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# The Impact of Captive Innovation Offshoring on the Effectiveness of Organizational Adaptation



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## ABSTRACT

We analyze the effects of captive offshoring of innovation activities on the firms' ability to adapt their organizational structures. Basing our arguments on the complexity theory, we use three consecutive waves of the German part of the Community Innovation Survey to test our hypotheses. We find an inverted u-shape of innovation offshoring on the effectiveness of organizational adaptability, implying an optimal threshold value of innovation offshoring. This value is 11% for the share of off shored R&D, 15% for downstream innovation activities such as local market adaptation, and 34% for design activities. We also analyze several contingency variables. In particular, we show that the costs of innovation offshoring in terms of reduced organizational adaptation are increased by a regional dispersion of the offshoring activities and strong embeddedness in onshore networks. We also show that smaller firms find it easier to deal with the management complexity induced by geographical dispersion of innovation activities.

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## 1. Introduction

Internationalization and offshoring of company operations have become an increasingly important topic in management and have evolved from being a strategy mainly used by very large corporations to becoming standard management practice in many firms (Rilla and Squicciarini, 2011). For a long time, internationalization focused on manufacturing and sales activities. Recently, more and more firms have started to (re)locate knowledge-based activities abroad, including R&D and innovation (Bardhan and Jaffe, 2005; Henley, 2006; Levy, 2005; Lewin et al., 2009). A growing literature on innovation offshoring reflects this increasing importance, including studies on motives and choice of location (Ambos and Ambos, 2011; Ørberg Jensen and Pedersen, 2011) as well as on performance impacts (cf. Ficarek et al., 2008; Nieto and Rodríguez, 2011; Kotabe et al., 2007 for impacts on innovation capabilities; cf. Nieto and Rodríguez, 2013; Tang and Livramento, 2010 for impacts on productivity).

Although we acknowledge that the term offshoring is sometimes used ambiguously in particular in its relation to outsourcing, we deal in this paper with a subset of offshoring activities that have been labeled captive offshoring by Mudambi (2008) as well as Kotabe

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and Mudambi (2009).<sup>1</sup> While it is commonly held that innovation offshoring requires organizational restructuring, this aspect has not been at the center of research interest so far (cf. the literature review in Schmeisser, 2013). Only recently literature contributions have emerged that relate offshoring to organizational complexity and modularity though no consensus has been reached yet on whether offshoring has an increasing or decreasing impact. On the one hand it is argued that offshoring makes organizational processes more complex (e.g. because of geographic separation of different management levels) and hence reduces the organizational ability to adapt to changing environments (Bartlett and Ghoshal, 2002). On the other hand, Kedia and Mukherjee (2009) and Nieto and Rodríguez (2013) claim that offshoring related disintegration advantages exist which arise from the modularization of larger tasks into simpler subtasks thus facilitating organizational adaptation.

We attempt to contribute to the literature in a theoretical and an empirical respect as well as in terms of conclusions which can be derived for managerial practice. We seek to reconcile the contradictory arguments on organizational consequences of innovation offshoring within the framework of complexity theory. We will argue for an inverted u-shape relationship between innovation offshoring and organizational adaptability, the latter denoting a firm's ability to respond to a dynamic environment through organizational change (Walker et al., 2004). An inverted u-shape implies that up to a certain level of innovation offshoring disintegration advantages facilitate organizational adaptability as complex tasks which used to be integrated at the companies' home base can be split into smaller, easily manageable subtasks (cf. Kedia and Mukherjee, 2009). Beyond that threshold, offshoring becomes detrimental due to the inability to further disintegrate tasks while organizational complexity of non-linear, recursive processes that are typical to innovation (cf. Kline, 1985) further increases. The latter reflects the cost side of offshoring activities.

We test our theoretical framework using data from three waves of the German Innovation Survey. The data include detailed information on innovation-related offshoring activities for a large, representative sample of firms in manufacturing and services. We find strong evidence of an inverted u-shape of innovation offshoring for organizational adaptability, where the relationship, however, depends on several contingency factors, which we derive from our framework. In addition, the key findings are illustrated by innovation offshoring experiences from a large German car manufacturer in China.

## 2. Theory

### 2.1. Complexity, organizational adaptability and innovation offshoring

Conceptual analyses of benefits and costs of innovation offshoring have frequently adopted the resource-based view of the firm, often combined with arguments from transaction cost theory. The resource-based perspective has proven useful for analyzing impacts on the firms' innovative capabilities (Grimpe and Kaiser, 2010; Kotabe et al., 2007; Nieto and Rodríguez, 2011). Along this line of theory, offshoring changes internal capabilities of organizations. One strand of literature emphasizes the importance of offshoring for tapping into new knowledge sources (Bardhan and Jaffe, 2005; Barthélemy and Quélin, 2006; DeSarbo et al., 2005; Maskell et al., 2007) and benefiting from complementarities between different knowledge sources (Cassiman and Veugelers, 2002). However, it has also been argued that outsourcing knowledge activities may weaken internal resources and reduce their productivity due to a loss in absorptive capacities (Grimpe and Kaiser, 2010; Helfat and Raubitschek, 2000). The same argument could be applied to offshoring because excessive relocation of knowledge-related activities can lead to a downgrading of onshore capabilities.

Moving beyond the view that costs and benefits of offshoring primarily emerge through impacts on internal (knowledge-related) resources, some recent contributions have stressed organizational features such as changes in managerial complexity and an organization's ability to effectively adapt to changes in the environment as another important challenge (Bals et al., 2013; Ørberg Jensen and Pedersen, 2011). We will follow this line of research by examining the impact of innovation offshoring on organizational adaptability.<sup>2</sup>

We employ complexity theory as our main theoretical guide (Simon, 1962, 1996, 2002) since this approach allows us to investigate the consequences of increasing complexity on a system's performance as well as alternative organizational designs. Its key concept is the nearly decomposable system of tasks (ND-system), where decomposable task systems are any division of overall tasks into smaller subtasks such that the subtasks are independent of each other (cf. Zhou, 2013). The main postulation of complexity theory is that decomposable systems, often also called modular systems, are able to adapt to environmental turbulence faster than non-decomposable systems (Ethiraj and Levinthal, 2004; for simulation results see for example Frenken et al., 1999; Rivkin and Siggelkow, 2007; Simon, 2002; Yayavaram and Ahuja, 2008). The reason for this is that if subsystems are linked by some sort of interdependence, the optimum state of the entire system can only be found when all subsystems are jointly optimized. If subsystems are

<sup>1</sup> The authors argue that outsourcing relates to whether an activity is kept inside or outside the boundaries of a firm, while offshoring relates to the geographical dimension and classifies activities into those that are performed outside the country where the headquarter is located (offshore) or inside that country (onshore). This distinction leads to a four-cell-matrix, in which captive offshoring comprises all activities that are performed inside the boundaries of a firm but in another country than the headquarters. Captive offshoring activities are all activities that are performed inside the firm boundaries but outside the country where the firm's headquarters are located. For the sake of conciseness we will drop the term "captive" in the subsequent text except when the context requires this degree of precision. Innovation offshoring, as used in this paper, hence includes all activities a firm performs to establish or strengthen innovation activities at a location outside the firm's home country. Innovation activities include both activities which generate new scientific and technological knowledge that can be used to develop new products or new processes (referred to as 'R&D' in this paper), and activities which introduce new products to the market place and implement new processes within the firm. This concept of innovation is strongly oriented at the well-established concepts used in international innovation statistics (such as the Community Innovation Survey) and is in line with international standards of measuring innovation (such as the Oslo Manual, see OECD and Eurostat, 2005). Though this concept does not explicitly refer to newly emerging fields in innovation such as business model innovation, user innovation or open innovation, these types are not excluded by the definitions used here.

<sup>2</sup> Organizational adaptability is used here to denote the effectiveness of organizational changes with respect to performance.

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