

The Impact of External Pressure and Sustainable Management Practices on Manufacturing Performance and Environmental Outcomes

Purpose: The study investigates the direct effect of external pressure on environmental outcomes and manufacturing performance and examines the mediating effect of sustainable management practice.

Design/methodology/approach: This study draws upon Institutional Theory and Resource Based View to understand how factors such as external pressure and sustainable management relate with environmental outcomes and manufacturing performance. The model specifies previously unexplored direct and mediating relationships between external pressure, sustainable management, environmental outcomes and manufacturing performance. The empirical analysis is based on data collected from the sixth edition of the International Manufacturing Strategy Survey (IMSS). The research hypotheses were tested using Structural Equation Modelling.

Findings: Results show that while there is a significant direct and mediating relationship between external pressure, adoption of formal sustainability programs and environmental outcomes, such significant relationships do not exist with manufacturing performance.

Practical implications: The study shows that external pressure can influence the adoption of sustainable practices but the adoption of formal sustainable practices does not necessarily lead to an improvement in manufacturing performance. The implication therefore is that managers need to clearly understand what the actual benefits of sustainability are and where financial advantage, other than manufacturing cost, may be gained.

Originality/value: The relationship between the adoption of sustainable practices and organisational performance is a complex one. In contrast to previous studies, this study found that while external pressure and sustainable management relate positively with environmental outcomes, no such relationship exists with manufacturing performance. This raises a number of questions over naively following such strategies.

Keywords: Sustainable Management, environmental, manufacturing performance, survey

Article Classification: Research Paper

Introduction

The adoption of sustainable management practices is an increasingly important topic for organisations worldwide. Several studies have examined sustainable practices and their impact on organisational performance. A significant body of the literature has focused on green supply chain management (GSCM) with the primary argument being that supply chain partners, particularly customers, drive organisations to adopt sustainable management practices (Diabat and Govindan, 2011; Wu *et al.*, 2011). Nevertheless, the pressure to be sustainable can come from a number of different sources and these include supply chain partners as well as other stakeholders such as competitors, society and regulators (Walker *et al.*, 2008; Zhu and Sarkis, 2007). Walker *et al.* (2008) also identified social drivers to include consumer criticism and pressure from the public and environmental groups. However, there is a lack of understanding of the impact of the combined effect of such external pressure on organisational performance. According to Zhu and Sarkis (2007), the ability of production managers, particularly those in developing countries, to manage economic and environmental performance in a more strategic manner can be improved by having an understanding of the effects of environmental pressure.

This study, based on manufacturers in three Asian countries – Malaysia, India and China – examines the impact of external pressure on environmental outcomes and manufacturing performance. In particular, it investigates the direct effect of external pressure on environmental outcomes and manufacturing performance and the mediating effect of formal sustainable management practice. In other words, does external pressure on its own affect environmental outcomes and manufacturing performance or is its impact mediated through other relationships.

Focus on manufacturing performance is an important dimension of this study. Several studies have examined the effect of GSCM on organisational performance from the perspective

of economic outcomes by examining factors such as profitability, market share, waste reduction and productivity (e.g. De Giovanni, 2012; Eltayeb *et al.*, 2011). However, the impact on manufacturing performance is less well understood. For many manufacturers, manufacturing performance is an important measure of their success and cost base, and it is important to understand how the pressure to be more sustainable in their operations impacts their manufacturing performance.

These issues are examined through the lens of two theoretical perspectives – Institutional Theory and Resource Based View (RBV). In effect, this study examines if institutional forces can solely be responsible for improved environmental and manufacturing performance or if it is necessary to adopt a resource based strategy as a mediating factor to achieve improved performance. An understanding of such relationships is important in enabling manufacturers to strategically manage external pressure. Zhu *et al.* (2005) argued that organisations need to understand the importance of gaining competitive advantage by changing in accordance to external pressure for sustainable practices. The authors of this paper agree and extend this perspective in suggesting that external pressures from various stakeholders may become so overwhelming that organisations become reactive or simply crumble and consequently, fail to turn the pressure into an advantage.

The study is organised as follows: the next section presents a review of the literature and the study's hypotheses. Thereafter, the research methodology is described and followed by the findings and discussion. Finally the study's conclusions are presented.

Literature review and hypotheses

The development of sustainable practices within supply chains has generated much debate within the academic literature as well as among industry practitioners. Seuring and Muller (2008, p. 1700) defined sustainable supply chain management as “the management of material, information and capital flows as well as cooperation among companies along the supply chain while taking goals from all three dimensions of sustainable development, i.e., economic, environmental and social, into account which are derived from customer and stakeholder requirements”. This perspective emphasises two key issues that are relevant to this study. First is the specification that customers and other stakeholder requirements are important in the pursuit of sustainability and, second, is the identification of the potential links between sustainable practices and different dimensions of development – economic, environmental and social. These dimensions of development have also been identified in different studies as important measurement areas where organisations need to focus their sustainable practices (Green *et al.*, 2012; Zailani *et al.*, 2012). The implication is that organisations that adopt sustainable practices can expect such practices to have an impact on their performance.

Evidence concerning the potential impacts that sustainable practices have on performance is mixed. Rao and Holt (2005) and Green *et al.* (2012) suggested that organisational performance can be positively impacted by the adoption of sustainable practices, but studies by De Giovanni and Vinzi (2012) and Huang *et al.* (2012) failed to find such relationships. Another set of studies including Azevedo *et al.* (2011) and Wu and Pagell (2011) suggested that the relationships between sustainable practices and organisational performance were part positive. These studies indicated that the nature of the relationship was dependent on the particular performance measures that were considered.

Theoretical perspectives

The issues relating to the influence of supply chain partners and other stakeholders, as well as the potential impact of sustainable practices raise interesting theoretical questions about the imperative for organisations to adopt such practices. This study examines these questions from two theoretical perspectives – Institutional Theory and Resource Based View (RBV).

Institutional Theory suggests that organisations are subject to three types of forces - normative, mimetic and coercive (DiMaggio and Powell, 1983; Meyer and Rowan, 1977). Normative forces refer to the pressure placed on organisations by market forces, such as customers, to adopt certain practices (Scott, 1995). Such pressure can be important as organisations need to find legitimacy in the eyes of important commercial partners. On the other hand, organisations operate in a competitive environment and need to be aware of the activities of their competitors. Therefore, there may be a pressure to copy or ‘mimic’ the activities of more successful competitors and this pressure encapsulates the essence of mimetic forces. Coercive forces refer to the pressure to conform or adopt certain practices based on the demands from regulatory authorities or other pressure groups. Within the context of sustainability, Zhu and Sarkis (2007) asserted that organisations are subject to all three forces. In addition, they noted that manufacturers are considered to be greater polluters and responsible for higher depletion of resources than others and are therefore subject to greater pressure. Similarly, Hsu *et al.* (2013) found that manufacturers in Malaysia were compelled by institutional forces to become more environmentally responsible in their operations. Their study found that competitor pressure and regulatory pressure were particularly strong in this respect. The study by Zhu *et al.* (2007) also confirmed that manufacturers in China are faced by increasing institutional pressure to become sustainable in their operations. This study therefore adopts a view that manufacturers operate in

an environment where they are subject to external pressure from different external stakeholders to be sustainable in their operations. The key issue is developing an understanding of what is the impact of such intense pressure.

RBV suggests that organisations are able to develop certain resources and competencies that can be used to improve their level of performance and competitiveness (Halley and Beaulieu, 2009). According to RBV, the resources and competencies to be leveraged can be considered to be valuable, rare, inimitable and non-substitutable and the ability to effectively leverage these resources is what leads to competitive advantage (Barney and Griffin, 1992). Within the context of sustainability, Shang *et al.* (2010) and Menguc and Ozanne (2005) suggested that RBV theory is a relevant theory with respect to gaining competitive advantage. Within the context of implementation of green practices, Shang *et al.* (2010) highlighted the applicability of RBV in understanding the relationship between GSCM capability and organisational performance. In addition, Shi *et al.* (2012) noted that RBV theory had been used in several studies in order to understand the link between GSCM and organisational performance improvement. Shi *et al.* (2012) further suggested there needed to be better understanding of the role of RBV in GSCM development.

In a study of GSCM boundaries and flow, Sarkis (2012) suggested that both Institutional Theory and RBV are applicable in understanding relationships and performance. Sarkis suggested that while Institutional Theory is relevant in understanding the adoption of green practices due to external pressure, whilst RBV is relevant to understanding the impact of the development of internal capabilities and resources. Given that manufacturers may be driven by institutional forces to implement sustainable practices but may also be subject to RBV-led resources and competencies, it is unclear how these two dimensions not only relate to each other

but also to the performance outcomes of the organisation. Are both dimensions necessary for competitive advantage, or is one more dominant than the other? Given the ambiguity of the findings of previous studies regarding the relationship between sustainability and economic performance and the suggestion by Zhu and Sarkis (2007) that manufacturers typically consider their economic performance to be a key priority, this study will examine economic performance from a specific set of variables that relate to manufacturing performance. Not only has manufacturing performance not been studied specifically from a sustainability perspective, it is important to note that for manufacturers, the actual performance of their manufacturing operations is one of the most important, if not the most important economic measure. It is also a direct outcome of their core competencies.

The effect of External Pressure

Diabat and Govindan (2011) and Lee (2008) noted the importance of external pressure with regards to implementing sustainable practices and suggested that such pressure is increasingly becoming dominant. This perspective was also identified by Linton *et al.* (2007) who noted that organisations worldwide are increasingly subject to legislation that encourage them to reduce the polluting effects of product and process activities. The increasing awareness of consumers in addition to other external pressures to be sustainable were identified by Diabat and Govindan (2011) when they identified customers, investors and non-governmental organisations as drivers of sustainability. In addition, Lee (2008) identified the effect of suppliers in driving sustainability. However, it has been suggested that external pressure also include social pressure and ethical conduct which are often considered as important dimensions of sustainability (Baden *et al.*, 2009; Ciliberti *et al.*, 2008; Faisal, 2010). This suggests organisations face significant external pressure

to be sustainable. However, Zhu *et al.* (2008) argued that organisations need to turn the pressure that they face into an advantage. Some of such potential advantages are the environmental outcomes experienced by the organisation. Therefore, the following is proposed:

H1. External pressure will lead directly to an improvement in environmental outcomes.

However, for manufacturers, economic performance is also important, particularly manufacturing performance. Manufacturing performance with respect to sustainability refers to the ability of manufacturers to reduce waste, reduce the use of resources/energy and improve productivity (Eltayeb *et al.*, 2011; Theyel, 2000; Zhu and Sarkis, 2004). Therefore, it is proposed that:

H2. External pressure will lead directly to an improvement in manufacturing performance.

However, the goal of external pressure may not necessarily be related to organisational performance of the focal firm. Indeed many external stakeholders are not particularly driven by the performance imperatives of the organisation. For example, regulatory agencies may be driven by the need to reduce pollution and promote recycling, whether or not, this leads to improved economic performance for the organisation, while customers may be driven by a need to conform to their own sustainability agenda (Laosirihongthong *et al.*, 2013). Similarly, social pressures aim to encourage responsible corporate citizenship (Awaysheh and Klassen., 2010; Baden *et al.*, 2009). Therefore, the direct effect of external pressure may drive the

implementation of visible and demonstrable sustainability management initiatives. Hence, it is proposed that:

H3. External pressure will lead to an increased emphasis on sustainable management initiatives.

The effect of Sustainable Management Initiatives

Sustainable management initiatives have been the focus of several studies – primarily in the Corporate Social Responsibility (CSR), Business Ethics and GSCM fields. While the GSCM literature has been mainly concerned with environmental sustainability (e.g. Laosirihingthong *et al.*, 2013; Zhu and Sarkis, 2004), the CSR and Business Ethics literature has also considered social sustainability (e.g. Awaysheh and Klassen., 2010; Tsoi, 2010). There has been considerable attention paid to the need to manage sustainability by launching formal programmes by subscribing to international standards. For example, Tsoi (2010) alluded to the pressure on organisations to attain Social Accountability (SA 8000) standards while others, such as Vachon (2007) have noted the increasing pressure to adopt formal environmental standards, such as ISO 14001. In addition, Tsoi (2010) identified the importance of having formal training programmes for sustainability management. Clearly there is pressure on organisations to implement some form of Environmental Management System (Large and Thomsen, 2011; Sarkis, 2012; Zhu *et al.*, 2005). However, the implementation of such programmes requires the injection of resources and the acquisition of new knowledge or skills. From a RBV perspective, the availability of such resources, knowledge and skills could lead to competitive advantage. There is an expectation that the implementation of such formal initiatives will lead to some benefits for organisations,

including environmental outcomes such as environment friendly products and processes, Therefore, the following hypothesis is proposed:

H4: Improvement in sustainable management practices will lead to an improvement in environmental outcome

There has been considerable debate about the potential for sustainability programmes to lead to improved economic outcomes. Wittstruck and Teuteberg (2012) and Zailani *et al.* (2012) found that implementation of sustainable management can have positive economic outcomes. While the specific impact on manufacturing performance has not been clarified, there has been some suggestion that sustainable management can have a positive impact on aspects of manufacturing performance, such as energy consumption, material usage (Rao, 2002; Zhu *et al.*, 2012) and improved product design. Therefore, the following hypothesis is proposed:

H5: Improvement in sustainable management practices will lead to an improvement in manufacturing performance.

Though not initially considered or hypothesised, this study later considered the ability of sustainable management to mediate the relationship between external pressure and environmental outcomes. External pressure to consider environmental and social issues could lead firms to adopt formal sustainable management programmes, and lead to the achievement of improved environmental results. In effect, can institutional pressure to consider environmental

and social impact lead to a RBV perspective, which then results in competitive advantage with respect to environmental outcomes? Therefore, it is hypothesised that:

H6: Sustainable management practices will mediate the relationship between external pressure and environmental outcomes.

The Asian Context

This study is based on data collected from three Asian countries – China, India and Malaysia. Increasing outsourcing of global manufacturing to these Asian countries makes this a topical study and a particularly relevant region to study. The increasing external pressure on Asian manufacturers to adopt environmental and social practices is well documented in literature (e.g. Eltayeb *et al.*, 2011; Tsoi, 2010; Zhu and Sarkis, 2007). However, the cost of adopting such practices has been identified as a major barrier in such countries (Gulger and Shi, 2009; Lund-Thomsen and Nadvi, 2010). These countries, characterised by intense competition and where much of the competitive advantage and value proposal is based on low-cost manufacturing, manufacturing performance is an important outcome that needs to be measured in its own right. If there are clear links between adoption of environmental and social practices with manufacturing performance, the drive to adopt such practices could become self-propelling.

Research Methodology

Data for this study were collected from the sixth round of the International Manufacturing Strategy Survey (IMSS) (The International Manufacturing Strategy Survey, 2014). IMSS-VI was carried out in 23 countries between July 2013 and June 2014. This global project collected data

from plant, production or operations manager of manufacturing firms listed in the International Standard Industrial Classification (ISIC) codes ranging from 25, 26, 27, 28, and 29 to 30. IMSS-VI used a self-administered survey questionnaire and the research was centrally coordinated to ensure consistency in data collection procedures across different countries.

IMSS-VI data collection used two sampling methods, namely convenience and random sampling. For random sampling, each country coordinator was required to establish a sampling frame of the population of the companies in the respective country using national databases. The selection was restricted to companies with the six ISIC codes (i.e., 25, 26, 27, 28, 29 and 30) and with more than 50 employees (per company). Next, each country coordinator randomly selected and contacted the companies from the sampling frame. For convenience sampling, country coordinators directly contacted companies that participated in previous IMSS editions or that researchers know previously. Given that IMSS is a longitudinal project, country coordinators who participated in IMSS I, II, III, IV and/or V were advised to invite all the companies that were in the database in the previous releases, in order to maximize the overlap between the samples. For both convenience and random sampling, country coordinators were advised to first contact the potential respondents and check for their availability for research participation, prior to survey distribution.

Non-response bias and late-respondent bias test were performed and validated before compilation of IMSS-VI dataset. For non-response bias test, each country coordinator was required to run *t*-test and Chi-square test using the figures of sales, number of employees and SIC code for respondents and non-respondents. For late- response bias, each coordinator was required to run *t*-test and Chi-square test using the figures of sales, number of employees and SIC code for early-respondents and late-respondents. Therefore, all three country samples used

in this study were checked and validated for non-response bias and late-response bias before being added to the IMSS dataset.

Data were systematically compiled in electronic spreadsheets by country coordinators. The central coordination at Politecnico di Milano (Italy) performed quality checks and released the final pooled data to the research network in September 2014.

For the purpose of this study, a total of 159 datasets were analysed. The responses included 56 (35.2%) from China, 90 (56.6%) from India, and 13 (8.2%) from Malaysia. The three selected countries are emerging economy countries in Asia. The breakdown of companies with ISIC code is as follows: 23 (14.5%) with ISIC 25, 42 (26.4%) with ISIC 26, 27 (17%) with ISIC 27, 29 (18.2%) with ISIC 28, 30 (18.9%) with ISIC 29 and remaining 8 (5%) with ISIC 30.

Measures

The survey items are detailed in Table 1. We used a two-item scale from Sarkis *et al.* (2010) and Porter and Kramer (2002) to measure the level of external pressure. The two survey items were assessed using five-point Likert scale where 1 represents very low and 5 represents very strong. Sustainable management was measured using five items adapted from Kitazawa and Sarkis (2000), Longo *et al.* (2005), Daily and Huang (2001), Sarkis (1998), and Klassen and Whybark (1999). The question for sustainable management (i.e., effort put in the last three years into implementing) was evaluated on a five-point Likert scale where the anchors were 1=none and 5=high. A four-item scale was adapted from past studies (i.e., Ferdows and De Meyer, 1990; Pagell and Gobeli, 2009; Woo *et al.*, 2001) to measure the level of manufacturing performance. All responses for manufacturing performance (i.e., compared to three years ago) were captured using a five-point Likert scale where 1 represents decrease (-5% or worse), 2 represents stayed

about the same (-5%/+5%), 3 represents slightly increased (+5 to +15%), 4 represents increased (+15% to 25%), and 5 represents strongly increased (+25% or better). The scale of environmental outcomes was measured using three items adapted from Gimenez *et al.* (2012), and Maxwell and van der Vorst (2003). These items were assessed using a Likert scale where anchors ranging from 1 (not important) to 5 (very important).

[Place Table 1]

Scale validation

Table 2 shows the studied variables and their factor loadings. All the items of each scale had high factor loadings between 0.779 and 0.875, meeting the desirable value of 0.50 (Hair *et al.*, 2010). Table 3 presents the results of descriptive, reliability and validity analyses. In this study, internal reliability and validity of the constructs were validated by examining the values of Cronbach's Alpha, composite reliability and the average variance extracted. As shown in Table 3, all variables had Cronbach's Alpha ranging from 0.700 to 0.898. The reliability was validated as the Cronbach Alpha was greater than the threshold of 0.70 (Hair *et al.*, 2010). Composite reliability values ranging from 0.867 to 0.925 were greater than the desirable threshold of 0.60 recommended by Bagozzi and Yi (1988). In terms of validity analysis, the resulting average variance extracted for each scale ranged from 0.689 to 0.766, meeting the requirement for convergent validity. In addition, the values of square roots of average variance extracted were greater than the off-diagonal measures in the corresponding rows and columns in the correlation matrix, indicating that discriminant validity was established (Fornell and Larcker, 1981).

[Place Table 2]

[Place Table 3]

The study used the SPSS and AMOS programs to analyse the data (see Figure 1). The hypothesized model was tested using SEM. There are several distinguished characteristics of SEM (also known as covariance structure analysis and latent variable analysis) which support the use of SEM in this study. According to Hair *et al.* (2010) and Kline (2005), SEM has three main characteristics: (1) ability to perform estimation of multiple and interrelated dependence relationships; (2) represent unobserved concepts in the dependence relationships and account for measurement error in the estimation process; and (3) construct a model to predict a full set of relationships. In this study, the use of SEM provided an excellent way to (1) concurrently analyse the multiple and interrelated dependence relationships; (2) accommodate measurement errors directly in the estimation of a series of direct and mediating relationships (Hoyle and Smith, 1994); (3) provide overall model fit indices to examine if the hypothesised models are correctly specified (Peyrot, 1996). Using SEM, we ran a bootstrap of 600 samples with each sample having 159 data points. In this study, the model fit was assessed using seven common measures including normed chi square (χ^2), goodness-of-fit (GFI) index, adjusted goodness-of-fit (AGFI) index, root mean square error of approximation (RMSEA), normed fit index (NFI), Tucker Lewis index (TLI), and comparative fit index (CFI). Our hypothesized model fit the data well with normed chi square (χ^2) = 1. 535, GFI = 0. 912, AGFI = 0. 868, RMSEA = 0. 058, NFI = 0. 910, TLI = 0. 956, and CFI = 0. 966.

[Place Figure 1]

As shown in Table 4 and Figure 2, the hypothesis testing results of the model indicated external pressure ($\beta=0.410$; p-value < 0.001) was reported to have a significant and positive relationship with environmental outcomes. External pressure ($\beta=0.335$; p-value < 0.01) was also found to have a significant and positive relationship with sustainable management. Sustainable management ($\beta=0.450$; p-value < 0.01) was positively related to environmental outcomes. Interestingly, there were no significant relationships between external pressure and manufacturing performance ($\beta=-0.114$; p-value > 0.05), and between sustainable management and manufacturing performance ($\beta=0.182$; p-value > 0.05). As a result, hypotheses H1, H3 and H4 were empirically supported. The findings did not support H2 and H5.

[Place Figure 2]

[Place Table 4]

The bootstrap approach introduced by Preacher and Hayes (2004) has been recognised as one of the most widely used methods to test the mediation hypotheses. Therefore, the mediation hypotheses in this paper were analysed using the bootstrap approach. As shown in Table 5, the indirect effect of sustainable management on environmental outcomes was calculated as the product of the path coefficients between external pressure and sustainable management ($\beta = 0.335$), and between sustainable management and environmental outcomes ($\beta = 0.450$). This indirect effect coefficient was equal to 0.151, which can be tested for significance using the bootstrap approach (Preacher and Hayes 2004). The results of bootstrapped tests are shown in Table 6. The indirect effects were significant as the lower confidence interval of the bias corrected bootstrap does not contain zero. Given that both direct and indirect effects were significant, the mediating effects were supported for sustainable management. In other words, H6 was supported.

[Place Table 5]

[Place Table 6]

Discussion

There can be little doubt that organisations worldwide are facing increasing pressure to be more sustainable in their practices. The imperative to be more sustainable requires organisations to make changes or adopt practices that require resource allocation. The issue that many organisations ask is whether adopting sustainable practices will lead to organisational improvement or not, and what the type and magnitude of improvement will be. This study provides new and significant insight into this on-going debate by examining if the external pressure to be sustainable can lead directly or indirectly to two important dimensions of performance – environmental outcomes and manufacturing performance. The study has shown that external pressure has a significant direct and positive relationship with environmental outcomes. However, external pressure does not have a significant relationship with manufacturing performance. With respect to the mediating effect of sustainable management, the study has also found that sustainable management can mediate positively between external pressure and environmental outcomes but does not mediate between external pressure and manufacturing performance. In effect the study has identified a clear distinction in relationships between environmental outcomes and manufacturing performance.

With respect to environmental outcomes, the study shows a significant relationship between external pressure and environmental outcomes. Therefore, the findings from this study concur with those of Zailani *et al.* (2012) who found that external pressure from regulation and customers have a significant relationship with environmental outcomes. However, their study did

not examine the relationship with manufacturing performance. This study also shows a significant relationship between external pressure and the adoption of sustainable management practices and a further significant relationship between the adoption of sustainable practices and environmental outcomes. This study therefore concurs with other studies such as Testa and Iraldo (2010), Zhu and Sarkis (2004) and Eltayeb *et al.* (2011) that found that adoption of sustainable practices leads to improved environmental outcomes. However, this study had further found not only that external pressure is an important driver of the adoption of such sustainable practices but that external pressure to be sustainable has a direct impact on environmental outcomes. Therefore, this study confirms the pre-eminence of external pressure in driving environmental outcomes, irrespective of whether the relationship is mediated by the adoption of formal sustainable management programs such as environmental certification, training and waste recycling programs. The practical implications of this finding are important. It suggests that while external pressure can drive organisations to implement formal sustainability programs and consequently improve environmental outcomes, the pressure on its own, can also drive environmental outcomes even when such formal programs do not intermediate. This may suggest that informal programs implemented as a direct consequence of external pressure can also lead to improved environmental outcomes. For organisations in developing countries, where there may not be the opportunity to be certified to formal programs such as ISO 14001 or where the cost of such formal programs are prohibitive, this study indicates that it is still possible to achieve improved environmental outcomes.

From a theoretical perspective, this study suggests institutional pressures can lead directly to improved environmental outcomes. However, institutional pressures can also lead to organisations gaining new competencies as a result of the implementation of formal sustainable

practices and consequently improved environmental outcomes. Therefore, while institutional forces can positively influence environmental outcomes, a resource based strategy can also act as a mediating factor to positively influence environmental outcomes. The study by Zhu *et al.* (2005) found that external pressure to be sustainable led to increased awareness among Chinese organisations, but did not necessarily translate to the strong adoption of green practices. The findings of this study suggest adopting a resource based strategy which implies implementing formal programs such as ISO 14001 and training is more likely to lead to longer term gains in environmental outcomes as opposed to only reacting to external pressure without formal programs in place. This is more likely to enable the awareness mentioned by Zhu *et al.* (2005) to be translated into established practices. In contrast, neither institutional forces nor the mediating factor of sustainable management relate to manufacturing performance. The implication therefore is that while institutional pressures and RBV can lead to environmental outcomes, it is not necessary that both are present for an organisation to achieve positive environmental outcomes. What is unclear, however, is whether the presence of both external pressure (institutional pressure) and sustainability competencies (RBV) will lead to relatively better outcomes than the presence of just external pressure even though both dimensions have positive results.

Effect on Manufacturing Performance

While the impact of external pressure and sustainable practices on environmental outcomes is important, for many companies, it can be argued that the impact on manufacturing performance is more important. This is because manufacturing performance, and particularly manufacturing cost is perhaps the most significant component of the operational cost of manufacturers.

According to Zhu and Sarkis (2007), economic performance is the most important consideration for manufacturers. While the study by Zhu and Sarkis (2007) did not specifically examine manufacturing performance, it did conclude that adopting formal programmes, such as ISO 14001 improved environmental performance but did not impact economic performance. This study has qualified the findings by Zhu and Sarkis (2007) by finding that neither environmental pressure nor adoption of formal sustainability programs lead to a significant improvement in manufacturing performance – a major component of economic performance. Therefore, external pressure from stakeholders to be sustainable in their operations, can impact organisations in two ways. Firstly, it could make them react by developing a sustainable management program by adopting practices such as ISO 14001, SA 8000 waste recycling and energy reduction. Secondly, external pressure could impact them by encouraging a less formal approach to sustainability. Irrespective of which of the two options is chosen, the ultimate impact will be an improvement in environmental outcomes. However, if there is an expectation that these approaches would also lead to an improvement in manufacturing performance, this study suggests that no such impact exists. This view is partly supported by the finding of Wagner (2005) that there is an inverse relationship between environmental and economic performance although Wagner (2005) did not specifically study manufacturing performance. This study therefore comes to a different conclusion in contrast to previous of studies by Eltayeb *et al.* (2011), Zhu and Sarkis (2004) and Theyel (2000) that sustainable activities, such as reduction of energy consumption or waste can lead to productivity improvements. While it can be widely accepted that energy and waste reduction have a direct reduction impact on manufacturing cost, the cost of implementing and maintaining other aspects of a sustainability program (e.g. training, ISO 14001) counteract the benefits of factors such as waste and energy reduction. This is because while the reduction of

resources (e.g. energy, water) consumed may reduce the cost of manufacturing, other activities such as implementing a waste recycling programme, training employees and subscribing to environmental and social certification require significant capital outlay and changes to process (e.g. finding suppliers with the requisite green credentials) or equipment (e.g. replacing old equipment with more environmentally friendly ones). It is important to note that Zhu and Sarkis (2007) found that external pressure to adopt eco-design practices led to deterioration in economic performance because of the significant financial outlay required for such adoption. Therefore, the net effect of adopting such formal sustainability programmes could be a failure to reduce manufacturing costs overall.

From the point of view of economic performance, there has been a lack of consensus about whether green practices lead to improved economic performance (Green *et al.*, 2012; Zailani *et al.*, 2012) or otherwise (De Giovanni and Vinzi, 2012; Huang *et al.*, 2012). The authors of this study would argue that the findings from the study neither agree nor disagree with either of the opposing views. Rather, it is suggested that the findings put the opposing views into a different perspective. The suggestion is that the lack of a relationship between the adoption of sustainable practices and manufacturing performance implies that the ability to gain improved economic performance from sustainable practices is not related to manufacturing costs but to other factors. For example, this study has confirmed the relationship between such practices and environmental outcomes and it is possible that such positive environmental outcomes may lead to an improvement in product image and market share, and consequently improved economic performance. It may also be that products with a better sustainability credentials can command premium pricing and, therefore, lead to better economic outcomes. Therefore, external pressure and the adoption of sustainable manufacturing may lead to improved economic outcomes if the

benefits of factors such as improved product image, market share and premium pricing can supersede the financial outlay to implement the programmes. It is important therefore, for organisations that are reacting to external pressure to be more sustainable to investigate if adopting sustainable practices can provide other avenues for economic benefits. The authors suggest that the ability to do this will depend on various factors including the nature of the product, the industry, the mind set of their customers and the markets in which they sell their products. The lack of a relationship between external pressure and manufacturing performance identified in this study may help to partly explain the finding by Zhu *et al.* (2005) that while external pressures have increased awareness of GSCM in Chinese companies, this awareness has not necessarily translated into adoption of sustainable management practices. It suggests that if organisations do not identify clear linkages between the external pressures they face and manufacturing performance, they may be reluctant to invest in the implementation of sustainable initiatives.

From a theoretical perspective and based on the factors examined in this research, the study has shown that neither institutional pressures nor the attainment of RBV-related sustainability competencies will necessarily lead to improved manufacturing performance. This is based on the finding that neither external pressure nor sustainable management has a significant relationship with manufacturing performance. Therefore, manufacturers that face institutional pressures or that are sold sustainability programs on the premise that it will improve manufacturing performance need to consider these issues carefully.

Conclusion

This study set out to investigate the relationship between external pressure to be sustainable, adoption of formal sustainability programs and manufacturing performance and environmental outcomes. It has found that while there is a significant relationship between external pressure, adoption of formal sustainability programs and environmental outcomes, such significant relationships do not exist with manufacturing performance. It has been also been argued that the lack of a relationship with manufacturing performance does not necessarily imply that organisations cannot gain economic benefits from implementation of sustainable practices. Rather such economic benefits may come from other performance dimensions related to environmental outcomes.

Study Implications

This study has important managerial and academic implications. For managers, the study suggests that in implementing sustainable practices, it is important to understand that the investment in such practices may not lead to a direct reduction in their manufacturing cost base. Therefore, while regulatory directives may compel organisations to be more sustainable in their operations, complying with such directives may not lead to manufacturing cost improvement. It is therefore important to examine carefully if economic advantage may be gained elsewhere as a result of the adoption of such practices. For example, adopting sustainable practices may make their products ‘greener’ and they may be able to charge a premium price. In addition, it may improve their market share by attracting environmentally conscious customers. Secondly, managers should understand the impact that external pressure to be sustainable can have on their organisation, and therefore the importance of attaining environmental outcomes in order to

satisfy external stakeholders. They could react to these pressures by either adopting formal programs or by adopting less formal programs. While either approach would lead to improved environmental outcomes, neither would lead to improved manufacturing performance. Thirdly, managers need to understand that, even when formal sustainability programs such as ISO 14001 are not implemented, it is still possible to attain positive environmental outcomes. In addition, managers need to understand that institutional forces can affect environmental outcomes either directly or through mediation with sustainable management. The key decision that managers may need to make is whether to invest in formal programs in order to achieve the desired environmental outcomes. It may well be that investment in such programs will serve the purpose of formalising and grounding sustainable thinking in their organisation in contrast with reacting to external pressure by adopting less formal approaches..

For academia, this study has shown that the relationship between adoption of sustainable management practices and economic performance is not as simple as ‘yes’ or ‘no’ and that a much more complex relationship exists. In addition, the study has shown that institutional pressures have a direct impact on environmental outcomes while adoption of formal sustainable programs can also mediate between institutional pressures and environmental outcomes.

Finally, the study’s limitations and suggestions for future studies are presented. Firstly, the study has focused only on external pressures to be sustainable and not on internal pressures. It is unclear if such internal pressures exist generally and whether their existence will lead to different results with respect to adoption of formal environmental practices and environmental outcomes and manufacturing performance. This could be a subject for future studies. Future studies could also consider if there is a significant difference in outcomes between organisations that implement formal sustainability programs and those that choose less formal routes. Studies

may also consider whether the presence of both external pressure and sustainable competencies would lead to relatively better outcomes than just the presence of external pressure.

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