NOVA
University of Newcastle Research Online

nova.newcastle.edu.au

Lin, Nidthida; Tan, Hao; Chen, Stephen; 'Global offshoring portfolio diversity and performance implications'. Published in International Journal of Physical Distribution and Logistics Management Vol. 47, Issue 2/3, p. 114-136 (2017)

Available online: http://dx.doi.org/10.1108/IJPDLM-11-2016-0314

Accessed from: http://hdl.handle.net/1959.13/1329727

GLOBAL OFFSHORING PORTFOLIO DIVERSITY AND PERFORMANCE IMPLICATIONS

Nidthida Lin

nidthida.lin@newcastle.edu.au

Hao Tan

hao.tan@newcastle.edu.au

Stephen Chen

stephen.chen.newcastle.edu.au

Newcastle Business School

University of Newcastle, Australia

ABSTRACT

Purpose:

In this paper, we examine how three key dimensions of a firm's offshoring portfolio- (1) location diversity, (2) functional diversity, and (3) governance mode – affect the financial and innovation outcomes of offshoring.

Design/methodology/approach:

We investigate the relationships between the diversity of a firm's offshoring portfolio and its offshoring outcomes using a sample of US, European, and Asia Pacific firms engaging in offshoring activities.

Findings:

We found that: (1) location diversity shows a significant "flipped S-shape" relationship with innovation outcomes, but has a negative impact on financial outcomes, (2) functional diversity has a significant and positive effect on innovation outcome and (3) the use of an outsourcing governance mode significantly moderates these relationships, such that the degree of offshore outsourcing weakens some of these effects.

Originality/value:

We conclude that firms which strategically coordinate all three dimensions of their offshoring portfolio are more likely to achieve better innovation or financial outcomes from their use of offshoring in global supply chain and sourcing.

Keywords: Offshoring portfolio, Governance mode, Functional diversity, Location Diversity, Global Value Chain

INTRODUCTION

As shown by many studies, there has been a tremendous increase in the offshoring of manufacturing and services over the last decade, particularly to low labor cost countries. However, there has also been a move to "reshore" activities, which were previously offshored

for various economic and political reasons (Tate and Bals, 2015). The question now for many companies is on achieving the optimal mix of domestic activities versus offshored activities.

However, most studies have tended to examine this question at the level of individual projects and to the best of our knowledge researchers have not examined the performance implications of a portfolio of mixed offshoring projects. This is an important question given that operations of multinational corporations (MNCs) often involve multiple projects across multiple locations, both offshore and onshore. At the corporate level, firms often attempt to coordinate their operations across different offshore locations in order to maximize efficiencies in resource allocations and project management. Consequently, we argue that the assessment of the impact of offshoring on firm-level performance should go beyond just the outcome of each individual offshoring project to examine the interactions among different projects. Therefore, the key question we ask in this paper is: how does the way in which a firm disaggregates its global value chain and distributes its activities geographically affect innovation and financial outcome of their offshoring? More specifically, this study examines the effect of location diversity and functional diversity of a firm's offshoring portfolio on its performance, the moderating effects of governance mode on such relationships, and the three-way interactions among the three dimensions on innovation and financial outcome.

The rest of the paper is structured as follows. First, we briefly review the previous research on the relationship between offshoring and performance. Then we introduce the concept of 'offshoring portfolio diversity' and how different types of offshoring diversity (location, function and governance mode) affect different types of outcome (innovation and financial). Next we describe the methods and results from our tests on a sample of firms drawn from the international Offshoring Research Network (ORN) and we conclude with a discussion of the implications for the use of global sourcing in designing the optimal configurations of global supply chains.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Many studies have examined the relationship between offshoring and firm performance, but the findings are inconclusive (Schmeisser, 2013). For instance, Coucke and Sleuwaegen (2008) find that firms from developed countries which engage in offshoring of value activities have a greater likelihood to survive in globalized industries compared to those that do not source goods and services internationally. Bertrand (2011) report a positive and significant relationship between offshore outsourcing and firms' export sales of final goods is revealed, which is positively moderated by firm's export experience. Di Gregorio et al. (2009) find empirical evidence that offshore outsourcing of knowledge-intensive (administrative and technical) services by small- and medium-sized enterprises increases the scale and scope of their internationalization of sales. On the other hand, Mol et al. (2005) found in a study of Dutch manufacturing firms no observable performance effects of international or global outsourcing. Funk et al. (2010) found empirical evidence that in some cases a cross-border relocation of parts of the value chain backfires and negatively affects sales volume of the final product.

We argue that one reason for the conflicting findings in previous studies is a failure to consider the complex interactions among different projects. The relationship between offshoring and firm performance is not only jointly determined by a number of cost and benefit factors at the individual project level, but also by interrelationships among individual offshoring projects as well as between offshore and onshore operations at the firm level. Hence, a firm's overall outcome of offshoring may be dependent on the characteristics of its offshoring project portfolio. We define 'offshoring portfolio' as the range of offshoring activities in which a firm engages, which can be characterized through three key dimensions: (1) location diversity, (2) functional diversity, and (3) governance mode. Location diversity concerns how diversely a firm disperses its activities geographically across the globe while functional diversity concerns how finely a firm slices or disassembles activities across its value chain. In a similar vein, governance mode diversity considers the degree to which a firm engages third party offshore outsourcing (as opposed to captive offshoring). Our key argument here is that each aspect of location, function and governance mode contributes to explain differences in overall offshoring performance of

firms and firms that are able to efficiently coordinate their offshoring activities across these three dimensions are more likely to achieve better outcomes in their offshoring.

Performance Implications

We argue that a second reason why previous studies have conflicting findings is that different measures of performance have been used depending on the study. These include financial benefits such as cost savings (e.g., Hutzschenreuter et al., 2011), improved innovation (Nieto and Rodríguez, 2011, Bertrand and Mol, 2013), improved export performance (Bertrand, 2011) and firm survival (Coucke and Sleuwaegen, 2008). Despite various aspects of offshoring outcomes, in this study, we focus on financial (i.e., cost savings) and innovation outcomes.

Offshoring is most often used to reduce costs (Jensen and Pedersen, 2011, Contractor et al., 2010, Maskell et al., 2007), for example, by relocating labor-intensive operations to a less developed country with lower wage rates (Doh, 2005), in order to lower labor costs, or by outsourcing a task to a offshore service provider who has expertise and economies of scale in order to get the task done at lower cost. Therefore, financial outcomes (i.e., cost savings) have long been the major driver, which has been examined extensively in several studies (see, for example, Farrell, 2005). On the other hand, studies have shown that offshoring increases transaction costs (Stratman, 2008), thereby offsetting benefits from labor arbitrage and having adverse effects on financial outcomes of offshoring.

More recently, firms have increasingly used offshoring to gain access to talent and improve their innovative capabilities (Lewin et al., 2009a, Manning et al., 2008). Several studies have found a positive effect of offshoring on innovation. For instance, in their study using data from an annual survey of Spanish firms, Nieto and Rodríguez (2011) found that R&D offshoring leads to better innovation performance of firms and that the positive impact of offshoring is greater on product innovation than process innovation, and is greater with captive offshoring than with offshoring outsourcing. However, Mihalache et al. (2012) argue that offshoring of innovation activities creates challenges for knowledge transfer and integration and the outcome on innovation is, therefore, not necessarily positive. In the following section, we discuss how the

different dimensions of a firm's offshoring portfolio (location, function, and governance mode) affect these two key performance measures of innovation outcomes and financial outcomes and how this may explain some of the conflicting findings reported in previous studies.

Location Diversity

Location diversity refers to the dispersion of a firm's offshoring activities across countries—whether a firm relocates its activities to a wide range of foreign locations or centers its offshoring operations on specific destinations. In this section we discuss the role of location diversity on both innovation and financial outcomes of offshoring.

Scholars have proposed arguments for both positive and negative impacts of location diversity on a firm's innovation. Two complementary theoretical perspectives have been frequently used by researchers to examine offshoring decisions: the resource based view and transaction cost economics. From the resource-based view (Barney, 2001), the availability of highly qualified personnel and resource capabilities at offshore locations is a key driver of offshoring (Roza et al., 2011, Lewin and Peeters, 2006). The resources that firms can access offshore such as skilled personnel may enable firms to perform the existing activities more efficiently, or else enable the organization to be more innovative, leading to better longer-term competitive positioning. Kedia and Mukherjee (2009) identify several sources of competitive advantages from offshoring including (1) disintegration-related advantages as a result of increased focus on core competencies and increased modularity; (2) location-specific resourcing advantages derived from lower input costs, higher labor productivity and institutional advantages specific to the offshoring destination; and (3) externalization advantages, such as co-specialization advantages and organizational learning, which arise from both offshoring and domestic outsourcing. Providing empirical support for the positive impact of location diversity, Mihalache et al. (2012) show that offshoring leads to an *increase* in a firm's innovativeness due to two key reasons. First, MNCs can take advantage of lower labor costs offered by offshoring destinations to carry out more intensive activities such as R&D and engineering, which help

them to generate more knowledge and innovation. Second, offshoring enables firms to tap into various local knowledge and technologies which enhance their innovativeness.

The second perspective is transaction cost economics (Coase, 1937). According to transaction costs economics, the choice between carrying out activities in-house or outsourcing them depends on the transaction costs of each option. These costs include increased costs of coordination with the partner and increased costs owing to the liability of foreignness (Bertrand, 2011). These costs incurred in managing and coordinating offshoring activities tend to be higher when the activities are performed at more geographically and organizationally distant locations from the home country (Contractor et al., 2010, Ceci and Prencipe, 2013). Therefore, from a transaction cost perspective, the net financial benefits of offshoring should *decrease* with location diversity. Empirical support for the negative impact of offshoring to various locations on innovativeness can also be found in the literature. As noted in Mihalache et al. (2012), geographical dispersion of offshoring activities creates challenges for knowledge transfer and integration. It is also widely accepted in the economic geography literature that physical proximity requires better interaction and communication to facilitate the transfer of tacit knowledge which is an important source of innovation (Feldman, 2000). When a firm's activities are carried out in dispersed foreign locations, physical and cultural differences may create additional difficulties for achieving effective collaborations among different units and an innovation process may become less manageable. As a result, innovation performance may decline.

We propose that these contrasting arguments can be reconciled in a model in which both positive and negative relationships are observed at different levels of location diversity. More specifically, we hypothesize a "flipped S-curve" relationship as follows. At low levels of location diversity, advantages of location diversity of offshoring portfolio, such as access to location-specific knowledge, outweigh disadvantages, resulting in a positive relationship. In the next stage, when firms increasingly engage in a larger number of offshoring activities, disadvantages of location diversity become more evident and outweigh advantages, leading to a negative relationship. In the third stage, as firms accumulate experience and learn how to efficiently

manage knowledge flows among offshoring locations as well as between offshoring locations and the home country, innovation outcomes from offshoring improve again. Based on those considerations, we hypothesize:

Hypothesis 1: *Location diversity of a firm's offshoring activities has a "flipped S-shape" relationship with innovation outcomes of offshoring.*

A large body of literature in international business has also examined the relationship between financial performance of MNCs and their level of internationalization. Early researchers found a positive relationship between internationalization and firm performance (e.g., Bühner, 1987) but later studies have found a negative relationship (Collins, 1990) or an inverted U-shape relationship (Geringer et al., 1989). Subsequently other researchers (Ruigrok and Wagner, 2003) found a standard U-shape relationship. More recently, Contractor et al. (2003) and Lu and Beamish (2004) have found an S-shape relationship, which they explained by changes in costs and benefits of internationalization as the firm expands internationally. More specifically, in stage 1, the relationship is negative as costs of international expansion outweigh the benefits. In stage 2, the relationship becomes positive as accumulated experience allows firms to reap benefits of internationalization. In stage 3, the relationship then becomes negative again as coordination costs of increasing internationalization outweigh the benefits. Although the studies by Contractor et al. (2003) and Lu and Beamish (2004) were not specifically on offshore outsourcing but on internationalization in general, we argue that a similar relationship would be expected for offshore outsourcing and financial outcomes. During the initial stage, firms may not obtain much net financial benefit from offshoring owing to learning costs. Many costs associated with offshoring may be 'hidden', in the sense that the complexities and uncertainties may not be fully recognized ex-ante when the offshoring decision was made (Larsen et al., 2012). It is only once the firm has learned how to best manage offshoring that it starts to obtain net financial benefits. However, if the firm over expands into too many locations, the net benefits decrease as increasing costs of coordination outweigh benefits. Therefore, we test the following hypothesis:

Hypothesis 2: *Location diversity of a firm's offshoring activities has an S-shape relationship with financial outcomes of offshoring.*

Functional Diversity

A parallel set of hypotheses for functional diversity can be derived. Functional diversity in this study refers to the extent to which a firm disaggregates the business functions in its value chain and relocates them to foreign locations. Offshoring activities may range from high value-added activities such as R&D, product design, engineering services, advertising and marketing research to low value-added activities such as call centers or other back-office standardized functions (Mudambi and Venzin, 2010). Firms may choose to disaggregate and relocate most of their peripheral functions to foreign countries and keep only the core function at home, resulting in greater functional diversity in its offshoring portfolio; or to offshore only a small number of specifically selected functions, resulting in lower functional diversity.

According to the resource-based view, increasing functional diversity should increase inward knowledge transfer from a greater number of sources of knowledge offshore. The ability to source each activity in the value chain from the best leads to enhanced innovation outcomes of offshoring firms. While researchers have raised a concern over the risk of knowledge leakage and a hollowing-out effect of offshore outsourcing (Kogut and Zander, 1993), studies show that firms can learn to become sophisticated in their offshoring and are able to strategically manage their offshoring of high value activities over time (Lewin et al., 2009b, Massini et al., 2010). We, therefore, propose the following hypothesis:

> ***Hypothesis 3:*** *Functional diversity of a firm's offshoring activities is positively related to the innovation outcomes of offshoring.*

On the other hand, from a resource-based perspective, increased functional diversity also reduces economies of scale and scope. Economies of scale arise when greater project size results in reuse of resources and learning effects while economies of scope economies result when activities can share productive inputs at little or no additional cost. When offshored projects are distributed across many functions, there is less opportunity for firms to benefit from economies of scale in one function and less opportunity to reuse resources and learning among offshoring projects From a transaction cost perspective, increasing functional diversity also increases coordination costs since offshoring firms will need to translate instructions

between functions as well as monitor understanding and compliance. Other things being equal, the combination of reduced economies of scale and scope and increasing coordination costs should result in poorer financial performance. Therefore, we hypothesized:

Hypothesis 4: *Functional diversity of a firm's offshoring activities is negatively related to financial outcomes of offshoring.*

Moderating Role of Governance Mode

The third dimension of offshoring portfolio diversity is the governance mode used to control offshore activities: either offshoring through affiliates abroad (captive offshoring) or else through arm's length relationship with third party service providers (offshore outsourcing). The choice of governance mode has significant performance implications for offshoring firms (Kedia and Mukherjee, 2009, Nieto and Rodríguez, 2011, Mudambi, 2008).

Offshore outsourcing exposes firms to a greater risk of opportunistic behavior and knowledge leakage. From a resource-based perspective, this may result in the firms' exclusive knowledge becoming available to competitors and the market, which could destroy their competitive advantages. Opportunistic service providers may utilize knowledge learnt from offshoring firms and develop themselves to become future competitors. Intellectual property protection is another major concern in offshore outsourcing. Several studies point out the extensive risk of intellectual property violation by third party service providers, especially in countries where intellectual property law is weak. Hence, Kogut and Zander (1993) argue that MNCs could alleviate the issue of knowledge leakage by engaging in knowledge transfer with subsidiaries rather than with third-party service providers. Excessive offshore outsourcing also leads to the problem of high dependency on service providers. By heavily relying on external service providers, firms gradually lose their knowledge base and core competencies, leading to so-called "hollowing out". This also causes the loss of firms' capabilities to respond to changes and technologies and, consequently, the erosion of innovation capability (Paju, 2007). These risks are lower for captive offshoring as firms have a greater control over offshoring activities.

Accordingly, we propose that governance mode influences the relationship between the location and functional diversity and innovation outcome of offshoring. More specifically, captive offshoring may offer firms advantages of lower risk of opportunistic behavior and knowledge leakage, and hence offshore outsourcing negatively moderates the relationships between location and innovation performance and between functional diversity and innovation performance. These arguments lead us to propose the following two hypotheses:

Hypothesis 5: *The effect of location diversity on innovation outcomes of offshoring is negatively moderated by the degree of offshore outsourcing.*

Hypothesis 6: *The effect of functional diversity on innovation outcomes of offshoring is negatively moderated by the degree of offshore outsourcing.*

On the other hand, transaction cost scholars suggest that firms choose a governance mode of their offshoring activities that minimizes transaction costs. Accordingly, in making this governance choice firms should take into account every factor leading to inefficiency and increasing transaction costs (Buckley and Casson, 1976). In a foreign market expansion, a non-equity mode allows firms to enjoy the benefits of a lower resource commitment while facing a challenge of less control over their foreign operations (Pan and Tse, 2000). In contrast, when firms internalize foreign operations, they unavoidably expose themselves to greater risks of investment but are likely to enjoy greater benefits from the higher level of control over such operations. In sum, the use of offshore outsourcing allows firms to globally source their activities with a lower capital commitment and hence leads to improved financial outcomes of offshoring. Accordingly, we argue that the use of offshore outsourcing positively moderates the relationships between offshoring diversity and firm financial and innovation performance.

Hypothesis 7: *The effect of location diversity on the financial outcomes of offshoring is positively moderated by the degree of offshore outsourcing.*

Hypothesis 8: *The effect of functional diversity on the financial outcomes of offshoring is positively moderated by the degree of offshore outsourcing.*

EMPIRICAL ANALYSIS

Sample and Data Collection

The empirical analysis is based on data drawn from the Offshoring Research Network (ORN) database, a cumulative database collected through annual surveys over four years (2007-2011) across 24 countries from North American, Europe, and Asia Pacific. The ORN database is unique as it contains detailed information about all offshoring implementations that firms have engaged in rather than companies' general experience with offshoring, resulting in fine-grained data which enable an analysis of offshoring dynamics of business services located in various countries, across industries and across different governance modes. The ORN surveys gather information about offshoring implementations across the main business functions, including administrative (finance and accounting, HR, legal services), contact centers, marketing and sales, IT, procurement, and innovation services (R&D, engineering services, product design and software development). From the ORN database, records with missing data were removed and 286 companies formed the basis of our analysis. These companies have been engaging in offshoring and are drawn from different countries and industries. Table 1 provides a summary of characteristics of companies included in the analysis.

Insert Table 1 about here

Variables

Dependent variables*. Innovation outcome* is a composite measure derived from two survey questions which ask firms to rate the level of their product and process innovation outcomes from their offshoring activities, indicated in the survey as "major product innovation" and "breakthrough process improvement" respectively. The responses are on a 5-point Likert scale ranging from strongly disagree (1) to strongly agree (5). We constructed an average measure from these two items to operationalize innovation outcome. To check internal consistency, we ran Cronbach's alpha test on these two measures. The results show a scale reliability coefficient of 0.80, suggesting that the two survey items are good measures of the same construct.

Financial Outcome is an actual cost saving measure derived from the ORN survey question asking the percentage of actual cost savings achieved in each offshoring project. To measure a firm's financial outcome of offshoring, an average of achieved cost savings from each offshoring project is taken across all offshoring projects in which a firm engages.

Independent variables. *Location diversity* measures the number of offshoring destinations (i.e., countries) to which a firm offshores its activities. This measure captures the global diversity of a firm's offshoring operations. *Functional diversity* measures the number of offshoring functions (i.e., services) in which a firm engages in offshoring. This measure allows us to assess the degree of disaggregation of a firm's value chain through offshoring. *Degree of outsourcing* is defined as the ratio of offshore outsourcing to total number of offshoring projects. Instead of using a dichotomous variable like in most studies (Nieto and Rodríguez, 2011), the use of a continuous variable (ratio) allows us to examine the effect of a mix of governance modes (outsource and captive), reflecting the degree of control and exposure to risks.

Control variables. A number of control variables are also included in the analysis. First, we control for differences in offshoring destination by including an *innovation index of offshoring countries*. This measures the level of country's innovativeness through the average number of science and engineering graduates in the country. This measure is derived from the OECD Library on Science, Technology, and Industry Outlook. *High value activity ratio,* or ratio of high value activities to total offshoring activities, is also included in the analysis to capture differences in the types of activities the firm offshores. High value activities include R&D, product design, engineering services, software development, and knowledge services while other activities are considered as low value. The underlying assumption is that high value activities are by nature more likely to result in a higher innovation outcome. To control for any potential experience effect, we include an *offshoring experience* measure, the number of years since a firm's first offshoring project. In addition, we also control for the effect of *organization size*. Based on resource-based theories (McIvor, 2009, Vivek et al., 2008), both innovation and financial outcomes of offshoring are also influenced by firm size and the richness of firm's

resources, measured here by the natural logarithm of the total number of firm's employees in a home country.

We also control for industry and headquarter location effects. *Technical industry* is a dichotomous variable representing whether a firm operates in a technical industry, which is defined as Automotive, Chemical, High Tech and Other Manufacturing (value 1 if a firm is in technical industry and 0 otherwise). Lastly, because firms from different countries/regions have different expectations on their offshoring, we controlled for unobserved regional idiosyncratic effects through the inclusion of a set of *headquarter region* fixed effects. Dummy variables are coded for companies with their headquarters from United State, Europe, and other regions. The basic statistics and correlations among all variables are shown in Table 2.

Insert Table 2 about here

Methods of Analysis

We conducted a series of regression analysis to test the proposed hypotheses and examine the effect of location diversity and functional diversity and the degree of outsourcing on the offshoring firm's innovation and financial outcome (see Figure 1 for the summary of hypotheses proposed in this study). More specifically, we use a hierarchical regression analysis with successive OLS regression models, adding more independent variables to each model. The hierarchical feature refers to the gradual building of separate but related models with an increasing number of independent variables until we reach the final model in which all independent variables are included. Hence, the full models investigate the effect of explanatory variables on innovation and financial outcomes.

Insert Figure 1 about here

RESULTS

Regression Analysis

The results of the regression analysis are presented in Table 3 and Table 4. In Table 3, Model 1 includes the linear relationships between functional diversity and innovation outcome while in Model 2 we add the linear, square and cubic terms of location diversity to examine an s-shape relationship between location diversity and innovation outcome. Model 3 examines the moderating effect of degree of outsourcing on both functional diversity and location diversity. Model 4 is a full model, which includes linear, S-shape relationship, and interaction terms.

In Table 4, Model 5 shows the linear relationship between functional diversity and financial outcome while Model 6 includes also the linear, square and cubic terms for location diversity. In Model 7, we add in the interaction terms between functional diversity, location diversity and degree of outsourcing. Model 8 is the full model with all linear, square, cubic, and interaction terms included. Note that in both Model 3 and 6, we include the 3-way interaction of functional diversity, location diversity and degree of outsourcing to test our proposed three dimensions of offshoring portfolio.

Insert Table 3 and Table 4 about here

Innovation Outcomes

The results from Model 1 show the significant positive effect of functional diversity on the innovation outcomes of offshoring firms (β = 0.072, p < 0.1), supporting Hypothesis 3 that functional diversity of firms' offshoring portfolio is an important determinant of innovation outcome. In Model 2, the linear, square, and cubic terms of location diversity were added. The linear term shows a positive significant effect ((β = 0.631, p < 0.05) while the square term is negatively significant (β = -0.155, p < 0.1). Although the cubic term of location diversity is not significant in Model 2, the effect becomes stronger and significant in Model 3 and 4. Model 3 includes the moderating effects of degree of outsourcing on the linear term of both functional diversity and location diversity. The effects of functional diversity, linear and square term of location diversity remain significant in Model 3 while the cubic term of location diversity

becomes significant (β = 0.012, p < 0.1), suggesting a "flipped" S-curve relationship between location diversity and innovation, consistent with our Hypothesis 1. The results also show that degree of outsourcing negatively moderates the positive relationship between functional diversity and innovation outcome (β = -0.181, p < 0.05), supporting our Hypothesis 6. In other words, the positive effect of functional diversity on innovation outcome of offshoring is reduced as a firm engages in more offshore outsourcing compared to captive offshoring. On the other hand, we do not find a significant moderating effect of governance mode on the relationship between location diversity and innovation outcome. Model 4 includes the interaction terms between degree of outsourcing and the square and cubic terms of location diversity. The results suggest that governance mode has no significant moderating effect on the relationship between location diversity and innovation outcome, rejecting Hypothesis 5.

Among all control variables, only firm size showed significant effects. Models 2, 3, and 4 also show that firm size has a significant negative effect on innovation outcome of offshoring, although small in magnitude. This finding is consistent with studies in the innovation literature that point out that the enemy of most large established organizations is the inertia which holds back innovation and causes them to fall behind their smaller and faster competitors (see, for example, Damanpour, 1992).

Financial Outcomes

In Table 4, we examine the effects of functional diversity, location diversity and degree of outsourcing on cost savings derived from offshoring. The results show no significant effect of functional diversity on financial outcomes throughout all models, rejecting Hypothesis 4. Only the linear term of location diversity shows a significant and negative effect. This suggests a significant negative effect of location diversity on the financial outcome of offshoring, rejecting our Hypothesis 2 (of an S-shape relationship). Model 7 also indicates the significant moderating effect of degree of outsourcing on the relationship between location diversity and financial outcome (β = 3.952, p < 0.05). However, we do not find a significant moderating effect of the degree of outsourcing on the relationship between location diversity and financial outcome (see

Model 8), leading us to reject Hypothesis 8. The degree of outsourcing also does not show a significant moderating effect on the relationship between functional diversity and financial outcome, rejecting Hypothesis 7. It should be noted that, although we tested for it, we were unable to show a significant relationship of functional diversity, location diversity and governance mode (3-way interaction) on both innovation and financial outcomes (results not shown). However, this may be due to the small size of our sample. Ideally, a larger sample size and more variety in the firms' offshoring portfolios might provide a more significant result. We further investigate the role of the mix of projects in the offshoring portfolio in the next section.

The control variables, innovation index of offshoring destination, high tech industry, and European company, show significant effects on financial outcome of offshoring. The estimated coefficients of innovation index of offshoring destinations are significant and positive in Model 6, 7, 8 and 9, suggesting an interesting implication that firms that offshore their business services to innovative countries are more likely to achieve higher cost savings from offshoring. The findings also indicate that offshoring firms from high tech industries tend to achieve more cost savings compared to offshoring firms from other industries. The significant and negative estimated coefficient of a dummy variable, European company, from Model 7 and 8 suggests that European firms are likely to achieve lower cost savings from offshoring compared to firms from U.S. and other regions. This could possibly be explained by the fact that European firms, on average, engage in offshoring later than American firms (Lewin and Peeters, 2006) and hence have less experience in managing the hidden cost of offshoring.

Comparative Post-Hoc Analysis

While the regression analysis tells us about the relationship between each dimension (location diversity, functional diversity, and degree of outsourcing) of offshoring portfolio and the outcomes of offshoring, it does not allow us to illustrate the optimal offshoring portfolio, which yields higher performance than others. To further examine the optimal offshoring portfolio and the role of the offshoring portfolio diversity (i.e., a combination of location diversity, functional diversity, and governance mode) on the outcomes of offshoring, we ran a

comparative post-hoc analysis on the average innovation and financial outcomes of firms with various offshoring portfolios.

In doing so, we first classified firms in the sample into 8 strategic groups with different offshoring portfolios based on the three dimensions: offshoring location diversity, functional diversity, and degree of outsourcing. More specifically, firms with location diversity lower than the average location diversity of the sample (*mean* = 2.216 from Table 2) are considered to have a *low location diversity* (i.e., offshoring destinations concentrated in a small number of locations) while firms with a location diversity more than or equal to the average location diversity of the sample are considered to have a *high location diversity* (i.e., offshoring activities dispersed in a large number of locations). Similarly, firms with a functional diversity lower than the average functional diversity of the sample (*mean* = 2.499 from Table 2) are viewed as having a *low functional diversity* (i.e., offshore only a small number of specific activities in the value chain). On the other hand, firms with a functional diversity more than or equal to the average functional diversity of the sample are considered to have a *high functional diversity*. Similarly, firms that have degree of outsourcing lower than the average degree of outsourcing of the sample (*mean* = 0.554 from Table 2) are considered to have a low degree of outsourcing while firms with degree of outsourcing more than or equal to the average degree of outsourcing of the sample are considered to have a high degree of outsourcing in this analysis. Figure 2 illustrates the characteristics of offshoring portfolios in each group. For example, Group 1 includes firms that have a *high* location diversity, a *high* functional diversity, and a *high* degree of outsourcing.

We then examine the characteristics of firms in each group and compare innovation and financial outcomes of firms across groups. Table 5 illustrates the detail of characteristics of firms in each group. These characteristics will facilitate a discussion of our findings in the next section. However, it is interesting to discuss here a few observations regarding the preferred offshoring portfolio according to firm characteristics. As the results show, small firms show their preference for low functional diversity and high degree of outsourcing (Groups 3 and 5) of offshoring portfolio, while large firms are more likely to have a high location diversity and a high functional diversity in their offshoring portfolio (Groups 1 and 2). The results further indicate

that firms with more extensive offshoring experience tend to possess an offshoring portfolio with a high location diversity and a high degree of outsourcing (Group 2 and 4).

Insert Figure 2 and Table 5 about here

Innovation Outcomes

The results from Table 6 indicate that, among all groups of firms, firms with high location diversity and high functional diversity but low degree of outsourcing (Group 2 - HHL) achieve higher innovation outcomes from offshoring compared to firms in other groups. On the other hand, firms with an offshoring portfolio that have a low location diversity and low functional diversity but a high degree of outsourcing (Group 5 - LLH) achieve the lowest innovation outcomes among all groups. Overall, firms with highly dispersed offshoring destinations but low degree of outsourcing tend to achieve higher innovation outcome (Group 2 and 4) compared to firms in other groups. We explain this finding as a result of greater access to diverse sources of knowledge and expertise from various locations with the better control of knowledge transfer through captive operations as oppose to outsourcing. The results also suggest that offshoring portfolios with low degree of outsourcing (Group 2, 4, 6, and 8) tend to achieve higher innovation outcome.

Insert Table 6 about here

We also conducted a t-test to examine the significance of differences between firms in Group 2 (HHL), which show the highest average innovation outcomes, and other groups of firms. The t-test results show that there is no significant difference in the innovation outcomes of firms from Group 2 (M = 2.86, SD = 1.05) and firms in other groups (M = 2.43, SD = 1.02); t = -1.377, p = 0.169. It should be noted that the sample size for Group 2 is relatively small (n = 11) compared to other groups and this unbalanced sample size might affect the reliability of the t-test. However, the results from the t-test suggest that innovation outcome of firms in Group 5 (LLH) (M = 1.99, SD = 1.06), which show the lowest average innovation outcome, is significantly lower than that of firms in other groups (M = 2.51, SD = 1.00); t = 3.29, p = 0.001.

Financial Outcomes

Table 7 illustrates the results of a comparative analysis on financial outcome among firms from each group. The findings indicate that while offshoring firms from Group 2 (HHL) achieve, on average, the highest innovation outcome (see Table 6), Group 2 shows the lowest average financial outcome among firms in other groups. Consistent with our arguments, this result suggests that an overly diverse offshoring portfolio (i.e., high location and functional diversity) leads to a complexity in coordination among globally dispersed teams while the captive operations also lead to higher costs compared to outsourcing, causing a negative effect on the financial outcomes of offshoring. On the other hand, offshoring portfolios with a low diversity of offshoring destinations and governance modes but a high diversity of offshored functions (Group 8 – LHL) show the highest financial outcomes among all groups. More broadly, offshoring firms with highly diverse offshoring destinations and low degree of outsourcing (Groups 2 and 4) tend to achieve lower financial outcomes compared to firms from other groups, suggesting coordination costs among dispersed teams and high cost of captive operations play a critical role in determining financial outcomes of offshoring.

Insert Table 7 about here

To examine the significance of differences in financial outcome between groups, we conducted a t-test between firms Group 8, which has the highest average financial outcomes among all groups, and the rest of the sample. The t-test results show no significant difference in the financial outcomes between firms from Group 8 (M = 38.03, SD = 22.39) and firm in other groups (M = 32.17, SD = 22.82); t = -1.288, p = 0.198. The t-test also suggest that the average financial outcome of Group 2 (M = 26.73, SD = 17.77), which has the lowest average financial outcome, and other groups (M = 33.06, SD = 23.13) is also not significantly different; t = 1.414, p = 0.158. We further find that firms with highly diverse offshoring locations but low degrees of outsourcing (Groups 2 and 4) tend to achieve higher financial outcomes compared with firms in other groups. This provides support for our arguments about the increased coordination and

operation costs in offshoring portfolios with high location diversity and high degrees of captive offshoring. These findings support our arguments proposed earlier regarding the role of offshoring portfolio diversity and the need for firms to strategically coordinate their offshoring activities across all three dimensions in order to optimize performance.

DISCUSSION

Our results show clearly that a company's offshoring portfolio matters, as evident from the differing outcomes of project portfolios that vary in (1) location diversity, (2) functional diversity, and (3) governance mode. Further, the results show that the effects differ on the two performance measures, namely innovation and financial outcomes.

Effect of Offshoring Portfolio on Innovation Outcomes

Consistent with our Hypothesis 1, our results showed a "flipped S-curve" relationship between location diversity and innovation outcomes, suggesting that product and process innovation outcomes improve with location diversification at low and high degrees of location diversification, but decrease with location diversification at intermediate degrees of diversification. Interestingly, this pattern is the opposite of what is predicted in the three-stage model of internationalization-performance proposed by Contractor et al. (2003) and Lu and Beamish (2004). In their model, the curve goes down, up and then down whereas in our case the curve goes up, down and then up again (See Figure 3).

Insert Figure 3 about here

One possible explanation is that while the three-stage model proposed by Contractor et al. (2003) and Lu and Beamish (2004) is concerned with the relationship between financial performance and the degree of internationalization based on foreign sales or foreign investment, while our model is focused on the relationship between innovation outcomes and diversity of offshoring. This suggests that when companies start their offshoring operations at foreign locations their innovation performance may initially increase as they are exposed to more knowledge and skills embodied in locations, and then declines because of increasing

coordination required for new product development and process improvement, as well as real or perceived risks in losing intellectual properties resulting in weakening innovation activities within the firm. However, once a firm has gained more experience in managing its offshoring projects in diverse foreign locations, it is likely to gain an innovation boost from an access to a greater store of local knowledge.

We also found evidence to support a significant positive effect of functional diversity on innovation outcomes. This finding suggests that firms benefit more from offshoring when it allows them to enhance their innovation capability through specialist foreign service providers who are equipped with advanced technologies to perform activities in focused areas. Firms that operate a greater number of functions overseas may also create a more dynamic innovation environment within the firm, as a result of the greater level of heterogeneity of functional teams (Bantel and Jackson, 1989). However, it is interesting that functional diversity has different effects from location diversity. The findings suggest that despite concerns over the increasing organizational costs, greater innovation outcomes are obtained when firms offshore multiple functions (i.e., high functional diversity). There may also be a knock-on effect of offshoring one function on offshoring another function. As innovation in firms typically involves an integration of activities of multiple functions (Ettlie and Reza, 1992, Tatikonda and Montoya-Weiss, 2001), it could also be that positive innovation outcomes are more likely to accrue when more offshored functions are integrated. We do not have data in the survey to test this but future research could examine how integration of the offshored functions and integration with domestically located functions affect innovation outcomes.

A significant finding in our study concerns the moderating effect of the offshoring governance mode on offshoring innovation outcomes. An extensive body of work has established the importance of foreign entry modes on performance of internationalizing firms (Canabal and White, 2008, Morschett et al., 2010) and previous studies have found that the offshoring governance mode has a significant effect on offshoring outcomes (Roza et al., 2011). However, they have not examined the effects in conjunction with a portfolio of offshoring projects. Our results show that the effects of functional diversity of the offshoring portfolio are

reduced when an outsourced governance mode is used compared with an in-house or captive mode or conversely the effects of functional diversity are greater when captive governance modes are used. We were unable to examine the organizational costs directly from the data we have but we presume this is due to the greater organizational changes required in captive versus outsourced projects. Outsourced projects typically require less organizational commitment compared with in-house or captive projects (Anderson and Gatignon, 1986) and indeed this is often one reason why non-captive foreign entry modes are preferred over captive (ownership) foreign entry modes by some companies when they internationalize (Agarwal and Ramaswami, 1992). Future studies could delve deeper into the organizational costs involved with different offshoring governance modes and how this affects offshoring innovation outcomes.

Interestingly, our results from the comparison of the different offshoring portfolios show that firms in Group 2 (HHL) with a portfolio featured with a high degree of functional diversity and location diversity, together with a low degree of outsourcing (or in other words, a prevalence of the captive mode across the firm's offshoring projects), are more likely to achieve, on average, higher innovation outcomes than firms with other offshoring portfolios. By contrast, Group 5 (LLH), which has characteristics in the three dimensions opposite to Group 2, shows the poorest innovation outcomes. These results suggest that offshoring portfolios based on different combinations of offshoring activities in the three dimensions significantly differ in their innovation outcomes. This confirms our arguments that it is important to consider the joint effects of location diversity, functional diversity and governance mode. More specifically, it suggests the existence of different organizational configurations for highly innovative firms and less innovative firms. This is in line with the notions of early configurational theorists in strategy such as Miles and Snow (1978) and Mintzberg (1978) who identified different organizational configurations of organizational strategy and structure, and confirms the importance of considering the desired outcomes from offshoring in deciding the optimal combination of locational diversity, functional diversity and governance structure.

Effect of Offshoring Portfolio on Financial Outcomes

Another key finding of our study is that the effects on financial outcomes differ from the effects on innovation performance. In contrast with the S-shape relationship with innovation performance and the predictions of the standard three-stage model of internationalization (Contractor et al., 2003), location diversity showed a negative relationship with financial outcome. This provides supporting evidence for our hypothesis, and is further confirmed in our post hoc comparison analysis where, in general, the best financial outcomes from cost savings were obtained by groups which had low location diversity (LLH, LHH and LHL). Therefore, while engaging with multiple foreign locations for offshoring projects may benefit innovation performance, this is not necessarily the case for the financial outcomes as the liability of foreignness and transaction costs, including costs associated with coordinating operations across borders, may outweigh the saving in labor costs and other financial benefits derived from offshoring operations.

However, we found no significant effects of functional diversity on financial outcome. One possible explanation for this result is that the firms in our sample had been offshoring for an insufficiently long time to gain the financial benefits of offshoring. Previous studies (e.g., Hutzschenreuter et al., 2011) have shown that there is often a significant time lag before financial benefits of offshoring are observed.

It is particularly interesting when contrasting some results concerning the effects of offshoring portfolios on the innovation versus financial outcomes. For example, the best/worst performing combination for innovation outcomes is almost the complete opposite for financial outcomes i.e., Group 2 (HHL) shows the best innovation outcome but has the worst financial outcome, whilst Group 5 (LLH) gives the worst innovation performance but gives the third best financial outcome. Meanwhile Group 7 (LHH) is the second worst in innovation outcome but second best in financial outcome. Such results again indicate that the effects of offshoring portfolios may be different across different performance measures of offshoring. This is not to say that offshoring firms belonging to other groups cannot improve their innovation or financial outcome. However, those results do provide a strong indication that the interactions among the three dimensions matter, and a search for an 'optimum' level of diversity in a given dimension,

whether it concerns location, function or governance mode, would have to take the diversities of offshoring projects in other dimensions into account.

Theoretical Implications

Unlike many previous studies on offshoring, our study employs a novel approach that takes a more holistic view in assessing the effects of offshoring. This approach goes beyond the traditional view seeing offshoring as an exercise simply for the purpose of cost saving. Instead, our basic assumption is that offshoring can be viewed as a reconfiguration of the value chain, and offshoring of one activity in a firm could have important implications to the rest of the firm through re-structuring, relocation and re-organization of the firm's business process. Moreover, offshoring is also part of 'global network building' (Contractor et al., 2010), and the way that a company determines the levels of organizational disaggregation, geographic dispersion and governance modes of projects in its offshoring portfolio tends to have significant impacts on the innovation and financial outcomes of offshoring.

Our study also contributes to the literature on offshoring by examining the effects of offshoring portfolios on both of the innovation and financial performance measures. Previous studies indicated different mechanisms through which internationalization impacts on firm financial performance and innovation respectively (Hitt et al., 1997). Although the innovation literature generally supports the notion that innovation leads to superior financial performance of the firm, the relationship can be moderated by a range of factors such as the firm's competitive environment (Zahra, 1996), or the nature of innovation activities, whether they are explorative or exploitative (Uotila et al., 2009), and so the two may not be directly linked. Our study confirms the importance of distinguishing innovation and financial performance effects of offshoring.

Managerial Implications

Our study also has significant implications for offshoring strategies and practices by firms. Companies might consider how to more strategically design and arrange their offshoring activities across the globe in order to achieve an optimum offshoring portfolio. Further, a firm

may choose different offshoring portfolios depending on its corporate strategy and both short and long term priorities. As our study suggests, offshoring may have different effects on innovation and financial outcomes, which may not show up at the same time. As many cases have shown, there may be a time lag between when a product or process innovation is launched and the financial benefits resulting from that innovation. This may seem puzzling at first glance, but, as previous studies suggest, the relationship between innovation and financial outcome is complex. Therefore, a firm needs to align its offshoring decisions with the strategic goal that the firm wishes to achieve through offshoring, whether it is to improve innovation or financial outcomes.

Limitations and Further Research

Our study is not without limitations. First, it should be noted that the majority of the firms in our sample are engaged in a relatively small number of offshoring projects (over 80% are engaged in 5 or fewer offshoring projects). In that case, the effects of location and functional diversity may not be fully observed and different results may be observed in firms with a greater number of offshoring projects. Secondly, it should be noted that most firms in our sample had been offshoring for a relatively short period of time. (More specifically, over 57% of firms in the sample have less than 9 years of offshoring experience (see Table 1) and the average offshoring experience is 8.9 years. This too may have limited our observations, particularly the effects on innovation, which typically show a significant time lag. Future studies could examine firms with more offshoring projects and longer experience of offshoring to see if the results still hold.

Thirdly, one of our dependent variables, namely 'financial outcomes', is derived from the ORN survey concerning the overall cost saving effect of offshoring projects, which captures the estimated cost improvement to the company as a result of offshoring projects. While we believe this variable reflects the most significant element in the financial outcomes of offshoring, admittedly there may be other elements, which are not captured. Additionally, as our measure of cost saving is an estimate by survey respondents, there is a possibility of respondent bias. We were constrained by the limitations of the ORN survey design but other studies could attempt to measure this more directly.

Lastly, the relatively small size of our sample did not allow us to conduct more extensive statistical tests of differences in performance between the strategic groups we identified. A larger sample would allow the relationships between the factors to be more thoroughly investigated.

CONCLUDING REMARKS

In this paper we have introduced a portfolio approach to examine a firm's offshoring strategy and performance, based on three factors associated with a MNC's offshoring operations, namely location diversity, functional diversity and governance mode. Based on this approach, we explored the relationships between offshoring behaviors at the corporate level on the one hand, and innovation outcomes on the other. Using data from a sample of 286 offshoring firms surveyed by the Offshoring Research Network, we found a significant, positive relationship between functional diversity of the offshoring projects and innovation outcomes, and a significant, S-curve relationship between location diversity of the offshored projects and innovation performance. Furthermore, we have provided evidence showing counter-moderating effects on those relationships of the degree of outsourcing used by MNCs to manage the offshoring operations compared with a captive governance mode. We show that the optimal offshoring portfolios are results of the configurations of offshoring activities in the three dimensions. .

To conclude, we find that the relationships between offshoring location, function, governance mode and innovation and financial outcomes are jointly determined and, therefore, that designing the optimal global supply chain configuration requires a consideration of all three dimensions of the offshoring portfolio at the same time. Our finding of significant differences between effects on innovation and financial outcomes also highlights that in deciding the optimal distribution of the portfolio of offshoring activities across locations, functions and governance modes, it is also necessary to consider the main objective in offshoring (i.e., the optimal configuration to maximize innovation outcomes is likely to be different from the optimal configuration to maximize financial outcomes).

REFERENCES

Agarwal, S. and Ramaswami, S. N. (1992), "Choice of foreign market entry mode: Impact of ownership, location and internalization factors", *Journal of International business studies,* Vol. 23 No. 1**,** pp. 1-27.

Anderson, E. and Gatignon, H. (1986), "Modes of foreign entry: A transaction cost analysis and propositions", *Journal of international business studies,* Vol. 17 No. 3**,** pp. 1-26.

Bantel, K. A. and Jackson, S. E. (1989), "Top management and innovations in banking: Does the composition of the top team make a difference?", *Strategic Management Journal,* Vol. 10 No. S1**,** pp. 107-124.

Barney, J. B. (2001), "Is the resource-based "view" a useful perspective for strategic management research? Yes", *Academy of Management Review,* Vol. 26 No. 1**,** pp. 41.

Bertrand, O. (2011), "What goes around, comes around: Effects of offshore outsourcing on the export performance of firms", *Journal of International Business Studies,* Vol. 42 No. 2**,** pp. 334-344.

Bertrand, O. and Mol, M. J. (2013), "The antecedents and innovation effects of domestic and offshore r&d outsourcing: The contingent impact of cognitive distance and absorptive capacity", *Strategic Management Journal,* Vol. 34 No. 6**,** pp. 751-760.

Buckley, P. J. and Casson, M. (1976), *The future of the multinational enterprise,* New York, Holmes & Meier Publishers.

Bühner, R. (1987), "Assessing international diversification of west german corporations", *Strategic Management Journal,* Vol. 8 No. 1**,** pp. 25-37.

Canabal, A. and White, G. O. (2008), "Entry mode research: Past and future", *International Business Review,* Vol. 17 No. 3**,** pp. 267-284.

Ceci, F. and Prencipe, A. (2013), "Does distance hinder coordination? Identifying and bridging boundaries of offshored work", *Journal of International Management,* Vol. 19 No. 4**,** pp. 324-332.

Coase, R. H. (1937), "The nature of the firm", *Economica,* Vol. 4 No. 16**,** pp. 386-405.

Collins, J. M. (1990), "A market performance comparison of u.S. Firms active in domestic, developed and developing countries", *Journal of International Business Studies,* Vol. 21 No. 2**,** pp. 271-287.

Contractor, F. J., Kumar, V., Kundu, S. K. and Pedersen, T. (2010), "Reconceptualizing the firm in a world of outsourcing and offshoring: The organizational and geographical relocation of high-value company functions f. J. Contractor et al. Relocation of high-value functions", *Journal of Management Studies,* Vol. 47 No. 8**,** pp. 1417-1433.

Contractor, F. J., Kundu, S. K. and Chin-Chun, H. (2003), "A three-stage theory of international expansion: The link between multinationality and performance in the service sector", *Journal of International Business Studies,* Vol. 34 No. 1**,** pp. 5-18.

Coucke, K. and Sleuwaegen, L. (2008), "Offshoring as a survival strategy: Evidence from manufacturing firms in belgium", *Journal of International Business Studies,* Vol. 39 No. 8**,** pp. 1261-1277.

Damanpour, F. (1992), "Organizational size and innovation", *Organization studies,* Vol. 13 No. 3**,** pp. 375-402.

Di Gregorio, D., Musteen, M. and Thomas, D. E. (2009), "Offshore outsourcing as a source of international competitiveness for smes", *Journal of International Business Studies,* Vol. 40 No. 6**,** pp. 969-988.

Doh, J. P. (2005), "Offshore outsourcing: Implications for international business and strategic management theory and practice", *Journal of Management Studies,* Vol. 42 No.**,** pp. 695-704.

Ettlie, J. E. and Reza, E. M. (1992), "Organizational integration and process innovation", *Academy of Management Journal,* Vol. 35 No. 4**,** pp. 795-827.

Farrell, D. (2005), "Offshoring: Value creation through economic change", *Journal of Management Studies,* Vol. 42 No. 3**,** pp. 675-683.

Feldman, M. P. (2000), Location and innovation: The new economic geography of innovation, spillovers, and agglomeration, *The oxford handbook of economic geography.* New York: Oxford University Press.
Funk, C. A., Arthurs, J. D., Treviño, L. J. and Joireman, J. (2010), "Consumer animosity in the global value chain: The effect of international production shifts on willingness to purchase hybrid products", *Journal of International Business Studies,* Vol. 41 No. 4**,** pp. 639-651.
Geringer, J. M., Beamish, P. W. and Dacosta, R. C. (1989), "Diversification strategy and internationalization: Implications for mne performance", *Strategic Management Journal,* Vol. 10 No. 2**,** pp. 109-119.
Hitt, M. A., Hoskisson, R. E. and Kim, H. (1997), "International diversification: Effects on innovation and firm performance in product-diversified firms", *Academy of Management journal,* Vol. 40 No. 4**,** pp. 767-798.
Hutzschenreuter, T., Lewin, A. Y. and Dresel, S. (2011), "Time to success in offshoring business processes", *Management International Review (MIR),* Vol. 51 No. 1**,** pp. 65-92.
Jensen, P. D. Ø. and Pedersen, T. (2011), "The economic geography of offshoring: The fit between activities and local context", *Journal of Management Studies,* Vol. 48 No. 2**,** pp. 352-372.
Kedia, B. L. and Mukherjee, D. (2009), "Understanding offshoring: A research framework based on disintegration, location and externalization advantages", *Journal of World Business,* Vol. 44 No. 3**,** pp. 250-261.
Kogut, B. and Zander, U. (1993), "Knowledge of the firm and the evolutionary theory of the multinational corporation", *Journal of international business studies,* Vol. 24 No. 4**,** pp. 625-645.
Larsen, M. M., Manning, S. and Pedersen, T. (2012), "Uncovering the hidden costs of offshoring: The interplay of complexity, organizational design, and experience", *Strategic Management Journal,* Vol. 34 No. 5**,** pp. 533-552.
Lewin, A. Y., Massini, S. and Peeter, C. (2009a), "Why are companies offshoring innovation? The emerging global race for talent", *Journal of International Business Studies,* Vol. 40 No. 6**,** pp. 901-925.
Lewin, A. Y. and Peeters, C. (2006), "Offshoring work: Business hype or the onset of fundamental transformation?", *Long Range Planning,* Vol. 39 No. 3**,** pp. 221-239.
Lewin, A. Y., Perm-Ajchariyawong, N. and Russel, J. (2009b). Taking offshoring to the next level. The Conference Board and Duke University.
Lu, J. W. and Beamish, P. W. (2004), "International diversification and firm performance: The s-curve hypothesis", *Academy of Management Journal,* Vol. 47 No. 4**,** pp. 598-609.
Manning, S., Massini, S. and Lewin, A. Y. (2008), "A dynamic perspective on next-generation offshoring: The global sourcing of science and engineering talent", *Academy of Management Perspectives,* Vol. 22 No. 3**,** pp. 35-54.
Maskell, P., Pedersen, T., Petersen, B. and Dick-Nielsen, J. (2007), "Learning paths to offshore outsourcing: From cost reduction to knowledge seeking", *Industry & Innovation,* Vol. 14 No. 3**,** pp. 239-257.
Massini, S., Perm-Ajchariyawong, N. and Lewin, A. Y. (2010), "Role of corporate-wide offshoring strategy on offshoring driveres, risks and performance", *Industry and Innovation,* Vol. 17 No. 4**,** pp. 337-371.
Mcivor, R. (2009), "How the transaction cost and resource-based theories of the firm inform outsourcing evaluation", *Journal of operations management,* Vol. 27 No. 1**,** pp. 45-63.
Mihalache, O. R., Jansen, J. J. J. P., Van Den Bosch, F. a. J. and Volberda, H. W. (2012), "Offshoring and firm innovation: The moderating role of top management team attributes", *Strategic Management Journal,* Vol. 33 No. 13**,** pp. 1480-1498.
Miles, R. E. and Snow, C. C. (1978), *Organizational strategy, structure, and process,* New York, McGraw-Hill.
Mintzberg, H. (1978), "Patterns in strategy formation", *Management science,* Vol. 24 No. 9**,** pp. 934-948.
Mol, M. J., Van Tulder, R. J. and Beije, P. R. (2005), "Antecedents and performance consequences of international outsourcing", *International Business Review,* Vol. 14 No. 5**,** pp. 599-617.

Morschett, D., Schramm-Klein, H. and Swoboda, B. (2010), "Decades of research on market entry modes: What do we really know about external antecedents of entry mode choice?", *Journal of International Management,* Vol. 16 No. 1**,** pp. 60-77.
Mudambi, R. (2008), "Location, control and innovation in knowledge-intensive industries", *Journal of economic Geography,* Vol. 8 No. 5**,** pp. 699-725.
Mudambi, R. and Venzin, M. (2010), "The strategic nexus of offshoring and outsourcing decisions r. Mudambi and m. Venzin offshoring and outsourcing decisions", *Journal of Management Studies,* Vol. 47 No. 8**,** pp. 1510-1533.
Nieto, M. J. and Rodríguez, A. (2011), "Offshoring of r&d: Looking abroad to improve innovation performance", *Journal of International Business Studies,* Vol. 42 No. 3**,** pp. 345-361.
Paju, T. (2007), "Conceptual model of r&d offshore outsourcing", *Journal of Global Business and Technology,* Vol. 3 No. 1**,** pp. 49.
Pan, Y. and Tse, D. K. (2000), "The hierarchical model of market entry modes", *Journal of international business studies,* Vol. 31 No. 4**,** pp. 535-554.
Roza, M., Van Den Bosch, F. a. J. and Volberda, H. W. (2011), "Offshoring strategy: Motives, functions, locations, and governance modes of small, medium-sized and large firms", *International Business Review,* Vol. 20 No. 3**,** pp. 314-323.
Ruigrok, W. and Wagner, H. (2003), "Internationalization and performance: An organizational learning perspective", *MIR: Management International Review,* Vol. 43 No. 1**,** pp. 63-83.
Schmeisser, B. (2013), "A systematic review of literature on offshoring of value chain activities", *Journal of International Management,* Vol. 19 No. 4**,** pp. 390-406.
Stratman, J. K. (2008), "Facilitating offshoring with enterprise technologies: Reducing operational friction in the governance and production of services", *Journal of Operations Management,* Vol. 26 No. 2**,** pp. 275-287.
Tate, W. L. and Bals, L. (2015), Outsourcing/offshoring insights: Going beyond reshoring to rightshoring. *International Journal of Physical Distribution & Logistics Management* [Online].
Tatikonda, M. V. and Montoya-Weiss, M. M. (2001), "Integrating operations and marketing perspectives of product innovation: The influence of organizational process factors and capabilities on development performance", *Management Science,* Vol. 47 No. 1**,** pp. 151-172.
Uotila, J., Maula, M., Keil, T. and Zahra, S. A. (2009), "Exploration, exploitation, and financial performance: Analysis of s&p 500 corporations", *Strategic Management Journal,* Vol. 30 No. 2**,** pp. 221-231.
Vivek, S. D., Banwet, D. and Shankar, R. (2008), "Analysis of interactions among core, transaction and relationship-specific investments: The case of offshoring", *Journal of Operations Management,* Vol. 26 No. 2**,** pp. 180-197.
Zahra, S. A. (1996), "Technology strategy and financial performance: Examining the moderating role of the firm's competitive environment", *Journal of Business venturing,* Vol. 11 No. 3**,** pp. 189-219.

Table 1: Sample and responding firms' characteristics

	% Companies
Firm Size (number of employees)	
Large (>20,000)	25
Medium (>500 and <20,000)	35
Small (< 500)	40
Number of offshoring projects	
1	28
2	23
3	11
4	10
5	7
6	5
7	2
8	3
9	3
10	1
11	2
12	2
More than 12	4
Headquarter Region	
United States	87.06
Europe	9.79
Others	3.15
Industry	
Finance & Insurance	15
Technical Services	15
Software and IT services	13
Manufacturing	13
Professional Services	13
High Tech	6
Telecommunications	5
Automotive	3
Biotech & Pharmaceutical	2
Transportation and Warehousing	2
Consumer Goods	2
Others	9
Offshoring Experience (years)	
0	3.5
3	0.35
4	8.39
5	8.39
6	13.64
7	11.19
8	11.54
9	10.14
10	3.5
11	8.04
12	4.2
13	2.1
14	2.45
15 year and over	12.6

Table 2: Summary statistics and correlations between variables used in the models

	Variables	Mean	S.D.	Min	Max	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
1	Innovation Performance	2.36	1.06	1	5	1											
2	Financial Performance	32.12	19.09	-40	93.75	0.18	1										
3	Location Diversity	2.22	1.92	1	13	**0.16**	-0.1	1									
4	Functional diversity	2.50	1.86	1	11	**0.17**	0.03	**0.32**	1								
5	Outsourcing vs. captive Ratio	0.55	0.47	0	1	**-0.23**	0.1	-0.04	**-0.21**	1							
6	Innovation index of offshoring countries	13.94	17.45	0	105.2	**0.21**	0.07	**0.26**	**0.33**	**-0.21**	1						
7	Ratio of high value activity offshoring	0.35	0.38	0	1	-0.04	0.09	**-0.14**	-0.03	0.05	-0.1	1					
8	Years of Offshoring Experience	8.68	5.41	0	47	**0.2**	-0.02	**0.39**	**0.12**	**-0.18**	**0.19**	-0.05	1				
9	Firm Size	7.09	3.22	0	12.861	-0.11	-0.02	**0.24**	**0.16**	-0.09	-0.09	**-0.2**	**0.11**	1			
10	High Tech Industry Sector	0.27	0.44	0	1	0.01	0.12	0.04	0.04	0.04	0.05	**0.21**	0.02	**-0.13**	1		
11	U.S. Company	0.19	0.39	0	1	0	0.08	-0.09	**0.3**	0.03	0.07	**0.28**	-0.07	0.06	**0.12**	1	
12	European Company	0.14	0.34	0	1	0.04	-0.06	-0.05	-0.02	0.07	0.04	**0.29**	-0.04	**-0.19**	0.1	**-0.19**	1

Bold = significant at 5% confidence level

Table 3: Results of OLS models of innovation outcome

	Innovation Outcome			
Variables	*Model 1*	*Model 2*	*Model 3*	*Model 4*
Functional diversity	**0.072***	**0.073***	**0.106***	0.092
	(0.043)	(0.043)	(0.056)	(0.056)
Location Diversity	0.013	**0.631***	**0.730****	**1.082*****
	(0.054)	(0.363)	(0.368)	(0.406)
Location Diversity Squared		-0.155*	**-0.190****	**-0.252****
		(0.091)	(0.092)	(0.100)
Location Diversity Cubed		0.010	**0.012***	**0.015****
		(0.006)	(0.006)	(0.007)
Interaction				
Functional diversity x Degree of Outsourcing			**-0.181****	-0.002
			(0.084)	(0.126)
Location Diversity x Degree of Outsourcing			0.028	-0.317
			(0.138)	(0.334)
Location Diversity Squared x Degree of Outsourcing				0.073
				(0.113)
Location Diversity Cubed x Degree of Outsourcing				-0.001
				(0.009)
Location Diversity x Functional diversity x Degree of Outsourcing			0.025	-0.036
			(0.035)	(0.046)
Controls				
Innovation Index of Offshoring Destinations	0.007	0.007	0.006	0.006
	(0.005)	(0.005)	(0.005)	(0.005)
Ratio of High Value Activity Offshoring to Total Offshoring	0.020	0.023	-0.016	0.056
	(0.301)	(0.301)	(0.301)	(0.303)
Years of Offshoring Experience	0.028	0.028	0.027	0.032*
	(0.017)	(0.017)	(0.018)	(0.018)
Firm Size	-0.049	-0.053*	-0.054*	-0.056*
	(0.031)	(0.031)	(0.031)	(0.031)
High Tech Industry Sector	-0.028	-0.012	-0.031	-0.034
	(0.182)	(0.182)	(0.182)	(0.181)
U.S. Company	-0.068	-0.031	0.075	0.017
	(0.250)	(0.251)	(0.260)	(0.260)
European Company	-0.004	0.018	0.126	0.085
	(0.260)	(0.260)	(0.265)	(0.264)
Constant	2.167***	1.622***	1.615***	1.347***
	(0.313)	(0.445)	(0.461)	(0.479)
Observations	168	168	168	168
R-squared	0.098	0.115	0.142	0.164

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 4: Results of OLS models of financial outcome

	Financial Outcome			
Variables	*Model 5*	*Model 6*	*Model 7*	*Model 8*
Functional diversity	0.427	0.501	1.233	1.268
	(0.792)	(0.801)	(0.956)	(0.988)
Location Diversity	**-1.440****	-3.755	**-9.336****	**-10.03****
	(0.691)	(3.948)	(4.291)	(4.806)
Location Diversity Squared		0.357	1.181	1.423
		(0.881)	(0.917)	(1.155)
Location Diversity Cubed		-0.013	-0.060	-0.079
		(0.052)	(0.054)	(0.078)
Interaction				
Functional diversity x Degree of Outsourcing			-0.352	-0.681
			(1.603)	(2.291)
Location Diversity x Degree of Outsourcing			**3.952****	5.312
			(1.650)	(4.798)
Location Diversity Squared x Degree of Outsourcing				-0.513
				(1.517)
Location Diversity Cubed x Degree of Outsourcing				0.038
				(0.109)
Location Diversity x Functional diversity x Degree of Outsourcing			-0.174	-0.110
			(0.384)	(0.504)
Controls				
Innovation Index of Offshoring Destinations	0.115	0.120*	0.151**	0.152**
	(0.072)	(0.072)	(0.072)	(0.073)
Ratio of High Value Activity Offshoring to Total Offshoring	4.846	4.708	4.901	4.796
	(3.407)	(3.423)	(3.378)	(3.423)
Years of Offshoring Experience	-0.009	0.024	0.205	0.218
	(0.230)	(0.239)	(0.242)	(0.247)
Firm Size	0.196	0.227	0.317	0.323
	(0.372)	(0.375)	(0.373)	(0.379)
High Tech Industry Sector	4.734*	4.928*	4.965*	4.862*
	(2.624)	(2.645)	(2.623)	(2.665)
U.S. Company	-0.703	-0.782	-2.094	-1.932
	(3.940)	(3.951)	(3.985)	(4.027)
European Company	-6.603	-6.661	-7.558*	-7.451*
	(4.170)	(4.184)	(4.171)	(4.205)
Constant	29.276***	31.291***	31.125***	31.169***
	(3.752)	(5.261)	(5.223)	(5.245)
Observations	286	286	286	286
R-squared	0.050	0.052	0.091	0.091

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 5: Characteristics of firms in each group

	Group 1 *HHH*	*Group 2* *HHL*	*Group 3* *HLH*	*Group 4* *HLL*	*Group 5* *LLH*	*Group 6* *LLL*	*Group 7* *LHH*	*Group 8* *LHL*
Firm Size								
Large	58%	54%	33%	29%	20%	29%	13%	22%
Midsize	32%	36%	24%	36%	34%	34%	44%	33%
Small	11%	11%	43%	36%	45%	37%	38%	33%
Year of offshoring experience	10.1	13.2	9.0	16.1	7.3	7.9	8.0	9.0
Number of offshoring projects	9.4	10.8	4.6	5.6	1.6	1.7	5.1	4.7
Industry								
Aerospace and Defense	0%	4%	0%	0%	0%	0%	6%	0%
Arts, Entertainment, and Recreation	5%	0%	0%	0%	1%	0%	0%	0%
Automotive	0%	11%	5%	0%	0%	3%	0%	4%
Banking and Capital Markets	0%	0%	0%	0%	0%	0%	6%	0%
Biotech & Pharmaceutical	5%	0%	5%	0%	3%	0%	0%	7%
Chemical	0%	0%	0%	0%	1%	0%	0%	0%
Construction	0%	0%	0%	0%	0%	3%	0%	0%
Consumer Goods	0%	4%	5%	7%	1%	1%	0%	4%
Energy, Utilities and Mining	0%	0%	0%	0%	0%	1%	0%	0%
Finance & Insurance	32%	11%	10%	0%	17%	18%	13%	7%
Government/Public services	0%	0%	0%	0%	2%	0%	0%	0%
High Tech	5%	18%	10%	14%	3%	3%	0%	4%
Management of Companies and Enterprises	5%	0%	0%	0%	5%	0%	0%	0%
Manufacturing	16%	14%	10%	21%	0%	19%	6%	19%
Media	5%	0%	0%	0%	1%	1%	6%	0%
Oil & Gas	0%	4%	0%	0%	0%	1%	0%	0%
Other	11%	0%	5%	7%	3%	3%	0%	0%
Pharmaceuticals and Life Sciences	0%	0%	0%	0%	0%	0%	0%	4%
Professional Services	5%	7%	5%	14%	18%	12%	25%	4%
Retail and Consumer Goods	5%	0%	0%	0%	1%	1%	0%	0%
Software and IT services	5%	7%	5%	29%	16%	10%	13%	22%
Technical Services	0%	18%	10%	7%	17%	16%	13%	22%
Telecommunications	0%	4%	24%	0%	6%	3%	6%	0%
Transportation and Warehousing	0%	0%	10%	0%	2%	3%	0%	4%
Travel	0%	0%	0%	0%	0%	0%	6%	0%
Other	11%	0%	5%	7%	3%	3%	0%	0%

Table 6: Comparison of innovation outcome of firms with various offshoring portfolios

	Innovation Outcome*							
	Group 1 HHH	*Group 2 HHL*	*Group 3 HLH*	*Group 4 HLL*	*Group 5 LLH*	*Group 6 LLL*	*Group 7 LHH*	*Group 8 LHL*
Obs	15	11	9	5	46	34	21	27
Mean	2.37	**2.86**	2.50	2.70	**1.99**	2.54	2.19	2.57
Std. Dev.	1.01	1.05	0.90	0.67	1.06	1.05	1.18	1.04
Min	1	1	1	2	1	1	1	1
Max	4.5	4.5	4	3.5	4.5	4.5	5	4.5

** Interpretation of the result might not be accurate due to the non-linear relationship between location diversity and innovation outcome*

Table 7: Comparison of financial outcome of firms with various offshoring portfolios

	Financial Outcome							
	Group 1 HHH	*Group 2 HHL*	*Group 3 HLH*	*Group 4 HLL*	*Group 5 LLH*	*Group 6 LLL*	*Group 7 LHH*	*Group 8 LHL*
Obs	19	28	21	14	93	68	16	27
Mean	29.62	**26.73**	33.47	26.86	33.94	30.15	35.16	**38.03**
Std. Dev.	11.89	17.77	13.67	20.69	19.67	20.00	18.23	22.39
Min	10	0	10	0	-40	-25	0	0
Max	52.5	70	61.25	75	80	77.5	60	93.75

Figure 1: Summary of hypotheses

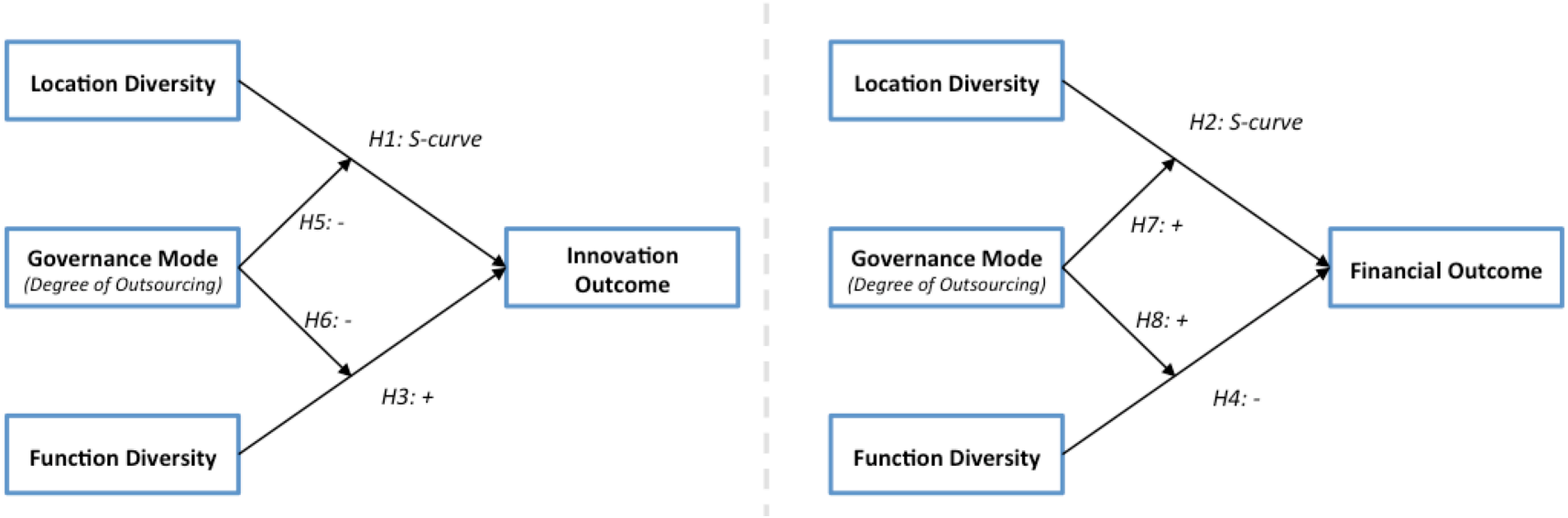

Figure 2: Classification of offshoring portfolios for post-hoc analysis

Group	1 *HHH*	2 *HHL*	3 *HLH*	4 *HLL*	5 *LLH*	6 *LLL*	7 *LHH*	8 *LHL*
Location Diversity	H	H	H	H	L	L	L	L
Function Diversity	H	H	L	L	L	L	H	H
Degree of Outsourcing	H	L	H	L	H	L	H	L

H = High diversity
L = Low diversity

Figure 3. Location diversity-innovation performance relationship