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Emerging market presence, inventory, and product recall linkages

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ABSTRACT

This study investigates simultaneous linkages between outsourcing, in-house offshoring, sales to emerging markets, inventory and product recalls. The study finds a positive and significant association between outsourcing to emerging markets and recalls and that sales penetration into emerging markets reduces recalls; however, it finds no direct relationship between in-house offshoring and recalls. Interestingly, in-house offshoring to emerging markets appears to mitigate the positive relationship between outsourcing to these markets and recalls; this suggests that transactional complexities of outsourcing to emerging markets are mitigated by a physical presence in the market. This important finding suggests that by keeping some operations in-house, firms may reduce the negative effect of outsourcing on product quality and safety while reaping low-cost benefits of sourcing from these emerging markets. Additionally, the results indicate that institutional immaturities within recipient countries (associated with outsourcing) are primary contributors to inefficiencies affecting quality performance. On the inventory side, sourcing from emerging markets negatively affects inventory performance. Although inventory performance typically does not appear to be related to recalls, finished goods inventory is positively associated with quality failures.

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1. Introduction

Diversification into emerging markets (hereafter referred to as EMs) is an important strategic choice for many firms. Over 4000 US firms (with over 63,000 subsidiaries) now operate directly or indirectly in about 191 countries (Han et al., 2013), including many EMs. Interestingly, in certain consumer goods categories (e.g., electronics and toys), US domestic manufacturing now only represents *less than half* of the total goods consumed in the US (Blackburn and Noll, 2011; Manning, 2009). US firms not only depend on EMs for their manufacturing needs, but they also generate approximately half of their revenues and sales in foreign countries, especially EMs (Fortune Magazine, 2010).

We examine three EM penetration strategies, outsourcing or contract manufacturing intensity, in-house offshore manufacturing intensity, and sales penetration intensity, and hypothesize relationships linking them to inventory and product-quality performance. We also evaluate interactions between these forms of EM penetration modes and their joint effects on supply chains (hereafter referred to as SC), measured via inventory and product quality. Additionally, we investigate three common characteristics of EMs that are associated with poor SC performance: institutional immaturity, infrastructural immaturity, and physical distance.

Anecdotal evidence and academic research have suggested that a firm's presence in an EM will ultimately yield mixed results. An EM presence may lead to lower costs and inventories, yield new markets, and increase worldwide sales and profits (Babbar et al., 2008; Garten, 1997; Khanna and Palepu, 1997; Khanna et al., 2005; Pacek and Thorniley, 2007). On the other hand, SC performance metrics, such as product quality and inventory levels, can be adversely affected. Cost-quality tradeoffs may appear more salient to firms operating in EMs because of the induced and hidden costs (Holweg et al., 2011; Lorentz et al., 2013). Moreover, certain attributes of EMs (e.g., weak contract legislation and enforcement, poor infrastructure, and physical distance) are known to increase SC risks (e.g., opportunism, uncertainties, and SC disruptions) and thus raise the likelihood of higher inventory levels and product recalls. However, limited research has been conducted on these types of

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relationships. These tradeoffs lead to essential research questions: *Is supply chain performance (as measured via product recalls and inventory) associated with EM penetration? Which of the three common EM characteristics (i.e., institutional immaturity, infrastructural immaturity, and physical distance) affect firm performance the most*?

This study focuses on the three aforementioned forms of EM penetration intensity and examines their relationships with two SC performance metrics: product quality (and safety) and inventory performance. Outsourcing and offshoring are directly associated with product manufacturing. These practices may have quality implications; the popular media has linked them with low quality and product recalls. Furthermore, distances between home markets and manufacturing locations, as well as infrastructural and institutional challenges endemic in EMs, clearly affect lead times and inventory performances. SC disruption risks, which are higher in EMs (Hendricks and Singhal, 2005), lead to more safety stocks, increasing inventory levels. Additionally, quality standards and expectations may be lower in EMs, making the market less sensitive to failures associated with quality problems and product unavailability. Thus, entering into EMs adds new uncertainties, such as more complex SCs and unpredictable markets, which negatively affect performance associated with product quality and inventory.

Product recalls and inventory are important SC performance measures. Product recalls erode market value through both direct costs, such as the cost of managing the reverse logistics, restitution, and legal expenses (Berman, 1999; Rupp, 2004; Tang, 2008), and indirect costs, such as loss of sales revenue, market value, and brand image (Jarrell and Peltzman, 1985; Thirumalai and Sinha, 2011; Heerde et al., 2007). Consequently, firms recalling products are expected to be financially penalized (Jarrell and Peltzman, 1985; Thirumalai and Sinha, 2011). Though inventory holdings provide product availability and reduce the likelihood of stock-outs, reductions in inventory decrease the holding cost of inventory, thus potentially improving profitability for the firm as the funds released from the inventory investment are put to better uses. Recalls and inventory therefore, have important implications for organizations short term bottom line, and long term sustainability, and their linkages to any firm strategies would consequently, have significant research and managerial implications.

This research has several contributions to the literature. First, a theoretical model is developed that establishes linkages between EM penetration, inventory, and product recalls. A distinction we make, between the three forms of operations in EMs (i.e., sales, offshore outsourcing, and in-house offshoring), yields a significant contribution to the general understanding of business operations in EMs and some of the associated risks such as uncertainty, opportunism, and disruptions. Second, we investigate nuances of EM operations and the relationships with quality failures and comparatively assess the effects of common characteristics (i.e., institutional weaknesses, infrastructure and physical distances) in EMs on product recalls and inventory performance. The study finds that institutional weaknesses (vs. infrastructure and physical distances) are the main drivers of recalls when manufacturing is outsourced to EMs. These nuanced findings contribute significantly to the theoretical linkage between outsourcing to EMs and SC performance. Third, although our results show that in-house manufacturing in EMs has limited impact on quality, it appears to curb agency problems associated with outsourcing to these markets. Fourth, our findings indicate that outsourcing to EMs has a significant and negative impact on both inventory and quality performance. Finally, although sales penetration does not appear to negatively affect inventory or quality performance, we find that an excess of finished goods (FG) inventory is associated with higher recalls.

2. Theory and hypotheses

2.1. EM penetration and quality

There is little research linking EM penetration and product quality and safety failures. However, EMs have some common characteristics that can be associated with poor product quality and safety. These include exposure to higher risks of disruptions (Hendricks and Singhal, 2005); weak legislation; lack of quality enforcements; corruption (Luo, 2008); poor traceability (Lyles et al., 2008); educational, physical, and cultural gaps between EMs and their developed country counterparts; and differing contractual views shaped by differing cultures (Lyles et al., 2008). EM penetration intensity may increase the exposure of a firm to SC disruptions for many reasons. First, infrastructure in many EMs is either poor or fledging as demonstrated by meager transportation systems, inadequate warehousing facilities, and low-quality or congested ports (Babbar et al., 2008; Prasad et al., 2005; Lorentz et al., 2013; Ruamsook et al., 2007), resulting in increased exposure to SC disruptions. In addition, deficient technological infrastructure (Prasad and Tata, 2010; Lorentz et al., 2013) and the limited use of advanced supply chain management (SCM) systems make visibility and traceability of SC activities difficult. Second, poor institutional infrastructure (e.g., legislation, regulations, policies, and the implementation and enforcement of rules and regulations) adds to risks of opportunistic behaviors and hinders compliance to contractual policies (Marquis and Raynard, 2015; Child and Lu, 1996). Third, EM partners (i.e., customers and suppliers) may be less reliable than domestic suppliers due to differences in business rules, standards, and business cultures (Babbar et al., 2008; Cook, 2007; Pagell et al., 2005; Hitt et al., 2000). Thus, a broad hypothesis is that there is a positive relationship between EM penetration intensity and product recalls. Three hypotheses examining linkages between offshore outsourcing, in-house offshoring, and sales penetration (and interactions between offshore outsourcing, in-house offshoring, and product recalls) are proposed in the following sections.

2.1.1. Outsourcing to EMs

Agency theory supports the view that quality may be lower at the facility of an agent (i.e., a supplier) than at a brand-owner facility. This theory has been used in SC settings to explain relationships between buyer (principal) and suppliers (agent) (Zu and Kaynak, 2012). This problem arises when, moral hazard, and/or adverse selection risks, affect the actions of agents and cause the equilibrium to be inefficient (Eisenhardt, 1989; Jensen and Meckling, 1979). Moral hazard problems refer to information asymmetries associated with an agent's *effort*, and adverse selection relates to information asymmetries associated with an agent's *capabilities* (Eisenhardt, 1989). The moral hazard problem arises when it is difficult or costly for the principal to monitor an agent's effort; this yields an incentive for the agent to provide lower quality than what was requested or expected. This leads to information disadvantages for buyers (Whipple and Roh, 2010) and generates settings conducive to cheating (Mishra et al., 1998). Moral hazard can result in a willfully dishonest effort by suppliers to generate higher profits at the expense of buyers via self-induced quality fade (Whipple and Roh, 2010). Of course, as the SC expands, it becomes increasingly difficult for buyers to monitor suppliers (e.g., traceability becomes challenging); thus more information asymmetries may arise and monitoring costs and suppliers' incentives to cheat may increase. The moral hazard problem is a significant concern in EMs that face endemic issues such as corruption, black markets, and an unwillingness or inability of authorities to enforce contractual agreements, or punish culpable parties in quality

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