

신제품 개발을 위한 공급자 통합에 관한 연구: 영업사원의 조정 및 규제 행동의 관점으로

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Peeking Inside The Black-box of Supplier Integration for New Product Development: Salespersons' Coordinating and Regulating Behaviors

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ABSTRACT

Purpose: This study investigates how the salespersons behave in coordinating the multiple communication channels during supplier integration (SI) for new product development (NPD), especially when their engineers directly collaborate with the buyer.

Methods: This study conducted a qualitative study to explore the dynamics of the supplier's salespersons during SI for NPD. With the support of a consumer goods manufacturer (focal firm) in South Korea, we interviewed several managers, including purchasing and engineering, from the focal firm and salespersons from eight tier-1 suppliers of the focal firm.

Results: The results found that the supplier's salespersons show two different behaviors toward managing and controlling the collaboration between their engineers and the buyer: (1) Process regulating behaviors that control the flows of information or communication between the engineers and the buyer, and (2) knowledge regulating behaviors that directly and indirectly support the engineers to be equipped with accurate and complete knowledge so that they can share the right knowledge with the buyer.

Conclusion: This study contributes to academia and practitioners as follows. To academia, this study fill the gap in the literature by introducing the distinct behaviors of the supplier's salesperson in SI for NPD. To practitioner, in addition, our findings present coordination mechanisms to manage and control multiple communications within an inter-organizational collaboration.

Key Words: Supplier Integration, New Product Development, Salesperson, Multichannel Coordination and Regulation

● Received 15 March 2022, 1st revised 7 April 2022, accepted 20 April 2022

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1. Introduction

Supplier integration (SI) for new product development (NPD) brings suppliers into the NPD process for buyer's and allows the buyer to closely collaborate with several functional units, engineering in particular, without formality or constraints (Petersen et al., 2005; Carter & Miller, 1989). Through this technical collaboration channel, a buying firm can enhance inter-organizational collaboration quality (Yan & Dooley, 2014) by quickly learning a supplier's explicit and tacit knowledge about its technology and product, smoothly adjusting the different interests, and thereby deriving sincere support from the supplier participating in SI (Duhaylongsod & Giovanni, 2019). Such benefits of SI have encouraged firms in various industries, such as automotive and aerospace, to adopt this practice as a norm, closely working with a competent supplier(s) for better innovation and operational excellence (Jean et al., 2014; Hephher, 2018).

While SI facilitates collaboration quality by allowing a buyer to communicate with its suppliers' engineers directly, it also raises some concerns in terms of sensitive information leakage, inconsistent messages to the buyer, and over-engineered products due to the multiplex of the relationship between the buyer and supplier (Kull et al., 2013; Carter & Miller, 1989; Murtha et al., 2011), thus requiring appropriate coordination mechanisms to manage the multiple communication ties between the parties. While the suppliers' engineers directly support technical issues under SI, their salespersons still remain the primary touchpoint within the supplier that the buyer contacts for commercial transactions, such as for contract renewal, performance feedback review, and specification agreement. As a traditional gatekeeper is mainly responsible for external relationship management and acting as an internal knowledge broker (La Rocca et al., 2016; Ulaga & Kohli, 2018), the supplier's salesperson should be aware of such SI's distinctive characteristics and mitigate potential risks that may occur due to it.

Despite the increasing importance of the supplier's salesperson in inter-organizational collaboration, the literature provides little explanation regarding their roles, especially under SI for NPD. Numerous studies explain that salespersons contribute to inter-organizational collaboration, serving as relationship managers, representative intermediaries, intra-firm intermediaries, knowledge brokers, and risk mitigators (Storbacka et al., 2019; La Rocca et al., 2016; Panagopoulos et al., 2017; van den Berg et al., 2014; Ulaga & Kohli, 2018). However, none of them elucidate how they behave to coordinate the multiple communication channels during SI for NPD. While Murtha et al. (2011) and Kull et al. (2013) highlighted SI's distinctive attribute of multi-communication for a buyer, neither of them investigated the specific behaviors of the supplier's salespersons during SI for NPD.

To address the gap in the literature, this study has conducted a qualitative study to explore the dynamics of the supplier's salespersons during SI for NPD. With the support of a consumer goods manufacturer (focal firm hereafter) in South Korea, we interviewed several managers, including purchasing and engineering, from the focal firm and salespersons from eight tier-1 suppliers of the focal firm. The results found that the supplier's salespersons show two different behaviors toward managing and controlling the collaboration between their engineers and the buyer: (1) Process regulating behaviors that control the flows of in-

formation or communication between the engineers and the buyer, and (2) knowledge regulating behaviors that directly and indirectly support the engineers to be equipped with accurate and complete knowledge, so that they can share the right knowledge with the buyer.

This study contributes both to academia and practitioners as follows. For academia, this study fills the gap in the literature by introducing the distinct behaviors of the supplier's salesperson in SI for NPD. For managers, in addition, our findings present coordination mechanisms to manage and control multiple communication channels within an inter-organizational collaboration.

2. Literature Review

2.1. SI for NPD: multi-channel relationships

Inter-organizational NPD collaboration is a combined function of practical intra-functional cooperation and smooth inter-organizational communication. Traditionally, inter-organizational NPD collaboration used to be implemented through a single-channel (see "A. Single-Channel without SI" in Figure 1), where a buyer simply purchases entire parts or sub-assemblies developed by its supplier. In other words, the buyer's purchasing and the supplier's sales serve as primary contact points to share information or plans regarding NPD (Carter & Miller, 1989; Koufteros et al., 2007). As markets have become globalized and competitive, NPD collaboration requires multiple channel relationships within and between firms (see "B. Multiple Channel with SI" in Figure 1) (Koufteros et al., 2007; La Rocca et al., 2016; Kull et al., 2013). It means that the success of inter-organizational NPD collaboration demands appropriate coordination mechanisms to manage and control the multiple relationships within an organizational boundary as well as at the interface between the buyer and supplier. In a similar vein, SI for NPD requires several linkages between a buyer and its supplier (a linkage between the buyer and supplier's engineer; a linkage between the buyer and supplier's salesperson) through which the buyer can achieve fast problem solving, smooth knowledge acquisition, and better relationship closeness (Suurmond et al., 2020). In other words, unlike a traditional relationship with the supplier, where the supplier's salesperson serves as the only gatekeeper communicating with the buyer, SI allows a buying firm to coordinate, cooperate, and collaborate directly with its supplier's engineers to design and develop new products.

Kull et al. (2013) argued that SI for NPD requires coordinating relational dynamics among functional units within the supplier chain, and it is the traditional boundary spanners—the supplier's salesperson—who can orchestrate and harmonize other internal members' collaboration with the buyer to alleviate problems that may occur during SI for NPD. The existing literature articulates that salespersons can play essential roles in managing all the communications and knowledge flows within and across the organizational boundary (Ernst et al., 2010). Specifically, the salespersons manage inward and outward knowledge and communication during inter-organizational collaboration, acting as relationship managers (Gonzalez & Claro, 2019), knowledge brokers (van den Berg et al., 2014), risk managers (Ulaga & Kohli, 2018), and market in-

telligence investigators (Panagopoulos et al., 2017). Unfortunately, however, these studies still fail to present specific behaviors of the salespersons during SI for NPD, thereby leading us to conducting qualitative research to understand the salesperson's behaviors and identify specifics.

3. Qualitative Case Research

3.1 Data Collection and Coding Process

To understand how the supplier's salespersons behave under contextual idiosyncrasies of SI, we conducted a case study. Specifically, this case study explores any behaviors of the supplier's salespersons that can serve as indicators of coordinating and regulating mechanisms to manage a multiplicity of relationships during SI for NPD, particularly from a (supplier's) salesperson's perspective.

Table 1. Interview Sample Profile

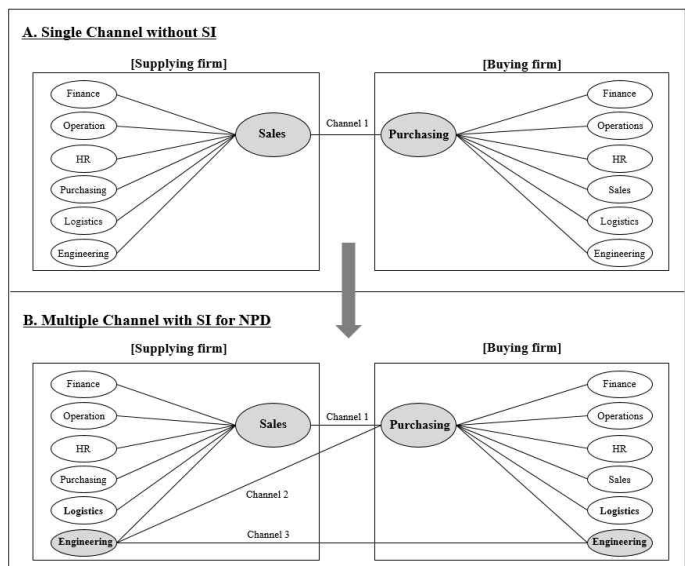
	Focal firm (4)	Supplier					
		A (1)	B (2)	C (2)	D (1)	E (1)	F (1)
Location	South Korea	Japan	South Korea	Japan	South Korea	South Korea	South Korea
Annual Sales	27B	2.14B	7.14B	7.14B	17.B	98M	330M
Business Relations with the buyer		5 years	10 years	13 years	15 years	11 years	13 years
% sales to the buyer		35%	30%	23%	75%	70%	30%
Rank of interviewee	Manager	Assistant Manager	Manager	Assistant Manager, Manager	Assistant Manager	Deputy General Manager	Manager
Ave. tenure in profession (year)	9.5	4	10.5	11	8	14	9

Note: the numbers in parentheses indicate the number of interviewees from the firm

For this study, we contacted an electronics manufacturing firm (also focal firm or buying firm hereafter) in South Korea, explaining the aim and potential benefits of this study and promising a summary report, upon request. This firm produces core electronic device installed TVs, automobiles, laptops, lighting, etc. For better innovation, this manufacturing firm has actively initiated intensive collaboration with competent suppliers located in South Korea and Japan in the form of SI, and we identified six tier-1 suppliers who have closely worked with this manufacturing firm to support the firm's NPD success (see Table 1 for sam-

ple profile). With the support of this manufacturing firm, we were able to talk to two purchasing managers and two engineers from the manufacturing firm to understand its NPD processes and, meanwhile, access the tier-1 suppliers' salespersons for a structured interview. Finally, eight salespersons agreed to participate in a one-hour interview with the protocols outlined in Figure 1.

Context: As you can see below, in “(A) single-channel without SI,” sales representatives have played a role of a sole gatekeeper in supplying firm (your firm) to communicate with XX company (mostly with purchasing managers through “channel 1.” In “(B) multiple channel with SI for NPD,” other members within the XX company (i.e., engineers or purchasing managers) directly contact to engineers in the supplier (your firm) to obtain desired information without passing through the traditional gatekeeper, sales representatives. The additional direct communication channels (channel 2 or 3) under SI for NPD may affect sales representatives in various ways.



Question: Relative to (A), how (B) affects you (sales representative) and the supplying firm (your firm)? Do you have any suggestion/measures to mitigate or solve the problems/issues in (B)?

Figure 1. Interview Protocol

We chose our samples from the electronics industry for our theoretical purpose (Eisenhardt, 1989; Yin, 2009). This industry is characterized by intensive competition with tremendous pressure on buying firms to directly collaborate with their suppliers' engineers to acquire their technical expertise and knowledge, and thereby develop innovative products without formality and constraints (Basloe & Bellamy, 2014; Bellamy et al., 2014). As such, it is reasonably assumed that samples in this industry can appropriately reflect the SI's distinct situation, in which a buying firm operates dual interfaces through its suppliers' sales and engineering. Therefore, by analyzing the cases in this industry, we can understand how the supplier's

salesperson, a traditional gatekeeper in inter-organizational collaboration, behaves with regards to coordinating and regulating the collaboration route between the engineer and the buyer.

The interview data was analyzed with the support of two academic researchers, thereby ensuring research reliability and validity by comparing outcomes among researchers and discussing/reconciling their discrepancies (Barratt et al., 2011; Gligor & Autry, 2012). Consistent with the grounded theory approach (Strauss & Corbin, 1990), we conducted a two-step process to analyze our interview data. Initially, two researchers independently reviewed the interview transcripts from the eight salespersons multiple times, to identify salient discrete passages that indicate coordinating and regulating actions of salespersons; we then initiated open coding – fragmenting or taking apart passages related to the matter of interest into discrete parts (Voss et al., 2002). Next, we implemented axial coding – putting together the fragmented parts in new ways (Voss et al., 2002)– by grouping similar parts together to identify broader conceptual categories (Malshe & Biemans, 2014). Then, selective coding – integrating and refining revealed categories (Gligor & Autry, 2012) – was applied by identifying core concepts among the grouped conceptual categories (Strauss & Corbin, 1990). A distinction between axial and selective coding is that while the former defines a conceptual boundary among the discrete phases and develops conceptual categories accordingly, the latter extracts core concepts from the created categories. Once the two researchers reached a consensus on the core concepts, the coding process was stopped (Stanczyk et al., 2015).

3.2 Case Analysis and Findings

3.2.1 Benefits and Concerns of The Multi-channels in SI for NPD

All the salespersons we interviewed explained that their companies have actively collaborated with the focal firm through engineers in their organizations. “A” supplier manufactures screen materials for TVs, PCs, mobiles, etc., because the materials from this supplier serve as core parts of the end products of the focal firm. Due to the strategic importance of this supplier to the focal firm, this supplier’s engineers actively collaborate with the focal firm. “B” supplier produces raw materials and components for semi-conductors, monitors, solar cells, etc., which determines the focal firm’s end-product performance. Thus, this supplier maintains a long-term business relationship with the focal firm by providing direct technical support through its engineer. “C” supplier possess leading adhesives and coating techniques integral to the focal firm’s production process. Due to its skills and techniques, the focal firm invites the supplier’s engineers at an early stage of the NPD. “D” supplier produces chemical products, and more than 70% of sales come from the focal firm. Such high interdependence leads to intensive NPD collaboration through technical channels. “E” supplier also deals with chemical products for electronic materials; while this supplier’s materials are not as superior as “D” supplier’s, the focal firm still needs to consult the supplier’s engineers to use the materials without any undesired issues. Lastly, “F” supplier produces electronic materials and fine chemicals. The focal firm also holds close collaboration with this supplier’s engineers to find the best ways to apply this chemical solution to its production.

All the salespersons interviewed collectively showed favorable attitudes toward the direct collaboration between their engineers and the focal firm for NPD, due to several advantages of the direct collaboration such as better information accuracy and completeness, better access to buyer-sensitive information, fast and smooth information sharing, more business opportunities, sales workload release, and fast NPD. They explained that the technical channel is inevitable for effective NPD collaboration between the focal firm and its supplier, where tacit knowledge sharing determines NPD success. Related to this, one of the salespersons from “C” supplier stated the following:

“Since salespersons are in charge of handling so much work, such as quality assurance, order fulfillment, and product development, it is hard to have deep knowledge on technical issues. So, if buyer’s engineers ask more specific questions, we need to understand the issue by talking with our engineers and give the answer to the buyer’s engineer, which also increases working time. In this sense, the direct communication between engineers will reduce a salesperson’s work time and increase engineers’ understanding about the technical issue.”

Despite the benefits of the direct collaboration between the focal firm and the supplier’s engineers, on the other hand, the salespersons also shared some concerns about the new collaboration pattern that could damage collaboration quality in SI for NPD. They presented several issues such as sensitive information leakage, inconsistent messages to the buyer, and increasing conflicts with engineering. Especially, one of the major concerns among the salespersons regarding the direct communication of the engineers with the buyer was the engineer’s increased support for the buyer. For example, the engineers may promise unwritten support, share sensitive internal information, including price and future projects, and easily admit some mistakes that the buyer may make. The salesperson from “D” supplier expressed his concerns about the engineers’ behaviors as follows:

“Our products are price-sensitive. So, if our price information is exposed to the buying firm, we will have difficulty in negotiating with buying firm’s purchasing, damaging our financial performance. Our engineers sometimes expose price information to the buyer’s engineers by mistake.”

In a similar vein, the salesperson from “F” supplier described a potential risk of the engineer’s direct collaboration in SI for NPD, explaining as follows:

“When buyer’s engineers directly meet our engineer to find the root cause of the defect of their final product, our engineer may readily admit the mistake, even though it is actually not our problem but their problem. In this case, the buyer’s engineer claims compensation for the defect, which is very huge damage to our company. ”

3.2.2 Salesperson’s Coordinating and Regulating Behaviors

All salespersons advocated the necessity of the technical channel through which the direct collaboration between the buyer and their suppliers occurs. Specifically, they agreed that such a pattern of communication facilitates effective knowledge sharing and fast problem solving, which leads to the success of SI for

NPD. However, they argued that the aforementioned issues and concerns of the engineers' direct communication with the buyer could limit their individual performance as salespersons, and the entire supplier performance as an organization. They claimed to have often lost negotiation powers over the buyer due to information leakage or needed to give up other business opportunities because of thoughtless promises. For example, two salespersons shared their experiences as follows:

“Our products are price-sensitive. So, if our price information is exposed to the buying firm, we will have a difficulty in negotiating with buying firm's purchasing, damaging our financial performance. Our engineers sometimes expose price information to the buyer's engineers by mistake.” (“D” supplier)

“Our engineers promised or made an exclusive contact on new technology or products with the buyer's engineers, meaning that salespersons were not able to sell it to other buying firms.” (“A” supplier)

To prevent such problems while ensuring collaboration quality through SI for NPD, the salespersons explained several measures to successfully coordinate and regulate the collaboration between the buyer and their engineers. For example, as presented in Table 2, we found several discrete phrases from open coding, such as “security lock on the sensitive information”, “do not share any information about price with our engineer”, “do not directly share pricing information with external engineering”, “forbid sharing of some information with buyer, without sales or top management approval and share it only via sales”, all of which, we believe, represent “prohibiting inter-firm sharing of sensitive or pricing information without approval” (axial coding). Following the similar approach, we identified eleven categories from the axial coding, and we extracted two core concepts of regulating behaviors from the eleven categories (selective coding). The first concept is process regulating behaviors that control the flow of information or communication between the engineers and the buyer. For example, internally, the salespersons control all the communications in the technical channel by monitoring conversations through email CC or by sitting in the actual meetings. In addition, salespersons should be allowed to make a strict information sharing policy that dictates all documents or information to be shared with the salespersons' consent. Externally, the salespersons will preemptively build a personal network on the buyer's side, making the buyer feel more comfortable contacting the salespersons first, and not the engineers. These regulating behaviors mean that the salespersons participate in any form of interaction between the buyer and the engineers to avoid any negative impacts on the sales performance and supplier performance as a whole. Regarding this, “C” supplier's salesperson shared his experience:

“The best way [to regulate the interaction] is to be there when engineers have a meeting. During the meeting, we can sense what process of development is going on and know new issues brought up during the meeting”

[My approach to regulating is to] “build my network in the buying firm so that all contact from the buying firm pass through me. Also, we can ask people in the buying firm to contact me first for any issues.”

The second one is knowledge regulating behaviors that directly and indirectly support the engineers to be equipped with accurate and complete knowledge, so that they can share the right knowledge with the buyer. A distinct difference between process and knowledge regulating behaviors is that the knowledge regulating behaviors coordinate and control the content of knowledge only, while allowing the direct communication of the engineers with the buyer. For example, the salespersons will explain to the engineers about what can and cannot be discussed for their organization, developing a shared understanding with the engineers regarding information sharing through regular meetings. In addition, by aligning some of the engineers' key performance indicators (KPIs) with the salespersons' KPIs (e.g., the number of developments that eventually lead to mass production), they can guide the engineers to support the buyer in a reasonable and sensible manner. For this, "A" supplier's salesperson and "B" supplier's salesperson shared their opinions, respectively, as follows.

"Solution is to clearly define meetings/issues that salespersons need to be involved in and to educate engineering...to involve us in or inform us of the meeting regarding the issues" ("A" supplier)

"KPIs of our engineering are (1) the number of developments that are successfully completed and (2) the number of developments that lead to mass production. These days, engineers also consider "cost" one of their KPIs (Key performance indicators) which must be achieved" ("B"supplier)

Table 2. Coding Results for Salesperson's Coordinating and Regulating Actions

Open coding	Axial Coding	Selective Coding
Security lock on the sensitive information	Prohibit inter-firm sharing of sensitive or pricing information without approval	Process Regulating Behaviors
do not share any information about price with our engineer		
do not share pricing information with internal engineering		
do not directly share pricing information with external engineering (share only with purchasing)		
forbid sharing of some information with buyer, without sales or top management approval and share it only via sales	Real-time monitoring of inter-firm communication between engineers	
Attending at the engineering meeting		
Real-time monitoring through email CC		
Real-time information sharing via IT systems		
Have sales present during inter-firm engineering and production meetings		
Real-time formal monitoring of engineers-participation or report	Sales controls s-engineer's interaction with b-engineer	
All the projects are imitated and controlled by a salesperson		
Norm development that all the information should be shared through sales		
Making a policy that all the files/data are shared by sales		

Open coding	Axial Coding	Selective Coding	
A salesperson as a final decision maker			
Asking a buying firm to contact our firm via us			
Request (often) buyer to contact via salesperson			
Require buyer to initiate contacts through sales			
Sales controls engineering commitments to buyer			
A salesperson as a final decision maker			Salesperson needs to be a decision maker
Sales remains project leader and decision maker			
Preemptive network building activity			Preemptive network building
Sales thoroughly establish social network in advance			
Sales requires engineers to work under sales social network			
Asking a buying firm to contact us via their purchasing	Sales does not communicate with b-engineer		
Avoid information exchange of sales direct with buyer engineers			
Defining specific topics for direct communication	Define specific issues in which sales involvement is needed	Knowledge Regulating Behaviors	
Defining issues in which sales needs to be involved			
Sufficient internal information sharing	Regular internal information sharing between sales and s-engineer		
Documentation of all the meeting to share with our engineers			
Share information internally after contacts with buyer			
Regularize meetings with internal meetings			
Meet with internal engineering to reach consensus before contacting buyer			
Extensive internal information sharing between sales and engineering			
Treat number of developments that result in mass production as part of engineering's KPI	Establish appropriate KPIs for s-engineer		
Treat cost as part of engineering's KPI			
Treat number of successfully completed developments as part of engineering's KPI			
Salesperson information corrected by internal engineers	Sales does cross-checking		
Meet directly with buyer's other functional units to check validity of information sales has received			
Investigate why sensitive information is being requested			
Use of task force teams	Use of task force teams		

Note: "b-" stands for buyer; "s-" stands for supplier

4. Discussion

This study investigates how salespersons behave to coordinate the multiple communication channels during SI for NPD, especially when their engineers directly collaborate with the buyer. To this end, we conducted a qualitative study to understand and explore the dynamics of the supplier's salespersons during SI for NPD. This qualitative research articulated that SI for NPD establishes multi-channels between a buyer and its supplier. One is for the commercial transactions between the buyer and their suppliers' salespersons, and the other is for technical collaborations between the buyer and their suppliers' engineers. The salespersons, traditional gatekeepers in inter-organizational collaborations, agreed that the technical channel benefits both the buyer and the supplier, in that effective knowledge sharing and problem-solving are ensured. However, they also shared some concerns about the presence of the technical channel with regards to undermining of the suppliers' benefits from SI for NPD. To mitigate the problems, we found that the salespersons coordinate and regulate the direct collaboration of the engineers with the buyer through two approaches: process and knowledge regulating behaviors.

The benefits of this study are two-fold. For academia, our findings contribute to the SI literature by introducing the salesperson's behaviors that coordinate and regulate the flow of work and knowledge during SI for NPD. None of the inter-organizational studies has focused on salespersons' behaviors that arise during SI for NPD. Our research is the first study that introduces specific behaviors to the literature to the best of our knowledge. In addition, unlike existing studies on the intra-organizational level quality issues (Lee et al., Chong et al., 2020; Lee et al., 2020), this study shed lights on "collaboration quality" at the inter-organizational level (Yan & Dooley, 2014), providing specific regulating mechanisms to enhance the collaboration quality during SI for NPD. We argue that the behaviors would facilitate or support effective inter-organizational process management (Park et al., 2011), which would eventually result in successful collaboration outcomes. For practitioners, this study uncovers the hidden issues that could affect the success of SI for NPD. These behaviors could serve as coordination mechanisms that operate within an organization and the interface between the buyer and its supplier, enhancing collaboration quality during SI for NPD.

5. Future Research

This study can serve as the cornerstone for future research. First, we found the salesperson's behaviors that regulate and coordinate the direct communication in the technical channel from a salesperson's perspective, expecting these behaviors to enhance collaboration quality during SI for NPD. Future research can empirically test if the behaviors do contribute to collaboration quality, and thus the success of SI for NPD. Second, future studies can conduct the same research from an engineer's perspective. This study could help understand what aspects of the salespersons' behaviors benefit or limit the engineers' directr

collaboration with the buyers for product innovation.

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저자소개

오재영 University of Kentucky 경영학 박사를 취득하고 현재 Central Washington University에서 공급사슬관리전공 조교수로 재직 중이다. 주요 연구관심 분야는 공급자통합, 공급사슬전략, 공급자네트워크, 의료서비스 운영관리 등이다.