



**A STUDY ON THE KEY CRITERIA THAT CONTRIBUTE TO
THE MANUFACTURING COMPANY SUSTAINABILITY**

This report submitted in accordance with requirement of the Universiti Teknikal
Malaysia Melaka (UTeM) for the Bachelor Degree of Manufacturing Engineering
(Manufacturing & Management) (Hons.)

by

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I hereby, declared this report entitled “A Study On The Key Criteria That Contribute To The Manufacturing Company Sustainability” is the results of my own research except as cited in references.

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APPROVAL

This report is submitted to the Faculty of Manufacturing Engineering of UTeM as a partial fulfillment of the requirements for the degree of Bachelor of Manufacturing Engineering (Manufacturing & Management) (Hons.). The member of the supervisory is as follow:

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(Dr. Zuhriah Bt Ebrahim)

ABSTRACT

‘Sustainability’ is a term that represent the company ability to establish and survive for a long time. Nowadays, most of companies realize that sustainability is important for them to compete in global market. Other than that, there are criteria that contribute to the sustainability of a company to remain successful in the long term. Up to this date, a thorough study has not been done yet on identifying the key criteria of sustainability that focus on manufacturing companies. Thus, this study attempts to provide a thorough study on identifying the key criteria of sustainable manufacturing company that selected from Fortune Global 500. Three objectives are set; i) To identify manufacturing companies that has managed to remain in the Fortune Global 500; ii) To identify criteria of sustainable manufacturing companies; iii) To clarify the key criteria that contributes to the manufacturing companies’ sustainability. Thus, comparison method is used to clarify the key criteria that determined through the Fortune Global 500, time line study of sustainable manufacturing company and literature study. Results of this study show that eight manufacturing companies in automotive industry have been identified as a sustainable manufacturing company. Ten criteria are clarified through timeline study of these companies. As a conclusion, the key criteria of sustainable manufacturing company for automotive industry have been determined as innovation of new product. The second important criteria is clarified as design improvement. Whilst, the others criteria such as technology, merging, partnership, joint venture, market expansion, new plant or branch and product diversion are clarified as third important criteria.

ABSTRAK

'Kemampuan' merupakan satu istilah yang melambangkan kestabilan dan kekukuhan syarikat dalam tempoh yang panjang. Kini, kebanyakan syarikat menyedari bahawa kemampuan adalah penting untuk mereka bersaing dengan organisasi syarikat lain di dalam pasaran global. Selain itu, terdapat juga beberapa kriteria yang turut menyumbang kepada kemampuan sesebuah syarikat untuk mereka kekal berjaya dalam jangka masa panjang. Namun, sehingga kini masih belum ada sebarang kajian yang dijalankan untuk mengenalpasti kriteria kemampuan yang fokus kepada syarikat pembuatan. Oleh yang demikian, kajian ini cuba menyediakan satu kajian menyeluruh bagi mengenalpasti kunci kriteria yang terdapat dalam syarikat pembuatan yang telah dipilih daripada Fortune Global 500. Tiga objektif telah dilaraskan iaitu; i) Untuk mengenalpasti syarikat-syarikat pembuatan yang telah berjaya kekal dalam senarai Fortune Global 500; ii) Untuk mengenalpasti kriteria syarikat pembuatan yang mampan; iii) Untuk menjelaskan kunci kriteria yang menyumbang kepada kemampuan syarikat pembuatan. Untuk itu, kaedah perbandingan telah digunapakai bagi menjelaskan kriteria kemampuan yang ditentukan melalui Fortune Global 500, kriteria yang didapati daripada laman sesawang setiap syarikat pembuatan yang mampan dan kajian literatur. Keputusan daripada kajian ini telah menunjukkan bahawa sebanyak lapan buah syarikat dalam bidang automotif industri telah dikenalpasti sebagai syarikat pembuatan yang mampan. Manakala, sepuluh kriteria telah dikenalpasti melalui kajian keatas laman sesawang untuk setiap syarikat pembuatan yang mampan. Kesimpulannya, kunci kriteria kepada kemampuan syarikat pembuatan untuk automotif industri telah dikenalpasti sebagai inovasi terhadap produk baru. Seterusnya, untuk kriteria kedua penting adalah penambahbaikan rekabentuk, manakala kriteria yang lain seperti teknologi, gabungan, rakan kongsi, usahasama, pengembangan pemasaran, pelan atau cawangan baru dan peralihan produk telah dikategorikan dalam kelompok kriteria ketiga terpenting.

DEDICATION

*I would first like to express heartfelt thanks for warmth of love to
My husband & My children, Parents, Siblings and my friends.*

*Thanks you for the endless support and loves to me.....
May god bless those who have been giving me their support
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LIST OF ABBREVIATIONS, SYMBOLS AND NOMENCLATURE

CNN	-	Cable News Network
CORE	-	Computer-aided Software Engineering
Dfs	-	Design for sustainability
FG500	-	Fortune Global 500
FP	-	Frequency Percentage
GRI	-	Global Reporting Initiative
LCM	-	Life Cycle Management
SIC	-	Standard Industrial Classification
TBL	-	Triple Bottom Line
UK	-	United Kingdom
US	-	United Stated

CHAPTER 1

INTRODUCTION

1.0 Preliminary

This chapter presents the overview of the study including background of the study, problem statement, aim and objectives and scope of the study. All of that are explained in greater details later on. The expected outcome is explained in the last section of this chapter.

1.1 Background of study

The numbers of manufacturing companies have drastically expanded creating a high competitively business environment. Competitive advantage is needed to make manufacturing companies becoming sustainable in the global market thus leading to the company's growth. This shows a positive improvement in the industry where they need to compete among themselves to maintain the reputation of their company. To keep or further establish a company's reputation is not an easy matter as it seems. Companies need to struggle very hard to ensure they achieve the company's mission. Thus, to enhance the ability of the company's operation, various methods of approaches are used in order to survive in their own industry. Different approaches are used by different

industries and when companies choose the best approach, it will bring a good result and drive a company to further success. To achieve company goal is easy but to remain sustainable in global market is difficult.

However, the criteria that enable companies to be sustainably enlarged for longer period of time are not clearly determined. Therefore, the aim of this study is to clarify the criteria that contribute to a manufacturing company's survival. In this regard, a study on sustainable manufacturing companies that have been listed in the Fortune Global 500 (FG500) will be carried out to identify the key criteria involved in order to constantly remain sustainable.

Through this study, analyses on the criteria will be identified in advance through FG500, the timeline study and also from literature studies on sustainability issues. In this way, the key criteria on sustainability of manufacturing companies were identified by looking at the most common criteria used and the similarities from the three aforementioned sources.

1.2 Problem statement

Basically, manufacturing companies exist when there is a demand from consumers, and whenever there is a demand there will be a supply. As long consumers' demands are in existence, the manufacturers will seek to increase their production. However, having said that, the demands from consumers have changed over time and will continue to evolve. Thus, the manufacturing company has to be creative, proactive and innovative to sustain their business in the long run.

Maintaining a good reputation is not an easy task. Therefore, manufacturers must vary their methods to maintain the performance of their companies. Most manufacturing company started off with small-scale businesses before expanding to a wider range.

Some company expands their business through the franchise method thus enabling for expansions all over the world. Hence, the FG500 list shows a very encouraging development for manufacturing companies. Furthermore, the positive changes in company's development could be seen year by year. As a result, people are encouraged to find out the methods and applications that successful manufacturing companies used to sustain their position in the list.

Up to this date, there has not yet a study done on identifying the criteria of manufacturing sustainability through companies that selected from FG500. Comparisons of sustainability criteria between the criteria used by FG500 and criteria identified from company's timeline study and literature study has also never been studied. Therefore, this study was held to determine the main criteria that contributed to the sustainability of manufacturing companies.

1.3 The importance of study

The importance of the study is to determine the critical criteria that should be in every organization of manufacturing companies to keep sustainable. The critical criteria identified can be used as guidance to any manufacturing company for their survival in competitive business environment.

1.4 Aim and Objectives

The aim of this study is to provide a thorough study on identifying critical criteria for manufacturing company. Thus, the main objectives of this study are:

- i) To identify manufacturing companies that has managed to remain in the list of Fortune Global 500.

- ii) To identify the criteria of sustainable manufacturing companies.
- iii) To clarify the key criteria that contributes to the manufacturing companies' sustainability.

1.5 Scope of study

This study covers analyses on sustainability criteria of manufacturing companies selected from the Fortune Global 500 between year 2005 and 2012. The study focuses on:

- i) The list of manufacturing companies that have been successfully listed every year and in the first 100 ranking.
- ii) The strategies and approaches applied by manufacturing companies to keep sustaining in business.
- iii) Analysis of time line study of manufacturing companies selected from the FG500 list.
- iv) Analysis of literature study on sustainability issues.

1.6 Expected outcome

Results from analysis of the criteria of sustainability would be used to clarify the key criteria of manufacturing companies' sustainability.

CHAPTER 2

LITERATURE REVIEW

2.0 Preliminary

This chapter presents the literature review on sustainability and Fortune Global 500. The first section presents the sustainability in general overview. In this section, it contains the definition of sustainability and manufacturing sustainability from several opinions. It also include the sustainability definition based own perception and more explanation about sustainability will be discussed. The second section, presents about Fortune Global 500 (FG500) itself by explaining in detail on the history and criteria of FG500 companies. Next, the third section clarifies on the strategy to be sustainable which is defined from three elements. The three sustainable elements are economy, environment and social. After that, the criteria of sustainability and FG500 are discussed in the fourth section. The summary of this chapter also provided to describe the overall view in this chapter.

2.1 Definition of sustainability

In particular, Vince (2009) specifies that sustainability can be reached by balancing of three dimensions:

(a) *Economic*

Sustainability with supply and demand considerations in providing for the resource wants and needs of populations and communities. Profit motives and businesses enter this scene.

(b) *Social*

Sustainability is concerned with communities, life style, and populations.

(c) *Environmental*

Sustainability with ecological considerations for air, water and land, quality and preservation

Nowadays more customers expect companies to offer products and services which comply with sustainability aspects, especially environmental friendly products. Sustainability is needed in achieving a balance between economic activities, social impact and ecological impact. From a report by the World Commission on Environment and Development (1997), there are a lot of definitions which proposed for sustainability; a comprehensive definition is to use the resource to meets the needs of the present without compromising the ability of future generations to meet their own needs.

According to Zairi and Liburd (2001), sustainability is defined as the ability of an organization to adapt to changes in the business environment, to capture contemporary best practice methods, and to achieve and maintain superior competitive performance. It means that sustainability is really important for organization to maintain its competitiveness. However, according to Vince (2009), general definitions of sustainability deal with, a concern for resource use, equitable distribution of resources, awareness of interrelationships between and among the

economy, the society and the environment, and living with constraints on resource use and availability.

Moreover, from a report by TATA Business Excellence model (2010), the term sustainability refers to the organization's ability to address current business needs and to have the agility and strategic management to prepare successfully for future business, market and operating environment. Sustainability considerations might include employee competence and ability, resource availability, conservation of natural resources, adoption and or investing in niche, low carbon foot print technology, innovating new, green products and services, identification and creation of new environment friendly business opportunities, reputation management, knowledge, core competencies, work systems, facilities and equipment. Sustainability might be affected by changes in the marketplace and customer preferences, changes in the financial markets, and changes in the legal and regulatory environment.

However, some do view "Sustainability" in a differing light in the senses that it remains ambiguous and politically charged, particularly within the lexicons of businesses. Companies that actively manage a wide range of sustainability indicators are better able to create long term value for all stakeholders. From the management of corporate liabilities to new market ventures, a sustainable business strategy can improve all segments of corporate activity (Winter, 2003).

Nevertheless, mention by Alex (2004), it also can be defined as a state in which the relationship between human activities and larger, dynamic ecological systems allow for human potential to be realized to the maximum extent possible, but in which the effects of human activities remain within bounds, so as not to destroy the supporting functions of ecological systems. Furthermore it means to support, hold, or bear up from below to keep up or keep going, to supply with the necessities of life.

Sustainability is becoming a key strategic and business issue for companies. The growing social pressure, new environmental legislation, and increasing customer demand for green products is forcing companies to address all sustainability challenges related to increased operational profit, the environment, social impacts and legislation in a holistic and proactive way. It is being perceived as a cost instead of adding value to the company (Jos et al., 2010).

In addition, sustainability can mean ensuring companies economic viability for the long term, maintaining an ecological balance on our planet, and committing to practices that are socially desirable, culturally acceptable and psychologically nurturing. However, initiating movements toward sustainability will provide greater security. Manufacturing companies may become more robust, resilient and healthy by committing to sustainability in four ways (Kathleen, 2010):

- (a) ***Saving money*** by reducing waste and increasing energy efficiencies
- (b) ***Mitigating risk*** related to regulation, accountability, transparency and energy
- (c) ***Capturing customer loyalty*** by connecting through common values pertaining to people, profit and planet
- (d) ***Attracting, retaining, and engaging talent*** by creating a strong purpose and committing to sustainable practices.

Other than that, “Sustainability” also can be viewed in terms of Triple Bottom Line (TBL) concept. It means that sustainability efforts need to be assessed in terms of impact on social, economical and environmental aspects. This concept is also symbolised in literature by triple P which is planet, people and profit. Its implies that a company creates more value over the long run and encounters little risks if it takes into consideration the environmental (planet), social (people) and economic or financial issues (profit) as compared to a company that focuses merely on the profit. A sustainable business strategy can improve all segments of corporate activities (Asif et al., 2008).

Therefore, sustainability has becoming an increasingly important issue amongst companies around the world. It is a critical and timely topic (Linton et al., 2007), a major concern internationally over the last decade (Mien et al., 2005), a major competitive factor for many manufacturing companies (Seidel et al., 2006), and an important concept to survive the competitive environment (Bevilacqua et al., 2007). Increasing concerns to sustainability have forced manufacturing companies to consider sustainability into their strategies and activities. In response to the growing sustainability concerns, manufacturing companies must formulate measures to evaluate sustainable manufacturing performance, aiming at integration of sustainability aspects.

2.2 Definition of Manufacturing Sustainability

Business sustainability is one of the most critical issues facing manufacturers today (Found et al., 2006). With the demand profile for products and services changing, companies must now operate in a less secure and more complex manufacturing environment forcing their business and manufacturing strategies to cater for a wider range of consumer requirements. (Martinez et al., 2010) describe the way in which manufacturing organizations need to change their strategic perspective towards becoming “product service” providers rather than simply products manufacturers.

According to the report of Institute for Sustainability (2011), business sustainability is defined as an increase in productivity and or reduction of consumed resources without compromising product or service quality, competitiveness or profitability while helping to save the environment. They were concentrating more closely on the aspects of business sustainability rather than a more generic definition of sustainability.