# Global R&D, A Literature Review: Evolution or Isomorphic Forces?

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**Abstract:**

*This paper reviews the literature on the growth of globalization of research and development (R&D) laboratories and capabilities of large multi-national firms. Based on this detailed review of the literatures, we posit that firms may be increasing their R&D efforts for two distinctly different reasons. First, overseas R&D labs may be a natural evolution of the MNC structure. Then again MNC's may be following institutional isomorphic forces. We develop arguments for coercive factors by government policies or mimicry of firms following other successful firms in R&D offshoring. We compare these evolutionary and institutional forces in the development of competing propositions. A discussion and brief methods section concludes the paper.*

**Keywords:** R&D, offshoring, institutional forces, global research

## 1.0 Introduction

This paper evaluates the growing trend of large multinational corporations (MNC) to spend research and development (R&D) resources in other countries. A report issued by the Office of Technology Policy is one of several demonstrating a significant growth in overseas R&D. R&D spending abroad by U.S. firms grew from $5.2 billion in 1987 to $14.1 billion in 1997 (Dalton & Serapio, 1999). By 2010 U.S headquartered MNCs were performing nearly $40 billion in R&D overseas (NSF, 2014). The role of R&D in the U.S. is still strong but shrinking relative to many other countries. Most notably at current rates of R&D change, China which surpassed Japan in 2011, will overtake the U.S. for the highest level of R&D spending by 2022. China has increased funding in R&D by between 12% and 20% per year in each of the last 20 years (Grueber & Studt, 2013). Western MNCs are exacerbating these trends by moving R&D outside of their home countries. This paper conceptually explores reasons for these changes in R&D corporate structure.

Popular press has highlighted the growing trends of moving home country. employment opportunities overseas, particularly in the manufacturing sector, in recent years. The emergence of software and back office operations in India and other lesser developed countries has also been widely noted. The positioning of R&D facilities around the globe is a newer and less well known phenomenon. R&D is the seed corn of innovation. If local firms are choosing to expand R&D in other countries., it impacts on the longer-term competitiveness of the home country workforce. For example, China, which has focused on increasing its R&D capabilities is rapidly gaining on the U.S. in terms of both patent applications and scientific papers (Grueber & Studt, 2013).

The purpose and motivation for direct investment in overseas R&D labs is critical to understand to assess the potential impact on the home country economy. This paper addresses this research question by comparing an evolutionary framework with a mimetic isomorphism perspective. These differing motivations generate questions about the growth of R&D offshoring. The following two sections review relevant literature and develop three propositions. Then a discussion section follows including some initial methods thoughts. Finally, the paper concludes with some limitations and future work suggested in this field.

## 2.0 Why Globalize R&D?:

The dominant theory for multinational corporation (MNC) formation and behavior involves the use of subsidiaries for overseas functions. Traditionally the role of these subsidiaries extends the advantages of the home (or parent) corporation.

This internalization approach views overseas functions as supportive of the technology created in the home office (Meyer & Estrin, 2014; Pedersen & Shaver, 2011). This is consistent with a product life cycle model of the firm and explains why scholars believe firms will not shift core R&D away from the home location unless a serious threat to competitiveness exists (Dunning, 2001; Lall, 1979; Le Bas & Sierra, 2002). In this view, R&D would only move overseas if there were compelling localized market or customer needs. Often this demand based rationale leads to a small R&D center which will adapt the home product or service for local overseas markets. Overseas units often start out as support organizations for regional manufacturing or service support. However it appears many of these facilities are now contributing to a global innovation effort (Pearce, 1999; Stanko & Calantone, 2011). Several studies find the purpose of the R&D center adapts over time and tends to show an evolutionary trend with increasing technical responsibilities. Often these R&D centers build their own creative capabilities separate and beyond those in the home office (Kuemmerle, 1999a; Lessard, Teece & Leih, 2016; Ronstadt, 1978).

Exploiting ideas from widely dispersed R&D units is much more difficult than from a centralized location (Nobel & Birkinshaw, 1998). Economies of scope are reliant on the direct transfer or spillover of knowledge between businesses (Penrose, 1959). Previous studies show that communication is critical to effective R&D operations. Nobel and Birkinshaw (1998) for example, surveyed 110 R&D labs in 15 Swedish firms and found that the type of R&D conducted required different forms of communication and control. Cultural and geographic diversity do not enhance communications capabilities for the firm (De Meyer, 1991). Clearly this process is more difficult with locational and cultural dispersion of R&D functions. As the organization becomes less centralized, the issues of miscommunication and problems of monitoring become more significant concerns for the firm. This despite the technological enhancements of the internet and mobile communications. Additionally, R&D involves a high degree of risk and requires a significant amount of absorptive knowledge and information to be successful (Cohen & Levinthal, 1990; Martinez-Noya, Garcia-Canal & Guillen, 2013). Both of these factors will tend towards a concentrated rather than dispersed alignment of R&D resources (Alchian & Demsetz, 1972; Patel & Vega, 1999; Williamson, 1991). If R&D is so critical to innovation in MNC's and distributing it has been shown to introduce managerial difficulties, why would firms want to globalize their R&D?

Many forces drive internationalizing R&D. Early on Mansfield et al (1979) raised the question of why firms would invest in R&D overseas. They noted four possible reasons; first, unique environmental conditions abroad; second, special design needs of overseas markets; third, available lower cost skills to perform R&D or fourth opportunity to better monitor technical achievements abroad. Their survey results showed the responding firms largely cited special design needs of overseas markets. One of the primary reasons given for this role of overseas R&D was concern about the 'leakage' of key technical information outside the firm (Frishammar, Ericsson & Patel, 2015). By focusing foreign R&D on local adaptations, the core knowledge base of the firm can remain in the home R&D labs (Mansfield, Teece, & Romeo, 1979). Patel and Vega (1999) found a somewhat similar result using a much different research method. They studied U.S. patent data to look at innovative activities for 220 firms outside their home country. By using the resident country of the first inventor and the technology fields covered by the patents, they found R&D work outside the home country largely either supports the work of the home office or it is for local adaptation of the firm's product and services. La Bas & Sierra (2002) build upon the methods of Patel and find support for the notion that overseas R&D is built in technical areas where the firm is already strong at home.

Globalizing R&D has attracted several theoretical motivations in the literature. Some of those commonly mentioned are: access to scientific talent, ideas from diverse markets, response to local needs, response to local governments, and division of labor (Nobel et al., 1998; Ronstadt, 1978). Additional research has highlighted two newer reasons for globalizing R&D. First, to monitor new technology developments and second, to create completely new products and technologies (Patel et al., 1999). Narula classifies these forces into two categories: demand-driven and supply-side factors (Narula, 2002). Demand-driven reasons are the most widely studied and include proximity to foreign customers and offshore production facilities. In this case these overseas activities essentially substitute for those actions in the home location. Supply-side factors spring from a firm wanting to improve existing assets. Here, the foreign location has advantages not available in the home market and is therefore viewed as a complement to the parent activities at home. Examples of supply-side factors are technology listening outposts which connect with the foreign technical or competitive community and the development of 'out of the box' technology and products which are more successful with new resources than those in the 'inertia' of the parent firm (Narula, 2002). Mergers and acquisitions or R&D alliances are often the resultant of supply-side impetus for an overseas R&D presence (Narula, 2002).

For a different perspective on a similar question, John Hagedoorn looks at the formation of international R&D alliances. He notes firms use such alliances for access to foreign markets and to build new sources of R&D (Hagedoorn, 2002). His study using the MERIT-CATI database containing 40 years of data on R&D partnerships shows a variance in international R&D formations by industrial sector. He divides the sectors into high-tech, mid-tech and low-tech using a relative scale for the analysis. He finds a perhaps counter-intuitive result that mid-tech industries have more international R&D alliances than either low or high-tech sectors. High-tech seems to be held down by information technology while both consumer electronics and chemicals (not including pharmaceuticals) elevate the scaled results for mid-tech sectors (Hagedoorn, 2002).

## 3.0 Theory Development:

One of the seminal empirical studies on overseas R&D expenditures was conducted by Edwin Mansfield, David Teece & Anthony Romeo and published in 1979 in *Economica*. Based on survey results from 55 major manufacturers, they found these firms spent about 10% of their total R&D dollars overseas in 1974 (Mansfield et al., 1979). This figure ties in well with data from the same time period independently collected by the Conference Board for U.S. based multinationals (Mansfield et al., 1979).

Mansfield and his colleagues speculated that the percent of a firm's R&D expenses overseas would be highly correlated to the firm's percent of foreign sales. Further they hypothesized a focus on the percent of overseas sales from foreign subsidiaries (rather than exports from the domestic facilities). Overseas R&D is often performed in support of foreign manufacturing operations which would be contained in subsidiaries and therefore would drive R&D expenses accordingly (Mansfield et al., 1979). Using OLS regression analysis they found a direct and statistically significant relationship between a firm's percentage of subsidiary sales abroad and its percentage of R&D expenses overseas.

Supporting this resultant, historical data collected by the Bureau of Economic Analysis (BEA) shows a large part of the flow of foreign direct investment is still largely among developed nations (Grueber & Studt, 2013; Lipsey, 2001). Foreign sales are strongest among these same developed countries. Government reports do not indicate evidence of major shifts in this direct investment trend with the exception of China (Dalton et al., 1999; NSF, 2014; UNCTAD, 2002).

Survey work by both Pearce (1999) and Kuemmerle (1999) also demonstrates that the role of these overseas locations can change over time. A survey of large firms with R&D labs in the United Kingdom finds that work in these offices tend to emphasize an aspect of strategic competitiveness, new product development, as well as a growing emphasis on pre-competitive research which is akin to basic R&D (Pearce, 1999). Earlier case study work by Ronstadt (1978) at 7 MNC's demonstrated that if the role of the R&D lab changes there is likely to be growth of both size and scope. If the goals of the R&D lab remain constant, there tends to be no growth over time. (Ronstadt, 1978). Kuemmerle builds upon Ronstadt's work with a survey of R&D labs in 5 countries. He finds support for R&D labs to be generally located near existing facilities and markets and further, for the labs to grow in scope as the markets and current operations grow (Kuemmerle, 1999b). Once overseas operations are established, a natural inertia sets in motion the desire for more local searches for new information and knowledge (Nelson & Winter, 1982). This may at times even supersede the corporate desires for more centrality and lead to the evolution of greater capabilities in overseas units.

Taken together, the literature shows strong support for foreign industrial R&D labs to be closely tied to gradual development of overseas facilities and markets. By evolving over time the organizations build routines which allow further capability growth and development. These ideas were classically explored in Nelson & Winter's book on evolutionary economics. There are indications these labs further change over time and evolve to meet new goals and expectations in line with the overall business of the firm. (Nelson & Winter, 1982). We therefore propose a major motivation for global R&D:

- ***Proposition 1: MNC's develop global R&D capabilities as an evolution of their overseas capabilities.***

Empirical results show that home country conditions have a large impact on creating global advantage in innovation (Patel et al., 1999). Policy decisions on home country financial, educational, and research institutions can have major results on international success of multinational corporations. The tendency to globalize innovative activities does differ between countries. Nations such as the UK, Switzerland and the Netherlands have traditionally had a high level of international technology and R&D particularly after WWII (Cantwell, 1995).

The U.S. has a relatively low percentage of R&D patenting from foreign affiliates compared with other industrialized countries (Cantwell, 1995).

In a study of Norwegian based international firms, Narula showed a distinction between two groups of firms. The first group was more traditional industries with a tendency to work in process related areas and this group was less internationalized in sales than the second group of technology-intensive firms. Their study showed that the location of R&D activities is quite subject to country-specific factors (Narula, 2002).

While there can be a variety of factors leading to country specific differences in R&D activities, research from several institutional scholars indicates governmental policies in particular can have a substantive impact on industry and firm structures. For example, Frank Dobbin (1994) produced comprehensive historical research demonstrating the impact of government factors on the structure of the railroad industry. Dobbin traces over 75 years of the railroads in the United States, Britain and France. He argues that the emergent industrial characteristics of each country are differentiated by the distinct political factors in each of the three nations. For example, the French political structure was achieved through central control and absolutism. This led to a railway industrial structure in France which was financed, supervised and sometimes actually constructed by the national government. By contrast, the United States was built largely on community activism. This manifested itself in a railroad industry initially directed by state and local governments to enforce a market approach in the railroads. Eventually the U.S. federal government did intervene as the railroads grew into national networks but even then, the federal government mirrored the initial state organizations in both structure and market approach. Dobbin finds government practices and traditions lead to quite different industrial organizations for the railroad industries in the U.S., France and Britain. Additionally, he notes these observations can be reproduced in a variety of different industries beyond the railway system (Dobbin, 1994).

Another study which looks at the country level impact on industry is undertaken by Isin Guler and colleagues. These scholars study the pattern of ISO 9000 quality certifications across 85 countries between 1993 and 1998 (Guler, Guillen, & Macpherson, 2002). The authors provide empirical support for the idea that country level policies can significantly influence the diffusion patterns of ISO 9000 certificates. They thus conclude that the adoption of such organizational processes spreads across national boundaries in a heterogeneous manner and is influenced by the role of the various national governments (Guler et al., 2002).

On a more localized scale, Edelman and her associates find support for a bi-directional influence between industry and government in the formation or grievance procedures in the United States. This study evaluates the emergence of internal equal employment opportunity (EEO) grievance procedures as a measure of compliance with the EEO law. In particular, the article looks at the influence industry actions and federal court cases had on each other (Edelman, Uggen, & Erlanger, 1999). Here we have another case of corporate organizational changes being impacted by government actions albeit in this study it is also true that government actions seem to be influenced by corporate organizational practices as well (Edelman et al., 1999). These government policies are often considered coercive in nature. They try to 'force the hand' of large MNCs to invest high skilled work into their local economy. This action aligns with the concept of coercive isomorphism first developed in a classic work by DiMaggio and Powell (1983). These scholars used institutional theory to develop categories of isomorphic forces. Coercive is one of these and is relevant here. It is the formal and informal pressures exerting change on the focal MNC organization. Mimetic isomorphism is discussed in the third proposition and relates to social legitimacy of adapting actions that other successful organizations are already doing (DiMaggio & Powell, 1983; Haveman, 1993).

In summary, government policies are important. Governments can entice industrial development through beneficial tax policies and training programs. They can also attain such development through more coercive devices such as with-holding market access until R&D investments are committed by the firm. There is good reason to believe the actions taken by governments can either help or hinder the establishment and growth of overseas R&D labs. As early as 1974 the United Nations was advising developing countries to encourage MNC's to establish R&D labs in their countries. It is well established that R&D labs enable innovation spillovers such as in the local supply base which are helpful to the local economy in general. We therefore propose that firms will create R&D labs in locations where government policies strongly encourage such activity.

- ***Proposition 2: MNC's develop global R&D capabilities as isomorphic foreign government policies are established locally.***
- When a firm extends R&D capabilities to a new location it incurs costs. Some firms minimize these costs of entry by using cooperative approaches with a firm already in the desired location (Narula, 2002). The increasing number of mergers, acquisitions and R&D alliances is evidence of this approach (Hagedoorn, 2002). Acquiring an existing laboratory for example, reduces the time needed to build valuable connections with the local technical community (Narula, 2002). Acquisitions can also be difficult to integrate into the parent firms culture. From a practical managerial perspective, globalization brings in a whole host of new issues for the home based firm (Narula, 2002). R&D alliances mitigate some of these concerns. Such alliances can respond to threats from leading competitors by reducing both the investment and the risks associated with starting up a new R&D facility.

One of the key tenets of *mimetic isomorphism* is a high level of uncertainty. Organizations are prone to copy the visible actions of other firms when faced with limited information and high risk (DiMaggio & Powell, 1983). R&D labs have many attributes which are likely to drive decision makers to imitate firms viewed as industry or technology leaders. First, R&D is inherently high risk. By its very nature a majority of R&D projects will not come to fruition for the firm (Contractor, et al., 2010). Second, due in part to this high risk, organizational goals are often not clear or are subject to debate. In such situations when a new facility is to be opened without a track record of achievement, other forms of legitimacy are often sought (Haveman, 1993). The ability to imitate a leading firm provides some level of such authority and also helps eliminate contentious discussions on otherwise disparate goals often involved in new laboratories. Third, because many nations and regions are trying to attract R&D labs, the opening of new facilities rarely goes without notice in the local press and trade journals. Therefore there will be a trail of information available for interested parties to follow. Finally, R&D labs employ a highly skilled work force. These employees will be acutely aware of what others in the field are doing both in terms of technology and placement/purchase of new laboratories.

A study that looks at the location of research laboratories within the United States is quite germane to our discussion (Appold, 2005). Stephen Appold studies county level location data of over 10,000 research laboratories in the U.S. in 1985. The work focuses on ten research fields that were all in existence for more than a decade. The author finds support for a primary argument in the DiMaggio and Powell work on isomorphism (DiMaggio & Powell, 1983). Appold argues that the inherent risks of the large capital investment needed for a research laboratory, combined with ambiguity of quantifiable locational advantages, leads firms to rely on signals from other firms. This signaling in turn yields higher concentrations of labs across the country than would otherwise be expected. Using a stochastic method to test for independent decision making of research lab locations, he discovers that firms in his study indeed influence each other on locational decisions. Appold finds that mimetic isomorphism is a significant factor in location decisions resulting in the multiple agglomerations of research labs across the U.S (Appold, 2005).

This type of 'follow-the-leader' approach is also found in Fligstein's work on the spread of the multidivisional form (Fligstein, 1985). The author studied archival data from large U.S. firms from 1919 to 1979. The work compares five distinct theories of organizational change to explain the emergence of the multidivisional form over this period. To test the probability of mimetic effect, Fligstein uses industry S.I.C. codes to define industries and evaluates what decade firms within the SICs change to a multidivisional form. Using multivariate models of the largest 100 industrial firms in the U.S. over the timeframe, he found firms were more likely to restructure if their competitors had already shifted to a multidivisional form (Fligstein, 1985).

Haveman (1993) provides another empirical work in a U.S. framework. He studies the California Savings and Loan (S&L) industry. This research applies the contagion process ideas found in other works (Fligstein, 1985; Williamson & Cable, 2003) to study the diversification of S&L's into six market opportunities created by deregulation over the period 1977 to 1987. Using event history methods, the author finds strong results supporting the imitation of firms considered to be large and profitable. These noted successful firms seem to serve as role models for other firms entering the focal markets (Haveman, 1993).

Taken together, we have uncovered empirical support for mimetic behavior in the location of MNC research labs, the extension of the multidivisional form and finally in the entrance of new markets. The placement of R&D labs in overseas countries creates heightened levels of uncertainty and is therefore a rich environment to study for such conformity of action.

Our framework is a logical application to integrate these prior studies together in a holistic manner and consider the organizational change of entry into a new foreign location for an R&D lab. Hence we propose on the international front, location choices will be heavily influenced by mimicking what the competition has done before.

- ***Proposition 3: MNC's develop global R&D capabilities to imitate successful competitors.***

## 4.0 Discussion and Proposed Methods:

The proposed framework and propositions are intended to move the field forward in determining some of the key underlying causes of the global dispersion of private sector R&D. As noted by both scholars and practitioners this field is changing in ways that seem to confound traditional MNC strategic thinking. The offshoring discussion adds another layer to the "open vs closed" innovation models developed thus far in the 21st century (Chesbrough & Appleyard, 2007).

The propositions have been developed from conflicting work of prior scholarship. As has been noted in a recent review of empirical studies on this question, "both managers in traditional R&D organizations as we as those in firms providing contract R&D services may benefit from understanding the circumstances that make innovation outsourcing more likely" (Stanko & Calantone, 2011. pg. 17). The contrast between the evolutionary perhaps "more natural" progression of an offshore R&D laboratory versus one influenced by institutional factors is an import point of study.

If, as the first proposition predicts, evolutionary forces are most significant, company managers should work to develop both human capital and organizational routines to foster the growth of offshore manufacturing and distribution centers into organizations of higher levels of problem solving. Local partnerships should be constructed around growing capabilities and deeper understanding of customer needs. MNC managers should focus on developing not only local management talent but also build relationships with area universities and government research arms to recruiting highly skilled workers with new technological capabilities.

The next two propositions build from the institutional theories on isomorphism. The second proposition posits that firms will bend to governmental policies. MNCs will establish offshore R&D locations in response to these 'carrots and sticks' set up by assertive regional and national governments across the globe. The final proposition is that these global R&D laboratories are motivated by mimetic isomorphism. In other words, firms establish labs away from their core R&D locations when they see other firms deemed successful or with social legitimacy already doing so.

Next, we develop some thought on how these propositions could be empirically tested. The dependent variable for all three of the propositions is the presence of an R&D lab outside of the United States. While we intend to ask those firms without international R&D labs their reasons for not globalizing R&D, our primary interest here is looking at the group of firms which do have such facilities. We therefore will be sampling in research intensive industries and probably with a focus on larger firms to assure a respondent pool large enough for robust data analysis.

A variety of independent variables will be included in the testing of the three propositions. For the first item on R&D locations supporting existing operations, a survey tool will ask if existing operations (ie. Manufacturing, marketing, sales or distribution) were important determinants in the location of the R&D lab. In addition, we will ask if the R&D lab is co-located with any other existing facilities and how far away is the nearest facility to the focal R&D lab in question. We also plan to ask the age of the focal lab and if any of the major goals for the lab have changed since its opening. Annual reports from the public firms will be consulted over the time horizon of the R&D lab for evidence of the original purpose of the lab and any notation of changes over the reported period.

The second proposition, on the role of government policies as coercive isomorphic devices, stimulates several questions on tax incentives, training programs, market access, quota relief, local sourcing and other forms of government encouragement for the location of R&D labs. Additional data on measures on governmental institutions may be pulled from the United Nations (UNCTAD, 2002) and the World Factbook. These data sources can be used to compare overall corporate tax rates between countries as well as measures such as GNP and wage levels which are likely needed as control variables for a thorough analysis. One ramification of this proposition is the possibility of a firm setting up a phantom or symbolic R&D lab to meet the requirements of some government agency without actually performing any significant level of R&D on-site. We intend to control for this by asking the investment level in dollars and the average employment level of the focal R&D lab in the survey.

The third proposition, on mimetic isomorphism, can utilize survey items on the importance and awareness of competitors and the major factors in the consideration of the selected location over other sites considered. Several authors have noted the difficulty of separating out mimetic behavior from other types of institutional forces (DiMaggio et al., 1983; Guler et al., 2002; Mizruchi & Fein, 1999). Recognizing that mimetic isomorphism can be a rational behavior and therefore difficult to tease out causal inferences from data. In other words, the firm was the 10th company to locate R&D in Bangalore because it is the right place to put the facility not because the other 9 were already there. Additionally, corporate decision makers are likely to retrospectively ascribe logical decision factors when reviewing a previously made choice such as the locating of an R&D lab. The survey instrument is therefore a conservative tool in measuring indications of competitive mimetic behavior. The respondents will be biased towards providing logically internal decisions for the location of the lab and will therefore be reluctant to note the possible influence of competitor decisions. To account for this tendency we suggest probing on the specific reasons for the chosen location over others and the risk/ uncertainty factors considered in the decision.

In multinational R&D literature there are two approaches to secondary data. One is to look at patents as a major output of R&D. Scholars have used patent data in both the U.S. and Europe to good effect to discuss R&D locations, globalization, and function for the MNC (Le Bas et al., 2002; Patel et al., 1999). The second major data source is research inputs such as expenses or R&D intensity (R&D expenses divided by total sales of the firm) and alliances. Both these methods could contribute to furthering the answers to the primary motivations for the growth of offshoring R&D.

## 5.0 Conclusions & Limitations:

The successful performance of private sector R&D is important to increasing the standard of living across the globe. However, the benefits of R&D, whether direct and indirect, accrue disproportionately to the regions performing it. Knowledge spillovers and human capital gains both have a large local component which remains even in this age of rapid digital communications. Thus the main motivation behind the location of these R&D centers is a key for regional economic development. It can also be critical for the firm's competitive advantage especially in the longer term.

Managerial and policy implications vary widely across these propositions. If the first proposition on an evolutionary approach to offshore R&D prevails, company managers would be wise to start building a local team of talented workers in the early stages of a new offshore endeavor for the firm. Also, the MNC should evaluate empowering the foreign operation to engage in some partnerships with local knowledge generators such as universities. These steps would enhance the ability of the foreign operation to dynamically change as technology and economics permits it to begin a development lab and then move into more research as well.

However, if the second proposition on coercive factors is supreme, then the path is clear for government policy actions. In this situation managers are less decision makers and more reactive to the external environments of their business. Corporations in this model would be well served to spend resources evaluating the stability of the local governments as well as longer term trends such as demographics and history of conflicts. The firm would not want to invest in a location due to today's government policy only to find the government shifts frequently and thus changes to motivating policy. R&D labs can tend towards asset specificity and take time to build up the useful knowledge base. Opening one for only a short time can be a big resource drain and a distraction for even a large MNC.

Finally, if the third proposition is most significant then managerial actors should develop finely tuned competitive analysis capabilities. In this environment, the main motivation for offshoring R&D is because others before you have done it and they seem to be successful with it. It takes a critical analysis for the focal firm to find out if that competitor is *actually* successful at offshore R&D or is it merely a perception the firm (& local officials) wish to convey.

Our proposed framework has limitations. Survey instruments have some inherent weaknesses and complementing them with a variety of archival sources can help. Bringing in multiple data sources guards against inaccuracies and bias from survey respondent answers. Survey tools are an excellent way to gain more contextual information such as intentions and still have results that are likely to apply to several different settings. This contrasts to a case study or ethnography which though offering quite rich detail, often provides inferences which can be difficult to generalize.

This work contributes to an important research stream and enhances a relatively new area that currently has limited empirical results (Hsuan & Mahnke, 2011). Understanding the reason firms place R&D labs outside their home country can have significant implications for governments, firms and managers. The factors we study here; an evolution of the firm, governmental coercive influence, and competitive copying, each drive different decisions on the location of R&D labs. We hope our results can be useful in the prediction of future trends in R&D lab locations and purposes.

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