The Impact of Firm's Social Media Applications on Green Supply Chain Management

Mahdi Nasrollahi[#1]

[#]Department of Industrial management, Imam Khomeini International University (IKIU), Qazvin, Iran

m.nasrollahi@soc.ikiu.ac.ir

***Abstract*— Social Media Applications (SMA) has become a common tool for networking and communication and also content sharing. As a result, firms utilize SMA for organizational purposes. Then again, Green Supply Chain Management (GSCM) is a popular subject in the area of operations management for both researchers as well as practitioners. However, the influences of SMA on GSCM practices and finally on organizational performance are not well understood. SMA can expedite information flow and knowledge sharing amidst supply chains and also may assist organizations for greening their SCM practices. In this research, we empirically investigate the impact of SMA capabilities on GSCM practices. Data collected from 206 manufacturing managers were analysed applying a structural equation modelling methodology. Results confirm that the adoption of SMA in supply chains by manufacturing firms positively affect the GSCM practices among the chain.**

Keywords*—** *Social Media Application, Green Supply Chain Management, Structural Equation Modelling,**

1. Introduction

The rate of design and adoption of Social Media Apps (SMA) by firms is growing rapidly over time. These apps are LINE, Facebook, WeChat [1], Telegram and so on. Social media afford a platform for experience sharing, knowledge gathering and organizational learning [2]. The social media world is changing very swiftly and long range assumptions about the value creation sources in businesses are changing respectively. Someone can use SMA to share text, photo, video, to make advertisements, to build virtual groups for communications and messaging with customers, partners, and other people. Therefore businesses in every industry nowadays not only employ SMA to intercommunicate with their clients and suppliers [3], but also to promote their brands for supporting the creation process of brand societies [4]. With social media, firms can create distinct groups of customers and other stakeholders to discuss organization specific issues, operate collaboratively and create novel ideas [5]. Customers purchasing decisions and suppliers reliability directly affect the success of businesses. So the ability of firms to influence, involve and inspire of suppliers and customers in the decision-making process is very requisite. Logically, social media apps (SMA) have become a pivotal gadget for business communication goals with suppliers and an important tool for influencing beliefs and ideas of co-partners and customers. Consequently, strategic using of social media is an attracting subject in many firms [5]. Nowadays firms are attempting to utilize social media as a means to keep partners in contact; in addition, they apply SMA as an occasion for direct sales and marketing [6].

As we know, having a direct connection with partners in business is very valuable, and SMA can empower firm's connections with suppliers, customers, and even competitors; and ultimately generate opportunities for operational enhancements [5]. Social media uplifts knowledge sharing within organizations [7]. Social media in intra-organizational communications will also simplify information interchange and knowledge fusion, promoting cross-functional coordination and management [5]. Thus social media lets business partners to have access to beneficial and valuable information amidst organizations and supply chain networks. Although anecdotal evidence implies that social media scrambles have advantages for firms in terms of operational efficiency [8], but some managers are apprehensive about possible predicaments of adopting social media in their organizations.

At the same time, the business sustainability and greening operations in all variety of organizations is an increasingly growing agenda [9; 10; 11; 12; 13]. Sustainability of operations management and supply chain are maturing an innovative competitive dimension and increasingly significant agenda for every businesses [14; 15; 16]. Supply chain management (SCM) requires the assimilation and consonance of business processes and strategy alignment all over the supply chain to satisfy the final customers of the supply chain [17]. Numerous processes in the business need to be integrated such as purchasing, manufacturing, marketing, logistics, and so on. In addition, firms must align their customer focus, efficiency, quality, responsiveness [18] and newly environmental sustainability [17] and greening operations. Because customers' demands are changing and competition is very fierce, firms require competing at the supply chain level and identifying and pursuing strategies and practices that result in competitive advantage at this level and successively produces enhancements in performance for partners in the supply chain. Hence leading organizations started to execute Green supply chain management (GSCM) practices to produce sustainable goods and services in order to satisfy customers' needs and comply with the governments' environmental regulations.

Combining and coordinating organizations within a supply chain will bring in more people and complicated human relations [19]. Accordingly designing and implementing a proper tool for connecting these parties across the supply chain is quite incumbent. With regard to capabilities of social media applications, if operations and supply chains tend to be greener [14] and to move toward more advanced GSCM, they need to use this new tools intelligently. As a result, investigating the impact of SMA on GSCM is extremely important. However, concurrent studying and integrating of this two emerging Phenomena is attractive and can create synergy also this integration is necessary to advance in the field of sustainable supply chains [20]. Searches in the ISI Web of Science and SCOPUS databases, before the March 2017, show that there is no published study that joins "Social Media Applications" and "Green Supply Chain Management". Indeed without considering "green" issues, there are no works that regarding the influence of SMA on SCM. So the evolution of two fields of SMA and GSCM was isolated although they need each other. Utilizing SMA for GSCM is unavoidable because SMA can play a vital role for the effective greening of organizations; and GSCM is part of the SSCM concept that is very relevant when organizations are pursuing sustainability [21].

As argued, SMA and GSCM are two rising and significant agendas that scholars and practitioners striving to investigate and implement them. Notwithstanding, these topics are studied separately so we must study and analyse SMA and GSCM in a connected manner to answer the necessity of progression in organizational sustainability and to elaborate on "how" organizations can shift more sustainable [20]. Consequently, we contribute to the GSCM literature by analysing and illustrating processes by which SMA can Impact on Greening SCM. To meet goals of this study, Section 2 reviews the theoretical background of this study, discusses related studies, present the development of a research model, and develops hypotheses. Section 3 describes the research design and methodology. Section 4 presents the test of hypotheses based on data analysis. The final section concludes with implications and considerations of the study for managers, practitioners, scholars, and students in the field of SMA and GSCM.

2. Literature review and hypothesis development

2.1 Social Media Applications

Social media are "a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of User Generated Content" [22]. Firms increasingly adopt social media applications for several organizational objectives such as marketing, operations, and innovation management [23]. Social media applications, which permit multi-way communication among organizations and their stakeholders in an efficient and cost-effective manner [24], are employed by corporations because their susceptibilities which can potentially contribute to the effectiveness of communication in the industrial markets and afterward heighten business performance [25]. Social media influences business performance through four channels: social capital, revealed preferences, social marketing, and social corporate networking.

2.2 Green Supply Chain Management

A number of definitions of GSCM exist [26; 27; 28], But in brief we can say: Efforts for minimizing and even erasing the negative impacts of supply chains on environment named GSCM [29] therefore it addresses the post-use step of a product life cycle. The GSCM issue arises in scientific journals in 1990's [30]. It works as an efficient management tool and philosophy for leading manufacturing organizations [31]. GSCM decreases negativities, establishes control mechanisms, permits for recycling, and facilitates resource utilization [27]; hence, by executing GSCM practices organizations can attain competitive advantage [17]. Researches demonstrate that some companies implement GSCM practices to satisfy consumers, while some others adopt GSCM for complying with environmental regulations [32]. Firms also can use GSCM as a marketing tool. GSCM is obtaining growing concern amongst researchers and practitioners of operations and supply chain management [33] and numerous manufacturers attempt to diminish the environmental effect of their products by implementing GSCM [34].

2.3 Theoretical Model and Hypotheses

In our endeavour to develop The theoretical model (figure 1), research studies by [17; 25; 26; 29; 30; 31; 32; 36; 37; and 38] provide really helpful resources for us. Definitions of constructs incorporated in the model are presented in table 1 and all hypotheses demonstrated in the figure 1 are theorized. In the theorized model, social media capabilities indicators are as antecedent's variables. Social media applications provide the capability for firms to create green information systems (GIS) and do better internal environmental management (IEM); and betterment of IEM and GIS will effect on firm's competencies for implementing green supply chain practices.

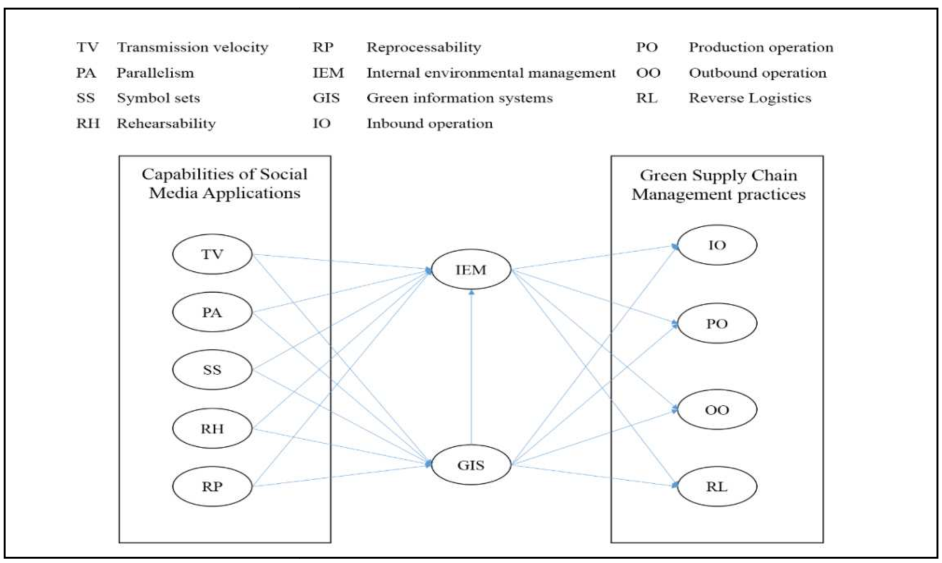

Figure 1. Theoretical model

Researches show that SMA capabilities enhance the quality of communication performance among the sender and the recipients [25] and as a result promoting SMA capabilities will impact on the green information system and internal environmental management. The green information system is the quintessential element of environmental management efforts by supporting the firm's internal environmental management systems [39] and therefore green information system can affect IEM. By assuming IEM as a compulsory strategy with management support in firms [17], the GSCM will change by this obligatory strategy.

GSCM practices are categorized in various ways amid researchers. For example, Ref. [31], recognize internal environmental management, green purchasing, cooperation with customers, eco-design, and investment recovery as the main groups of GSCM practices. On the other hand Ref. [36], employs only the green activities related to purchasing, packaging, and transportation. Ref. [37] consider GSCM practices pursuant to their relationship with the activities of design, purchasing, production, warehousing, transportation, and recycling. In a similar way, Ref. [29] show regard to five main groups as green operations of design, purchasing, transportation, logistics, and reverse logistics. Ref. [38], on the other hand, classified them into five main groups as inbound, production, reverse logistics, packaging, product design and outbound operations. From another perspective, [26] consider internal environmental management, green purchasing, cooperation with customers, eco-design, reverse logistics and investment recovery are the main groups of GSCM practices. Finally, Ref. [30] consider GSCM practices as green purchasing eco-design, reverse logistics, and environmental cooperation. While developing our decision hierarchy for GSCM evaluation, we consider the above-mentioned studies and by accentuating on the definition of Supply Chain Management (SCM) declared by Council of Supply Chain Management Professionals [32], we conclude that it is more suitable to categorize GSCM practices under four main groups. These are the activities related to (1) inbound operations, (2) production operations, (3) outbound operations, and (4) reverse logistics.

Table 1. Construct definitions

Construct	Definition
Transmission velocity (TV)	Transmission velocity is described in terms of agile or “immediate” (as in feedback) and interactivity among the sender and the recipient [40].
Parallelism (PA)	The degree to which a medium enables information from various senders to be transferred concurrently [41].
Symbol sets (SS)	Symbol sets are the number of forms in which a medium can support encoding information for communication; media that are weak in symbol sets are regarded low in social presence, a critical determinative of online participation [42].
Rehearsability (RH)	The capability to edit a message before sending it [43].
Reprocessability (RP)	The degree to which a message can be reviewed or treated afresh by the receiver [41].
Internal environmental management (IEM)	The action of developing environmental sustainability as a strategic organizational mandatory through obligation and reinforcement of the imperative from senior and mid-level managers [31].
Green information systems (GIS)	Information systems that are adjusted and applied to control environmental practices and results [44].
Inbound operation (IO)	Inbound operations comprise purchasing and managing the inbound movement of raw materials, parts, and components to a producing firm [32].
Production operation (PO)	Production operations comprise Design products for recycling, Adopting cleaner technology, Enhancing capacity exploitation and ameliorating remanufacturing [32].
Outbound operation (OO)	Outbound operations, including all completion operations, warehousing, and transportation to consumers [45].
Reverse Logistics (RL)	Reverse logistics holds a very alike description to IR, in that it is defined as coming back the goods to the suppliers at the end of its life, permitting them to renovate, refill, rehabilitate, restitute, revamp, repackage or rectify the material [35].

Based on the literature review and displayed model in fig.1, this research propose 19 hypotheses. Each of these hypotheses as given below is theorized as being direct and positive.

H_{1a}: Transmission velocity directly and positively impacts internal environmental management.

H_{1b}: Transmission velocity directly and positively impacts green information systems.

H_{2a}: Parallelism directly and positively impacts internal environmental management.

H_{2b}: Parallelism directly and positively impacts green information systems.

H_{3a}: Symbol sets directly and positively impacts internal environmental management.

H_{3b}: Symbol sets directly and positively impacts green information systems.

H_{4a}: Rehearsability directly and positively impacts internal environmental management.

H_{4b}: Rehearsability directly and positively impacts green information systems.

H_{5a}: Reprocessability directly and positively impacts internal environmental management.

H_{5b}: Reprocessability directly and positively impacts green information systems.

H_6: green information systems directly and positively impacts internal environmental management.

H_{7a}: Internal environmental management directly and positively impacts inbound operation.

H_{7b}: Internal environmental management directly and positively impacts Production operation.

H_{7c}: Internal environmental management directly and positively impacts outbound operation.

H_{7d}: Internal environmental management directly and positively impacts Reverse Logistics.

H_{8a}: green information systems directly and positively impacts inbound operation.

H_{8b}: green information systems directly and positively impacts Production operation.

H_{8c}: green information systems directly and positively impacts outbound operation.

H_{8d}: green information systems directly and positively impacts Reverse Logistics.

3. Methodology

The purpose of this study is to better realize the influence of firm's social media application on their green supply chain management. To fulfil this aim we applied the field data with a focus on manufacturing organizations.

Measuring and Validation of GSCM practices and also Measuring and validation of social media application capabilities were originally assessed by [25; 30; 31; and 32] respectively. For example, internal environmental management was measured using seven items adopted from [31]. The green information systems scale was developed from items adopted by [44]. Inbound operation, Production operation, and outbound operation were measured using fourteen items adopted from [32]. Reverse logistics was measured using four items adopted from [46]. Unless otherwise specified, all items were on a 7-point Likert scale, ranging from 1 (strongly disagree) to 7 (strongly agree).

We applied an internet-based questionnaire to gather data from a sample of the top and middle-level managers working in manufacturing organizations in Iran. The questionnaires were sent through an email process to respondents with some screening questions to distinguish only top and middle-level managers working in manufacturing organizations in Iran.

2750 emails were sent totally on April 1st – 3rd 2017. Over a period of one month, a total 742 questionnaires were received, 459 were eliminated as non-managers and not completed and finally, 283 managers completed the survey. On the 283 respondents, 206 selected the "our firm use one or more social media application" and so data from 206 managers were included in the dataset that yielding a valid response rate of 7.5%. Table 2 illustrates the sample demographics.

Table 2. Sample demographics

	Item	N	%
Sex	Male	178	86.4
	Female	28	13.6
Age	Under 30	29	14.1
	31–40	58	28.2
	41–50	84	40.7
	Over 50	35	17.0
Work experience	Under 10	50	24.3
	11–20	73	35.4
	21–30	64	31.1
	Over 30	19	9.2
Job title	Managing Director	17	8.3
	Vice president	29	14.1
	Plant manager	39	18.9
	Marketing and sales manager	22	10.7
	Purchasing manager	28	13.6
	Operations manager	8	3.9
	Logistics manager	16	7.8
	Supply chain manager	23	11.2
	Information system manager	24	11.7
	Total	**206**	**100**

Table 3 exhibits the respondent's industry type. The respondents were from 23 diverse industries with many differences.

Table 3. Sample industry

description		*N*	*%*
Food and Kindred Products		25	12.1
Dairy Products		13	6.3
Water, Sewer, Pipeline & Power Line Construction		1	0.5
Electrical equipment and component manufacturing		3	1.5
detergent, cosmetic and hygienic products		19	9.2
sanitary ware		2	1.0
Iron and steel industry		3	1.5
automotive parts manufacturing		14	6.8
automobile manufacturing		4	1.9
Medical equipment manufacturing		4	1.9
Machine-Made Carpets manufacturing		1	0.5
Textile mills		1	0.5
Tobacco Products manufacturing		2	1.0
Lumber & Wood Products manufacturing		5	2.4
Office Furniture manufacturing		8	3.9
Papers & Allied Products manufacturing		3	1.5
Chemicals & Allied Products manufacturing		16	7.8
Pharmaceutical Preparations manufacturing		10	4.9
Petroleum Products manufacturing		15	7.3
Plastics, Rubber and Synth Resins manufacturing		21	10.2
Concrete, Gypsum & Plaster Products manufacturing		9	4.4
Leather & Leather Products manufacturing		10	4.9
Transportation equipment manufacturing		17	8.3
Owner	multinational corporation (MNC)	8	3.9
	Private	119	57.8
	Government and Semi-Government	79	38.3
Total		**206**	**100**

Normality of the data must be assessed before running the statistical tests. Normality of data was tested by using the Kolmogorov-Smirnov test at a significance level of 5%. As is obvious in table 4, the significance level for all constructs is bigger than 5% so the data had a normal distribution and we are allowed to use structural equation modelling to test hypotheses.

Table 4. Normality (K-S) test, Descriptive statistics, and Validity test

Construct	N	K-S	Sig.	Number of items	Mean	SD	A
Transmission velocity (TV)	206	1.859	.331	3	3.102	1.316	0.876
Parallelism (PA)	206	2.326	.241	3	3.229	1.128	0.902
Symbol sets (SS)	206	1.752	.116	3	3.148	1.201	0.859
Rehearsability (RH)	206	1.946	.196	3	3.312	1.193	0.861
Reprocessability (RP)	206	1.722	.217	4	3.278	1.085	0.793
Internal environmental management (IEM)	206	2.022	.413	7	3.406	0.929	0.931
Green information systems (GIS)	206	1.662	.195	10	3.415	1.006	0.806
Inbound operation (IO)	206	1.824	.325	4	2.983	1.297	0.892
Production operation (PO)	206	1.931	.178	4	3.483	1.073	0.965
Outbound operation (OO)	206	1.508	.169	6	3.736	1.140	0.910
Reverse Logistics (RL)	206	1.775	.144	4	3.429	1.221	0.885

Inasmuch as all scales were obtained outright from previous research, content validity is assumed. Chi-square difference tests for pairings of each scale with other study scales returned significant differences at the 0.01 level, indicating sufficient discriminant validity for all scales [17]. Confirmatory factor analysis (CFA) was conducted out to validate the multi-item measures for SMA, GSCM, and performance. In line with Ref [47], this research uses elliptical reweighted least squares (ERLS) estimation as this method gives unbiased parameter estimations for both normal and non-normal data. The outcomes of the analysis show a good model fit. The ERLS chi-square is 246.79. Other statistics are presented in table 5.

Table 5. Model Fit Statistics

Chi-square statistic	246.79
Non-normed fit index (NNFI)	.916
Normed fit index (NFI)	.928
Comparative fit index (CFI)	.951
Goodness of Fit Index (GFI)	.980
Adjusted Goodness of Fit Index (AGFI)	.949
Root mean square errors of approximation (RMSEA)	.056

To verify the internal consistency of the constructs and to measure the reliability of the measurements, Cronbach's alpha was applied. The results in the Table 4 demonstrate that all values are beyond 0.7 and accordingly constructs are consistent.

Our model is evaluated utilizing a structural equation modelling methodology as a whole in spite of the large number of constructs and the small sample size. LISREL 9.30 software was used to complete both the confirmatory factor analysis required to appraise the measurement model and the structural analysis needed to assess the structural model due to the significant model fit information existing.

4. Results

Synopsis of descriptive statistics is exposed in Table 4. Correlation coefficients that manifested in table 6 are positive and significant at the 0.01 level for all variable pairings. Results of structural equation modelling by LISREL absolutely support a claim of a good fit.

Table 6. Correlation coefficient matrix

	TV	PA	SS	RH	RP	IEM	GIS	IO	PO	OO	RL
TV	1										
PA	.724	1									
SS	.678	.783	1								
RH	.465	.332	.547	1							
RP	.325	.435	.625	.704	1						
IEM	.339	.663	.496	.488	.430	1					
GIS	.621	.732	.828	.434	.621	.820	1				
IO	.416	.599	.237	.391	.541	.454	.818	1			
PO	.526	.828	.261	.660	.735	.792	.628	.273	1		
OO	.736	.739	.508	.565	.394	.883	.639	.501	.303	1	
RL	.657	.680	.302	.390	.502	.471	.228	.428	.726	.801	1

Table 7 displays the results of hypotheses test. The research model is almost supported by the data. Only 7 hypotheses out of 19 hypotheses were not supported. The first five sets of hypotheses (H_{1a}-H_{5b}) examined the impact of social media applications (SMA) capabilities on IEM and GIS. As illustrated in Table 7, PA and SS have a positive significant influence on IEM. In addition, TV, PA, RH, and RP also have a positive significant influence on GIS. GIS has a negative insignificant influence on IEM, thus rejecting H_6. IEM has a positive significant effect on PO, OO, and RL, therefore supporting H_{7b}, H_{7c}, and H_{7d} respectively. As hypothesized in H_{8a}, H8c, and H_{8d}, GIS is positively related to IO, OO, and RL respectively. These results indicate that IEM and GIS are two necessary precursors to implementation of GSCM practices.

Table 7. Structural model results

Research Hypothesis				Std coefficients	Status
H_{1a}	TV	→	IEM	-0.12	Not Supported
H_{1b}	TV	→	GIS	0.26**	Supported
H_{2a}	PA	→	IEM	0.19**	Supported
H_{2b}	PA	→	GIS	0.32**	Supported
H_{3a}	SS	→	IEM	0.21**	Supported
H_{3b}	SS	→	GIS	0.03	Not Supported
H_{4a}	RH	→	IEM	-0.20	Not Supported
H_{4b}	RH	→	GIS	0.28**	Supported
H_{5a}	RP	→	IEM	-0.04	Not Supported
H_{5b}	RP	→	GIS	0.36**	Supported
H_6	GIS	→	IEM	-0.19	Not Supported
H_{7a}	IEM	→	IO	-0.07	Not Supported
H_{7b}	IEM	→	PO	0.54**	Supported
H_{7c}	IEM	→	OO	0.22**	Supported
H_{7d}	IEM	→	RL	0.49**	Supported
H_{8a}	GIS	→	IO	0.28**	Supported
H_{8b}	GIS	→	PO	0.09	Not Supported
H_{8c}	GIS	→	OO	0.45**	Supported
H_{8d}	GIS	→	RL	0.36**	Supported

5. Conclusion and future research

Deployment of SMA is prevalent in today's life and business milieu, hence distinguishing the influence of SMA on business operations such as GSCM is inevitable. In this regard researchers and practitioners want to comprehend how the SMA capabilities can affect the GSCM. In this viewpoint, the intention of this paper is to respond this query. To do this, firstly a review of literature is conducted from SMA and GSCM standpoint. Accordingly capabilities of social media applications and practices of GSCM are obtained. Secondly assessing the impact of SMA on GSCM by collecting demanded data from experts is accomplished. This investigation provides helpful tips for managers in concluding which SMA capabilities affect GSCM practices. As a result, this investigation discloses lessons that practitioners can actuate as a strategic leverage for enhancing organizational performance.

The findings of this research indicate potential managerial implications especially in using SMAs for B2B communications amongst GSCM. Our theoretical model and results have proven that there are positive relationships between parallelism and symbol sets and IEM; while TV, RH, and RP have not positively impact on IEM. In the case of GIS, we can see that TV, PA, RH, and RP are positively related to GIS; and only SS has not any effect on it. The practical implication of this part of the study is in providing firms that would like to enhance their social media network among their supply chain with a better understanding of the various SMA capabilities that can affect their GSCM practices.

In summary, this empirical study has investigated the relationship among the five SMA capabilities and GSCM practices in Iranian manufacturing firms. Our study provides some initial evidence that such capabilities can help firms to improve their GSCM practices and eventually gain a competitive advantage through a better and faster communication channel. Given the theoretical and empirical support, this research confirms that SMA capabilities could be gainfully conceptualized as an important necessity for GSCM success and performance improvement among manufacturing firms. By studying the different capabilities of SMA as well as different dimensions of GSCM, both practitioners, as well as researchers, may obtain a fine comprehension of how different SMA capabilities can affect GSCM. If firms view adopting and implementing SMA as a worthwhile aspect of their supply chain management tool and give full support for its deployment, this may positively influence the extent of supply chain greening.

Future research can include the development of model measurements and confirmation of the proposed model to validate the links among constructs. This model is the first testing of the comprehensive model that evaluates the impact of SMA on GSCM, and as a consequence, reassessment of the model with data from the additional sample is important. Apart from Iran, developed nations with many differences in market and culture and also developing countries, which share similar characteristics in both market socio-cultural situations can also learn from the potential relationship identified in this study and also retest these results in their context.

References

[1] McKinsey&Company, *"Global Media Report 2014,"* McKinsey&Company, pp. 1–27, 2014.

[2] B. Nguyen, X. Yu, T. C. Melewar, and J. Chen, *"Brand innovation and social media: Knowledge acquisition from social media, market orientation, and the moderating role of social media strategic capability,"* Ind. Mark. Manag., vol. 51, pp. 11–25, 2015.

[3] C. Shih, *Facebook Era*, the Prentice Hall, 2009.

[4] M. Kaplan, *"If you love something, let it go mobile: Mobile marketing and mobile social media 4x4,"* Bus. Horiz., vol. 55, no. 2, pp. 129–139, 2012.

[5] H. K. S. Lam, A. C. L. Yeung, and T. C. E. Cheng, *"The impact of firms' social media initiatives on operational efficiency and innovativeness,"* J. Oper. Manag., vol. 47–48, pp. 28–43, 2016.

[6] M. Gamboa and H. M. Gonçalves, *"Customer loyalty through social networks: Lessons from Zara on Facebook,"* Bus. Horiz., vol. 57, no. 6, pp. 709–717, 2014.

[7] J. Cao, P. B. Lowry, and P. B. Lowry, *"A Systematic Review of Social Networks Research in Information Systems : Building a Foundation for Exciting Future Research,"* Commun. Assoc. Inf. Syst., vol. 36, no. 37, pp. 727–758, 2015.

[8] G. C. (Jerry) Kane, D. Palmer, A. N. Phillips, *D. Kiron, and N. Buckley, "Moving Beyond Marketing: Generating Social Business Value Across the Enterprise*," MIT Sloan Manag. Rev., vol. 56, no. 1, pp. 1–27, 2014.

[9] J. González-Benito and Ó. González-Benito, *"A Review of Determinant Factors of Environmental Proactivity,"* Bus. Strateg. Environ., vol. 102, pp. 87–102, 2006.

[10] K. Govindan, J. Sarkis, C. J. C. Jabbour, Q. Zhu, and Y. Geng, *"Eco-efficiency based green supply chain management: Current status and opportunities,"* Eur. J. Oper. Res., vol. 233, no. 2, pp. 293–298, 2014.

[11] Gunasekaran and E. W. T. Ngai, *"The future of operations management: An outlook and analysis,"* Int. J. Prod. Econ., vol. 135, no. 2, pp. 687–701, 2012.

[12] Gunasekaran and A. Spalanzani, *"Sustainability of manufacturing and services: Investigations for research and applications,"* Int. J. Prod. Econ., vol. 140, no. 1, pp. 35–47, 2012.

[13] a. Marcus and A. R. Fremeth, *"Green Management Matters Regardless,"* Academy of Management Perspectives, vol. 23, no. 3. pp. 17–26, 2009.

[14] J. Sarkis, *"A boundaries and flows perspective of green supply chain management,"* Supply Chain Manag. An Int. J., vol. 17, no. 2, pp. 202–216, 2012.

[15] S. Seuring and M. Müller, *"From a literature review to a conceptual framework for sustainable supply chain management,"* J. Clean. Prod., vol. 16, no. 15, pp. 1699–1710, 2008.

[16] M. Thürer, M. G. Filho, M. Stevenson, and L. D. Fredendall, *"Competitive priorities of small manufacturers in Brazil,"* Ind. Manag. Data Syst., vol. 113, no. 6, pp. 856–874, 2013.

[17] K. W. Green Jr, P. Zelbst, J. Meacham, and V. S. Bhadauria, *"Green supply chain management practices : impact on performance,"* Supply Chain Manag. An Int. J., vol. 17, no. 3, pp. 20–305, 2013.

[18] P. J. Zelbst, K. W. Green Jr, R. D. Abshire, and V. E. Sower, *"Relationships among market orientation, JIT, TQM, and agility,"* Ind. Manag. Data Syst., vol. 110, no. 5, pp. 637–658, 2010.

[19] F. C. A. Santos, *"Integration of human resource management and competitive priorities of manufacturing strategy,"* Int. J. Oper. Prod. Manag., vol. 20, no. 5, pp. 610–628, 2000.

[20] M. Pagell and A. Shevchenko, *"Why research in sustainable supply chain management should have no future,"* J. Supply Chain Manag., vol. 50, no. 1, pp. 44–55, 2014.

[21] P. Beske and S. Seuring, *"Putting sustainability into supply chain management,"* Supply Chain Manag., vol. 19, no. 3, p. 322, 2014.

[22] M. Kaplan and M. Haenlein, *"Users of the world, unite! The challenges and opportunities of Social Media,"* Bus. Horiz., vol. 53, no. 1, pp. 59–68, 2010.

[23] D. Kiron, D. Palmer, A. N. Phillips, and N. Kruschwitz, *"Social Business : What Are Companies Really Doing ?"* MIT Sloan Manag. Rev., p. 31, 2012.

[24] Y. Chua and S. Banerjee, "Customer knowledge management via social media: the case of Starbucks," J. Knowl. Manag., vol. 17, no. 2, pp. 237–249, 2013.

[25] W. Y. C. Wang, D. J. Pauleen, and T. Zhang, "How social media applications affect B2B communication and improve business performance in SMEs," Ind. Mark. Manag., vol. 54, pp. 4–14, 2016.

[26] J. C. Jabbour and A. B. L. De Sousa Jabbour, "Green Human Resource Management and Green Supply Chain Management: Linking two emerging agendas," J. Clean. Prod., vol. 112, pp. 1824–1833, 2016.
[27] G. Akman, "Evaluating suppliers to include green supplier development programs via fuzzy c-means and VIKOR methods," Comput. Ind. Eng., vol. 86, pp. 69–82, 2015.
[28] M. K. Chien and L. H. Shih, "An empirical study of the implementation of green supply chain management practices in the electrical and electronic industry and their relation to organizational performances," Int. J. Environ. Sci. Technol., vol. 4, no. 3, pp. 383–394, 2007.
[29] Ö. Uygun and A. Dede, "Performance evaluation of green supply chain management using integrated fuzzy multi-criteria decision making techniques," Comput. Ind. Eng., vol. 102, pp. 502–511, 2016.
[30] H. Younis, B. Sundarakani, and P. Vel, "The impact of implementing green supply chain management practices on corporate performance," Compet. Rev. An Int. Bus. J., vol. 26, no. 3, 2016.
[31] Q. Zhu, J. Sarkis, and K. hung Lai, "Confirmation of a measurement model for green supply chain management practices implementation," Int. J. Prod. Econ., vol. 111, no. 2, pp. 261–273, 2008.
[32] K. Sari, "A novel multi-criteria decision framework for evaluating green supply chain management practices," Comput. Ind. Eng., vol. 105, pp. 338–347, 2017.
[33] G. Buyukozkan and G. Cifci, "Evaluation of the green supply chain management practices: a fuzzy ANP approach," Prod. Plan. Control, vol. 23, no. 6, pp. 405–418, 2012.
[34] Y. S. Peng and S. S. Lin, *"Local responsiveness pressure, subsidiary resources, green management adoption and subsidiary's performance: Evidence from taiwanese manufactures,"* J. Bus. Ethics, vol. 79, no. 1–2, pp. 199–212, 2008.
[35] V.-H. Lee, K.-B. Ooi, A. Y.-L. Chong, and C. Seow, "*Creating technological innovation via green supply chain management: An empirical analysis,"* Expert Syst. Appl., vol. 41, no. 16, pp. 6983–6994, 2014.
[36] K. H. Lau, *"Benchmarking green logistics performance with a composite index,"* Benchmarking an Int. J., vol. 18, no. 6, pp. 873–896, 2011.
[37] R. Rostamzadeh, K. Govindan, A. Esmaeili, and M. Sabaghi, "*Application of fuzzy VIKOR for evaluation of green supply chain management practices,"* Ecol. Indic., vol. 49, pp. 188–203, 2015.
[38] A. Awasthi and G. Kannan, *"Green supplier development program selection using NGT and VIKOR under fuzzy environment,"* Comput. Ind. Eng., vol. 91, pp. 100–108, 2016.
[39] O. F. El-Gayar and B. Fritz, *"Environmental Management Information Systems (EMIS) for Sustainable Development: A Conceptual Overview,"* Commun. Assoc. Inf. Syst., vol. 17, no. 34, pp. 2–50, 2006.
[40] Y. L. Wu, E. Y. Li, and W. L. Chang, *"Nurturing user creative performance in social media networks An integration of habit of use with social capital and information exchange theories,"* Internet Res., vol. 26, no. 4, pp. 869–900, 2016.
[41] X. Cao et al., "*Exploring the influence of social media on employee work performance Exploring the influence of social media in the workplace,"* Internet Res. Internet Res. Iss An Int. J., vol. 26, no. 4, p. 528543, 2016.
[42] W. He and L. Yang, "*Using wikis in team collaboration: A media capability perspective,"* Inf. Manag., vol. 53, no. 7, pp. 846–856, 2016.
[43] C. Lam, "*Can slack curb slacking?: Examining the importance of team communication in reducing social loafing,"* 2016 IEEE Int. Prof. Commun. Conf., pp. 1–4, 2016.
[44] K. W. Green Jr, P. J. Zelbst, V. S. Bhadauria, and J. Meacham, *"Do environmental collaboration and monitoring enhance organizational performance ?,"* Ind. Manag. Data Syst., vol. 112, no. 2, pp. 186–205, 2012.
[45] S. B. Tiwari, "*Challenges and Prospects of Emerging Management and Accounting of Green Supply Chain in the Next Millennium,"* vol. 3, no. 6, pp. 1–12, 2013.
[46] G. Scur and M. E. Barbosa, *"Green supply chain management practices: Multiple case studies in the Brazilian home appliance industry,"* J. Clean. Prod., vol. 141, pp. 1293–1302, 2017.
[47] S. Du, G. Yalcinkaya, and L. Bstieler, *"Sustainability, Social Media Driven Open Innovation, and New Product Development Performance,"* J. Prod. Innov. Manag., vol. 33, pp. 55–71, 2016.