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## *Influence of Green Supply Chain Management Practices on Firm's Performance*

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*Abstract: This study attempts to examine the relationship between green supply chain management practices (GSCMPs) and firm's performance. Therefore, we approached the firms who implemented or intend to implement the green supply chain management practices in the firms. The data was collected from 250 respondents using a structured questionnaire. In addition, the data was analyzed using simple regression technique. The results of our study documented that green supply chain management practices positively and significantly influence the market performance, operational performance, social performance, financial performance, and environmental performance of the firms. Therefore, findings contribute to existing knowledge on the relationship between green supply chain management practices and firm's performance from the developing economy and Indian perspectives.*

*Keywords: Green Supply Chain Management, Market Performance, Operational Performance, Social Performance, Financial Performance, Environmental Performance.*

### I. INTRODUCTION

Environmental issues like quick consumption of assets, natural contamination, an unnatural weather change and reduction in organic variety cause disintegration in the biological equilibrium. The way that these biological issues are expanding consistently drives governments, networks, organizations and people to avoid potential risk in ecological issue (Walker et al., 2008). Organizations that are viewed as the wellspring of ecological issues have needed to survey their creation cycles and supply chains because of pressing factor from the local area and governments. Alongside the acknowledgment of organization obligation coming about because of exercises all through production network, green supply chain management (GSCM) has begun to get conspicuous (Adriana, 2009). In addition, manufacturing firms have begun to implement green supply chain management (GSCM) practices in response to customer demand for products and services that are environmentally sustainable and that are created through environmentally sustainable practices and in response to governmental environmental regulations (Murray, 2000; Green et al., 1998). Therefore, in this study, we attempt to investigate the relationship between green supply chain management practices (GSCMPs) and firm's performance. The rest of the article is organized as follows. Section 2 deals with literature review. In Section 3, we provide the research methodology. Further, Section 4 discusses the empirical results. Section 5 explains the findings of the article.

### II. LITERATURE REVIEW

Srivastava (2007) announced that green supply chain management (GSCM) incorporates green plan, green buying, green creation, green circulation, coordinations, advertising and opposite coordination. As indicated by Walker et al. (2008), the green store network idea covers all periods of an item's life cycle, from the extraction of crude materials through the plan, creation and

circulation stages, to the utilization of the item by customers and its removal toward the finish of the item's life cycle. Obviously, GSCM rehearses are incredibly broad. In likeness to the idea of SCM, the limit of GSCM relies upon the objective of the analyst (Srivastava, 2007). These practices have been chosen for the accompanying reasons: right off the bat, these practices are viewed as the most basic and critical practices in GSCM that can possibly diminish the hurtful natural impacts of any associations store network measure. Besides, these practices have been cited variously in a few investigations writing (Yildiz Çankaya and Sezen, 2019). Thirdly, these measurements as referenced above cover both the inner and outer practices (AlGhwayeen and Abdallah, 2018). Ultimately, these practices can be executed by assembling areas in both creating and created nations (Al-Ghwayeen and Abdallah, 2018).

Hart (1995) noted that “the constraints created by the natural environment such as depletion of resources and degradation of the ecosystem, threaten firms’ existing resources and capabilities”. GSCM rehearses cover each work to diminish the unfriendly impacts of an organization's items or administrations on the climate. These endeavors decidedly sway the improvement of ecological execution by diminishing the utilization of strong/fluid squanders and perilous substances, decreasing the frequency of natural mishaps and improving local area wellbeing (Eltayeb et al., 2011 Lee, 2009).

Figure 1: Proposed research model



### III. METHODOLOGY

#### 3.1 Target population, sampling and data collection

Target population for our research study was individuals who responsibility and authority to implement green supply chain management practices in the organization. These individuals are perfect target population to test the relationship between green supply chain management practices and firms’ performance. After selecting the target population, we need to choose the target respondents. According to MacCallum et al. (1999) “a sample size of between 100 and 200 observations is acceptable provided

communalities are high, factors are well determined, and convergence to a proper solution is achieved". Therefore, we approached the individuals of firms in state of Haryana who implemented or intend to implement the green supply chain management practices in the firms. To collect the data, a total of 300 questionnaires were distributed among respondents in firms at different level. Of the 300, 250 questionnaires were returned by respondents. Hence, results of the study are based on 250 respondents.

### 3.2 Measurement

The measurement scales included in this research study were previously developed and assessed. The GSCMPs scale was adapted from Cousins et al. (2019), Inman and Green (2018) and de Sousa Jabbour et al. (2015). Further, OP was measured using 6 items developed by Green and Inman (2005) and Hasan (2013). Further, we measured MP via 6 statements from Choi et al. (2018) and Agyabeng-Mensah et al. (2020). In addition, this study measured SP via 6 statements from Zaid et al. (2018), Agyabeng-Mensah et al. (2020) and Longoni et al. (2018). EP was also assessed by 6 statements adopted from Agyabeng-Mensah et al. (2020). FP was assessed by 6 statements adapted from Çankaya and Sezen (2019), Agyabeng-Mensah et al. (2020) and Baah et al. (2020). The measurement tools are showed in the "Appendix A". All responses corresponding to items were recorded on five point Likert's scale from strongly disagree to strongly agree.

### 3.3 Statistical tests

In this study, we deployed exploratory factor analysis to validate the internal consistency of the constructs and variables. Further, we used simple regression technique to test the connection between consumer green supply chain management practices and firms' performance.

## IV. DATA ANALYSIS

### 4.1 Demographical characteristics

Table 1 presents the type of organizations where respondents are associated. Further, 42% of respondents belong to small scale manufacturing industries, whereas 32% belongs to Ancillary industries, 18% belongs to small scale service industries, 7.20% belongs to small scale export industries, and remaining 0.80% belongs to any other type of small scale industries. Moreover, results show that 94% of survey respondents were males, whereas 6% were females. Our results show that majority of respondents were males. In addition, we found that 14% of respondents had only education up to 12<sup>th</sup> class, whereas, 34% of respondents have graduation degree, 48% of respondents have post-graduation degree, and rest of respondents have any other education qualification degree. Further, results show that 42% of the respondents were owner of the organizations, whereas, 26% of respondents were manager, 18.40% of respondents were senior managers, and rest of the respondents (13.60%) were belonged to any other designation. Our results show that 18% of the organizations have environmental certifications (ISO-14001), whereas, remaining 82% of organization have not environmental certifications (ISO-14001).

**Table 1:** Demographical characteristics of respondents

Type of the organizations	Category	Frequency	Percentage
Type of the organizations	Manufacturing unit	105	35
	Ancillary unit	80	32
	Service unit	45	18
	Export unit	18	7.2
	Any other	2	0.8
	Gender of respondents	Male	235
	Female	15	6
Educational qualification	Up to 12	35	14
	Graduation	85	34

	Post-graduation	120	48
	Any other	10	4
Designation of the respondents	Owner of the organization	105	42
	Manager	65	26
	Senior manager	46	18.4
	Any other	34	13.6
Environmental certifications (ISO-14001)	Yes	45	18
	No	205	82

Notes: N=250.

#### 4. 2 Factor analysis

In this study, we deployed factor analysis to check the composition of measurement items corresponding to green supply chain management practices, firms' market performance, operational performance, social performance, financial performance, and environment performance. As suggested by previous studies (Aulakh and Gencturk, 2000; Anić *et al.*, 2014), to identify in the initial extraction of factors, we deployed principal component analysis with varimax rotation. As displayed in Table 2, the rotated pattern matrix shows five factor solutions for market performance, operational performance, social performance, financial performance, and environment performance and one factor solution for green supply chain management practices, respectively.

In addition, the Kaiser-Meyer-Olkin (KMO) Test was reported 0.8132, and 0.841 respectively, for firms' performance and green supply chain management practices. Furthermore, Bartlett's test of sphericity were reported 0.000, and 0.000, respectively, for firms' performance and green supply chain management practices and validate the pre-requisite of EFA. Five factors in relations to market performance, operational performance, social performance, financial performance, and environment performance emerged with an eigenvalue > 1 and explained 85.02% of the total variance. Similarly, one factor in relation to green supply chain management practices extracted with an eigenvalue > 1 and showed 58.34% variance. As recommended by Hair *et al.* (2010), a rotated factor loading > 0.5 served as a threshold to retain the items. Furthermore, all items reported factor loading greater than 0.72.

**Table 2:** Internal consistency

Variables	Codes	Items	Factor loadings
Market performance	MP1	New market opportunity	0.68
	MP2	Increase in sales	0.78
	MP3	Increase in market shares	0.88
	MP4	Customer loyalty	0.74
	MP5	Improvement in customer satisfaction	0.83
	MP6	Improved corporate brand image	0.75
Operational performance	OP1	Reduction in penalty for environmental mishaps	0.76
	OP2	Decrease in cost of materials purchased	0.88
	OP3	Decrease in cost of energy consumption	0.67
	OP4	Decrease in fee for waste discharge	0.78
	OP5	Increase in product quality	0.81
	OP6	Reduction in payment of compliance fees	0.73
Social performance	SP1	Lowering the adverse impact of products and processes on the local community	0.88
	SP2	Improvement in its image in the eyes of its customers	0.78
	SP3	Improvement in employee training and education	0.87

	SP4	Improvement in occupational health and safety of employee	0.69	
	SP5	Improvement in overall stakeholder welfare or betterment	0.83	
	SP6	Improvement in relations with customers and suppliers	0.91	
	FP1	Improvement in earnings per share	0.83	
	FP2	Improvement in return on investment	0.88	
Financial performance	FP3	Gross profit growth	0.82	
	FP4	Net profit growth	0.71	
	FP5	Return on equity	0.88	
	FP6	Return on assets	0.76	
	Environmental performance	EP1	Reduction of air emissions	0.72
		EP2	Reduction of effluent waste	0.88
EP3		Reduction of solid wastes	0.65	
EP4		Decrease in consumption of hazardous/ harmful/toxic materials	0.79	
EP5		Decrease in frequency of environmental accidents	0.77	
EP6		Improvement in an enterprise's environmental situation	0.72	
<i>Total explained variance = 85.22%; KMO measure = 0.813; Bartlett's Test of Sphericity (p&lt;0.000).</i>				
	GSCMP1	Green purchasing	0.84	
	GSCMP2	Green cooperation with customers	0.88	
	GSCMP3	Cross-functional cooperation for environmental improvements	0.79	
Green supply chain management practices (GSCMPs)	GSCMP4	Total quality environmental management	0.67	
	GSCMP5	Environmental compliance and auditing programs	0.66	
	GSCMP6	ISO 14001 certification	0.76	
	GSCMP7	Environmental management systems	0.68	
	GSCMP8	Green supply chain information systems	0.71	
	GSCMP9	Reverse logistics	0.92	
	GSCMP10	Green distribution and packaging	0.82	
<i>Total explained variance = 58.34%; KMO measure = 0.844; Bartlett's Test of Sphericity (p&lt;0.000).</i>				

Notes: N=250.

#### 4.3 Reliability analysis of variables

Table 3 shows the reliability results of observed variables corresponding to green supply chain management practices, market performance, operational performance, social performance, financial performance, environment performance. In this study, we measured the reliability of observed variables using Cronbach's alpha statistics. We found value of Cronbach's alpha corresponding green supply chain management practices, market performance, operational performance, social performance, financial performance, environment performance, respectively, 0.874, 0.822, 0.783, 0.912, 0.883, 0.892, which is validate the reliability of observed variables.

**Table 3:** Reliability results

Variables	Items	Cronbach's alpha
Green supply chain management practices (GSCMPs)	10	0.874
Market performance (MP)	6	0.822
Operational performance (OP)	6	0.783
Social performance (SP)	6	0.912
Financial performance (FP)	6	0.883
Environmental performance (EP)	6	0.892

Notes: N=250

## 4.4 Correlation between observed variables

Table 4 shows the correlation between variables. We found significant and positive correlation between variables. Correlation of green supply chain management practices with market performance, operational performance, social performance, financial performance, environment performance, respectively, 0.581, 0.499, 0.588, 0.471, and 0.501. Similarly, we found positive and significant correlation between the rest of variables.

**Table 4:** Comparison of correlation

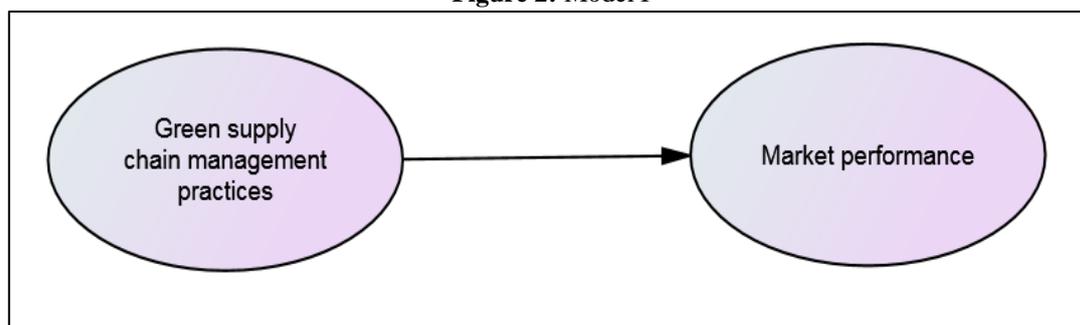
	MP	OP	SP	FP	EP	GSCMPs
MP	1					
OP	0.311*	1				
SP	0.362**	0.311*	1			
FP	0.367**	0.241*	0.340**	1		
EP	0.388**	0.287*	0.279*	0.243*	1	
GSCMPs	0.581***	0.499***	0.588***	0.471***	0.501***	1

Notes: \* and \*\*correlation is significant at 0.05 and 0.01, respectively.

## 4.5 Green supply chain management and firm's performance

## 4.5.1 Green supply chain management and market performance

**Figure 2** shows theoretical Model I which propose influence of green supply chain management practices on market performance. To validate Model I, we deployed regression analysis. As shown in **Table 5**, the results of regression analysis corresponding to Model I provide that green supply chain management practices significantly and positively influence market performance of small scale industries ( $\beta = 0.390$ ,  $p < 0.000$ ). Therefore, green supply chain management practices adopted by firms leads to improved market performance.

**Figure 2:** Model I**Table 5:** Results of Model I

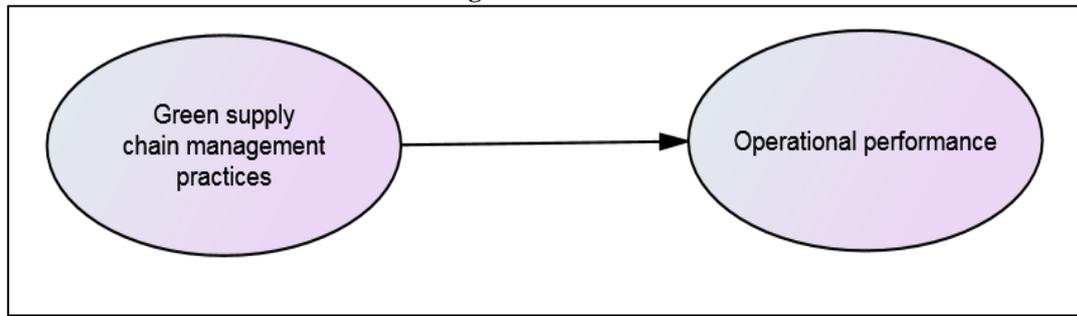
Variable	Unstandardized Coefficients	Standard Error	t-value	Standardized coefficients
Constant	1.710	0.168	10.187***	-
GSCMPs	0.433	0.043	10.354***	0.390

Notes: Dependent variable = Market performance. Adj.  $R^2 = 0.312$ . \*, \*\*, and \*\*\* coefficient is significant at 0.05, 0.01 and 0.001, respectively.

Sources: The authors' own calculation.

## 4.5.2 Green supply chain management and operational performance

**Figure 3** shows theoretical Model II which propose influence of green supply chain management practices on operational performance. Similarly to validate Model II, we deployed regression analysis. As shown in **Table 6**, the results of regression analysis corresponding to Model II provide that green supply chain management practices significantly and positively influence operational performance of small scale industries ( $\beta = 0.354$ ,  $p < 0.000$ ). Therefore, green supply chain management practices adopted by a small scale industry leads to improved operational performance.

**Figure 3: Model II****Table 6: Results of Model II**

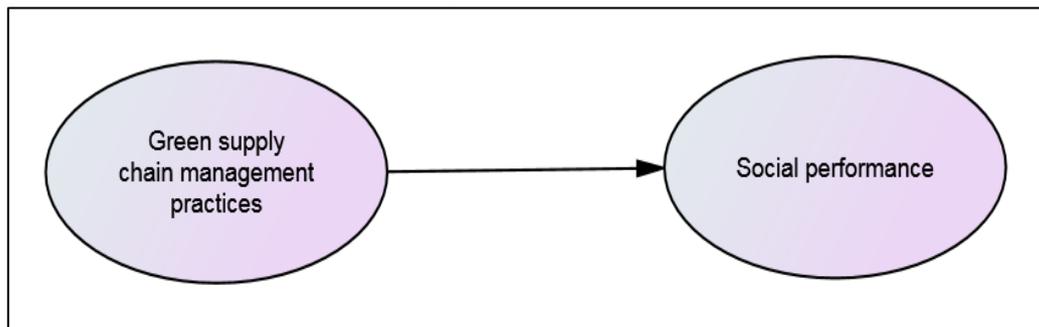
Variable	Unstandardized Coefficients	Standard Error	t-value	Standardized coefficients
Constant	0.994	0.092	10.804***	-
GSCMPs	0.441	0.035	12.600***	0.354

Notes: Dependent variable = Operational performance. Adj.  $R^2 = 0.322$ . \*, \*\*, and \*\*\* coefficient is significant at 0.05, 0.01 and 0.001, respectively.

Sources: The authors' own calculation.

#### 4.5.3 Green supply chain management and social performance

**Figure 4** shows theoretical Model III which propose influence of green supply chain management practices on social performance. Similarly to validate Model III, we deployed regression analysis. As shown in **Table 7**, the results of regression analysis corresponding to Model III provide that green supply chain management practices significantly and positively influence social performance of small scale industries ( $\beta = 0.311$ ,  $p < 0.000$ ). Therefore, green supply chain management practices adopted by a small scale industry leads to improved social performance.

**Figure 4: Model III****Table 7: Results of Model III**

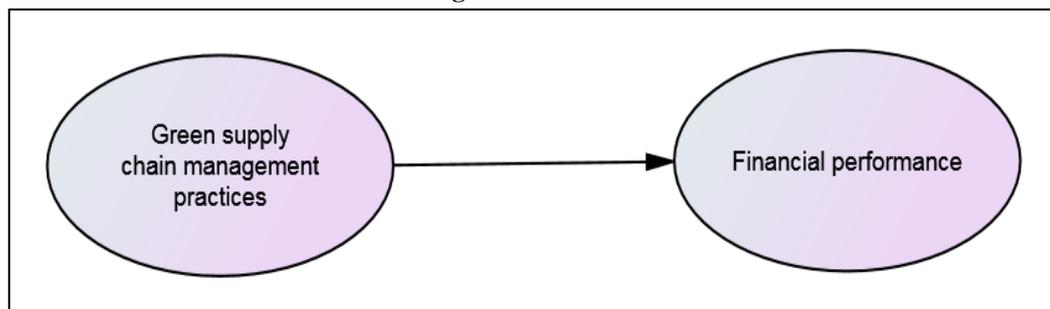
Variable	Unstandardized coefficients	Standard Error	t-value	Standardized coefficients
Constant	1.033	0.162	6.377**	-
GSCMPs	0.441	0.045	9.800***	0.311

Notes: Dependent variable = Social performance. Adj.  $R^2 = 0.389$ . \*, \*\*, and \*\*\* coefficient is significant at 0.05, 0.01 and 0.001, respectively.

Sources: The authors' own calculation.

#### 4.5.4 Green supply chain management and financial performance

**Figure 5** shows theoretical Model IV which propose influence of green supply chain management practices on financial performance. Similarly to validate Model IV, we deployed regression analysis. As shown in **Table 8**, the results of regression analysis corresponding to Model IV provide that green supply chain management practices significantly and positively influence operational performance of small scale industries ( $\beta = 0.433$ ,  $p < 0.01$ ). Therefore, green supply chain management practices adopted by a small scale industry leads to improved financial performance.

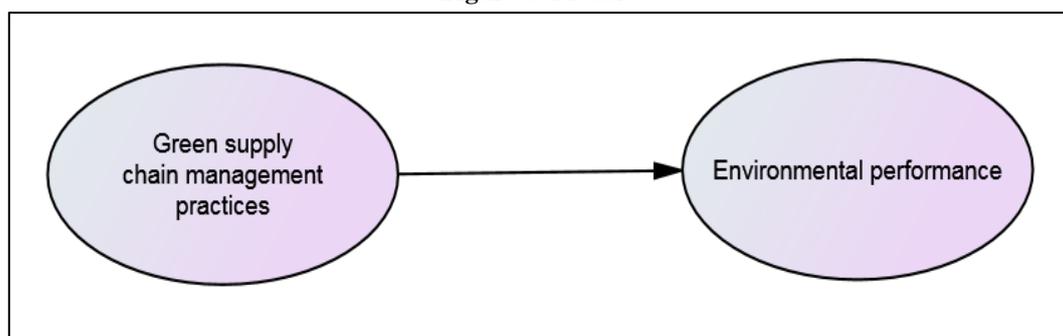
**Figure 5: Model IV****Table 8: Results of Model IV**

Variable	Unstandardized coefficients	Standard error	t-value	Standardized coefficients
Constant	1.010	0.112	9.018***	-
GSCMPs	0.511	0.067	7.627**	0.433

Notes: Dependent variable = Financial performance. Adj.  $R^2 = 0.412$ . \*, \*\*, and \*\*\* coefficient is significant at 0.05, 0.01 and 0.001, respectively.

#### 4.5.5 Green supply chain management and environmental performance

**Figure 6** shows theoretical Model IV which propose influence of green supply chain management practices on environment performance. Similarly to validate Model V, we deployed regression analysis. As shown in **Table 9**, the results of regression analysis corresponding to Model IV provide that green supply chain management practices significantly and positively influence environment performance of small scale industries ( $\beta = 0.31$ ,  $p < 0.01$ ). Therefore, green supply chain management practices adopted by a small scale industry leads to improved environment performance.

**Figure 6: Model V****Table 9: Results of Model V**

Variable	Unstandardized Coefficients	Standard error	t-value	Standardized coefficients
Constant	0.643	0.192	3.349**	-
GSCMPs	0.377	0.065	5.800**	0.31

Notes: Dependent variable = Environmental performance. Adj.  $R^2 = 0.299$ . \*, \*\*, and \*\*\* coefficient is significant at 0.05, 0.01 and 0.001, respectively.

## V. CONCLUSION

This study investigated the influence of green supply chain management practices on firms' market performance, operational performance, social performance, financial performance, and environment performance. To investigate the influence of independent variable (green supply chain management practices) on dependent variables (market performance, operational performance, social performance, financial performance, and environment performance), we used simple regression methodology via IBM SPSS V.24.

Using the sample of 250 respondents, our study documented that green supply chain management practices positively and significantly influence the market performance of firms. Therefore, our findings are consistence with previous research studies

of Green Jr et al. (2012), Hsu et al. (2012), Namagembe et al. (2016), and Acquah et al. (2021). Moreover, our findings documented that green supply chain management practices significantly and positively influence operational performance of small scale industries. Therefore, our results are consistent with the results of Feng et al. (2018), which provided that green supply chain management practices cause improvement in operational performance in production and distribution firms in China. The result indicates that firms adopting green supply chain management practices to improve “product quality”, “save cost associated with regulatory and compliance fines” and “reduce cost of energy consumption and waste”.

Next, our findings provide that green supply chain management practices significantly and positively influence social performance of firms. It means that green supply chain management guarantees improvement in cultural and representative security and wellbeing. Further, our findings have documented that green supply chain management practices have significant and positive effect on financial performance, implied that adoption of green supply chain management practices by small scale industry will substantially increase financial benefits. Therefore, our findings are in line with Green Jr et al. (2012), Hsu et al. (2012), Namagembe et al. (2016), Acquah et al. (2021) and Agyabeng-Mensah et al. (2020). Subsequently, our findings show that green supply chain management practices have significant and positive effect on environment performance. Hence, our findings support the findings of Longoni et al. (2018) and Zaid et al. (2018), which are conducted in the manufacturing firms in Italy and Palestine, respectively.

Therefore, our study contributes to existing knowledge on the relationship between green supply chain management practices and firm’s performance from the developing economy and Indian perspectives. Furthermore, the study shows that green supply chain management link facilitates to improve in operational performance, market performance, environment performance, financial performance and social performance, which is a new theoretical insight.

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