



Investigating the Relationship of Employee Empowerment and Sustainable Manufacturing Performance

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ABSTRACT

Literature identified employee empowerment under the socio-technical context can help to enhance sustainable manufacturing performance (SMP). However, few studies have attempted to empirically test the relationship between the employee empowerment and SMP. The current study focused on the investigation of the relationship between employee empowerment and SMP. The study used quantitative research design to address the problem. The study used random sample of 100 employees from large manufacturers in Malaysia to collect data on a 5 point- likert scale questionnaire adopted from the literature. Further, this data statistically tested using smart PLS (structural equation modeling) to empirical investigations of the relationships between employee empowerment and SMP. Results indicated that employee empowerment has a positive relationship with social, environmental and economic performance of the manufacturers in Malaysia. A result of the study suggests to the policy makers to enhance level of employee empowerment in order to improve SMP.

Keywords: Employee Empowerment, Sustainable Manufacturing Performance, Structural Equation Modeling

JEL Classifications: J5, L6

1. INTRODUCTION

The Manufacturing sector is the most resource consuming sector of the economy. International Energy Agency (IEA, 2007) declared that 36% of carbon dioxide (CO₂) emissions over the globe are due to the manufacturing sector. However, the improvement potential towards sustainable development is significant. The technological changes have decreased this rate of CO₂ emission to the 19%. Organization for Economic Cooperation and Development (OECD, 2008), argues that holistic approaches to sustainable manufacturing, extending beyond the boundaries of the company, would yield better environmental performance improvements. Over decade manufacturing industry realized the impact of manufacturing practices on the natural environment. Increasingly, stakeholders including regulators, customers, shareholders, board members, and employees are asking organizations to adopt sustainable manufacturing practices. Stakeholder demands

include regulatory requirements, product stewardship, enhanced public image, potential to expand customer base, and potential competitive advantages. Research on the impact of environmental practices on organizational outcomes is somewhat inconclusive. Some researchers have founded that environmental initiatives may have a negative impact on company performance (Yu et al., 2009), other researchers indicate that being environmentally proactive can produce competitive gains (Hart, 1995).

Qureshi et al., (2015) indicated that the top management should provide employees empowerment in decision making relative to the environmental issues. The employees who have more sense of control over their work and engaged in to the decision making process are more likely to be concern about the all dimension of the product and process improvement during manufacturing process. Despite of these studies (Sudin, 2011; De Giovanni, 2012), literature on how employee empowerment is related to

the improvement in sustainable manufacturing performance (SMP) is limited. Thus, this provides opportunity to capitalize on the relationship of the employee empowerment and SMP to fill the gap in literature. This leads to the first research question of the current study “What is the effect of employee empowerment on SMP (Social performance, environmental performance and economical performance)?”

Malaysia is a prominent member of the Association of Southeast Asia Nation with a population of about 30 million in 2014. In 2004, the country was ranked by the Institute for Management Development as the 5th most competitive country in the world among countries with a population of < 20 million, ahead of countries such as Germany, UK, Japan, and Mainland China. In addition, Malaysia is a multicultural country with different types of organizations and with different organizational structures and cultures as 1739 non-Malaysian ownership and 168 joint Malaysian and non-Malaysian companies are operating in the country.

Recently, manufacturing sector in Malaysia has grown rapidly in comparison with previous decades. The current trading and manufacturing environment in Malaysia are supportive and effective, yet globally competitive. Malaysia is one of the largest trading nations in the world that has a prominent manufacturing sector which contributes almost 80% of overall country's export (Raja, 2011). Raja (2011), the vice president of Federation of Malaysian Manufacturers stated that products which are manufactured in Malaysia are acceptable in US, EU, and Japan as important developed countries.

Malaysia's geographical advantage has positioned the country strategically to regional resources and supply chains in the South East Asia region. In fact, because of the uniqueness of the country due to its geographical location, Islamic-based country, IT-host country, and etc., this country was selected as the context of this study. This is supported by the following factors that further strengthen Malaysia as investors' choice for their regional operation base. Firstly, strong trade openness policy and trade infrastructure such as transportation, communication, and financial services which facilitate and widen market reach in the region. Malaysia ranked at 29th position in the WEF global competitiveness ranking for quality transport infrastructure (roads, railroads, sea ports and air) in 2012. Secondly, Malaysia offers a cost competitive location for investors intending to set up offshore operations for services and manufacturing activities including in the areas of resource-based industries, high-technology industries, knowledge-based and advanced technology industries for regional and international markets.

2. LITERATURE REVIEW

2.1. The Concept of Sustainability

The meaning of the word sustainability can be interpreted in many ways, but the most common interpretation refers to the human development on Earth. The concept of sustainable development was originally defined by Brundtland (1987), on behalf of the UN general assembly. The need for sustainable development came

as a response to growing concerns over how economic growth often was associated with environmental damage (OECD, 2008). The commission defined sustainable development as Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs (Brundtland, 1987). The original definition has been heavily criticized for being too ambiguous. This however, is not unexpected since the definition is designed to be universally applicable. In that sense, the concept of sustainable development is similar to other universal concepts such as freedom and justice. Several new definitions have been developed over time based on different interpretations of the true meaning of sustainable development. However, Andrew (1994) concludes that the concept of sustainable development as a strategy towards a better environment ultimately has failed so far. As a response, OECD (2008) has started working on a new strategy defined as “*Green Growth*”, which can be seen as a subset of sustainable development.

2.2. Sustainable Manufacturing

The manufacturing industry is a big consumer of resources and energy. In fact, 36% of all global CO₂ emissions can be attributed to manufacturing industries according to IEA (2007). However, the improvement potential towards sustainable development is significant. A potential reduction of CO₂ emissions by 19-32% and a reduction in energy use by 18-26% would be possible if the manufacturing industry implemented best practice technologies available today. OECD (2008) argues that holistic approaches to sustainable manufacturing, extending beyond the boundaries of the company, will yield better environmental performance improvements

2.2.1. The triple bottom line (TBL)

TBL concept, developed by Elkington (2004), addresses the importance of integrating social and economic dimensions to sustainable development to achieve environmental progress. The concept calls for corporations to serve their stakeholders interests rather than just maximizing shareholder profit. Stakeholders may be concerned about environmental and social issues in addition to financial performance according to Ho and Taylor (2007). The TBL concept is also commonly referred to as the three pillars of sustainability. Figure 1 describes the relationship between the different forms of sustainable capital. Each form of capital has its own set of restrictions put on the capital. The intersection of all three forms of capital is described as the area where sustainable development takes place. However, Norman and McDonald (2004) among others criticize the TBL concept for a lack of substance that ultimately will be a cause for distraction for managers as well as investors. Figure 1 shows the concept of TBL.

2.3. Employee Empowerment

A literature review reveals that empowerment can be divided into two categories (i-e. structural empowerment or psychological empowerment) (Seibert et al., 2004; Mills and Ungson, 2003; Psoinos and Smithson, 2002; Randolph, 1995; Conger and Kanungo, 1988; Thomas and Velthouse, 1990; Menon, 2001). Structural empowerment is related to the organizational structures, practices and policies of an organization that maintains employee

empowerment (Seibert et al., 2004; Mills and Ungson, 2003; Psionos and Smithson, 2002; Randolph, 1995). Psychological empowerment is related to the special type of cognition that an individual makes according to his work environment (Conger and Kanungo, 1988; Thomas and Velthouse, 1990; Menon, 2001).

Menon (2001) reveals in his study that the psychological experience of power produces the feeling of empowerment. The sociological experience refers power as potential influence in social interactions context (Bacharach and Lawler, 1980), whereas the psychological perspective considers power as one of the motivating factors (McClelland, 1975). Menon (2001), has combined these three perspectives and explains empowerment in three dimensions: Power as perceived competence, power as perceived control, and power as being energized in order to achieve the valuable goals of an organization.

2.4. Conceptualization of Theoretical Framework

The Previous section has provided arguments and definitions of each variable and historical evaluation of the relevant theories to the variables of interests in the study. This section aims to provide theoretical arguments to build up foundations for conceptualizing of proposed framework. This framework is used to evaluate whether employee empowerment and quality of work life enhances SMP.

The recent interest on the Sustainable manufacturing has suggests that sustainable manufacturing is an integrated social-technical approach which encompasses a wide variety of management practices. These management practices work synergistically to create a streamlined high quality system that mitigate manufacturing harmful effects to the society and the environment to produce eco-efficient products (Deif et al., 2011). STS focuses on two subsystems. First, the social subsystem comprises of employees and encompasses their aptitudes, attitudes, beliefs, and their relationships both within and between groups (Dalpiaz et al., 2013; Davis et al., 2014; Shani et al., 1992; Pasmore, 1988; Emery, 1959). Second, the technical subsystem focuses on how things get done and consists of tools, techniques, procedures, and technology used by employees in an organization to acquire inputs, and transform inputs into outputs (Hussein et al., 2014; Kull et al., 2013; Hupp and Polak, 1995; Shani et al., 1992; Emery, 1959). Figure 2 presents a theoretical model of an integrated SMP with employee empowerment and quality of work life based on STS principles. More specifically, the model has exposed the relationship between the specific employee empowerment and SMP.

Most of the research studies have focused on the organizational the social and environmental concern and admit the role of corporate social and environmental responsibility to enhance sustainability in manufacturing sector. Some other research studies have praised the role of green HR to enhance the green intellectual capital and to develop a sustainable organization culture. However, studies have less emphasized on how human factor can develop sustainability. Organizations that encourage employee empowerment by enhancing employees feeling of perceived control, perceived competence, and goal internalization are tend to be more productive towards SMP. The ultimate goal

Figure 1: Three forms of sustainable capital and their role

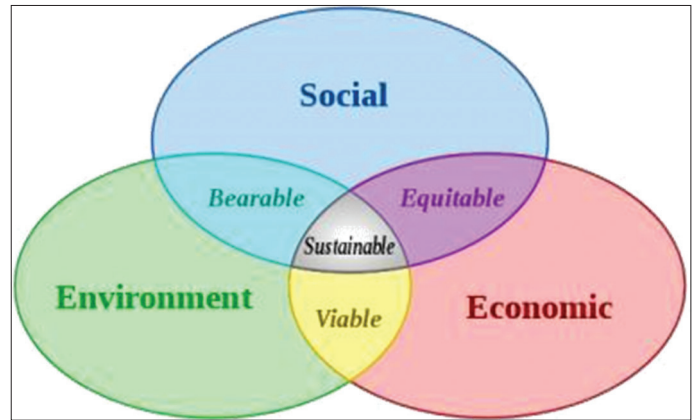
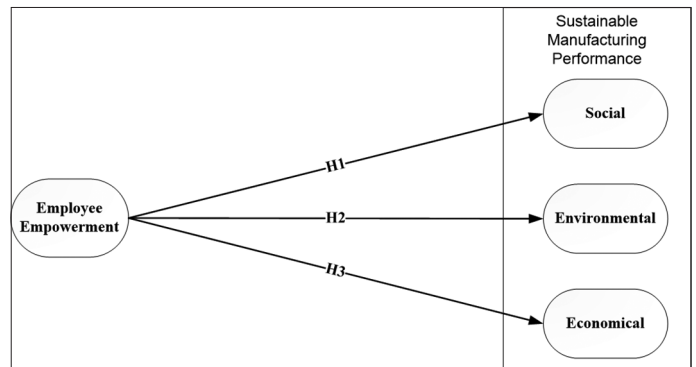


Figure 2: Proposed study framework



of the employee empowerment is to create a sense that the production process can cause damage to the environment and society if not managed well. Many researches admit the role of employee empowerment for greening the manufacturing process (Meyerson and Kline, 2008; Cole, 1992). Empowered employees, having a perceived control and competence over their work are more likely to adopt the procedures to contribute to the economic, social and environmental performance of the firm. Employees’ ability to control and/or influence decisions that affect their work area can lead to improvement in Sustainability in manufacturing process. Thus study proposed following hypotheses.

H₁: Employee empowerment is positively related to social performance.

H₂: Employee empowerment is positively related to environmental performance.

H₃: Employee empowerment is positively related to economic performance.

3. METHODOLOGY

3.1. Measures

The questionnaire design follows the general guidelines for designing questionnaire to produce attractive, simple and standardized data collection tool that would achieve answering the research questions. The survey includes: A cover letter

and the questionnaire itself. The cover letter explains the main purpose of the survey, and the respondents will be assured on the confidentiality of their purpose.

The questionnaires consist of thirty eight items and a cover letter. First section of the questionnaire intended to gather demographic information of participants. In this part of the survey, there were seven questions that were supposed to gather some information about the respondents. The questions were about the gender of respondent, age, education, and years at the current position, work experience, specialization and tenure. The scale uses a five point Likert scale from 1 is strongly disagree, 2 is disagree, 3 is neither agree nor disagree, 4 is agree, and 5 is strongly agree for measuring the statement for each respective sub question. The current study has used three main constructs; the details relating to all constructs have been explained in subsequent section.

3.1.1. SMP

SMP will be measured using scale developed by De Giovanni, (2012). The scale used three dimensions to measure the SMP. **These dimensions are social performance,** environmental performance and economic performance. Social performance will be measured through the 5 items while environmental and economic performance will be measured through the 5 items for each dimension. Five point likert scales is used to measure the responses of the participants in the study. This scale includes 1 as strongly disagree and 5 as strongly agree. The reported reliability of each dimension was 0.917 for social performance, 0.898 for the environmental performance and 0.96 for economic performance.

AQ1

3.1.2. Employee empowerment

Employee empowerment will be measured using scale developed by Menon, (2001). The scale used three dimensions to measure employee empowerment. These dimensions are goal internalization, perceived competency and perceived control. Each dimension will be measured through the 4 items while. Five point likert scales is used to measure the responses of the participants in the study. This scale includes 1 as strongly disagree and 5 as strongly agree. The reported reliability of each dimension was 0.808 for perceived control, 0.84 for the perceived competency and 0.82 for goal internalization.

This section provides the measurement items used for each construct in the research model. The construct employee empowerment, quality of work life and SMP will be measured as second order constructs, having multiple first order factors. Details of number of indicators used to measure each latent construct or factors and their previously reported reliability is given in Table 1.

Table 1: Measurement scale

Construct	Dimension	Items	References	Reliability
Sustainable manufacturing performance	Social performance	5	De Giovanni, (2012)	0.917
	Environmental performance	5	De Giovanni, (2012)	0.898
	Economic performance	5	De Giovanni, (2012)	0.96
Employee empowerment	Perceived control	4	Menon, (2001)	0.808
	Perceived competence	4	Conger and Kanungo (1987) and Menon (2001)	0.84
	Goal internalization	4	Menon (2001)	0.82

AQ2

*Reference to the reliability of scale used most recently, SMP: Sustainable manufacturing performance

3.2. Population and Sample Frame

Target population is the group that the contribution of the current study was generalized to them. Malaysia is a federal constitutional monarchy in Southeast Asia. It consists of thirteen states and three federal territories and has a total landmass of 329,847 Km² separated by the South China Sea into two similarly sized regions, Peninsular Malaysia and Malaysia Borneo. The discussion in the Section 1.2 and 1.3 showed the importance of manufacturing sector in Malaysia and the reason to choose this context to conduct the current study.

A review of the literature revealed that most of the studies in the context of Malaysian manufacturers were on SMEs rather than large manufacturers. Moreover, large manufacturers in Malaysia are the most resource consuming sector of the economy. Hence, the target population of the current study is all large manufacturers in Malaysia, both local and Multinational Companies (MNCs). The large manufacturers in Malaysia are those who have more than 200 full time employees or their sales turnover are from more than RM50 million in a financial year. Table 2 shows the definition of micro, small, medium, and large size manufacturers in Malaysia.

To collect maximum required data, the current study focused on the most industrialized part of the country which is Klang Valley (i.e., Selangor Peninsula and Federal Territory of Kuala Lumpur), as the fastest growing metropolitan region in terms of economy and population. Therefore, the unit of analysis in the current study was large manufacturers which are located in Klang Valley, both local and MNCs.

The study aims to use random sampling to calculate true effect of the population. A random sample of 30 manufacturing companies was chosen for study. The current study intends to employee a quantitative research design. Therefore, at to make sure that the statistical tests performed in this study will detect an effect on the sample size when, in fact, a true effect exists in the population, the sample size has to be adequate (Hair et al., 2006). A review of literature has exposed there is no consensus on sample size needed for applying the SEM technique (Schumacker and Lomax, 2004). Literature revealed following criteria for the sample size selection is based on the number of observed variables, number of parameters to be estimated, and adequate statistical power desired. So the minimum sample size of the study was 150 responses to ensure the detection of true effect within the population. A random sample of 150 responses from selected manufacturing plant was taken for the study.

4. RESULTS

4.1. Assessment and Goodness of Measurement Model

In the measurement model, all the items which have been confirmed through confirmatory factor analysis are further tested to check whether all the constructs' items significantly contribute as a whole in the proposed model of this study. In order to evaluate the measurement models, the PLS algorithm procedure was performed by examination of construct reliability and construct validity, which is composed of convergent and discriminant validity, and loadings of all indicators to their respective constructs.

4.1.1. Convergent validity

Convergent validity is the construct indicators that reflect a large amount of the mutual proportion of variance among factors. The convergent validity can be assessed by the values of Average Variance Extraction, factor loadings and reliabilities. Figure 3 shows the outer loadings of the measurement model. It can be seen from the Figure 3 that all factors loadings are above than 0.50. This shows that all items are significantly loaded on their respective constructs.

Table 2: Definition of large manufacturers in Malaysia

Category	Manufacturing
Micro	Sales turnover of <RM300,000 OR employees of <5
Small	Sales turnover from RM300,000 to <RM15 million OR employees from 5 to <75
Medium	Sales turnover from RM15 million to not exceeding RM50 million OR employees from 75 to not exceeding 200
Large	Sales turnover from more than RM50 million OR employees more than 200

Table 3: Convergent validity

Constructs	AVE	Composite reliability	Cronbachs alpha
Economic performance	0.693	0.918	0.887
Employee empowerment	0.649	0.965	0.961
Environmental performance	0.627	0.893	0.850
Social performance	0.692	0.918	0.888

Figure 3: Measurement model

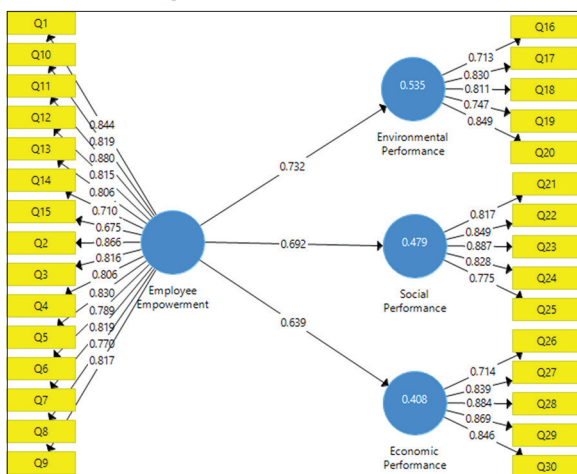


Table 3 shows the average variance extraction, composite reliability and cronbach's alpha of each construct. An average variance extraction value of at least 0.5 and higher indicates that a latent variable is able to explain more than half of the variance of its indicators on average, therefore it is considered as sufficient (Hair et al., 2013). While the threshold value of the Composite reliability is 0.70 or above. Table 3 shows that all the constructs have adequate convergent validity.

4.1.2. Discriminant validity

Discriminant validity is the extent to which an instrument contains a construct that was truly distinct from all others. Discriminant validity is the degree to which similar constructs have distinct values. In this type of validity, the responses are measured without cross loading in terms of latent constructs. Discriminant validity is violated when the correlation among exogenous constructs is more than 0.85. In discriminant validity, the value of the square root of average variance extraction should exceed the value of inter-construct correlations. Table 4 shows the fornell-Larcker criteria for the discriminant validity. The results showed that the square root of average variance extraction is higher than the inter-construct correlations. Thus, this proves that there is no issue of discriminant validity in the model.

4.1.3. Hypothesis testing

The structural model results can be used to test the research hypotheses. The results of the hypothesis can be tested on the basis of path coefficients, P-value and t-values, with a significance level of 0.05. Table 5 shows all proposed hypotheses and parameters estimated in this study and Figure 4 represents the related results. Therefore, the hypotheses were tested to make modifications to the proposed research model.

This study proposed three main hypotheses to test the relationship among the variables. The hypothesis H₁ states that employee empowerment have a positive relationship with environmental performance. The research findings in this study indicate that hypothesis H₁ has been accepted and employee empowerment have a positive effect on environmental performance. Table 5 shows that results for the structural model of the influence of employee empowerment on environmental performance. Path coefficient was 0.639, t-value 12.229 and P-value was 0.000, which is < 0.05. Thus, H₁ has been accepted. This means there is a positive influence of employee empowerment on environmental performance among large manufacturers of Malaysia.

The hypothesis H₂ states that employee empowerment have a positive relationship with social performance. The research findings in this study indicate that hypothesis H₂ has been accepted and employee empowerment have a positive effect on social performance. Table 5 shows that results for the structural model of the influence of employee empowerment on social performance. Path coefficient was 0.732, t-value 20.372 and P-value was 0.000, which is < 0.05. Thus, H₂ has been accepted. This means there is a positive influence of employee empowerment on social performance among large manufacturers of Malaysia.

The hypothesis H₃ states that employee empowerment have a positive relationship with economic performance. The research

Table 4: Fornell-larcker criterion

Constructs	Economic performance	Employee empowerment	Environmental performance	Social performance
Economic performance	0.833*			
Employee empowerment	0.639	0.806*		
Environmental performance	0.586	0.732	0.792*	
Social performance	0.594	0.692	0.614	0.832*

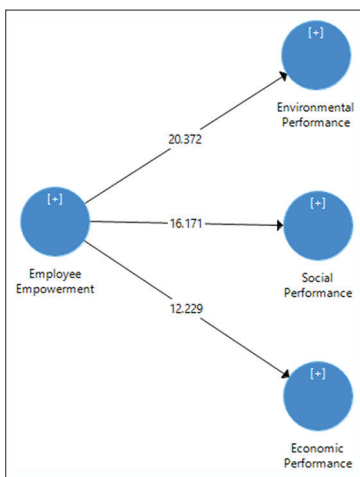
*Square root of average variance extraction

Table 5: Direct hypothesis results

Path	Path coefficient	Standard error	T statistics	P values
Employee empowerment→Economic performance	0.639	0.052	12.229	0.000
Employee empowerment→Environmental performance	0.732	0.036	20.372	0.000
Employee empowerment→Social performance	0.692	0.043	16.171	0.000

S.E: Standard error, T value: t statistic value, P: Probability value

Figure 4: Hypotheses results



findings in this study indicate that hypothesis H₂ has been accepted and employee empowerment have a positive effect on economic performance. Table 5 shows that results for the structural model of the influence of employee empowerment on economic performance. Path coefficient was 0.692, t-value 16.171 and P-value was 0.000, which is < 0.05. Thus, H₂ has been accepted. This means there is a positive influence of employee empowerment on economic performance among large manufacturers of Malaysia.

5. CONCLUSION AND RECOMMENDATIONS

Developing countries are consistently facing energy, environmental and economic crisis. So the importance of manufacturing industry sustainability has gained more weight. Manufacturing sector is the biggest contributor of the energy consumption and environmental pollution in Malaysia (Government of Malaysia, 2014) which ultimately brings negative effects to the economy of the country. Most of energy consumption and wastage finally makes addition to environmental pollution occurs during the transformation process. Technology and skilled human resource are involved during the Transformation process. One factor which is most studied for sustainability during the recent years is technology but other factors are neglected.

The current study focuses on how human factor affect the sustainable manufacturing and would investigate the relationship of employee empowerment with the SMP. Therefore, study focused on the manufacturing industry in Malaysia. A review of literature has exposed that the focus of researchers and practitioners from the last decade tilted towards studying and practicing sustainable manufacturing practices. This results in significant reduction of damage to the environment and society caused by the manufacturing practices. Literature has also revealed that increase in the renewable energy practices, remanufacturing and recycling has dramatically reduce the resource consumption (OECD, 2008) which ultimately result into conservation of natural environment.

Advocates of the lean production system argue that the sustainable manufacturing is an extension of lean production systems (Bergmiller and McCright, 2009). Lean production concept eliminates 7 types of waste from the production process, transcendence towards the sustainable manufacturing by adding some new types of waste management (energy use, pollution control, etc.). These theories lead to the need for a rational contextual investigation of sustainable manufacturing process. Moreover, the role of HR is somehow acknowledged in the literature to achieve sustainability, but work design practices which required to integrate the workers job to the sustainability is still needs to be investigated. The results of the current study highlighted that providing empowerment to the employees can affect the social, environmental and economic performance of the manufacturing industry in Malaysia.

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