

Green supply chain management practice adoption in Ugandan SME manufacturing firms

154 --- The role of enviopreneurial orientation

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Abstract

Purpose – The purpose of this paper is to advance enviopreneurial orientation (EO) as a new internal driver for green supply chain practice adoption. Because manufacturing supply chains are major contributors to environmental pollution, green practice adoption is a means of reducing environmental pollution. However, why owner/managers adopt green practices remains uncertain. The concept of EO is a potential and important motivation for adoption of green supply chain practices that has yet to be explored. The study investigates the relationship between EO and green supply chain practice adoption.

Design/methodology/approach – Cross-sectional survey design was employed to collect data from owners/managers of SME manufacturing firms in Uganda. The structural equation modelling was used to analyse results on the influence of each of nine EO on green supply chain practice adoption and the influence of EO dimensions on green supply chain practice adoption.

Findings – Findings show that EO positively influences green supply chain practice adoption. All but two of nine dimensions of EO were significant predictors of green supply chain practice adoption. Competitive aggressiveness and perceived pressure from environmental regulations were not significant predictors for green supply chain practice adoption.

Research limitations/implications – The study was cross-sectional. A longitudinal survey was more appropriate because of the presence of a behavioural variable green supply chain practice adoption. Further a comparative study is required because of the existence of differences in classifications of SMEs in both the developing and developed countries.

Originality/value – The research contributes to further scholarly understanding of green practice adoption in SMEs through offering a new construct, EO, and its role in influencing green supply chain practice adoption. The authors develop EO as a construct, a concept that has not been developed for more than two decades.

Keywords Adoption, Environmental behaviour

Paper type Research paper

1. Introduction

Over 50% of an average corporation's carbon emissions are typically from the supply chain rather than within its own four walls. Managing supply chain emissions is therefore critical if we are going to address climate change effectively (Carbon Disclosure Project, 2011, p. ii, Supply chain report).

Small- and medium-sized enterprises (SMEs) are responsible for a significant portion of environmental pollution globally, however, how they manage environmental issues and what impact they have on the environment are not well understood (de Oliveira and Jabbour, 2015; Zeković *et al.*, 2014; Zobel, 2007). Negative environmental impact is especially seen in manufacturing supply chains because inbound, outbound and reverse logistics combined with internal firm operations produce substantial



environmental pollution (Sarkis, 2003; Zhu *et al.*, 2013; Tamyez *et al.*, 2015). These pollution problems are of local, national and global concern, particularly in developing nations where regulations are fewer and enforcement less effective (Blackman, 2010; Ling and Khor, 2002; Najam, 2005). Further, competing in global markets increasingly requires products that are not only innovative but also environmentally sound (Coyle *et al.*, 2015; Esty and Simmons, 2011; Smith *et al.*, 2014). These imperatives have led to a focus on creating “green supply chains” in which firms adopt practices that minimise environmental harm (Aneyrao and Ahemad, 2014; Cognizant, 2008; Zhang *et al.*, 2012). Green supply chains “entail integrating environmental thinking into supply-chain management, including product design, material sourcing and selection, manufacturing processes, delivery of the final product to the consumers as well as end-of-life management of the product after its useful life” (Srivastava, 2008, p. 54).

While there is increasing interest in green supply chain practices (Chien and Shih, 2007; Zhu and Sarkis, 2004), there is less on why firms adopt green practices and to what extent. Literature on green supply chain practice adoption distinguishes between external and internal factors that drive adoption (Walker *et al.*, 2008). Of the two, less understood are the internal factors such as management perceptions of the external pressures and management attitudes towards adoption (Bose and Pal, 2012; Carter *et al.*, 1998; Henriques and Sadorsky, 1999; Muduli *et al.*, 2013; Taylor, 1992). This represents a managerial issue that, if better understood, would benefit SMEs and the broader community. Although the term *enviropreneurial orientation* (EO) has been mentioned in various literature, mainly strategic marketing, it has not been developed as a construct. Based on entrepreneurship and environmental management literature, we developed dimensions for the new construct, EO, and tested its influence on green supply chain practice adoption among SME manufacturing firms in the developing nation of Uganda. The aim of the paper is to report on our study of a new internal factor, EO and its influence on the adoption of green supply chain practices.

The paper has eight sections, commencing with Section 2, EO and the Theory of Reasoned Action followed by a review of the determinants of EO in Section 3. Section 4 explains the proposed conceptual relationship between EO and green supply chain practice adoption; Section 5 outlines the survey method; Section 6 presents the research findings; Section 7 discusses the research implications; and Section 8 concludes the paper with an outline of the research limitations and suggestions for further research.

2. EO and the Theory of Reasoned Action

Introduced over 20 years ago by Varadarajan (1992), no clear definition exists for EO. It can be assumed that Varadarajan saw no further need to define the term EO, however EO was raised as an area for further research by Menon and Menon (1997). Although the term later appears in the work of Hartman and Stafford (1998), Paulraj (2011), Thoo *et al.* (2014), the concept has not been developed and tested as a construct.

Because EO is an attitude and our interest is in its relationship to green supply chain practice adoption, the Theory of Reasoned Action is an appropriate theoretical framework. An attitude can be defined as an enduring organisation of motivational, emotional, perceptual and cognitive processes with respect to some aspect of an individual's world (Pande and Soodan, 2015; Wannenburg *et al.*, 2015). Within the environmental management literature, most focus has been on the effects of mandatory pressures (objective pressures) on firms to force green practice adoption.

Little attention has been given to the perceived value of the objective pressures by firm owners in the decision to adopt green practice adoption. In line with the Theory of Reasoned Action, our focus is on both attitudes and perceived pressures. The theory suggests that an individual's behaviour is determined by his/her intentions to perform behaviour and those intentions are a function of his/her attitude towards the behaviour and perceived social pressure. The theory dominates environmental management and entrepreneurship literature and explains determinants of behavioural decision making intentions in a firm (e.g. Hikkerova *et al.*, 2016; Winston *et al.*, 2016).

Objective pressures are taken to be mandatory pressures with which owners or managers have to comply (Delmas and Toffel, 2004; Liu *et al.*, 2010) while perceived pressures are objective pressures that are transformed into subjective (perceived) pressures by organisational processes or interpreted by individual owner/managers (Delmas and Toffel, 2004; Liu *et al.*, 2010). Emphasis is placed on the influence of objective pressures in most environmental management, entrepreneurship and green supply chain management studies (see Seroka-Stolka, 2014; Wagner, 2015) with less attention to owner/manager perceptions of the external pressures. Owners/managers may make an analysis of whether there is a need to respond to external pressures and this represents their perception of a pressure (Chan *et al.*, 2012).

The following section outlines the dimensions of EO developed through a review of the relevant literature in the areas of entrepreneurship and environmental management.

3. EO and its dimensions

We created EO as a second order construct or multidimensional construct based on multidisciplinary roots across entrepreneurship and environmental management. Nine first order constructs were identified from the literature in order to form the second order construct, EO. The nine dimensions comprise five attitudes (innovativeness; risk taking propensity; competitive aggressiveness; employee empowerment; and proactiveness) and four perceived pressures (perceived pressure from external social networks; perceived consumer pressure; perceived pressure from environmental regulations; and perceived local community pressure). EO is a second order construct comprised of the aggregate of nine dimensions which include both attitudes and perceptions.

To generate the first order constructs for EO, two literatures were searched for attitudinal factors that led to engagement in environmental management behaviour and entrepreneurial behaviour. Given the large number of factors identified in the literature, a comparison of the factors was made to find those with characteristics common to both literatures and group them together to form nine first order constructs or categories. Common characteristics included the context to which the factors were applied and the outcome of the factors. For example factors discussed in the proactiveness context in the different literature were grouped under that category while factors that led to innovativeness or proactiveness were grouped together. For example, the dimension of risk taking propensity contained six factors, three of which (management openness to experiences; managerial attitudes towards the environment; and managerial strategic creative intentions) were common to both environmental management and entrepreneurship research and three of which could be found only in the environmental management literature (management support; environmental social responsibility; and managerial perceptions of environmental issues).

4. Relationship between EO dimensions and green supply chain practice adoption

In the absence of a measurable conceptualisation of EO, in order to hypothesise a relationship between EO and green supply chain practice adoption, we needed to base our hypotheses on previous research on each dimension of EO. Summaries of the research for each of the nine dimensions and any unresolved issues are outlined below.

Innovativeness and green supply chain practice adoption

Performance of green supply chain practices necessitates owner/managers of SME firms to be innovative. Innovativeness refers to “the tendency to engage in and support new ideas, novelty, experimentation, and creative processes that may result in new products, services, or technological processes” (Lumpkin and Dess, 1996, p. 142). Lack of innovativeness hinders an owner/manager’s engagement in green supply chain practices (Zailani *et al.*, 2015). Innovativeness of owner/managers may lead to the evolvement of radical green supply chain practices (Dwyer *et al.*, 2009). While previous research in green supply chain management recognises the relevance of innovativeness, the influence of innovativeness on green supply chain practice adoption is still unclear.

Risk taking propensity and green supply chain practice adoption

Owner/managers of SME firms in a green supply chain operate in a dynamic environment that creates an environmental and investment risk. Owner/managers may implement green supply chain practices in response to experiencing an environmental risk (Wang *et al.*, 2012). Investment in green supply chain practices depends on the degree of environmental risk perceived. Environmental risk refers to the negative environmental impact resulting from the actions of an owner/manager’s firm (González-Benito and González-Benito, 2006). An investment is made in resources required for the enactment of green supply chain practices. An analysis of the investment risk is made before an owner/ manager makes a decision to invest in an environmentally friendly practice (Brockhaus, 1980). An owner/manager with a risk taking propensity may invest more in green supply chain practices. A change in any of the practices may require a new investment to be made by an owner/manager. For example: a change in the eco-design of a product results in change in other green supply chain management practices. Such a change may lead to investing in new production processes and environmentally friendly technologies, changing the supply base and/or the composition of the eco-design team, hiring staff with expertise in undertaking the investment recovery activities or training the existing staff.

Competitive aggressiveness

Competitive aggressiveness in environmental management denotes the ability of owner/managers to challenge their competitors (Lumpkin and Dess, 1996). Rather than compete on individual firm to firm basis, competition between similar firms in a supply chain depends on the broader supply chain context where competition is based on engagement with green practices (Eiadat *et al.*, 2008; Rao and Holt, 2005). In order for owner/managers to obtain a reduction in environmental pollution and waste material in their supply chains, they compete using their green supply chain management competences and technical knowledge. Competition among firms leads to adoption of environmentally friendly practices (Zhu *et al.*, 2013). Whereas owner/managers may

copy both management competencies and technical knowledge used by the leading firm within its entire supply chain, imitation of such practices is complex (Wu *et al.*, 2012).

Employee empowerment and green supply chain practice adoption

Employee empowerment entails a participative approach whereby employees have a right to make decisions, determine the necessary actions required to implement the decisions and take responsibility for their actions. Within environmental management literature, the concept is integral to green practice implementation (Corbett and Cutler, 2000; Massoud *et al.*, 2011). It contributes to pollution prevention through employees initiating waste reducing options which is a key goal for green supply chain practice adoption (Corbett and Cutler, 2000; Sarkis *et al.*, 2010). Within the green supply chain management, employee empowerment is a driver for green supply chain practice adoption but without empirical justification (see Lin and Dai, 2015; Walker *et al.*, 2008).

Proactiveness and green supply chain practice adoption

Proactiveness in a supply chain refers to the ability of owner/managers to identify and anticipate current and future environmental management problems and opportunities. Owner/managers identify problems and opportunities through systematically examining the environment (Hughes, 2007). When owner/managers identify the environmental problems and opportunities, they initiate proactive environment management strategies in order to resolve the problems and exploit the potential environmental management opportunities (Tang *et al.*, 2014; Meng *et al.*, 2013). Although proactiveness may lead to adoption of green practices, proactiveness is taken to be a preventive approach to environmental pollution in green supply chain management and therefore lacks the entrepreneurial aspect. This study employs an approach to proactiveness similar to Paulraj (2011) in sustainable supply chains and Menguc and Ozanne (2005) in environmental management and entrepreneurial literature.

Perceived pressure from external social networks and green supply chain practice adoption

Social networks for an owner/manager's SME manufacturing firm in a supply chain consist of different parties or members. Within the green supply chain management literature, emphasis is placed on the influence of social networks rather than the influence of managerial perceptions of the pressure from the social networks (Ruef, 2002). Previous supply chain studies on social networks confuse supply chain networks with social networks (see Capó-Vicedo *et al.*, 2011; Cousins *et al.*, 2006; Galaskiewicz, 2011; Lee, 2005). However, the two concepts differ. Most supply chain studies view supply chains as distribution networks and not social networks. An owner/manager of an SME firm generally engages in inter-firm cooperation and linkages that limit the engagement to a few members of the supply chain while social networks are not limited to an owner/manager supply chain (Newman and Park, 2003). Inter-firm relationships created by owner/managers of SME manufacturing firms are transaction based and lack the relational aspects of social networks (Yang, 2007). Further, compared to supply chain networks, owner/managers are driven by the social influence of the members from their social networks (Li *et al.*, 2015).

Perceived pressure from consumers and green supply chain practice adoption

Owner/managers of SME firms operating in a supply chain may experience pressure from consumers in the downstream chain. This pressure in turn triggers the owner/manager to pressure suppliers in the upstream chain (Shi *et al.*, 2012). Similarly, owner/managers of SME manufacturing firms operating close to consumers may experience higher pressure compared to those further away from consumer contact (Anton *et al.*, 2004). Thus, managerial perceptions of consumer pressure may lead to adoption of green practices. However, the influence of managerial perceptions of consumer pressure on adoption of green supply chain practices remains unclear within the green supply chain management literature.

Perceived pressure from environmental regulations and green supply chain practice adoption

Supply chain firms in a must comply with a number of government imposed environmental regulations. The regulations spell out environmental goals to be met by the owner/managers and represent a major motivation for engagement in green supply chain practices (Kuo *et al.*, 2014; Schrettle *et al.*, 2014). Although research in environmental management shows that managerial perceptions of pressure from environmental regulations determine adoption of green practices (see Banerjee, 2002; Gabzdylova *et al.*, 2009; Mol and Spaargaren, 2000), there is little examination of the influence of managerial perceptions of environmental regulations pressure on green supply chain practice adoption. Greater attention is given to the objective compliance with environmental regulations.

Perceived pressure from the local community and green supply chain practice adoption

Owner/managers of SME manufacturing firms have an implied obligation to ensure their activities do not harm the health and safety of local communities (Liu *et al.*, 2010). Environmental concern by local communities places direct pressure on the owner/managers rather than other members of their supply chain (Hsu *et al.*, 2013). Owner/manager responses to local community pressure depend on the degree of pressure perceived by an owner/manager. In responding, owner/managers may focus both on their own environmental impact as well as that of their suppliers. Regardless, the influence of managerial perceptions of pressure from local community on green supply chain practices requires further investigation.

Based on the above discussion, we developed the following hypotheses to test the relationship between EO and green supply chain practice adoption and each of the nine for EO and green supply chain practice adoption:

- H1. EO positively influences green supply chain practice adoption.
- H1(a). Innovativeness is positively associated with green supply chain practice adoption.
- H1(b). Risk taking propensity is positively associated with green supply chain practice adoption.
- H1(c). Competitive aggressiveness is positively associated with green supply chain practice adoption.
- H1(d). Employee empowerment is positively associated with green supply chain practice adoption.

- H1(e)*. Proactiveness is positively associated with green supply chain practice adoption.
- H1(f)*. Perceived pressure from external social networks is positively associated with green supply chain practice adoption.
- H1(g)*. Perceived pressure from consumers is positively associated with green supply chain practice adoption.
- H1(h)*. Perceived pressure from environmental regulations is positively associated with green supply chain practice adoption.
- H1(i)*. Perceived pressure from the local community is positively associated with green supply chain practice adoption.

5. Method

The section explains the Ugandan context of the research, the sample, instrument used in the collection of data and analysis of the data.

Ugandan context

Small and medium enterprises (SME) are the backbone of the Ugandan economy. They contribute to job creation and poverty reduction (Uganda Investment Authority SME Business Guide, 2008). SMEs in Uganda account “for approximately 90% of the private Sector, over 80% of manufactured output, contributes about 75% to the gross domestic product (GDP) and employs more than 2.5 million people, which makes it one of the largest employers in the country” (Ministry of Finance, Planning and Economic Development draft report, 2011, p 1). Uganda’s SMEs are concentrated mainly in Kampala and the Central region.

The Ugandan government increasingly concerned about environmental pollution caused by manufacturing firms by the Ugandan government. The Ugandan government promotes environmentally friendly practices among manufacturing firms through the Uganda Cleaner Production Centre and the Uganda National Environmental Management Authority. The role of the authority is to put pressure on those manufacturing firms that engage in environmentally polluting activities. Most amount of the environmental pollution in Uganda emanates from manufacturing firms (NEMA, 1994, 1996, 2008, 2010). Enforcement is not effective because of corruption typical in developing countries.

Research paradigm

A pragmatic research paradigm was employed. The pragmatic paradigm neglects the ontology and epistemological assumptions in favour of a with application of a method that works based on the need to provide a solution to a problem (Patton, 1990). Although research on supply chain management generally and green supply chain management specifically employs both quantitative and qualitative methods, the majority of the research is within a postivist paradigm (see Golicic and Davis, 2012; Walker *et al.*, 2008; Zhu *et al.*, 2013). Similarly, this research uses quantitative method involving hypothesis testing, however, it is carried out within the pragmatic paradigm because the research dealt with perceptions and beliefs among particular owners/managers of SME manufacturing firms. Owners/managers were required to give their perceptions of what they thought was absolute truth rather than relying on the absolute truth of knowledge because absolute truth may never be established.

Sample

Similar to most studies in supply chain, a cross-sectional quantitative survey design was employed. A sample of 200 owner/managers of SME manufacturing firms engaged in Ugandan supply chains represented a 67 per cent response rate. Owner/managers were the unit of enquiry because they are the major decision makers in relation to green practices adoption (Yahya *et al.*, 2014). In developing countries like Uganda, it is usual for the owner to be the manager. The sample size for owner/managers of SME manufacturing firms was determined using Roscoe's (1975) rule of the thumb for determining sample size, the minimum sample should be ten times or more than the number of variables being studied (Logaa and Zailani, 2013). Using this rule with ten study variables, a minimum sample of 100 (ten variables multiplied by ten) was required. The simple random sampling technique was used to select owner/manager's firms. This was done using the random number generator function in the excel work sheet (RAND () function) which assigned numbers to each firm after a soft copy of the list was generated using the Uganda Bureau of Statistics Business Register (Quirk *et al.*, 2013). The firms were later arranged in ascending order using the assigned numbers and the first 300 firms were selected. The response rate of 67 per cent from 300 owner/managers invited to participate is in line with previous researcher on SME manufacturing firms in Uganda (Nakku *et al.*, 2013a, b). Over 70 per cent of the 200 firms were well established having operated for over ten years the largest percentage (41 per cent) had operated for between 11 and 20 years. The majority of the firms (67 per cent) were classified as medium-sized firms employing between 50 and 100 employees and 61 per cent were in non-food manufacturing sectors.

Instrument and data collection

The survey instrument included items covering the nine dimensions for EO, five dimensions for green supply chain practice adoption and firm information. Measurement items for the dimensions of EO were adapted from existing instruments used in entrepreneurship and environmental management literature. Before, adaptation of the items, a comparison was made on the measurement items for each of the dimensions to find out whether they had been applied in both the environmental and entrepreneurial literature. Proactiveness, innovativeness, competitive aggressiveness, risk taking propensity and employee empowerment had measurement items appearing in both the environmental and entrepreneurial literature. However, for the case of managerial perceptions of social pressures had measurement items only found in environmental management literature but were identified in entrepreneurial literature as factors that drive entrepreneurial activity. Proactiveness items were adopted from Lotz and Van der Merwe (2013); innovativeness from Panayides (2006); competitive aggressiveness from Dess and Lumpkin (2005) and Hughes and Morgan (2007); risk taking propensity from Wagener *et al.* (2010); employee empowerment from Hughes and Morgan (2007); perceived pressure from external social networks from Lu *et al.* (2005) and San Martín and Herrero (2012); perceived pressure from environmental regulations from Epstein and Wisner (2005); Fraj-Andrés *et al.* (2009); and López-Gamero *et al.* (2010); perceived local community pressure from Liu *et al.* (2010) and Wing-Hung Lo *et al.* (2010) and lastly perceived consumer pressure from Khanna and Speir (2013) and Mathiyazhagan *et al.* (2014).

For green supply chain practice adoption, five dimensions and their measurement items were adapted from Zhu *et al.* (2008a, b, 2007a) and Zhu and Sarkis (2007). The five dimensions are internal environmental management, investment recovery, eco-design,

green purchasing and customer cooperation. To overcome inefficiencies in internet and postal services in Uganda, data were collected using a hard copy survey questionnaire through a pickup and drop off method. The survey included 57 items plotted on a seven point Likert scale, similar to other studies (Akman and Pişkin, 2013; Lee, 2008; Tsireme *et al.*, 2012; Sarkis *et al.*, 2010). Before the administration of the questionnaire, the suitability of the items to the Ugandan environment was examined. One item: support for GSCM from mid-level managers and commitment of GSCM from senior managers for the internal environment management construct: a green supply practice adoption construct was not applicable to the SMEs in the Ugandan context and this was deleted. Further, one item for proactiveness; our business is very often the first to introduce new products/services/ processes was deleted because of its similarity to another of Lotz and Van der Merwe's items, our business continuously seeks out new products/processes/services.

Data analysis

The analysis was conducted using the Analysis of Moment Structures software (AMOS): a covariance-based structural equation modelling software, Smart PLS software and SPSS software. AMOS is structural equation modelling software used for conducting tests like model fit and mediation while SPSS may be used to examine for normality reliability and descriptive statistics. Smart PLS was only used when testing for convergent validity and discriminant validity while SPSS and AMOS were used in the rest of the analyses including common method variance analysis and measurement model analysis.

Once collected, the data were tested for normality and reliability using SPSS Version 21. Skewness values for the variables were less than 2 while all kurtosis values for the variables were less than 7. Skewness values ranged from -0.437 to 0.454 while kurtosis values ranged from -0.168 to -0.811 . Skewness or kurtosis values lying between $+1.0$ and -1 indicate the existence of a normal distribution (Ahmad *et al.*, 2013; George and Mallery, 2006, p. 99; Yussof and Daud, 2011). Reliability values were above 0.70 as recommended by Nunnally (1978).

Convergent and discriminant validity was tested for using the Smart PLS software. Average variance extracted values were above 0.40 which is the minimum value and ranged between 0.41 and 0.75 (see Zaheer *et al.*, 2010). In order to examine for discriminant validity, cross-loadings were used. Discriminant validity exists when indicators load highest on their associated constructs. In order to test for discriminant validity, crossing loadings on the indicators for the green supply chain practice adoption dimensions with indicators of the dimensions for EO were obtained. All indicators for the green supply chain practice adoption dimensions loaded highly on their respective constructs. Hence, both the nine dimensions and the dependent variable, green supply chain practice adoption demonstrated adequate internal reliability, convergent validity and discriminant validity. Common method variance was tested using the latent factor variable in AMOS. Results ranged between -0.023 and 0.411 and were less than 50 per cent. Hazen *et al.* (2011) and Mowday *et al.* (1979) argue that any variance below 50 per cent does not lead to invalidation of research findings. There were no problems with multicollinearity as the variance inflation factors (VIF) were less than 10.0 while the tolerance factors were above 0.10. Multicollinearity was examined using the VIF with 10.0 being the maximum (Vachon and Klassen, 2006; Zhu *et al.*, 2007). The tolerance factors above 0.10 indicate low levels of multicollinearity (O'Brien, 2007).

6. Findings and discussion

EO positively and significantly influenced adoption of green supply chain practices (standardised regression weight = 0.40; p -value = 0.000). Overall, EO predicted 40 per cent of green supply chain practice adoption (see Table I). The findings are in line with the Theory of Reasoned Action in so far as attitudes (EO) lead to adoption of behaviour (green practices in supply chain). However, the remaining 60 per cent is the influence of factors other than attitudes and managerial perceptions such as objective pressures. Since the study was not aimed at examining the differences in EO and green supply chain practice adoption across firms, manufacturing categories of the firms were controlled for.

Among the dimensions for EO, both attitudes and perceived pressures were significant; however, attitudes were slightly stronger. This is explained by the standardised regression weight coefficients which were 0.710 for attitudes and 0.561 for perceived pressures. R^2 results show that the dimensions for EO adequately measure EO (see Table II). This means that the EO dimensions jointly explain the variation in EO and that EO can adequately be predicted using attitudes and perceived pressures. The results are in line with the Theory of Reasoned Action that argues that attitudes influence behaviour. Since the study was not aimed at examining the differences in managerial attitudes, managerial perceptions and green supply chain practice adoption across firms, control variables such as manufacturing categories of the firms and firm size were controlled for.

In relation to the influence of the individual dimensions of EO on green supply chain practice adoption are but two hypotheses were supported and while some results were in line with previous research, others were not. The seven supported hypotheses were in accord with previous research. The dimension, employee empowerment had the most significant impact on green supply chain practice adoption followed by innovativeness and perceived pressure from social networks. While these three results accord with the literature in terms of their relationship to adoption, their greater influence compared to the other dimensions, is unexpected. Possible explanations for the relative importance of the top three dimensions include the following. Employee empowerment contributes to pollution prevention through employees initiating waste

Variables	Standardised regression weight	Significance
Green supply chain practice adoption ← enviropreneurial orientation $R^2 = 0.40$	0.621	0.000

Note: EO and green practice adoption

Table I.
EO and green supply chain adoption

Variables	Standardised regression weights	Sig
Enviropreneurial orientation ← attitudes	0.710	0.000
Enviropreneurial orientation ← perceived pressures $R^2 = 0.82$	0.561	0.000

Note: Influence of attitudes and perceived pressures on EO

Table II.
Influence of attitudes and perceived pressures on EO

reducing options which is a key goal for green supply chain practice adoption (Corbett and Cutler, 2000; Sarkis *et al.*, 2010). Perceived pressure from external social networks in the form of social influences to perform or not to perform a particular behaviour may go to personal standing and esteem among peers in influencing the adoption of environmentally friendly practices (Lu *et al.*, 2005). Implementation of green supply chain management practices necessitates investments in green supply chain management activities such as recycling and ISO14000 systems that require a positive attitude towards risk taking through investment (Kocabasoglu *et al.*, 2007). Also unexpected and contrary to other findings, were the insignificance of the two dimensions, competitive aggressiveness and perceived pressure from environmental regulations, on green supply chain practice adoption. Competitive aggressiveness may not influence adoption of the green supply chain practices under circumstances where intellectual property rights exist on the products or services for the competitors (Gilbert, 2006) or where an owner/manager is unable to invest in risky environmental management innovations due to lack resources such as financial resources (Hofer *et al.*, 2012). Perceived pressure from environmental regulations may influence adoption of environmentally friendly practices when the influence from environmental regulation is viewed as an opportunity by an owner/manager (Russo and Fouts, 1997). Governments promote different types of environmental practices through formulation of regulations and policies. The response to the regulations and policies is determined by an owner/manager's perception. A positive response may occur when the owner/managers perceive the influence from the regulations and policies as opportunities and not threats (López-Gamero *et al.*, 2010). Such opportunities may include competitive or market opportunities (López-Gamero *et al.*, 2010). Further, the existence of fewer, weak and less effective enforcement in developing nations negatively affects perceptions which in turn results into negative responses to environmental regulations. Since the study did not aim to examine the differences in dimensions for EO and green supply chain practice adoption across firms, manufacturing categories of the firms were controlled for. See Table III for results of the influence of the EO dimensions on green supply chain practice adoption.

Table III.
Influence of the dimensions for enviropreneurial orientation on green supply chain practice adoption: regression results

Variables	Standardised regression weights	Significance
Green supply chain practice adoption←employee empowerment	0.312	0.000
Green supply chain practice adoption←innovativeness	0.226	0.000
Green supply chain practice adoption←perceived external social networks pressure	0.206	0.000
Green supply chain practice adoption←risk taking propensity	0.171	0.004
Green supply chain practice adoption←perceived consumer pressure	0.149	0.011
Green supply chain practice adoption←perceived local community pressure	0.146	0.013
Green supply chain practice adoption←proactiveness	-0.144	0.014
Green supply chain practice adoption←competitive aggressiveness	0.108	0.066
Green supply chain practice adoption←perceived pressure from environmental regulations	0.068	0.246

7. Implications

The study provides a theoretical contribution to green supply chain management literature and a contribution to government policy, firm practice and climate change.

Theoretically, the research contributes to scholarly understanding of green practice adoption through developing a new construct, EO, hitherto used but not developed nor tested, testing its role in influencing green supply chain practice adoption, and examining the impact of each of the EO dimensions on green supply chain practice adoption. The majority of the dimensions developed for EO lacked previous empirical support so this a major contribution of this research. Our study provides empirical results for constructs such as employee empowerment, innovativeness and managerial perceptions of social pressures that lack an empirical grounding in the green supply chain management literature. This study employs an entrepreneurial approach when studying the proactiveness construct compared to a preventive approach that is employed in the green supply chain management literature. We examine competitiveness of a firm at an individual level rather than firm or supply chain level which is a new innovation in the green supply chain management literature. Previously, the risk taking propensity construct was limited to its effect on investment recovery practices only. Our study goes further by examining the effect of risk taking propensity on the green supply chain management practices. Further, compared to existing research that predominantly uses the stakeholder theory and institutional theory to explain adoption of green supply chain practices, our research introduces a behavioural theory: Theory of Reasoned Action to explain adoption of green supply chain practices.

Alongside regulations, the results imply a need to develop support policies and incentives that encourage attitudinal and then behavioural change to increase adoption of green supply chain practices in SME firms. Such programmes that might include capacity building in entrepreneurship, communication of entrepreneurial opportunities and assistance to firms in the form of subsidies for owner/managers interested in protecting the environment through an entrepreneurial approach. Given the lack of awareness and possibly simple solutions to the adoption of green practices, the results further imply that owner/managers of SME manufacturing firms would do well to seek advice and training in innovations in cleaner production and other environmental friendly practices.

The results have an implication for climate change. Results show that EO leads to adoption of green supply chain practices. Adoption of the practices will result in a reduction in carbon emissions that emanate from inbound and outbound logistics flows and manufacturing operation. With EO, owners/managers may respond to environmental challenges or problems through initiating manageable solutions to environmental problems in their firms.

8. Limitations of the study and areas of further research

The study involved a behavioural variable: green supply chain practice adoption linked to EO. Although cross-sectional data are commonly used when examining factors that cause a particular behaviour (Coleman, 1981; Davies, 1994; Blossfeld and Rohwer, 1995), longitudinal designs better explain causality and map behavioural change (Ruspini, 2000). A second limitation is response bias. Data on the independent and dependent variables would better be collected separately to avoid response bias. Collection of the data on the independent and dependent variables in the same time period may be influenced by social desirability of respondents such as distorting responses towards a particular direction rather than focusing on the content (Leavitt, 1977; Peer and Gamliel,

2011). Response bias may occur when the respondents want to portray a certain image of themselves in the eyes of the researcher (Leavitt, 1977; Peer and Gamliel, 2011).

Further, research might compare EO and green supply chain practice adoption between developed and developing economies taking into account differences in firm size, ownership and sector. Definitions of SME differ between developed and emerging economies such what is categorised as an SME in a developed economy would be a large in a developing economy. Related to size differences, ownership in SMEs differs in that is it more common for decisions in SME firms in the developed world to be taken by a board of directors than an individual owner/manager as is more often the case in developing nations. Furthermore, developed economies have industrial types that may not exist in emerging economies and vice-versa.

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