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Examining sustainable supply chain management of SMEs using resource based view and institutional theory

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Abstract The long-term viability of an organization hinges on social, environmental, and economic measures. However, based on extensive review of the literature, we have observed that measuring and improving the sustainable performance of supply chains is complex. We have grounded our theoretical framework in institutional theory and resource-based view and drawn thirteen hypotheses. We developed our instrument scientifically to validate our model and test our research hypotheses. The data was collected from the Indian auto components industry following Dillman's total design test method. We gathered 205 usable responses.

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Following Peng and Lai's (J Oper Manag 30(6):467–480, 2012) arguments, we have tested our model using variance-based structural equation modeling (PLS-SEM). We found that the constructs used for building our theoretical model possess construct validity and further satisfy the specified criteria for goodness of fit. The hypotheses test further suggests that coercive pressures under the mediation effect of top management belief and participation have significant influence on resource selection (i.e. supply chain connectivity and supply chain information sharing). The supply chain connectivity and supply chain information sharing have significant influence on environmental performance. Contrary to our belief, the normative and mimetic pressures have no significant influence on top management participation. The managerial implications of the findings are also discussed.

Keywords Sustainable supply chain performance · Structural equation modeling · Institutional theory · Resource-based view · Partial least squares

1 Introduction

Amid high environmental uncertainty, the performance measurement systems (PMS) for supply chain sustainability are gaining increasing attention from academia and practitioners. Some of the operations and supply chain management scholars (see Ketchen and Giunipero 2004; Boyer and Hult 2005; Toptal and Çetinkaya 2017; Du et al. 2017; Kaur and Singh 2016; Wang and Gunasekaran 2017; Dubey et al. 2017) argue that the competitiveness of organizations is defined more by the competitiveness of their supply chains rather than by any other traditional measures or concepts. Kauppi (2013) further argues that, with the passage of time, economic considerations are not enough to sustain competitive advantage. Hence, social and environmental considerations, along with economic criteria, are equally important for any organization to sustain competitive advantage. Here comes the importance of integrating sustainability concepts with the supply chain. In the early stage, sustainability concepts in the supply chain were often misunderstood to be just economically rational to all stakeholders in the chain (Walley and Whitehead 1994; Jabbour et al. 2015; Brandenburg and Rebs 2015; Jindal and Sangwan 2016). Many scholars, like Min and Galle (1997, 2001), also clarified their stance on supply chain sustainability: that sustainability in the supply chain is not limited to cost reduction, but includes holistic measures that take the environment and society into consideration (Carter and Liane Easton 2011; Dyllick and Hockerts 2002; Garbie 2014). Hence, sustainable supply chain performance measures include environmental, social, and economic dimensions. Supply chain sustainability is not a management fad (Linton et al. 2007); rather, it is a pressing concern of emerging economies (Du et al. 2015). Managing supply chain sustainability is complex, because striking a balance between environmental, social, and economic issues requires significant effort (Massaroni et al. 2016).

While there is a rich body of literature on supply chain sustainability measurements, theory-focused research on supply chain sustainability and its measures are scant (Mollenkopf et al. 2010). Ketchen and Hult (2007) argue that how use of organizational theories often help to distinguish traditional supply chains from best value supply chains. Hoejmose and Adrien-Kirby (2012) further argue that many of the studies focusing on supply chain sustainability are purely descriptive; hence, the theoretical contribution of these studies is limited. Winter and Knemeyer (2013) further support these arguments by stating that many of the previous studies are focused on the identification of few constructs and their interrelationships, without sufficient theoretical justification. Kumar and Rahman (2016) argue that there are limited studies that have considered all three sustainability dimensions (social, economic, and environmental). Touboulic and Walker (2015) further argue that, in recent years, social sustainability has attracted significant attention from operations and supply chain management scholars. Pagell and Shevchenko (2014) argues that a majority of the studies in supply chain have explored the answers to "what", with reference to SSCM, and that "how" is rarely touched upon. We argue that there is a need for theory-focused research to further our understanding of supply chain sustainability and its constructs. Organizational theories deal with formal organization and basic scientific fundamentals to increase management efficiency (Taylor 1947; Weber 2009). Organizational theories are "characterized by vogues, heterogeneity, claims and counterclaims" (Waldo et al. 1978). Hence, the selection of one or more organizational theories, with justification and proper fit to the area of study, is an important and difficult task. The use of organizational theories for giving fundamental theoretical support to various supply chain management concepts is not new (see Halldorsson et al. 2009; Ketchen and Hult 2007; Miri-Lavassani et al. 2009). However, Ketchen and Hult (2007) have noted that, despite increasing acceptance of the use of organizational theories in the operations and supply chain management (O&SCM) community, the use of organizational theory or the integration of two or more theories to explain complexity in supply chains is still in the nascent stage. Thus, our present study may be considered an attempt to answer the pressing call of the scholars who have advocated for theory-focused research to advance the existing boundaries of O&SCM literature. This doesn't mean that nobody has so far attempted to use any of the organizational theories to build their arguments in the supply chain management domain (Zsidisin et al. 2005), but there have been very rare attempts, like Madhok (2002), to use a combination of more than one organizational theory for making use of their unique fundamentals to have a best fit of theoretical concepts and strong base.

In this context, resource-based view (RBV) theory can provide a better explanation of the interplay of the strategic resources of the organization and capability to gain competitive advantage (Taylor and Taylor 2009; Hitt et al. 2016). In recent years, RBV has gained significant attention among the operations and supply chain management (O&SCM) community (see Bowen et al. 2001; Rungtusanatham et al. 2003; Taylor and Taylor 2009; Hunt and Davis 2012; Gligor and Holcomb 2014; Brandon-Jones et al. 2014). RBV is the best fit to explain the path to gain competitive advantage by focusing on resources. The internal strengths and weakness of an organization are the ones that are easily controllable, rather than external opportunities and threats (Grant 1991). RBV of firms mainly focuses on those internal strengths and weaknesses (Grant 1991; Foss and Eriksen 1995). RBV theory in sustainable supply chain management suggests how competitive advantage can be gained by focusing on sustainability-based operations in supply chain (Touboulic and Walker 2015). Thus, we argue that RBV logic can explain the resource capability building and economic part of the business. Hence, in our context, RBV can be the natural best fit to become the base for all conceptual thoughts on the economic dimension of the sustainability performance of supply chain.

However, despite immense popularity, the antagonists of RBV have criticized that it has not looked beyond the properties of the resources and resource markets to explain the firm's enduring heterogeneity (Oliver 1997). Oliver (1997) argues that RBV logic has not examined the social context within which resource selection decisions are embedded. Hence, to address the limitations of the RBV, Oliver (1997) proposes a theoretical framework based on the integration of RBV and institutional theory (IT). IT has been used extensively for building green supply chain frameworks (Sarkis et al. 2011) and adopting quality programs and technology applications (Barratt and Choi 2007; Nair and Prajogo 2009; Liu et al. 2010; Heras-Saizarbitoria et al. 2011). IT offers a better explanation when motivation for the adoption of practices or technology stems from legitimacy (DiMaggio and Powell 1983). There are three types of institutional pressures—coercive pressures (CP), mimetic pressures (MP), and normative pressures (NP)—which together constitute the force behind institutional isomorphism (DiMaggio and Powell 1983). All three factors act as the forces behind the actions of organizations to improve their social and environmental sustainability initiatives, through which they can attain better legitimacy and brand value. Thus, we strongly argue that institutional theory can be the second theory to be selected from all organizational theories, as it is the best fit to explain the social and environmental dimensions of the sustainability performance of supply chains (Seles et al. 2016).

A majority of the studies on sustainable supply chains have largely ignored SMEs. Following previous scholars' arguments (see Min and Galle 2001; Pagell and Wu 2009; Asgari et al. 2016), we argue that sustainable supply chain management for SMEs may broaden our limited understanding of the supply chain sustainability. Gopal and Thakkar (2016a, b) argue that sustainability issues in supply chains with reference to the Indian auto components industry have received less attention than other emerging economies like Brazil and China. Greening or ensuring sustainability practices in (SMEs) in India is not easy when we consider many key practical challenges, like lack of availability of adequate and timely credit; limited access to equity capital; procurement of raw material at a competitive cost; inadequate infrastructure facilities, including power, water, and roads; low technology levels and lack of access to modern technology; and lack of skilled manpower for manufacturing, services, marketing, etc. (Singh et al. 2014). Major challenge areas to supply chain management are visibility, cost containment, risk management, increasing customer demands, and globalization (Butner 2010). Automotive supply chain is very complex, with multiple levels of networks and its size, and at a global level it is lagging behind other supply chains, like pharmaceutical and consumer goods, in terms of responsiveness, integration, and visibility (Bhattacharya et al. 2014). Sustainability issues are becoming more and more critical and a thriving topic within the automotive industry (Mayyas et al. 2012; Habidin et al. 2015). Kumar and Rahman (2016) conducted a study with reference to the Indian automotive supply chain, and noted that sustainability benefits and external forces have a positive influence on the commitment of top management in the adoption of sustainability practices. However, how these constructs affect the three measures of supply chain sustainability in the context of the SMEs in the Indian auto components industry is less understood. Hence, we specify our research question as: *What are the distinct and joint effects of institutional pressures, top management commitment and strategic resources on social, environmental and economic performance?*

We answer our research question based on a sample of 205 Indian automotive SMEs, using PLS-SEM. In doing so, we further add to the understanding of the links between the constructs drawn using RBV and IT logic and the performance measures based on triple bottom line (TBL) logic, thus contributing to supply chain sustainability measures in the context of SMEs within the Indian auto components industry. From a practitioner view, we provide theory-focused and empirically proven guidance for managers to understand what kind of strategic resources and capability under the influence of institutional forces may affect the environmental, social, and economic performance of the firm.

The paper is organized as follows. In Sect. 2, we illustrate our theoretical framework and develop our research hypotheses accordingly. In Sect. 3, we present our research design, including discussion of the operationalization of the constructs, sampling design, and data collection. In Sect. 4, we present our statistical analyses. In Sect. 5, we present our research discussion, including theoretical contributions, managerial implications, limitations, and further research directions. Finally, we have concluded our research.

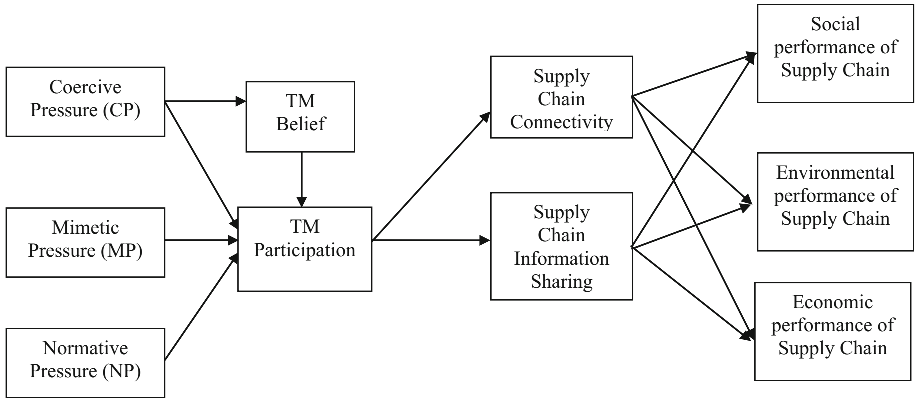

Fig. 1 Proposed theoretical framework

2 Theoretical framework and hypotheses development

The theoretical framework creates a balance between the routine inductive and deductive theory, building research methods to further guide and lead the research community to the best managerial practices (Meredith 1993). O&SCM scholars have clearly acknowledged the need for clearly defined and distinct constructs and a theoretical framework to enhance understanding of the complex operations and supply chain phenomena (see New et al. 2000; Saunders 1995, 1998; Babbar and Prasad 1998; Chen and Small 1996; Ho et al. 2002; Chen and Paulraj 2004). We have grounded our framework in IT (DiMaggio and Powell 1983), RBV (Barney 1991; Hoopes et al. 2003) and TMC (Greenwood and Hinings 1996; Delmas and Toffel 2008). DiMaggio and Powell (1983) identify three basic types of institutional pressures: coercive pressures (CP), mimetic pressures (MP) and normative pressures (NP). These three pressures represent three distinct processes of institutionalization. RBV argues that an organization can create competitive advantage by creating a bundle of strategic resources and / or capabilities. According to Barney (1991), resources may be categorized as physical capital, human capital, and organizational capital and have been further extended to include financial capital, technological capital, and reputational capital (Grant 1991). Hence, they may be tangible, such as infrastructure, or intangible, such as information or knowledge sharing (Größler and Grübner 2006). Following, Greenwood and Hinings (1996) arguments that institutional theory does not offer explanation that how does the institutional pressures may translate into selection of the strategic resources to achieve sustainable performance. In the similar vein Delmas and Toffel (2008) argues that the relationships between organizational factors and the institutional pressures are not well established. To address, these limitations Greenwood and Hinings (1996) highlight the importance of internal dynamics within organizations. Hence, based on these arguments we argue that role of TMC as a mediating construct between institutional pressures and resources of the organization may help to extend the Oliver (1997) arguments. In short, the key elements of our theoretical framework are RBV, IT, TMC, and TBL (see Fig. 1). Hence, we have conceptualized a reflective framework. Next, we discuss our hypotheses development.

2.1 Linkage between coercive pressures (CP) and top management belief (TMB)

Based on Liang et al.'s (2007) contribution, we argue that the role of top management comprises two elements: top management belief (TMB) and top management participation (TMP). Past research indicates that the external environments have significant effect on TMB (see Liang et al. 2007). Based on belief-action-outcome (BAO) framework, Gholami et al. (2013) further argue that coercive pressures have a positive impact on senior management beliefs and attitudes, which, in turn, will become a controlling factor in the adoption of environmental sustainability practices. Chen et al. (2011) further argue that the coercive pressures have a significant influence on the attitude of top management. Top management attitude is one of the critical factors that decide the strategy and the sustainability adoption level into an organization's operational level (Ageron et al. 2012; Klassen 2001). According to Zhu and Sarkis (2006), coercive pressures such as government rules and regulations have a positive influence on organizations to have better environmental performance. Hence, based on previous research, we hypothesize:

H1: Coercive pressure has a positive influence on top management belief.

2.2 Linkage between top management belief (TMB) and top management participation (TMP)

The psychological state and perceptions of top management on various things related to the management of an organization are referred to as top management belief (TMB), whereas top management participation (TMP) refers to the various behaviors and actions by top management on the business issues of an organization. TMB and TMP are the two pre-steps in the process of embracement of top management commitment (Liang et al. 2007). Akkermans et al. (1999) list top management involvement as one of the prerequisites to having an internationally successful supply chain and show how top management participation is influenced by their beliefs and perceptions. According to Min et al. (2004), top management belief and support are critical in setting up the direction for the organization, and the lack of it may become a barrier—and, as a result, functional managers will lack motivation and decision-making guidance. According to Chatterjee et al. (2002), top management can formulate vision and guidelines for managers and business based on their belief to assimilate the opportunities and risks of new technologies. Mello and Stank (2005) also assert the positive role of top management beliefs and participation in shaping the firm's culture and orientation to supply chain success. Thus, we hypothesize it as:

H2: Top management belief has a positive impact on top management participation.

2.3 Linkage between coercive pressures (CP) and top management participation (TMP)

Liang et al. (2007) have found positive linkage between CP and TMP. Pressures from the market and customers due to high environmental awareness and social morality have a positive impact on the green practices of supply chains (Zhu and Sarkis 2007). Previous studies have widely accepted the positive and critical role of top management in achieving sustainability practices (see Gattiker and Carter 2010; Foerstl et al. 2010). Hence, based on the previous studies, we hypothesize:

H3: Coercive pressures have a positive influence on top management participation.

2.4 Linkage between normative pressure and top management participation

Top management confidence and participation are key factors influencing the success of the implementation of any technology, innovation, or management system in an organization

(Hamel et al. 1989; Yeung et al. 2003; Zhu et al. 2008). To figure out the factors behind the effective implementation of ERP systems, Liang et al. (2007) empirically tested that the high level of normative pressure has a positive impact on top management participation. Ageron et al. (2012) have noted the lack of top management commitment and participation as one of the barriers to the adoption of sustainability practices into the supply chain. Based on existing literature, we hypothesize:

H4: Normative pressure has a positive influence on top management participation.

2.5 Linkage between mimetic pressure (MP) and top management participation (TMP)

Liang et al. (2007) argue that a high level of MP has a positive influence on TMP. MP also positively influences the attitude and the perception of top managers, which in turn decide their level of participation (Chen et al. 2011; Gholami et al. 2013). Zhu and Geng's (2013) findings further support the previous findings that the top management of organizations in emerging economies have a strong tendency to mimic the actions and strategies of their successful competitors and peers. However, the relationship between MP and TMP has been rarely examined in O&SCM literature. Based on the existing literature, we hypothesize:

H5: Mimetic pressure has a positive influence on top management participation.

2.6 Linkage between top management participation (TMP) and supply chain connectivity (SCC)

Gunasekaran and Ngai (2004) argue that top management involvement and awareness have a positive impact on the strategies and goals of SCM and information technology adoption, both in terms of flexibility and in responsiveness to changing market requirements. Previous studies provide strong evidence in support of the positive influence of TMP and involvement in the adoption of technologies for better connectivity by organizations (Khalifa and Davison 2006; Lee et al. 2014). Management interest and participation are the key driving forces behind the investment decisions in technologies related to the sustainability performance of any organization (Nidumolu et al. 2009). Hence, based on previous studies, we hypothesize:

H6: Top management participation (TMP) has a positive influence on supply chain connectivity (SCC).

2.7 Linkage between top management participation (TMP) and quality of information sharing (IS)

The quality of information sharing has a positive impact on the level of integration between the partners in the supply chain (Prajogo and Olhager 2012). The role of top management in information sharing is widely acknowledged by many researchers in their studies (e.g., Lai et al. 2015; Kembro and Näslund 2014; Wu et al. 2014). They further argue that heavy investment in IT infrastructure may not ensure the quality of information sharing. Li and Lin (2006) argue that the willingness to share information and strategic collaboration depends on TMP. Top management has a critical role in ensuring the quality of information in the supply chain in a timely manner without any distortion (Feldmann and Müller 2003). Quality of information sharing and trust is an essential requirement for better collaboration in supply chains. There is a positive linkage between top management commitment and level of collaboration in supply chain (Ireland and Bruce 2000; Horvath 2001). Hence, we hypothesize:

H7: Top management participation has a positive influence on quality of information sharing.

2.8 Linkage between supply chain connectivity (SCC) and sustainability performance of supply chain (SSCP)

Supply chain connectivity improves the collaboration between the players in a supply chain (Fawcett et al. 2011). Collaboration has a positive impact on supply chain performance (Fugate et al. 2010; Cao and Zhang 2011). According to Chen et al. (2009), improved supply chain connectivity is the key factor behind efficient integration of supply chains that ultimately helps to improve supply chain efficiency by minimizing redundancy, reducing complexity, and improving relationships. Dell Computers has achieved significant improvement in their supply chain performance by ensuring better supply chain connectivity (Magretta 1998). Dell's web-enabled supply chain helped them significantly reduce inventory levels and ensure negative cash conversion cycles with respect to their financial cycles (Fields 2002). Cisco Systems achievement in improved performance and collaboration in its global supply chain because of the implementation of its supply chain digital platform is another classic example of the positive impact of supply chain connectivity on supply chain performance (Enslow 2000; Sabath and Frentzel 1997). Further, integration improves information availability (Daugherty et al. 1995), efficiency (Flynn et al. 2010), and time and place utilization (Droge et al. 2004). Thus, improved supply chain connectivity leads to improved customer service and improved supply chain performance (Adams et al. 2014). Although there is a rich body of literature on SSC and financial and market performance, the research on SCC and TBL is scant. Hence, we extend the argument based on RBV logic that SCC has positive influence on TBL. Hence, we hypothesize:

H8a: Supply chain connectivity has a positive impact on the social performance of supply chains.
H8b: Supply chain connectivity has a positive impact on the environmental performance of supply chains.
H8c: Supply chain connectivity has a positive impact on the economic performance of supply chains.

2.9 Linkage between information sharing (IS) and sustainability performance of supply chain (SSCP)

Information systems enabling the timely sharing of data within the supply chain network are an essential requirement for ensuring efficient supply chain operations. The positive impact of information systems on supply chain performance is widely acknowledged by many researchers (Fawcett and Clinton 1996; Williams et al. 1997; Stank et al. 1999; Lambert and Cooper 2000; Lau and Lee 2000; Brandon-Jones et al. 2014). Timely and accurate information on inventories and stocks provided by logistics information systems help organizations minimize the inventory quantities and strategically allocate storage locations and logistics hubs in an optimum way (Chen et al. 2009). Information systems help ensure better collaboration and co-ordination and assist the entire chain in achieving the goal of acting as a single unit (Dewett and Jones 2001). Electronic data exchange is acute for maximizing the responsiveness and service advantage (O'Callaghan et al. 1992; Sutton 1997), to improve perceived value and minimize costs (Sutton 1997; Williams et al. 1997; Zhao et al. 2001). There is enough evidence in the literature on the positive linkage between collaboration through better information sharing and sustainable supply chain performance (Brandon-Jones et al.

2014; Dao et al. 2011; Lee and Whang 2000; Vachon and Klassen 2008; Melville 2010). Hence, we hypothesize:

H9a: Supply chain information sharing has a positive impact on the social performance of supply chains.
H9b: Supply chain information sharing has a positive impact on the environmental performance of supply chains.
H9c: Supply chain information sharing has a positive impact on the economic performance of supply chains.

3 Research design

3.1 Operationalization of constructs

To test our research hypotheses, we used a survey-based instrument. The constructs were drawn based on extensive literature review. We further pre-tested the questionnaire with the help of senior managers from the automotive industry in India with fifteen-plus years of experience and scholars with a strong research background. We rephrased or further modified the statements of our questionnaire based on the expert's input to improve reliability and validity. We have operationalized the constructs in our theoretical framework as reflective constructs (see Table 1).

3.2 Data collection

In our study, we surveyed senior managers in Indian auto components manufacturing firms following Malhotra and Grover's (1998) guidelines. Samples were drawn from the automotive components manufacturers association of India (ACMA) database. It is an apex body in India that represents the interest of over 750 auto components manufacturers. We sent the questionnaire, along with the cover letter, via e-mail following Dillman's (2011) guidelines to the senior supply chain and procurement managers. We sent two reminders at an interval of 15 days to these respondents. Finally, we could gather 205 usable responses out of the total of 323 respondents (63.2% response rate) in a time span of four months.

3.3 Non-response bias (NRB) test

When data is collected over a period, there is a requirement to check the NRB of the responses (Chen and Paulraj 2004). The scholars have suggested an NRB test as a necessary practice before conducting statistical analyses (Blome et al. 2013). This is important because there is chance that the early responses may be different from the late responses. Hence, by taking this into consideration, we conducted an NRB test before testing research hypotheses. Following Armstrong and Overton's (1977) suggestion, we conducted wave analysis. In the wave analysis, any possible statistical difference between the early response set of data and late response set of data is checked by using either a chi-square test or a t-test. Following Chen and Paulraj's (2004) suggestions, we split the data into two equal halves and performed a t-test. No significant difference ($p > .05$) was observed between the two samples, and thus it can be inferred that non-response bias does not exist. Further, following Wagner and Kemmerling's (2010) arguments, we have done further phone follow-ups with the non-respondents and collected their responses.

Table 1 Construct operationalization

Constructs	Derived from	Measures
CP—Coercive pressure	Kauppi (2013), Liang et al. (2007), Colwell and Joshi (2013)	Our firm always strives to act according to the:
		Legislated standards for carbon emissions; threat of legal prosecution (CP1)
		Fines and penalties potentially associated with environmentally irresponsible behavior (CP2)
		Fear of losing brand value and goodwill (CP3)
		Pressure from federal and provincial environmental laws (CP4)
NP—Normative pressure	Kauppi (2013), Liang et al. (2007), Colwell and Joshi (2013)	Our firm always strives to act according to the:
		Pressures from trade associations or professional associations (NP1)
		Pressures from the firms or group of firms from same domain (NP2)
		Pressures from the industry (NP3)
MP—Mimetic pressure	Kauppi (2013), Liang et al. (2007), Colwell and Joshi (2013)	Our firm always strives to act according to the:
		Pressures to achieve the best in class standards in comparison with other firms (MP1)
		Pressures to follow well established and proven processes (MP2)
		Pressures to follow the competitors and their latest processes (MP3)
TMB—Top management belief	Sirmon et al. (2008), Augier and Teece (2009), Hitt et al. (2016), Chadwick et al. (2015)	Our top management:
		Believes in the significant business benefits from the firm's environmental efforts (TMB1)
		Believes in the firm's environmental efforts to gain significant competitive advantage (TMB2)
		Supports the environmental efforts of the firm (TMB3)
TMP—Top management participation	Liang et al. (2007), Colwell and Joshi (2013), Prajogo and Olhager (2012)	Our organization is very keen on the:
		Commitment of top management to reducing carbon emissions associated with the supply chain activities (TMP1)
		Continued assessment of top management on the environmental impact of the business (TMP2)
		Top management commitment towards environmental conservation (TMP3)

Table 1 continued

Constructs	Derived from	Measures
SCC—Supply chain connectivity	Crook and Esper (2014), Brandon-Jones et al. (2014), Barratt and Oke (2007)	Our organization is always vigilant on the:
		Efficiency of current information systems in satisfying the supply chain communication requirements (SSC1)
		Level of integration of information applications with the firm and supply chain (SSC2)
		Effectiveness of information systems linkage with suppliers and customers (SSC3)
SCIS—Supply chain information sharing	Brandon-Jones et al. (2014), Dewett and Jones (2001), Lee and Whang (2000)	Our firm exchanges information with our partners:
		Relevant information (SCIS1)
		Timely information (SCIS2)
		Accurate information (SCIS3)
		Complete information (SCIS4)
		Confidential information (SCIS5)
SP—Social performance	Zhu and Sarkis (2004), Hoejmose and Adrien-Kirby (2012)	Our firm:
		Believes in gender equality (SP1)
		Pays significant attention to the mortality rate of the daily wage workers' children (SP2)
		Believes in poverty reduction (SP3)
		Pays significant attention to the nutritional status of the meal served in the canteen (SP4)
		Pays significant attention to the sanitation at the workplace, offices, and lavatories (SP5)
		Ensures adequate safe drinking water facility (SP6)
		Pays significant attention to effective health care delivery (SP7)
		Helps to find proper residence for employees (SP8)
		Provides adequate transport facility from residence to the workplace (SP9)
		Pays significant attention to the living conditions of the employees (SP10)
EP—Environmental performance	Zhu and Sarkis (2006), Liu et al. (2012), Vachon and Mao (2008)	The organization is keen to adopt:
		Measures for reduction of air emissions (EP1)
		Measures for recycling waste water (EP2)
		Measures to prevent discharge of solid waste (EP3)
		Measures to prevent consumption of hazardous harmful toxic materials (EP4)

Table 1 continued

Constructs	Derived from	Measures
		Measures to reduce the frequency of environmental accidents (EP5)
		Measures to improve the enterprise's environmental situation (EP6)
ECOP—Economic performance	Zailani et al. (2012), Ortas et al. (2014)	The organization always strive to:
		Decrease the cost for materials purchasing (ECOP1)
		Decrease of cost for energy consumption (ECOP2)
		Decrease of fee for waste treatment (ECOP3)
		Decrease of fee for waste discharge (ECOP4)
		Decrease of fine for environmental accidents (ECOP5)

4 Data analyses

We have used Warp PLS version 5.0, which relies on the partial least squares (PLS) method to estimate the hypothesized relationships (Kock 2016). PLS is prediction-oriented and allows the researcher to assess the predictive validity of the exogeneous variables (Peng and Lai 2012; Kock 2016). This study aims to assess the predictive or explanatory power of the antecedent factors (e.g., CP, NP, MP, TMB, TMP, SCC, and IS). The relationship between external pressures, TMC, and the resources of the organization, tangible and intangible, are not examined in the literature. Hence, PLS is appropriate for estimating such a complex structural equation model as proposed in our study (Peng and Lai 2012; Moshtari 2016). In conducting the model estimation, we have followed the Peng and Lai (2012) guidelines in two stages: examining the validity and reliability of the measurement model and analyzing the measurement model.

4.1 Common method bias

There is a high probability of common method bias (CMB) in the case of self-reported data from multiple sources (Podsakoff et al. 2003; Liang et al. 2007). We have conducted Harman's one factor test by following the suggestions of Podsakoff and Organ (1986). The maximum value of covariance explained by any one factor was found to be 41%, which is less than 50% and indicates that common method bias is not a significant problem with our data and results.

4.2 Measurement model reliability and validity

The validity and reliability of the model is assessed using confirmatory factor analysis. ECOP2, SP4-SP10, and CP4 were excluded from further analyses as the factor loadings were found to be less than 0.5 (Hair et al. 2010). All remaining indicators shown in Appendix 4 have factor loading values greater than 0.5. Two types of construct validity (convergent and discriminant validity) are statistically assessed for the constructs considered in the study (Hair et al. 2010; Fawcett et al. 2014). We have considered composite reliability (CR) along with Cronbach's alpha as a better measure of reliability (see Revelle and Zinbarg 2009; Henseler et al. 2009). Reliability coefficient Cronbach's alpha values for the indicators in

Table 2 Model fit and quality indices

Model fit & Quality indices	Value from analysis	Acceptable if	References
Average path coefficient (APC)	.308, $p < .001$	$p < .05$	Rosenthal and Rosnow (1991)
Average R-squared (ARS)	.300, $p < .001$	$p < .05$	
Average block VIF (AVIF)	1.935	≤ 5, ideally ≤ 3.3	Kock (2015)

the measuring instrument related to all the constructs were found to be much higher than the suggested value of 0.60, and are presented in Appendix 1 (Malhotra and Dash 2011; Nunally and Bernstein 1978). We note that the composite reliability (CR) of all constructs was found to be greater than 0.7 and the average variance extracted (AVE) of each construct is greater than 0.5. Hence, we can argue that the measurements are consistent and the measurement model is having convergent validity (Fornell and Larcker 1981).

Next, a discriminant validity test was conducted to find any insignificant relationships between the indicators and constructs (Bagozzi et al. 1991; Kock 2014) (see Appendix 3). From Appendix 3, our model possesses discriminant validity, as the square roots of the AVE values in the diagonal positions are greater than all off-diagonal elements. The lack of cross loadings among the variables in the factor loadings table also confirms the establishment of discriminant validity. Thus, discriminant validity of our model is also established.

R^2 and Q^2 values for the latent variables are also shown in "Appendix 2". VIF values for the constructs were also found to be less than 5, which indicates that the measure of multicollinearity among the latent variables is within the limit (Hair et al. 2006; Kock 2014; Kock and Lynn 2012).

4.3 Model fit and quality indices

Average path coefficient (APC), Average R-squared (ARS), and Average block VIF (AVIF) are the three model fit and quality indices estimated in this study, which are shown in Table 2 below. Relationships between the latent variables are predicted by these indices. The values of APC and ARS are found to be significant for the model as the *p* values are coming less than .05. The value of AVIF is less than the ideal threshold value of 3.3, which also confirms that common method bias is not a significant problem with the model .

According to Tenenhaus et al. (2005), there can be a single value for the goodness of fit analysis in the case of PLSR analysis. Dubey et al. (2016) also show the calculation of goodness of fit value based on the R^2 and AVE estimates. We have also calculated the goodness of fit by using the average value of R^2 and the geometric mean of AVE as per the following formula:

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

The goodness of fit value as calculated with the above formula for our current model is 0.46. According to Wetzels et al. (2009), baseline values for the relative fit of GoF estimate are 0.36 = large, 0.25 = medium, and 0.1 = small. Thus, based on these values, the GoF of our model is large.

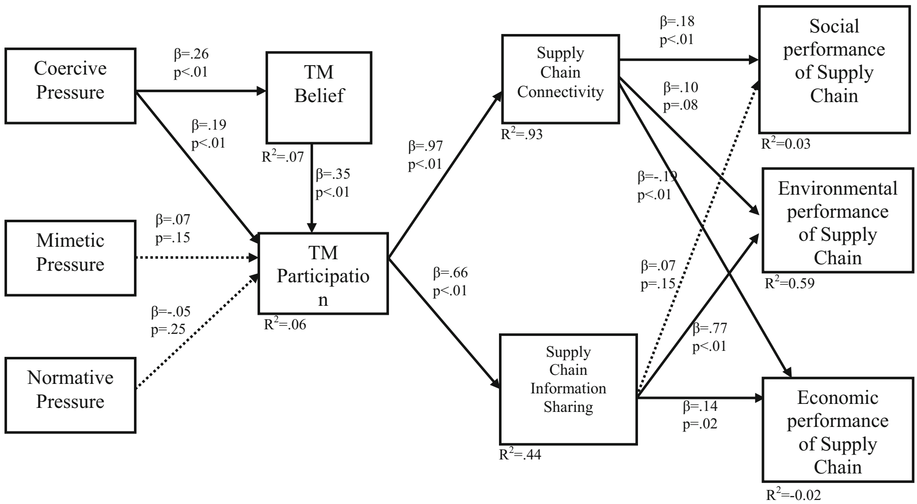

Fig. 2 Conclusive sustainable supply chain management model

4.4 Causality assessment

Guide and Ketokivi (2015) in their editorial note have noted that the endogeneity is one of the major issue associated with non-experimental data. Roberts and Whited (2013) have offered extensive directions which is equally useful in our study. Hence, different causality assessment parameters obtained from PLS SEM analysis are discussed. Three out of the four causality indices are found to be well above the threshold values, showing that the developed model is robust in terms of causality perspective (Spirtes et al. 1995; Pearl 2009). The result can be interpreted as that the direction of causality assumed between the latent variables is correct.

- Sympson's paradox ratio (SPR) = .615, acceptable if >= 0.7, ideally = 1
- R-squared contribution ratio (RSCR) = .942, acceptable if >= 0.9, ideally = 1
- Statistical suppression ratio (SSR) = 1.0, acceptable if >= 0.7
- Nonlinear bivariate causality direction ratio (NLBCDR) = 1.0, acceptable if >= 0.7

SPR is the only causality index that is a little bit less than the acceptable limit.

4.5 Hypotheses testing

PLS does not assume a multivariate normal distribution, so traditional parametric-based techniques for significance tests are inappropriate (Peng and Lai 2012; Moshtari 2016). The final theoretical model is based on these hypotheses test results (see Fig. 2). Linkage between MP and TMP (MP → TMP) is found to be insignificant ($\beta = 0.07$, $p = 0.15$) at $p = 0.01$. The path between NP and TMP (NP → TMP) is also found to be insignificant ($\beta = -0.05$, $p = 0.25$) at $p = 0.01$. Hence, we can infer based on the results that MP and NP don't have a significant impact on TMP in deciding the sustainability performance of supply chain. However, the linkage between CP and TMB (CP → TMB) is found to be significant, with estimates of $\beta = 0.26$ and $p < 0.01$. The linkage between coercive pressure and top management participation (CP → TMP) is also found to be significant ($\beta = 0.19$, $p < 0.01$). Thus, we can infer that CP has a significant influence on TMP and TMB in deciding the sustainability performance of supply chain. TMB has a significant positive impact on TMP (CP → TMP) with statistical estimates of $\beta = 0.35$ and $p < 0.01$. Paths connecting TMP with SCC (TMP → SCC; $\beta = 0.93$ and $p < 0.01$) and SCIS (TMP → SCIS; $\beta = 0.66$ and $p < 0.01$) are also found to be significant. TMP explains 93 percent of total variance in SCC and 66 percent of total variance in SCIS constructs. There are three linkages connecting supply chain connectivity with the social, economic, and environmental performance of the supply chain, which together predict the sustainability performance of supply chain. The linkage between SCC and social performance (SCC → SP) is found to be significant, having estimates of $\beta = 0.18$ and $p < 0.01$. But the linkage between SCC and environmental performance (SCC → EP) is found to be insignificant at $p = 0.05$, as the p value is found to be .08. But the linkage can be found to be significant at $p = .1$, with estimates of $\beta = 0.1$ and $p < .08$. Linkage between SCC and economic performance (SCC → ECOP) is also found to be significant with estimates of $\beta = 0.19$ and $p < .01$. Hence, we may conclude that the SCC is having a positive impact on the sustainability performance of the supply chain at a significance level of $p = 0.1$. The linkage between supply chain information system (SCIS) and sustainability performance of supply chain is tested in the same manner. But the linkage between SCIS and social performance (SCIS → SP) was found to be insignificant at $p = 0.1$, as the p value was found to be .07. The analysis confirms the positive impact of SCIS on the environmental performance (SCIS → EP) with estimates of $\beta = .77$ and $p < .01$. The relationship between SCIS and economic performance of supply chain is not significant at $p = .01$ as the estimate of p is found to be 0.03. Thus, the linkage between SCIS and economic performance (SCIC → ECOP) is significant at $p = 0.1$ with statistical values of $\beta = 0.14$ and $p = 0.02$. We can conclude that SCIS is having a positive impact on the EP and ECOP of supply chain at $p = 0.1$. Out of the 13 linkages in the model shown, 10 are found to be statistically significant at a significance level of $p = 0.1$.

5 Discussions

5.1 Theoretical implications

The role of strategic sources and capabilities in shaping PMS for supply chain sustainability is well discussed in the O&SCM literature. What is less understood is how institutional pressures under the mediating effect of TMP can influence the selection of the SCC and SCIS, which in turn impact the SP, EP, and ECOP. The two key aspects of this study signify our contribution to the sustainable operations and supply chain management literature. First, following Oliver's (1997) arguments, we have integrated IT and RBV to explain how SCC and SCIS, under the influence of the institutional pressures, can explain TBL. Previous literature has utilized either RBV or IT to explain the PMS for supply chain sustainability. Our study integrates these two independent theories to examine the influence of resources under the influence of external pressures to impact social performance, environmental performance, and economic performance. Hence, by doing so we argue that previous limitations of the RBV and IT are addressed in the study. The present study reveals that different dimensions of the institutional pressures have differential effect on top management participation. Specifically, CP has positive effect on top management participation, while the effects of the MP and NP have no significant effect. As suggested by Teo et al. (2003), the MP play a role when the innovation is highly complex to understand and use. Here, in this case, the SSC and SCIS are easier to implement (Boyer and Olson 2002; Liu et al. 2010). Such an argument may explain why the present study does not find support for the positive effect of mimetic pressures on firms' inclination to adopt SCC and SCIS for supply chain sustainability. Similarly, based on existing literature, we hypothesized that NP should affect TMP, since norms carry with them accepted practices pre-evaluated within the organizational field without needing further cognitive effort on the part of top management. Surprisingly, this hypothesis was not supported. This finding of our study is consistent with Liang et al. (2007). This may be the reflection of successful training programs conducted by the focal firms and the dissemination of the best practices through the extensive network programs of the auto components manufacturers association and CII Institute for Manufacturing. However, we must be cautious about this conjecture, since no focal firm's data was collected in our survey. We hope that in future studies, the data from focal firms will be collected, and hypotheses about the extent to which focal firms yield to normative pressures can be tested.

Second, the study contributes to the growing literature focusing on sustainable supply chain management practices in emerging economies in the context of SMEs. Our study focuses on the auto component manufacturers of India. Our study further supports Gopal and Thakkar's (2016a; 2016b) arguments that Indian auto component manufacturers are lagging in terms of the adoption of sustainable supply chain management practices.

6 Managerial implications

The study provides immense scope to the Indian auto component industry to maximize benefits by clearly understanding the focus areas, viz., supply chain connectivity, supply chain information sharing, and top management commitment and belief based on some external and internal factors to achieve better social, environmental, and economic performance. Focusing and improving the sustainability part of the supply chain may help them improve their branding and attempt to go global by acting locally (Bello et al. 2004; Ravet 2012). The study findings suggest that top management can focus on improving the SCIS and SCC, which may further help them improve, which in turn will help them penetrate new markets by having better brand value. The importance of effective information sharing systems is also explicitly proven by the analysis, and will help the companies improve visibility, design robust processes, improve operational efficiency, increase responsiveness, and eliminate wastages (Vanpoucke et al. 2017). Unless robust information sharing systems are implemented, it is very difficult to integrate the end-to-end supply chain of auto component manufactures when the product varieties, quantities, suppliers, and customers are large. Therefore, the current study will help Indian auto component manufacturers focus their energy in certain crucial areas, like supply chain integration, by which they can enjoy the benefits of high operational efficiency and better sustainability performance of the supply chain to compete with the highly matured competitors from other Asian economies like China, Japan, and Korea (Gopal and Thakkar 2015, 2016a, b; Kumar and Rahman 2016; Mayyas et al. 2012; Habidin et al. 2015). From a policy perspective, organizations can depend on the empirical evidence derived from this study by ensuring better commitment from top management for building robust supply chain connectivity and information sharing systems to achieve effective supply chain integration and, ultimately, better sustainability performance.

6.1 Limitations of the study and further research directions

We acknowledge that, like many other studies, our study has its own limitations. Therefore, it is important to evaluate the findings of our study's results and contributions in the light of its own limitations. We believe that our limitations may be well addressed by future research. First, our study has gathered data at one point in time (i.e., cross-sectional data). The cross-sectional data has its own limitations, such as CMB (Podsakoff et al. 2003; Ketokivi and Schroeder 2004). Hence, to address the CMB issue, it is recommended to test the theoretical model using longitudinal data. Second, the study is heavily driven by institutional theory and resource-based view. Hence, we have focused on few antecedents. However, future studies can explore the value of including new constructs in the model, for example, how flexible or control orientation of the firm may influence the effect of the institutional pressures on PMS for sustainability. There is also an opportunity to investigate how the different industries or cross-cultural differences or coordination among supply chain partners may influence the PMS for supply chain sustainability. Finally, the demographic of our sample may limit the generalizability of our findings. To avoid noise caused by industry differences, we purposely chose to study auto components manufacturing firms. Thus, the research findings should be applied to other contexts with caution. We acknowledge that generalizability is a major concern of all survey-based research. Although it is difficult, with proper sampling design we may enhance generalizability. Hence, future research should be conducted over a longer time with samples gathered from multiple industries, countries, and informants with diverse backgrounds.

7 Conclusions

The current study is a response to the call for more theory-grounded research works in the sustainable supply chain domain (Carter and Liane Easton 2011; Carter and Rogers 2008; Mollenkopf et al. 2010). The interrelationships among the antecedents of the supply chain sustainability performance, based on the triple bottom line concept with reference auto components manufacturers on the SMEs scale, is limited (Min and Galle 2001; Pagell and Wu 2009). Hence, we have grounded our theoretical model in IT, RBV, and TMC. Constructs are identified based on the two well-established organizational theories and by considering the triple bottom line concept, which justifies the call for more theory-grounded empirical research works from the operations and supply chain management community (Winter and Knemeyer 2013; Touboulic and Walker 2015). The present study reveals that the different dimensions of institutional pressures have differential indirect effects on SCC and SCIS under the mediation effect of TMB and TMP. Further, SCC and SCIS have different effects on SP, EP, and ECOP. Specifically, the CP has a positive and significant influence on TMB and TMP, while the effects of the NP and MP on TMB and TMP are not significant.

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Appendix 1: Reliability test result—Cronbach's alpha values

CP	NP	MP	TMB	TMP	SCC	SCIS	SP	EP	ECOP
0.621	0.948	0.846	0.965	0.959	0.965	0.938	0.984	0.943	0.866

Appendix 2: Loadings of the indicator variables

Construct	CP	NP	MP	TMB	TMP	SCC	SCIS	SP	EP	ECOP
CR	0.8	0.967	0.907	0.977	0.974	0.977	0.952	0.989	0.956	0.909
AVE	0.576	0.906	0.765	0.934	0.925	0.935	0.801	0.968	0.784	0.715
R^2 Values				0.068	0.059	0.932	0.437	0.028	0.591	– 0.018
Q^2 Values				0.07	0.211	0.933	0.428	0.055	0.511	0.046

Appendix 3: Correlations among the latent variables

Component	CP	NP	MP	TMB	TMP	SCC	SCIS	ECOP	SP	EP
CP	0.76									
NP	0.61	0.95								
MP	0.24	0.39	0.87							
TMB	– 0.03	0.00	0.23	0.96						
TMP	0.16	0.15	0.06	0.00	0.96					
SCC	0.43	0.61	0.59	0.11	0.19	0.97				
SCIS	– 0.07	– 0.10	– 0.17	– 0.06	0.06	– 0.17	0.89			
ECOP	0.20	0.20	0.11	0.03	0.36	0.30	0.02	0.96		
SP	– 0.05	– 0.03	– 0.09	– 0.05	0.19	– 0.06	0.11	0.14	0.88	
EP	– 0.07	– 0.10	– 0.15	0.09	0.16	– 0.19	0.24	0.01	– 0.08	0.84

Appendix 4: Combined loadings and cross loadings

	CP	NP	MP	TMB	TMP	SCC	SCIS	SP	EP	ECOP	*p* value
CP1	**0.72**	− 0.14	2.58	3.48	− 0.75	0.76	− 0.05	0.07	− 5.62	− 0.19	< 0.001
CP2	**0.65**	0.04	− 1.66	− 2.14	0.13	− 0.13	− 0.04	− 0.04	3.55	0.29	< 0.001
CP3	**0.88**	0.09	− 0.88	− 1.26	0.51	− 0.52	0.07	− 0.02	1.96	− 0.06	< 0.001
NP1	0.01	**0.96**	− 0.35	− 0.11	− 0.12	0.13	0.01	0.00	0.37	− 0.01	< 0.001
NP2	0.00	**0.94**	− 0.62	− 0.96	0.18	− 0.22	0.02	0.00	1.38	− 0.02	< 0.001
NP3	− 0.02	**0.96**	0.97	1.05	− 0.06	0.08	− 0.03	0.00	− 1.72	0.03	< 0.001
MP1	0.03	− 0.14	**0.87**	7.57	0.15	− 0.19	− 0.02	0.01	− 13.28	− 0.03	< 0.001
MP2	− 0.04	0.18	**0.91**	1.15	− 0.16	0.22	0.03	− 0.01	− 2.06	0.03	< 0.001
MP3	0.01	− 0.05	**0.84**	− 9.12	0.02	− 0.04	− 0.01	0.01	16.04	− 0.01	< 0.001
TMB1	− 0.01	− 0.03	− 5.82	**0.95**	0.15	− 0.13	0.00	− 0.02	14.25	0.00	< 0.001
TMB2	0.03	0.02	2.40	**0.98**	− 0.10	0.09	− 0.01	0.00	− 5.85	− 0.01	< 0.001
TMB3	− 0.02	0.01	3.25	**0.97**	− 0.04	0.03	0.01	0.02	− 7.97	0.01	< 0.001
TMP1	0.01	0.10	− 0.90	− 0.94	**0.97**	− 0.02	0.01	0.02	1.68	− 0.03	< 0.001
TMP2	0.00	0.02	0.15	0.17	**0.96**	0.44	0.00	0.00	− 0.30	− 0.02	< 0.001
TMP3	0.00	− 0.12	0.76	0.79	**0.96**	− 0.42	− 0.02	− 0.02	− 1.40	0.05	< 0.001
SCC1	− 0.04	− 0.04	0.03	0.06	− 0.15	**0.96**	0.00	− 0.01	− 0.06	− 0.02	< 0.001
SCC2	0.04	0.04	− 0.03	− 0.06	− 0.38	**0.95**	0.00	0.01	0.06	0.02	< 0.001
SCC3	0.00	0.00	0.00	0.00	0.51	**0.99**	0.00	0.00	0.00	0.00	< 0.001
SCIS1	0.01	− 0.07	− 1.78	− 2.91	0.16	− 0.01	**0.92**	0.03	4.42	0.07	< 0.001
SCIS2	0.02	0.00	− 1.79	− 2.73	0.14	− 0.01	**0.93**	0.02	4.21	0.04	< 0.001
SCIS3	− 0.06	− 0.36	3.26	3.83	− 0.73	0.51	**0.87**	− 0.04	− 6.36	0.00	< 0.001
SCIS4	0.08	0.37	− 0.54	0.09	0.11	− 0.12	**0.87**	0.05	0.12	− 0.06	< 0.001
SCIS5	− 0.06	0.06	1.05	2.03	0.30	− 0.36	**0.88**	− 0.06	− 2.86	− 0.06	< 0.001
SP1	− 0.01	− 0.03	− 0.27	− 0.45	0.00	0.00	− 0.01	**0.99**	0.70	0.01	< 0.001
SP2	0.02	0.06	0.29	0.58	0.01	− 0.04	0.02	**0.98**	− 0.88	0.01	< 0.001
SP3	− 0.01	− 0.03	− 0.01	− 0.13	− 0.01	0.04	− 0.01	**0.98**	0.17	− 0.02	< 0.001
EP1	0.03	− 0.14	7.22	7.57	0.15	− 0.19	− 0.02	0.01	**0.71**	− 0.03	< 0.001
EP2	− 0.04	0.18	1.69	1.15	− 0.16	0.22	0.03	− 0.01	**0.82**	0.03	< 0.001
EP3	0.01	− 0.05	− 6.61	− 9.12	0.02	− 0.04	− 0.01	0.01	**0.94**	− 0.01	< 0.001
EP4	− 0.01	− 0.03	− 5.82	− 8.05	0.15	− 0.13	0.00	− 0.02	**0.95**	0.00	< 0.001
EP5	0.03	0.02	2.40	4.67	− 0.10	0.09	− 0.01	0.00	**0.94**	− 0.01	< 0.001
EP6	− 0.02	0.01	3.25	6.01	− 0.04	0.03	0.01	0.02	**0.92**	0.01	< 0.001
ECOP1	− 0.12	0.26	− 1.44	− 2.06	0.34	− 0.34	− 0.10	− 0.02	3.18	**0.78**	< 0.001
ECOP3	0.00	0.21	− 3.29	− 4.11	1.26	− 1.32	0.08	0.05	6.88	**0.84**	< 0.001
ECOP4	0.10	− 0.16	1.39	1.74	− 0.39	0.43	0.08	− 0.02	− 2.90	**0.91**	< 0.001
ECOP5	0.00	− 0.27	3.11	4.12	− 1.15	1.16	− 0.08	− 0.01	− 6.64	**0.85**	< 0.001

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