



Print ISSN: 1738-3110 / Online ISSN 2093-7717
 JDS website: <http://kodisa.jams.or.kr/>
<http://dx.doi.org/10.15722/jds.18.8.202008.55>

Impact of Informational Justice on Pharmaceutical Enterprises

Changjoon LEE¹, Byoung-Chun HA², So-Youn LIM³

Received: June 14, 2020. Revised: July 12, 2020. Accepted: August 05, 2020

Abstract

Purpose: This paper addresses issues that concern business-to-business marketing, namely informational justice in the supply chain or organizations. As previously reported by other studies, there is information asymmetry in organizations. The present study explores and addresses this in the medical industry, aiming to investigate how informational justice relates to information quality or logistics performance in the medical industry. This study also suggests a method for development of informational justice in medicine-related fields. **Design, methodology, approach:** The hypothesis and model were developed through a review of the literature. To this end, we surveyed 293 valid survey samples collected from occupational pharmacists and used structural equation modelling for analysis. **Findings:** The results of the empirical analysis of the hypotheses showed that symmetric sharing of information between pharmacists and employees of pharmaceutical companies has a positive effect on the perceived quality. Moreover, the results showed that quality information has a positive impact on logistics performance, whereas informational justice does not. **Conclusions, implications:** If information and explanations are exchanged fairly, information and logistics performance—as well as operational expenses—will be enhanced. Furthermore, our study has immense implications outside of academic applications since it suggests practical solutions to government and medical industry employees.

Keywords : Informational Justice, Information Quality, Logistics Performance, Medical Industry

JEL Classification Code : I19, M00, M30

1. Introduction

The basic philosophy of Supply Chain Management (SCM) is to integrate the most efficient logistics operations of every party in the supply chain to complete orders satisfactorily (Salah, Rahim, & Carretero, 2011). The Council of Supply Chain Management Professionals

(CSCMP) has defined SCM as the planning and management of all the activities involved in sourcing, procurement, conversion, and logistics management. Malhotra, Gosain, and Sawy (2005) claimed that SCM has a crucial impact not only on productivity, but also on performance, while Sezen (2008) emphasized that supply chain competitiveness derives from information sharing based on cooperative relations among parties. Many previous studies have established that efficient information sharing among the parties involved in the supply chain can enhance supply chain performance and increase competitiveness.

However, SCM performance is attributed to not only efficient information sharing but also to other factors. Liu, Huang, Luo, and Zhao (2012) identified justice and ethics as factors required for cooperation between sellers and buyers. Justice can be generally classified into distributive, procedural, and interactional justice (Colquitt, 2001). Whereas distributive justice and procedural justice are

1 First Author, PhD Candidate, Department of Logistics, Services, Operations Management, Sogang University, Seoul, Korea. Email: cjlee0825@hanmail.net

2 Corresponding Author, Professor, Department of Logistics, Services, Operations Management, Sogang University, Seoul, Korea. Email: habc@sogang.ac.kr

3 Second Author, PhD Candidate, Department of Global Service Management, Sogang University, Seoul, Korea. Email: limsy@sogang.ac.kr

related to the treatment of an organization, interactional justice pertains to justice within the scope of human relations—in other words, mutual relations (Colquitt, 2001). Interactional justice (Greenberg, 1990) classified as interpersonal and informational justice, denotes the social aspect of organizational justice by emphasizing the importance of a just treatment of the opposite party's decision maker when making decisions (Zapata-Phelan, Colquitt, Scott, & Livingston, 2009).

Colquitt (2001) defined informational justice as the provision of adequate information in a truthful way. When exchanged information features higher quality and accuracy, people tend to react more positively to the results of the decision-making process (Gao, Zhang, Wang, & Ba, 2012). The most frequently noted issue regarding the supply chain information exchange is the bullwhip effect—a phenomenon by which information is expanded and distorted. This effect serves to illustrate the importance of information for an effective supply chain. If the information between buyers and sellers is distributed unfairly, it could lead to information asymmetry, a situation in which the party with less dependency possesses more information than the one with more dependency (Yue & Raghunathan, 2007).

Meanwhile, the dependency structure can be classified as symmetric or asymmetric, according to the dependency level (Buchanan, 1992). Symmetric dependency reflects a similar level of dependency among business partners, whereas asymmetric dependency represents the opposite. Buchanan (1992) argued that in the dependency structure it is difficult to maintain symmetry between buyers and sellers, because the party with lower dependency leads their business relations. When the dependency structure remains asymmetrical, it can have a negative impact on business relations by leading to information asymmetry (Hsieh, Lai, & Shi, 2006).

Information asymmetry is a problematic issue that occurs frequently in the medical industry. A Korean Ministry of Health and Welfare official explicitly referred to the medical market as an emblematic example of information asymmetry between suppliers and consumers. The Korean government has implemented various policies to solve this problem of asymmetry, although the efforts have been unsuccessful so far. Obtaining informational justice within a mutual business relationship is critical in both the medical industry and governments and asymmetry is regarded as a hindrance to that endeavor.

Our study investigates the importance of informational justice within the supply chain, by identifying the causal relations between informational justice and information quality, and analyzing the impact those relations have on logistics performance—which is the most significant aspect of an organization's SCM performance. Further, this study

provides a basis for the development of an academic method related to informational justice within a supply chain. The goals of this study are summarized as follows:

- Understand the impact of informational justice on information quality and logistics performance;
- Understand the importance and necessity of informational justice;
- Suggest a method for the deployment of informational justice in medicine-related fields.

2. Theoretical Framework

Our research objective was triggered by a prevailing problem of information asymmetry and unfair trade within the medical industry. We aimed to examine organizational justice first, and then investigate informational justice. The range of observation was confined to employees of pharmaceutical companies within the supply chain and pharmacists, who have direct contact with consumers. We first define informational justice, information quality, and logistics performance within the supply chain.

2.1. Informational justice

Justice is often defined by how one perceives the other party in a business situation (Kernan & Hanges, 2002). Adams (1965) equity theory set a base for research in organizational justice. His theory defines equity as the difference in the ratio of contribution to benefit, between parties in direct trading relations. The justice perception level can be defined as the level of justice perceived in the exchange process during trade (Thurston & McNall, 2010). Jones and Skarlicki (2012) defined organizational justice as the level of justice perceived by society or an organization. Justice is important to all health and medical sectors, including the medical and pharmaceutical industries, for ethical purposes (Buchbinder & Shanks, 2017). Buchbinder and Shanks (2017) presented human respect, good deeds, and justice as core ethical principles in healthcare-related fields.

Researchers have employed a different method when classifying organizational justice. Blodgett, Hill, and Tax (1997), for instance, classified organizational justice as a combination of procedural and distributive justice, while Colquitt (2001) classified procedural, distributive, and interactional justice as one principle. However, researchers have recently distinguished interactional justice from procedural justice, and have classified organizational justice as procedural, distributive, and interactional justice while

treating interpersonal justice and informational justice as sub-categories of interactional justice (Greenberg, 1990). Distributive justice is defined as the fairness one feels while comparing one's contributions to the other's benefits (Kumar, Scheer, & Steenkamp, 1995); while interactional justice is the recognition of the fairness engendered by interpersonal relationships in the decision-making process. Interpersonal justice, which is a sub-factor of interactional justice, is interpreted in light of the etiquette, respect, consideration, and regard mutually accorded to one another. Finally, informational justice is interpreted as the perception of the accuracy and quality of information during the process of exchange (Kernan & Hanges, 2002).

Meanwhile, discussions on informational justice have been developing over the past two decades. Colquitt (2001) defined informational justice as the delivery of information with sufficient explanation and authenticity based on Greenberg (1990)'s research. Kernan and Hanges (2002) defined informational justice as the accuracy of information delivered via transparent communications. Briefly, informational justice focuses on how well explanations are delivered in the decision-making process, as explanations can have a potentially significant impact (Ellis, Reus, & Lamont, 2009).

The absence of informational justice within mutual relations can lead to uncertainty. Uncertainty in certain economic activities, or in other words, the lack of essential information, can lead to unpredicted consequences. One aspect of uncertainty is information asymmetry, whereby a buyer or seller possesses superior information in a trading relation (Lu, Chen, & Liao, 2010). If the amount of information each party possesses is unequal one party has an advantage over the other during trade relations; subsequently, this leads to an unfair acquisition of profits. Moreover, when information asymmetry occurs, it can also result in informational arbitrage, depending on the specific circumstances.

2.2. Information quality

Information is a general term that is used in daily life to denote knowledge. The general definition of information is "*useful data in reality, which is based on fact learned from observation*" (Oxford English Dictionary). For example, visiting a hospital and being diagnosed by the doctor is an act to obtain information, whereas having a conversation with friends or acquaintances is an act to exchange information. Thus, information is difficult to distinguish from knowledge or data. However, in the field of economics, information is strictly defined, because it is crucial to specific decision-making and action taking processes (Healy & Palepu, 2001). In short, information is crucial when it enables the holder to predict upcoming events accurately.

Exchanged information is central to decision making in the supply chain, because inaccurate information can compromise competitiveness (Sahin & Robinson, 2002). Therefore, accurate and reliable information is indispensable to build an efficient supply chain in an increasingly competitive and intense business environment.

Information quality is closely related to the product-purchase-decision-making process. Chen-Yu and Kincade (2001) claimed that an item's information quality, which reveals its usage and performance, has a positive impact on not only the desire to explore but also the purpose of purchasing. Kim and Niehm (2009) emphasized the importance of information quality to the seller, because their reputation is a major factor that simplifies interpersonal relations with the buyer.

Such information quality is very important in the medical community; hence, the emergence of "health informatics" today. According to Buchbinder and Shanks (2017), health informatics is the production of information needed to make decisions by analyzing diagnostic information, drug information, and medical information in various forms. Improving information quality is one of the important issues in the medical community, in pursuit of higher medical quality.

Information quality has been measured and examined in various fields. Bovee, Srivastava, and Mak (2003) listed accuracy, completeness, existence, and consistency as the determining factors for information quality, whereas Rainer and Watson (1995) proffered accuracy, timeliness, simplicity, and validity. Our study, however, derives a scalability variable—gained through preliminary interviews conducted with industry employees—along with accuracy and safeness (Hillgoss & Rieh, 2008) as the main determinants of information quality.

2.3. Logistics performance

In the field of business, logistics is the management of the supply chain flow from raw materials to manufactured products. Korean Article 2 of the Framework Act on Logistics Policies defines logistics as the processing, assembling, packaging, and selling (including transportation and storage) of goods by the supplier to the customer. CSCMP explained logistics management as that part of SCM that controls and executes the flow of goods, services, and related information from the beginning to the end to meet customer needs.

Supply chain performance can be evaluated by various indicators, among which logistics performance is the most significant. This study uses logistics performance as an indicator of business performance, because it can provide objective measurement and allow for visualization of supply chain efficiency (Ha, Park, & Cho, 2011).

Beamon (1999) defined logistics performance in terms of expense, time, and other factors that determine the success and efficiency of the supply chain's conversion of raw materials (or parts) to finished products. Further, numerous previous studies have proposed cost, quality, and flexibility as the key indicators of logistics performance (Closs & Xu, 2000). Ramdas and Spekman (2000) measured logistics performance according to delivery time, lead time, production flexibility, and response to orders; Harrison and New (2002), meanwhile, used lead time, inventory turnover, order completeness and return processing capability as the key indicators. The present study utilizes logistics performance and lead-time order completeness, inventory turnover, and overall logistics cost as measurements in determining the impact of information asymmetry and interactional justice on supply chain performance.

3. Hypothesis and Study Model

3.1. Informational justice and information quality

Information asymmetry in the medical industry is most frequently encountered in two situations. First, when patients visit the hospital, they have difficulty in understanding the doctors' explanations and technologies, leading to trust issues. Second, when employees of pharmaceutical companies visit pharmacies to sell OTC drugs and therapeutic devices, they might not reveal any potential side effects or other potentially negative product information. Likewise, consumers or buyers who do not receive necessary information from suppliers or sellers, may suffer from the ethical misconduct in the medical industry. Ethical misconduct refers to clandestine actions taken by one party against another with no access to certain information and who consequently suffers a loss of profit (Wiid, Cant, & van Niekerk, 2013).

Recently, informational justice between companies within the supply chain or between buyers and sellers has become more important, because it not only influences trust, but also reinforces collaboration (Lee & Ha, 2020). Moreover, if justice is not acknowledged within business relations, those relations might prove to be unsustainable (Hoffman & Kelley, 2000). Informational justice refers to the level of information shared during the process of decision making in order to secure justice (Colquitt, 2001). Ellis, Reus, and Lamont (2009) argued that the sharing of correct information while making decisions is essential. Liu et al. (2012) argued that informational justice can reduce information asymmetry and mutual uncertainty by creating an environment conducive to cooperation. Therefore, it can

be surmised that when the information exchange process is conducted fairly, the quality of information will be enhanced. In this light, the following hypothesis was drawn:

Hypothesis 1: Informational justice has an impact on information quality.

3.2. Information quality and logistics performance

In the market, buyers consider the availability of more information in purchase decisions, which makes sellers to provide additional information in order to lure the buyers. If sellers do not provide ample information to the buyers, they may potentially lose revenue. To maximize profit in buyer-seller relations, the opposite party must be supplied with adequate information, while misleading information might cause harm on one side while benefiting the other (Michalski, Montes-Botella, & Narasimhan, 2018). Buyers and sellers often maintain business relations that are more advantageous to themselves, leading to information asymmetry within the relations.

Meanwhile, information quality is the intrinsic value contained in the information, which can affect the reliability of decision-making. As the supply chain includes the flow of information and materials, companies in the supply chain exchange a lot of information. If the information needed to run the enterprise is sufficient and accurate, efficiency will increase throughout the supply chain.

Swanson (1974) alternatively conceptualized information as an element that could provide companies with a competitive edge in an extremely competitive market, and further explained that accurate and high-quality information satisfies the recipient. Demeter, Forslund, and Jonsson (2007) explained that information quality could have an impact on the performance of an organization. Information quality is important to the collaborative relations of buyers and sellers within the supply chain since it leads to positive impacts on a company's performance (Sahin & Robinson, 2002). Based on this claim, the present study classifies logistics performance using dependent variables and evaluates the quality of information exchanged within interpersonal relations. In this regard, the following hypothesis was drawn:

Hypothesis 2: Information quality has an impact on logistics performance.

3.3. Informational justice and logistics performance

In today's business environment, the issue of justice is of

one the most important issues, as it affects multidimensional areas. Tyler (1987) empirically verified that if justice is not recognized or is negatively perceived in management activities, job performance would be negatively affected. In particular, informational justice helps parties communicate frankly and rationally with each other (Colquitt, 2001), reducing the impropriety that can hinder mutually beneficial relationships, thereby inducing mutual trust (Tyler, 1987). Likewise, if useful information is exchanged in a fair environment, it helps increase responsiveness to customers (Paulraj, Lado, & Chen, 2008). In addition, Gupta and Kumar (2013) empirically explored whether informational justice can lead to employee immersion, and Cheung (2013), whether informational justice can have a positive impact on organizational citizenship behaviors.

Therefore, it is believed that recognizing information justice at a high level will not only reduce information asymmetry, but also improve the relationship between buyers and sellers in the supply chain, thereby improving the performance of the entity. In the regard, the following hypothesis was drawn:

Hypothesis 3: Informational justice has an impact on logistics performance.

By integrating the hypotheses formulated above, the study model shown in Figure 1 was derived and verified.

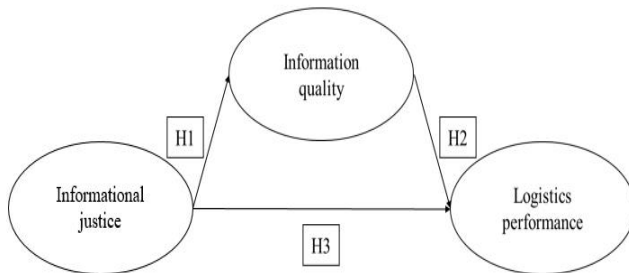


Figure 1: Study model

4. Methods and Analysis

4.1. Data collection and sample characteristics

The study’s objective is based on the information asymmetry observed within the medical industry. Pre-selected domestic pharmacists in the Yeongnam region in Korea were chosen as samples for empirical analysis. To verify the validity of the samples, survey questions were selected based on the guidance and input of doctors and employees of pharmaceutical companies. A total of 600

surveys were distributed from April and June (3 months) through field visits, and 400 completed surveys were collected (completion rate: 66.6%). A total of 107 surveys were excluded from consideration due to several unanswered questions or errors. Thus, 293 valid surveys were subjected to statistical analysis. Table 1 shows the key characteristics of the samples. Those aged in their 50s or above represented 50.51% of the respondents, whereas those in their 40s accounted for 31.40%. The survey showed that 93% of the respondents had 50 customers or more. More than half of the respondents were in business relationships with more than 10 pharmacies. Overall, the majority of the respondents were experienced and employed in large pharmacies.

Table 1: Sample characteristics

	Range	Frequency (N)	Percentage (%)
Age	20-29	1	0.34
	30-39	52	17.75
	40-49	92	31.40
	50s and above	148	50.51
Number of customers	Less than 50	20	6.83
	50-99	189	64.51
	100-200	65	22.18
	More than 200	19	6.48
Number of partner pharmaceutical companies	Less than 10	68	23.21
	10-29	207	70.65
	30-50	14	4.78
	More than 50	4	1.37

4.2. Operational definitions of variables and measurement

Following Colquitt (2001) and Colquitt, Greenberg, and Zapata-Phelan’s (2005) empirical research on measurement sections, this study uses three categories for informational justice as independent variables. To measure information quality, modified versions of questions used by Demeter et al. (2007), and Lee and Chen (2014) were utilized. Logistics performance, as the dependent variable, was evaluated in four sections using measurement questions from Flynn, Huo, and Zhao (2010) and Harrison and New (2002).

On the measurement scale, 1 point indicates very negative, 3 points average, and 5 points very positive. This study was validated through interviews conducted with

medical and academic practitioners. The operational definitions for the mentioned measurement sections are enumerated in Table 2.

Table 2: Operational definition of variables

Potential variance	Measurement variance	Operational definition	Reference
Informational justice	Frank communication	Frank communication with partner	Colquitt (2001); Colquitt <i>et al.</i> (2005)
	Proper explanation	Drugs are explained properly	
	Detailed explanation	Drugs are explained in detail	
Information quality	Information is easy to understand	Information related to drugs are easy to understand	Forslund and Jonsson (2007); Lee and Chen (2014)
	Substitute drug information is provided	Information related to substitute drugs are provided for	
	Information on complementary medication is provided	Information related complementary medication is provided for	
Logistics performance	Total logistics	Cost on storage, transportation, and inventory of drugs	Flynn <i>et al.</i> (2010); Harrison and New (2002)
	Lead time	The time between the order and delivery of drugs	
	Order completeness	The rate at which a drug is delivered to a designated location in accordance with the order conditions within a given time	
	Inventory turnover	Decrease of time on drugs being stored in pharmacy	

4.3. Reliability and validity testing

To prove the hypotheses, this study validated the measurement variables using Cronbach's alpha. SPSS 18.0 was used to measure reliability, and the scores were as follows: informational justice = 0.742, information quality =

0.755, and logistics performance = 0.756. According to Hair, Black, Babin, and Anderson (2010), when Cronbach's alpha is higher than 0.7, reliability is generally considered secured.

Next, AMOS 18.0 was used in a confirmatory factor analysis to verify the validity of the observational variables constituting the potential variables. The results were CMIN/DF = 2.701, TLI = 0.915, RMR = 0.036, CFI = 0.939, GFI = 0.945, and RMSEA = 0.076, which verified the study model (Hair *et al.*, 2010).

Furthermore, to test the convergent validity, construct reliability, and the average variance extracted were measured for each variable. When the construct reliability score is higher than 0.7 and the average variance extracted score is higher than 0.5, the results are interpreted to be high (Hair *et al.*, 2010). The main factors of this study, which are informational justice (CR = 0.807, AVE = 0.582), information quality (CR = 0.783, AVE = 0.547) and logistics performance (CR = 0.850, AVE = 0.587), all satisfied the recommended standard values.

Finally, to determine the discriminant validity, we measured the AVE for each variable and evaluated the relative coefficient between variables. To qualify, correlation between variables had to be smaller than the AVE square root of each variable. Table 3 shows the results of the discriminant validity analysis.

Table 3: Result of discriminant validity analysis

	Informational justice	Information quality	Logistics performance
Informational justice	0.763	-	-
Information quality	0.752	0.740	-
Logistics performance	0.548	0.548	0.766

4.4. Empirical analysis

The results of the structural equation model used to test the hypothesis of this study were as follows: CMIN/DF = 2.701, TLI = 0.915, RMR = 0.036, CFI = 0.939, GFI = 0.945, RMSEA = 0.076, which generally satisfied the appropriate standard suggested by Hair *et al.* (2010). These results can also be interpreted as an adequate explanation of the causal relations between the variables used in the survey. A path analysis of the study model was performed to verify the hypotheses. First, informational justice turned out to have a positive impact on information quality. This supports Hypothesis 1, which stated that informational justice has a positive (+) impact on information quality. Furthermore, information quality turned out to have an impact on logistics performance. Therefore, Hypothesis 2, which stated that

information quality has a positive (+) impact on logistics performance was also verified. Lastly, informational justice has not been shown to have a significant impact on logistics performance. This means that even if information-related fairness is secured in interpersonal relationships, it does not directly help improve management performance. Table 4 shows the results of the verification of causality for each of the variables in the study model. Figure 2 shows regression weights in the structural model estimation results.

Table 4: Hypothesis verification results

Hypothesis	Estimate	Standard error	Critical ratio	P value	Result
1	0.664	0.086	7.714	0.001	Retain
2	0.376	0.125	3.002	0.003	Retain
3	0.187	0.108	1.734	0.083	Reject

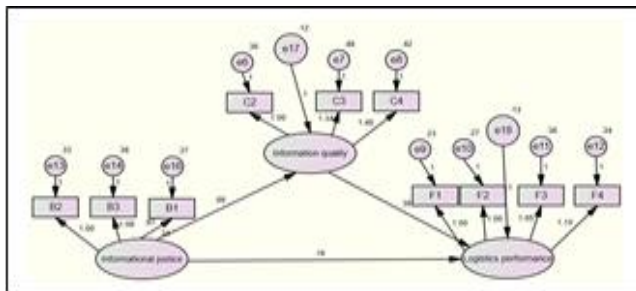


Figure 2: Estimation of structural model

5. Discussion, Implications, and Limitations

5.1. Discussion and implications

This study aims to understand the impact that informational justice has on logistics performance by evaluating information quality in seller-buyer business relations. The study particularly focuses on the medical industry, a sector in which information asymmetry often occurs due to the inaccuracy of information exchanged between parties. Ultimately, this study suggests that informational justice should be evaluated to develop information quality and logistics performance within business relations between pharmacists and employees of pharmaceutical companies.

First, this study verifies that informational justice has a positive (+) impact on information quality. This result can be interpreted as a need for appropriate and detailed explanations and punctual exchange of information to strengthen the information quality between buyers and sellers. In short, when sellers behave unethically while handling information, the quality of the information that is

being exchanged may drop. Further, when buyers acknowledge the unethical behavior of sellers, information asymmetry can occur in both ways, exacerbating overall business performance. Therefore, it can be reasonably concluded that it is important to devote effort to ensure that information is not distributed unfairly and that sellers and buyers perceive justice in their business relationships.

Moreover, our model proves that information quality has a positive (+) impact on logistics performance. When information sharing is obtained in a two-way interaction between buyers and sellers, partners of the supply chain can build trust in their relationships and exchanged information can also be understood more accurately and easily. In short, when informational justice is perceived, information quality can be enhanced; eventually, this results in a positive impact on supply chain performance, consistent with findings by Demeter, Forslund, and Jonsson (2007) who claimed that information quality could influence the performance of an organization. Our study suggests information quality together with all aspects of logistics performance of pharmacies can improve when justice is exercised between partners within a supply chain.

Lastly, this study proves that informational justice does not have a positive (+) impact on logistics performance. These results are different from those of previous studies. Extant studies that looked at the correlation between justice and corporate performance argued that the justice perceived within interpersonal relationships not only promotes cooperation, but also helps improve the performance of enterprises (Hui, Au, & Zhao, 2007). However, this study shows that although informational justice can alleviate uncertainty in the behavior of exchanging information, it does not directly help improve the performance of an entity. That is, even if the right information is exchanged between the seller and the buyer in a fair environment, the performance of the entity can be interpreted differently depending on how it is used.

Consequent to these findings, this study arrives at the following theoretical implications. First, informational justice has an impact on logistics performance. This result is particularly important as this study, unlike extant studies, examines informational justice and buyer-seller relationships within the supply chain by focusing on a particular industry. Some previous studies have explored the causal effects between different kinds of justice and logistics performance, while others explored justice within single organizations rather than within an industry or the supply chain (Greenberg, 1990). For example, Hofer, Knemeyer, and Murphy (2012) observed the roles of procedural and distributive justice in logistics outsourcing relationships, while Williams (1999) studied the impact of distributive and procedural justice on task performance. Our study is one of its kind with its investigation on the causal relations between

informational justice and logistics performance; thus, it has strong academic significance.

The second unique implication of this study pertains to its new measurement sections for information quality, optimized for the medical industry. Most precedent studies consider information quality to have been derived from information-related systems. King and Epstein (1983) selected the amount of information, accessibility, up-to-date-ness, and others, while Liu and Arnett (2000) selected usage level, user satisfaction, and business profitability as measurement sections for information quality. In our measurements, we considered the information quality among interpersonal relations within a supply chain and added several measurement sections (substitution/complementary medication information) including necessity, understandability, and the consideration of the occupation (pharmacist) of survey respondents. This approach, specifically the introduction of the concept of information-quality dependency on particular industries and the proposal of different evaluation approaches, adds depth to this study and lends greater significance to it.

The third academic implication of this study is related to its relatively unique focus on justice within an industry, specifically the medical industry. Several previous studies have examined justice only within a single organization or among an organization's individual members, and so there are still not enough studies devoted to informational justice within a specific industry. Moreover, within the medical industry, information asymmetry is becoming a controversial topic, and social awareness of it is increasing. In this context, this study bears significance not only in reflecting aspects of a domestic medical industry but also in its empirical evaluation of the relationship between informational justice and information quality or logistics performance.

This study has the following practical implications. First, it highlights the importance of information to pharmacists and employees of pharmaceutical companies by examining the relations between informational justice and information quality. We prove that informational justice has a direct influence on information quality. This result indicates that appropriate and detailed explanations need to be exchanged with timeliness between buyers and sellers. Since the importance of information is great not only in the medical industry, but in all industries, a collective effort is required to achieve informational justice and improve information quality. Furthermore, adequate management is required to exchange information without unethical misconduct (e.g. illegal kickbacks).

Secondly, our study evaluates the causal relations among informational justice, information quality, and logistics performance. This approach validates the studies for Korean government departments such as the Ministry of Health and

Welfare. Recently, governments have made efforts to root out information asymmetry derived from social positions. The present study proves that when justice is obtained between buyers and sellers, logistics performance can improve as a result. This suggests that when buyers and sellers build equitable relationships, buyers can achieve quality information and greater profit. Therefore, based on a nudge strategy, governments must manage and monitor information asymmetries and any related business practices.

Thirdly, the principles of this study are applicable in retail stores, including pharmaceutical companies. Retail stores usually trade directly with the end user in the supply chain, thus concerning themselves only with the selling of products. However, this study proves the positive impact on logistics performance when desirable information quality is achieved. Therefore, retail stores need to improve the information quality exchanged between them and their partners within the supply chain, in order to achieve better business performances and build trust with their customers.

Finally, the results of this study may present practical implications to the purchasing managers in the medical supply chain. Pharmacists are notorious for their potential unethical conduct against pharmaceutical company employees for personal reasons or to achieve better performances, leading to agency costs. Principal-agent theory means that the problems of moral hazard or free ride can be caused by the asymmetry of information and the imperfection of monitoring, and the associated costs are spent to reduce them. Therefore, the person in charge within the medical supply chain needs to refrain from unethical behavior, and maintain a smooth relationship with the other party. In other words, to improve logistics performance, which can be considered one of the main objectives of the supply chain, there should be greater efforts to achieve fair information exchange between partners.

5.2. Limitations

Although this study has enormous academic and practical contributions, it is subject to limitations. First, we observed the relations between information quality and logistics performance by exclusively using informational justice amongst all other forms of justice because certain studies have already explored procedural justice and distributive justice as important predisposing factors. Secondly, this study uses only logistics performance among business performance indicators. Other indicators such as financial performance should also be considered for pharmaceutical companies. Lastly, our survey was conducted only on pharmacists. Due to the role of information fairness, information quality, and logistics performance may vary depending on the seller's position and the situation the buyer is in. Hence, future research needs to

consider the perspective of the seller, i.e., the pharmaceutical company's employees. In this regard, such a study could use this model as a basis for investigating the supply chain at the aggregate level.

6. Conclusion

This study recognizes the role of information justice in reducing information asymmetry within the medical industry. Although several prior studies indicated that there was no information asymmetry between suppliers and consumers in the supply chain, our study argues otherwise and regards information justice as a key factor in reducing information asymmetry within the medical supply chain. Moreover, our research shows that when information justice is secured, the quality of information exchanged between suppliers and consumers improves and that information quality has a positive effect on logistics performance. Therefore, it is necessary to ensure that information can be exchanged in a fair environment to improve the performance of the enterprise within the medical industry's supply chain.

References

- Adams, J. S. (1965). Inequity in social exchange. *Advance in Experimental Social Psychology*, 2(1), 267-299.
- Beamon, B. M. (1999). Measuring supply chain performance. *International Journal of Operations & Production Management*, 19(3), 275-292.
- Blodgett, J. G., Hill, D. J., & Tax, S. S. (1997). The effects of distributive procedural, and interactional justice on post-complaint behavior. *Journal of Retailing*, 73(2), 185-210.
- Bovee, M., Srivastava, R. P., & Mak, B. (2003). A conceptual framework and belief function approach to assessing overall information quality. *International Journal of Intelligent Systems*, 18(1), 51-74.
- Buchanan, L. (1992). Vertical trade relationships: The role of dependence and symmetry in attaining organizational goals. *Journal of Marketing Research*, 29(1), 65-75.
- Buchbinder, S. B., & Shanks, N. H. (2017). *Introduction to Health Care Management (3rd ed.)*. Burlington, MA: Jones & Bartlett Learning.
- Chen-Yu, H. J., & Kincade, D. H. (2001). Effects of product image at three stages of the consumer decision process for apparel products: Alternative evaluation, purchase, and post-purchase. *Journal of Fashion Marketing and Management*, 5(1), 29-43.
- Cheung, M. F. Y. (2013). The mediating role of perceived organizational support in the effects of interpersonal and informational justice on organizational citizenship behaviors. *Leadership & Organization Development Journal*, 34(6), 551-572.
- Closs, D. J., & Xu, K. (2000). Logistics information technology practice in manufacturing and merchandising firms-An international benchmarking study versus world class logistics firms. *International Journal of Physical Distribution and Logistics Management*, 30(10), 869-886.
- Colquitt, J. A. (2001). On the dimensionality of organizational justice: A construct validation of a measure. *Journal of Applied Psychology*, 86(3), 386-400.
- Colquitt, J. A., Greenberg, J., & Zapata-Phelan., C. P. (2005). *What is organizational justice? A historical overview*. In J. Greenberg & J. A. Colquitt (Eds.), *Handbook of Organizational Justice* (pp.3-56). Washington: Lawrence Erlbaum Associates Publishers.
- Demeter, K., Forslund, H., & Jonsson, P. (2007). The impact of forecast information quality on supply chain performance. *International Journal of Operations & Production Management*, 27(1), 90-107.
- Ellis, K. M., Reus, T. H., & Lamont, B. T. (2009). The effects of procedural and informational justice in the integration of related acquisitions. *Strategic Management Journal*, 30(2), 137-161.
- Flynn, B. B., Huo, B., & Zhao, X. (2010). The impact of supply chain integration on performance: A contingency and configuration approach. *Journal of Operations Management*, 28(1), 58-71.
- Gao, J., Zhang, C., Wang, K., & Ba, S. (2012). Understanding online purchase decision making: The effects of unconscious thought, information quality, and information quantity. *Decision Support Systems*, 53(4), 772-781.
- Greenberg, J. (1990). Organizational justice: Yesterday, today and tomorrow. *Journal of Management*, 16(3), 399-432.
- Gupta, V., & Kumar, S. (2013). Impact of performance appraisal justice on employee engagement: a study of Indian professionals. *Employee Relations*, 35(1), 61-78.
- Ha, B. C., Park, Y. K., & Cho, S. (2011). Suppliers' affective trust and trust in competency in buyers: Its effect on collaboration and logistics efficiency. *International Journal of Operations & Production Management*, 31(1), 56-77.
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson R. E. (2010). *Multivariate data analysis*. Englewood Cliffs, NJ: Prentice Hall.
- Harrison, A., & New, C. (2002). The role of coherent supply chain strategy and performance management in achieving competitive advantage: An international survey. *Journal of the Operational Research Society*, 53(3), 263-271.
- Healy, P. M., & Palepu, K. G. (2001). Information asymmetry, corporate disclosure, and the capital markets: A review of the empirical disclosure literature. *Journal of Accounting and Economics*, 31(1-3), 405-440.
- Hilligoss, B., & Rieh, S. Y. (2008). Developing a unifying framework of credibility assessment: Construct, heuristics, and interaction in context. *Information Processing & Management*, 44(4), 1467-1484.
- Hofer, A. R., Knemeyer, A. M., & Murphy, P. R. (2012). The roles of procedural and distributive justice in logistics outstanding relationships. *Journal of Business Logistics*, 33(3), 196-209.
- Hoffman, K. D., & Kelley, S. W. (2000). Perceived justice needs and recovery evaluation: a contingency approach. *European Journal of Marketing*, 34(3/4), 418-432.
- Hsieh, C., Lai, F., & Shi, W. (2006). Information orientation and

- its impacts on information asymmetry and e-business adoption: Evidence from China's international trading industry. *Industrial Management & Data Systems*, 106(6), 825-840.
- Hui, M. K., Au, K. Y., & Zhao, X. (2007). Interactional justice and the fair process effect: the role of outcome uncertainty. *Journal of Experimental Social Psychology*, 43(2), 210-220.
- Jones, D. A., & Skarlicki, D. P. (2013). How perception of fairness can change: A dynamic model of organizational justice. *Organizational Psychology Review*, 3(2), 138-160.
- Kernan, M. C., & Hanges, P. J. (2002). Survivor reactions to reorganization: Antecedents and consequences of procedural, interpersonal and information justice. *Journal of Applied Psychology*, 87(3), 916-928.
- Kim, H., & Niehm, L. S. (2009). The impact of website quality on information quality, value, and loyalty intentions in apparel retailing. *Journal of Interactive Marketing*, 23(3), 221-233.
- King, W. R., & Epstein, B. J. (1983). Assessing information system value. *Decision Sciences*, 14(1), 34-35.
- Kumar, N., Scheer, L. K., & Steenkamp, J. B. E. (1995). The effects of supplier fairness on vulnerable resellers. *Journal of Marketing Research*, 32(1), 54-65.
- Lee, C., & Ha, B. C. (2020). The impact of interactional justice and supply-chain collaboration on sustainable scm performance: The case of multinational pharmaceutical firms. *Journal of Asian Finance, Economics and Business*, 7(2), 237-247.
- Lee, H. M., & Chen, T. (2014). Perceived quality as a key antecedent in continuance intention on mobile commerce. *International Journal of Electronic Commerce Studies*, 5(2), 123-142.
- Liu, C., & Arnett, K. P. (2000). Exploring the factors associated with web site success in the context of electronic commerce. *Information and Management*, 38(1), 23-33.
- Liu, Y., Huang, Y., Luo, Y., & Zhao, Y. (2012). How does justice matter in achieving buyer-supplier relationship performance. *Journal of Operations Management*, 30(5), 355-367.
- Lu, C. W., Chen, T. K., & Liao, H. H. (2010). Information uncertainty, information asymmetry and corporate bond yield spreads. *Journal of Banking & Finance*, 34(9), 2265-2279.
- Malhotra, A., Gosain, S., & Sawy, O. A. E. (2005). Absorptive capacity configurations in supply chains: Gearing for partner enabled market knowledge creation. *MIS Quarterly*, 29(1), 145-187.
- Michalski, M., Montes-Botella, J. L., & Narasimhan, R. (2018). The impact of asymmetry on performance in different collaboration and integration environments in supply chain management. *Supply Chain Management*, 23(1), 33-49.
- Paulraj, A., Lado, A. A., & Chen, I. J. (2008). Inter-organizational communication as a relational competency: antecedents and performance outcomes in collaborative buyer-supplier relationships. *Journal of Operations Management*, 26(1), 45-64.
- Rainer, R. K. Jr., & Watson, H. J. (1995). The keys to executive information system success. *Journal of Management Information Systems*, 12(2), 83-98.
- Ramdas, K., & Spekman, R. E. (2000). Chain or shackles: Understanding what drives supply-chain performance. *Interfaces*, 30(4), 3-21.
- Sahin, F., & Robinson, E. P. (2002). Flow coordination and information sharing in supply chains: Review, implications, and directions for future research. *Decision Sciences*, 33(4), 505-536.
- Salah, S., Rahim, A., & Carretero, J. A. (2011). Implementation of lean six sigma (LSS) in supply chain management (SCM): An integrated management philosophy. *International Journal of Transitions and Innovation Systems*, 1(2), 138-162.
- Sezen, B. (2008). Relative effects of design, integration and information sharing on supply chain performance. *Supply Chain Management*, 13(3), 233-240.
- Swanson, E. B. (1974). Management information systems: Appreciation and involvement. *Management Science*, 21(1), 178-188.
- Thurston, P. W., & McNall, L. (2010). Justice perceptions of performance appraisal practice. *Journal of Managerial Psychology*, 25(3), 201-228.
- Tyler, T. R. (1987). Procedural justice research. *Social Justice Research*, 1(1), 41-66.
- Wiid, J. A., Cant, M. C., & van Niekerk, C. (2013). Moral behavior and ethical misconduct in Nigerian small businesses. *International Business & Economics Research Journal*, 12(9), 1087-1100.
- Williams, S. (1999). The effects of distributive and procedural justice on performance. *The Journal of Psychology*, 133(2), 183-193.
- Yue, X., & Raghunathan, S. (2007). The impacts of the full returns policy on a supply chain with information asymmetry. *European Journal of Operational Research*, 180(2), 630-647.
- Zapata-Phelan, C. P., Colquitt, J. A., Scott, B. A., & Livingston, B. (2009). Procedural justice, interactional justice, and task performance: The mediating role of intrinsic motivation. *Organizational Behavior and Human Decision Processes*, 108(1), 93-105.