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Dubey, Rameshwar, Gunasekaran, Angappa, Childe, Stephen J., Papadopoulos, Thanos and helo, Petri (2019) *Supplier Relationship Management for Circular Economy: Influence of External Pressures and Top Management Commitment. Management Decision*, 57 (4). pp. 767-790. ISSN 0025-1747.

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Supplier Relationship Management for Circular Economy: Influence of External Pressures and Top Management Commitment

Abstract

Purpose: With considerable international awareness of circular economy (CE), the purpose of the study is to propose a theoretical framework, informed by institutional theory and upper echelon theory, to explain how top management commitment mediates the relationship between external pressures and supplier relationship management (SRM) practices for the circular economy.

Design/methodology/approach: We test our hypotheses using cross-sectional data gathered using a survey of companies involved in sustainability practices.

Findings: The results of the hierarchical regression and mediating regression analyses suggest that top management commitment positively mediates the effect of external institutional pressures on supplier relationship management.

Originality/value: We advance existing theory by integrating institutional theory and upper echelon theory to explain SRM practices in sustainable supply networks. Furthermore, we offer guidance to managers who would like to engage in leveraging supplier relationship management in sustainable supply networks and outline future research directions.

Keywords: *Sustainability, Supply Chain Management, Supplier Relationship Management, Institutional Theory, Upper Echelon Theory, Hierarchical Regression.*

Paper type: *Research paper*

1. Introduction

The concept of circular economy (CE) has gained enormous attention from academia and practitioners (Lieder and Rashid, 2016; Batista et al. 2018). There is growing pressure on governments and policy makers to introduce policies aimed at transitioning societies to become more sustainable by better managing resources and closing loops in production, consumption, and disposal stages of products. Hence linking CE philosophies in procurement is one of the options of creating fundamental change and contributing to making societies more sustainable (Witjes and Lozano, 2016; Koh et al. 2017). Some management scholars perceive that the pressure for sustainability in supply chains is more than just the reputational risk (see, Roberts, 2003; Baskaran et al. 2012; Song et al. 2012, 2017; Gopal and Thakkar, 2016; Wu et al. 2017; Movahedipour et al. 2017; Hadiguna and Tjahjono, 2017). Hence, the role of first-tier suppliers (*henceforth referred to as 'suppliers'*) in achieving sustainable supply chain management has been the subject of immense interest among academics and practitioners (Lu et al. 2012; Huo et al. 2013; Luthra et al. 2015; Wilhelm et al. 2016; Jitmaneroj, 2016; Zhang et al. 2017). This paper investigates the critical role of the collaboration between the focal firm (buyer) and its suppliers in disseminating sustainable standards in the supply network under the influence of institutional pressures. Grimm et al. (2014) argue that though the literature focusing on buyer and suppliers is rich, still the role of the first-tier suppliers in disseminating sustainability standards throughout multi-tier supply chains has received limited attention (see Wilhelm et al. 2016).

Caniels et al. (2013) have acknowledged the role of suppliers in greening the supply chain. Cao and Zhang (2011) argue that amidst uncertainty, firms are pressed to look for opportunities to collaborate with partners to ensure that the supply chains remain efficient and responsive to emerging market needs. Fawcett and Magnan (2004) further argue using resource based view

logic that firms strive for greater supply chain collaboration to leverage the resources and knowledge of their suppliers and customers. As per Simatupang and Sridharan (2002), “*Supply chain collaboration means two or more autonomous firms working jointly to plan and execute supply chain operations*”. Firms having strong relationships with suppliers are likely to enjoy superior performance (Jabbour and Jabbour, 2009; Reuter et al., 2010; Gimenez and Tachizawa, 2012). Strategic supplier relationship leads to better risk management with collaborative learning and organizational sustainability (Corsten and Felde, 2005; Foerstl et al., 2010; Paulraj, 2011; Hartmann and Moeller, 2014; Jabbour et al. 2015; Neumüller et al. 2016). The term ‘supplier relationship management’ (SRM) refers to the practices and processes for interacting with suppliers (Liker and Choi, 2004).

Businesses and organisations are increasingly facing external pressures (such as from NGOs, customers and regulators) to maintain sustainable supply chains (Grimm et al. 2014; Guenther et al. 2016). However, despite increasing focus on collaboration between suppliers and buyers, there has been limited research that has investigated how collaboration under the influence of institutional pressures (external pressures) can help maintain desired sustainability standards in supply chains.

Institutional pressures are the external pressures felt by organizations within the same field to constrain organizational choice and ensure organizational conformity, which leads to isomorphism (Colwell and Joshi, 2013; Ye et al. 2013; Lee et al. 2013; Seles et al. 2016; Graham, 2017). DiMaggio and Powell (1983) argue that there are three types of isomorphism, namely coercive, normative and mimetic isomorphism. *Coercive isomorphism* occurs from both formal and informal pressures exerted on organisations by other organisations (e.g. government agencies, regulatory norms) and from expectations from society (DiMaggio and Powell, 1983). When buyers

are strong and supply market strength is low, a company can exercise coercion to serve its own interest by demanding that partners adopt its preferred operational practices (Liu et al., 2010).

Following Suschman (1995) we argue that institutional pressure fosters corporate environmental responsiveness and draw from the literature on pragmatic legitimacy and compliance as a strategic response to these external pressures. Despite the rich body of literature focusing on the role of external pressures on sustainable supply chain practices, the literature focusing on *how* and *when* the external pressures have influence on the buyers and supplier's behaviour towards sustainable practices in supply chains is lacking. In this research, we draw from literature on institutional theory (Greenwood et al. 2008; Sarkis et al. 2011; Colwell and Joshi, 2013) to address how and when an organization focusses on the management of suppliers to improve supply chain coordination and align organizational policies with the external pressures.

We address two key research gaps in SRM's role in sustainable supply chains for CE literature. These are due to the shortcomings of institutional theory with regards external forces, and a lack of research on the effect of top management commitment in this area. In this study, we test the theoretical framework to investigate SRM practices in a sustainable supply network based on a survey with 210 managers in Indian manufacturing companies that have implemented SSCM practices. These practices are necessary to create truly sustainable supply chains and address negative social and environmental impacts including, for instance, better resource use and emissions reductions (Beske and Seuring (2014).

The rest of the paper is organised as follows. The next section deals with theoretical framing. The third section deals with theoretical framework and development of hypotheses. In the fourth section, we discuss our research design in depth. In the fifth section, we discuss our data analysis, which includes construct validity testing and hypothesis testing using hierarchical regression

analysis and mediating regression tests. Finally, we discuss our research findings and outline theoretical implications, managerial implications, limitations and further research directions for research.

2. Theory Development

Our theoretical framework has three components (Figure 1). First, the institutional pressures (i.e. coercive pressures, normative pressures and mimetic pressures), second, the top management commitment, and third, the SRM. However, we cannot exclude the possibility of external mediators, size of the firm, absorptive capacity of the organization and time since the supplier relationship management was implemented in a sustainable supply network. Wilhelm et al. (2016) argue that due to the growing complexity of globally dispersed multi-tier supply chains, first tier suppliers have an instrumental role in the quest for achieving sustainability compliance along the supply chain. While institutional theory predicts institutional isomorphism, organizations have exhibited diversity in respect of degree of collaboration between focal firms and the suppliers in implementing sustainable practices in supply chains in similar institutional environments. To account for this diversity, we apply upper echelon theory and posit that the top management members are the primary human agency that translates external influences into managerial actions such as changing organizational structures and establishing policies based on their perceptions and the beliefs of institutional practices. We will treat these variables as control variables in our study as shown in Figure 1.

2.1 Institutional Theory

Institutional theory argues that organisational processes are institutionalised through a series of adaptive processes that are less influenced by individual members (Selznick, 1996; Ye et al. 2013; Seles et al. 2016). These adaptive processes lead to organisational isomorphism that is the result

of imitation of the best practices or due to government or regulatory norms (Kauppi, 2013). Research in institutional theory examines the causes of isomorphism; factors leading organisations to adopt similar structures, strategies and processes (Sarkis et al., 2011; Kauppi, 2013; Ayuso et al. 2014). DiMaggio and Powell (1983) argue that forces within the organisations and the environment encourage convergent business practices.

Here we consider the three dimensions of institutional theory i.e. coercive pressures, normative pressures and mimetic pressures (DiMaggio and Powell, 1983). In operations management (OM) and supply-chain management (SCM), institutional theory helps us understand the intentions behind the adoption or implementation of OM and SCM best practices (Kauppi, 2013). Ketokivi and Schroeder (2004) identified two important variants of institutional theory which helped to resolve the puzzle that has confounded the OM & SCM field for several years, namely the economic variant (e.g. Haunschild and Miner, 1997) and the sociological variant (e.g. DiMaggio and Powell, 1983). The sociological variant argues that there are a set of organizations that seek legitimacy in their adoptions, whereas the economic variant argues that some organisations believe only in efficiency or productivity of the organization. In the past, scholars have used institutional theory to explain complex phenomena (see, Ketokivi and Schroeder, 2004; Ketchen and Hult, 2007; Zhu and Sarkis, 2007; Liu et al., 2010; Sarkis et al., 2011; Bhakoo and Choi, 2013; Kauppi, 2013). For instance, Zhu and Sarkis (2007) have suggested that all institutional pressures moderate between practices for green manufacturers and performance in China, and normative and coercive pressures moderate environmental performance, whereas mimetic pressures improve economic performance. Ke et al. (2009) investigated the impact of institutional pressures, which includes coercive pressures, normative pressures and mimetic pressures on firm intentions to adopt e-SCM. Liu et al. (2010) used

Institutional Theory to examine the effect of institutional factors on firms' internet-enabled systems adoption intention, suggesting that firms are not both economically and socially rational entities. However, apart from these notable exceptions, applications of institutional theory in the field of OM and SCM are scarce. In a recent study, Bhakoo and Choi (2013) investigated the response of organisations in different tiers of the supply chain to institutional pressures during the implementation of inter-organisational systems. Although there has been wide acknowledgement of the use of institutional theory among the OM & SCM community, the impact of institutional pressures on the behaviour of supply chain members is yet to be explored (Ketchen and Hult, 2007; Cai et al., 2010; Kauppi, 2013). DiMaggio and Powell (1983) suggest that institutional pressures foster corporate commitment towards the environment by creating a sense of legitimacy around these actions. Suchman (1995, p.574) argues using institutional theory that actions towards environment are desirable, proper or appropriate. Colwell and Joshi (2013) argue that the arguments may be true, it is complete in at least two critical aspects: it suggests that (i) the organization endorses this organizational legitimacy and that (ii) it is capable of undertaking the actions required to conform to institutional requirements. Hence, we can say that organizations differ both in terms of extent to which they endorse a particular institutional practice and in terms of their ability to institute organizational change (Delmas and Toffel, 2008). Therefore we argue that the inclusion of human agency (the role of top management) as a mediating construct may address two mechanisms of the institutional theory, endorsing or committing to a practice and instituting change by implementing such practices. Top management commitment (*from the focal firm perspective*) has been identified as a priority for organizations and supply partners seeking to implement sustainability practices (Gattiker and Carter, 2010; Foerstl et al., 2015; Jabbour et al. 2017).

2.2 Upper Echelons Theory (UET)

The role of top management can be explained using upper echelon theory (Hambrick and Mason, 1984, Hambrick, 2007). The theory has two key assumptions. First, that executives act based on their personalized interpretations of the strategic situations they face, and second, that the executives' behaviours are determined by their experiences, values and personalities. The theory is built on the premise of bounded rationality. These factors can be instrumental in addressing the problems resulting due to poor alignment between focal firms and agents. Assuming that the actions of suppliers are driven by the self-interest and opportunism, it may be difficult or expensive for the focal organization (or principal agent) to verify what the agent is doing, which creates risk for focal firm (see Hartmann and Moeller, 2014), particularly when there is high information asymmetry in favour of the agent and goal conflicts among the members (Zsidisin and Ellram, 2003; Wilhelm et al. 2016). Top management commitment may help to endorse the institutional practices and institute the organizational change (Colwell and Joshi, 2013). Thus, the external pressures affect the SRM practices through the agency of the key organizational members (top management) (Liang et al. 2007). Hambrick and Mason (1984) suggest that organizational choices reflect the top management's values and cognitive biases. Thus, the positive beliefs of top management about the importance of sustainable practices in the supply chains and the role of the suppliers in maintaining desired sustainability standards in supply chains result in certain managerial actions intended to adopt sustainability practices.

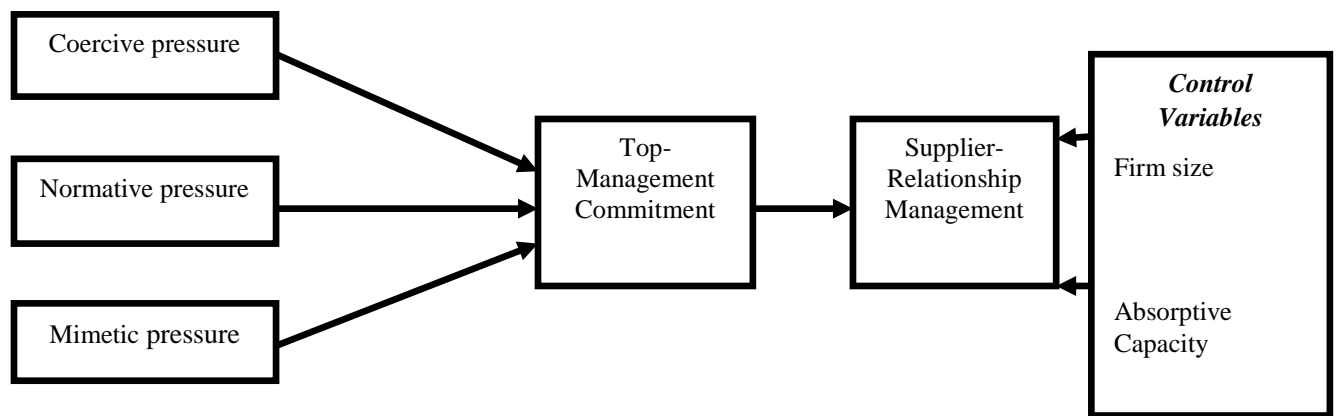


Figure 1: Theoretical Framework

2.3 Integration of Institutional Theory and Upper Echelons Theory

The prior literature has found empirical support for the effect of the individual forces. Clemens and Douglas (2006) support the effect of coercive pressure, while Bansal (2005) supports the effect of normative and mimetic forces on the organizational commitment towards environmental responsibility. However, with exceptions, (see Colwell and Joshi, 2013), the literature utilizing all three forces together to explain the organizational commitment towards supplier relationship management (SRM) suffers from limitations of the institutional theory. Criticisms of institutional theory (see Dacin et al. 2002; Kostova and Roth, 2002), show that it fails to explain how organizations within the same field, exposed to similar external pressures, achieve different degrees of success in terms of coordination between focal firm and first-tier supplier to achieve better towards environmental responsiveness in sustainable networks. To address the limitations of the institutional theory, various scholars have incorporated the role of intra-organizational dynamics within the institutional framework (Delmas and Toffel, 2008; Colwell and Joshi, 2013). However, barring a few studies the existing work has largely ignored

this extension within institutional framework. Following Greenwood and Hinings (1996), Colwell and Joshi (2013) and Ye et al. (2013) we include the role of top management commitment in our study. However, how the action of the top management creates difference in the outcome is subject to bounded rationality. Hence, by analysing from upper echelons theory we argue that top management role plays a significant role between focal firm and suppliers. By doing so, we address the second gap in the literature that how top management commitment helps to translate the external pressures to improve effective collaboration and coordination between focal organization and the agents (first-tier suppliers) in sustainable supply chains.

The effect of the institutional pressures under the mediating effect of top management commitment on the adoption of SRM practices to improve the effective and efficient collaboration and coordination in a sustainable supply network is largely underdeveloped. Wilhelm et al. (2016) have utilized institutional theory and agency theory to explain the coordination between focal firm (principal agent) and the first-tier suppliers (agents) to achieve sustainability goals in multi-tier supply chains. We extend that work using upper echelon theory by introducing the role of top management commitment between external pressures and the first-tier supplier's sustainable behaviour in supply chain.

2.4 Hypotheses Development

2.4.1 Institutional pressures and top management commitment

Coercive Pressures (CP) have been shown to be significant for firm orientation to environmental sustainability (Clemens and Douglas, 2006; Colwell and Joshi, 2013). We predict such forces remain significant in influencing the relationship between focal firm and suppliers with regards to implementing sustainable practices in supply chains. Grimm et al. (2014) argues that pressures resulting from governments are important external drivers of supplier management for achieving

sustainability in supply chains. In the adoption of sustainability practices or environmental practices, the CPs arise from regulatory agencies or government (Sarkis et al. 2011; Grimm et al. 2014). In those developing countries where government agencies still exert significant influences on business policies and practices (in addition to emerging market forces) (Liang et al. 2007), CPs are more likely to arise from governments. Thus, firms that have focused on supplier management for implementing sustainable practices in supply chain are obliged to implement certain practices into their work routines to meet government regulations. Top management team members are the focus of these CPs and they are compelled to participate in structuring activities to improve supplier management to implement sustainable practices in supply chain. Thus, we argue that CPs directly stimulate top management commitment (TMC) aimed at improving collaboration between buyers and suppliers to implement sustainable practices in supply chain. We hypothesize this as:

H1: Higher level of coercive pressures lead to higher levels of top management commitment towards corporate sustainability responsiveness.

The *normative pressure* (NP) results from professional codes (and the like), which expect professionals to follow specific guidelines. Sarkis et al. (2011) argued that pressures from consumers have driven the adoption of sustainable practices. Although normative pressures permeate through the channels of professional affiliations, we believe that the networking of top managers along the value chain comprising group of closely related suppliers and customers is a more important route through which NP influences permeate in the context of this study. This is especially true in the case of developing countries where the governance of interfirm relationships (here buyer and suppliers) is pervasively achieved through interpersonal relationships between senior managers (Krishnan et al. 2006). Scholars in prior studies (see Liang et al., 2007; Gattiker and Carter, 2010; Foerstl et al., 2015) illustrate how NP influences top management in

implementing professional codes through proper training and regular workshops, and young managers assimilate the professionalization. We therefore hypothesize:

H2: Higher level of normative pressures lead to higher levels of top management commitment towards corporate sustainability responsiveness.

The *mimetic pressure* (MP) results from the mimicking action of an organisation. When an organisation lacks clarity in terms of goals, or environmental uncertainty is high (i.e. high demand uncertainty, high supply uncertainty and high technology uncertainty), in such a situation the top management tends to replicate the existing trend in industry. Literature is not clear about how top management commitment mediates the impact of mimetic forces on SRM. On one hand, institutional theory posits that mimetic forces should directly affect TMC, since the practices of the competitors may be taken for granted. On the other hand, based on vicarious learning, top management may choose to imitate certain organizational practices according to their perceived impact or outcomes. Colwell and Joshi (2013) suggest that organizations may “borrow” mindfulness from a few successful peers by observing what they are doing and what they have to say about the organization’s engagement in environmental practices. As a rational response to uncertainty, top management tends to develop their beliefs about sustainable practices benefits and then translate beliefs into desired actions. Thus, we argue that the SRM practices of such organisations are pressured to align with current practices in the same or similar industries. Hence, we hypothesize it as:

H3: Higher level of mimetic pressures lead to higher levels of top management commitment towards corporate sustainability responsiveness.

2.4.2 Top management commitment and supplier relationship management

We draw from the insights of Colwell and Joshi (2013), that there are two factors which are critical in affecting organizational change in response to institutional pressures: (i) commitment to reform and (ii) a capacity to change. While theoretically both commitment and capacity can be found throughout the organization, the role of top management is critical because it can take decisions related to restructuring of the organization and policies that for change. Grimm et al. (2014) have noted that top management support is one of the important internal critical factors for sustainable practices in supply chain. Hence, we argue that top management commitment has significant influence on supplier management. Hence, we hypothesize:

H4: Higher level of top management commitment leads to alignment of supplier relationships towards corporate sustainability responsiveness.

2.4.3 Mediation effect of top management commitment between institutional pressures and supplier relationship management

Top management's boundary-spanning role has been found to significantly affect corporate environmental responsiveness (Greenwood and Hinings, 1996; Colwell and Joshi, 2013). In the institutional environment, top managers are not influenced by other choices of the suppliers, they may benchmark the supplier's performance on the basis of the sustainability criteria. Thus, we propose that institutional pressures may not directly affect the degree of collaboration between the focal firms and the suppliers to maintain desired sustainability practices in supply chains; rather their effects on the supplier's behaviour towards sustainability practices is realized by the actions of the top management (Grimm et al. 2014). The role of top management commitment may offer interesting insights into how organizations translate external pressures into desired managerial actions which may help to improve collaboration between focal firms and suppliers to implement

sustainable practices in supply chains. Hence, we argue that TMC acts as a mediating construct between external pressures (i.e. CP, NP and MP) and SRM. We hypothesize this as:

H5: Top management commitment mediates the relationship between institutional pressures and SRM practices in a sustainable supply chain.

We can divide H5 into its sub-hypotheses thus:

H5a: Top management commitment mediates the relationship between CP and SRM practices in a sustainable supply chain.

H5b: Top management commitment mediates the relationship between NP and SRM practices in a sustainable supply chain.

H5c: Top management commitment mediates the relationship between MP and SRM practices in a sustainable supply chain.

2.4.4 Control Variables

We included control variables to account for extraneous effects. The larger the size of the firm, greater the external pressures on top managers to adopt best practices which include those related to supplier relationship management (Zhu et al. 2008). Following Zhu et al.'s arguments (Zhu et al 2008, 2008a) we included firm size as one of the control variables. In our study, we assess firm size by the logarithmic values of the number of employees and of the annual revenue (Eckstein et al. 2015).

We included absorptive capacity as another control variable in our study. Absorptive capacity (AC) is the “the ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends” which “is critical to its innovative capabilities” (Cohen and Levinthal, 1990: p. 128). Zahra and George (2002) conceptualise AC as related to

knowledge creation and utilisation to enable a firm to enhance its abilities to achieve and sustain competitive advantage. Nagati and Rebolledo (2012) suggest that the majority of studies have focused on the dyadic level (e.g. Dyer and Singh, 1998) or have analysed the role of AC within strategic alliances and in particular joint ventures, or have illustrated its role within R&D and innovation activities. Hence, following Nagati and Rebolledo's (2012) arguments, we submit that different organisations have different levels of absorptive capacity. In this study, we follow the aforementioned studies in that we acknowledge the role of the prior knowledge of suppliers in enhancing the effectiveness of SRM and the innovative capabilities (Grant, 1996) of the supply networks, applying the concept to sustainable supply networks. Accordingly, to account for the differences in innovative capabilities regarding SRM practices in sustainable supply networks, it is important to control for the absorptive capacity of the organisation.

3. Research Design

3.1 Operationalization of Constructs

The indicators used to measure the theoretical constructs are based on our extensive review of literature. Following Malhotra and Grover's (1998) arguments, this study adopted established scales from the literature. This was feasible for the measures of CP, NP, MP, TMC and AC. However, for SRM we could not identify a suitable scale for the context of our study. Hence, we followed the scale development process suggested by Churchill (1979) including an extensive literature review, followed by pretesting with managers and academics in operations management and supply chain management. We made minor modifications to the wording of the items based on the feedback from pre-tests to improve scale performance. With the exception of the control variables examining firm size, all scales were 5-point anchored with 1= strongly disagree and 5= strongly agree.

3.1.1 Coercive pressure (CP)

To operationalise CP, we reviewed the literature (Colwell and Joshi, 2013; Zhu et al., 2013; Gualandris and Kalchschmidt, 2014), and devised a reflective scale with three-items:

- Firms in our industry that do not meet the legislated standards for pollution control face a significant threat of legal prosecution;
- Firms in our industry are aware of the penalties potentially associated with environmentally irresponsible behaviour;
- There are negative consequences for companies that fail to comply with the central and state government laws.

3.1.2 Normative pressure (NP)

We operationalised the normative pressure by reviewing the relevant literature (e.g. Zhu and Sarkis, 2007; Colwell and Joshi, 2013) and identifying a three-item reflective scale which we modified for the Indian setting. This includes:

- Our industry has trade associations that encourage organizations to take more responsibility for their partners' actions towards sustainable practices;
- Our industry expects all firms and their partners to be responsible towards environment and society;
- Being responsible towards environment and society is the requirement for firms to be part of this industry.

3.1.3 Mimetic pressure (MP)

Mimetic pressure was operationalised by identifying a three-item reflective scale from the literature (Zhu and Liu, 2010; Colwell and Joshi, 2013) and modifying it as required. The scale includes

- greatly benefitted from SRM practices in sustainable supply network;
- favourably perceived by others in the same industry; and
- favourably perceived by their customers.

3.1.4 Top management commitment (TMC)

To measure TMC we have developed a four-item reflective scale from Zhu et al., (2007a) and Colwell and Joshi (2013). It includes

- managers believe that deep supplier relationship management (SRM) will certainly help a firm to successfully implement sustainable practices in supply network;
- SRM practices will offer our organisation a competitive edge over competitors,
- managers involve suppliers in joint projects;
- managers provide training to suppliers' staff to improve coordination.

3.1.5 Supplier relationship management (SRM)

Based on literature (e.g. Spence and Bourlakis, 2009; Gimenez et al., 2012; Gimenez and Tachizawa, 2012) we identified five measurements for SRM as:

- supplier's capabilities;
- convert supplier rivalry into opportunity;
- supervise your suppliers;
- develop suppliers' technical and product development capabilities;

- share information intensively but selectively with suppliers and joint improvement activities.

3.1.6 Absorptive capacity (AC)

The scale for absorptive capacity was based on items developed by Szulanski (1996) and modified using Liang et al.'s four item reflective scale (2007). The four items we used for measuring the absorptive capacity were:

- Prior to SRM system implementation, our employees had extensive training in procurement or materials management;
- It is well known who can solve problems associated with the SRM systems;
- Our organization can provide adequate technical support on using SRM systems; and
- The extent to which professional bodies promote information technology influences our firm to use SRM package.

In the present study, a four-item construct is used and the absorptive capacity of a firm is controlled to further generalize the outcome (Delmas et al. 2011).

3.1.7 Firm size (FS)

We use logarithms of number of employees and revenue as two measures of the firm size.

3.2 Data collection

The unit of analysis employed in this study was at the level of the manufacturing plant. Previous research has indicated that this unit of analysis provides a detailed understanding of the supply chain. The initial survey sample consisting of 1050 firms was drawn from CII (Confederation of Indian Industries) and ITC Centre of Excellence for Sustainable Development, the largest body representing Indian companies. It was verified using databases provided by Dun & Bradstreet.

In the area of EFQM, the CII-ITC Sustainability awards were constituted to recognize and reward excellence in businesses that are seeking ways to be more sustainable in their activities. The initial survey was administered to managers in Indian manufacturing companies who had implemented SSCM practices and applied for CII-ITC Sustainability awards or who had taken the assistance of CII for implementing sustainability in last five years. Data collection was conducted following a modified version of Dillman's (2007) total design method. The data was collected through a two-part electronic survey. The first part consisted of questions related to the respondent and their firm (i.e. name, age, gender, designation, number of employees, annual revenue) and the second part consisted of questions related to CP, NP, MP, TMC, SRM, and AC of the firm. Prior to questioning, the respondents were reassured that their responses would be kept strictly confidential. A two-stage data collection approach was used that consisted of pre-testing and testing the survey (Malhotra and Grover, 1998).

The survey questionnaire was sent to targeted individuals in SCM departments. Managers were requested to pass this questionnaire to procurement and CSR departments. In this way, we attempted to reduce the bias resulting from perceptual scales used in our survey (Podsakoff et al., 2003). Depending upon the preference of the respondents, surveys were answered via e-mail or fax. Overall, we received 210 complete and usable responses (see Appendix 1), showing an effective response rate of 20 percent. The sample size is sufficient for studying the hypotheses developed in this study (Hair et al., 2006), and is comparable to response rates achieved in recent research investigating SCM and OM phenomena (e.g. Zhu et al., 2013; Gualandris and Kalchschmidt, 2014). As the questionnaire was part of a larger project, the questionnaire was quite long (11 pages), which may have added to the relatively low response rate. A further difficulty is

that in recent years' companies are adopting policies not to engage in external surveys, as we were informed in our follow-up phone calls to non-respondents.

The final sample consisted of 36 vice-presidents (17.14%), 82 general managers (39.05%), 56 managers (26.67%) and 36 deputy or assistant managers (17.14%). The respondents were from auto-components manufacturing firms (41.43%), heavy machinery (20.48%), electrical components manufacturing firms (15.71%), the steel manufacturing sector (17.62%) and the chemical sector (4.76%).

3.3 Non-Response Bias (NRB) Test

As in case with all survey based research, the potential for biases exists in our study. The NRB addresses self-selection in the sample, being the difference between respondents and non-respondents (See Chen and Paulraj, 2004). To look for non-response bias, we compared the responses of early and late waves of returned surveys (Armstrong and Overton, 1977; Chen and Paulraj, 2004; Dubey et al. 2015). The final sample of our study was ranked per the date survey responses were received and then split into nearly equally-sized groups. The early wave (first 62 responses) was compared against the late wave (second 61 responses). The t-statistics yielded no significant differences ($p=0.56$). These results suggest that NRB is not a serious concern in our data set.

4. Data Analyses and Results

Before evaluating the reliability and the validity of the measurement items, the indicators were tested for assumption of constant variance, existence of outliers, and normality. The residuals plot by predicted value, rankit plot of residuals, and statistics of skewness and kurtosis were used. To detect multivariate outliers, we used Mahalanobis distances of predicted variables (Stevens, 1984). The maximum absolute values of skewness and the kurtosis of the indicators in the remaining

dataset were found to be 1.798 and 8.544 respectively. These values are well within the limits recommended by Kline (2011): univariate skewness <3 , kurtosis <10 . To ensure that multicollinearity was not a problem, variance inflation factors (VIF) were calculated. All the VIFs were less than 3.0, and therefore considerably lower than the recommended threshold of 10.0, suggesting that multicollinearity was not a problem (Hair et al., 2006).

4.1 Measurement Model

To calculate the reliability of constructs, the equation proposed by Fornell and Larcker (1981) was used. This equation has attracted interest among scholars (e.g. Bagozzi and Heatherton, 1994; Chau, 1997; Stank et al., 2001; Cua et al., 2001; Straub et al., 2004; Chen and Paulraj, 2004; Luo and Bhattacharya, 2006; Flynn et al., 2010). From Appendix 2 it can be noted that the composite reliability of constructs of the proposed theoretical framework is found to be greater than 0.7 and each average variance extracted (AVE) is greater than 0.5, indicating that the measurements are reliable and the latent construct can account for at least 50 percent of the variance in the items. As shown in Appendix 2, the loadings are in the acceptable range and the t-value indicates that they are significant at the 0.05 level.

To establish discriminant validity, the square root of AVE is compared with the inter-construct correlations as shown in Appendix 3. The results in Appendix 3 clearly demonstrate that the leading diagonal of the matrix (i.e. square root of AVE) is significantly greater than the inter-construct correlations. This shows that the constructs of our framework possess discriminant validity (see Fornell and Larcker, 1981; Chin, 1998; Chen and Paulraj, 2004; Flynn et al., 2010).

The fit indices were as follows for overall measurement model: Normed Chi-square= 1.79; Root Mean Square Error of Approximation (RMSEA)=0.078; Non-norm Fit Index (NNFI)=0.88;

Comparative Fit Index (CFI)=0.91. The fit indices met or exceeded the minimum threshold value suggested by Hu and Bentler (1999).

4.2 Common Method Bias

Since our study utilizes a survey based approach to gather data to test research hypotheses, we cannot entirely eliminate the possibility of common method bias (CMB) from our study (Ketokivi and Schroeder, 2004; Guide and Ketokivi, 2015). Following Podsakoff et al.'s (2003) arguments, we attempted to enforce a procedural remedy by asking respondents not to estimate SRM based on their own experience, but to obtain this information from minutes of organizational meetings or from documentation (Fawcett et al. 2014). We also conducted Harman's single-factor test which requires loading all the measures in a study into an exploratory factor analysis and analyse the un-rotated factor solution, with the assumption that the presence of CMB is indicated by the emergence of either a single factor or a general factor accounting for most covariance among measures (Podsakoff et al. 2003, p. 889). For the first case, we fixed the number of factors equal to one, prior to obtaining un-rotated factor solutions. With this a single factor was obtained which explains 31.793 %, of the variance which should be ideally less than 50%. Following criticisms of Harman's single-factor method (Guide and Ketokivi, 2015), we further assessed the common method bias by comparing the fit between the one-factor model, the measurement model with only traits, and the measurement model with both traits and a method factor (Flynn et al., 2010). The one-factor method yielded ($\chi^2=1783.92$ $p<0.00$) that was significantly poor in comparison to that of measurement model with only traits. The chi-square ($\chi^2=486.47$, $p<0.001$) of the measurement model with both traits and a method factor did not significantly improve that of the measurement

model with only traits. Thus, from this we can conclude that common method bias may be there but the impact of CMB on our statistical analyses will be minimum.

4.3 Endogeneity Test

Before conducting hypothesis tests, following criticism by some empirical scholars (see Fawcett et al. 2014; Guide and Ketokivi, 2015) we conducted some statistical tests before we proceeded to regression analyses. We tested for the endogeneity of the exogenous variable in our model following some of the recent works (see Dong et al. 2016; Liu et al. 2016). The institutional pressures are regarded to be the drivers, which influence top management commitment, but not the other way around (Liang et al. 2007). Thus, endogeneity is unlikely to be a concern in this context. However, we first wished to test the impact of CP, NP and MP on SRM following institutional theory logic and on TMC following agency theory logic. Hence, in this we need to assess endogeneity. Thus, we also tested empirically whether endogeneity was an issue by conducting the Durbin-Wu-Hausman test (Davidson and MacKinnon, 1993). We first regressed CP, NP and MP on SRM, then used the residual of this regression as an additional regressor, in our hypothesized equations. The parameter estimate for the residual was not significant, indicating that CP, NP and MP were not endogenous in our setting, consistent with its conceptualization. Similarly, following similar tests we assessed the endogeneity of TMC. We noted that TMC was not endogenous.

4.4 Hypotheses Tests

We tested our hypotheses via hierarchical regression and mediation regression analyses. The hierarchical regression test is considered most suitable and the more conservative technique in

comparison to covariance-based modelling techniques (cf. Gefen et al. 2000). Table 1 and Table 2 provide the results of the regression analyses. The hypothesized linkages between external pressures and TMC is specified in H1-H3. The hypothesized linkage between TMC and SRM is specified as H4. Addressing hypothesis H1 first, we observe support (see Table 1) for the prediction that TMC is positively associated with CP ($\beta=0.21$; $p=0.003$), consistent with the findings of Colwell and Joshi (2013).

Next hypothesis H2, we observe no support (Table 1) for the prediction that TMC is not significantly associated with NP ($\beta=0.128$; $p=0.239$). Addressing H3, we observe support (Table 1) for the prediction that TMC is significantly associated with MP ($\beta=0.817$; $p=0.000$) which conforms Zhu and Sarkis' (2007a) and Colwell and Joshi's (2013) findings. We also observe that external pressures together with control variables explain a significant portion of variance in degree of top management commitment to environment ($R^2=0.296$). We also note that FS ($\beta=0.294$; $p=0.000$) and AC ($\beta=0.497$; $p=0.000$) has a significant effect on the model. We interpret these observations as evidence that in the current scenario the absorptive capacity of the organizations and the firm size are meaningfully driving the degree of commitment in the top management towards environmental sustainability. Hence, we can argue that readiness of the organization towards supplier relationship management practices to achieve sustainability in supply networks and firm size may have significant influence on the top management commitment in terms of willingness to bring reform in the existing practices and capacity for change.

Addressing H4, we observe support (Table 1) for the prediction of SRM significantly associated with TMC ($\beta=0.723$; $p=0.000$), explaining a significant portion of the SRM practices in the sustainable supply network ($R^2=0.63$). We also note that FS ($\beta=-0.057$; $p=0.27$) has no significant influence on the model. However, AC ($\beta=0.155$; $p=0.000$) has a significant effect on

the model. We interpret these observations to mean that the organization's size may not be a concern regarding the SRM practices, however the readiness of the organizations may have meaningful influence on the level of SRM practices. Next, we present our hypotheses test.

Table 1: Regression results for Top Management Commitment and Supplier Relationship Management

Variables	DV= TMC		DV= SRM	
	β	p-value	β	p-value
Controls				
Firm size (FS)	0.294	0.000	-0.057	0.270
Absorptive capacity (AC)	0.497	0.000	0.155	0.005
Main effects				
	β	p-value	β	p-value
Coercive pressures (CP)	0.210	0.003		
Normative pressures (NP)	0.128	0.239		
Mimetic pressures (MP)	0.817	0.000		
Total management commitment (TMC)			0.723	0.000
Model summary				
R ²	0.296		0.630	
Adj R ²	0.266		0.620	
Model F	12.828		67.423	

The H5, which has three sub-hypotheses, was analyzed using regression analysis following Baron and Kenney (1986). The results are shown in Figure 2 and Table 2.

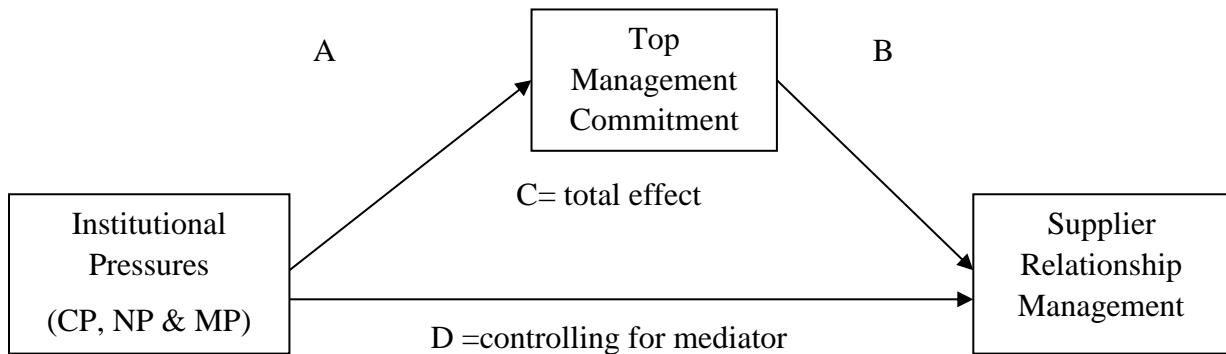


Figure 2: Mediating Effects of Top Management Commitment

First, we measured the impact of coercive pressure (CP) on top management commitment (path A). Coercive pressure had a significant impact on top management commitment ($\beta=0.21$, $p<0.01$). Second, the impact of top management commitment (TM) on SRM was studied. The TM had a significant impact on SRM ($\beta=0.723$, $p<0.01$). In the third step, the SRM was regressed on both TM and CP. It was observed that TM was a significant predictor ($\beta=0.667$, $p, 0.01$) while the CP was controlled. This suggested that TM had a complete mediation effect on CP and SRM. The significance of the mediation was further established using the Sobel test ($p=0.038$).

Table 2: Mediation Hierarchical Regression Analysis

Hypothesis	Model	Path A	Path B	Path C	Path D (controlling for mediator)	Mediation	Sobel p-value
Coercive Pressure (H1a)	CP-TMC-SRM	0.21 at p=0.003	0.723 significant at p=0.000	Not significant	0.076 at p=0.01 and 0.667 at p=0.000	Complete	0.038
Normative Pressure (H1b)	NP-TMC-SRM	Not significant	0.723 significant at p=0.000	Not significant	Not significant	Not supported	NA
Mimetic Pressure (H1c)	MP-TMC-SRM	0.817 at p=0.000	0.723 significant at p=0.000	0.216 at p=0.003	0.01 at p=0.03 and 0.742 at p=0.000	Partial	0.000

A similar analysis was performed for Hypotheses H1b and H1c. The results of mediation hierarchical regression are shown in Table 2. In the case of hypothesis H1b, firstly TM was regressed on normative pressure (NP) (Path A). The NP had insignificant impact at p=0.05. Hence, it can be concluded that impact of NP was not mediated by TM. Secondly, the direct impact of NP on SRM was also examined. The path was also found to be insignificant at p=0.05. In the case of hypothesis H1c (see Table 2), firstly the TM was regressed upon mimetic pressure (MP) (Path A). MP had significant impact on TM ($\beta=0.817$, $p<0.01$). Secondly, the SRM was regressed on TM. TH had significant impact on SRM ($\beta=0.723$, $p<0.01$). Thirdly, the SRM was regressed upon TM and MP. It was observed that MP had significant impact on SRM ($\beta=0.742$, $p<0.01$) under the controlled effect of MP. This suggests that TM has a complete mediation effect on MP and SRM. The significance of mediation was further established using Sobel test ($p=0.00$).

5. Discussion

Our research aimed to address two specific gaps in the literature:

(1) to establish that institutional pressure collectively fosters SRM to address sustainability in supply network.

(2) following criticisms of institutional theory we propose the mediating role of TMC between external pressures and SRM, to address the limitations of institutional theory.

To address our first research gap, we tested three hypotheses (H1-H3). We noted that the link (NP→TMC) was found to be insignificant. However, other two links (CP→TMC and MP→TMC) were supported. Thus, we can establish that the external pressures have significant influence on the TMC.

Following prior research, we also assumed that normative pressures should affect the degree of involvement since norms carry with them accepted practices pre-evaluated within the field without needing further cognitive effort on the part of top management. Surprisingly, the mediation test of our second sub-hypothesis (H5b), suggests that our initial assumption about normative pressure impacting supplier relationship management practices under the mediation effect of top management commitment was not supported. This could be an interesting revelation of our study. It may be that the reflection of training impacts on the agent's behaviour, however we must be cautious about this conjecture since our research data is based on a single informant from each organization. We offer two explanations. First, there is a chance that common method bias, though minimal, may have effect on the result. Second, in our sample, over 41.43% of the respondents represent the auto components sector (car parts) and 20.48% represent heavy machinery. The auto components sector in India caters mainly for domestic requirements. In comparison to Chinese, Korean, Japanese, Taiwanese and Malaysian settings, Indian auto components firms are guided by

local needs (with some notable exceptions). However, our findings differ slightly from those of Lin and Lan (2013), which further strengthens our argument that there are contextual differences between Indian and Chinese auto components suppliers. The contextual factors such as the nature of the industry or sample origin may help provide interesting insights.

The third sub-hypothesis (H5c) was tested using mediating hierarchical regression analysis. The result supports our initial assumption that mimetic pressure impacts on supplier relationship management practices, which to some extent are mediated by top management commitment. The study suggests that items that constitute mimetic pressures (i.e. greatly benefitted from SRM practices in sustainable supply network, favourably perceived by others in the same industry and favourably perceived by their customers) are efficiently and effectively translated into desired managerial actions in improving supplier relationship management practices. The findings clearly extend the relevant literature (e.g. Zhu and Sarkis, 2007a; Colwell and Joshi, 2013) by examining the mediation role of TMC between external pressures and SRM for achieving desired sustainable practices in supply chains. The results suggest that the size of the firm and the absorptive capacity may play a differentiating role in determining the degree of involvement of the top managers in building strong relationship with suppliers. The results provide interesting scope for further investigation how firm size and readiness level of the organization may help to formulate different strategies.

6. Conclusion

Addressing our two gaps, we have found that the impact of coercive pressures on SRM practices is, to some extent, mediated by TMC. This supports our conceptualization as shown in Figure 1 based on our review of the literature. The findings of our study clearly suggest the role of human agency (Eisenhardt, 1989; Zhu et al., 2007a; Liang et al. 2007; Fayezi et al., 2012) in translating

local government statutory and regulatory requirements, the industry association and competitive conditions into desired managerial actions towards building relationship with suppliers. This finding is consistent with other studies which have regarded statutory and regulatory requirements, industry association, and competitive conditions as enablers of SSCM implementation (Zhu et al., 2013; Colwell and Joshi, 2013). These results extend Wilhelm et al.'s (2016) work in context to multi-tier supply chains where role of first tier suppliers is critical. However, Wilhelm et al. (2016) acknowledge the importance of building visibility; the role of top management commitment (human agent) in translating external pressures into positive outcome was under-represented.

Next, we outline our contributions to theory, managerial implications, limitations and further research directions.

6.1 Theoretical Contributions

The role of institutional forces in affecting the adoption of SSCM practices in supply networks is well discussed in the literature (e.g. Vachon and Klassen 2006; Hsu and Hu 2009; Testa and Iraldo, 2010; Sarkis et al., 2011; Bhakoo and Choi, 2013; Kauppi, 2013; Zhu et al., 2013). What is less well understood is how institutional forces affect SRM practices, and this constitutes our first contribution. In the supply chain literature, there are studies highlighting SRM practices in sustainable supply networks (see Hsu and Hu, 2009; Kuo et al., 2010; Shaw et al., 2012). However, the literature has little focus on the limitations of the institutional theory and how the role of top management commitment (human agents) may help to address those limitations that are noted by the institutional theory critics. Two key aspects of our study signify our contribution to SSCM literature. First, the focus on the impact of institutional pressures on SRM practices, and second, the role of human agency in translating the institutional pressures into desired managerial actions.

Our second contribution lies in applying both institutional theory and upper echelon theory in OM/SCM field, driven partly by the encouragement by Taylor and Taylor (2009) to use alternative lenses to explore OM and SCM phenomena. Our findings extend the work of Seles et al. (2012), Testa and Iraldo (2010), Fayezi et al. (2012) and Wilhelm et al. (2016) as well as of scholars focusing on how risks and relationships are managed by explaining the role of top management commitment towards SRM practices in sustainable supply networks.

6.2 Managerial Implications

Our findings offer guidance to manufacturing and supply chain management practitioners. The mediating role of top management clearly signifies that the role of leadership skills and vision of top management has a significant impact on initiatives of organisations to implement SRM practices. Suppliers are seen to be the most important aspect of a supply network when responding to the demand to embrace environmentally friendly or sustainable practices (e.g. Testa and Iraldo 2010; van Hoof and Lyon 2013). Thus, it can be understood that when an organisation fails to mediate between institutional pressures and suppliers, the managerial actions lack focus towards SRM. The suppliers may not embrace environmentally friendly or sustainable practices in their corporate strategy. Top management would need to motivate and provide incentives to their suppliers, as the suppliers' actions can influence the entire supply network. Top managers, therefore, would need to conduct regular meetings and workshops with their suppliers or potential suppliers, and provide necessary training to sensitize the employees of suppliers towards sustainable practices.

6.3 Limitations and Further Research Directions

Following Guide and Ketokivi (2015) and Fawcett et al.'s (2014) recent editorial notes, we submit that our study utilizes cross-sectional data gathered using survey based instruments. Hence, CMB

and endogeneity may have affected our statistical analyses. Through following the best possible methods, we have attempted to minimize the effect of CMB and endogeneity issues as these are pressing issues associated with the cross-sectional survey based data. In future the hypotheses should be tested using longitudinal data. In the case of cross-sectional data, we recommend gathering data from multiple informants from the same sampling unit to avoid CMB, however endogeneity may be the concern. Thus, future research using multi-methods may offer better solutions to the existing concerns.

Second, we grounded our theoretical framework in institutional and agency theory. However, other organizational theories like strategic choice theory (SCT) may offer better explanation for the impact of the firm size and the absorptive capacity on the model. Interesting insights into managerial actions and their approach towards suppliers can be derived using appreciative inquiry (AI) methods, termed ‘quasi-ethnographic’ studies. In this vein, we will be able to get in-depth insights as to how and why top management commitment mediates the relationship between SRM practices and institutional pressures within sustainable supply networks. The present study has not included top management beliefs and top management participation as two different constructs. In future, it may be fruitful to include these two constructs to draw further insights from top management impacts on SRM within sustainable supply networks.

Appendix 1: Respondents profile

		Number of respondents	Percentage of respondents
Job Title	Vice President	36	17.14
	General Managers	82	39.05
	Managers	56	26.67
	Deputy/Assistant Managers	36	17.14
Work experience (years)	Above 20	53	25.24
	15-20	76	36.19
	10-14	65	30.95
	5-9	10	4.76
	0-4	6	2.86
Type of business	Auto Components manufacturing	87	41.43
	Heavy Machinery	43	20.48
	Electrical Components	33	15.71
	Steel Sector	37	17.62
	Chemical	10	4.76
Age of the firm	>20	55	26.19
	15-20	53	25.24
	10-14	36	17.14
	5-9	56	26.67
	1-4	10	4.76
Revenue (million USD)	>302	28	13.33
	226.5 - 302	36	17.14
	151 - 226.49	36	17.14
	75.5 - 150.85	37	17.62
	<75.5	73	34.76
Number of employees	Greater than 500	50	23.81
	250-500	65	30.95
	100-249	55	26.19
	Less than 100	40	19.05

Appendix 2: Loadings of the Indicator Variables (Composite Reliability) (AVE)

Construct	Indicator	Mean	SD	Loading	T-value
Coercive Pressure (CP) (0.811) (0.588)	CP1	4.516	0.756	0.777	66.206
	CP2	4.516	0.831	0.780	60.507
	CP3	4.242	0.867	0.743	53.262
Normative Pressure (NP) (0.833) (0.626)	NP1	4.242	0.887	0.742	53.262
	NP2	3.710	1.034	0.856	39.944
	NP3	3.772	1.006	0.771	41.561
Mimetic Pressure (MP) (0.967) (0.937)	MP1	3.911	1.306	0.968	33.214
	MP2	3.064	1.214	0.968	28.094
Top Management (TMC) (0.938) (0.791)	TMC1	2.766	1.263	0.909	24.387
	TMC2	3.202	1.133	0.938	31.460
	TMC3	3.307	1.01	0.888	33.525
	TMC4	2.491	1.544	0.818	27.126
Supplier Relationship Management (SRM) (0.974) (0.882)	SRM1	2.331	0.877	0.965	15.955
	SRM2	2.347	1.626	0.976	16.787
	SRM3	2.363	1.557	0.978	16.664
	SRM4	2.331	1.579	0.887	31.955
	SRM5	2.718	1.286	0.884	22.674
Absorptive Capacity (AC) (0.943) (0.804)	AC1	3.355	0.646	0.867	31.703
	AC2	3.274	1.334	0.930	31.196
	AC3	2.564	1.150	0.882	30.692
	AC4	3.112	0.930	0.907	32.923

Note: MP3 has been dropped due to weak loading

Appendix 3: Correlations among Major Constructs

	CP	NP	MP	TMC	SRM	AC
CP	0.767					
NP	0.593	0.791				
MP	.157	0.19	0.968			
TMC	.091	.084	0.512	0.889		
SRM	.061	.032	0.621	0.453	0.939	
AC	.034	.088	0.543	0.456	0.612	0.897

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