

## Article

# Interactional Justice, Informational Quality, and Sustainable Supply Chain Management: A Comparison of Domestic and Multinational Pharmaceutical Companies

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**Abstract:** As the business environment gradually intensifies, interest in building efficient supply chain relationships is growing. The basic principle of supply chain management (SCM) is to enhance efficiency by maintaining sustainable relationships between companies in the supply chain. This study classifies interactional justice into interpersonal justice and informational justice and examines their effects on informational quality and sustainable SCM by comparing Korean pharmaceutical companies with multinationals. The study used a theoretical structural model to investigate the causal impact of interactional justice on informational quality and sustainable SCM. The results indicated that interpersonal justice showed a significant positive relationship with informational justice. Further, interpersonal justice and informational justice had a significant positive effect on informational quality in Korean pharmaceutical companies but not in multinationals. Finally, informational quality had a positive effect on sustainable SCM performance regardless of the company's nationality. This study is important because it identified the influence of interactional justice on informational quality and sustainable SCM by comparing Korean with multinational pharmaceutical companies. The study also highlighted the necessity of interpersonal justice and informational justice in the pharmaceutical industry. Lastly, the study suggests a useful method for the literature to investigate pharmaceutical companies.

**Keywords:** interactional justice; informational quality; sustainable supply chain management; pharmaceutical companies; Korea



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## 1. Introduction

Supply chain management (SCM) is a collection of integrated activities that start with the procurement of the raw materials and ends with the delivery of the products to the end customers [1]. In other words, SCM can be seen as an innovative process useful for transforming raw materials into finished products and delivering them to customers. Companies in the supply chain create added value by establishing mutual transactional relationships. Moreover, as the business environment gradually intensifies, interest in building efficient supply chain relationships is growing [2]. The basic principle of SCM is to enhance efficiency by maintaining sustainable relationships between companies in the supply chain [3]. Ryu, So, and Koo argued that maintaining a cooperative relationship between companies based on trust affects organizational performance [4]. To achieve this, it is important to perceive ethical concepts such as justice, which is a major factor in building trust [5]. Perceiving justice between companies in the supply chain can improve resource allocation and reduce opportunism [6], thereby strengthening cooperation. Furthermore, sustainable economic incentives can be created by reducing relational uncertainty [7].

The medical field is a highly regulated industry in many countries, including the United States. Many laws such as tort law and contract law have been enacted based on ethical concerns. A “principle of justice”, an ethical principle related to the philosophy

of ethics, is also applied in the medical field and can be defined as fairness [8]. As such, justice is equally important in the medical field. This is because the themes surrounding ethical concepts such as justice affect the daily activities of medical organizations [8].

However, although the role of justice is crucial for SCM in various industries, including medicine, relevant research is lacking [9]. In particular, among the different types of justice, interactional justice can be perceived between individuals as well [10]. It is therefore essential to explore the relationship between sellers and buyers in the supply chain. Based on the foregoing research, this study bridges a gap in the body of knowledge on this topic by examining the importance of interactional justice in the relationship between pharmaceutical company employees (the seller) and pharmacists (the buyer). This study also explores how the perception of interactional justice relates to informational quality and sustainable SCM performance.

SCM can be considered to be a strategy for effectively integrating the delivery process from supplier to consumer to deliver the right products at the right time and in the right quantities [11]. However, issues can arise in the supply chain due to lead time, price fluctuations, and demand processing, which Lee, Padmanabhan, and Whang [12] called the bullwhip effect. Chatfield et al. [13] argued that to solve these problems, accurate information must be shared among companies in the supply chain. Therefore, informational quality with characteristics such as accuracy and timeliness [14] can be considered to be a necessary factor for establishing an efficient supply chain.

Sustainable SCM has a broad meaning covering economic, social, and environmental performance [15]. Carter and Rogers [16] defined sustainability in the supply chain as companies achieving economic, social, and environmental goals to improve economic performance. Many companies now recognize the importance of sustainability [17], because sustainable SCM can maximize social co-benefits in addition to reducing supply chain risks and enhancing the benefits for the entire supply chain [18]. Numerous studies have explored sustainable SCM performance after dividing it into economic, social, and environmental performance [18,19]. This study, in contrast, conceptualizes sustainable SCM performance in the relationship between pharmaceutical companies and pharmacies through economic factors and then examines it as a dependent variable.

By exploring the effects of interactional justice on informational quality and sustainable SCM performance, various implications can be provided for sellers and buyers in the supply chain. In addition, a major limitation of previous studies on interactional justice is that they have not compared the role of justice in domestic and multinational companies. Therefore, it is academically important to identify the causal relationship between interactional justice and informational quality and analyze its effect on sustainable SCM performance in Korean and multinational companies. Accordingly, first, this study identified the effects of interactional justice on informational quality and sustainable SCM performance. Second, it compared the role of interactional justice in Korean and multinational pharmaceutical companies. Third, it discussed the necessity and importance of interactional justice and informational quality in the pharmaceutical industry. Lastly, it explores the antecedents for sustainable SCM performance in this industry.

The rest of this paper is organized as follows. Section 2 presents the theoretical background, Section 3 details the hypothesis formulation, Section 4 explains the research method, Section 5 elucidates the empirical analysis, Section 6 outlines the discussion, implications, and limitations, and, finally, Section 7 suggests the conclusions.

## 2. Theoretical Background

Through a theoretical review, this study investigated and presented interactional justice and informational quality as antecedents for establishing and operating a sustainable supply chain. It also examined the meaning of these antecedents in the relationship between the pharmaceutical company's employees, the seller, and the pharmacist, the buyer, in the pharmaceutical supply chain.

### 2.1. Interactional Justice

Studies related to justice focus on how the parties in a trading scenario feel in regard to the other party [20]. Such an examination of justice from a social perspective is referred to as organizational justice. Organizational justice refers to organizational members comparing their efforts with the compensation received from the organization and their managers [21]. It is divided into distributive justice, procedural justice, and interactional justice [10]. Early research on organizational justice was based on Adams' [22] equity theory and it consisted primarily of distributive justice. Later, based on the research by Thibaut and Walker [23] examining the response to dispute resolution procedures, the theory of procedural justice was developed.

Meanwhile, interactional justice is related to the perception of the members of an organization of implementing formal procedures [24], for which related research did not begin until the 1990s. Interactional justice is achieved when a reliable procedure is conducted with rational information [25]. Tyler and DeGoeij [26] described interactional justice using group value theory. According to group value theory, people highly value social relationships and want to know if the other party places as much value on the relationship as they do. Namely, if the other party shows politeness or respect, it indicates that they are placing considerable value on their social relationship.

Several studies have divided this interactional justice into interpersonal justice and informational justice [10,27]. Judge and Colquitt [28] argued that, unlike other types of justice, interactional justice considers justice not only in terms of structure but also in terms of interpersonal relationships. Therefore, as in previous research, this study divided interactional justice into interpersonal justice and informational justice [10] and then, examined them at each dimension. Colquitt [10] defined interpersonal justice as being respectful and dignified when dealing with others. In addition, Kernan and Hanges [25] described interpersonal justice as reflecting whether managers in an organization treat other members respectfully. Taken together, interpersonal justice can be perceived as indicating polite and respectful behavior toward others. As such, compared with other types of justice, it has the advantage of predicting the other party's behavior [29].

Informational justice refers to providing true information with justification [10]. Kernan and Hanges [25] defined informational justice as adopting transparent communication about procedures, thus suggesting that justice lays in the accuracy of explanations. Taken together, informational justice can be viewed as reflecting whether explanations are correctly given when delivering information. Owing to these characteristics, informational justice can greatly affect the decision-making process [30].

In conclusion, interactional justice, which is divided into interpersonal justice and informational justice, can serve as an important factor to improve the quality of the information in the supply chain. This is because recognition of interactional justice is essential for ensuring efficient cooperation [31].

### 2.2. Informational Quality

The concept of informational quality has been extensively used in previous studies to explore the success factors of information systems. Recently, however, researchers have measured informational quality in various management fields, including management information systems [32]. As the exchange of information between companies increases, it has become essential to identify its influence on informational quality. The quality of information is also an important factor in SCM because if inaccurate information is exchanged between companies in the supply chain, they can lose competitiveness. For example, a company can distort information to hide its intentions from competitors, suppliers, and customers [33]. This can lead to the bullwhip effect [34], which can have numerous negative effects on the supply chain, such as excessive inventory investment [35].

Moreover, information sharing plays an important role in the supply chain because it not only enables process coordination between trading partners but also minimizes transaction costs [36]. Paulraj and Chen [37] argued that the effective flow of information between

companies in the supply chain can improve products and reduce customer response time. Additionally, Jarrell [38] argued that if the information exchanged between companies in the supply chain is accurate and timely, it can create flexibility. Taken together, the quality of information can be considered a key factor in SCM in the exchange of information between companies in the supply chain. Thus, to establish an efficient supply chain, companies must strive to reduce the distortion of information and improve informational quality.

Berry and Parasuraman [39] presented adequacy, usefulness, accuracy, reliability, and clarity as factors of informational quality, while Maltz [40] argued that informational quality can be measured using reliability, timeliness, adequacy, and clarity. Moreover, Lee et al. [32] proposed reliability, accuracy, timeliness, consistent expression, objectivity, and ease as measurement factors for informational quality. Accordingly, informational quality has been analyzed in numerous studies as a multidimensional concept. However, it is important to find measurement factors for the quality of information that fits the industry, given that the occupational group of the sample of this study was that of pharmaceutical employees. Interviewing pharmaceutical company employees and sharing information on supplemental drugs and alternative drugs were important factors used for measuring informational quality, in addition to the level of detail and timeliness.

### 2.3. Sustainable SCM Performance

The concept of sustainability was first introduced in 1972 in the report *The Limits to Growth* and then developed into the concept of sustainable development. In 1987, the World Commission on Environment and Development presented the concept of sustainable development and described it as development that meets the needs of the present without compromising the ability of future generations to meet their own needs. As the importance of cooperation between companies has increased in recent years, the importance of sustainability has also risen in domestic and overseas business environments. As such, numerous studies have explored sustainability in SCM.

Seuring and Muller [41] defined sustainable SCM as an activity that strengthens a company's capabilities while reducing social and environmental issues in its supply chain activities. Hassini, Surti, and Searcy [42] conceptualized sustainable SCM as an activity that minimizes environmental issues and maximizes social co-benefits by managing the knowledge, information, and resources in the supply chain. As such, sustainability has been used as a broad concept that integrates corporate interests, environmental sustainability, and social responsibility [16]. The ultimate goal of sustainable SCM is to establish close relationships with partners in the supply chain, provide value to consumers and stakeholders, and, finally, achieve optimal economic and ethical performance [43]. Furthermore, Chhabara [44] argued that building sustainable SCM requires supervision to reduce social and environmental issues, strengthening technical support, and evaluation to select the right suppliers.

The result of sustainability management is thus the triple bottom line of economic, social, and environmental performance [16]. Social performance helps consumers build trust and creates a positive image for the company, while economic performance leads to improved performance through reduced packaging costs and labor turnover as well as effective design for recycling and the like [19]. Finally, environmental performance can lead to reduced labor and processing costs and improved product quality [20]. In this study, however, it is suitable to measure performance more closely related to the relationship between pharmaceutical company employees and pharmacists. As such, this study redefines sustainable SCM using economic variables. This is measured based on previous studies, using the indicators "increased sales volume", "provision of products at reasonable prices", "maintenance of relationships", and "improved financial performance" [15,16].

### 3. Hypothesis Formulation

This study proposed interactional justice as an antecedent of informational quality based on previous studies and empirically verified its effect on sustainable SCM performance.

### 3.1. Interpersonal Justice and Informational Justice

The concept of justice involves examining economic relationships [22] and has been explored in various fields. With the recent increasing importance of justice in the supply chain, researchers have investigated it [9] as an essential factor in maintaining competitiveness [45]. Justice is divided into procedural justice, distributive justice, and interactional justice, which, in turn, is subdivided into interpersonal justice and informational justice [10]. Procedural justice and distributive justice are perceived by managers in the organization, while interactional justice is important in exchange and transactional relationships because it considers interpersonal aspects [28].

The concept of interpersonal justice reflects the respectful and dignified treatment of the other party [46] and can be perceived when both parties often help or show concern for each other [7]. When interpersonal justice is perceived, a bond may be formed with the other party [5]. Colquitt [10] defined informational justice as providing true information with justification. Kernan and Hanges [25] also described informational justice as reflecting the level of detail, accuracy, and quality of the explanations received from the other party. Thus, informational justice focuses on providing accurate information about the decision-making process or outcomes, making it important for the other party determining the degree of acceptance of the decision-making process [30].

Numerous studies have examined interpersonal justice and informational justice within the framework of interactional justice. However, to understand the importance of interactional justice in the supply chain, this study conducted preliminary interviews with pharmaceutical company employees and found a causal relationship between interpersonal justice and informational justice. Specifically, after interviewing five pharmaceutical company employees, it was difficult to establish an environment that could provide accurate and honest information in the case of improper language and actions or immoral behavior in their relationship with the pharmacist. De Cremecr mer and Van Hiel [47] argued that negative feelings, such as anger, increase when individuals are treated poorly by another party. Because being respected by others is a universal desire, negative behaviors such as rudeness create anger and hostility [48]. Therefore, if someone does not receive respect and politeness from another party, he or she is more likely to experience negative emotions, which can ultimately adversely affect the quality of transactional relationships. On this basis, Lee and Ha [49] presented interactional justice as an antecedent of supply chain cooperation and empirically demonstrated that interpersonal justice can be an antecedent of informational justice. Therefore, the following hypothesis can be derived.

**Hypothesis 1 (H1).** *Interpersonal justice positively affects informational justice.*

### 3.2. Interpersonal Justice and Informational Quality

Greenberg [50] conducted the first study that divided interactional justice into interpersonal justice and informational justice and since then, numerous researchers have investigated these factors. Kernan and Hanges [26] defined interpersonal justice as reflecting whether parties are respectfully treated in procedures and Colquitt [10] defined interpersonal justice as being respectful and dignified when dealing with others. Taken together, interpersonal justice can be perceived as a courteous attitude toward another party. The concept of informational quality includes aspects such as the accuracy, timeliness, and adequacy of the exchanged information [51]. Hence, it also plays an important role in SCM because sharing high-quality information between companies can reduce information distortion and ultimately minimize transaction costs [36].

Meanwhile, the mutual perception of interpersonal justice means that the parties involved feel familiar and personally interact with each other [5]. As interpersonal justice can also be interpreted as the willingness to regularly visit each other and provide help [50], perceiving interpersonal justice can increase emotional intimacy. Hence, securing interpersonal justice in the relationship with the other party can strengthen cooperation and reduce conflicts [52]. This, therefore, increases mutual satisfaction, leading to smooth

communication and an easy sharing of information [5]. Ultimately, because perceiving interpersonal justice can reduce uncertainty about the other party, relationships based on it are likely to continue in the long term [9]. In other words, perceiving interpersonal justice in exchanges can help establish a bond and strengthen coupling. Therefore, the following hypothesis can be derived.

**Hypothesis 2 (H2).** *Interpersonal justice positively affects informational quality.*

### 3.3. Informational Justice and Informational Quality

Informational justice refers to the extent to which information is honestly shared to provide justifications for the decision-making process [10]. Here, justification is conceptualized as informational justice because it requires the appropriate information and correct explanation to be provided [30]. As informational justice focuses on the proper delivery of decision-making-related information to the other party, it is crucial in the relationship between the seller and buyer in the supply chain. Securing informational justice can give the other party the impression that the decision was made rationally by considering all the information needed [53].

As informational quality must be secured when exchanging information to establish an efficient supply chain, several studies have addressed its importance [54]. Forslund and Jonsson [55] argued that to measure informational quality, factors such as the accuracy, reliability, adequacy, and timeliness of the exchanged information should be included. Studies have also investigated the idea that if the informational quality is improved in the process of sharing information between companies in the supply chain, it can positively affect supply chain performance [35].

As such, informational justice and informational quality are closely related. Fang and Chiu [56] reported that informational justice is an important factor in building trust. Liu et al. [5] argued that buyers and suppliers are likely to form a cooperative relationship when they perceive high levels of informational justice and Lee and Ha [49] empirically demonstrated that the perception of informational justice in the supply chain positively affects supply chain cooperation. In other words, the mutual perception of high levels of informational justice allows parties to trust each other. This is also likely to lead to actions that provide important, accurate, and timely information. Jap [57] argued that these actions can reduce information asymmetry and uncertainty for the other party, leading to concrete investments in the supply chain. Therefore, the following hypothesis can be derived.

**Hypothesis 3 (H3).** *Informational justice positively affects informational quality.*

### 3.4. Informational Quality and Sustainable SCM Performance

Informational quality measures the extent to which information exchanged between companies meets their needs. It is an important factor in SCM [58], and Li et al. [59] argued that, for companies to be successful, the quality of the information exchanged between them in the supply chain must be ensured. Moreover, Omar et al. [54] stated that informational quality affects the quality of decision-making. In other words, to improve firm performance, informational quality is needed for strategic decision-making and its influence on supply chain performance depends on with whom, how, and what information is shared within the supply chain [60]. Ensuring informational quality through effective information sharing, companies can formulate plans to reduce uncertainty and improve profitability [54]. Informational quality also allows companies to respond more proactively to rapidly changing market conditions, enabling them to focus more on meeting customers' needs [61].

SCM is the process of efficiently performing supply chain activities and operations to achieve the company's planned goals [62]. Sustainable SCM extends this concept by including social and ethical aspects [63]. Carter and Rogers [16] defined sustainable SCM as the strategic integration of companies' social, environmental, and economic goals to improve

their long-term economic performance as well as that of the supply chain. Sustainable SCM thus helps companies gain a competitive edge [64]. Furthermore, encouraging companies to participate in knowledge-sharing routines, such as creating opportunities for co-learning, increases the likelihood of co-creating new products or technologies [65]. To measure supply chain performance, many studies have used the balanced scorecard [66]. However, as sustainable SCM activities are divided into economic, environmental, and social activities, their performance is also classified as economic, environmental, and social performance [43].

Numerous studies have explored the relationship between informational quality and sustainable SCM performance. Lin, Huang, and Lin [67] examined the relationship between information sharing and supply chain performance in e-commerce and Fawcett et al. [68] explored the idea that information sharing positively affects supply chain performance. Moreover, Vivek et al. [69] reported a relationship between improved informational quality and better organizational performance and Zhou et al. [70] found that improving informational quality improves overall business performance. Based on this, Marinagi, Trivellas, and Reklitis [36] argued that supply chain performance can be improved by maintaining informational quality. Taken together, securing informational quality when sharing information between companies in the supply chain is likely to affect supply chain performance. Therefore, the following hypothesis can be derived.

**Hypothesis 4 (H4).** *Informational quality positively affects sustainable SCM performance.*

These hypotheses relate to interactional justice, informational quality, and sustainable SCM performance in the relationship between pharmaceutical company employees and pharmacists. Overall, the interactional justice in these relationships affects informational quality, which, in turn, influences sustainable SCM performance. Figure 1 shows the research model established and verified in this study based on these hypotheses.

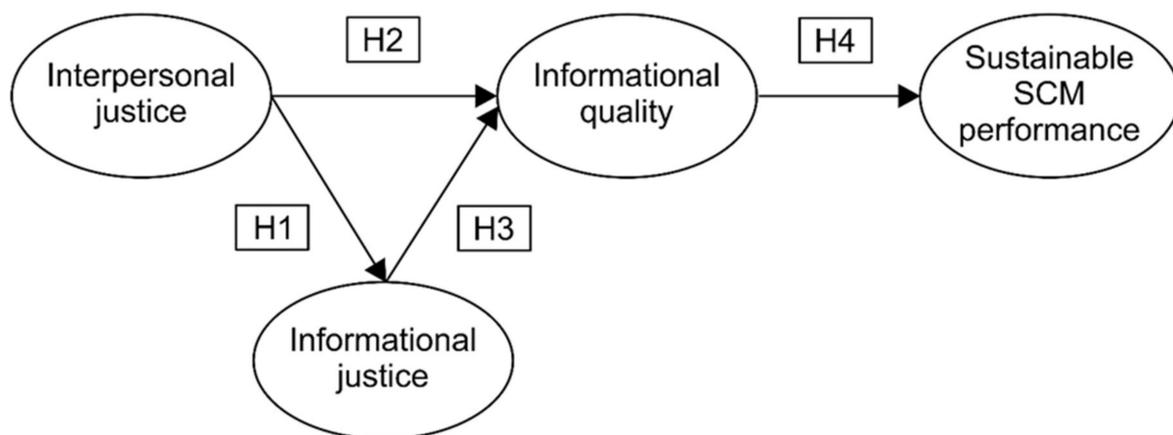


Figure 1. Research model.

## 4. Materials and Methods

### 4.1. Data Collection and Sample Characteristics

Surveys were conducted by mail and direct visits for four months from March 2018. A total of 700 questionnaires were distributed to Korean and multinational pharmaceutical companies; 268 were collected from the former and 208 from the latter. From these, after excluding incomplete questionnaires, 244 from Korean pharmaceutical companies and 201 from multinational pharmaceutical companies were used for the statistical analysis. Table 1 presents the characteristics of the sample. Respondents in their 30s had the highest proportion of complete questionnaires for both Korean and multinational pharmaceutical companies and the most common trading period with pharmacies was five years or less. In addition, nearly 80% of Korean pharmaceutical companies trade with at least

10 pharmacies, while 40% of multinational pharmaceutical companies trade with fewer than 10 pharmacies.

**Table 1.** Classification of the sample characteristics.

Range	Korean Pharmaceutical Companies		Multinational Pharmaceutical Companies	
	Frequency	Proportion (%)	Frequency	Proportion (%)
Age				
20 s	61	25	25	12.4
30 s	126	51.6	116	57.7
40 s	55	22.5	51	25.4
50 s	2	0.8	9	4.5
Number of trading pharmacies				
<10	50	20.5	82	40.8
10–29	116	47.5	39	19.4
30–49	44	18.0	38	18.9
50–99	32	13.1	31	15.4
>100	2	0.8	11	5.5
Trading period with pharmacies				
<5 years	177	72.5	145	72.1
5–9 years	65	26.6	43	21.4
10–14 years	1	0.41	10	5.0
>15 years	1	0.41	3	1.5

#### 4.2. Measurement of the Variables

In addition to collecting demographic data, the questionnaire comprised four parts: “interpersonal justice”, “informational justice”, “informational quality”, and “sustainable SCM performance”. Five questionnaire items were used for informational justice, while four were used for the other parts; all were measured on a five-point scale with one point corresponding to “very negative,” three points to “average”, and five points to “very positive”. Following previous studies, this study carried out preliminary interviews with workers in the pharmaceutical industry and academia to secure content validity. Table 2 shows the operational definitions for the metrics used in this study.

First, with reference to the measurement items used by Colquitt [10] and Ellis et al. [30], interpersonal justice and informational justice were subjectively evaluated by respondents on the five-point scale. Second, the informational quality was measured after adapting it to the pharmaceutical industry based on Li and Lin [51] and Nelson et al. [71]. Finally, with reference to the measurement items used by Carter and Easton [15] and Carter and Rodgers [16], four items were used to measure sustainable SCM performance.

**Table 2.** Operational definitions of the variables.

Variable	Metric	Reference(s)
Interpersonal justice	Degree of politeness	[10,24]
	Degree of respect	
	Degree of sharing opinions	
	Degree of refraining from improper behavior	
Informational justice	Degree of honest communication	[10,30]
	Proper descriptions of medication	
	Detailed descriptions of medication	
	Exchange of opinions about medication at the right time	
	Voluntary provision of information about medication	
Informational quality	Sharing of detailed information about medication	[51,71]
	Timely sharing of opinions about medication	
	Sharing of information about supplemental drugs	
	Sharing of information about alternative drugs	
Sustainable SCM performance	Degree of increase in medication sales	[15,16]
	Provision of medication at reasonable prices	
	Maintenance of sustained relationships with pharmacies	
	Sustained improvement of financial performance	

## 5. Results

### 5.1. Reliability and Validity Tests

Before testing the hypotheses, this study verified the reliability and validity of the measurement variables using SPSS 18.0. First, Cronbach's alpha was measured to ensure the internal consistency of the measurement variables. According to the reliability verification, as shown in Table 3, Cronbach's alpha for interpersonal justice, informational justice, informational quality, and sustainable SCM performance ranged from 0.708 to 0.805 for Korean pharmaceutical companies and 0.777 to 0.812 for multinational pharmaceutical companies.

**Table 3.** Confirmatory factor analysis and convergent validity verification results.

Factor	AVE	CR	Cronbach's Alpha
Korean pharmaceutical companies			
Interpersonal justice	0.601	0.850	0.783
Informational justice	0.560	0.864	0.805
Informational quality	0.505	0.802	0.750
Sustainable SCM performance	0.512	0.806	0.708
Multinational pharmaceutical companies			
Interpersonal justice	0.543	0.823	0.797
Informational justice	0.559	0.864	0.812
Informational quality	0.570	0.843	0.777
Sustainable SCM performance	0.563	0.837	0.778

Next, for the validity verification, a confirmatory factor analysis of the measurement model was performed using AMOS 18.0. The fit of the measurement model was deemed

acceptable for Korean pharmaceutical companies, with CMIN/DF = 1.915, RMR = 0.042, GFI = 0.903, CFI = 0.929, TLI = 0.913, and RMSEA = 0.061. Additionally, the recommended levels were met overall for multinational pharmaceutical companies, with CMIN/DF = 1.708, RMR = 0.042, GFI = 0.905, CFI = 0.941, TLI = 0.926, and RMSEA = 0.059 [70].

The convergent validity of the constructs used in this study was examined using the average variance extracted (AVE) and construct reliability (CR). According to the verification, the AVE values of the metrics all exceeded 0.5, the recommended threshold, and the CR values of all the potential variables were 0.7 or more, indicating that convergent validity was secured [72]. Table 3 shows the results of the confirmatory factor analysis and convergent validity verification for each factor.

Furthermore, to examine the independence of the latent variables that constitute the research model, this study confirmed whether the correlation coefficients between the latent variables were smaller than the square root of the AVE of each variable. As shown in Table 4, the correlation coefficients between the latent variables did not exceed the square root of the AVE of the latent variable located on the diagonal line, indicating that discriminant validity was tsecured.

**Table 4.** Discriminant validity analysis.

Factor	(1)	(2)	(3)	(4)	Average	S.D.
Korean pharmaceutical companies						
(1) Interpersonal justice	0.775				3.314	0.875
(2) Informational justice	0.552	0.748			3.650	0.841
(3) Informational quality	0.542	0.697	0.711		3.415	0.892
(4) Sustainable SCM performance	0.417	0.622	0.533	0.715	3.550	0.785
Multinational pharmaceutical companies						
(1) Interpersonal justice	0.737				3.368	0.945
(2) Informational justice	0.657	0.748			3.531	0.857
(3) Informational quality	0.479	0.731	0.755		3.442	0.928
(4) Sustainable SCM performance	0.560	0.543	0.575	0.750	3.454	0.835

## 5.2. Structural Equation Modeling Analysis

To test the hypotheses, this study used two models (Korean and multinational pharmaceutical companies) to examine the effect of interactional justice on sustainable SCM performance through informational quality. First, a structural equation modeling analysis was conducted using the maximum likelihood method. The following results were obtained for Korean and multinational pharmaceutical companies: CMIN/DF = 1.484, RMR = 0.037, GFI = 0.925, CFI = 0.961, TLI = 0.954, and RMSEA = 0.045 and CMIN/DF = 1.573, RMR = 0.044, GFI = 0.912, CFI = 0.950, TLI = 0.940, and RMSEA = 0.054, respectively. As such, the fit criteria presented by Hair et al. [72] were satisfied overall. The above results indicate that the survey data adequately explain the theoretical correlation between the variables used in this study. A path analysis model was then used to test the hypotheses, the results of which are shown in Table 5.

Based on the testing of the hypotheses, interpersonal justice showed a significant effect on informational justice in Korean pharmaceutical companies. Likewise, for multinational pharmaceutical companies, interpersonal justice showed a significant effect on informational justice. These results support Hypothesis 1 (interpersonal justice has a significant positive effect on informational justice).

However, while interpersonal justice showed a significant positive effect on informational quality for Korean pharmaceutical companies, it showed a non-significant effect for multinational pharmaceutical companies. Thus, for multinationals, Hypothesis 2 (interpersonal justice has a positive effect on informational quality) was rejected. In addition,

informational justice showed a significant positive effect on informational quality for Korean pharmaceutical companies and a positive effect on informational quality for multinational pharmaceutical companies. As such, Hypothesis 3 (informational justice has a positive effect on informational quality) was supported for both cases.

Finally, Hypothesis 4 (informational quality has a significant positive effect on sustainable SCM performance) was supported for both Korean and multinational pharmaceutical companies.

**Table 5.** Hypothesis test results.

	Estimate	S.E.	C.R.	$p$ (* $p < 0.05$ , *** $p < 0.001$ )
<b>Korean pharmaceutical companies</b>				
Hypothesis 1	0.965	0.208	4.635	<0.001 (***)
Hypothesis 2	0.286	0.128	2.226	0.026 (*)
Hypothesis 3	0.615	0.091	6.774	<0.001 (***)
Hypothesis 4	0.514	0.087	5.888	<0.001 (***)
<b>Multinational pharmaceutical companies</b>				
Hypothesis 1	0.685	0.130	5.282	<0.001 (***)
Hypothesis 2	0.080	0.107	0.751	0.453
Hypothesis 3	0.775	0.141	5.489	<0.001 (***)
Hypothesis 4	0.774	0.125	6.178	<0.001 (***)

## 6. Discussion

### 6.1. Discussion

This study examined the effect of justice on sustainable SCM performance through informational quality in transactional relationships between suppliers in a supply chain. In particular, it empirically verified the relationships between informational quality and the sub-dimensions of interactional justice for Korean and multinational pharmaceutical companies. On this basis, this study attempted to draw various implications to improve informational quality in the relationship between pharmaceutical company employees and pharmacists (i.e., the relationship between sellers and buyers in the supply chain of the pharmaceutical industry).

To summarize the empirical results of the testing of the hypotheses, first, interpersonal justice showed a significant positive effect on informational justice for both Korean and multinational pharmaceutical companies; in other words, interpersonal justice had a positive effect on informational justice in the transactional relationships of the supply chain regardless of the company's nationality. These results indicate that to ensure the proper delivery of information, the two parties must treat each other with respect and politeness.

Second, although interpersonal justice exhibited a significant positive correlation with informational quality in Korean pharmaceutical companies, it did not for multinationals. These results indicate that for multinational pharmaceutical companies, in the context of interpersonal relationships with pharmacists, improper behavior and language has little effect on the quality of public information. Korean pharmaceutical companies, however, must perceive politeness and respect by pharmacists to improve informational quality. This result is believed to reflect the Korean culture that values etiquette and politeness. This also can be interpreted as the primary result of the Korean government's recent legislation on fair trade and extensive efforts to create a fair trade environment.

Third, informational justice showed a significant positive effect on informational quality, with no difference between Korean and multinational pharmaceutical companies. This means that informational quality can also be improved by providing appropriate and correct descriptions to justify the decision-making process. Therefore, to properly share

information, companies in the supply chain must devote efforts to ensure that the process of delivering information is performed in a fair environment.

Finally, informational quality showed a significant positive effect on sustainable SCM performance regardless of the company's nationality. This result supports the findings of previous studies that have examined the relationship between informational quality and supply chain performance. It also indicates that sustainability can only be achieved if the information shared in the supply chain is accurate and detailed. Moreover, if informational quality is not secured, this can lead to the bullwhip effect. As such, companies must aim to improve informational quality to establish an effective supply chain.

### 6.2. Implications

The results of this study provide the following theoretical and practical implications. First, this study showed the relationship between the sub-dimensions of interactional justice and informational quality by comparing Korean with multinational pharmaceutical companies. Numerous studies of justice have explored the effects of interactional justice on informational quality or information sharing. However, few have investigated the role of interactional justice in leading informational quality and sustainability management. Accordingly, this study presented interpersonal justice and informational justice, sub-dimensions of interactional justice, as antecedents of informational quality, and subdivided companies by nationality to perform the empirical investigation.

Second, while researchers have investigated the role of justice in the company–employee and manager–employee relationships, few studies have examined justice in the seller–buyer relationship in the supply chain. Griffith, Harvey, and Lusch [9] and Narasimhan, Narayanan, and Srinivasan [73] examined the role of justice between companies in the supply chain; however, their results were somewhat non-significant, as they focused on specific industries. In this context, the present study is meaningful in that it empirically examined the relationships between interactional justice, informational quality, and sustainable SCM performance in the pharmaceutical industry, which is a special field.

Third, through an empirical analysis, this study confirmed that interpersonal justice can serve as an antecedent of informational justice. Many previous studies have classified interactional justice into interpersonal justice and informational justice and then explored them in parallel. In contrast, this study proposed a new relationship between interpersonal justice and informational justice based on interviews with pharmaceutical company employees [49]. By confirming that the process of communicating information requires politeness and respect for the other party to take place in a fair environment, this study broadened the literature on interactional justice.

Finally, this study proposed requirements for Korean and multinational pharmaceutical companies to improve informational quality. The results demonstrated that interpersonal justice does not affect informational quality for multinational pharmaceutical companies. However, for Korean pharmaceutical companies, interpersonal justice and informational justice both influence informational quality. These findings suggest that mutual politeness and respect, as well as refraining from improper language and behavior, are always necessary to improve informational quality in the relationship between pharmaceutical company employees and pharmacists.

### 6.3. Limitations and Future Research Directions

First, economic, environmental, and social performance must be examined to measure sustainable SCM performance. However, many previous studies have covered only one or two of these dimensions [74]. For example, Kot et al. [75] and Kot et al. [76] only explored environmental and social sustainability when measuring sustainable operations from a multinational perspective. This study also focused on the relationship between pharmaceutical company employees and pharmacists in the pharmaceutical industry supply chain. As such, we determined that it was appropriate to measure only economic performance for sustainability management. Future studies are needed to investigate more

accurately the meaning and role of sustainable SCM performance by considering both environmental and social performance in addition to economic performance.

Furthermore, this study examined the effects on informational quality and sustainable SCM performance using only interactional justice. As justice is divided into procedural justice, distributive justice, and interactional justice [10], considering only interactional justice is insufficient for deriving the positive significant influence of justice on sustainability management. Accordingly, future research should perform clearer investigations by discussing procedural justice, distributive justice, and interactional justice from a macro-level perspective.

## 7. Conclusions

This study classified interactional justice into interpersonal justice and informational justice and explored their impact on informational quality and sustainable SCM by comparing Korean with multinational pharmaceutical companies. Our findings show that to ensure the proper delivery of information, buyers and sellers need to treat each other with not only respect but also politeness. Interpersonal justice and informational justice had a positive significant effect on informational quality in Korean pharmaceutical companies, whereas interpersonal justice did not have a significant effect on informational quality in multinationals. Lastly, informational quality has a positive effect on sustainable SCM performance. Given that justice is essential for informational quality in the buyer–seller relationship, firms should aim to ensure fairness to maximize efficacy in informational quality and sustainable SCM. This study is meaningful in that it considers the importance and necessity of interpersonal justice and informational justice in pharmaceutical companies. It was also useful for identifying the influence of interactional justice on informational quality and sustainable supply chain management in the pharmaceutical industry. Despite these contributions, however, the study has several limitations. For example, this study considered only interactional justice and excluded environmental and social aspects when measuring sustainable SCM performance. If these shortcomings are overcome in future studies, it is reasonable to assume that the relationship between justice, informational quality, and sustainable SCM performance in the pharmaceutical industry could be identified from a broader perspective.

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