



Review of Revenue Sharing Contract: Evaluating its Role for Supply Chain Coordination

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Abstract

Purpose: The revenue sharing contract has been widely used in industries, and its ability to coordinate the supply chain system has been studied by numerous researchers. By reviewing the representative studies on the revenue sharing contract, this study intends to analyze the key features of this coordinating contract and identify its potential to be a more advanced coordination program than the original contract. **Research design, data, and methodology:** This study reviews past studies on the revenue sharing contract. The selected studies are investigated with a focus on how this contract is described to realize the supply chain coordination and the key issues that they address. **Results:** The literature review reveals that the revenue sharing contract requires standardized details about what and how to share. This study also finds additional issues that need to be addressed by researchers to improve this coordinating contract. **Conclusions:** Future researchers are advised to unify the detailed contents of the revenue sharing contract to confirm that it successfully coordinates the supply chain system. In addition, this study proposes key research issues that would enhance the role of revenue sharing contract as a supply chain coordination program.

Key words: Revenue Sharing Contract, Supply Chain Management, Supply Chain Coordination, Literature Review

JEL Classification Code: M11, M19, M20, M29

1. Introduction

The revenue sharing contract is one of well-known business practices that lead to the supply chain coordination. Once the double marginalization is commonly noticed as the significant trouble in most industries, the revenue sharing contract has become the effective tool to mitigate this operational inefficiency (Kumar & Haider, 2011). In fact, the revenue sharing contract has been applied to diverse business areas including semi-conductor, fashion, food, and movie

industries, and its outstanding performance is verified to bring the strong cooperation among supply chain members and improve the overall performance of the supply chain system (Palsule-Desai, 2013; Tang & Kouvelis, 2014; Xiao & Jin, 2011).

The revenue sharing contract is defined to be the supply chain contract that let the buyer share the portion of his revenue with the supplier (Hou, Wei, Li, Huang, & Ashley, 2017; Qin, 2008). The traditional supply chain system, where its individual members pursue their own benefits, possesses the inherent weakness that does not allow it to achieve the maximum profit, because of the conflict among them. In general, the revenue sharing contract is recognized as the critical tool in the perspective of the whole supply chain system, since this revenue sharing scheme is expected to give the obvious incentive for the supply chain members to align their operations to maximize the whole supply chain profit (Yan, Wu, Ye, & Zhang, 2017). In some cases, the supply chain members share even the cost to coordinate the supply chain system

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(Chen & Cheng, 2012; Katok & Wu, 2009).

This study reviews the past studies that research the revenue sharing contract as the coordinating mechanism in the supply chain system. The main purpose of this study is to identify the key features of this supply chain contract appeared in the past studies and suggest the proper direction to improve it to be an advanced supply chain coordination program. This study observes how the researchers describe the revenue sharing contract and set the contract details. The reviewed studies are classified in terms of other supply chain systems, which are compared with the revenue sharing contract. In addition, this study identifies the key issues that are commonly addressed in the past studies and recognizes their potential impacts on the performance of the revenue sharing contract.

One past study is identified as the literature review on the revenue sharing contract (Bart, Chernonog, & Avinadav, 2020). In that study, the researchers provide the overall outlines about the research trend and suggest the issues that would extend future research on the revenue sharing contract. Instead of the general issues regarding the revenue sharing contract, this study focuses on the supply chain coordination realized by this supply chain contract and identifies its potential to be a more advanced coordination program.

According to the literature review, the past studies use the distinct meanings of the supply chain coordination and represent the revenue sharing contract in their own ways to specify the contract details about revenue shares. The researchers test whether the revenue sharing contract coordinates the supply chain system by using different contract contents and distinct meanings of coordination, and they fail to make the generalizable conclusion about its effect after all.

Based on the findings from the review, this study points out that it is necessary to develop the unified contract contents about what to share and how to share. Future researchers are advised to focus on the contract details when they examine how the revenue sharing contract performs over time. While various issues are already addressed by the past studies, this study proposes the new key research issues that would help the future studies develop a more advanced coordination program than the original revenue sharing contract.

2. Research Background

The revenue sharing contract is the agreement made between the supplier and buyer, where the supplier offer the lower price than the normal market price to the buyer and the buyer, in return, share a predetermined portion of his revenue with the supplier (Gui-xia, Yi-pin, Jian-guo, &

Yue-hong, 2013; Hu & Feng, 2017; Qin, 2008). Since the revenue sharing contract allocates the risk as well as revenue to the supply chain members, it is expected to coordinate the decentralized multi-stage supply chain system (Hou et al., 2017). In particular, the revenue sharing contract is well-known as the effective tool to mitigate the double marginalization (Pang, Dong, Zhang, Balas, Hong, Gu, et al., 2019; Vafa Arani, Rabbani, & Rafiei, 2016).

Double marginalization indicates the prevailing phenomenon found in the most decentralized supply chain system where each member seeks to maximize only his profit. Due to the inefficiency of independent and self-interested decision making, the supply chain members fail to obtain the maximum profit of the entire supply chain system. The supply chain contract appears as the remedy for the double marginalization, and it is designed to coordinate supply chain members' decisions so that the decentralized supply chain system achieves the same performance as the centralized one (Kumar & Haider, 2011). The revenue sharing contract is one of the supply chain contracts including buy-back or return, quantity flexibility, price-discount, sales rebate, and two-part tariff (Altug & Ryzin, 2014; Hsueh, 2014; Sheu, 2011; Yan et al., 2017).

3. Literature Reviews

There have been numerous studies that conduct academic research on the revenue sharing contract, due to its extensive applications to the real industries. Meanwhile, the past studies show significant differences in terms of their perspectives on this supply chain contract. In order to understand the main stream of the past studies on the revenue sharing contract, this study identifies what makes their differences as the key research issues and uses them to classify the past studies.

In particular, the research framework that this study uses to review the past studies focuses on the supply chain coordination. At first, the past studies are classified in terms of the ways to understand that the revenue sharing contract achieves the supply chain coordination. Second, this study observes how the researchers compose the detailed contents of this supply chain contract to realize the supply chain coordination. Third, in the past studies, this study identifies the other forms of contracts and programs compared with the revenue sharing contract to verify that it coordinates the supply chain system. Furthermore, the additional issues covered by a good deal of the researchers in the past are addressed to provide the basis to produce the recommendations that would enrich the future studies on the revenue sharing contract.

3.1. Meaning of Supply Chain Coordination

The revenue sharing contract is originally introduced to bring the supply chain coordination. After all, it is important to describe the exact meaning of the supply chain coordination when any studies test that the revenue sharing contract performs in the supply chain system. In general, the supply chain coordination is defined to be the state where the supply chain members in every stage of the supply chain system align their operations in a way to maximize the total supply chain profit (Chopra & Meindl, 2010). Meanwhile, the literature review reveals that the past studies make the different meanings of the supply chain coordination and use diverse standards to judge whether the revenue sharing contract attains in its goal.

As Yan et al. (2017) describe that the supply chain coordination is designed to result in the improved overall efficiency of the supply chain system, most researchers explain the supply chain coordination by emphasizing its resultant outcome (Hou et al., 2017; Vafa Arani et al., 2016; van der Veen & Venugopal, 2005).

Meanwhile, a group of studies focus on the particular types of decision making and operations under the supply chain coordination. In Xiao and Jin's study (2011), under the supply chain coordination, the independent players of the supply chain system integrate their operations to attain the mutual goal of the supply chain as a whole.

The other researchers describe the supply chain coordination as a certain form of contracts that maximize the entire portion of the supply chain profit and then allocate that big portion of the profit among supply chain members in a way to make every one of them improves his performance (Altug & Ryzin, 2014).

When the past studies examine whether the revenue sharing contract achieves the supply chain coordination, they use even various standards that indicate the coordinated supply chain system. Many studies judge that the revenue sharing contract realizes the supply chain coordination when it results in the same channel profit with the centralized or integrated supply chain system (Gutierrez & He, 2011; Hu, Xu, & Meng, 2017; Li, Zhang, Zhao, & Liu, 2019; Panda, 2014; van der Rhee, van der Veen, Venugopal, & Nalla, 2010; Wang, Zhao, & Tang, 2008; Xiao & Xu, 2013; Xu, Chen, & Bai, 2016; Yan et al., 2017; Yao, Leung, & Lai, 2008a; Yao, Leung, and Lai, 2008b; Yao, Xu, & Luan, 2016; Zhao & Zhu, 2017; Zhao, Xu, Chen, Liang, Yu, & Wang, 2020b).

Another group of studies describe that the supply chain coordination requires the improved performances of the individual chain members other than the whole supply chain system (Alaei & Setak, 2015; Chakraborty, Mateen, Chatterjee, & Haldar, 2018; van der Rhee, Schmidt, A. van der Veen, & Venugopal, 2014; Yang, Zhang, & Ji, 2017b).

In particular, Pareto improvement over the status quo is considered to be a necessary condition of the supply chain coordination in several past studies and they emphasize that none of chain members should make a loss due to the coordination (Cai, Hu, Tadikamalla, & Shang, 2017).

The other researchers focus on the supply chain decisions and operations rather than the performance, when they examine whether the revenue sharing contract coordinates the supply chain system. A large group of studies judge that the revenue sharing contract realizes the supply chain coordination in the case that the operational decisions including order quantity, production amount, and price under this contract are same with the centralized supply chain system (Bai, Xu, & Zhang, 2018; Govindan, Diabat, & Popiuc, 2012; He & Zhao, 2016; Hou et al., 2017; Hu & Feng, 2017; Hu, Feng, & Chen, 2018; Hu, Meng, Xu, & Son, 2016; Li, Ye, & Lin, 2015; Luo, Chen, & Kai, 2018; Peng, Pang, & Cong, 2018; Tang & Kouvelis, 2014; Wang & Shin, 2015; Wang, Fang, Gou, & Liang, 2017; Wang, Zhou, & Wang, 2010; Xiao & Jin, 2011; Xiao & Xu, 2013; Xue, Tang, & Zhang, 2016; Zhang, Liu, Zhang, & Bai, 2015; Zheng, Shu, Wang, Chen, Lai, & Gan, 2015; Zhou & Wang, 2012).

Certain special cases are noticed in some past studies that test whether the revenue sharing contract attains its goal. Hsuesh (2014) examines whether both profit and CSR (Corporate Social Responsibility) performance are maximized. Qin (2008) observes the supply chain system controlled by the single member is considered to be coordinated. In Hsiao, Chen, and Xiong's study (2019), the supply chain system is coordinated when the product quality level and total supply chain revenue are identical to those under the centralized supply chain system.

While the past studies use different principles to judge whether the revenue sharing contract coordinates the supply chain system, the unified code of the supply chain coordination is essential to make the proper conclusion about the true effect of this contract. In general, it is acceptable to stand with two conditions indicating a particular contract coordinates the supply chain system (Rasay & Mehrjerdi, 2017). First, the contract improves the whole supply chain performance and it becomes close to one of the centralized system. Second, every individual chain member achieves the improved performance by sharing the benefit of chain coordination so that he is willing to participate in the contract.

3.2. Contents of Revenue Sharing Contract

A large number of past studies analyze how the revenue sharing contract affects the supply chain performance, and they still use different contents of this contract in terms of the subject to share and the way to decide shares. In most

studies, the revenue sharing contract indicates that the retailer's revenue is shared with the other supply chain members (Hua, Zhang, & Xu, 2011; Juliang & Jian, 2014; Liu, 2019; Moon, Feng, & Ryu, 2015; Palsule-Desai, 2013; Qu, Zhou, Zhang, Wahab, Zhang, & Ye, 2019; Rasay & Mehrjerdi, 2017; Rasay, Mehrjerdi, & Nezhad, 2015; Raza, 2018; Sheu, 2011; Tang & Kouvelis, 2014; van der Veen & Venugopal, 2005; Wang et al., 2017; Xue et al., 2016; Yang, Qi, & Li, 2015; Yang et al., 2017b; Yao et al., 2008a; Yao et al., 2008b; Yao et al., 2016; Zhao, Zhou, Cao, & Min, 2020a; Zhao et al., 2020b; Zhao & Shi, 2011; Zhu, Kong, Xie, Li, & Cao, 2019). Instead, the other studies point out the manufacturer's revenue as the subject to be shared (Govindan & Popiuc, 2014; Gutierrez & He, 2011; Heydari & Ghasemi, 2018; Mafakheri & Nasiri, 2013; Peng et al., 2018; Xu et al., 2016).

Meanwhile, a number of researchers extend the original term of the revenue sharing contract and they include even the cost other than the revenue to be shared under the new type of this contract (Chen & Cheng, 2012; Katok & Wu, 2009). This new version of revenue sharing contracts makes the supply chain members share either retailer's profit (Kong, Rajagopalan, & Zhang, 2013; Krishnan & Winter, 2011; Li et al., 2015; Song & Gao, 2018; Wang et al., 2010) or manufacturer's profit (El Ouardighi, 2014; Wang & Shin, 2015).

In some special situations, only the specific cost items are shared among the supply chain members. In Bai et al.'s study (2018), the revenue sharing contract let a supplier and a manufacturer share the investment to develop emission reduction technology. Zheng et al. (2015) assume that the retailer's revenue and marketing cost are allocated to a manufacturer and a retailer. In one unique case, besides sharing the revenue, the manufacturer prepares the relationship-specific asset to reserve production capacity and provide the supplier with incentives to encourage him to cooperate (Zhou, Zhu, & Wang, 2020).

While the past studies specify the distinct subjects to be shared under the revenue sharing contract, they assume the different ways to determine the portion of revenue shared by individual supply chain members. In a group of past studies that analyze the revenue sharing contract, the portion of revenue allocated to each supply chain member is determined by either retailer (Cai et al., 2017; Chen, Hu, & Wei, 2017; Zheng et al., 2015; Zhu et al., 2019) or manufacturer (Hu et al., 2017; Hua et al., 2011; Mafakheri & Nasiri, 2013; Palsule-Desai, 2013; Rasay & Mehrjerdi, 2017; Wang & Shin, 2015; Wang et al., 2008; Xue et al., 2016; Yang, Cao, Lu, & Zhang, 2017a; Zhou, Zhao, Xue, & Gargeya, 2012). The other cases show that the retailer or manufacturer agree upon the amount of shared revenue (Bai et al., 2018; Cachon & Lariviere, 2005; Chakraborty, Chauhan, & Vidyarthi, 2015; He & Zhao, 2016; Khouja,

Rajagopalan, & Sharer, 2010; Peng et al., 2018).

In quite a large number of past studies, the revenue sharing ratio are simply given as an exogenous variable (Chakraborty et al., 2018; Giovanni, 2014; Govindan et al., 2012; Hou et al., 2017; Liu, 2019; Qu et al., 2019; Tang & Kouvelis, 2014; Vafa Arani et al., 2016; van der Rhee et al., 2014; Wang & Liu, 2019; Wang et al., 2017; Wang et al., 2010; Xu et al., 2016; Yang et al., 2015; Yang, Miao, & Zhao, 2019; Yang et al., 2017b; Yu, Wang, Lu, & Yang, 2020; Zhao & Zhu, 2017; Zhao et al., 2020b). Meanwhile, a certain group of researchers seek the best solution for the revenue sharing contract and optimize the revenue sharing ratio to maximize the supply chain profit or to achieve the supply chain coordination (Alaei & Setak, 2015; Cachon & Lariviere, 2005; Chen & Cheng, 2012; Govindan & Popiuc, 2014; Hsueh, 2014; Li et al., 2015; Moon et al., 2015; Raza, 2018; Sheu, 2011; Song & Gao, 2018). Even some studies assume that the revenue sharing ratio is determined to maximize either retailer's (Zhao et al., 2020a; Zhao & Shi, 2011) or manufacturer's profit (Hu et al., 2018; Mafakheri & Nasiri, 2013; Yao et al., 2008a; Yao et al., 2008b; Yao et al., 2016; Zhou et al., 2020).

Some studies describe the special situations that the revenue sharing ratio is determined. Hsiao et al. (2019) consider not only the case that the revenue sharing ratio is exogenous but also the case that it is endogenous where it is negotiated by supply chain members or the retailer decides it.

Rasay et al.'s study (2015) employs Stackelberg game model to analyze the revenue sharing contract in the supply chain system with a vendor and multiple retailers. They consider four revenue sharing contract types that are distinct in terms of who determines the revenue sharing ratio and wholesale price, and compare their performances with the wholesale price only contract and centralized system.

Under the two-stage logistics service supply chain, Liu, Xu, and Kouhpaenejad (2013) emphasize the negotiation capability of the logistics service integrator to make the fair revenue sharing and introduce the fair entropy that represents how much the revenue is equally shared with the functional service provider. In their proposed model, the logistics service integrator determines the revenue sharing contract terms to maximize the fair entropy.

3.3. Other Systems Compared with Revenue Sharing Contract

The past studies examine whether the revenue sharing contract improves the supply chain performance by comparing it with the traditional decentralized supply chain system (Govindan & Popiuc, 2014; Hua et al., 2011). Sheu (2011) investigates the supplier and retailer's behaviors

under the distribution channel coordination and directly compares the case with the revenue sharing contract and the one without it.

A number of studies evaluate the performance of the revenue sharing contract compared with the centralized supply chain system as well as the decentralized one (Bai et al., 2018; Heydari & Ghasemi, 2018; Li et al., 2015; van der Rhee et al., 2014; van der Rhee et al., 2010; Wang et al., 2017; Xu et al., 2016; Yang et al., 2017b). Their research objectives are not only to check whether the revenue sharing contract improves the supply chain performance over the decentralized system, but also to find out whether it attains the goal of the supply chain coordination and comes up to the centralized system.

Under the revenue sharing contract, in general, the supplier discounts the wholesale price and the buyer, in turn, shares his revenue with the supplier. Many researchers compare the revenue sharing contract with the wholesale price only contract, and they obtain the pure effect of the revenue sharing activity by excluding the impact of the discounted wholesale price (Becker-Peth & Thonemann, 2016; Chakraborty et al., 2015; El Ouardighi, 2014; Giovanni, 2014; Hu et al., 2018; Juliang & Jian, 2014; Kong et al., 2013; Raza, 2018; Tang & Kouvelis, 2014; Wang & Shin, 2015; Zhao & Zhu, 2017; Zhu et al., 2019).

A certain group of researchers examine whether the revenue sharing contract successfully coordinate the supply chain system, and they compare its performance with the wholesale price only contract under the case with a single retailer (Yao et al., 2008a) and the case with two competing retailers (Yao et al., 2008b). The results of their numerical analyses indicate that the revenue sharing contract leads to greater supply chain profit than the wholesale price only contract.

In the past studies, diverse types of contracts are compared with the revenue sharing contract and they include the buyback (Govindan et al., 2012; Katok & Wu, 2009; Wu, 2013), quantity discount (Peng et al., 2018; Zhao et al., 2020b), rebate (Qu et al., 2019), and two-part tariff (Xu et al., 2016). Under the videocassette rental industry, where the revenue sharing contract is common, Cachon and Lariviere (2005) analyze the supply chain coordination enabled by this contract and compare with the other contracts including the buyback, price discount, quantity flexibility, sale rebate, franchise, and quantity discount.

While numerous past studies support the successful achievement of the revenue sharing contract (Govindan & Popiuc, 2014; Heydari & Ghasemi, 2018; Hu et al., 2018; Khouja et al., 2010; Sheu, 2011), there have been efforts to modify its original form and design the improved contract. A group of researchers find out that the conventional

revenue sharing contract fails to coordinate the supply chain system and add the extra features to this contract to achieve its original goal (Chakraborty et al., 2018; Wang et al., 2010; Yao et al., 2016).

Feng, Moon, and Ryu (2014) and Song and Gao (2018) propose the modified revenue sharing contract and demonstrate that this new contract outperforms the original one. In the studies done by Palsul-Desai (2013) and Rasay and Mehrjerdi (2017), the fairness among the supply chain members is the main interest, and they show that their proposed revenue sharing contracts lead to the win-win situation for every contracting party.

3.4. Other Issues

While the impact of the revenue sharing contract on the supply chain performance is the main topic that most researchers have in their studies, the others issues are addressed by a certain number of studies. Environmental protection is considered by numerous studies on the revenue sharing contract, because this supply chain contract is frequently used to encourage the supply chain members to participate in the activities for protecting the natural environment. A group of studies focus on how the revenue sharing contract coordinates the green supply chain, where the ecofriendly products are supplied (Qu et al., 2019; Song & Gao, 2018; Yang et al., 2019; Zhu et al., 2019). Due to the current main issue of global warming, the manufacturer's effort to reduce the carbon dioxide becomes the common subject that researchers consider in their studies on the revenue sharing contract (Bai et al., 2018; Li et al., 2019; Liu, 2019; Peng et al., 2018; Xu et al., 2016; Yang et al., 2017b; Yu et al., 2020).

The past studies also consider the reverse supply chain system where the end-of-life products are remanufactured. Under this special supply chain system, the revenue sharing contract is applied to induce the customer or retailer's willingness to return the used products for recycling (Govindan & Popiuc, 2014; Heydari & Ghasemi, 2018; Mafakheri & Nasiri, 2013; Zhao & Zhu, 2017).

The supply chain management under the unstable market conditions is another issue addressed by the past studies. They examine how the revenue sharing contract alleviate the impact of demand disruption and realizes the supply chain coordination (Wang et al., 2017; Zhang, Fu, Li, & Xu, 2012; Zhao et al., 2020b; Zheng et al., 2015).

There are certain experimental tests on the revenue sharing contract combined with other kinds of coordination programs. The consignment is the traditional business practice that coordinates the supplier and buyer by allowing the buyer to pay to the supplier after the products are consumed (Hariga & Al-Ahmari, 2013). Under the consignment, Chen and Cheng (2012) examines the price-

dependent revenue sharing outperforms the wholesale price contract or the price independent revenue sharing. In Zhao et al.'s study (2020a), they investigate how the consignment with revenue sharing contract affects two competing manufacturers' strategies.

Another well-known coordination program researched by the past studies on the revenue sharing contract is Vendor-Managed Inventory (VMI). VMI is the supply chain coordination scheme where the supplier manages the inventory stored at the buyer's warehouse and synchronizes the inventory management, replenishment and production operations with buyer's sales so that the supply chain system can reduce the required inventory level and preserve the proper service level (Yao, Dong, & Dresner, 2012).

The certain past studies examine how the revenue sharing contract under VMI performs compared with the wholesale price contract and centralized system (Rasay & Mehrjerdi, 2017; Rasay et al., 2015). Xiao and Xu (2013) investigate the interaction between the pricing and service level decisions under VMI with deteriorating products and propose a generalized revenue sharing scheme to coordinate the supply chain system. Under VMI with the revenue sharing operation, Zhao, Si, Zhu, Xie, and Shen's study (2019) focuses on the behavioral aspects of supply chain members' decision-making processes in different operational procedures and examines whether the subjects' decisions conform theoretical prediction.

Other than the consignment and VMI, Quick Response (Yang et al., 2015) and Pay-back (Tang & Kouvelis, 2014) are considered to be combined with the revenue sharing contract and their performances are evaluated by the past studies. Meanwhile, the past studies still rarely develop the new type of revenue sharing with the progressive coordinating features including information sharing and joint decision making, which are found in the recent supply chain coordination programs such as Efficient Consumer Response (ECR) and Collaborative Planning, Forecasting, and Replenishment (CPFR) (Holweg, Schnedlitz, & Teller, 2009; Yao, Kohli, Sherer, & Cederlund, 2013).

4. Key Findings and Implications for Future Studies

This study conducts the literature review on the revenue sharing contract, and focuses on its role for improving the overall supply chain performance and bring the cooperation among the supply chain members. Thorough investigation on the past studies enables this study to obtain the following considerable findings.

First, there is no unified meaning of the supply chain coordination, which is agreed among the past studies on

the revenue sharing contract. Even though most researchers describe the supply chain coordination as the ultimate goal of the revenue sharing contract, they use distinct meanings of coordination in their studies. In particular, the significant differences are noticed among the studies that choose their own ways to test whether the revenue sharing attains its goal.

A group of studies make the judgement that the decentralized supply chain system with the revenue sharing contract obtains the same total profit as the centralized system (Li et al., 2019; Xu et al., 2016; Yan et al., 2017; Yao et al., 2016; Zhao et al., 2020b). Other studies examine whether each individual members' independent operational decisions are identical to the ones made by a single decision maker (Bai et al., 2018; Hu & Feng, 2017; Hu et al., 2018; Peng et al., 2018). In some studies, the supply chain coordination is considered to be realized only when the revenue sharing contract results in the Pareto improvement as well as the maximum supply chain profit (Cai et al., 2017; El Ouardighi, 2014).

Second, this study finds that the different contents of the revenue sharing contract are assumed by the past studies. In particular, they show the significant differences in terms of the subject to share and the way to determine the revenue share. Most of the past studies describe that the supply chain members share the revenue under the revenue sharing contract (Juliang & Jian, 2014; Liu, 2019; Moon et al., 2015; Rasay & Mehrjerdi, 2017). Meanwhile, other studies assume that the entire profit or the revenue and particular cost items are shared among the members under this supply chain contract (Bai et al., 2018; Chen & Cheng, 2012; Katok & Wu, 2009; Zheng et al., 2015).

Furthermore, the distinct ways to determine the revenue share are found in the past studies. In a group of the studies, either manufacturer or retailer makes the decision on how much revenue is allocated to each member (Cai et al., 2017; Palsule-Desai, 2013; Rasay & Mehrjerdi, 2017; Zhu et al., 2019). Other studies assume that the revenue share ratio is simply given (Chakraborty et al., 2018; Qu et al., 2019; Vafa Arani et al., 2016; van der Rhee et al., 2014). Some researchers propose the algorithms to obtain the optimal revenue share ratio that results in the best performance (Alaei & Setak, 2015; Hsueh, 2014; Song & Gao, 2018).

Third, the past studies examine how the revenue sharing contract affects the supply chain performance under the different circumstances. Each of them applies this contract to the unique supply chain structures, which are different in the numbers of echelons and supply chain members (Feng et al., 2014; Moon et al., 2015; van der Veen & Venugopal, 2005). A group of studies assume that the market demand is stochastic (Alaei & Setak, 2015; Chakraborty et al., 2015; Yao et al., 2008a), while the deterministic demand is employed in the other studies (Bai

et al., 2018; Chen & Cheng, 2012). Even some researchers specify very special industry types or supply chains such as logistics services and green supply chain, when they evaluate the performance of the revenue sharing contract (Govindan & Popiuc, 2014; Heydari & Ghasemi, 2018; Liu et al., 2013).

Fourth, only the limited number of the studies focus on the issues that are related to improve the current form of the revenue sharing contract. The past studies address various research issues including social responsibility, carbon emission reduction, and demand disruption (Liu, 2019; Panda, 2014; Peng et al., 2018; Raza, 2018; Wang et al., 2017; Zhao et al., 2020b), and they provide the abundant examples that the revenue sharing contract can be successfully applied to diverse industries (Bart et al., 2020; Wang & Shin, 2015; Yan et al., 2017). Meanwhile, most of the issues addressed by the past studies are associated with the special situations, and they rarely support a revolution into the more advanced supply chain contract than the original one.

Finally, the past studies rarely employ the empirical analysis as their research methods to study about the revenue sharing contract. According to the literature review, most of researchers use the modeling analysis or numerical examples (Cachon & Lariviere, 2005; Li et al., 2019; Yao et al., 2008a; Yao et al., 2008b), and only a few studies choose the empirical study and case analysis, which provide the practical implications for the industries and supports theory development (Altug & Ryzin, 2014; Guixia et al., 2013; Katok & Wu, 2009; Kumar & Haider, 2011).

The preceding findings from the literature review provide the significant implications for the future researchers. First, the researchers need to develop the unified meaning of the supply chain coordination and they use the standardized criterion to judge whether the revenue sharing contract realizes the supply chain coordination. Many past studies examine the revenue sharing based on the distinct criteria of coordination, and their outcomes are not broadly acceptable to the general cases. Future studies need to confirm the exact meaning of the supply chain coordination and they use the identical standard to examine whether the revenue sharing contract coordinates the supply chain system.

Second, future studies should pay attentions to how to implement the revenue sharing contract. The past studies show their significant differences in what to share and how to determine the revenue share, when they evaluate the performance of the revenue sharing contract. In order to figure out what has to be shared under the revenue sharing contract, the researchers should directly compare the case that the additional cost is allocated to the supply chain members with the case that only the revenue is shared

among them (Li et al., 2019).

How determines the portion of revenue share distributed to the individual member is another important issue that requires the sophisticated analysis conducted by the future studies. The researchers need to find out that the revenue sharing contract results in better performance when the revenue share is determined by the member at the upstream or downstream of the supply chain system (Luo et al., 2018; Qin, 2008; Qin & Yang, 2008). Based on the results from those studies, the researchers are expected to provide more specific managerial guidelines on the revenue sharing contract than the existing studies does and help the business practitioners properly operate the revenue sharing contract and successfully coordinate their supply chain systems.

Third, the researchers should endeavor to establish generalizable assessment of the revenue sharing contract by contemplating the effect made by the environmental factors of the supply chain system. Many researchers already examine the performance of the revenue sharing contract under the diverse situations with the particular demand patterns, supply chain structures, and industry types. While their studies show that the revenue sharing contract can be applied to the extensive cases, they do not reach the common ground of agreement to make the definitive conclusion that is applicable to the general supply chain system. By investigating the impacts of the environmental factors including the demand pattern and supply chain structure (Moon et al., 2015; Tang & Kouvelis, 2014; van der Rhee et al., 2010; Yao et al., 2008b), the future studies would provide the business practitioners with the right answer to the question whether they should use the revenue sharing contract in their supply chain systems.

Fourth, by focusing on the relevant research issues, the future studies are expected to identify the potential of the revenue sharing contract to be the more advanced coordinating program than the original contract. Although the researchers already address the diverse issues including green supply chain and demand disruption, they cover only the minority of situations occurring in the supply chain system and their research focuses are rarely related with the improvement of the revenue sharing contract (Qu et al., 2019; Song & Gao, 2018; Wang et al., 2017; Zhao et al., 2020b). The researchers may investigate the roles of certain functions that the original revenue sharing contract lacks, such as information sharing (Juliang & Jian, 2014; Kim & Song, 2013) and joint decision making (Aviv, 2001). The combination with the recent coordinating programs including Efficient Consumer Response (ECR) and Collaborative Planning, Forecasting, & Replenishment (CPFR) is another significant issue, and it would enable the future studies to develop the advanced program that

effectively coordinate the supply chain system (Holweg et al., 2009; Yao et al., 2013).

Finally, the researchers need to develop the theories by using the empirical analyses or case studies when they study about the revenue sharing contract (Altug & Ryzin, 2014; Gui-xia et al., 2013; Katok & Wu, 2009; Kumar & Haider, 2011). The majority of the past studies rely on the modeling analysis and they successfully show the potential value of the revenue sharing contract. However, the researchers can obtain the extensive findings about how the revenue sharing contract brings the supply chain coordination by using diverse research methodologies. In particular, in order to provide the theoretical basis for the further progress in research on this supply chain contract, the future studies should conduct empirical analysis on the data collected from the real companies.

5. Conclusion

The revenue sharing contract has been studied by many academic researchers due to its application to various business areas and successful achievement of bring cooperation among the supply chain members and improving the whole system performance. Most past studies examine whether this supply chain contract leads to the supply chain coordination, and they evaluate its performance under diverse circumstances.

This study reviews the selected studies that conduct the investigation on the coordinating role of the revenue sharing contract in the supply chain system. Through the thorough observation on the past studies, this study intends to identify the key coordinating elements of the revenue sharing contract and propose the proper direction to conduct research on this supply chain contract. The review of this study mainly focuses on how the researchers observe that the revenue sharing operates in the supply chain system and attains its ultimate goal, the supply chain coordination. This study categorizes the key issues that are commonly appeared in the past studies and recognizes their impacts on the implementation of the revenue sharing contract.

The literature review conducted by this study results in notable findings and they give important implications to the future researchers. First, the past studies use their own meanings of supply chain coordination, when they test whether the revenue sharing contract realizes the coordination in the supply chain system. In order to confirm the true value of this supply chain contract, the researchers ought to reach an agreement on the unified meaning of the supply chain coordination.

Second, different studies use different details of the revenue sharing contract, and they do not provide the

managerial guidelines about how to implement this contract to achieve the best outcome. Future studies need to investigate the detailed contents of the revenue sharing contract and find out the best way to apply this contract to the practices.

Third, the researchers evaluate the performance of the revenue sharing contract under different circumstances and they fail to provide the general conclusion that is acceptable to the common cases. Since the revenue sharing contract is investigated under distinct conditions of supply chain structures, demand patterns, and industry types, it is hard to make a generalizable conclusion about whether the revenue sharing contract realizes the supply chain coordination. The researchers need to conduct the sophisticated investigation on the impacts of environmental conditions on the performance of the revenue sharing contract in their future studies.

Fourth, diverse research issues are already addressed in the past studies, and they do not necessarily support the progress of the revenue sharing contract toward more advanced coordinating initiatives. This study proposes the additional issues including combination with other coordinating programs, information sharing, and joint decision making, which the future researcher would consider to enrich the revenue sharing contract to realize the full coordination.

Finally, most of the past studies relies on mathematical modeling, and they rarely use the other research methods such as the case analysis and empirical study. The researchers would figure out the true nature of the revenue sharing by applying various research approaches to investigate this supply chain contract in their future studies. To develop the theoretical basis about the impact of the revenue sharing contract on the supply chain performance, in particular, supplementary studies need to conduct the empirical studies based on the data collected from the business practices.

After all, this study finds out that the researchers possess the different perspectives in their studies on the revenue sharing contract and they rely on its distinct goal and contents. By implication, on the purpose of understanding the basic nature of the revenue sharing contract, the future studies require the additional analysis based on the unified goal and contents of this supply chain contract. Furthermore, the researchers need to check that the current and new features of the revenue sharing contract contribute the supply chain coordination and identify its potential to be the improved contract that successfully coordinates the supply chain system.

This study possesses the limitations that imply the new research topics to future researchers. First, this literature review focuses on only the supply chain coordination, which is the single aspect of the revenue sharing contract.

By emphasizing the other issues including human behavioral effect of the contract (Wu, 2013; Zhao et al., 2019) and algorithm development (Chauhan & Proth, 2005), the future studies can identify the key nature of the revenue sharing contract and develop the managerial guideline to obtain the best performance from this supply chain contract.

Second, this study reviews only a portion of numerous past studies on the revenue sharing contract. Since most of the researchers choose the numerical analysis in their past studies on the revenue sharing contract regarding the supply chain coordination, this review covers only a small number of empirical or case studies (Gui-xia et al., 2013; Katok & Wu, 2009; Kumar & Haider, 2011). Meanwhile, the researchers become to pay attention to additional issues regarding the revenue sharing contract, such as impacts of environmental conditions, behavioral aspect of the contract, and application to specific industries, and many more studies are expected to exploit the diverse research methodologies other than mathematical modeling in the near future (Altug & Ryzin, 2014; Becker-Peth & Thonemann, 2016). The extensive literature review on various studies on the revenue sharing is rendered to future researchers.

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