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Industrial Marketing Management



Servitization, digitization and supply chain interdependency

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ABSTRACT

This study draws on literature at the intersection of servitization, digital business models and supply chain management. Work empirically explores how digital disruption has affected Business-to-Business (B2B) interdependencies. Dematerialization of physical products is transforming the way firms are positioned in the supply chain due to a reduction in production and transport costs and the different ways business engage with customers. Specifically, we propose that these new market conditions can empower downstream firms. We further propose that upstream firms can still capture additional value through digital service if their servitized offer includes difficult to imitate elements. The context of the analysis is the publishing industry. The Payment Card method employed is used to test UK and US consumer's perceptions of digital formats (eBooks) and assess their willingness to pay in relation to printed formats. The method undertaken enables us to elicit aggregated consumer demand for eBooks which in turn identifies optimal pricing strategies for the digital services. Analysis demonstrates that during digital servitization upstream firms should seek to deploy unique resources to ensure their strategic position in the supply chain is not diminished.

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1. Introduction

Product firms are gradually adopting service business models (Cusumano, Kahl, & Suarez, 2015). Approximately two thirds of product firms in developed countries have already adopted a servitization strategy (Neely, 2008). In addition, on average service revenue of product firms accounts for 30% of their total revenue (Fang, Palmatier, & Steenkamp, 2008). Through servitization, firms are able to differentiate their offering and enhance customer engagement (Vandermerwe & Rada, 1988). Nevertheless, recent studies have shown that capturing value through servitization is complex in firms selling manufactured (Benedetti, Neely, & Swink, 2015; Kohtamäki, Partanen, Parida, & Wincnet, 2013) and digitalized products (Suarez, Cusumano, & Kahl, 2013). This article seeks to unpack some of the complexities of servitization by examining the role of digital technologies and firm interdependencies, two underexplored elements in servitization literature.

Through digital technologies product firms are able to adopt, design and deliver new smart and connected products that change the way they compete (Porter & Heppelmann, 2014), and provide services

(Porter & Heppelmann, 2015). The dematerialisation of physical products is merging the trends in digitization and servitization of the offer in product firms (Lerch & Gotsch, 2015). An incipient but growing literature is analysing the role of digital technologies in servitized product firms under the heading *digital servitization* (Vendrell-Herrero & Wilson, 2016), which is formally described as the provision of digital services embedded in a physical product (Holmström & Partanen, 2014). This stream of literature examines how digital technologies are both a driver and enabler of servitization. In terms of establishing mechanisms of value capture, digital servitization introduces two important obstacles. First, digital services often substitute (or cannibalize) traditional products (Greenstein, 2010), which is challenging in terms of business model implementation (Cusumano et al., 2015). Second, once digital services are created the marginal cost of producing new units is practically zero, which reduces the customers' perception of the value created by the offering (Rifkin, 2014). An important contribution of this study is an analysis of how product firms can overcome these obstacles.

Digital disruption in combination with electronic commerce has affected firm interdependencies and power relationships in a number of different sectors. In the music, taxi and hotel sectors new digital services such as Spotify, Uber and AirBnB have entered the market as downstream retailers and have established competitive offerings by

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controlling consumer interaction and making upstream resource owners dependent suppliers. There are examples of upstream firms having maintained a dominant position in the supply chain. For example in the travel industry Airlines have been able to create reliable digital service platforms for retail and retain control over production, service provision and infrastructure operation despite many new digital intermediaries entering the market (Preiss & Murray, 2005). The present article examines how the appearance and growth of digital retailers impacts on the power relationships in the entire supply chain (Cox, 1999). Literature analysing the role of electronic retailers in supply chains has implicitly or explicitly explored the unidirectional dependence of upstream or downstream parties. Analysis of the music industry shows that music producers have increased their dependence on digital retailers (Bustanza, Parry, & Vendrell-Herrero, 2013). Ritala, Golnam, & Wegmann (2014) analyse digital servitization in book sales and find that Amazon uses its scale to dominate the relationship with its suppliers and competitors. These papers examine a particular context from only one perspective and to the best of our knowledge, literature is silent on the analysis of bidirectional, upstream–downstream interdependencies in those contexts. Consequently, a second important contribution of the present research is the analysis of the dynamics of upstream–downstream interdependencies in sectors where digital servitization has occurred.

The book publishing industry is a suitable context for study for a number of reasons. First, product firms in this industry have experimented with digital servitization through the development of digital products, eBooks, and the launch of specific hardware, eReaders (Anand, Olson, & Tripsas, 2009; Gilbert, 2015). Second, the industry has received widespread coverage in the popular press due to disagreements over product pricing between upstream organizations (publishers) and downstream electronic retailers (Baye, De los Santos, & Wildenbeest, 2013). Third, we argue that there is a difference in the market prices sought between a product firm and an electronic retailer as they control, and therefore seek to monetize, different resources. All these factors are features of the publishing industry and underpin the research design based on the comparison between publishers' desired prices and actual market prices of digital services. Therefore, a third important contribution of this study is the method implemented that robustly estimates a product firms' preferred prices. Previous studies analysing the pricing disagreement between product firms and electronic retailers in the publishing industry have used parametric (De los Santos & Wildenbeest, 2015; Reimers & Waldfoegel, 2014) or game-theoretic approaches (Gaudin & White, 2014; Li, Lin, Xu, & Swain, 2015). The empirical analysis in this paper exploits survey data for 8000 consumers residing in the UK and USA and elicits the consumers' willingness to pay specific prices using the payment card method (Camacho-Cuenca, García-Gallego, Georgantzis, & Sabater-Grande, 2004; Ryan & Watson, 2009). This exercise informs firms' decision-making and can be used to estimate the price that maximises publishers' profit.

The paper proceeds as follows. The next section develops the theoretical underpinning, positioning the paper as a study that examines how digital servitization affects the vertical interdependencies in supply chains. Insights allow the development of two testable theoretical propositions. Section 3 builds upon the particular case of the publishing industry and presents arguments as to why this is a suitable context to test theoretical propositions. Section 4 explains the data gathering process, describes methodology, and shows results. Section 5 presents a discussion of the results in relation to the current debates in the publishing industry. Section 6 closes the work with relevant theoretical and managerial implications and future research.

2. Theoretical underpinning

2.1. Structure of power in upstream–downstream relationships

Supply chain management (SCM) encompasses the efforts involved in delivering and producing products and services in the value chain

(Scherer, 2005). SCM links the processes across supplier–user companies and functions that enable the value chain to make products and provide services to the customer (Cox, Blackstone, & Spencer, 1995). The paradigm moves beyond the individual organization to a broader perspective examining the value-creating network formed by the key firms (Kothandaraman & Wilson, 2001). Firms work together in supply chains, but seek to maximize their individual power to capture greater value for themselves (Peppard & Rylander, 2006). The linkages between the systems of interdependent activities that compose a product's supply chain create the structures of power and therefore the resolution of the trade-offs created within these linkages provides a source of firm competitive advantage (Porter, 1985).

The research presented here builds upon theory of organizational power within the supply chain and follows Cox (1999), who describes power as an unbalanced relationship in which either upstream or downstream parties in the supply chain have the capacity to appropriate most of the value created within exchanges. Power can be examined from a single perspective, studying the dependence of the focal or partner company, where dependence is the unidirectional reliance of a party on its counterpart (Scheer, Miao, & Palmatier, 2014). Dependence plays a critical role in industrial marketing relationships and impacts on strategic behaviour and economic outcomes with widely divergent results (Lusch & Brown, 1996). An alternative and more integrative approach looks at power from a bidirectional perspective (Kumar, Scheer, & Steenkamp, 1995), studying the magnitude of interdependence between parties (e.g. level of dependency of the focal and partner parties) and the dyadic structure of power in terms of interdependencies (e.g. asymmetric or symmetric interdependencies). In a meta-analysis of the literature on interdependencies, Scheer et al. (2014) conclude that the impact of Business-to-Business (B2B) interdependencies differs from those of Business-to-Consumer (B2C) and product-based exchange relationships differ from service-based relationships.

Asymmetries of power in the supply chain can result from a firm having market dominance in terms of size and market share. In addition other strategic factors influence power imbalances between upstream and downstream companies. For instance, Palmer, Simmons, Robinson, and Fearn (2015) describe how downstream suppliers can produce power imbalances through institutionalizing industrial workshops, a venue based mechanism where the dominant partner enhances their standing in B2B exchanges by enacting presentations, discussions and award ceremonies. The approach ensures that institutional logics of a dominant buyer are persistent in the face of any potential supplier disruption and supplier dependence is increased through the generation of collective identities and the enhancement of supplier docility. Another way of exercising power is to increase switching costs through the enforcement of specific technology adoption. Hart and Saunders (1997) provide an example of the implementation of firm specific Electronic Data Interchange (EDI) technology. Non-dominant firms had to change to the powerful firms chosen technology if they wish to do business with them, locking them into the relationship by increasing their switching cost and making them technologically dependent.

The fact that an organization has power over another does not imply that power is exercised. The existence of power is not necessarily incompatible with trust and cooperation between upstream and downstream parties (Kumar, 2005). He, Ghobadian, and Gallear (2013) found that in long-term relationships the dominant company holding the balance of power could enhance knowledge acquisition processes and improve the performance of the supply chain by restraining from the use of their power.

The reviewed literature on power in supply chains is illustrated in Table 1 in a representation of power structure and perspective. On the horizontal axis, supplier–buyer interactions are analysed as unidirectional (i.e. the context is analysed from the perspective of the focal company only) or bidirectional (i.e. the context is analysed from the perspective of both focal and partner companies). On the vertical axis, power relationships can be balanced or unbalanced.

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