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The Impact of Institutional Pressures on Green Supply Chain Management and Firm Performance: Top Management Roles and Social Capital

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Abstract: This study investigates the impact of three institutional pressures, namely government, customer, and competitor pressures, on the environmental and operational performance of firms. These three institutional pressures are examined by implementing green supply chain management, considering the role of top management and studying social capital between buyers and suppliers in the supply chain. Data were collected through an electronic mail survey from buyer firms in the manufacturing industry in Korea. With 241 complete and usable responses, we used structural equation modeling to test our hypotheses. Our findings revealed that the majority of our hypotheses were supported, which is in line with the existing literature. However, the impact of coercive pressure on top management support and the impact of structural social capital on performance were found to be insignificant. The major contribution of our study is that it broadens the framework of green supply chain management (GSCM) by integrating major and recent constructs in the GSCM theory, while also providing instructive managerial implications through empirical evidence.

Keywords: institutional pressures; green supply chain management; firm performance; top management role; social capital

1. Introduction

Today, firms have to react to the growing focus on protecting the environment through green practices [1]. The implementation of green manufacturing has been long discussed [2,3]. Nowadays, green practices are certainly beyond the scope of a single firm [4]. It has instead become an important issue that should be considered in the whole supply chain, as eighty-seven percent of customers blame manufacturers for the “environmental negligence” of its suppliers [5]. Global and national regulations, green consumption and climate change acts as serious challenges for the firms, with the entire supply chain needing to be coordinated to meet those requirements [6]. A number of studies have investigated how management activities or policies correspond to those changes in environmental standards. Vachon [7] investigated the role of environmental collaboration and monitoring that occurred both upstream and downstream of the supply chain in environmental investment in management systems. The efforts of firms to meet societal conditions occasionally may be challenged by various internal and external factors. Handfield et al. [8] asserted that firms can face diverse environmental risks associated with supply chain issues. There is increased necessity for exploring the green supply chain management (GSCM) in a broader perspective. Markman and Krause [9] attempted to advance a new paradigm, insisting that sustainable practices, in order to make Earth and societies truly

sustainable, must prioritize the environment first, society second, and economics third, on the premise of enhancing all three sectors. Matthews et al. [10] took a problematization approach, questioning the dominant assumptions that have been strongly held in the sustainable supply chain management field and attempted to propose an alternative assumption ground. They took paradoxical framing to comprehend the inherent tensions between the different levels of sustainability and between the different types of theory, recognizing the importance of heterogeneous and diverse approaches to SSCM problems. A considerable amount of literature has used a theory-focused approach to examine the role of critical drivers in the GSCM that leads to performance, which focuses on the supply chain perspective [11].

Among the theory-based approaches in the GSCM field, Zhu and Sarkis [12] explored the moderating role of institutional pressures between GSCM practices and organizational performance. This study was an initiative in empirically testing the role of institutional theory in operations and production [13]. Zhu et al. [14] proposed a coordination theory-based approach, suggesting that the coordination of internal and external GSCM activities results in more satisfying performance in the overall supply chain. Recent theory-based empirical work includes studies conducted by Dubey et al. [11], which explored the relationship between leadership, institutional pressures and environmental performance; Ye et al., [15], which investigated the effect of institutional pressures, posture of top managers and reverse logistics on performance; and Lee [16], which investigated the role of social capital in the GSCM and performance. In addition, Whipple et al. [17] incorporated resource-based theory into a model and found that it is possible to have improvement in operational performance if the firms' investment in internal relationship management skills is accompanied by external buyer-supplier social capital. Busse [18] used a conceptual theory-building approach applying instrumental stakeholder theory, and identified the mediating effects of purchasing costs, supply chain sustainability risk costs, cooperation benefits, and benefits stemming from spillovers of a supplier's self-promotion, between suppliers' sustainability-related conditions, and buyers' economic performance. Using data collected from a North American-based major electronic components distributor and its suppliers, Preston et al. [19] found that relational, social capital facilitates knowledge transfer from a buyer-side to a supplier-side, with this process eventually contributing to the realization of cost reduction and innovation. These studies gave us insights to consider institutional pressure, top management role and social capital in an integrated framework as well as how best to validate these with empirical data.

This study offers the following major contributions to the field of green supply chain management by empirically validating the conceptual model based on related theoretical backgrounds. First, the study examines the model under the grounds of both institutional theory and social capital theory, which has not yet been considered in the same framework. In particular, using social capital in the GSCM area is in its infant stage [16]. The institutional theory has played a significant role in GSCM literature and has been long discussed for investigating the external pressure on organizations affecting GSCM performance. While there were a number of excellent studies based on this theory combined with other variables, they largely interpreted that external subjects generally impose pressure or motivation on firms adopting or implementing the GSCM. There was a relatively smaller amount of literature paying attention to the fact that the external role can lay between GSCM and its overall performance. Using social capital theory, we could attempt to take this standpoint into account, on top of the traditional standpoint. Social capital has been discussed as an important variable in supply chain management (SCM) studies, although it has only recently started to be discussed in GSCM [16]. Combining these two theories allows for investigation of the external role before and after the adoption of GSCM by firms. Moreover, if the institutional theory covers the role of customers, governments and competitors, the social capital theory covers the role of suppliers and partner companies in GSCM, facilitating for the study of diverse agents in a single frame. Both theories take insights from the role of external subjects outside the individual firm, while integrating two theories can provide a larger picture for investigating and implementing GSCM. Bringing together these two theories into

one framework is a novel idea in the GSCM literature. Secondly, regarding the final dependent factor, namely firm performance, we take operational performance into account rather than only environmental performance in order to give insight for managers that GSCM provides effective and beneficial results along with green performance. This can aid in solving the ongoing debate over the trade-offs between environmental and firm performance, with mixed results found in previous empirical studies [20].

Our research objectives are to validate our theoretical framework with an empirical study, to find managerial recommendations for the manufacturing firms in Korea, which has great national and global weight in the manufacturing industry, and to highlight further research opportunities in the area.

The remainder of the paper is organized as follows. In Section 2, related research and theories are reviewed and in Section 3, our conceptual model and hypotheses development are presented. Section 4 contains our research methodology, while Section 5 describes data analysis and the results. Section 6 includes deeper discussions on empirical findings. Finally, Section 7 contains our concluding remarks, research limitations and suggestions for future research.

2. Related Research

2.1. Green Supply Chain Management

Green supply chain management is an extensively crucial topic for business [1,3]. GSCM can be perceived as a set of managerial practices that combines environmental issues with supply chain management in order to guarantee environmental compliance and promote the environmental capability of the entire supply chain [1,21,22]. GSCM encompasses product design, material sourcing and selection, manufacturing processes in addition to depreciation of the products [23]. Liu and Chang [24] used structural equation models for a sample of 296 Chinese manufacturers and found that both closed-loop operation and GSCM positively influence the environmental and economic performance of firms. Zhu and Sarkis [25] also suggested that there should be a more extensive approach for these practices in addition to classifying GSCM into internal environmental management, green purchasing, investment recovery, eco-design practices and cooperation with supply chain partners.

Comprehensively, two distinctive yet complementary approaches are used in GSCM practices: monitoring- and collaboration-based approaches [3]. In the monitoring approach, the buyer firm gathers and processes the information about the supplier, establishes the supplier assessment standard as well as evaluates the environmental performance of suppliers and their products. As a representative example of monitoring GSCM, buyer firms require their suppliers to validate green manufacturing through international certification, such as ISO 14001 [16].

When based on the collaboration approach, GSCM demands buyers to be directly involved in improving the environmental performance of suppliers. It mainly focuses on the long-term goals, such as constructing the potential and capability of suppliers [3]. The collaboration approach includes a wide range of activities, which provide training and educational programs, information and experience networking sessions in addition to technical and financial assistance to help apply many different green management policies and acquire related environmental certifications [3,12,25,26]. Overall, GSCM has a great prospect in majorly contributing to the firm's competitive advantage in addition to both financial and non-financial performance [27].

2.2. Institutional Theory

Institutional theory has received growing attention in the operations management and supply chain management fields over recent years [28]. The institutional theory origins from the idea that firms institutionalize individual and organizational structures by adding either values or constraints to their internal activities or system [29]. Oliver [30] stated that firms incorporate social legitimacy through adopting predominant social norms, influences and traditions. Similarly, Suchman [31] suggested firms

realize the value of social legitimacy, along with economic profits. Scott [32] asserted that managers make decisions under pressure from external stakeholders. Thus, the theoretical perspective that can capture the impact of social networks is a much more comprehensive way of explaining organizational behaviors, when compared with the rational perspective that captures only the economic aspect. In associating relevant stakeholders with institutional theory, DiMaggio and Powell [33] propounded the idea of dividing predominant sources of institutional pressures on decision makers into three dimensions: coercive pressure, normative pressure and mimetic pressure.

Coercive institutional pressure derives from organizations facing cultural and societal expectations. After all, the firm operates in society and thus, inevitably comes under both formal and informal pressure from other organizations, such as government agencies and regulatory standards [33]. The government agencies perfectly illustrate how powerful groups may influence the actions of an organization [34].

Secondly, normative pressure occurs because of professional codes, which presume that professionals will abide by specific guidelines that are aligned with the conventions of formal education and the professional community [33]. Due to social legitimacy, each firm is expected to consider or follow standards, norms, and expectations of its external stakeholders [35,36]. In general cases, demand from customers shapes a core normative pressure [12,37]. Liu et al. [38] surveyed 106 Tier 1 suppliers to the Taiwanese computer industry to examine the effect of the Electronic Industry Citizenship Coalition (EICC) Code of Conduct on environmental responsibilities. This study found that characteristic differences in product type, geographic area, and supplier size are correlated with the efficiency of GSCM and environmental performance.

Lastly, mimetic pressure arises when an organization copies other successful competitors in the industry. Since organizations are instilled in social networks [35], firms in these networks tend to imitate the behaviors of other network members [39]. In particular, when the organization lacks clarity in establishing its organizational goal or in understanding the technology, there is a higher chance of imitating other firms [33,40].

2.3. Top Management Support

Top managers, namely the “CEO and its direct subordinates responsible for corporate policy” [41], act as important drivers in implementing diverse managerial practices that influence organizational performance. Top management plays an essential role in securing the required financial and personnel resources [42,43]. They also have a critical role in the promotion of changes [44], which is important in the adoption of the organizational commitment to new values [45]. Top management support has been examined in broad business sectors, including customer relationships [46], product development [47], information systems [43], and project success [48]. Yeung et al. [49] also stated that, when top managers value organizational learning and when it is shared through the organizational routine, infrastructure, and culture, this knowledge leads to high performance. Top management can never be underestimated since it creates a vision for the entire organization, which shapes corporate value, management direction, and the identity of the firm [50]. In other words, top management leads the company at the forefront and implements resources or systems that are necessary for desired output [51]. In the field of GSCM, top management support is widely treated as an essential driver for GSCM [52,53], facilitating resources and investment allocation into green practices [54].

2.4. Social Capital Theory

Social capital can be understood as a valuable asset that originates from social access to resources by utilizing social relationships [55]. Applying the social capital theory into academic theory has provided a broader perspective for examining the firm’s advantage achieved through their social networks. According to Nahapiet and Ghosal [56], social capital can be categorized into three dimensions: cognitive, structural and relational.

The cognitive dimension of social capital regards common goals, vision and values among actors within the social network that deliver common representations, shared understanding and systems of meaning [57]. Based on a sample of a supply chain in a construction project in Korea, which consists of a major construction company and 106 suppliers, Kim et al. [58] found that both suppliers and contractors should continuously communicate to keep and develop consistent perspectives on the environmental capabilities of the suppliers. Furthermore, this study warned that the ignorance of second-tier suppliers with regard to environmental concerns can potentially cause harm to the whole supply chain. Cognitive capital delineates suitable ways for buyers and suppliers to trade and share each other's thinking processes, which facilitates the development of collective ideologies and shared understanding [59]. The alliance of goals tends to reduce the chance of conflicts [60] and enhance joint returns for both parties, since both parties perceive synergistic potential of their relationships [57].

Secondly, structural social capital regards the pattern of connections between actors, namely, the pattern that answers the question of who to reach and how to reach them [56,61]. Interacting in frequent and various manners at many different levels and functions allows for timely information and resource exchange, which works as an opportunity and motivation for fortifying the relationship between two parties [62,63]. The power of interaction is operationalized by carefully designed institutional social events, team building, joint problem-solving workshops, and cross-functional teams [64,65]. Such interaction facilitates cooperation and collaboration in the supply chain. Structural social capital acknowledges the advantages that are derived from the arrangement of the network of contacts, continued communication, information sharing, and social interaction ties [66].

Finally, the relational dimension is related to the moral aspect of personal relationships between actors, such as trust, obligations, respect, and friendship [55,56]. For instance, trust is one of the crucial components of relational social capital [67]. Trust derived from repeated interactions reduces the expectation of opportunistic behavior, promotes open communication, and improves behavioral transparency between both parties [68,69]. Likewise, friendship, respect, and reciprocity are strengthened through repeated transactions and result in long-term relationships [70]. In short, relational social capital concentrates on partnership-based relationship in the long term to build trust, respect, friendship, and reciprocity through repeated transaction. This consequently reduces transaction costs by encouraging cooperative behavior [16,71].

3. Theoretical Framework and Hypotheses Development

In this section, we propose a theoretical framework and corresponding hypotheses, based on the review of existing literature. The framework is shown in Figure 1, which integrates the relationships between institutional pressures, top management support, GSCM, social capital and performance.

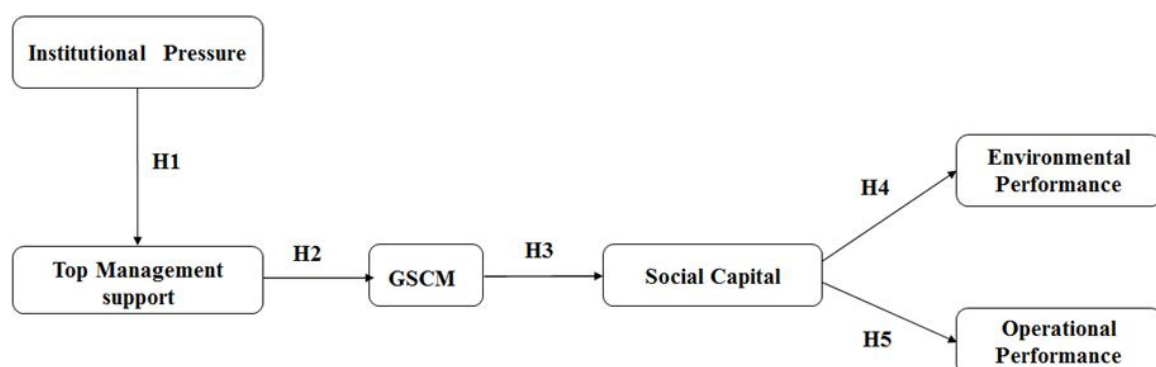


Figure 1. Conceptual framework.

3.1. Institutional Pressures and Top Management Support

Various pressures from stakeholders and institutions motivate enterprises to pursue GSCM-related practices [72]. It may be important to test whether there is a direct relationship between institutional pressures and implementation of GSCM on the premise of strong support from top managers in the process of adopting green practices. However, top managers may have greater influences from specific types of institutional pressures, such as government regulations, customers' needs or competitors' strategies. Therefore, their support can vary in response to each different type of institutional pressure. In this regard, this paper empirically tests how sensitive the reactions from top management are to heterogeneous institutional pressures, which effectively treats this as a middle-step towards an analysis on the effects of top management on the implementation of GSCM.

Although government regulation strongly reinforces innovative environmental actions [73], managers regard the regulation as the most evident external force that influence the environmental practices of their organizations [12]. Legally, organizations are expected to follow the government's environmental regulations or else they will face legal penalties and actions or even can be dismissed from the market [74]. Zhu and Sarkis [12] indicate that coercive pressure critically influences the behavior of top management.

In the meantime, the requirements of customers are also referred as an important initiative or a motivational force in the application of environmental activities [75,76]. As the general level of society's environmental consciousness increases, both consumers and downstream supply chain partners need to select eco-friendly products [77]. Companies also need to be conscious of the change in environment-related marketing strategies of competitors [77]. Successful organizations in the same industry and even the organizations that they have social relations with can provide appropriate sources for imitation [78]. According to Miemczyk [79], the firm can implement the best GSCM practice that can induce the best possible performance enhancement using the mimetic approach.

Hence, we hypothesize that:

- H1a. Coercive pressure has a positive influence on the support of top managers.
- H1b. Normative pressure has a positive influence on the support of top managers.
- H1c. Mimetic pressure has a positive influence on the support of top managers.

3.2. Top Management Support and GSCM

The role of top management is highly emphasized in determining the speed and range of the environmental practices [80]. Although capacity and commitment can be generated from any position in the organization, the decision from top management plays a most powerful role because it affects activities from resource allocation to deployment that influence environmental policy changes [30,75]. Support from top management facilitates the process of reflecting the institutional pressure for GSCM into the organization and enforcing organizational actions [81]. On the contrary, a lack of support from top management can result in higher resistance from the firm in incorporating institutional pressure and failure to adopt green production practices. The initiative from top management is one of the main driving forces for the companies to implement different kinds of environmental programs in the first place [82,83]. Overall, top management support is necessary for environmental strategies and programs to succeed [74].

Hence, we hypothesize that:

- H2. Top management support has positive influence on the implementation of GSCM.

3.3. GSCM and Social Capital

GSCM itself is the practice that aligns buyers and suppliers in coming together to the same vision and goal of environmental management and performance for both parties. GSCM is basically an interactive program, which requires a mutual understanding of supply chain partners in addition to

implementing transparent evaluation on performance and an efficient feedback system. This results in shared environmental goals and philosophical understanding for both supply chain partners Lee [16]. According to Wu and Ragatz [84], better understanding and open communication in order to meet environmental requirements can reduce possible conflicts between parties, which strengthens the relationship within the supply chain network [85].

The GSCM system has a greater focus on developing future, long-term capabilities than on advancing current quality or reducing current cost [3,86]. A larger extent of support and joint performances, such as training and education in addition to technical assistance along the execution of GSCM, can build long-term partnerships and loyalty for both buyers and suppliers [65,87]. Hence, reciprocal relationships between buyers and suppliers will make it easier to accumulate relational social capital. Similarly, GSCM makes interactions between supply chain partners obvious and necessary, generating frequent and repetitive open communication and information sharing. This makes it easier to accumulate structural social capital. Strengthened interactions often result in various organizational events, team exercises, joint workshops, and cross-functional teams [64,65].

However, there can be arguments about the relationship between GSCM and social capital as there can be different perspectives about the level of social capital that can act as a driver of GSCM or whether social capital can play a moderating role between GSCM and performance. However, up until now, there is a scarce body of literature that studies GSCM and social capital together. Wu et al. [26] has recently considered social capital as a driver of GSCM practices. However, our study aims to examine whether GSCM itself can help the accumulation of social capital and we judge that there are proper logics to support our idea. In particular, Lee [16] has shown support for the mediation role of social capital between GSCM and performance. Lee [16] found that GSCM has a positive impact on accumulating relational and structural social capital. In this paper, we also take cognitive social capital into account, attempting a more comprehensive framework.

Hence, we hypothesize that:

- H3a. GSCM has positive influence on the accumulation of cognitive social capital.
- H3b. GSCM has positive influence on the accumulation of structural social capital.
- H3c. GSCM has positive influence on the accumulation of relational social capital.

3.4. Social Capital on Environmental Performance

Many researchers tend to show growing interest in examining the contribution of suppliers in the improvements of the buying firms [65,88]. While only a few studies have clearly proved that social capital has a meaningful influence on environmental performance, Mitra and Datta [89] showed that supplier collaboration has a positive effect on environmental performance, specifically toward green product design and logistics.

We believe that a shared vision of environmental achievements between the buyer and supplier firms will naturally have a positive influence on environmental performance. Essentially, the cognitive social capital accumulated by GSCM will bring improvements for environmental performance. Structural social capital represented by frequent communication, information sharing and joint activities will lead to knowledge transfer [82], which can assist in discussing and finding solutions for achieving environmental capability and performance. Long-term and trust-based relationships, namely relational social capital, can increase the commitment between the two parties and provide incentives to improve environmental capabilities [13]. Overall, strong relationship-based interaction, sharing of information, communication and trust [65,90] will enable development of new solutions for various environmental challenges [91]. Thus, this brings great improvements to environmental performances.

Hence, we hypothesize that:

- H4a. Cognitive social capital has a positive influence on environmental performance of GSCM.
- H4b. Structural social capital has a positive influence on environmental performance of GSCM.
- H4c. Relational social capital has a positive influence on environmental performance of GSCM.

3.5. Social Capital on Operational Performance

Operational performance is concerned with the financial impact of a firm's GSCM practices [92]. Regarding operational performance, a number of studies have been supportive of the theory that social capital acts as a strong driving force for improvements [64,65].

Cognitive capital allows buyers and suppliers to share vision, combine each other's thinking processes, and seek resource integration [56,59]. This alliance of goals aiming for a synergistic effect tends to reduce the chance of conflicts and enhance joint returns for both parties [57,60], increasing the willingness of both parties to mutually improve operational and strategic performance [64].

Structural social capital, which acts as a channel for communication and information sharing, generates better goal-setting, planning, and problem solving, which can improve performances of both the buyer and supplier [93]. Interactions, including technical exchanges, are factors that can positively influence supply chain performance [94]. A number of studies have provided evidence that relational social capital has significant effects on the improvement of quality, cost, flexibility, and productivity performance [93,95,96]. Dyer and Singh [69] explain that relational social capital reduces opportunistic behavior and monitoring costs, which is the main reason for operational improvement.

In general, social capital, accumulated by frequent communication, timely information sharing, shared problem solving and good relationships, provide opportunities to improve operational performance [97,98].

Hence, we hypothesize that:

H5a. Cognitive social capital has a positive influence on operational performance of GSCM.

H5b. Structural social capital has a positive influence on operational performance of GSCM.

H5c. Relational social capital has a positive influence on operational performance of GSCM.

4. Research Design

4.1. Questionnaire Development

To conduct our study, we developed a questionnaire that included the five key constructs: institutional pressures, top managers' support, GSCM, social capital and performance. To enhance reliability and validity of measurement as well as to secure larger variability between survey individuals, multi-item measures were generated for each construct [99].

For each construct and their measures, we went through an extensive literature review and managerial interviews and obtained expert opinions from academia to ensure content validity. We found evidence for our survey items from previous empirical studies in the field of GSCM and social capital. These included Villena et al. [71], Wu et al. [26], Ye et al. [15], Dubey et al. [11], and Lee [16]. For confirmatory factor analysis, we ensured that each construct has at least three items for each measurement [100,101]. After several processes were completed, slight modifications were made to clarify the meaning or wording of the questionnaire. Our constructs and their measures, along with supporting literature, are presented in Table 1.

We used a 7-point Likert scale for measuring the perceptions of the surveyed individuals (where 1: Strongly Disagree and 7: Strongly Agree) for all 45 measures in our theoretical model. We included firm size, measured by the number of employees, as a control variable to explain extraneous effects [102] and to prevent the possibility of its influence on the relationships between the main variables. Firm size has traditionally been considered as an important control variable in observing organizational differences [103]. In particular, regarding the implementation of environmental management, large firms have a better chance of utilizing monetary and managerial resources than smaller ones [104].

Table 1. Constructs and their items measurement.

Constructs	Items	Reference
Coercive Pressure (CP)	CP1 Stringent government regulations on recycling, environmental protection and consumer rights protection force our company to implement green practices. CP2 The green environmental management of our firm will be influenced by regional government's environmental regulations. CP3 Potential conflicts between products and environmental regulations will affect our firm's green environmental management.	[15]. [26]. [26].
Normative Pressure (NP)	NP1 The increasing environmental consciousness of consumers has spurred our company to implement green practices. NP2 Consumers have a strong influence on our company's green practices implementation. NP3 For our firm, establishing enterprise's green image is extremely important.	[15]. [15]. [26].
Mimetic Pressure (MP)	MP1 Our competitors' earlier implementation of green practices provided a benchmark and guidance for our company's green practices implementation. MP2 Competitors have a strong influence on our company's green practices implementation. MP3 The green environmental management of our firm will be affected by competitors' green environmental protection strategy.	[15]. [15]. [26].
Top Management Support (TMS)	TMS1 Our top managers recognize the importance of green practices. TMS2 Our top managers proactively support green practices implementation. TMS3 Our top managers show positive attitude towards green practices. TMS4 Our top managers are willing to invest resources needed to implement green practices. TMS5 Our top managers are likely to approve special fund for investment in green practices. TMS6 Our top managers have well defined the company's environmental policy.	[15]. [15]. [11]. [15]. [11]. [11].
Green Supply Chain Management (GSCM)	GSCM1 We assess our suppliers' environmental performance through a formal and green procurement process. GSCM2 We demanded our suppliers to establish environmental management systems. GSCM3 We conducted environmental audits of our suppliers on regular basis. GSCM4 We demanded our suppliers to develop environmental-friendlier products. GSCM5 We provided our suppliers with relevant and helpful information on how to comply with our environmental requirements. GSCM6 We provided our suppliers with technical, managerial and financial assistance to address environmental issues. GSCM7 Our supplier firm and we jointly developed environment conscious products.	[16]. [16]. [16]. [16]. [16]. [16]. [16].
Cognitive Social Capital (CS)	CS1 Our supplier(s) and we have similar corporate culture/values and management styles. CS2 We have similar philosophies/approaches to business dealings. CS3 We have compatible goals and objectives. CS4 We have the same vision of business in the relationship.	[71]. [71]. [71]. [71].
Structural Social Capital (SS)	SS1 We are sharing relevant and timely information with our suppliers. SS2 We are interacting in a frequent and intensive manner with our suppliers. SS3 We are solving problems jointly. SS4 We are sharing and transferring knowledge and knowhow each other.	[16]. [16]. [16]. [16].
Relational Social Capital (RS)	RS1 Our major supplier and our firm trust each other. RS2 Our firm has a family-like relationship with our major supplier. RS3 Our major supplier and our firm have mutual respect. RS4 Our major supplier considers us as a long-term partner. RS5 Our major supplier and our firm are reciprocal to each other.	[16]. [16]. [71]. [16]. [71].
Operational Performance (OP)	OP1 Implementation of GSCM reduced the costs of processing products. OP2 Implementation of GSCM reduced inventory. OP3 Implementation of GSCM reduced raw material costs. OP4 Implementation of GSCM reduced logistics costs. OP5 Implementation of GSCM improved our company's profits.	[15]. [15]. [15]. [15]. [15].
Environmental Performance (EP)	EP1 Implementation of GSCM established a good corporate image. EP2 Implementation of GSCM enhanced our company's market competitiveness. EP3 Implementation of GSCM reduced environmental pollution. EP4 Implementation of GSCM helped meeting government requirements on environmental protection. EP5 Implementation of GSCM helped our company to fulfill its corporate social responsibility for environmental protection.	[15]. [15]. [15]. [15]. [15].

4.2. Sampling and Data Collection

Our target firms were manufacturing buyer firms in Korea, which incorporate green supply chain management, and our target subjects were manager-level employees, who are attached to supply chain management department at large, including purchasing, warehousing, inventory and managerial accounting. In order to reach our target respondents, we based our method on the data sample provided by Hankook Research, the largest marketing and opinion poll survey firm in Korea. Hankook Research provided a Master Sample based on three criteria, including national population statistics, ESOMAR (Guideline on Conducting Market and Opinion Research Using the Internet) and ISO/DIS 26362 (access panels in market, opinion and social research). Data were collected using an electronic mail survey, which included screening questions to ensure the sample reliability. Those questions were whether the respondent is an employee of a certain firm, whether the firm belongs to the manufacturing industry, whether it is a buyer firm that has one or more significant supplier partner(s), and whether the firm is implementing GSCM. To classify a firm as a GSCM-implementing firm, we use the question “Does your firm implement GSCM?” as cut-off criteria. If a respondent answered “no”, then we judged that GSCM was yet to be implemented in the firm. Although we did not limit the position to operations or supply chain management, we assumed that the individuals who were capable of going through these four successive screening questions, for example, those in managerial accounting departments, were already familiar with firms’ supply chain management practices.

A total of 25,365 surveys were sent to the Master Sample, while 3067 receivers actually participated in the survey. A total of 325 answers were removed after the job status of respondents were filtered; then, we dropped 1971 answers as they were in non-manufacturing industries; 210 answers also were removed as they did not satisfy the buyer firm requirement; 305 answers were finally dropped as they did not implement GSCM. Thus, after screening out the respondents that did not fit our target sample, 256 complete responses were left. Finally, we detected four unusable responses using unrealistic employee numbers and revenue, such as zero employees or a revenue of 4000 Won. We also detected 11 individuals who replied all responses with the same number at an average response time of 0 s for each question. Thus, our final data included 241 responses, satisfying the sample size of 150 that is needed to conduct the hypotheses analysis for empirical research [100]. Table 2 shows the descriptive statistics of the respondent firms.

Table 2. Profiles of the respondents.

Characteristics	Percentage Distribution
<i>Number of employees</i>	
<250	68.05%
250–1000	12.45%
>1000	19.50%
<i>Company type</i>	
Large Company	24.07%
Middle Company	36.93%
Small Company	39.00%

4.3. Non-Response Bias

In order to assess non-response bias, we compared the early- and late-wave responses of the returned surveys [102,105,106]. We listed the final sample according to the dates when responses were received and compared the first 30 percent of respondents against the last 30 percent of respondents. We conducted *t*-tests analysis based on fifteen randomly selected variables and results showed no statistically significant differences between two groups at 95% confidence intervals, suggesting an absence of non-response bias.

5. Data Analysis

5.1. Assessment of Psychometric Properties

Before testing the reliability and validity of the measurement items, it is necessary to test the normality assumption to satisfy the conditions of maximum likelihood method of estimation for structural equation modeling. The maximum absolute value of the skewness of the items was 0.594 and the maximum absolute value of the kurtosis was 3.440, which are fully within the limits to confirm univariate normality assumption (univariate skewness < 2, kurtosis < 7) [107,108]. We examined multivariate skewness and kurtosis following the method of Mardia [109] and revealed that multivariate kurtosis index is 515.989, which exceeds the absolute value of 2.58 at $p = 0.01$, dismissing the multivariate normality assumption. However, there are few data sets that satisfy multivariate normality assumption. We followed the guideline that once univariate normality assumption is fulfilled, it is sufficient to interpret that multivariate normality assumption is satisfied [110].

5.2. Common Method Bias

To test whether the common method bias exists, we adopted Harmon's single factor approach. This approach suggests that if common method bias exists, the factor analysis of all survey items will yield a single factor or a general factor that holds most of the common variance [111]. The unrotated exploratory factor analysis sorted all variables into eight independent parsimonious factors with Eigen's value greater than 1.0, explaining 79.601% of the total variance. The first latent variable explained nearly 46.812% of the total variance, which is less than the threshold value of 50%. From this, we concluded that common method bias is not a critical issue.

5.3. Construct Validity

We used Amos 23.0 to perform confirmatory factor analysis for evaluating convergent validity and discriminant validity. The model fit indices for 10 factor models are $\chi^2 = 2035.79$ with $df = 900$, SRMR = 0.0688, CFI = 0.901, TLI = 0.892 and RMSEA = 0.073, which are all tolerable. However, we decided to improve the model fit through discarding problematic items recommended by the Modification Index. Thus, TMS 1, TMS 3, GSCM 6, GSCM7, CS2, RS5, EP2, and EP4 were removed. As a result, the model fit improved to $\chi^2 = 1107.455$ with $df = 584$, SRMR = 0.0446, CFI = 0.940, TLI = 0.931, IFI = 0.940, and RMSEA = 0.061, which well satisfies the assumption of Hair et al. [100].

All standard regression weights are larger than 0.5, proving the convergent validity [112]. Each factor composite reliability is larger than 0.7, indicating the convergent validity and internal consistency. To check discriminant validity, we looked at the square roots of the average variance extracted (AVE). Other than normative pressure, all AVE fulfilled the threshold of 0.5 and had greater values than the correlation coefficients between any two constructs [112]. Although discriminant validity for normative pressure was not fulfilled, we interpreted that the correlation between institutional pressures are naturally high and decided to regard normative pressure as a single factor, considering its important role in previous theoretical review and our framework. Table 3 is the summary of our measurement model, while Table 4 depicts AVE analysis.

Table 3. Constructs factor loadings and reliability indicators, composite reliability (CR) and average variance extracted (AVE).

Scale	Items	Standardized Factor Loadings	Composite Reliability	AVE
Normative Pressure (NP)	NP3	0.839	0.828	0.461
	NP2	0.867		
	NP1	0.865		
Mimetic Pressure (MP)	MP2	0.903	0.862	0.676
	MP1	0.897		
	MP3	0.866		
Structural Social Capital (SS)	SS4	0.888	0.902	0.698
	SS3	0.888		
	SS2	0.848		
	SS1	0.891		
Operational Performance (OP)	OP5	0.842	0.901	0.646
	OP4	0.856		
	OP3	0.909		
	OP2	0.901		
	OP1	0.887		
Coercive Pressure (CP)	CP3	0.810	0.809	0.587
	CP2	0.859		
	CP1	0.876		
Top Management Support (TMS)	TMS6	0.886	0.901	0.695
	TMS5	0.902		
	TMS4	0.919		
	TMS2	0.876		
Green Supply Chain Management (GSCM)	GSCM1	0.861	0.913	0.677
	GSCM2	0.922		
	GSCM3	0.886		
	GSCM4	0.902		
	GSCM5	0.871		
Cognitive Social Capital (CS)	CS4	0.899	0.872	0.696
	CS3	0.873		
	CS1	0.829		
Relational Social Capital (RS)	RS4	0.838	0.884	0.657
	RS3	0.863		
	RS2	0.813		
	RS1	0.893		
Environmental Performance (EP)	EP5	0.876	0.847	0.650
	EP3	0.867		
	EP1	0.829		

Table 4. Discriminant validity.

Constructs	1	2	3	4	5	6	7	8	9	10
Normative Pressure (1)	0.462									
Mimetic Pressure (2)	0.500	0.677								
Structural Social Capital (3)	0.278	0.219	0.698							
Operational Performance (4)	0.029	0.066	0.232	0.647						
Coercive Pressure (5)	0.537	0.383	0.186	0.028	0.587					
Top Management support (6)	0.266	0.266	0.266	0.186	0.133	0.696				
GSCM (7)	0.304	0.304	0.420	0.225	0.174	0.507	0.678			
Cognitive Social Capital (8)	0.255	0.253	0.629	0.277	0.130	0.450	0.429	0.696		
Relational Social Capital (9)	0.208	0.170	0.677	0.305	0.100	0.364	0.326	0.567	0.658	
Environmental Performance (10)	0.412	0.291	0.437	0.203	0.196	0.408	0.456	0.472	0.503	0.650

Note: the square roots of AVEs are on the diagonal and correlation coefficients on the off-diagonal.

5.4. Hypotheses Test

We used the structural equation model with maximum likelihood estimation to test relationships in our conceptual framework. Here, we examined the model allowing direct relationships between GSCM and environmental performance as well as operational performance to assess whether social capital mediates GSCM and the two performance constructs. In addition, although it is not part of the hypotheses and framework, we also attempted to explore the relationship between environmental and operational performance, since previous empirical studies have generally brought mixed results, nurturing an ongoing debate [20]. The model fit indices of our structural equation model are $\chi^2 = 1233.832$ with $df = 607$, CFI = 0.928, TLI = 0.921, IFI = 0.929 and RMSEA = 0.066, which are all above the threshold values. The model also had SRMR = 0.986, which is tolerable [91].

Figure 2 represents the structural equation model and the standard coefficients of each relationship between latent variables.

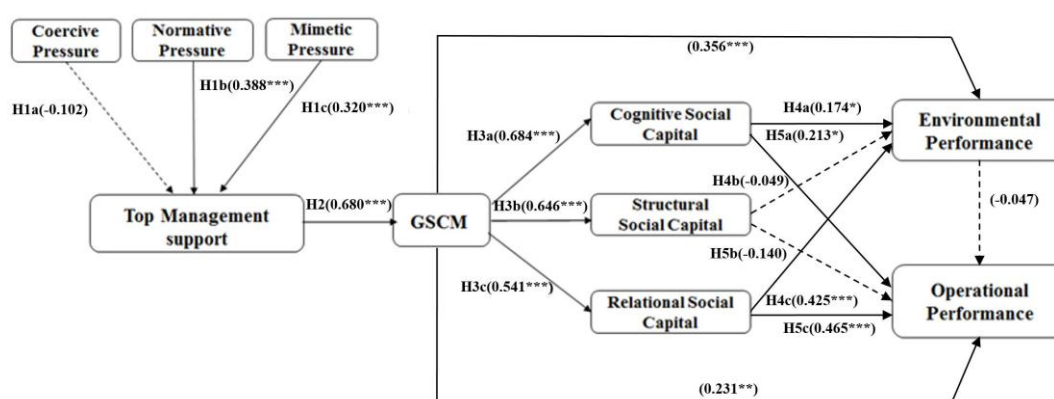


Figure 2. Structural equation model, path coefficients and significance level.

As shown in Figure 2, two of the three institutional pressures, namely customer and competitor, have significant and positive relationships with top management support toward green supply chain management, with the path coefficient = 0.388 and 0.320, which was found to be statistically significant ($p < 0.01$). However, government pressure was found to have no significant relationship with support from top managers. The relationship between top management support and green supply chain management was positively associated with the path coefficient = 0.680, which was found to be statistically significant ($p < 0.01$). The result also shows that GSCM leads to the accumulation of all three kinds of social capital (cognitive, structural and relational social capital) between the buyer and supplier relationship, associated with path coefficients = 0.684, 0.646 and 0.541, which were all statistically significant ($p < 0.01$). The direct paths between GSCM and the two performance constructs showed path coefficients of 0.356 and 0.231, which were significant ($p < 0.01$, $p < 0.05$).

Cognitive and relational social capital showed significant and positive relationships with environmental performance, with path coefficients of 0.174 and 0.425, which were all statistically significant ($p < 0.1$, $p < 0.01$). Structural social capital was found to have no significant relationship with environmental performance. Similarly, cognitive and relational social capital again showed significant and positive relationships with operational performance, with path coefficients of 0.213 and 0.465, which was statistically significant ($p < 0.1$, $p < 0.01$). However, structural social capital has no significant relationship with operational performance. Additionally, in the case of this study, we found no relationship between environmental and operational performance.

6. Empirical Findings and Discussion

The results provide strong support for H1b and H1c, while H1a was not supported. Normative and mimetic pressure showed significant positive influence on top management support, while

coercive pressure has no influence. Carter and Carter [113] examine the relationship of regulatory, consumer, competitor and supplier pressures with environmental activities. They found that only consumer-related pressure displays a positive and significant impact on the level of environmental purchasing. When we compare and contrast our test results with this previous study, the significance of normative pressure and the insignificance of coercive pressure were commonly found in both studies, while there were mixed results in assessing the role of mimetic pressures. We may attribute such an empirical discrepancy to differences in data and empirical methods implemented. Meanwhile, this result is also similar to previous studies in China, where regulations did not have significant influence on environmental practices accounting energy savings and emission reductions [114]. Similar to this case, we may assume that currently, Korean manufacturing firms tend to interpret that environmental regulations are generally flexible and the enforcement level of the regulations is relatively weak. Another possible explanation can be derived from our sample characteristic. Our sample largely consists of small firms, with 68.05% of the sample having firm size of less than 250 and 75.95% belonging to small and middle size companies, where generally the government regulation is likely to focus on large-sized firms in the major manufacturing industry. Nevertheless, even though the coercive pressure is insignificant, Korean manufacturing firms respond to significant impact from customers and competitors, showing that firms are autonomously influenced from market pressure.

The result gives strong support to H2, suggesting that top management plays an important role in implementing GSCM, giving support to previous results from related studies [12,115,116]. From this, we could confirm the role of top management in determining the speed and range of environmental practices [80] as well as reflecting the institutional pressure for GSCM into the organization and enforcing organizational actions [81]. Overall, firms in the Korean manufacturing industry tended to well defend previous findings, indicating the initiative from top management is one of the main driving forces for the companies to implement different kinds of environmental programs in the first place [82,83].

Our results empirically verify that GSCM leads to the accumulation of all three kinds of social capital (cognitive, structural, and relational social capital) between the buyer and supplier relationship, offering strong support for H3a, H3b, and H3c. This validates that GSCM deepens mutual alignment, collaboration, and commitment, thus building social capital across the supply chain [56,67,93]. We could confirm that GSCM has a positive influence on accumulating cognitive social capital, aligning buyers and suppliers to come together to the same vision and goal in addition to mutual understanding of supply chain partners [13]. Our results indicate that a reciprocal relationship between buyers and suppliers causes the accumulation of relational social capital. This is consistent with the results of previous studies, which found that the GSCM system has a greater focus on developing future, long-term capabilities than on advancing current quality, cost, and environment [3,86] or building long-term partnership and loyalty to both buyers and suppliers. [65,87]. Similarly, we verified that GSCM generates frequent and repetitive open communication and information sharing, which accumulates structural social capital, corresponding to studies suggesting that strengthened interactions result in various organizational events, team exercises, joint workshops, and cross-functional teams [64,65].

The direct paths between GSCM and the two performance constructs revealed significant and positive relationships. We could interpret that when social capital construct has a positive relationship with performance construct, it plays a partial mediation role between GSCM and performance. Only cognitive and relational social capital showed significant and positive relationships with environmental performance. Thus, H4a and H4c were supported, while H4b was not supported. We could conclude that cognitive social capital and relational social capital play partial mediation roles between GSCM and environmental performance. This confirms that social capital, including shared management philosophies and vision, mutual trust and respect, improve environmental performance [117]. From this, we could summarize the shared vision between the buyer and supplier firm toward environmental achievements and long-term, trust-based relationships can increase the commitment between the two

parties and provide incentives to improve environmental capabilities [16,65,90]. However, we found that the structural social capital has no significant influence on environmental performance, which will be explained below with the case of operational performance.

Once again, the results showed two of the social capital constructs, cognitive social capital and relational social capital, play partial mediation roles between GSCM and operational performance. Thus, H5a and H5c were supported and H5b was not supported. Shared management philosophies and vision, mutual trust, respect and partnership-oriented relationships tend to not only improve environmental performance, but also operational performance. In particular, this confirms the previous findings that relational social capital plays a critical role in positively affecting the operational performance [64,93]. Overall, our findings indicate that structural social capital has an insignificant impact on both types of performance. We might first attribute this result to the predominant effect of cognitive and relational social capital on performance [16]. Secondly, considering that some previous researchers examined a mediating role of relational social capital between structural social capital and operational performances, structural social capital might only have an indirect effect on performances [64].

Finally, we explored the relationship between environmental and operational performance, which showed no significant relationship in our case. Traditionally and increasingly, a number of empirical studies have provided positive correlations between environmental and operational performance. Essentially, environmental improvements can improve delivery performance or reduce the cost of goods [27,92,118]. Despite such positive results, previous empirical studies have also generally reported mixed results [20], which indicate trade-offs or some degree of ambiguity between the two.

7. Conclusions

This study provides a deeper understanding of GSCM and its effects on performance, regarding institutional pressure, top management role and social capital. In particular, this study seeks to make further investigations on the subject by integrating the role of social capital, with existing arguments that have been implemented in other studies both theoretically and empirically. The empirical results emphasize the critical role of each construct, especially the top management role adopting the institutional pressures and GSCM accumulating into social capital.

However, in examining the relationship between different constructs, many theoretical arguments of this paper are consistent with those of existing literature, with model specifications based on some of the unique underlying hypotheses. Therefore, modifying these theoretical frameworks and assumptions will serve as an alternative approach to the main object of study.

First, as outlined in Section 3.1, this paper assumes that the influence of top management on GSCM may differ depending on various institutional pressures. Therefore, we tested for the role of top management between institutional pressures and GSCM performance rather than a direct relationship between these two constructs.

However, it is true that there are other useful constructs/variables that we can take into account for further improvement of the empirical studies. For example, while this paper and a number of studies examine the direct positive impact of top management support towards GSCM, Carter and Jennings [119] note that changes in organizational culture created by top management may affect environmental and socially responsible supply chain management. This will eventually cause organizations to become more engaged with activities implemented for sustainable supply chain management. In addition, besides top management support, some studies have also demonstrated the role and contribution of middle-level managers as an internal construct in establishing initiatives for GSCM [115,119]. In this regard, it will be interesting to test for the significance of potentially omitted constructs/variables.

Secondly, in this paper, rather than assuming a direct relationship of GSCM with environmental performance and operational performance, we attempt to test the role of various types of social capital, finding that social capital partially mediates the relationship. While we attempt to examine the

contribution of various types of social capital to firms' performance, it is also possible to look for other effects that can be theoretically conceptualized and practically used in the hypothesis development. For example, a considerable amount of literature emphasizes the role of resource dependence theory on how the external resources of organizations affect the behavior of organization. As an alternative approach, the resource-dependence theory provides a useful theoretical standpoint to examine the various influences of customer, competitor and government pressures on environmental supply management [113] to figure out whether customers, NGOs, and other secondary stakeholders pressures are drivers of sustainability efforts [120]. Integrating this resource-related viewpoint with the social capital perspective is expected to contribute to a further development in GSCM literature.

Finally, while we explored the relationship between environmental and operational performance at our empirical test stage, there is room for further research. As discussed previously, there has been a considerable amount of research that demonstrates the impact of environmental performance on operational performance. One widely accepted argument is that firms with a significant environmental performance are, in general, more competitive because environmental management positively influences operational performance. Nishant, Teo, and Goh [121] found that reducing emissions and purchasing green power contributes to the improvement of operational performance. Jabbour et al. [122] applied structural equation modeling to the survey data collected from Brazilian companies with ISO 9001 certification, discovering a large positive and significant impact of environmental management on operational performance of companies. Future research can take this relationship from the hypotheses building stage combined with other variables and further verify the relationship that we did not fully define.

This study has several limitations. First, during the confirmatory analysis, we had to ignore some general statistical mismatches that could have provided insights following our original model. Secondly, since we used three distinct factors for institutional pressure and social capital, some of the parts were left to be further explained. We look forward to future research that can examine the different effects and relationships among those factors. Third, the sample of this study is constrained to over 200 Korean manufacturing firms and for the results to be generalized, further studies, either empirical studies or case studies, are necessary. Fourth, the online survey taken by the market survey firm was completed by scoring individual respondents, and we admit that social desirability bias in our study could not be fully controlled.

Despite some limitations, this study provides strong theoretical and practical implications. The academic implication of the study is that it empirically validates a conceptual model based on an integrated framework of top management support, institutional pressure on GSCM and performance, bringing together the previous studies into a comprehensive one. For managerial implication, the paper explains the importance of the top management's role of a firm for green supply chain management, along with coordinated social capital in the broad supply chain to achieve critical performance. This means that independent managerial decisions lead the direction of GSCM, but the inter-relationship between supply chain partners is also another key driver in final firm performance.

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