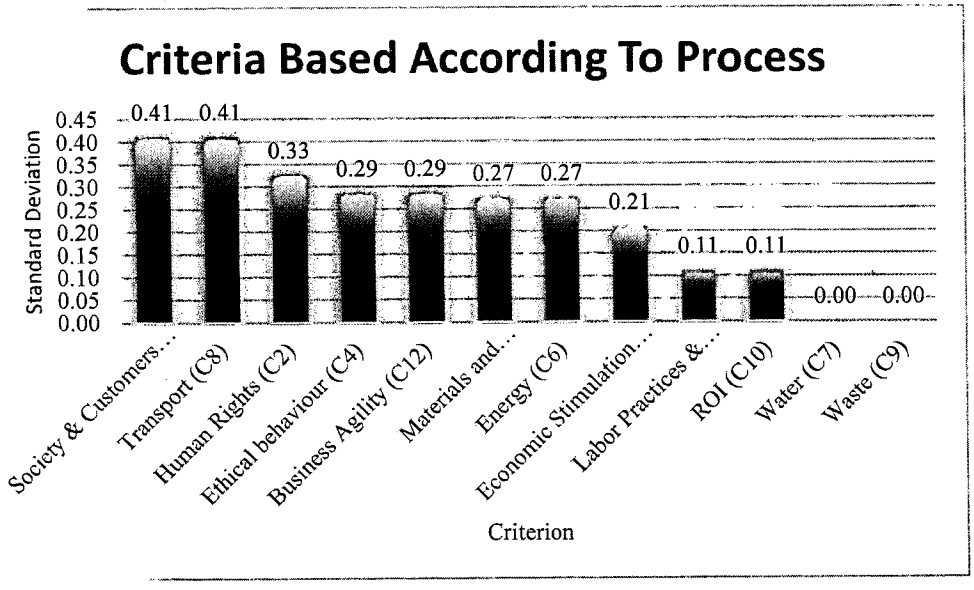

Figure 4.5: Process bar graph illustrating the rank value of the standard deviation.

Continuing to the Product bar graph in Figure 4.6 below, the Energy part which comes from the Planet criteria is laying on the topmost of the ranking. The value of the

spreading tendency from this criteria is 0.33 only. Consequently, the overall overview of the criteria based graph in terms of the Product is portraying a slightly minimal value of the standard deviation obtained from the fromulated data.

In contrast, there is only one criteria in this data that is having zero value of the dispersion data which is Society and Customers that comes from the group of People. It indicates that most of the interpretation from the respondents seems unbalance even though its having lower value of the spreading. Henceforce, the overall observation portraying that there is quite a challenging mission of this research study in order to succeed the goals.

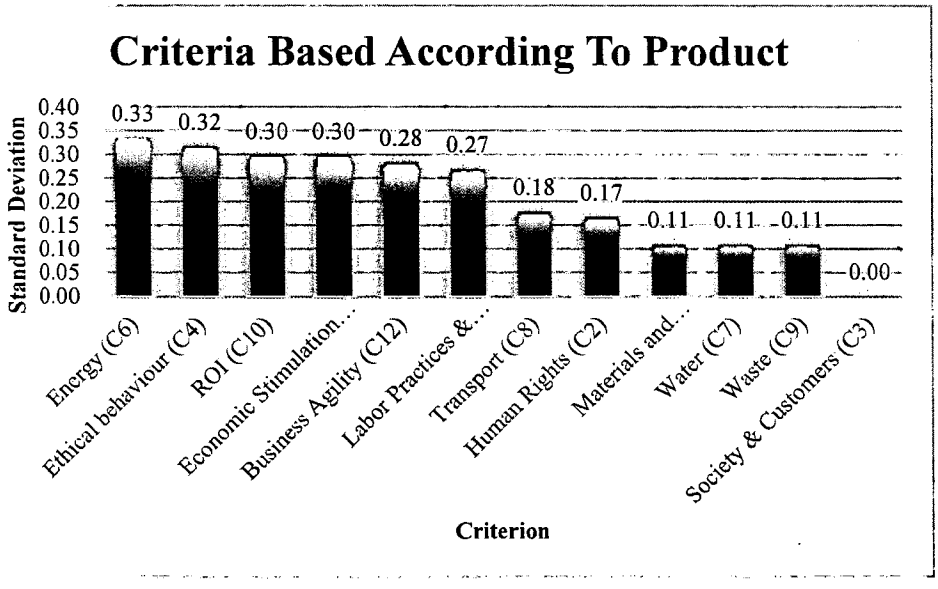

Figure 4.6: Product bar graph illustrating the rank value of the standard deviation.

4.2.4 Process Capability

Process capability analysis is one of the crucial technique that has been used to assist this research study. It is a technique of analysis that will evaluate on how well the process of reaching the purpose of this research converges to the targeted specification level of the sustainability assessment in the environmental management system area. In this type of analysis, it is necessaray to find out the value of the Process Capability, C_p and the value of the Process Capability Index, C_{pk}. In addition, C_p can be defined as the key performance of process where it measure on how well data can fit within the specification limits in the overall of the process meanwhile the C_{pk} measures on how centered the data of the current process between the specification limits.

Here, at this point 25 subgroups of data has been extracted out from the raw data and the value of the C_p and C_{pk} is being computed according to its formula (refer Apendix). The value of the Upper Specification Limit (USL) obtained is 5.36, Lower Specification Limit (LSL) marks on 3.80 along with the mean of the data which is 4.58 and its standard deviation is 0.26. Those important value in constructing the process capability is being mapped in to the line graph in Figure 4.7 and the normal distribution graph in Figure 4.8 below.

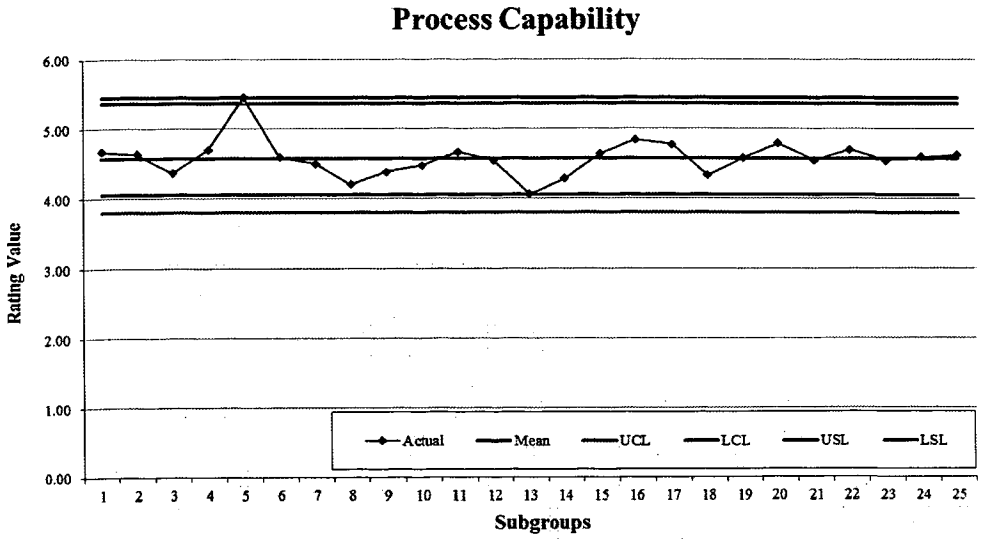

Figure 4.7: Process Capability line graph

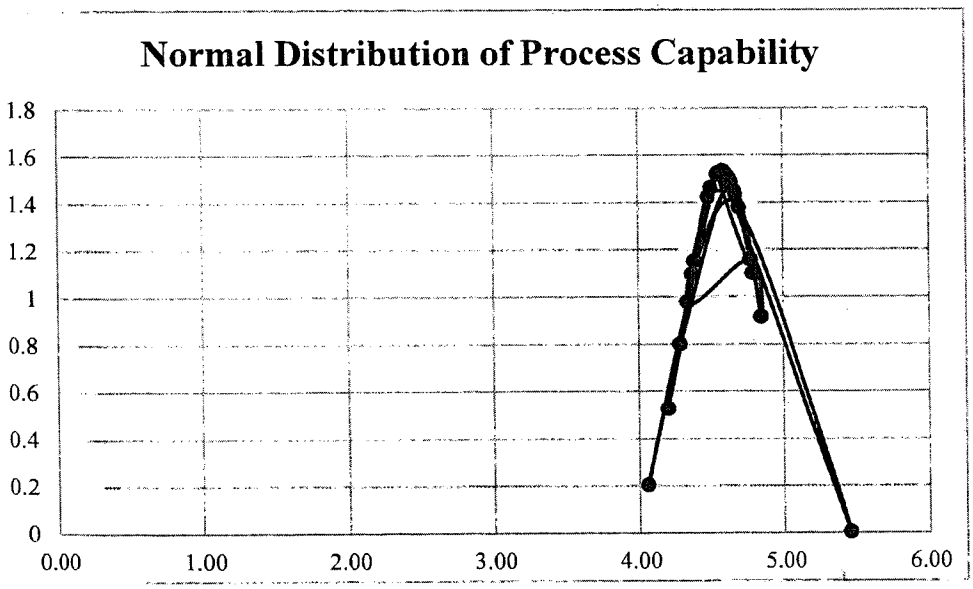

Figure 4.8: Process Capability "bell curve" graph

Aside from that, the calculated C_p and C_{pk} is 0.89 and 0.67 respectively where it indicates that the value of C_{pk} lower than the value of C_p. When the value of the C_{pk} is

less than 1.00, it shows that the process study is producing the results that does not conform to the specifications. Next, the value of the C_p which also less than 1.00 exhibits that the process of the research is still does not capable to achieve the aim of this project study.

The illustration of this graph will depicting on the variation of the respondents' level of knowledgement in the sustainability assessment. They did have the ideas of this "green" practices yet still they are not able to interconnecting the new integrated ideas of combining the five elements of the sustainability into one concept of assessment. Here at this point, it show on how diverse the data obtained from the research questions and it requires a vast improvement strategy to get their ideology toward this sustainability issue to be aligned into the united understanding.

CHAPTER 5

CONCLUSION

5.1 INTRODUCTION

This chapter presents the conclusions this project research and incorporating the potential recommendations for the future study and to improve the quality of this research study. The targeted objectives also will be revised again either it is successive or not according to the attaining results.

5.2 CONCLUSION

Conclusively, this research work is focusing on the sustainability assessment in the environmental management system for Malaysian context of industry. By means, it represents on how to integrate the current assessment for the sustainability concept for the environmental management system especially in the manufacturing field of industry. The existed approaching systems are not still in the deficiency level hence, it acquires a new solution to overcome this recent problems.

In the final analysis, the result performance are already expressed that the sustainability measure in the Malaysian industry are still under the satisfactory level. Attaching the previously stated graph result, the outcomes illustrating that the process capability does not equivalent to the field of research's objectives where the ranking value of the standard deviation that being arrayed in descending order is still showing a high value. The higher the value, the degraded the performance of the results.

Moving on to the process capability "bell curve" graph, the value of the Process Capability, C_p and the value of the Process Capability Index, C_{pk} is below 1.00. Therefore, it emphasizes that the sustainability practices in the environmental management system is still not obeying the comprehensively elements according to the GPM P5 Standard.

Most of the respondents that involve in this project research are having diverge of understanding about the sustainability compliance. Furthermore, their ideas towards this assessment are only restricted on the existed sustainability tool of measure which it does not comprises of the product and the process elements. Since the new integrated sustainability system aproach is introducing the five components into the assessment, the outcomes will surely across-the-board of the current assessment in the sustainability practices.

In addition, it will helps to fill the knowledge gap towards the sustainability compliance concept and provides new opportunities for further studies. Hopefully, the findings of this study will become a benchmarking purposes and as a point of references for the identifications in Malaysian industry especially in the environmental management system.

5.3 RECOMMENDATIONS FOR THE FUTURE RESEARCH

Due to the nature of the research study, a number of limitations were appeared to happened when interpreting the results presented and the conclusions that drawn at the end of this project. Several number of suggestions that will enhance the quality of this field of study are listed below:

iii. The outcomes of this study should be revised again if it does not achieved the satisfactory level of assessment. By means, the feedback result should be transmitted back to the company for further revision of improvements.

iv. The quality of the performance capability process must be modified back by enhancing the quality value of its standard deviation. An alteration on the dispersion understanding towards the sustainability assessment in the scope of study will gives an enormous consequence in the future outcomes.

v. Generating a new quantification formula like a mathematical regression model will surely becoming such a superior strategy in order to be implemented for another five to ten years future.

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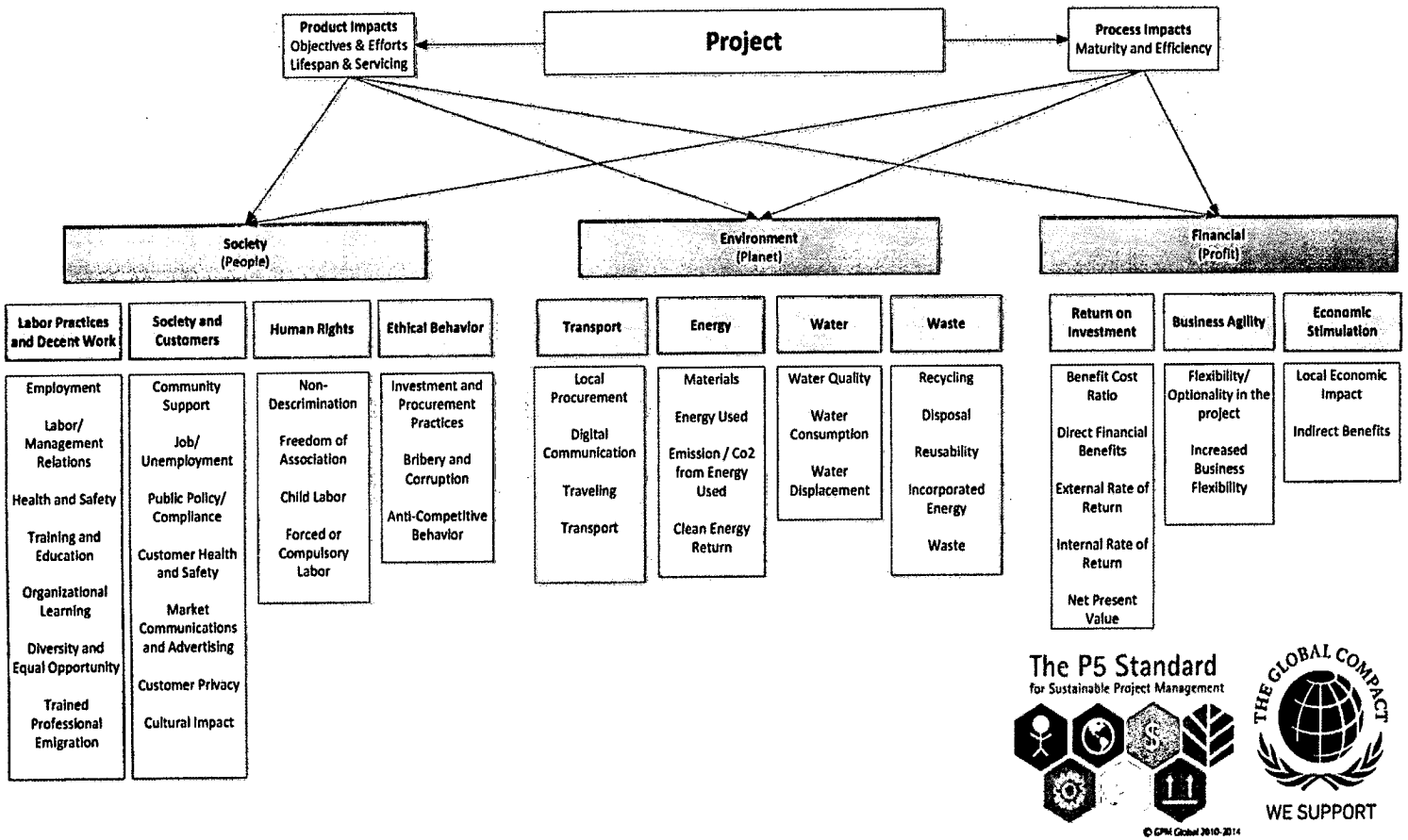
APPENDIX A

APPENDIX A1: The Green Project Management (GPM) P5 Matrix



APPENDIX A2: Scoring Data of Production Department

P5 Impact Worksheet V2.0

Project Name

Project Manager

Category	People				Planet					Profit		
	Labor Practices & Decent work	*Human Rights*	*Society & Customers*	*Ethical behaviour*	*Materials and Procuremen*	*Energy*	*Water*	*Transport*	*Waste*	*ROI*	*Economic Stimulation*	*Business Agility*
Product												
Environment	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-1	-2
Safety	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
Health	-2	-2	-2	-2	-2	-2	-2	0	-2	0	-1	-2
Lifespan	-1	-1	-2	0	-2	1	-1	2	-1	-1	1	0
Dual-Focus	2	-1	-1	0	-1	-1	-1	0	-1	-2	-1	-1
	0	0	0	0	0	0	0	0	0	0	0	0
Process												
Environment	-2	0	-2	0	-2	-2	-2	-2	-2	-2	0	-1
Safety	-3	-3	-3	-2	-2	-2	-2	-1	-2	-2	-1	-1
Health	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2
Work-In-Process	-2	0	-2	-1	-2	0	-1	-1	-2	-2	-1	0

APPENDIX A3: Scoring Data of Production (Assembly) Department

P5 Impact Worksheet v2.0

Project Name_____

Project Manager_____

Category	People				Planet					Profit		
	Labor Practices & Decent work	*Human Rights*	*Society & Customers*	*Ethical behaviour*	*Materials and Procuremen*	*Energy*	*Water*	*Transport*	*Waste*	*ROI*	*Economic Stimulation*	*Business Agility*
Product												
Environment	-2	-2	-2	-2	-2	-2	-2	-1	-2	-2	-1	-2
Safety	-3	-2	-3	-2	-2	-1	-2	-1	-2	-1	-1	0
Health	-2	-1	-2	-1	-2	-2	-2	0	-2	-1	-1	-2
Lifespan	-1	-1	-2	0	-2	-1	-1	-1	-1	-1	0	-1
Dual-Focus	-1	-1	-1	0	-1	-1	-1	0	-1	-2	-1	-1
	0	0	0	0	0	0	0	0	0	0	0	0
Process												
Environment	-2	0	-2	0	-2	-2	-2	-1	-2	-2	0	-1
Safety	-3	-1	-3	-2	-2	-2	-2	-1	-2	-2	-1	-1
Health	-3	-1	-3	-1	-2	-2	-2	0	-2	-1	-1	-1
Work-In-Process	-2	0	-2	-1	-2	0	-1	-1	-2	-2	-1	0

APPENDIX A4: Scoring Data of Technical Department

P5 Impact Worksheet v2.0

Project Name_____

Project Manager

Category	People				Planet					Profit		
	Labor Practices & Decent work	*Human Rights*	*Society & Customers*	*Ethical behaviour*	*Materials and Procuremen*	*Energy*	*Water*	*Transport*	*Waste*	*ROI*	*Economic Stimulation*	*Business Agility*
Product												
Environment	-2	-2	-2	-1	-2	-2	-2	-1	-2	0	-1	-2
Safety	-3	-2	-3	-2	-2	-1	-2	-1	-2	-1	-1	0
Health	-2	-2	-2	-2	-2	-2	-2	1	-2	-1	-1	-2
Lifespan	-1	-1	-2	0	-2	1	-1	0	-1	-1	1	0
Dual-Focus	-1	-1	-1	-1	-1	-1	-1	0	-1	-2	-1	-1
	0	0	0	0	0	0	0	0	0	0	0	0
Process												
Environment	-2	-1	-2	0	-2	-2	-2	-2	-2	-2	0	-1
Safety	-3	-1	-3	-2	-3	-2	-2	-1	-2	-2	-1	-1
Health	-3	-1	-2	-1	-1	-2	-2	-2	-2	-1	-1	-2
Work-In-Process	-2	-1	-2	-1	-2	-2	-1	-1	-2	-2	-1	-1

APPENDIX A5: Scoring Data of Environmental Quality Department

P5 Impact Worksheet V2.0

Project Name _____

Project Manager

	People				Planet					Profit		
Category	*Labor Practices & Decent work*	*Human Rights*	*Society & Customers*	*Ethical behaviour*	*Materials and Procuremen*	*Energy*	*Water*	*Transport*	*Waste*	*ROI*	*Economic Stimulation*	*Business Agility*
Product												
Environment	-2	-2	-2	-1	-2	-2	-2	-1	-2	-1	-1	-2
Safety	-3	-2	-3	-2	-3	-3	-3	-1	-3	-1	-1	-1
Health	-2	-2	-2	-2	-2	-2	-2	0	-2	-1	-1	-2
Lifespan	-1	-1	-2	-2	-2	-1	-1	-1	-1	-2	-1	-2
Dual-Focus	-1	-1	-1	-1	-1	-1	-1	0	-1	-2	-1	-1
	0	0	0	0	0	0	0	0	0	0	0	0
Process												
Environment	-2	-1	-2	-1	-2	-2	-2	-2	-2	-2	-1	-1
Safety	-3	-1	-3	-2	-3	-2	-2	-1	-2	-2	-1	-1
Health	-3	-2	-3	-2	-3	-2	-2	-2	-2	-1	-1	-2
Work-In-Process	-2	-1	-2	-1	-2	-2	-1	-1	-2	-2	-1	-1

APPENDIX A6: Scoring Data of Quality Department

P5 Impact Worksheet V2.0

Project Name _____

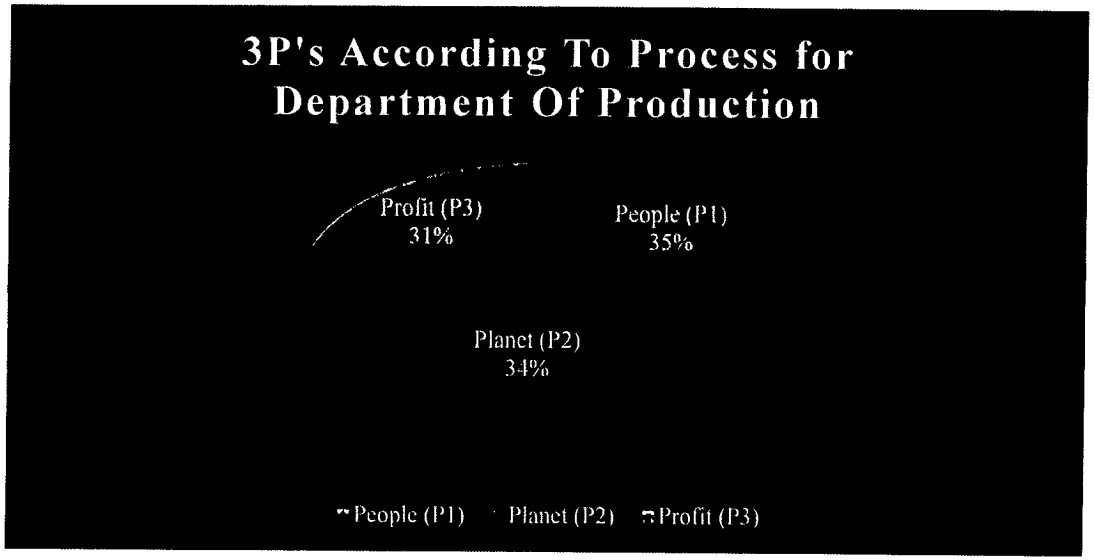
Project Manager _____

Category	People				Planet					Profit		
	Labor Practices & Decent work	*Human Rights*	*Society & Customers*	*Ethical behaviour*	*Materials and Procuremen*	*Energy*	*Water*	*Transport*	*Waste*	*ROI*	*Economic Stimulation*	*Business Agility*
Product												
Environment	-2	-2	-2	-1	-2	-2	-2	-1	-2	-2	-2	-2
Safety	-3	-3	-3	-2	-3	-2	-3	-2	-3	-2	-2	-1
Health	-2	-2	-2	-2	-2	-2	-2	0	-2	-1	-1	-2
Lifespan	-1	-1	-2	0	-2	-2	-1	0	-1	-2	-1	-2
Dual-Focus	-1	-1	-1	1	-1	-1	-1	0	-1	-2	-1	-1
	0	0	0	0	0	0	0	0	0	0	0	0
Process												
Environment	-2	-1	-2	-1	-2	-2	-2	-2	-2	-2	-1	-1
Safety	-3	-3	-3	-2	-3	-2	-2	-1	-2	-2	-1	-1
Health	-3	-2	-3	-1	-3	-2	-2	1	-2	-1	-1	-2
Work-In-Process	-2	1	2	1	-2	-2	-1	-1	-2	-2	-2	-2

APPENDIX B

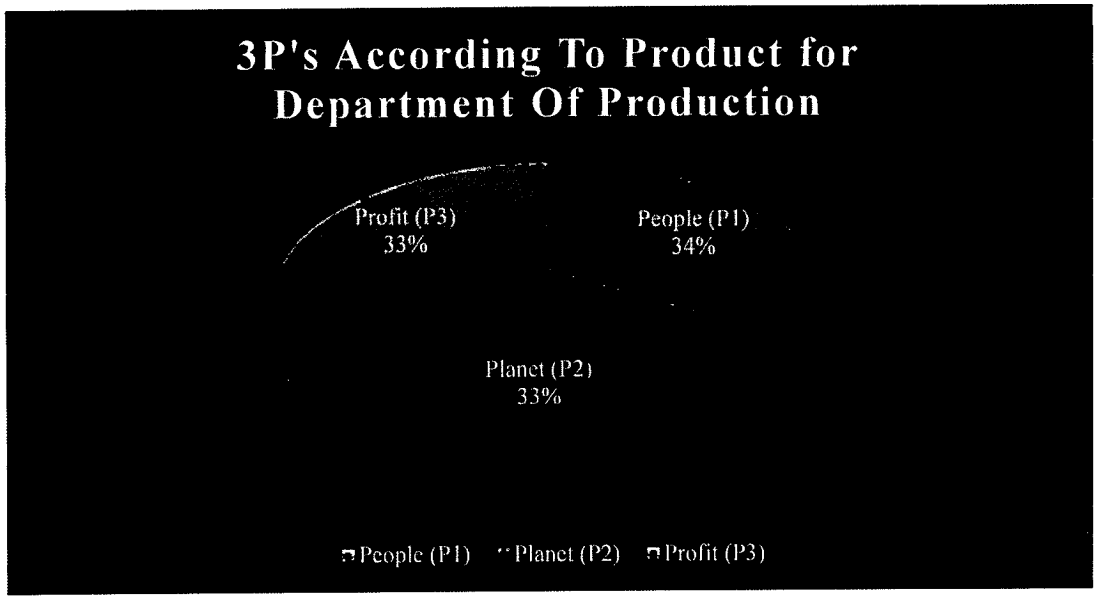
APPENDIX B1: Pie Chart of Production Department

3P's According To Process for Department Of Production		
People (P1)	Planet (P2)	Profit (P3)
4.75	4.75	4.3333



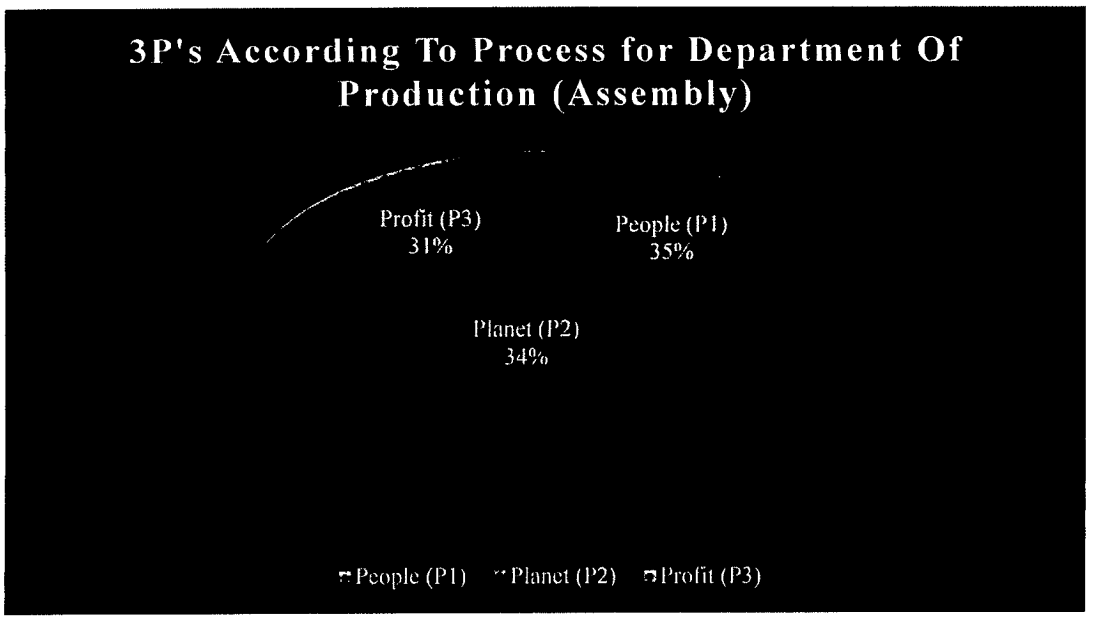
APPENDIX B1: (Continued)

3P's According To Product for Department Of Production		
People (P1)	Planet (P2)	Profit (P3)
4.6	4.52	4.4



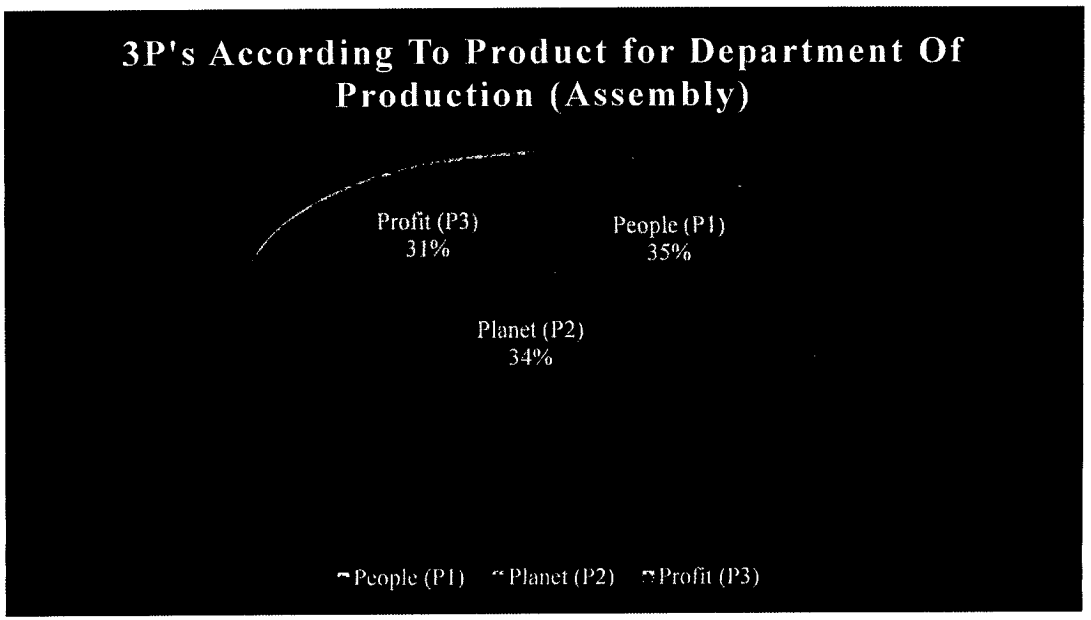
APPENDIX B2: Pie Chart of Production (Assembly) Department

3P's According To Process for Department Of Production (Assembly)		
People (P1)	Planet (P2)	Profit (P3)
4.625	4.6	4.0833



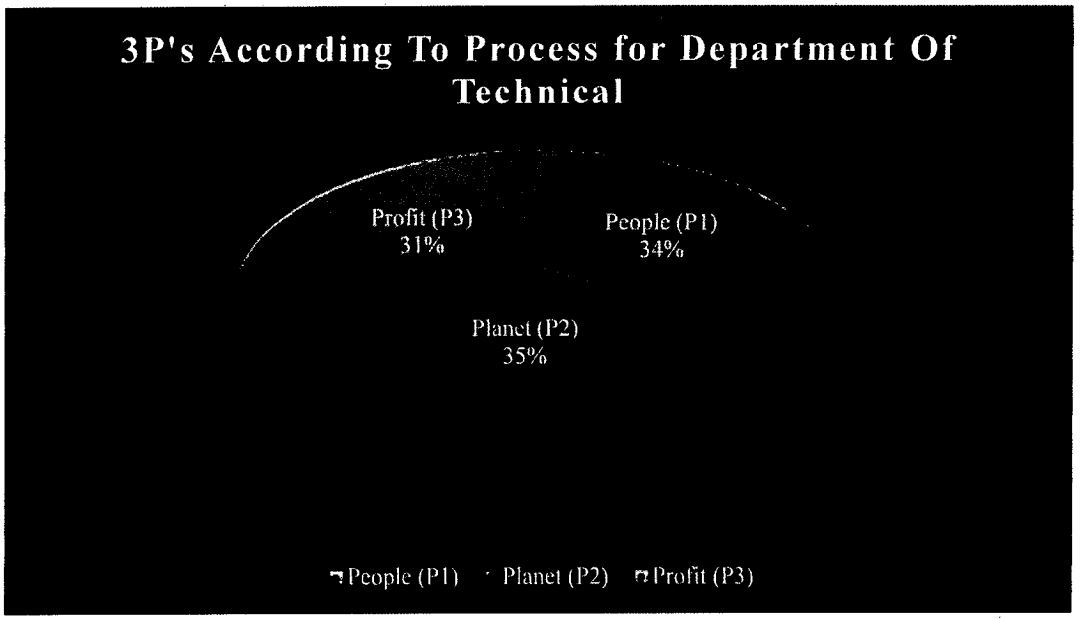
APPENDIX B2: (Continued)

3P's According To Product for Department Of Production (Assembly)		
People (P1)	Planet (P2)	Profit (P3)
4.55	4.4	4.1338



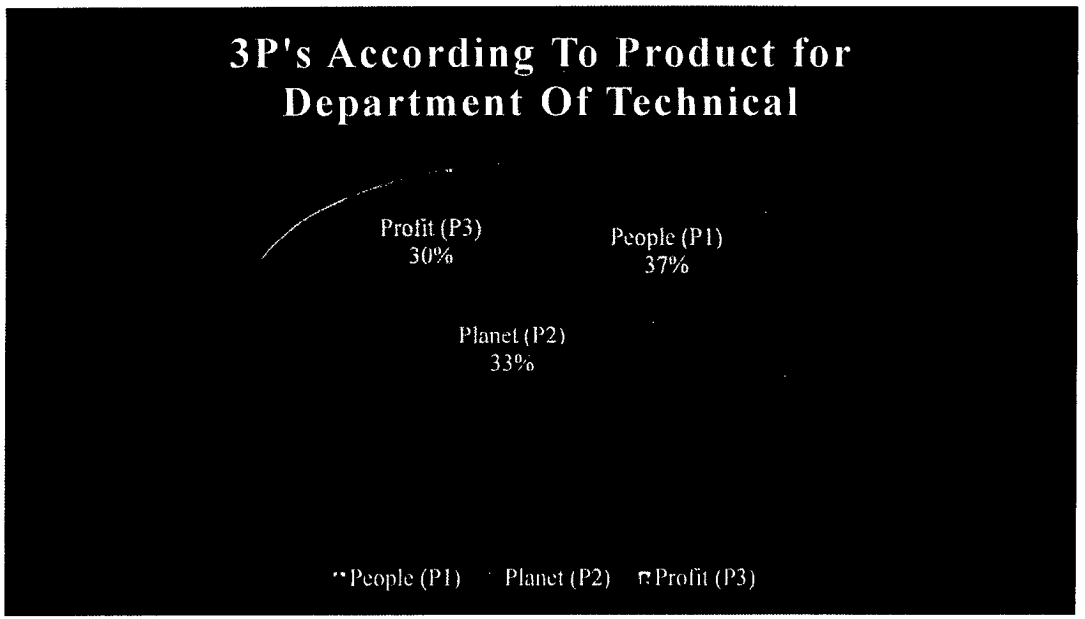
APPENDIX B3: Pie Chart of Technical Department

3P's According To Process for Department Of Technical		
People (P1)	Planet (P2)	Profit (P3)
4.6875	4.85	4.25



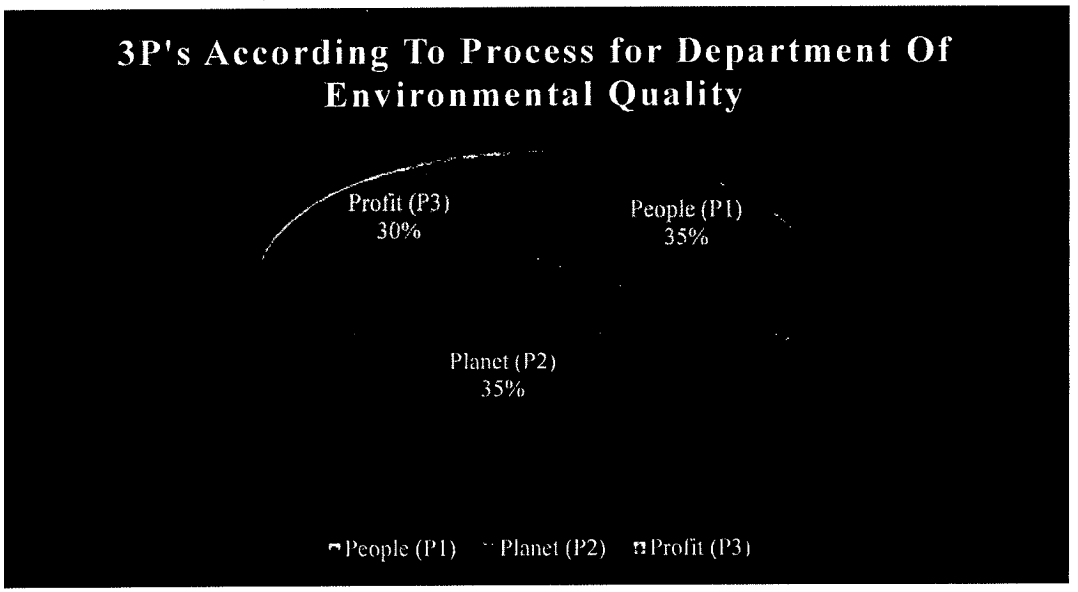
APPENDIX B3: (Continued)

3P's According To Product for Department Of Technical		
People (P1)	Planet (P2)	Profit (P3)
4.65	4.24	3.8667



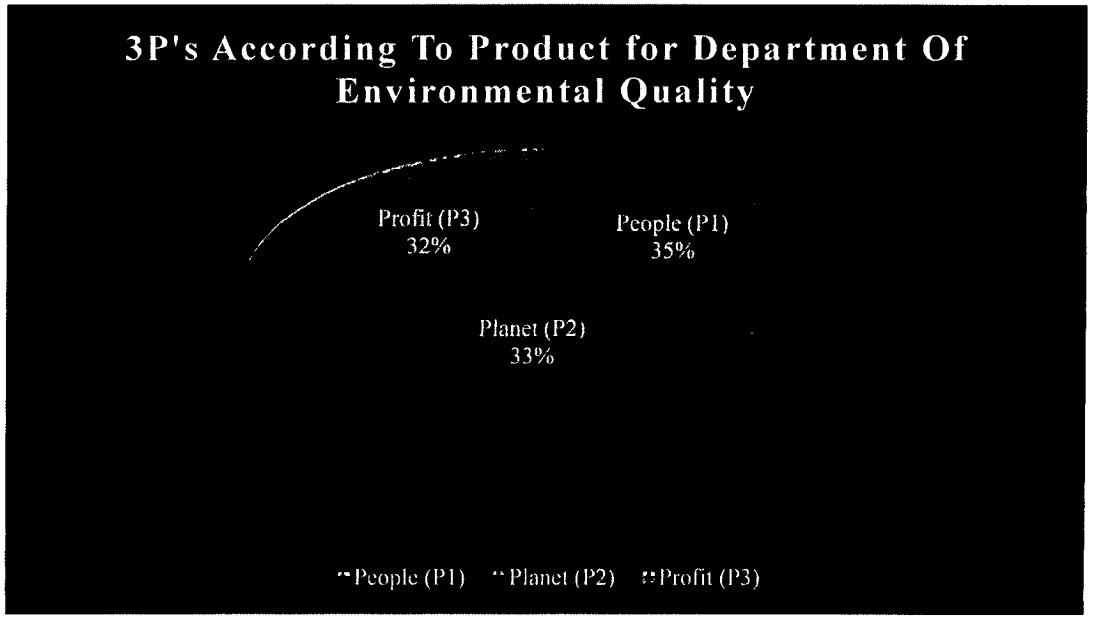
APPENDIX B4: Pie Chart of Environmental Quality Department

3P's According To Process for Department Of Environmental Quality		
People (P1)	Planet (P2)	Profit (P3)
4.9375	4.95	4.3333



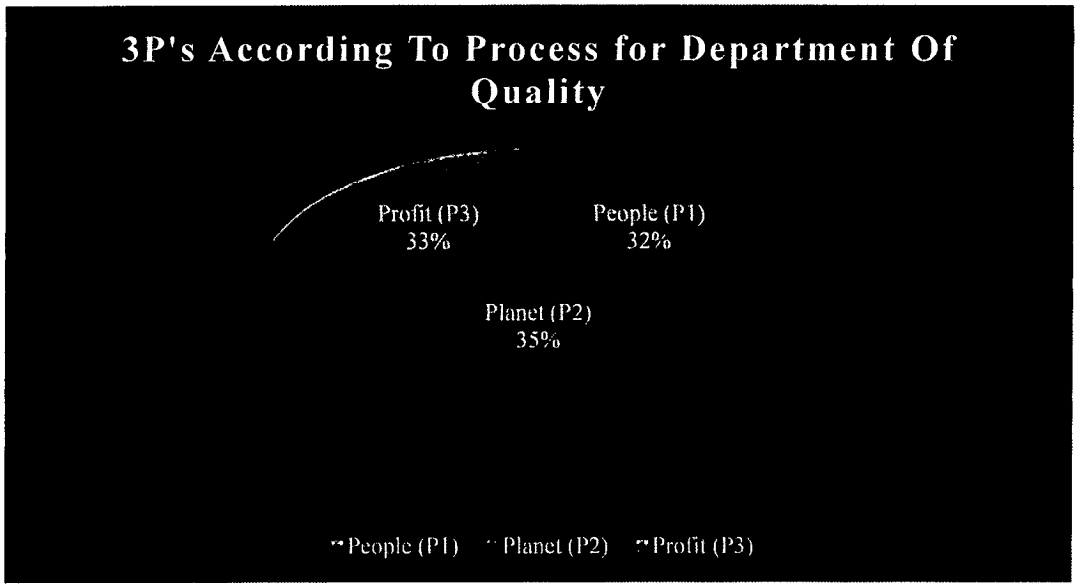
APPENDIX B4: (Continued)

3P's According To Product for Department Of Environmental Quality		
People (P1)	Planet (P2)	Profit (P3)
4.9375	4.95	4.3333



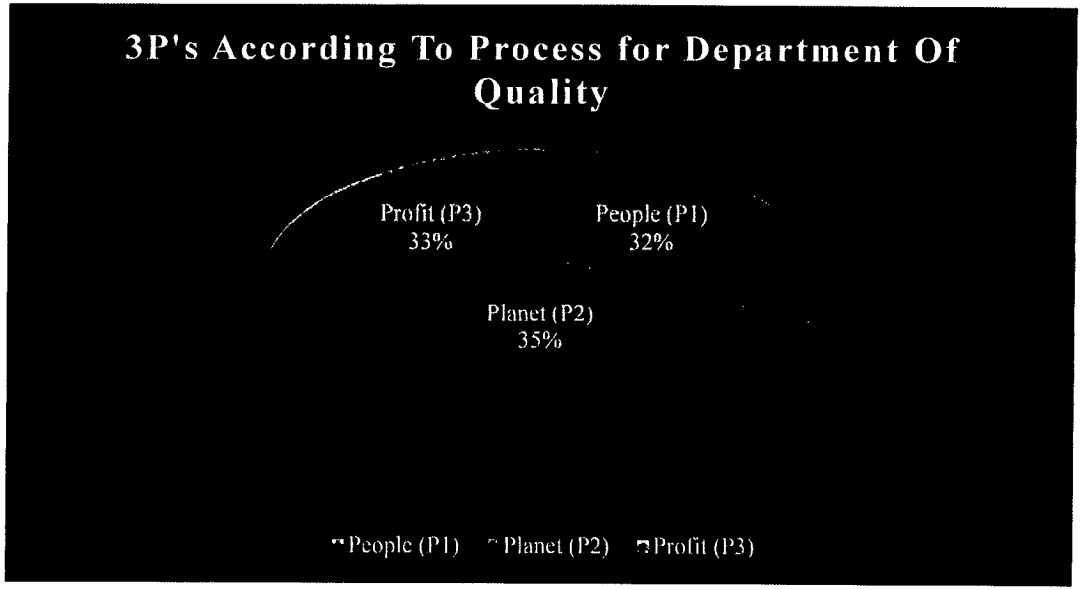
APPENDIX B5: Pie Chart of Quality Department

3P's According To Process for Department Of Quality		
People (P1)	Planet (P2)	Profit (P3)
4.5	4.8	4.5



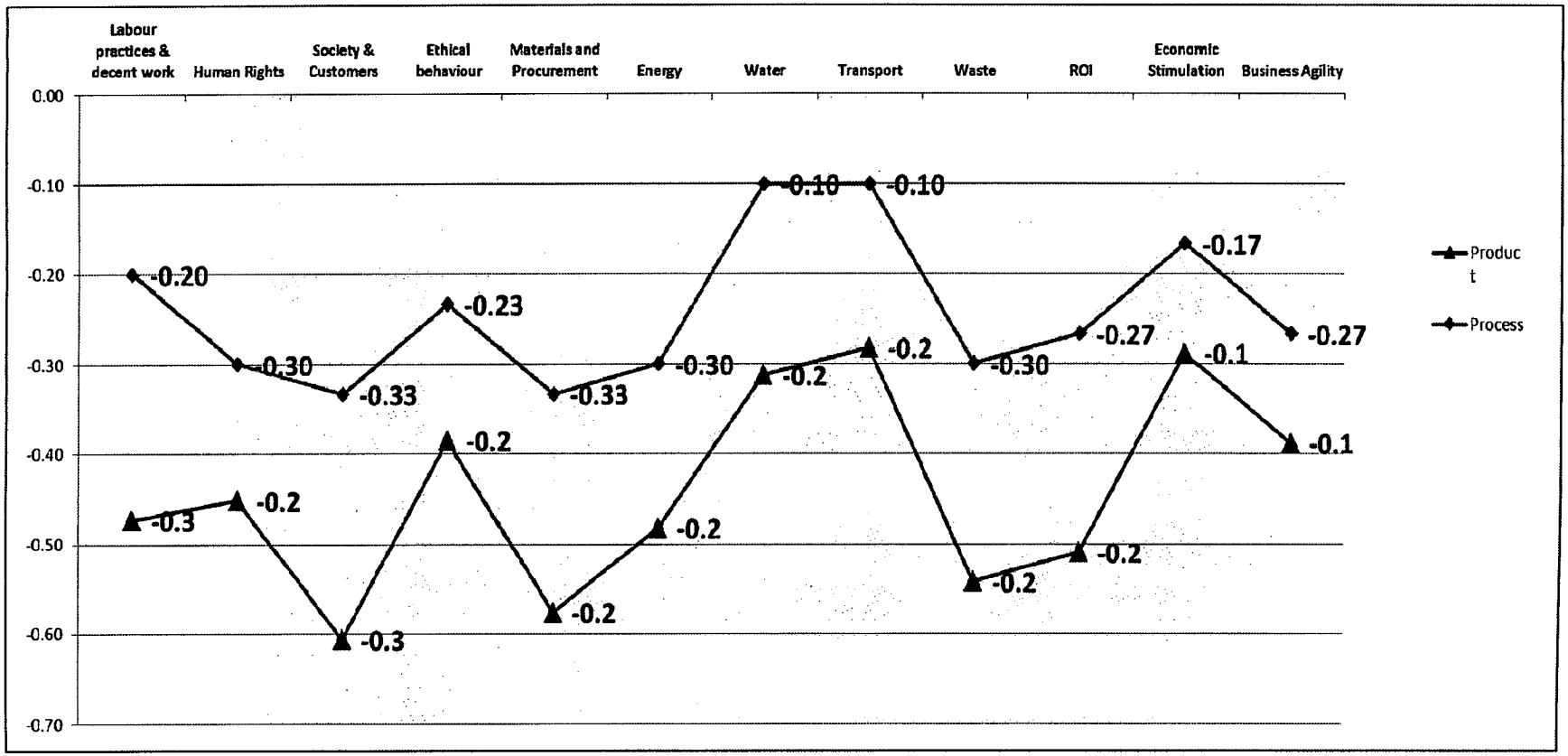
APPENDIX B5: (Continued)

3P's According To Process for Department Of Quality		
People (P1)	Planet (P2)	Profit (P3)
4.5	4.8	4.5

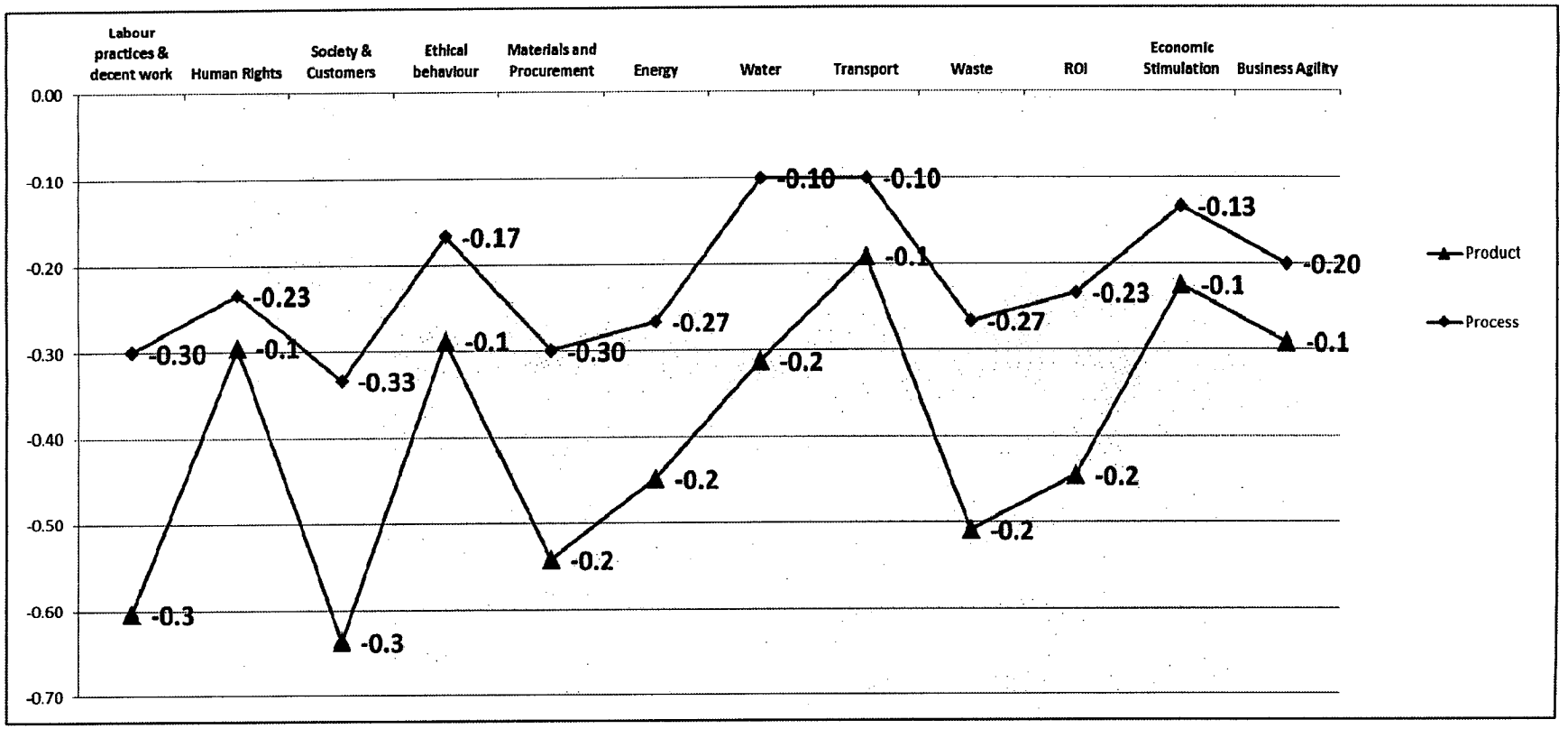


APPENDIX C

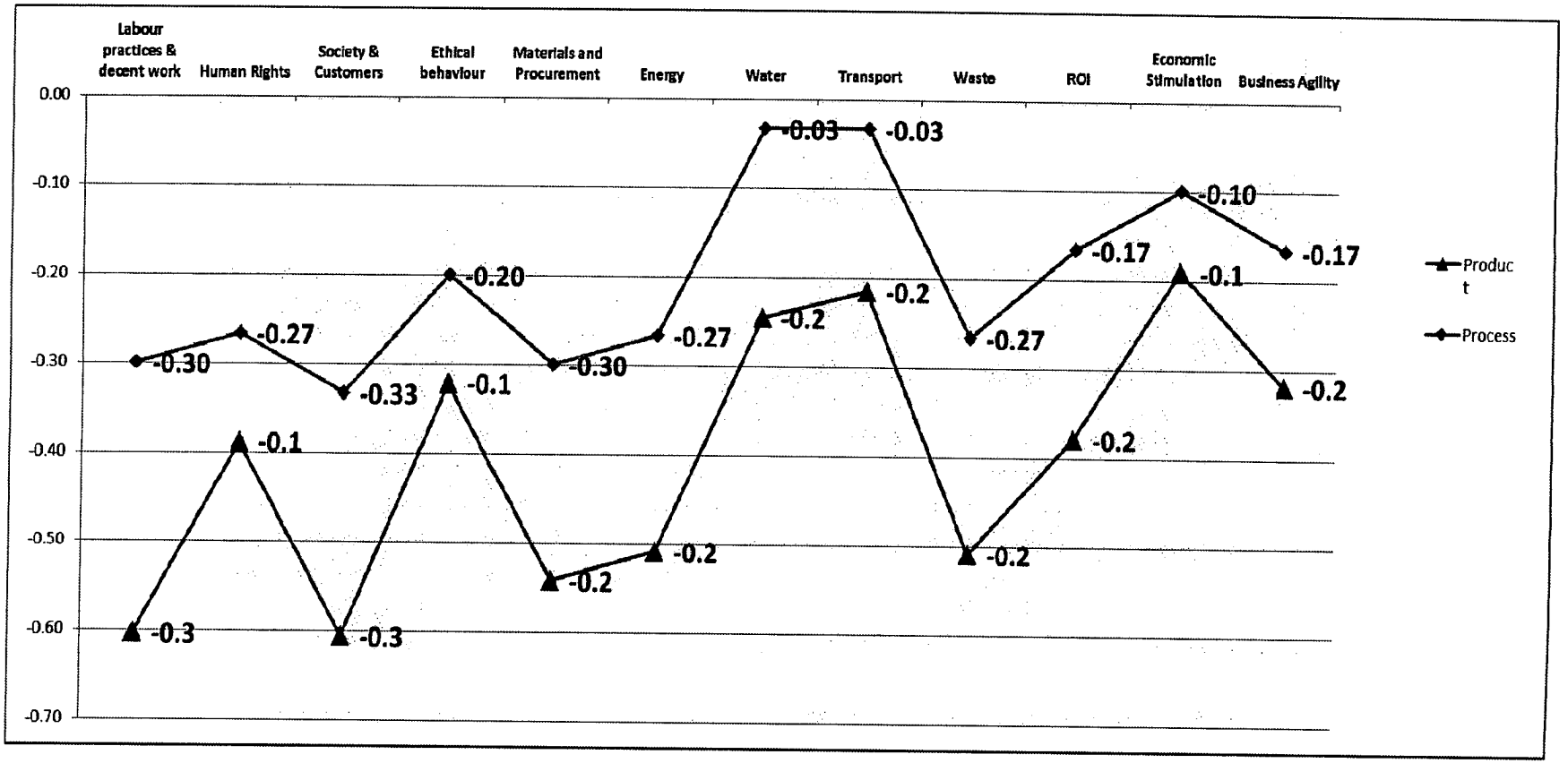
APPENDIX C1: Impacts by Category of Production Department



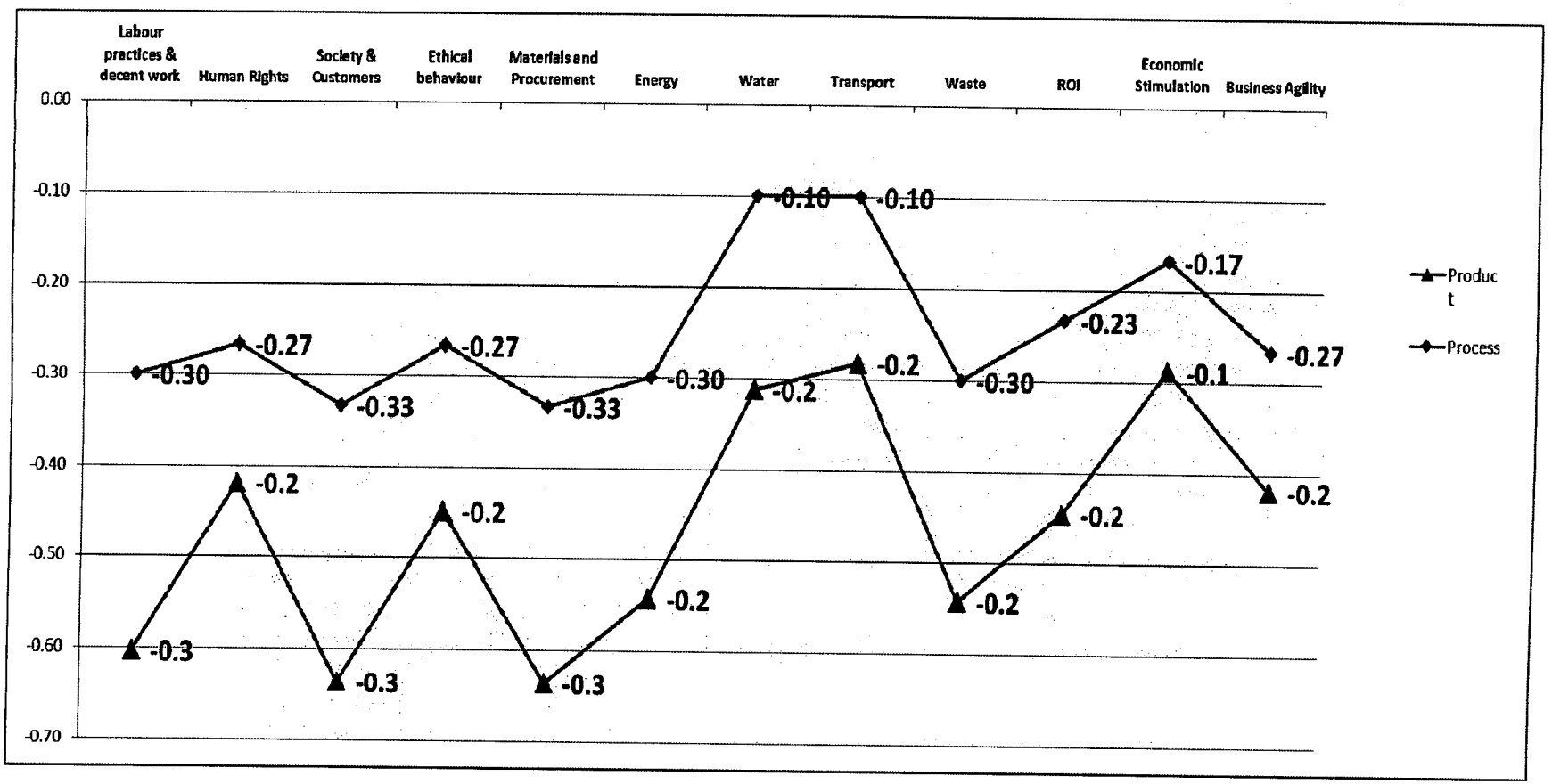
APPENDIX C2: Impacts by Category of Production (Assembly) Department



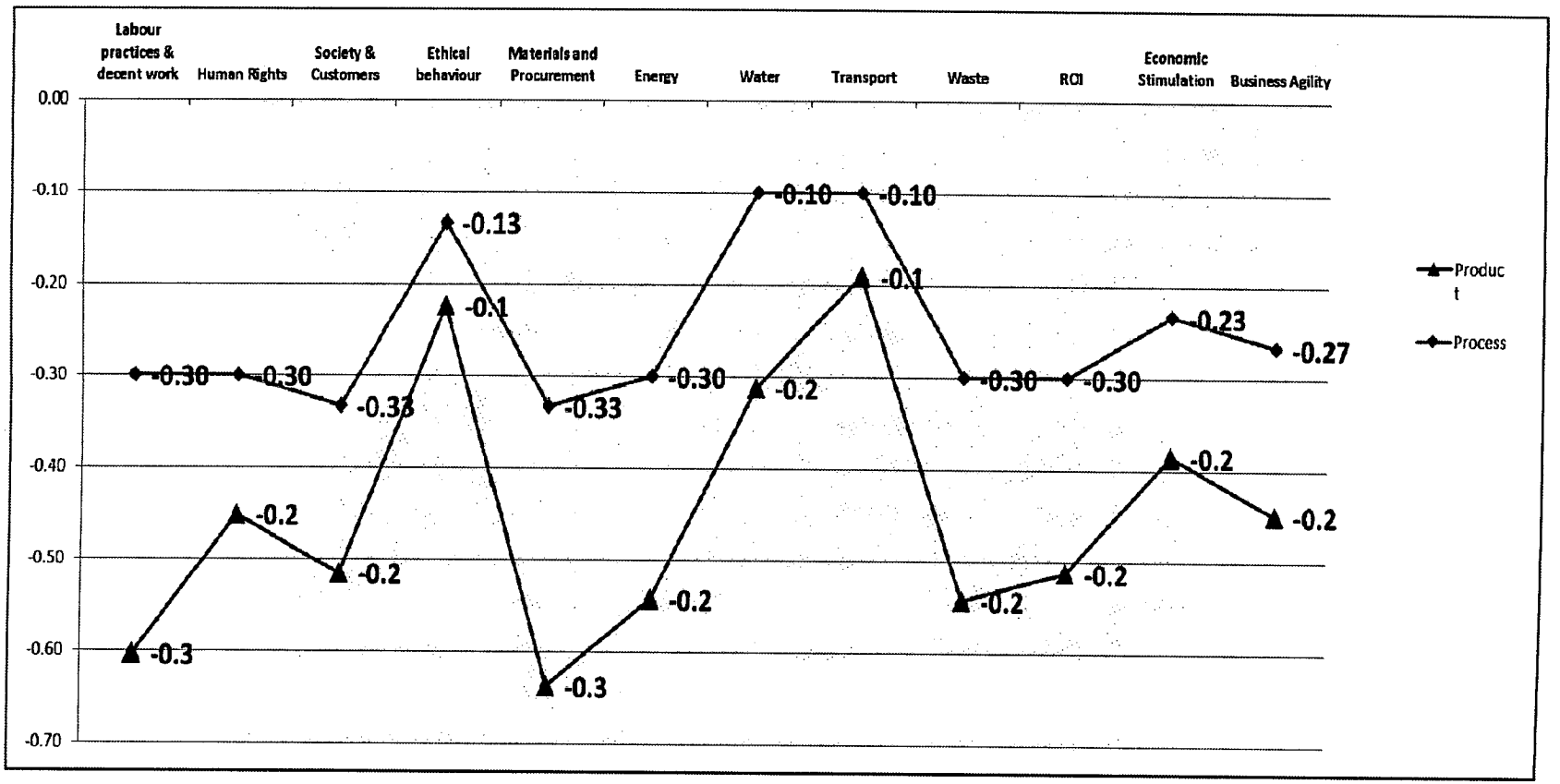
APPENDIX C3: Impacts by Category of Technical Department



APPENDIX C4: Impacts by Category of Environmental Quality Department



APPENDIX C4: Impacts by Category of Quality Department

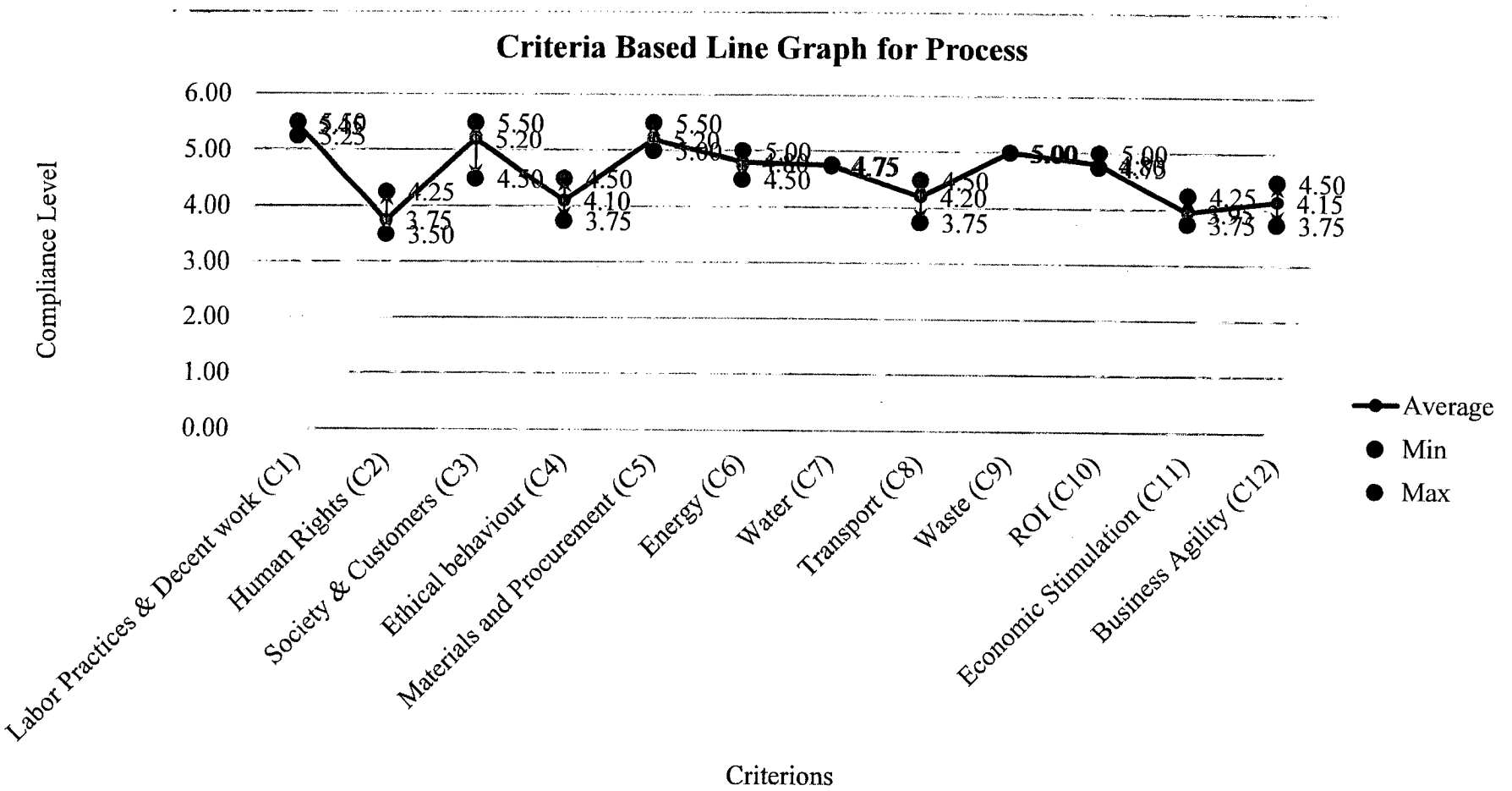


APPENDIX D

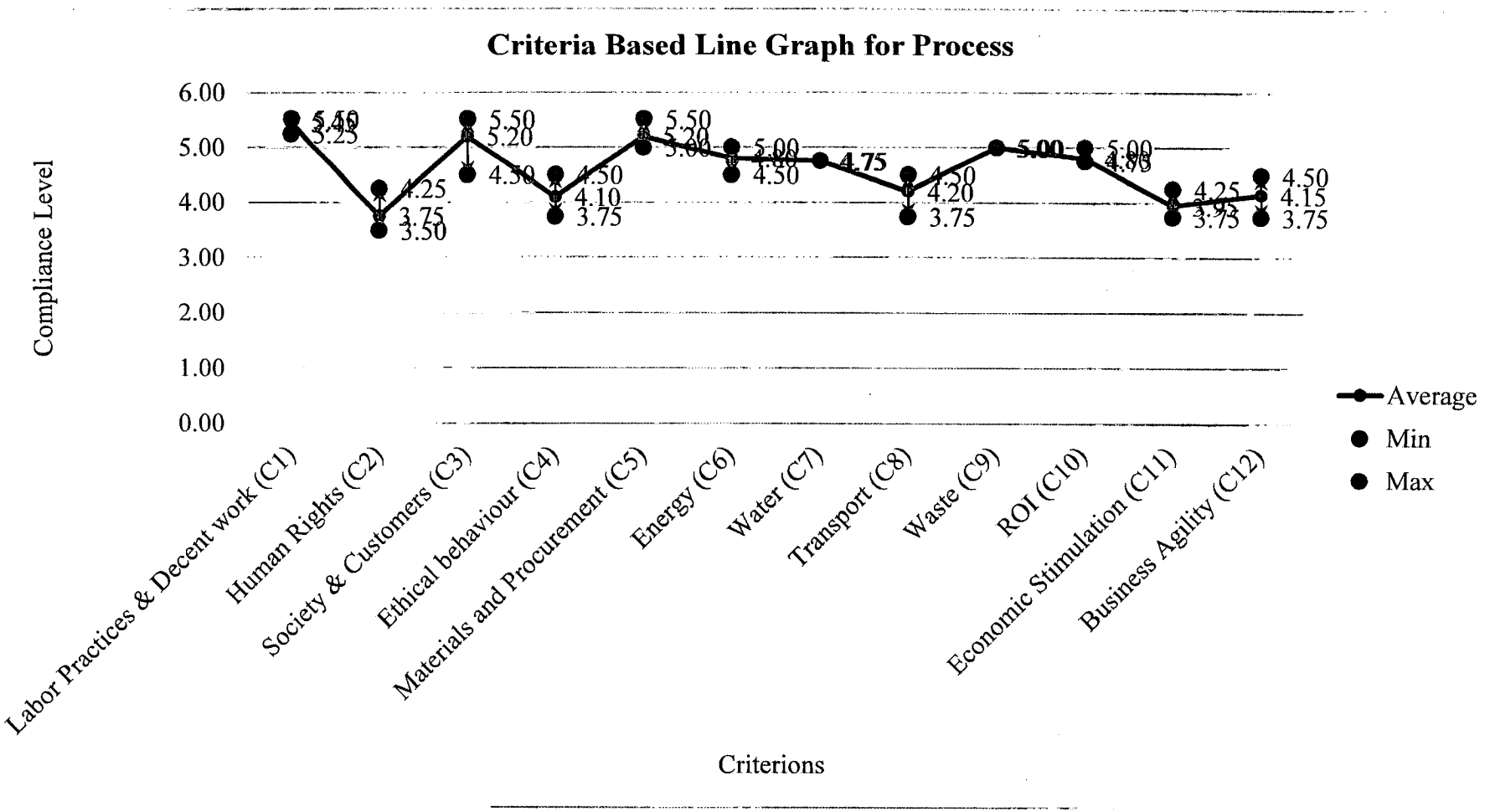
APPENDIX D1: Process Line Graph

PROCESS												
	People (P1)				Planet (P2)					Profit		
Criteria	Labor Practices & Decent work (C1)	Human Rights (C2)	Society & Customers (C3)	Ethical behaviour (C4)	Materials and Procurement (C5)	Energy (C6)	Water (C7)	Transport (C8)	Waste (C9)	ROI (C10)	Economic Stimulation (C11)	Business Agility (C12)
Dept 1	5.25	4.25	5.25	4.25	5.00	4.50	4.75	4.50	5.00	5.00	4.00	4.00
Dept 2	5.50	3.50	5.50	4.00	5.00	4.50	4.75	3.75	5.00	4.75	3.75	3.75
Dept 3	5.50	4.00	5.25	4.00	5.00	5.00	4.75	4.50	5.00	4.75	3.75	4.25
Dept 4	5.50	4.25	5.50	4.50	5.50	5.00	4.75	4.50	5.00	4.75	4.00	4.25
Dept 5	5.50	4.25	4.50	3.75	5.50	5.00	4.75	3.75	5.00	4.75	4.25	4.50
Average	5.45	3.75	5.20	4.10	5.20	4.80	4.75	4.20	5.00	4.80	3.95	4.15
Min		3.50	4.50	3.75	5.00	4.50	4.75	3.75	5.00	4.75	3.75	3.75
Max		4.25	5.50	4.50	5.50	5.00	4.75	4.50	5.00	5.00	4.25	4.50
STDEV		0.33	0.41	0.29	0.27	0.27	0.00	0.41	0.00	0.11	0.21	0.29
Diff		0.75	1.00	0.75	0.50	0.50	0.00	0.75	0.00	0.25	0.50	0.75

APPENDIX D1: (Continued)



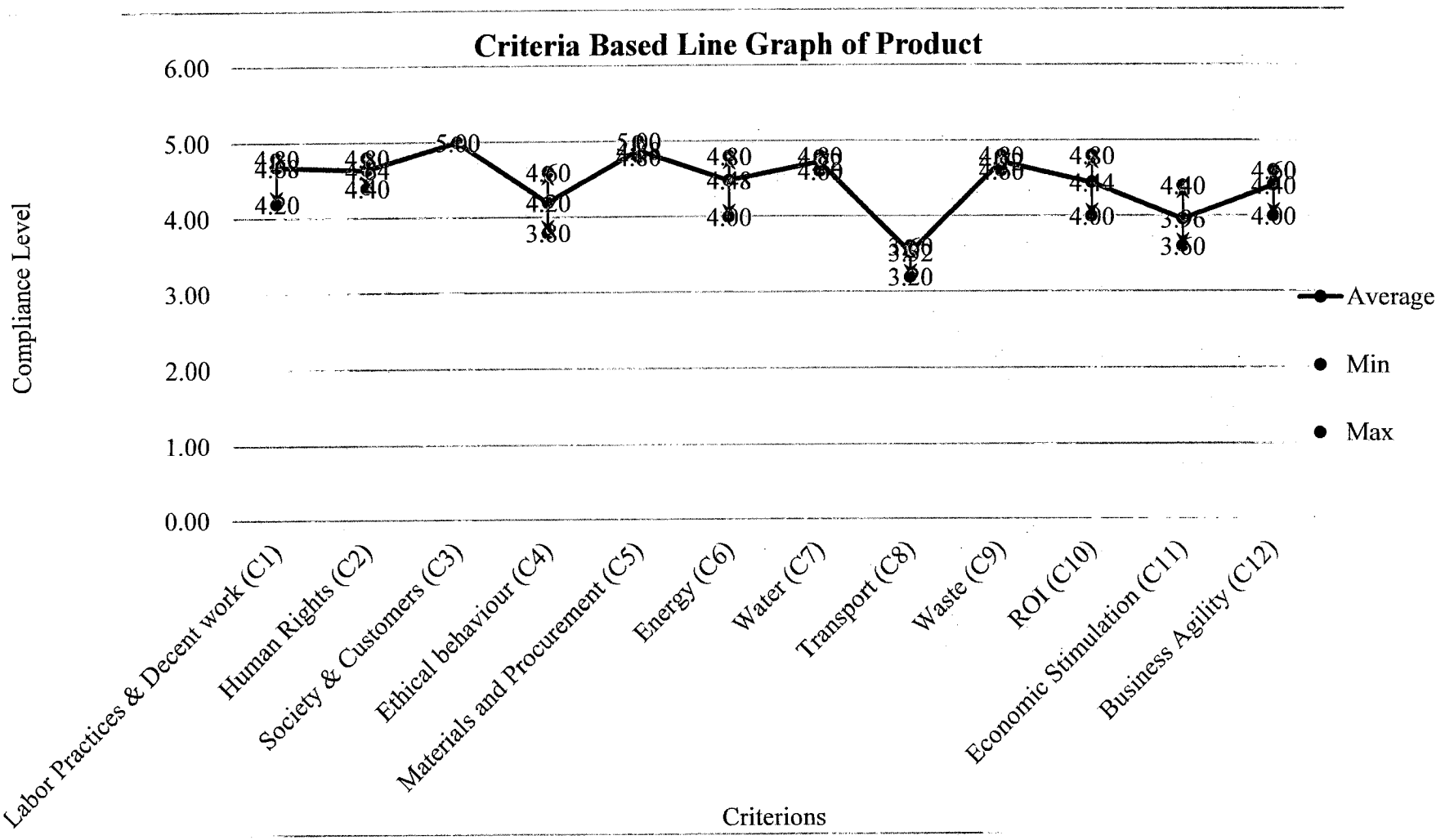
APPENDIX D1: (Continued)



APPENDIX D2: Product Line Graph

PRODUCT												
	People (P1)				Planet (P2)					Profit		
Criteria	Labor Practices & Decent work (C1)	Human Rights (C2)	Society & Customers (C3)	Ethical behaviour (C4)	Materials and Procurement (C5)	Energy (C6)	Water (C7)	Transport (C8)	Waste (C9)	ROI (C10)	Economic Stimulation (C11)	Business Agility (C12)
Dept 1	4.20	4.80	5.00	4.40	5.00	4.40	4.80	3.60	4.80	4.60	4.00	4.60
Dept 2	4.80	4.40	5.00	4.00	4.80	4.40	4.60	3.60	4.60	4.40	3.80	4.20
Dept 3	4.80	4.60	5.00	4.20	4.80	4.00	4.60	3.20	4.60	4.00	3.60	4.00
Dept 4	4.80	4.60	5.00	4.60	5.00	4.80	4.80	3.60	4.80	4.40	4.00	4.60
Dept 5	4.80	4.80	5.00	3.80	4.80	4.80	4.80	3.60	4.80	4.80	4.40	4.60
Average	4.68	4.64	5.00	4.20	4.88	4.48	4.72	3.52	4.72	4.44	3.96	4.40
Min	4.20	4.40	5.00	3.80	4.80	4.00	4.60	3.20	4.60	4.00	3.60	4.00
Max	4.80	4.80	5.00	4.60	5.00	4.80	4.80	3.60	4.80	4.80	4.40	4.60
STDEV	0.27	0.17	0.00	0.32	0.11	0.33	0.11	0.18	0.11	0.30	0.30	0.28
Diff	0.60	0.40	0.00	0.80	0.20	0.80	0.20	0.40	0.20	0.80	0.80	0.60

APPENDIX D2: (Continued)

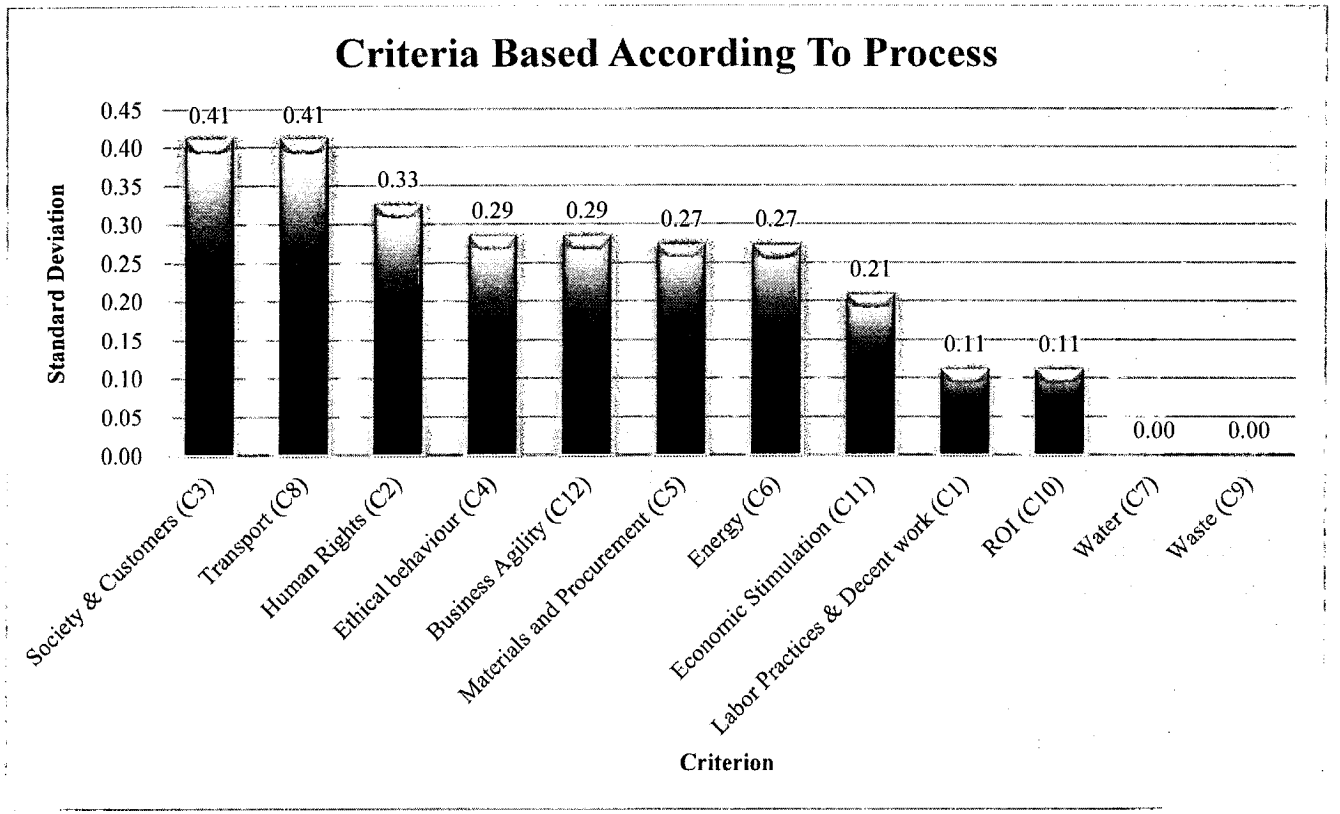


APPENDIX D3: Criteria Based Ranking

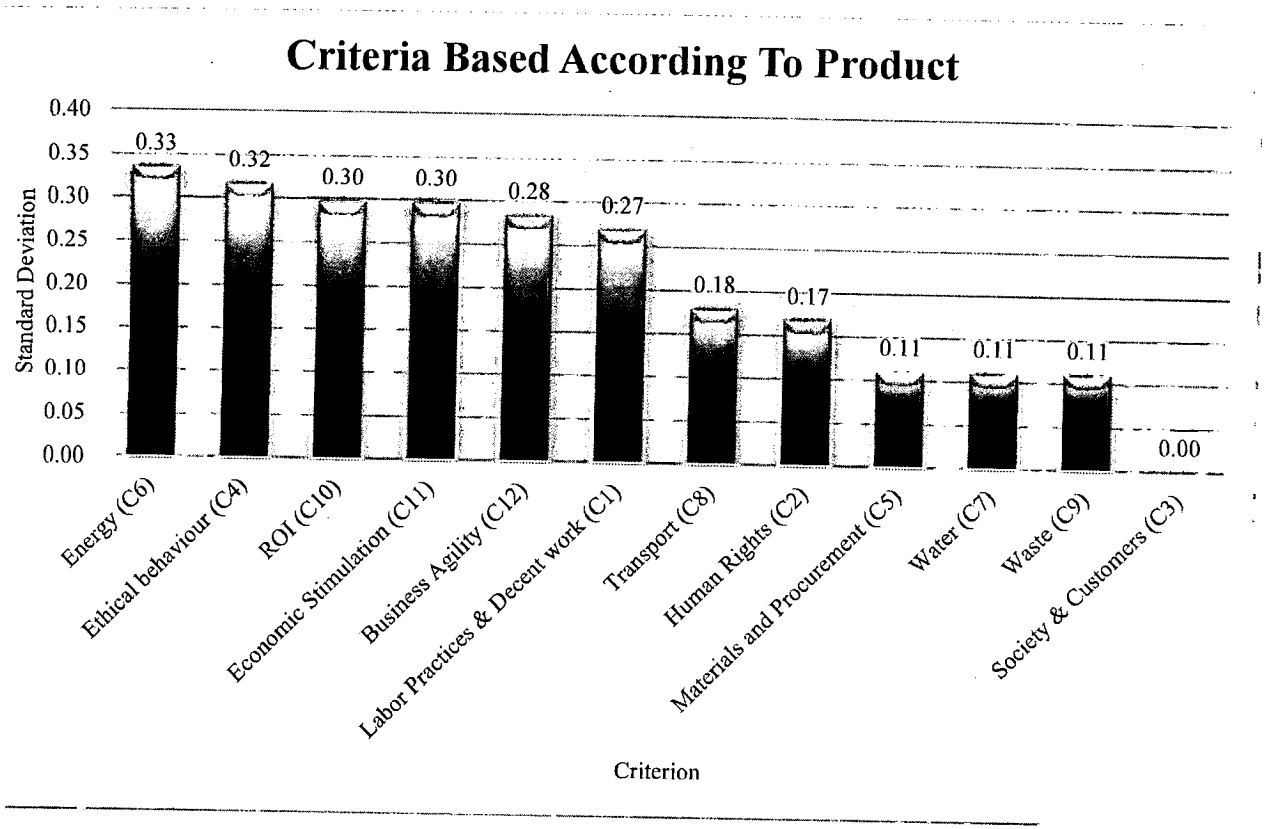
Product	
Criteria	**Standard Deviation**
Energy (C6)	0.33
Ethical behaviour (C4)	0.32
ROI (C10)	0.30
Economic Stimulation (C11)	0.30
Business Agility (C12)	0.28
Labor Practices & Decent work (C1)	0.27
Transport (C8)	0.18
Human Rights (C2)	0.17
Materials and Procurement (C5)	0.11
Water (C7)	0.11
Waste (C9)	0.11
Society & Customers (C3)	0.00

Process	
Criteria	**Standard Deviation**
Society & Customers (C3)	0.41
Transport (C8)	0.41
Human Rights (C2)	0.33
Ethical behaviour (C4)	0.29
Business Agility (C12)	0.29
Materials and Procurement (C5)	0.27
Energy (C6)	0.27
Economic Stimulation (C11)	0.21
Labor Practices & Decent work (C1)	0.11
ROI (C10)	0.11
Water (C7)	0.00
Waste (C9)	0.00

APPENDIX D4: Standard Deviation Graph Ranking

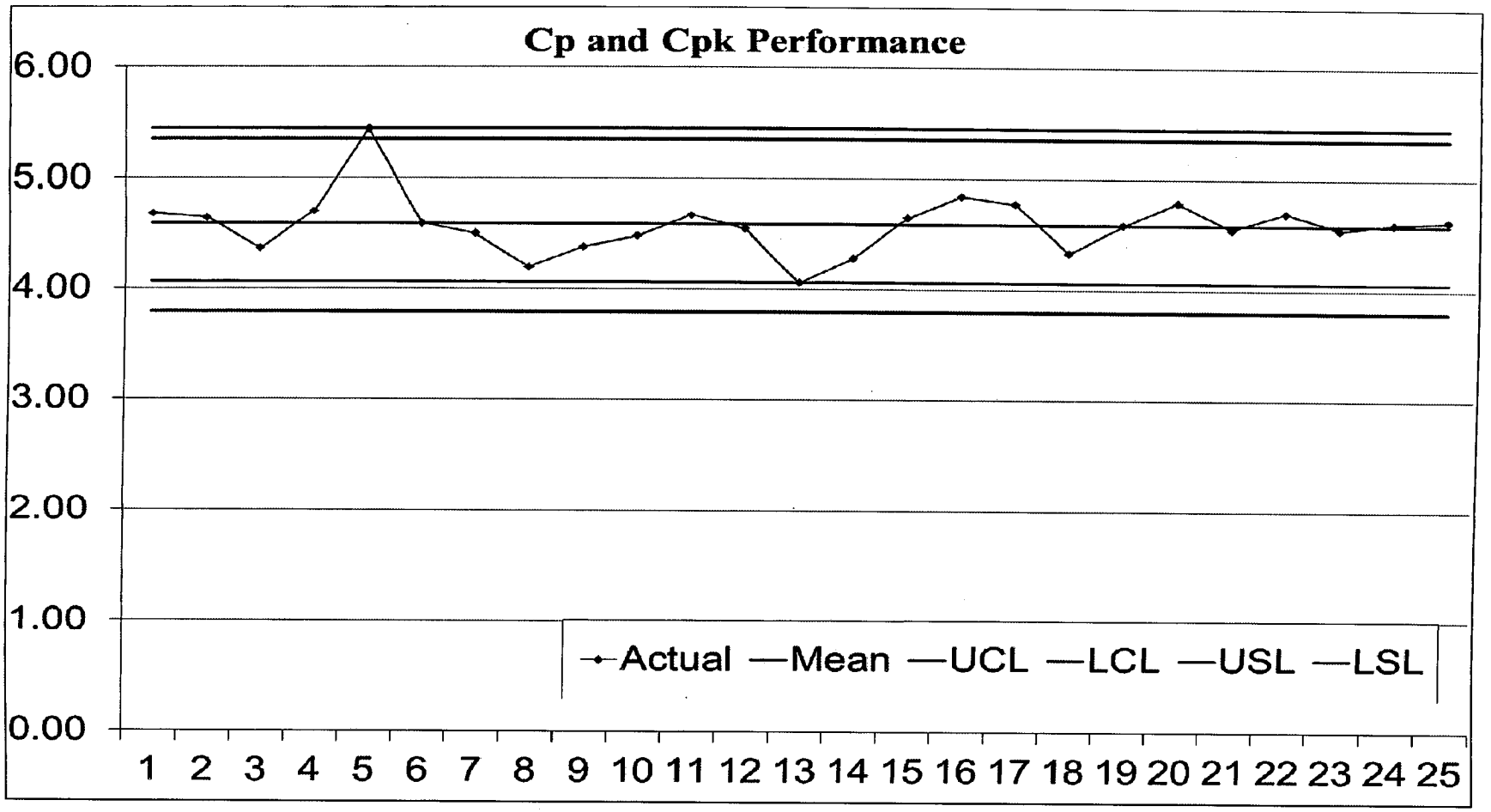


APPENDIX D4: (Continued)



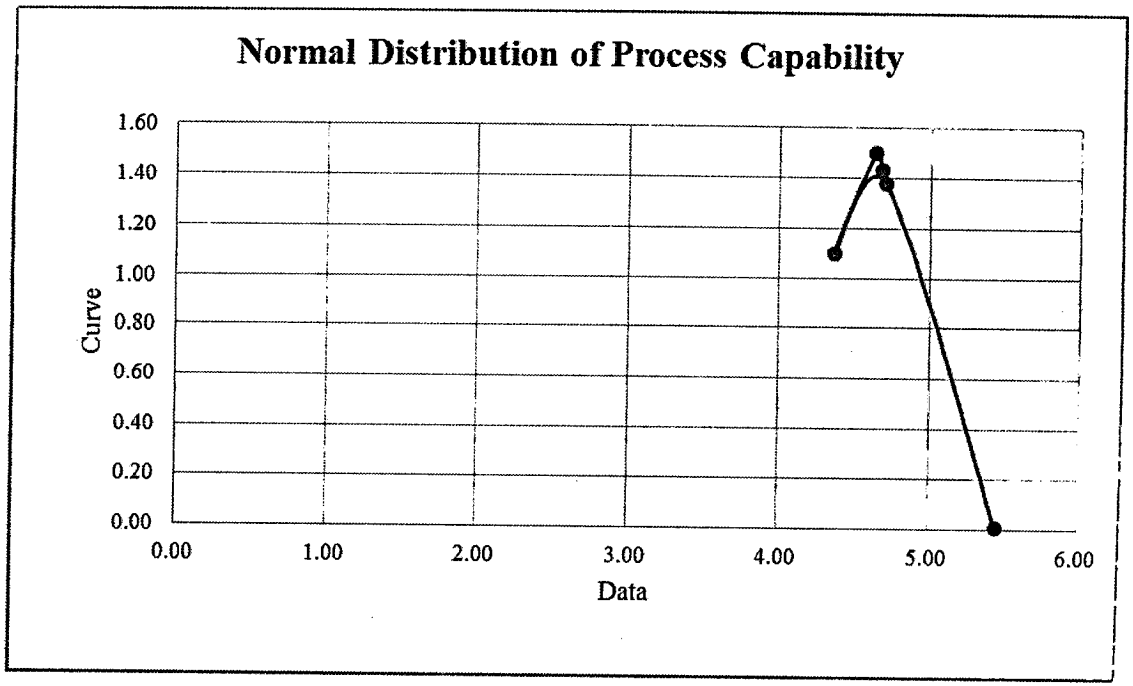
APPENDIX D5: Quality Performance Graph

Short-term Capability (Cp) :	0.89
Short-term Centered Capability - including Global Variation (Cpk) :	0.67



APPENDIX D5: (Continued)

Data	Curve	Data	Curve	Data	Curve	Data	Curve	Data	Curve
4.68	1.44	4.59	1.53	4.67	1.45	4.84	0.92	4.55	1.52
4.64	1.50	4.50	1.46	4.55	1.52	4.78	1.16	4.70	1.38
4.37	1.10	4.20	0.53	4.06	0.20	4.33	0.98	4.55	1.52
4.70	1.38	4.38	1.15	4.28	0.80	4.58	1.53	4.60	1.53
5.45	0.01	4.48	1.42	4.65	1.49	4.79	1.10	4.63	1.51



APPENDIX E

APPENDIX E1: Gant Chart for Semester 1 2016/2017

ID	TASK		week													
			1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Title Conformation	Plan														
		Actual														
2	Project Background	Plan														
		Actual														
3	Litrature Review	Plan														
		Actual														
4	Methodology	Plan														
		Actual														
5	Preparation for presentation	Plan														
		Actual														
6	FYP presentation	Plan														
		Actual														
7	Report documentation	Plan														
		Actual														
8	Completing draft report	Plan														
		Actual														
9	Completing full report	Plan														
		Actual														

APPENDIX E2: Gant Chart for Semester 2 2016/2017

ID	TASK		week												
			1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Title Conformation	Plan														
		Actual														
2	Surveying Company	Plan														
		Actual														
3	Company Visit	Plan														
		Actual														
4	Collecting Data	Plan														
		Actual														
5	Analyzing Data	Plan														
		Actual														
6	FYP presentation	Plan														
		Actual														
7	Report documentation	Plan														
		Actual														
8	Completing draft report	Plan														
		Actual														
9	Completing full report	Plan														
		Actual														