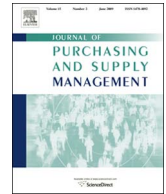




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The role of control power allocation in service supply chains: Model analysis and empirical examination

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ABSTRACT

In complex and competitive business environment, there have been many examples of supply chain members fighting for power. Therefore, researchers have begun focusing on the impact of control power allocation on the supply chain. This paper examines the allocation of power in different service supply chain relationships, analyzing the impact of service level on optimal control power allocation and comparing the differences between the optimal power distribution in service supply chains and that of manufacturing supply chains. We adopt a mathematical model building method to discuss this issue, verifying the theoretical perspectives through empirical studies of China's largest state-owned logistics company, the China Railway Company, and the private ownership enterprise, Tianjin SND Logistics Company. We also develop a conceptual model of the influence of control power on the performance of service supply chains, based on the modeling and case analysis. The conceptual model shows several results: the control power allocation determines the dominant structure of the supply chain; the service provider's wholesale pricing strategy and the service integrator's sales price strategy present different outcomes under various dominant structures of the supply chain, which will greatly affect the performance of the corresponding supply chain; and the relationship between the supply chain dominant structure and the price can be adjusted by the service level.

1. Introduction

Power has been defined as “the ability of an actor to influence another to act in the manner that they would not have otherwise” (Emerson, 1962) and relevant researches have been conducted in many branches (Svensson, 2002; Benton and Maloni, 2005; Hingley, 2005; Pinnington, 2009; Meehan and Wright, 2011; Robbins et al., 2014). Power, as the potential to influence, is implicit in all buyer–seller relationships (Croom et al., 2000). Consequently, a robust understanding of power is of value in the supply chain research agenda. Indeed, power has been well documented in the supply chain field, as it is focused on the relationships between the buyer and the suppliers (Meehan and Wright, 2011, 2012; Rehme et al., 2016). In the buyer–supplier relationship, many enterprises realize the influence of supply chain control power on their own performance. As discussed by Reimann and Ketchen (2015), supply chain power varying from how an individual firm wields power to how one controls the supply chain power to gain profits. Therefore, in the practice of supply chain management, reports of competition for control power among supply chain members show an increasing trend. For example, in the 1980s,

Procter and Gamble and Wal-Mart fought for control of commodity prices and shelf positions in a classic supply chain control power dispute (Lynn, 2006). Similar conflicts also appeared among Chinese manufacturing companies, such as GREE and GOME (Chen et al., 2007). There have been many cases of contention over control power in the service industry. For example, the China Railway Company (CRC) continues to expand its supply chain control by trying to achieve a dominant position in collaboration with China S.F. Express; China Southern Airlines and China Post have also had similar battles for control power. However, to date, these battles over supply chain control power have not been analyzed theoretically.

From a theoretical perspective, related theories of control power in terms of power–dependence theory (Pfeffer and Salancik, 1978; Gassenheimer and Ramsey, 1994; Skvoretz and Willer, 2010) and the relational view have formed an important theoretical basis of the supply chain partnership (Guerrero et al., 2010; Faith, 2009; Dahlander and Frederiksen, 2012). However, current research of supply chain control power is insufficient in two respects. On the one hand, since control power is invisible and difficult to measure, existing supply chain management research has not taken into account the

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impact of differences in control power allocation on supply chain decisions. To date, no study has viewed control power as an endogenous variable and explored the impact of control power on supply chain coordination (Demirkan and Cheng, 2008; Seifert et al., 2012). However, according to the resource-based view, supply chain members in the follower position do not lack control power completely. Rather, their weakness in resources results in less control power than the dominant supply chain member. Therefore, the control power variable is not simply 0 or 1, but a continuous variable (Kirilenko, 2001). Regardless, quantitative researches involving control power variables are quite rare in both service supply chain and manufacturing supply chain. Liu et al. (2015) viewed control power as a decision variable and studied the effect of differences in control power allocation on manufacturing supply chain coordination. However, Liu et al.'s study was limited to manufacturing supply chains issues and it did not extend to service supply chains. Furthermore, regarding to the theory of supply chain control power, a comparative study of manufacturing supply chains and service supply chains has not been reported. In the research of supply chain power, conceptual frameworks on the relationship between the supply chain control power and supply chain performance are still insufficient. Although supply chain power and supply chain performance have been studied independently, the relationship between them and the factors influencing their relationship are lack of corresponding researches (Panayides and Lun, 2009; Meehan and Wright, 2011, 2012; Fu et al., 2013). Many companies such as GREE, GOME and CRC etc. have suffered the performance loss in the power battles due to the lack of understanding of the relationship. Therefore, we are motivated to analyze the impact of supply chain control power on service supply chain performance in order to enrich the research on supply chain control power.

Our study has developed a conceptual model of the influence of control power on the performance of service supply chains. The model will help managers and researchers to understand the impact of supply chain control power and service level on supply chain performance in the operation of service supply chains. In this article, we analyze the optimal control power allocation in different supply chain relationships and compare the control power allocation in terms of supply chain performance. In order to facilitate the investigation, we study a two-echelon supply chain, consisting of a service integrator and a service provider, based on Liu et al. (2015) and Wei et al. (2013). However, unlike Liu et al. (2015) and Wei et al. (2013), we introduce the supply chain control power parameter and study service supply chain coordination in different relationships. We also adopt mathematical model building and case study to discuss this issue, introduce the control power parameter from a theoretical perspective, and verify the theoretical conclusions obtained in modeling through empirical studies of China's largest state-owned logistics company, CRC, and a private ownership enterprise, Tianjin SND Logistics Company, then compare our conclusions with those of Liu et al. (2015). The following questions were addressed:

1. Is there an optimal control power allocation in the supply chain with regard to three relationships: decentralized decision-making supply chain dominated by integrators, decentralized-decision making supply chain dominated by providers and Nash negotiation decision-making supply chain?
2. What effects will the service level have on the optimal control power decisions of service supply chains, the sales price of the provider and the wholesale price of the integrator?
3. How should supply chain managers use a conceptual model based on the influence of control power on the performance of service supply chains to better manage the supply chain performance?

Our study arrived at some unexpected conclusions. Firstly, the control power allocation determines the dominant structure of the supply chain; the service provider's wholesale pricing strategy and the

service integrator's sales price strategy present different rules under various dominant structures of the supply chain, which will greatly affect the performance of the corresponding supply chain; and the relationship between the supply chain dominant structure and the price can be adjusted by the service level.

Secondly, there are significant differences between the optimal control power allocation of manufacturing supply chains and that of service supply chains; the optimal control power allocation of two members in decentralized service supply chains is close to 1/2, whereas that in decentralized manufacturing supply chains is greater than 1/2. Furthermore, the member that dominates the supply chain gains more profit in manufacturing supply chains, whereas the profit of the dominant member in service supply chains is related to the service level. When the service level is relatively low, the dominant member is more profitable; however, when the service level exceeds a certain threshold, the subordinate member in the supply chain obtains a greater profit.

The remainder of this paper is organised as follows. Section 2 will provide the theoretical background. Section 3 will detail the methodology. Section 4 will present three different service supply chain models of control power allocation. Section 5 will offer a discussion of the conclusions drawn from the three models and make a comparison between our findings related to service supply chains and Liu et al.'s (2015) findings related to manufacturing supply chains. Section 6 will present the empirical cases. Section 7 will develop a conceptual model regarding to the influence of control power on the performance of service supply chains. Section 8 will propose the conclusions and the management implications of this study.

2. Theoretical background

This study is inspired by a number of related theories (Chiang and Monahan, 2005; Guerrero et al., 2010; Faith, 2009; Panayides and Lun, 2009; Meehan and Wright, 2011, 2012; Dahlander and Frederiksen, 2012; Fu et al., 2013). We present the theories that are most relevant to this paper, including the power-dependence theory, the relational view and supply chain performance, then we introduce the development as well as gaps of the theories. Finally, we will offer some new perspectives on these theories.

2.1. Power-dependence theory

Power was originally defined by Emerson (1962) as “the ability of a member to influence another to act in the manner that they would not have otherwise” (p. 32). This definition indicates that managers will struggle for more power in the use of power. Thus, some scholars view power as a way to control the level of cooperation and struggle; this view has resulted in a multitude of researches focused on dynamic power and the use of power (Cox et al., 2004; Ireland, 2004; Benton and Maloni, 2005; Payan and Nevin, 2006; Hingley, 2005; Gelderman et al., 2008). Although these definitions of power focus on shaping the behavior of other members, power is always discussed between two members (e.g., buyer–seller, employee–supervisor); that is, power is the potential for one member to change another's behavior (French and Raven, 1968; Benton and Maloni, 2005; Hingley, 2005; Meehan and Wright, 2011, 2012; Rehme et al., 2016). In addition, the two-echelon supply chain model is always considered as the research basis for complex model and the useful conclusions from two-echelon supply chain model could be extended to other complex models (Liu et al., 2013; Hu et al., 2016). Therefore, in this paper, we consider the supply chain power focused on the two-echelon supply chain, without multi-echelons or other complex supply chains.

On the other hand, power as a social property was once viewed as an attribute of an internal relationship within an organization; this view resulted in a wider definition, which considered power to be inherent, dynamic and potentially unstable. Thus, many empirical

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