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# **Towards a Theory of Sustainable Consumption and Production: Constructs and Measurement**

## **Abstract**

There has been increasing interest from both academics and practitioners in sustainable consumption and production (SCP) behaviour. The literature has mainly focused on antecedents and indicators for SCP behaviour, but scholars are yet to develop frameworks that provide insights into SCP behaviour. To address this gap, this paper develops a theoretical model grounded in institutional and agency theories that explicates the role of top management beliefs and participation when dealing with institutional pressures that impact upon SCP behaviour by facilitating information sharing and reducing behavioural uncertainty. Based on a sample of 167 responses from a survey with Indian organizations, we test the model using partial least squared regression-based structural equation modelling (PLSR SEM). Our results indicate the role of top management commitment as a mediator between institutional pressures and SCP behaviour and the role of beliefs as shaping the commitment of top managers towards strengthening SCP behaviour. We further suggest that participation plays a significant role in quality information sharing, which is important in reducing behavioural uncertainty among stakeholders. Finally we outline our research limitations and further research directions.

**Key Words:** Sustainable Consumption, Sustainable Production, Sustainable Operations, Partial Least Square Regression (PLSR), Institutional Theory, Agency Theory, Top Management Commitment, Information Sharing, Behavioural Uncertainty.

## **1. Introduction**

In recent years the interest in sustainable consumption and production (SCP) has grown steadily (Tukker et al. 2010). Subramanian and Gunasekaran (2015)

have argued that cleaner and sustainable supply chain practices can provide a competitive advantage to organizations, whereas unsustainable patterns of consumption and production are the root causes of pressing environmental problems (Southerton et al. 2004; Berg, 2011; Huang et al. 2012). SCP is defined as “the use of services and related products, which respond to basic needs and bring a better quality of life while minimizing the use of natural resources and toxic materials as well as the emissions of waste and pollutants over the life cycle of the service or product so as not to jeopardize the needs of further generations....” (Norwegian Ministry of Environment, Oslo Symposium, 1994). The concept of SCP received recognition during the World Summit on Sustainable Development (WSSD) held at Johannesburg in the year 2002 (UNEP, 2010). SCP is, hence, one of the key objectives of sustainable development that promotes resource and energy efficiency, sustainable infrastructure, and access to basic services, green and decent jobs and better quality of life for all (UNEP, 2010).

There is a rich body of literature on SCP behaviour (e.g. Tukker et al. 2008; Lebel and Lorek, 2008; Tukker et al. 2010; Berg and Hukkinen, 2011). Berg (2011) has argued that successful SCP policy revolves around three organizing principles: (i) deliberation; (ii) efficiency; and (iii) sufficiency, whereas Krajnc and Glavic (2003) have classified indicators under environmental, social and economic categories for measuring the success of SCP. Later studies (e.g. Spangenberg et al., 2010; Young et al., 2010; Lin and Huang, 2012; Nazzari et al., 2013) have investigated the impact of factors and issues such as values and attitudes, learning, and product attributes, as well as the integration of social, economic, environmental and institutional aspects to explain SCP and related behaviours.

However, literature has not yet explored the role of external pressures in strengthening SCP behaviour, and in particular how top managers may use external pressures to build SCP behaviour. Gunasekaran and Spalanzani (2012) highlight that there is a lack of frameworks for both practitioners and scholars that would provide insights into SCP behaviour in both manufacturing

and services. In their review, they suggest a framework for sustainable development along with strategies, techniques and tools. To address this gap in the SCP literature, we develop a theoretical framework that explicates (i) how top management can influence SCP behaviour, and (ii) what the influence of information sharing and reduction is in behavioural uncertainty on SCP behavior. We use survey data gathered from 167 Indian companies that have embraced SPC as one of their guiding philosophies. We draw on Institutional Theory (DiMaggio and Powell, 1983) and Agency Theory (Eisenhardt, 1989). Both theories have been popular in Operations Management (OM) and SCM research (Ketokivi and Schroeder, 2004; Liu et al., 2010; Zhang et al., 2015). However, they are yet to be used to explain SCP related phenomena (Ketchen and Hult, 2007; Cai et al., 2010; Kauppi, 2013). The study conducted by Zhu and Geng (2013) contributes to the supply chain management literature by indicating that internal barriers such as lack of financial gains, resource and capability tend to weaken the impact of external drivers. However, an investigation with respect to SCP behaviour will be an interesting contribution to SCP literature.

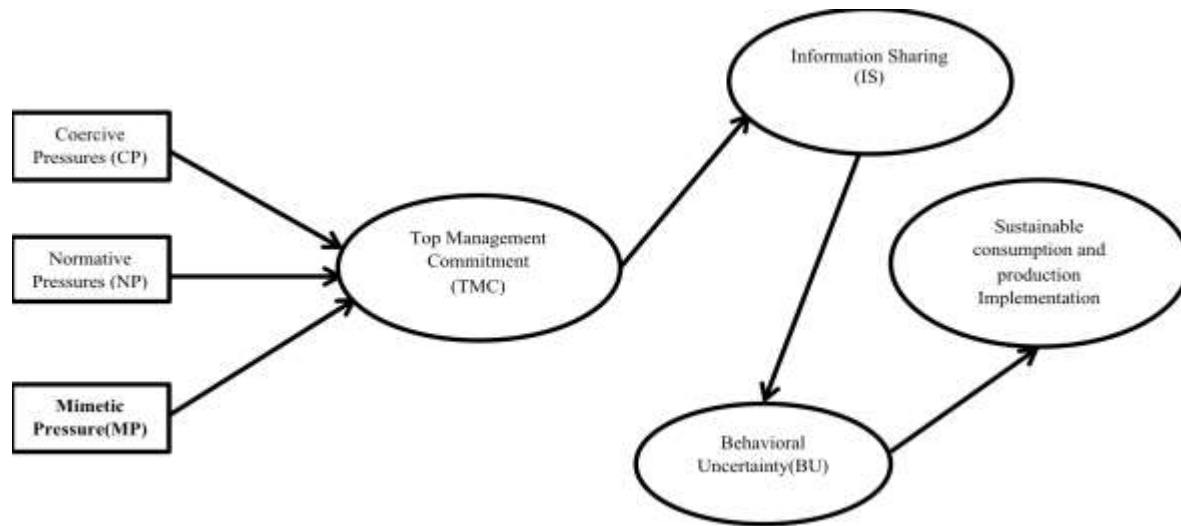
The rest of the paper is organized as follows. In the next section, we develop our theoretical framework and identify research hypotheses. The subsequent sections describe the construct operationalization and data collection process, present the data analysis procedure and the results of model testing, and discuss the findings and their theoretical and managerial implications. The last section concludes the paper and provides directions for future research.

## **2. Theoretical Framework**

The theoretical framework is firmly grounded in the literature (Figure 1). It comprises four elements: institutional theory, the influence of top management commitment, the role of information sharing among stakeholders, and the reduction of behavioural uncertainty among stakeholders. In the last two decades, Institutional Theory (DiMaggio and Powell, 1983) has been used by management scholars to explain the intention of the organizations to embrace

best practices. Zhu and Sarkis (2007) have attempted to investigate the moderating role of institutional pressures on green supply chain practices with reference to Chinese firms. Dubey et al. (2015) have attempted to explain firms' operational practices using institutional theory. Kauppi (2013) has argued the need for extending the use of institutional theory in the field of operations management and supply chain management. Eppel et al. (2013) have argued the need for strong policy to influence citizen behaviour toward sustainable consumption. Österle et al. (2015) have attempted to explain the sustainable behaviours of stakeholders in design of eco-efficient logistics.

We argue that institutional theory will offer some useful insight to understand the sustainable behaviour of the stakeholders. Furthermore, we argue that external forces, no matter how strong they are, will have no effect on the quality of information sharing which may help in reducing behavioural uncertainty. Hence we argue that the role of human agents (i.e. top management) in such situations may be instrumental in influencing the quality of information sharing and reducing behavioural uncertainty. The quality of information sharing and the degree of uncertainty reduction among key stakeholders will determine the successful implementation of SCP programs. Our theoretical framework is firmly grounded on the proposition that institutional forces affect organizational behaviour, being mediated by the top management. The role of top management in facilitating information sharing has been highlighted previously (e.g. Lai et al., 2010; Kembro and Naslund, 2014; Wu et al., 2014). Scholars, however, have not investigated the role of top management through top management commitment towards information sharing and reducing behavioural uncertainty which further helps to strengthen SCP behaviour.



**Figure 1: Theoretical Framework**

## **2.1 Institutional pressures**

Institutional theory posits that structural change and behavioural changes in organizations are driven less by competition and the desire for efficiency, and more by the need for organizational legitimacy. The drive for legitimacy fosters the process for institutionalization which makes the organizations more similar without necessarily making them more efficient, giving rise to institutional isomorphism (DiMaggio and Powell, 1983). There are three types of mechanisms, that is, institutional pressures, towards institutional isomorphism (DiMaggio and Powell, 1983): these are coercive, normative and mimetic. Kauppi (2013), based on DiMaggio and Powell (1983), has attempted to explain coercive isomorphism. It is due to both formal and informal pressures exerted on organizations by other organizations upon which they are dependent and by the expectations of the society. Liu et al. (2010) have argued that a powerful firm can exert coercion on their suppliers to embrace favourable operational practices to serve their own interests. Zhu and Sarkis (2007) have noted that companies are under pressure from stakeholders, such as customers and the government, to embrace sustainable practices. However,

Miemczyk (2008) has argued that coercive pressures can always lead to adoption of practices, but not always lead to efficiencies.

Normative pressures result from professionalization, defined as a move by members of an occupation to establish greater legitimacy for their occupation (Kauppi, 2013). DiMaggio and Powell (1983) argued that if many employees have similar qualifications and industry experiences, then they tend to define problems and filter information similarly.

Mimetic isomorphism is largely due to prevailing uncertainty that encourages imitation (Zsidisin et al. 2005; Kauppi, 2013). DiMaggio and Powell (1983) have argued that the greater the uncertainty in an organization, the greater the tendency this organization will show towards mimicking other successful organizations. Mimetic isomorphism occurs by imitating most successful practices and thus avoiding risk of failure as a first mover (Kauppi, 2013).

Institutional Theory has been used in the field of OM & SCM to explain 'unresolved puzzles' (Ketokivi and Schroeder, 2004; Zhu et al. 2005; Ketchen and Hult, 2007; Liu et al., 2010; Sarkis et al., 2011; Bhakoo and Choi, 2013; Kauppi, 2013). For instance, Bhakoo and Choi have investigated how organizations in different supply chain tiers respond to institutional pressures when implementing inter-organizational systems, whereas Liu et al. (2010) have looked into the institutional pressures that motivate a firm to adopt supply chain management systems. Apart from these notable exceptions, applications of Institutional Theory in the field of OM and SCM are scarce. Although there are studies where institutionalization of sustainable consumption (see, Mont, 2004; Zhu and Geng, 2013) has been discussed, more empirical research needs to be undertaken to answer the pressing call of the researchers who believe that institutional theory can offer a better explanation to most of the unanswered questions on SCP related phenomena (Kauppi, 2013), especially when discussing the influence of external forces (i.e. social, technical, and political environment) on SCP.

## **2.2 Top Management Commitment**

Scholars have identified top management commitment as crucial to the achievement of sustainability (Liang et al., 2007; Gattiker and Carter, 2010; Foerstl et al., 2015). The majority of studies (e.g. Abdulrahman et al., 2014; Jabbour and Jabbour, 2015) suggest that commitment of top management is crucial for the adoption of sustainable practices. Although institutional theory assists in explaining how isomorphism is achieved during strengthening of SCP behaviour, diverse SCP behaviour occurs under similar institutional arrangements. To explain this diversity, we use Agency Theory (Eisenhardt, 1989), which suggests that in a contract one party (the 'principal') delegates control and decision-making about tasks (and subsequently delegates authority) to another party, 'the agent' (Fayezi et al., 2012). Although in OM and SCM scholars have used agency theory in understanding supplier risk, effectiveness (Ketchen and Hult, 2007) and conflicts of interests taking place within supplier relationships (Zhang et al., 2015), there have not been extensive applications of this theory in SCP. Hence we apply Agency Theory to conceptualize top management as a principal agent that translates institutional pressures into suitable actions for SCP.

In this research we further conceptualise top management commitment following Jarvenpaa and Ives (1991) and Liang et al. (2007), as top management beliefs (TMB) and top management practices (TMP). TMB represents the psychological state of the top management, while TMP refers to the behaviour and actions performed to embrace SCP. Top managers, according to Walsh (1988), use beliefs in order to infer decisions drawing on stimuli from the environment; hence, TMB guides desirable managerial actions. Positive beliefs and practices can be 'translated' into managerial actions that help managers embrace SCP.

### **2.3 Information Sharing and Behavioural Uncertainty**

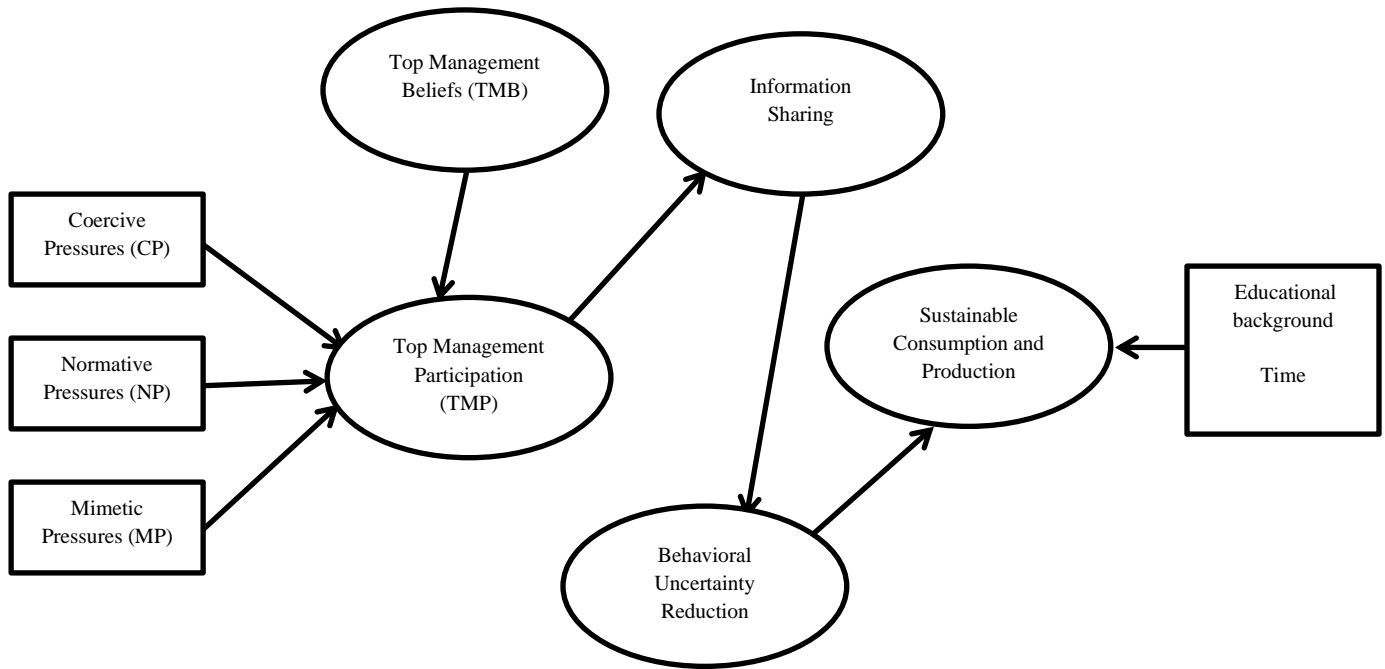
Scholars have long acknowledged the role of information sharing for supply chains (Näslund et al., 2014) including, inter alia, improving the speed of information flow, the efficiency and effectiveness of supply chains, the ability of organizations to respond to the changing needs of customers (Chow et al., 2007; Li & Lin, 2006), reducing supply chain costs (Cheng, 2011), improving decision making (Huang et al., 2003), collaboration (Wu et al., 2014), achieving supply chain performance (Lee et al. 2000; Yu et al., 2010; Ye and Wang, 2013) in the context of sustainable practices (Mont, 2002), and improving practice (Kwon and Suh, 2004; Zhou and Benton, 2007; Jeong and Leon, 2012; Wu et al., 2014). Lai et al. (2010) claim that while the role of information sharing for SCM has long been recognized, its environmental management dimension has not received attention. They suggest that when companies share environmental management information with their upstream suppliers to satisfy their environmental quests, there are no profit-related benefits, but there is cost efficiency and increase in environmental performance. However, when it comes to sharing environmental information with customers, companies would achieve profit-related benefits. Still, there are limited studies that relate information sharing to sustainable practices, and in particular the role of information sharing in helping top managers translates external pressures to SCP.

Literature has acknowledged that information sharing can reduce decision-making uncertainty, which is defined as “the inability to predict partner behavior or changes in the external environment” (Joshi and Stump, 1999). Information sharing appears to reduce the degree of uncertainty regarding a partner’s behaviour which enhances the level of trust among the supply chain partners (Kwon and Suh, 2004). Van Kleef and Roome (2007) have noted that building trust is one of the important factors that may influence sustainable business development, whereas Young et al. (2010) have argued that trust building is critical for achieving sustainable consumption and production.

Hence, we argue that reduction in behavioural uncertainty among stakeholders can help build trust that can further strengthen SCP behaviour.

## 2.4 Research Model and Hypotheses

In this section, based on our preceding discussion that top management mediates the impact of institutional pressure on SCP behaviour, we develop a research model (Figure 2) and eight research hypotheses.



**Figure 2: Research Model**

### 2.4.1 Institutional Pressures

Coercive pressures (CP) have significant impact on SCP behaviour (Veleva and Ellenbecker, 2001; Seyfang, 2006; O'Rourke, 2005; Tseng et al. 2013). Although there is literature supporting the direct relationship between CP and TMP (see Liang et al. 2007), there is limited literature discussing how CP can influence information sharing under the mediating effect of TMP. Hence, based on existing evidence we hypothesize:

*H1: CP positively impacts information sharing under the mediating effect of TMP.*

Normative pressures usually permeate through the channels of professional affiliations (Liang et al. 2007), and hence the NP has a strong impact on SCP behaviour (Tseng et al. 2013). However the literature surrounding SCP has not stressed much the relationship between NP and information sharing under the mediating effect of TMP. Hence, we hypothesize that:

*H2: NP positively impacts information sharing under the mediating effect of TMP.*

On the basis of literature (see Zhu and Geng, 2013) we can see that top management has shown a tendency to mimic the actions of their peers or competitors who were very successful. However, the literature is not clear about how TMP mediates the impacts of mimetic forces on information sharing. Hence we hypothesize:

*H3: MP positively impacts information sharing under the mediating effect of TMP.*

#### **2.4.2 Top Management Commitment**

The role of top management commitment and its operationalization through TMB and TMP has been highlighted (Srivastva, 1983; Liang et al. 2007). However, the literature surrounding SCP has paid less attention towards understanding the role of TMB on TMP in strengthening SCP behaviour. Therefore, we hypothesize:

*H4: TMB has strong positive impact on TMP in strengthening SCP behaviour.*

#### **2.4.3 Information Sharing, Behavioural Uncertainty, and SCP implementation**

In this study we argue that TMP can facilitate information sharing among stakeholders (Morsing and Schultz, 2006) which can further lead to reduction

in behavioural uncertainty (Kwon and Suh, 2004) and to strengthen SCP behaviour. Hence we hypothesize:

*H5: TMP can facilitate information sharing.*

*H6: Information sharing can reduce behavioural uncertainty.*

*H7: Reduction in BU can help to achieve SCP implementation.*

#### **2.4.4 Confounding variables**

We have identified the following two confounding variables. First, the ‘educational background of the stakeholders’ (Tanner and WölflingKast, 2003). Tanner and WölflingKast have argued that educational qualification is one of the important factors to explain sustainable consumption behaviour. Second, ‘time since the SCP implementation’ is a control variable for the reason that adaption is a time-sensitive process. We view SCP behaviour as being time-sensitive and the length of time since the implementation may have various degree of impact on predictor and response variables. We adopted the variable following Liang et al., (2007) and their study on systems’ assimilation within organizations.

### **3. Research Methods**

We used survey methodology to test our research model. We reviewed critically the guidelines by Fawcett et al. (2014). Our survey instrument was developed by identifying constructs from the literature. We pretested our instruments for which we identified experts from academia, government agencies, and reputable organizations that have contributed extensively in form of publications in reputable journals, policy papers and white papers and championed SCP implementations. On the basis of their suggestions we changed the wording of our questionnaire so that the respondents would not have difficulties in understanding the questions of the survey instrument. All of

these exogenous constructs in the research model are operationalized as reflective constructs whereas the SCP implementation was operationalized as a formative construct.

### **3.1 Operationalization of Constructs**

#### **3.1.1 Coercive Pressure**

‘Coercive pressure’ was operationalized in terms of the extent of external pressures including government policies, customer pressures and competitors (Liang et al. 2007). We used a three-item scale based on prior studies (see Liang et al. 2007; Zhu and Geng, 2013; Dubey et al. 2015). The items are ‘local regulatory authority pressure’, ‘industry competition’, and ‘industry associations’.

#### **3.1.2 Normative Pressure**

‘Normative pressure’ refers to the extent to which organizations have implemented SCP and the extent to which government agencies and various industry associations promote SCP implementations. In our study we emphasize the importance of the stakeholders’ network primarily based on the relationships between top management of the organizational field as well as government agencies in shaping SCP behaviours (Liang et al. 2007). We have used a three-item reflective scale based on prior studies (see Liang et al. 2007; Dubey et al. 2015). The items are ‘the extent to which the SCP is implemented by suppliers’, ‘the extent to which customers support SCP’, and ‘the extent to which government agencies promote the SCP behaviour’.

#### **3.1.3 Mimetic Pressure**

‘Mimetic pressure’ refers to the extent to which one organization tends to mimic their competitors’ or partners’ best practices related to SCP. Following Liang et al. (2007) and Dubey et al. (2015) we have used a six-item reflective construct. The items are ‘greatly benefitted from SCP program’, ‘favorably perceived by

others in the same industry’, ‘favorably perceived by customers’, ‘favorably perceived by suppliers’, ‘favorably perceived by transporters’, and ‘favorably perceived by the investors’.

#### ***3.1.4 Top Management Beliefs***

‘Top management beliefs’ (TMB) refer to the extent to which top managers consider that SCP will have an immense impact on sustainable development. We have used a four-item reflective construct. The items are the ‘efficient use of natural resources’, ‘reduction of the emission of harmful elements’, ‘creation of more jobs’, and ‘promotion of local culture & products’ (UNEP, 2011).

#### ***3.1.5 Top Management Participation***

‘Top Management Participation’ (TMP) refers to extent which top managers translate their beliefs in SCP into desirable actions. We have used a modified Liang et al. (2007) three-item construct for measuring TMP. They are: ‘sharing of mission and vision statement regarding SCP program’, ‘sharing potential benefits of SCP programs with all stakeholders’, and ‘creating awareness related to SCP’.

#### ***3.1.6 Information Sharing***

We have modified Hsu et al.’s (2008) construct for the context of the SCP program. We have used a three-item reflective construct: (i) ‘use of compatible information systems with various stakeholders engaged in strengthening SCP behaviour; (ii) ‘sharing of information related to various resources deployed for SCP’; (iii) ‘existence of a joint information center (JIC) for effective sharing of information among various agencies or organizations involved in SCP’.

#### ***3.1.7 Behavioural Uncertainty***

We adapt Joshi and Stump’s (1999) definition and define behavioural uncertainty as the inability to predict the behaviour of those individuals who are engaged in SCP behavior building. Behavioural uncertainty in the context

of the SCP behaviour may arise due to lack of trust between stakeholders, stemming from their potentially conflicting goals. In our study we have used a four-item reflective construct based on Joshi and Stump (1999) and Kwon and Suh (2004). The items that we used were 'role clarity', 'adaptability', 'alignment' and 'cooperation'.

### ***3.1.8 Sustainable Consumption and Production Implementation***

The success of the SCP program is measured in terms of 'sustainable management after and efficient use of natural resources', 'significant reduction of harmful elements', 'creates more jobs', 'improves health standard of the workers', and 'improving living standard for the people'. These were adapted from Veleva and Ellenbecker (2001) and UNEP (2010).

### **3.2 Data Collection**

The survey was sent to officers and managers in various organizations that are involved in SCP behaviour building programs. We used an e-survey to collect data. We assured respondents that confidentiality will be strictly kept regarding their names and companies. Following Malhotra and Grover (1998) we collected data in two stages. The data was collected using Dillman's (2007) modified total design test method. We sent the questionnaire via e-mail to each potential respondent. Overall we received 167 complete and usable responses after two follow-ups (as shown in Table 1). The responses that we received represent 16.17% vice presidents, 23.95% general managers, 38.92% managers and 20.96% deputy and assistant managers. Thus over 40% of respondents belong to the senior cadre (i.e. vice presidents and general managers). Table 1 further provides information related to years of experience, types of business activities in which these firms are involved, the age of the firms in years, the revenue generated in last financial year, and the number of employees engaged in these firms. However, the information related to number of employees may be more than we estimated as there are more than 20% of the workers who are not in

the payroll of these respective organizations and majority of them were daily-wage workers.

**Table 1: Demographic profiles of the respondents**

	Demographic profile	Number of respondents	Percentage of respondents
Designation	Vice President	27	16.17
	General Managers	40	23.95
	Managers	65	38.92
	Deputy/Assistant Managers	35	20.96
Job experience (years)	Above 20	53	43
	15-20	50	28.45
	14-10	29	16.26
	9-5	25	8.13
	4-0	10	4.07
Nature of business activities	Government bodies	45	26.95
	Industrial Associations	45	26.95
	Retailers	37	22.16
	Suppliers to leading manufacturers	23	13.77
	Transporters	17	10.17
Age of the firm	>20	45	26.95
	15-20	77	46.11
	14-10	27	16.17
	9-5	18	10.77
	4-0	0	0
Annual Revenue	> 2000 crores* (INR)	18	6.5
	1500-2000 crores* (INR)	42	14.63
	1000-1499 crores* (INR)	25	16.26
	500-999 crores* (INR)	27	21.95
	< 500	55	40.65
Number of employees in the payroll	Greater than 500	67	16.26
	250-500	29	26.02
	100-249	40	32.52
	Less than 100	31	25.2

\* 1 Crore= 10 million

### **3.3 Non-Response Biasness Test**

Chen and Paulraj (2004) have argued that the non-response bias test is one of the requirements for statistical surveys. Armstrong and Overton (1977) have argued that in a case when data is gathered, there is a possibility that the response of the early respondents may differ from the late respondents. Hence before the data can be used for further statistical analyses, it is always advisable to conduct a non-response bias test by using wave analysis. In this approach, depending upon data distribution, either the chi-square test or the t-test is performed on early responses and late responses to check whether there exists a significant statistical difference between the two groups. In recent years there is an increasing trend among operations management scholars to use wave analysis to check non-response biasness in gathered data (see Blome et al. 2013; Dubey and Gunasekaran, 2015). In this case we split the collected data into two equal halves as suggested by Chen and Paulraj (2004) depending on the dates they were received. We assessed non-response bias test on the two halves using t-tests. We have found no significant difference ( $p > 0.05$ ) and therefore we concluded that non-response bias is not an issue. However, Wagner and Kemmerling (2010) noted that a traditional method such as wave analysis (Armstrong and Overton, 1977) may not be a strong test for non-response bias. Hence, to further strengthen our claim for non-response biasness test we have further followed up our non-respondents (typically via phone) as suggested in the literature (Wagner and Kemmerling, 2010; Fawcett et al. 2014) and collected comparative demographic and response data. In this way we have ensured that our gathered data is free from non-response bias.

### **4. Data Analysis and Results**

Before undertaking any statistical analysis, we examined for constant variance, existence of outliers, and normality (see, Chen and Paulraj, 2004; Blome et al. 2013; Dubey and Gunasekaran, 2015). We also used plots of residuals by predicted values, rankits plot of residuals, and statistics of skewness and

kurtosis (Cohen et al. 2003; Blome et al. 2013; Dubey et al. 2015). We found maximum absolute values of skewness and kurtosis of the indicators in the remaining dataset to be 1.26 and 3.12, respectively. These values are much lower than the specified limits in past research of skewness <2 and kurtosis <7 (Curran et al. 1996; Kim and Malhotra, 2005; Blome et al. 2013; Dubey and Gunasekaran, 2015). We did not observe any significant deviations from the assumption in case of the plots or the statistics. To ensure that our data was free from multi-collinearity, we calculated variance inflation factors (VIF). All the VIFs were less than 1.58, which is well below than recommended threshold of 10.0 (Hair et al. 1995) suggesting that multi-collinearity is not an issue in our data.

#### **4.1 Measurement Model**

We note that all the reliability coefficients are above 0.70, the standardized factor loading of each item is above 0.5, the scale composite reliability (SCR) is above 0.5 and each average variance extracted (AVE) is above 0.5, except CP whose AVE is 0.45 but whose individual factor loadings are greater than 0.5 and SCR is greater than 0.7 as recommended by Hair et al. (1995) (see Table 2). This indicates that the measurements are consistent, and latent constructs account for at least 50 percent of the variance in the items. Hence it is evident that our measurement model (see Figure 2) demonstrates convergent validity.

Table 2 provides important measures for convergent validity as suggested by Fornell and Larcker (1981). Here ‘SCR’ is computed using mathematical formula  $SCR = (\sum \lambda_i)^2 / ((\sum \lambda_i)^2 + \sum e_i)$  where  $\lambda_i$  = factor loadings and  $e_i$  = error which is calculated using  $e_i = 1 - (\sum \lambda_i)^2$ .

**Table 2: Loadings of the Indicator Variables (Composite Reliability) and Average Variance Extracted (AVE)**

Construct	Indicator	Factor Loading	Variance	Error	SCR	AVE
Coercive Pressures (CP)	CP1 Local regulatory pressure	0.58	0.34	0.66	0.71	0.45
	CP2 Industry competition	0.71	0.50	0.50		
	CP3 Industry associations	0.72	0.52	0.48		
Normative Pressures (NP)	NP1 Suppliers involvement	0.91	0.83	0.17	0.83	0.62
	NP2 Customers involvement	0.87	0.76	0.24		
	NP3 Government agencies support	0.53				
Mimetic Pressures (MP)	MP1 Benefits from SCP programs	0.77	0.59	0.41	0.90	0.65
	MP2 Favorably perceived by others in the same industry	0.8	0.64	0.36		
	MP3 Favorably perceived by the customers	0.86	0.74	0.26		
	MP4 Favorably perceived by the suppliers	0.85	0.72	0.28		
	MP5 Favorably perceived by the transporters	0.73	0.53	0.47		
Top Management Beliefs	TMB1 Efficient use of natural resources	0.86	0.74	0.26	0.93	0.74

(TMB)	TMB2 Reduce the emission of harmful elements	0.91	0.83	0.17		
	TMB3 Create more jobs	0.86	0.74	0.26		
	TMB4 promote local culture & product	0.85	0.72	0.28		
Top Management participation (TMP)	TMP1 Sharing of mission & vision statement	0.78	0.61	0.39		0.65
	TMP2 sharing of potential benefits of SCP program with all stakeholders	0.81	0.66	0.34		
	TMP3 Creating awareness related to SCP programs	0.83	0.69	0.31		
Information Sharing (IS)	IS1 Compatible information systems	0.88	0.77	0.23	0.90	0.74
	IS2 Information sharing	0.88	0.77	0.23		
	IS3 Joint information center	0.82	0.67	0.33		
Behavioural Uncertainty (BU)	BU2 getting along with my groups	0.82	0.67	0.33	0.80	0.57
	BU3 Organize group	0.79	0.62	0.38		
	BU4 help seeking	0.64	0.41	0.59		
Sustainable Consumption & Production Performance (SCP)	SCP1 Sustainable Management after and efficient use of natural resources	0.71	0.50	0.50	0.91	0.66
	SCP2 Significant reduction of harmful elements	0.85	0.72	0.28		
	SCP3 Creates more Jobs	0.89	0.79	0.21		

	SCP4 Improves health standard of the workers	0.83	0.69	0.31		
	SCP5 Improving living standard for the people	0.78	0.61	0.39		

(Note: The measuring items MP6, and BU1 are not included in the Table 2 as the factor loadings of these items were found below 0.5. We suppressed weak factor loadings (see Hair et al. 1995). However we further consulted some of the industry practitioners on whether the dropped items are very important from present study. Hence based on their suggestions we proceeded with our factor analyses output (see Appendix 1))

We generated Table 3 based on discussions on construct validity by Fornell and Larcker (1981). Table 3 shows that the square root of the AVE in the leading diagonal is greater than all the entries in the given row and column (i.e. above correlation coefficient values). The results in Table 3 further suggest that our model possesses discriminant validity.

**Table 3: Correlations among Major Constructs**

Component	CP	NP	MP	TMB	TMP	IS	BU	SCP
CP	<b>0.67*</b>							
NP	0.09	<b>0.79*</b>						
MP	0.13	0.04	<b>0.81*</b>					
TMB	0.02	0.00	0.00	<b>0.86*</b>				
TMP	0.00	0.00	0.04	0.04	<b>0.81*</b>			
IS	0.03	0.03	0.00	0.04	0.01	<b>0.86*</b>		
BU	0.02	0.03	0.01	0.04	0.07	0.00	<b>0.75*</b>	
SCP	0.00	0.03	0.02	0.04	0.02	0.00	0.00	<b>0.81*</b>

(Note: The above Table 3 has been generated from appendix 2 (Inter-correlation matrix).

## 4.2 Common Method Bias Test

In the case of self-reported data there is every possibility that common method biasness exists arising from multiple sources such as consistency motif and social desirability (Podsakoff and Organ, 1986). We performed statistical analyses to assess the severity of common method bias. We conducted the Harmon one-factor test (as suggested by Podsakoff and Organ, 1986) on eight constructs of our model (Figure 2). Results from this test showed that five factors are present and the most covariance explained by one factor is 21.43 percent (see Appendix 3) indicating that common method biases are not a serious concern in our research.

## 4.3 Hypothesis Testing

We obtained estimates using PLSR analysis (see Figure 3). The  $R^2$  value of 0.72 with standard error of estimates 0.27 indicates that our theoretical model as shown in Figure 2 explains a substantial amount of SCP behaviour. The path (CP→TMP) explains 0.1 % of TMP, which was statistically insignificant ( $\beta = 0.036$ ,  $p=0.7$ ). Hence we can infer from the statistical analyses that CP does not play a significant role in influencing TMP in SCP implementation. However although we have not hypothesized in our study (i.e. CP→TMB), however we attempted to test the linkage between CP and TMB which was found to be statistically insignificant ( $p=0.409$ ). The path (NP→TMP) was found to be statistically insignificant at  $p=0.05$  ( $R^2=0.028$ ;  $\beta = 0.166$ ;  $p=0.073$ ). However at  $p=0.1$  the relationship (NP→TMP) was found to be significant. We further examined the hypothesized relationship (MP→TMP). The statistical analyses suggest that the relationship was found to be statistically significant ( $R^2=0.11$ ;  $\beta = 0.33$ ;  $p=0.00$ ). Hence we can conclude that MP plays a significant role in influencing TMP. The path (TMB→TMP) was tested positive and found to be

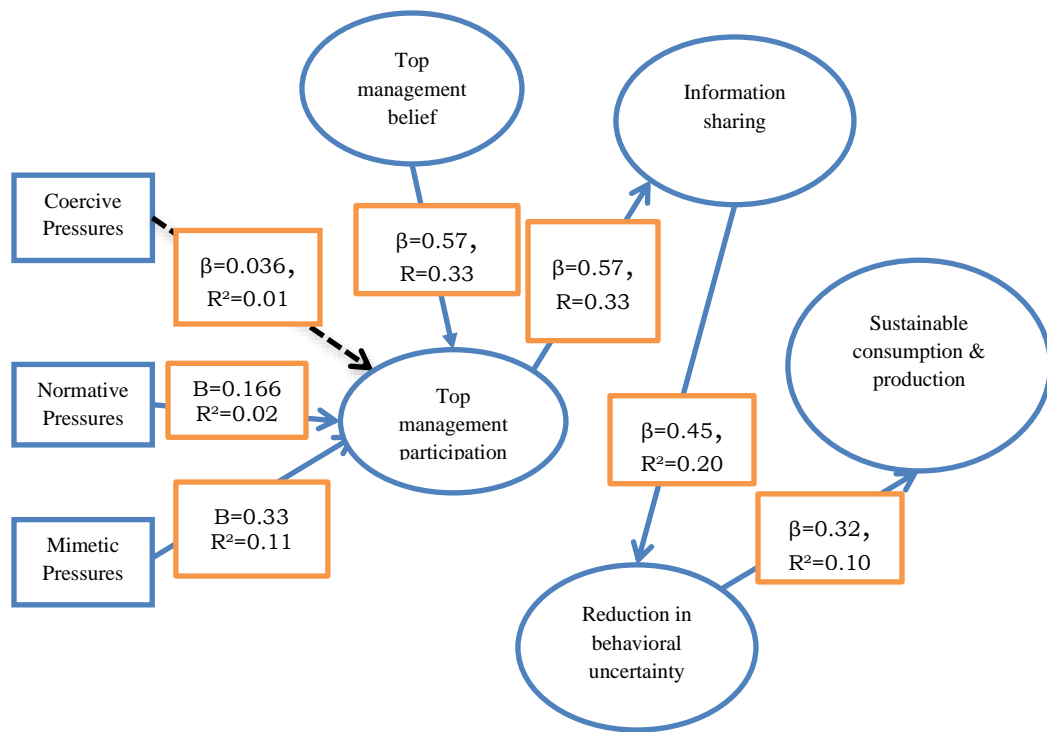
statistically significant ( $R^2=0.33$ ;  $\beta =0.57$ ;  $p=0.00$ ). Hence we can argue that TMB plays a significant role in explaining TMP in case of SCP implementation. The path (TMP→IS) was found to be statistically significant ( $R^2=0.39$ ;  $\beta =0.62$ ;  $p=0.00$ ). From the statistical analyses we can conclude that TMP plays a significant role in quality information sharing, which is significant construct of our theoretical framework (see Figure 2). The path (IS→BU) was found to be statistically significant ( $R^2=0.20$ ;  $\beta =0.45$ ;  $p=0.00$ ). Hence we can conclude that IS plays a significant role in reduction of behavioural uncertainty among stakeholders. The path (BU→SCP) explains 10.3 percent of total variance in SCP implementation. The path is found to be statistically significant ( $R^2=0.10$ ;  $\beta =0.32$ ;  $p=0.00$ ). Hence we found that our research hypotheses are supported (NP→TMP is supported at  $p=0.7$ ), except (CP→TMP) which was not supported in our study.

#### **4.4 Goodness-of-Fit test**

In our study we tested our research hypotheses using PLSR, which is a variance based SEM technique. Tenenhaus et al. (2005) argued that in case of PLSR the goodness-of-fit (GoF) has a single measure. In our study we have substituted the average of R-square and geometric mean of AVE for the endogenous constructs in the given formula as:

$$\text{GoF} = \sqrt{(\text{Average } R^2 * \text{geometric mean of AVE})}$$

The GoF value calculated for our theoretical framework using the formula was 0.33. Wetzels et al. (2009) suggested that the baseline values for GoF are (0.36= large, 0.25= medium, 0.1= small). In our case, we note that GoF is moderate.



**Figure 3: PLS Estimates**

## 5. Discussion

We undertook this research following recent research calls for more research on SCP. Our extensive review in the literature on sustainable consumption, sustainable production, and sustainable consumption and production has revealed that most of the research has yet to embrace alternative theories to explain SCP related phenomena and the adoption of SCP practices. Ketchen and Hult (2007) have argued that the use of organizational theories can help to explain supply chain management phenomena. Sarkis et al. (2011) have further attempted to classify GSCM literature on the basis of organizational theories. In the present study we have attempted to respond to the research call of Tseng et al. (2014), and explained SCP implementation using institutional theory (DiMaggio and Powell, 1983) and Agency Theory (Eisenhardt, 1989). Kauppi (2013) has argued that Institutional Theory can be a powerful theory to explain operations management phenomena. In the past

scholars (see Zhu and Sarkis, 2007; Dubey et al. 2015) have used institutional theory to explain GSCM practices. However, literature institutional theory is yet to be used in order to explain SCP practices, and this is our first contribution. We have included TMC as a mediating construct between institutional pressures and sustainable consumption and production (SCP) implementation. We further argue, through the use of Agency Theory, that TMP plays a significant role in information sharing, which in turn helps reduce BU among stakeholders. The reduction of BU further explains nearly 10 percent of SCP implementation, which is quite significant. In our study the path connecting CP and TMP is found to be statistically insignificant in case of SCP implementation. A first possible explanation could be that we have used relational exchanges and their constructs, that is, trust, cooperation, and conflict management in our theoretical framework as suggested by Morgan and Hunt (1994). A second possible explanation would be that regulatory pressures play a significant role in the initial stages. However in the present study the stakeholders are more conscious of the positive image that is created by SCP programs. Thus, MP was found to be a significant variable in explaining TMP.

To further support our hypotheses testing outcome we also found that AVE and individual factor loadings of CP construct (see Figure 2) is relatively weaker in comparison to other constructs which we have used in our theoretical framework based on the 117 responses. The findings of our study confirm the findings of Zhu and Geng (2013). Thus in case of successful SCP implementation the MP plays a significant role in explaining TMP. We can argue on the basis of our responses that the perceived benefits from SCP programs and how favorably these are perceived by others in same industry, customers, suppliers, transporters, and by the investors are significant items, which are loaded on the MP construct. This outcome further supports the findings of the study by Zhu and Geng (2013). NP has significant influence on TMP at  $p=0.07$ . The NP construct in our study is determined by the involvement of suppliers and customers in the SCP implementation. However,

the support from government in our study is found to be weak. Hence, we can argue that the government support schemes towards SCP have relatively weaker impact, which could be one of the areas for further research. Furthermore, we suggest that TMP may directly influence SCP implementation, but to offer some more useful insight we hypothesized that TMP will have a positive influence. The statistical analyses further support this hypothesis. IS(Kwon and Suh, 2004) is vital for both supply chain management and practice and environmental performance (Kwon and Suh, 2004; Zhou and Benton, 2007; Lai et al., 2010; Jeong and Leon, 2012; Wu et al., 2014). However SCP literature has yet to investigate the impact of TMP on IS, which plays a significant role in explaining SCP implementation. Based on the argument of the literature that external pressures (i.e. CP, NP, and MP) are not effectively translated into desired actions, we have hypothesized that top management mediates external pressures and SCP implementation. We argued, extending Liang et al. (2007), that TMC directly impacts SCP implementation through stakeholder involvement. Hence, to engage stakeholders towards SCP implementation, behavioural uncertainty needs to be reduced through quality IS. The reduction in behavioural uncertainty further plays a significant role in explaining SCP implementation. Overall our proposed theoretical model explains nearly 71% of the total variance in SCP implementation, suggesting that our proposed theoretical model is comprehensive.

## **5.1 Theoretical Contributions**

Our research extends the literature discussing the role of institutional pressures in SCP adoption (Tseng et al. 2013), by hypothesizing and testing the role of institutional pressures (coercive, normative, mimetic) in affecting the process of SCP implementation. Furthermore, we explain the role of institutional pressures using agency theory through TMC, IS and reduction in BU, thereby offering more comprehensive insights into SCP implementation. We extend Tseng et al.'s study by further explaining the weak external forces in

comparison to the internal barriers during SCP implementation, and suggest that internal barriers could be present in absence of a strong agent who can help to minimize them by offering information sharing and reduction in behavioural uncertainty. Therefore, this study provides an integrated lens on SCP implementation by using institutional theory, agency theory, and information sharing. Finally, we extend the previous literature on SCP by (i) further explicating the role of TMC through TMP and TMB, and (ii) arguing towards the role of TMB in TMP in SCP behaviour. We discover that TMP helps in IS and reducing BU among stakeholders.

## **5.2 Managerial Implications**

The findings of our study offer guidance to the managers and consultants who are engaged with the SCP implementation process. The mediating role of TMP clearly suggests that concrete meta-structuring actions by the top management play a significant role in improving quality IS which further helps in reducing BU among participating agents in SCP programs. Reducing BU among participating agents improves coordination that further helps in successful SCP implementation. Conversely, if top managers reduce their level of participation in SCP programs, then as argued by Zhu and Geng (2013), the magnitude of internal barriers may reduce the impact of institutional pressures.

Our results indicate that CP does not influence TMP. This means that, in terms of guidelines for the Indian context, the government would need to enact stricter regulations and strengthen their enforcement level, as argued by Zhu and Geng (2013) in the context of Chinese manufacturers. Furthermore, since NP has significant influence on TMP, we recommend that supplier relationship and customer relationship programs would need to be put into practice, as they will have positive influence on TMP. More effort would need to be made in order to bring government agencies and industries on a common collaborative platform through public-private participation.

In our study MP has significant influence on TMP. The perceived benefits from SCP programs and favourable perception among stakeholders further motivate top management to engage these stakeholders in SCP programs through proper information sharing, for example in the form of white papers that can improve coordination among participating agents. Finally, since in the presence of TMC as a mediating construct the influence of institutional pressures on SCP behaviour is significant, understanding institutional pressures can differentiate between SCP program implementation success and failure.

## **6. Conclusions**

In this paper we proposed and tested a framework that explicates the role of top management in dealing with institutional pressures during SCP implementation, based on institutional theory and agency theory. Our statistical analyses indicate that our hypothesized relationship as shown in theoretical model (see Figure 2) is supported except for CP, which is not a significant driver of TMP. We have outlined our research limitations and further research directions in the next sub-section.

### **6.1 Limitations and further research directions**

While we believe that we have developed a sound theoretical model grounded in literature and tested it using a reliable instrument that was developed using this literature and was pretested to reduce measurement errors and collected data guided by Dillman's (2007) modified total design test method, we also enumerate some limitations. First, we have tested our research hypotheses using cross-sectional data since we could not collect longitudinal data. Hence, we argue that present study could have been further benefited if the hypotheses can be tested using longitudinal study. Second, our study is based on data collected from Indian organizations. Therefore, we are limited in generalizing our findings widely. We thus believe that the present study would need further investigation using data collected from both developed and developing economies in order to compare and contrast our findings from

Indian organizations. Third, in the present study we have not included variables such as trust, conflict management and commitment, and these three constructs may have an impact on strengthening SCP behaviours. Although we have tested the direct impact of reduction in BU on SCP implementation, we argue that a reduction in BU may enhance trust among participating agents, thereby further enhancing the commitment level among the participating agents during the SCP implementation process. Fourth, the  $R^2$  values of the paths (NP→TMP; MP→TMP and IS→RBU) are low. Hence we recommend including some more constructs such as trust, conflict management and commitment to strengthen our model. If we had used more measures for CP, NP and MP then the results may have been different. Fifth, we have attempted to generate theory through a deductive approach. Markman and Krause (2014) have argued in their recent call for papers that the deductive approach has its own merit in terms of reliability, but at the same time the scope of the study may be limited. Hence, research on SCP implementation can be enhanced using multiple case studies or alternative methods and theories as suggested by operations management scholars (Ketchen and Hult, 2007; Pagell and Wu, 2009; Taylor and Taylor, 2009; Childe, 2011; Ketokivi and Choi, 2014). Notwithstanding the limitations of this research, we believe that we provide food for thought to those scholars who would like to engage in studying the role of institutional pressures and top management in SCP implementation.

## Appendices

### Appendix 1: Factor Loadings

Construct	Indicator	Factor Loading
Coercive Pressures(CP)	CP1 Local regulatory pressure	0.58
	CP2 Industry competition	0.71
	CP3 Industry associations	0.72
Normative Pressures(NP)	NP1 Suppliers involvement	0.91
	NP2 Customers involvement	0.87
	NP3 Government agencies support	0.53
Mimetic Pressures(MP)	MP1 Benefits from SCP programs	0.77
	MP2 Favorably perceived by others in the same industry	0.80
	MP3 Favorably perceived by the customers	0.86
	MP4 Favorably perceived by the suppliers	0.85
	MP5 Favorably perceived by the transporters	0.73
	MP6 Favorably perceived by the investors	**
Top Management Beliefs(TMB)	TMB1 Efficient use of natural resources	0.86
	TMB2 Reduce the emission of harmful elements	0.91
	TMB3 Create more jobs	0.86
	TMB4 promote local culture & product	0.85
Top Management	TMP1 Sharing of mission & vision statement	0.78

participation(TMP)	TMP2 sharing of potential benefits of SCP program with all stakeholders	0.81
	TMP3 Creating awareness related to SCP programs	0.83
Information Sharing (IS)	IS1 Compatible information systems	0.88
	IS2 Information sharing	0.88
	IS3 Joint information center	0.82
Reduction in Behavioural Uncertainty (BU)	BU1 Clarity in roles	**
	BU2 getting along with my groups	0.82
	BU3 Organize group	0.79
	BU4 help seeking	0.64
Sustainable Consumption & Production Performance	SCP1 Sustainable Management after and efficient use of natural resources	0.71
	SCP2 Significant reduction of harmful elements	0.85
	SCP3 Creates more Jobs	0.89
	SCP4 Improves health standard of the workers	0.83
	SCP5 Improving living standard for the people	0.78

## Appendix 2: Inter-correlation Matrix

Component	1	2	3	4	5	6	7	8
1	1.000							
2	.305	1.000						
3	.356	.190	1.000					
4	-.146	.012	.032	1.000				
5	-.001	-.052	-.210	.193	1.000			
6	.183	.162	-.044	.225	-.074	1.000		
7	-.155	.159	-.089	.241	.269	.061	1.000	
8	-.017	.162	.132	-.009	-.140	-.069	.014	1.000

## Appendix 3: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings <sup>a</sup>
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	6.64	21.43	21.43	6.64	21.43	21.43	5.37
2	4.98	16.06	37.48	4.98	16.06	37.48	4.55
3	3.28	10.59	48.08	3.28	10.59	48.08	4.42
4	2.74	8.84	56.92	2.74	8.84	56.92	3.92
5	2.21	7.13	64.05	2.21	7.13	64.05	2.83
6	1.57	5.05	69.10	1.57	5.05	69.10	2.78
7	1.35	4.35	73.46	1.35	4.35	73.46	2.79

8	1.06	3.42	76.88	1.06	3.42	76.88	2.21
9	0.95	3.08	79.95				
10	0.83	2.67	82.62				
11	0.73	2.34	84.95				
12	0.59	1.92	86.87				
13	0.57	1.82	88.69				
14	0.52	1.67	90.37				
15	0.44	1.43	91.79				
16	0.41	1.32	93.11				
17	0.31	1.01	94.12				
18	0.29	0.93	95.05				
19	0.24	0.79	95.83				
20	0.24	0.76	96.59				
21	0.20	0.65	97.23				
22	0.17	0.54	97.77				
23	0.16	0.50	98.28				
24	0.12	0.39	98.67				
25	0.11	0.34	99.01				
26	0.08	0.26	99.26				
27	0.08	0.25	99.51				
28	0.07	0.22	99.73				
29	0.05	0.16	99.89				
30	0.03	0.11	100.00				
31	0.00	0.00	100.00				

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