



Global sourcing and quality recalls: An empirical study of outsourcing–supplier concentration–product recalls linkages



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ABSTRACT

This study investigates how supply chain sourcing strategies are associated with product quality recalls. In particular, the research examines how make-or-buy decisions (i.e., outsourcing), the use of foreign suppliers (i.e., offshore outsourcing), the relocation of production to offshore markets (i.e., offshoring), and decisions to consolidate supply bases (i.e., the use of few vs. myriad suppliers) are related to product recalls. Product recalls are serious quality failures in supply chains with significant, negative impacts on firm performance. Product recalls are frequently connected to the globalization of supply chains. Globalization has, at times, promoted inconsistency in quality control and standards, leading to quality problems and failures. Data across multiple industries, with widely reported recalls, have been collected and analyzed using regression techniques. Our findings indicate that offshore outsourcing has a greater impact on recalls than offshoring without outsourcing; outsourcing domestically has the least influence. Outsourcing to a smaller supplier base may lead to fewer recalls at low levels of outsourcing. However, it may exacerbate the impact of outsourcing on recalls at high levels of outsourcing.

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1. Introduction

Most industries have seen an increase in outsourcing and offshoring activities, ranging from business processes and information technology (Corbett, 2005) to production and manufacturing (Wilhelmsson, 2004). While outsourcing and offshoring are motivated by myriad factors, cost savings are most often the driving force (e.g., Landis et al., 2005; Insinga and Werle, 2000; Kakabadse and Kakabadse, 2003; Cecere, 2005). However, these strategies may have unintended consequences, such as increased exposure to quality risks resulting from reduced control and visibility in the supply chain (e.g., Doig et al., 2001; Landis et al., 2005; Robinson et al., 2008). In this study, we investigate the relationship between outsourcing and product quality via product recalls. We examine different forms of outsourcing, subsequent supply chain implications, and hypothesize relationships linking individual structural measures in the supply chain related to outsourcing and product

quality (as measured by product recalls of individual firms). We also examine the interactions between key attributes of outsourcing and their joint effects on product quality.

Outsourcing involves changes in supply chain governance, but research has been rare in examining the role of supply chain governance in managing product quality and the likelihood and frequency of quality failures. More broadly, Leiblein et al. (2002) suggest an examination of how governance strategies affect not only profits but also risks as well. Quality risks may be higher under outsourcing because, as indicated in Marucheck et al. (2011), outsourcing and offshoring make supply chains longer and more complex as more hands touch products moving across supply chain nodes and international boundaries. Further, outsourcing involves losing a degree of control over outsourced activity, which creates avenues for opportunism.

While some risks (e.g., product recalls) intuitively seem greater with outsourcing and offshoring, limited research has been conducted on this relationship. Decisions, associated with outsourcing/offshoring decisions, can impact the structure of supply chains. Key choices (e.g., the extent of supply base diversification or concentration) may be related to quality risks resulting from complexities in supply chains. This all leads to important research questions: *Are quality recalls associated with outsourcing and offshoring in supply chains? Which of the three outsourcing options*

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– *outsourcing, offshore outsourcing, or offshoring* – *impact product recalls the most?*

Offshoring may include shifting manufacturing to offshore locations within the same parent company or to different offshore companies. In this paper, shifting manufacturing to offshore locations within the same company is termed *offshoring* and sourcing from offshore firms is referred to as *offshore outsourcing*. This paper contributes to operations management literature by proposing, and empirically investigating, linkages between various aspects of *outsourcing* and product recalls. Product recalls are quality failures within supply chains. While quality management has garnered substantial interest among researchers (e.g., Sousa and Voss, 2002), quality failures have been understudied from the supply chain perspective. This research empirically investigates whether product recalls are associated with a firm's global sourcing decisions and supply base. We examine the relationships between recalls and the degree a supply chain is outsourced, offshore outsourced, and offshored. In addition, we examine the concentration (diversification) of the supply base and how it relates to recalls.

This research contributes to operations literature in several ways. First, drawing upon quality management and outsourcing literature, we propose and empirically investigate the link between outsourcing, offshore outsourcing, offshoring and quality failures as assessed through product recalls. The results significantly contribute to theory: interest misalignments and outsourcing complexities result in high-quality failure risks when manufacturing is outsourced; the risk is higher when the outsourced activity is offshored. Second, a model is developed from the theoretical relevance that establishes linkages between consolidation of the supply base and product recalls. We propose two different relationships between supply base concentration and recalls: a direct effect via reduced exposure to risks and a moderating effect via diminishing transactional complexity and coordination challenges. This provides contingencies for our theory. Our findings indicate that *both* outsourcing and offshore outsourcing have significant and positive impacts on product recalls. Interestingly, offshoring appears to have *less* impact on recalls relative to offshore outsourcing and domestic outsourcing has the least impact. We also find that outsourcing to a smaller supplier base may actually lead to *fewer* recalls for firms on the low side of outsourcing.

This work is organized as follows: a review of the literature is presented in Section 2, followed by a discussion of hypotheses developed from the literature in Section 3, and data and research methodologies in Section 4. The results are presented and discussed in Section 5. They are followed by a conclusion.

2. Literature review

To develop the theoretical underpinnings for the research hypotheses, we draw upon literature on strategic sourcing and quality management, under the framework of agency theory.

2.1. Quality management and product recalls

Quality management (QM) research has focused on quality programs within a firm or facility (Sousa and Voss, 2002). While it has been well developed, there is a dearth of QM literature focusing on quality issues in a supply chain setting (e.g., Robinson & Malhotra, 2005). Notable exceptions include analytical (and a few empirical) studies examining the relative effectiveness of different forms of quality management at a contract manufacturer or supplier (e.g., Hart et al., 1997; Economides, 1999; Hwang et al., 2006; Forker, 1997; Trent and Monczka, 1999; Handley and Gray, 2013). Empirical studies have looked at how buyer–supplier collaborations may impact supplier quality (Trent and Monczka, 1999), the impact on

supplier quality of the interaction between buyers' quality management practices and suppliers' efficiencies and power (Forker, 1997), and the impact of contractual incentives and monitoring mechanisms on quality performance (e.g., Handley and Gray, 2013). A few studies have indicated that offshore locations typically perform worse in quality (Gray et al., 2011).

Anecdotal evidence has indicated that well-known quality failures, associated with product recalls, are often linked to outsourced manufacturing. Recently, there has been an increase in empirical research in operations management on product recalls. Marucheck et al. (2011) have summarized the issues and outlined research opportunities in product safety research. They indicated industries prone to recalls and areas with potential for academic research (e.g., supplier relationship management). Thirumalai and Sinha (2011) conducted an empirical investigation of causes of recalls in the medical devices industry. They found that research firms are more likely to make recalls; product diversification and prior recall experiences are negatively correlated with future recalls. Earlier studies found a negative relationship between learning experiences and recalls. Haunschild and Rhee (2004) found that past voluntary recalls have a negative impact on future recalls. Beamish and Bapuji (2008) suggested that outsourcing to China has *not* been a contributor to recalls; most recalls are actually due to design flaws based on issues in the *home country*.

Much research regarding product recalls has been on the impact of recalls, rather than on the sources or causes of recalls. For example, researchers have examined the effects of recalls on demand (Crafton et al., 1981; Reilly and Hoffer, 1983), brand equity (Dawar and Pillutla, 2000), marketing effectiveness (Herde et al., 2007), and on shareholders' wealth (e.g., Jarrell and Peltzman, 1985; Hoffer et al., 1988; Thirumalai and Sinha, 2011). This research contributes to the QM literature by linking the granularities of outsourcing/offshoring decisions and product recalls. Specifically, this study investigates the extent to which outsourcing, offshored outsourcing, offshoring, and the concentration of a firm's supply base are associated with quality failures as measured through recalls.

2.2. Outsourcing and offshoring

Outsourcing decisions involve activities firms buy from other firms (Stuckey and White, 1993). Studies have shown that outsourcing creates competitive advantages (e.g., Narasimhan and Das, 1999) and strategic benefits for firms (Kakabadse and Kakabadse, 2003; Holcomb and Hitt, 2007; Kroes and Ghosh, 2010). A major theoretical framework behind outsourcing is based upon agency theory, which explains that outsourcing is a strategic move to delegate responsibility to another firm in order to, among other goals, lower costs for the outsourcer (Kroes and Ghosh, 2010).

While offshoring may be broadly defined as the relocation of some manufacturing and production stages to foreign countries, it is comparable and more relevant to quality recalls when it involves international outsourcing. So, while the focus of this study is on the outsourcing-recall nexus, a distinction is made between domestic and offshore outsourcing. This delineation further advances the understanding of the outsourcing-recall relationship via the agency theory lens.

Considerable research has examined outsourcing and offshoring. In summarizing the literature on outsourcing, Lacity et al. (2010) reported that empirical findings are conflicting (i.e., results from outsourcing and offshoring research studies have been found to be negative, positive, or insignificant). Some scholars have found a negative curvilinear relationship between outsourcing and firm performance, using measures such as market share (e.g., Kotabe et al., 2012) and financial performance (e.g., Grimpe and Kaiser, 2010; Kotabe and Mol, 2004; Kotabe et al., 2008; Rothaermel et al., 2006). While some empirical studies have found that outsourcing

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