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The Impact of Headquarters-Subsidiary Relations on Alliance Formation Behavior of MNC Subsidiaries

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Abstract

Previous literature has examined alliance formation at the firm-level, ignoring that MNCs actually consist of different but interrelated subsidiaries that are geographically dispersed. In this paper, we therefore shift focus to the subsidiary-level, identifying conditions that explain the alliance formation behavior of MNC subsidiaries. Based on transaction costs economics and recent MNC literature, we argue that, apart from inducements to form alliances and opportunities to find alliance partners, a third condition becomes apparent when studying alliance formation at the subsidiary-level - i.e. the relationship between the subsidiary and the headquarters. Based on a panel dataset of subsidiaries of seven large MNCs in the pharmaceutical industry, we find that the geographical distance, the level of ownership and the relative size of the subsidiary significantly influence the extent to which subsidiaries form strategic alliances. In this way, our study provides important insights into how MNCs access external knowledge and how they structure their alliance activities internally.

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ABSTRACT

Previous literature has examined alliance formation at the firm-level, ignoring that MNCs actually consist of different but interrelated subsidiaries that are geographically dispersed. In this paper, we therefore shift focus to the subsidiary-level, identifying conditions that explain the alliance formation behavior of MNC subsidiaries. Based on transaction costs economics and recent MNC literature, we argue that, apart from inducements to form alliances and opportunities to find alliance partners, a third condition becomes apparent when studying alliance formation at the subsidiary-level – i.e. the relationship between the subsidiary and the headquarters. Based on a panel dataset of subsidiaries of seven large MNCs in the pharmaceutical industry, we find that the geographical distance, the level of ownership and the relative size of the subsidiary significantly influence the extent to which subsidiaries form strategic alliances. In this way, our study provides important insights into how MNCs access external knowledge and how they structure their alliance activities internally.

Keywords: Alliance formation; headquarters; subsidiaries; control; support

INTRODUCTION

Strategic alliances, or “voluntary arrangements between firms involving exchange, sharing, or co-development of products, technologies or services” (Gulati, 1998: 293), are a common organizational practice among firms, and particularly among multinational companies (MNCs). Scholars (e.g. Das and Teng, 2000; Deeds and Hill, 1996) have discussed several motivations to form strategic alliances. Moreover, alliance scholars have studied why some firms are able to ally with partners, and others are not. Several firm-level characteristics (Bishop, 2003; Colombo, Grilli, and Piva, 2006; Zhang, Baden-Fuller and Mangematin, 2007), network-level characteristics (Gulati, 1999; Powell, Koput and Smith-Doerr, 1996) and country-level characteristics (Dickson and Weaver, 2011) are found to affect the extent to which firms ally.

While the existing alliance literature has increased our understanding of why and which firms form strategic alliances, it tends to frame the firm as a monolithic entity, implicitly assuming that all alliances are formed at the ultimate parent-level. Through aggregating all alliances information to the ultimate parent level, existing alliance formation scholars remain silent on the internal structure of the firm, ignoring that different entities within firms can form alliances. This shortcoming is especially important in the setting of multinational companies (MNCs) – i.e. “a group of geographically dispersed and goal-disparate organizations that include its headquarters (HQ) and the different national subsidiaries” (Ghoshal and Barlett, 1990: 603) -, as a number of recent studies (e.g. Alnuaimi, Singh, and George, 2012; Zaheer and Hernandez, 2011) have observed that not only the headquarters (HQ) but also the subsidiaries of a MNC engage in strategic alliances. To our knowledge, however, a systematic analysis of why some subsidiaries form alliances, and others do not, is lacking. In this paper, we therefore shift focus to the subsidiary-level, identifying conditions that explain the alliance formation behavior of MNC subsidiaries.

In line with alliance formation at the firm-level, subsidiaries should both have inducements and opportunities to ally (Ahuja, 2000; Eisenhardt and Schoonhoven, 1996). However, we also expect that a third dimension – i.e. the nature of the relationship with the headquarters-, might significantly impact the extent to which subsidiaries engage in alliance activities. First, according to transaction cost theory, strategic alliances are risky (Pisano, 1990; Tsang, 2000). Therefore, the headquarters will not always provide fiat for alliance formation to the subsidiary (Williamson, 1991), especially when it is difficult to monitor or control the subsidiary. Second, besides its controlling role, recent MNC literature has suggested that headquarters can also fulfill a more supportive role (Dellestrand and Kappen, 2012; Foss, 1997), by providing support during the alliance formation process, which also increases the likelihood that the headquarters will provide fiat to the subsidiary to form a strategic alliance. In sum, we argue that, to understand why strategic alliances emerge at the subsidiary-level, one needs to consider its intra-firm relation with the headquarters. We therefore empirically examine how specific characteristics of the relationship between the headquarters and the subsidiary (i.e. geographical distance, ownership and relative size of the subsidiary) might influence alliance formation behavior of the latter.

To test the hypotheses, we compiled a new panel dataset on the alliance formation behavior of subsidiaries of seven large MNCs in the pharmaceutical industry. After obtaining detailed information from annual reports on the characteristics of these subsidiaries over time, we linked the subsidiaries to alliance announcements in the Thompson SDC Platinum database. An important strength of our dataset is that we use the complete set of subsidiaries for specific MNCs for a period over time. Most studies examining the strategic behavior of subsidiaries of MNCs (e.g. Bouquet and Birkinshaw, 2008; Mudambi and Navarra, 2004) use surveys among a limited sample of subsidiaries, and therefore have a relatively small, cross-sectional sample size. We, on the other hand, provide a more detailed understanding of the

alliance formation behavior of all subsidiaries rather than a subset. Our final dataset consists of 3802 subsidiary-year observations.

The results of our analysis confirm that the subsidiary-headquarters relationship influences the formation of strategic alliances by MNC subsidiaries. We find that both full ownership and relative subsidiary size positively influence the number of alliances that has been formed by the subsidiary. Furthermore, our results show a U-shaped relationship between geographical distance and subsidiary alliance formation. Similar to alliance formation studies conducted at the firm-level, we also find support that subsidiaries should both have inducements and opportunities to collaborate. Together these findings show that, when studying the alliance behavior of MNCs, it is important to study both the characteristics of the unit and its relationship with the headquarters.

Our findings have important implications for the alliance literature and MNC literature. Through shifting attention from the firm-level to the subsidiary-level, we contribute to the alliance formation literature, revealing additional issues that are relevant in the alliance formation decision. Second, whereas alliance literature has already extensively relied on transaction costs theory, using concepts as transactions costs, asset specificity and opportunistic behavior (e.g. Hennart, 1988; Tsang, 2000), the concept of fiat has received less attention. This paper, however, shows the relevance of this transaction cost concept in explaining alliance formation behavior at the subsidiary level. Finally, our paper contributes to the MNC literature by focusing on the controlling and supporting roles of the HQ simultaneously. In this way, we are able to integrate arguments from different perspectives, which advances the current research on the role of the HQ in the modern MNC.

ALLIANCE FORMATION: THEORETICAL BACKGROUND

In this section, we first provide an overview of existing alliance formation literature. Subsequently, we discuss how the formation of alliances at the subsidiary-level is different from alliance formation at the firm-level.

Alliance formation at the organizational level: Inducements and opportunities

Firms need to have inducements to form strategic alliances. The existing literature has identified several motivations why firms form strategic alliances: to share costs and risks with their partners, to realize economies of scale, to avoid duplication of efforts (Deeds and Hill, 1996; Eisenhardt and Schoonhoven, 1996; Mowery, Oxley and Silverman, 1996; Sakakibara, 2002); to gain access to complementary assets that are not available in-house and are too costly or time-consuming for develop internally (Colombo, Grilli, and Piva, 2006; Das and Teng, 2000; Deeds and Hill, 1996); to achieve synergies via the sharing and recombination of each other's' resources and knowledge (Colombo, Grilli, and Piva, 2006; Lin, 2011, Tsang, 2000); to gain market share and market power (Glaister and Buckley, 1996); to gain access to new foreign markets (Duysters and Lokshin, 2011; Glaister and Buckley, 1996; Hennart, 1988); or, to learn from the skills and capabilities of your alliance partner (Cohen and Levinthal, 1990; Lane and Lubatkin, 1998). According to Ahuja (2000), the underlying factor in these motivations is the need for resources and knowledge. Resource-based view scholars have argued that the majority of the firms do not have all the necessary resources and knowledge in-house to obtain or maintain a sustainable competitive advantage, especially not in industries with high levels of technological change and environmental uncertainty (Dias and Magrico, 2011; Eisenhardt and Schoonhoven, 1996; Powell, Koput and Smith-Doerr, 1996). Since firms are heterogeneous with respect to the resources and capabilities they possess (Barney, 1991; Peteraf, 1993), firms can collaborate with other parties in order to gain

access to the necessary resources or knowledge without having to acquire or develop them internally.

Next to the inducements to access external resources and knowledge, scholars (e.g. Ahuja, 2000; Eisenhardt and Schoonhoven, 1996) have stressed a second important condition explaining alliance formation, namely the availability of alliance opportunities. Firms need to be able to find suitable alliance partners that can provide them with access to the necessary knowledge. One important source is an existing industry network which can provide information about the existence and reliability of potential partners. The more central the position that the firm occupies in the network, the more likely it is to receive information (Gulati, 1999; Powell, Koput and Smith-Doerr, 1996). This network can therefore substantially decrease the search costs for alliance partners (Chung, Singh and Lee, 2000). The geographical location of the firm can also influence the alliance opportunities of the firm. In this respect, firms located in larger economies are found to have access to more resources through the availability of a larger pool of potential alliance partners (Dickson and Weaver, 2011). Moreover, as strategic collaboration is a two-way process, also the potential partners need to be willing to collaborate, implying that a firm needs to have something valuable to offer in return. Several studies have already shown that the possession of valuable resources increases a firm's attractiveness as an alliance partner (Ahuja, 2000; Das and Teng, 2000; Pollock and Gulati, 2007; Stuart, 1998). In this way, the parties can mutually gain from the alliance by complementing each other's weaknesses (Chung, Singh, and Lee, 2000).

Alliance formation at the subsidiary level

Moving from the firm-level to the subsidiary-level, we argue that the extent to which subsidiaries of MNCs are engaged in alliance formation can be explained by three conditions. Two conditions have already been studied when analyzing alliance formation behavior at the firm-level. First, subsidiaries should have inducements to form an alliance. For instance, if the

subsidiary is very specialized, not all the necessary resources and knowledge are available in-house or in the internal MNC network, which creates incentives for the subsidiary to form a strategic alliance with an external partner. Second, subsidiaries need to find potential partners. Several studies have already shown that the host country in which the subsidiary operates can be a source of valuable and unique knowledge (Almeida and Phene, 2001; Berry, 2013; Frost, 2001).

However, we expect that alliance formation at the subsidiary-level is theoretically different from alliance formation at the firm-level. Being part of a MNC network implies that subsidiaries are influenced by their relationship with the headquarters when considering the formation of a strategic alliance¹. In this section, we therefore stress the relevance of including a third condition. In particular, we argue that, in order to understand why strategic alliances emerge at the subsidiary-level, the nature of the relationship between the focal subsidiary and the headquarters also needs to be considered.

In multinational companies, subsidiaries do not operate as stand-alone, independent entities. Instead, they function in an intra-firm network, consisting of the headquarters and other subsidiaries (Ghoshal and Barlett, 1990). Operating in an intra-firm network implies that, when considering the formation of a strategic alliance, managers should not only take into account the potential benefits and risks for the involved subsidiary, but also consider the interests of the firm as a whole. Parise and Casher (2003), for instance, state that alliances can compete or conflict with each other or with the interests of other subsidiaries harming the performance of the firm. Next to these potential intra-organizational problems, forming a

¹ In line with the existing MNC literature, we assume that the headquarters can influence the behavior of its subsidiaries. Powell and Rhee (Forthcoming), for instance, argue that MNCs can be seen as nested hierarchical structures, where the headquarters has some level of central oversight and can coordinate its subsidiaries. Foss, Foss, and Nell (2012) stress as well that the headquarters is the holder of the ultimate decision rights. Even in the modern, networked MNC, the headquarters is needed to define the decision rights of subsidiaries and to build and maintain the supporting information structures. Moreover, the headquarters defines the overall strategy of the firm. Brenner and Ambos (2013) state as well that subsidiaries are more dependent on the headquarters than on their external environment. Moreover, they argue that the ultimate example of fiat that the headquarters can exercise is to close the subsidiary if its behavior does not comply with the strategy of the headquarters.

strategic alliance is perceived to be a risky strategy (Pisano, 1990; Tsang, 2000) because of potential opportunistic behavior of the alliance partner and appropriability problems (Oxley, 1997; Pisano, 1990), increasing the likelihood of losing your own core capabilities to external partners (Kale, Singh and Perlmutter, 2000). To prevent the potential leakage of important knowledge, Zhang, Baden-Fuller and Mangematin (2007) stress that the headquarters needs to keep control of the knowledge that is exposed to outsiders.

Transaction cost economists (e.g. Hennart, 1988; Mjoen and Tallman, 1997; Tsang, 2000) have extensively studied the governance of the relationship between subsidiaries and the headquarters within firms. Williamson (1991) states that the implicit contract law of the firm (i.e. hierarchy) can be defined as forbearance law. Access to court is denied if two parties of the same organization have a conflict. Hence, these parties have to resolve their conflicts internally, implying that the firm acts as its own court. Williamson (1991) points to fiat, or approval, as the governance mechanism that allows firms to solve disputes internally. In other words, the headquarters needs to approve the behavior and decisions of its subsidiaries and solve disputes arising from conflicting interests between subsidiaries or between subsidiaries and the headquarters itself. Subsidiaries might, however, pursue their own interests, which are not always aligned with the headquarters (Alnuaimi, Singh and George, 2012; Mudambi and Navarra, 2004). This implies that the headquarters needs to monitor and control the behavior of its subsidiaries (Chang and Taylor, 1999). However, not all subsidiaries can be controlled to the same extent by the headquarters (Brenner and Ambos, 2013; Gupta and Govindarajan, 1994), which is why we expect differences in the extent to which the headquarters provides fiat when subsidiaries consider alliance formation.

Next to a controlling role, the existing literature has argued that the headquarters can also fulfill a more positive, supporting role in the MNC. Foss (1997) argues that the positive view of the headquarters is complementary to the negative, controlling view. Several studies

have already empirically shown that that support of the headquarters can stimulate the innovation output (Ciabuschi, Dellestrand, and Martin, 2011), the absorptive capacity (Schleimer and Pedersen, 2013) and the general development of subsidiaries (Bouquet and Birkinshaw, 2008). The headquarters can, for instance, provide additional resources and legitimacy to the subsidiary (Ciabuschi, Dellestrand, and Martin, 2011), but it can also coordinate learning processes and stimulate knowledge transfer between subsidiaries (Foss, 1997; Schleimer and Pedersen, 2013). Moreover, additional attention from the headquarters can provide a gateway to best practices, the latest technological developments and managerial support (Bouquet and Birkinshaw, 2008). In a similar vein, headquarters can stimulate alliance formation behavior at the subsidiary-level by providing additional resources and legitimacy during the alliance formation process. However, headquarters are limited in the amount of resources and attention they can provide to their subsidiaries (Dellestrand and Kappen, 2012). We, therefore, expect that subsidiaries differ in the extent they receive additional support from the headquarters, which accordingly influences the extent which headquarters will provide fiat for alliance formation to a certain subsidiary.

In sum, we argue that the nature of the relationship with the headquarters influences the extent to which subsidiaries are engaged in strategic alliances. Because the headquarters wants to keep control of the information that is exposed to outsiders, not all subsidiaries will be allowed to form alliances. Whether or not a subsidiary gets approval from the headquarters for alliance formation depends on the extent to which the headquarters can control and monitor the subsidiary. Additionally, the headquarters can fulfill a supporting role by providing additional resources and legitimacy to subsidiaries during the alliance formation process, which also influences the likelihood that the headquarters will provide fiat for alliance formation at the subsidiary-level. In the next section, we develop hypotheses to test the impact of the headquarters-subsidiary relationship on the alliance formation behavior of

subsidiaries. We will focus on three characteristics, which are common in the MNC literature, namely the geographical distance between the headquarters and the subsidiary, the level of ownership of the headquarters in the subsidiary, and, finally, the relative size of the subsidiary in the intra-firm network.

HYPOTHESIS DEVELOPMENT

Geographical distance between the headquarters and subsidiary

The subsidiaries of a MNC are located in a wide variety of countries; some subsidiaries are located relatively close to the headquarters and others are located far away. Jandik and Kali (2009) and Oxley (1997) state that the more geographically distant the subsidiary is from the headquarters, the more difficult and costly it becomes for the headquarters to monitor the behavior and performance of the subsidiary, increasing the likelihood of opportunistic behavior by the subsidiary. In addition, subsidiaries that are far away from the headquarters find it more difficult to transfer information to the headquarters about their intentions, behavior and performance (Ciabuschi, Dellestrand, and Holm, 2012; Tsang, 2000), as distance is an important barrier to effective knowledge transfer (Zaheer and Hernandez, 2011). Moreover, managers at the headquarters are found to have difficulties to understand the subsidiaries that are further away, because of unfamiliarity with the country setting (Bouquet and Birkinshaw, 2008; Rosenkopf and Padula, 2008). Hence, as geographical distance limits the headquarters to carefully monitor and control its subsidiaries, it will be less likely to provide its fiat for alliance formation to geographically distant subsidiaries.

The headquarters can also provide more support to geographically close subsidiaries. Several studies have shown that geographically close subsidiaries receive more attention from the headquarters in comparison to subsidiaries that are located faraway (Bouquet and Birkinshaw, 2008; Dellestrand and Kappen, 2012; Parmigiani and Holloway, 2011). For the

headquarters, it is easier and less costly to have face-to-face contact with geographically close subsidiaries (Ambos and Ambos, 2009; Dellestrand and Kappen, 2012), facilitating the transfer of knowledge and experience. This additional support from the headquarters in the alliance formation could, for instance, involve sharing previous alliance experiences and assisting in the partner selection process.

Hence, we expect that, as the geographical distance between the headquarters and the subsidiary increases, it becomes more difficult for the headquarters to control and support the subsidiary in the alliance formation process, which accordingly decreases the likelihood that the headquarters will give fiat to the subsidiary. Rather than a linear effect, we expect a marginally decreasing effect of geographical distance on subsidiary alliance formation. Previous studies (e.g. Holyoak and Mah, 1982; Mark, Freksa, Hirtle, Lloyd and Tversky, 1999; Levinthal and March, 1993) have shown that people are cognitively biased towards geographically close locations, indicating that the negative slope is steeper at lower levels of geographical distance. Managers at the headquarters perceive a high level of control and support at low levels of geographical distance, implying a high likelihood that the headquarters will provide its fiat for alliance formation. However, as perception of control and support fades rapidly, the likelihood that the headquarters provides fiat is expected to decrease disproportionately to the increase in geographical distance. Hence, we hypothesize a negative, but diminishing effect of geographical distance:

Hypothesis 1 (H1). The geographical distance between the subsidiary and the headquarters has a negative, but diminishing effect on the extent to which the subsidiary will form strategic alliances, *ceteris paribus*.

The level of ownership in the subsidiary

According to Erramilli (1996: 225), ownership is often defined as “the degree to which the parent multinational corporation exercises control over its subsidiary’s activities”. When the

headquarters owns 100% of its subsidiary, it has full control over the resources of this subsidiary (Figure 1B). The headquarters would especially prefer full ownership when the subsidiary possesses a large amount of tacit knowledge and goodwill (Hennart, 1991) and in case of greater uncertainty (Chang and Taylor, 1999). However, when a subsidiary is only partially owned by the headquarters, there are one or more external parties who also have some control over the strategic resources of the subsidiary (Mjoen and Tallman, 1997) (see Figure 1A). In this situation, the headquarters does not only need to monitor the behavior of the subsidiary, but also the behavior of the third (external) party.

Insert Figure 1 about here

Accordingly, if a partially owned subsidiary forms an alliance with an external actor, the situation becomes even more complicated (see Figure 1A; from monitoring three to monitoring six relationships). Now the headquarters has to additionally monitor its relation with the alliance partner, the relationship between the alliance partner and its subsidiary, and the relationship between the alliance partner and the external party. Since managers at the headquarters are rationally bounded, the amount of control it can exercise on all parties simultaneously will be limited (Tsang, 2000; Williamson, 1967). Because of the limited control, either the subsidiary, the alliance partner or the external party is more likely to pursue its own interests (Das and Teng, 1998), substantially increasing the risk of opportunistic behavior and appropriability hazards. Moreover, the external party, also partially owning the subsidiary, faces the same monitoring problems (e.g. six relationships) as the focal firm. Combining these monitoring problems, we argue that the likelihood that both the external party and the focal firm will give their approval is rather low.

Furthermore, we argue that the willingness of the headquarters to provide support during the alliance formation process will also be lower for partially owned subsidiaries. Gulati, Nohria, and Zaheer (2000) and Heimeriks, Duysters and Vanhaverbeke (2007) state

that alliance capabilities are firm-specific and can only be developed over time through experience. They can therefore be seen as a significant resource for firms. Hennart (1991) has argued that firms are not willing to transfer uncodified or poorly protected knowledge to its partially owned subsidiary because of unexpected knowledge spillovers to the external, third party. Hence, we expect that the headquarters is less willing to provide support to partially owned subsidiaries because it faces the risk that the unique alliance management capabilities will spill over to the external party.

Hence, we argue that the headquarters will be hesitant to give fiat to partially owned subsidiaries who want to form strategic alliances. First, the headquarters will aim to minimize the number of parties it needs to monitor and will therefore prefer alliance formation by wholly-owned subsidiaries. Second, it will aim to limit the risk of leaking unique alliance management capabilities to other parties. Therefore, we hypothesize:

Hypothesis 2 (H2). Fully owned subsidiaries form more strategic alliances than partially owned subsidiaries, *ceteris paribus*.

The relative size of the subsidiary in the intra-firm network

The size of a subsidiary (measured in terms of e.g. the amount of assets, sales or knowledge, relative to the overall organization it belongs to) reflects “its power vis-à-vis its headquarters” (Peng and Beamish, 2014: 51). Mudambi and Navarra (2004) argue that MNC-networks operate as political systems, in which subsidiaries aim to influence decision-making processes as well as the allocation of resources. These scholars find that the size of knowledge assets of the subsidiary increases its ability to influence strategic decisions. In similar vein, Bouquet and Birkinshaw (2008) find that if subsidiary conducts activities that are important for the firm as whole, it will have more power and a stronger position within the network. A high level of power is therefore expected to enable subsidiaries to influence the alliance formation decision in their advantage and, in this way, enforce approval of the headquarters.

Furthermore, subsidiaries that are relatively important in the intra-firm network are found to receive additional time and effort from the headquarters (Chang and Taylor, 1999). Johnston and Menguc (2007) show that the headquarters supports large subsidiaries with managerial expertise in order to deal with the increasing coordination complexities. We expect that these higher levels of attention and support facilitate the sharing of alliance experience and alliance mechanisms between the headquarters and the subsidiary which further enhances the likelihood that headquarters will give approval.

In sum, we argue that relative subsidiary size has a positive effect on the extent to which subsidiaries form alliances. With increasing subsidiary size, subsidiaries have more power and are more likely to enforce approval from the headquarters. In addition, the headquarters will invest more time and effort in supporting the subsidiary, which further increases the likelihood that the headquarters will provide fiat for alliance formation by the subsidiary. Hence, the following hypothesis is stated:

Hypothesis 3 (H3). The relative size of the subsidiary in the intra-firm network has a positive effect on the extent to which the subsidiary will form strategic alliances, *ceteris paribus*.

METHODOLOGY

To test the hypotheses, we have constructed a new panel dataset on the alliance formation behavior of subsidiaries of large MNCs in the pharmaceutical industry. First, after identifying the largest MNCs in the pharmaceutical industry, we analyzed the subsidiary lists in their annual reports. It is important to note that a large majority of these firms only report a list of names and the country location of their subsidiaries, which is the legally required minimum of information to be included². A minority of the firms, however, does provide further details on

² The SEC requires, for instance, that firms provide a list of their subsidiaries in their 10-K report in which they specify their names and the US state or country in which they operate. This requirement is based on Item 601 of

their subsidiaries. Because we were specifically interested in the characteristics of the subsidiaries (such as their city location, their activities and their size), we selected 7 firms³ that provided the most detailed information on their subsidiaries. Subsequently, an overview of MNCs' subsidiaries over time was created. The number of years for which we could collect subsidiary information differed per firm, ranging from 6 years (2006-2011) to 15 years (1997-2011)⁴. Moreover, following Bouquet and Birkinshaw (2008), a subsidiary is only included in our dataset if the parent has more than 50% ownership.

Second, the Thompson SDC Platinum database was used to collect information on alliance announcements. We searched for the parent name of the MNC, the specific subsidiary names, and the names of acquired units in the database. Subsequently, the alliances were linked to specific subsidiaries in the lists of the annual reports.

An important strength of our dataset is that most studies (e.g. Bouquet and Birkinshaw, 2008; Mudambi and Navarra, 2004) examining the strategic behavior of subsidiaries of MNCs, use surveys among a limited sample of subsidiaries, and therefore have a relatively small, cross-sectional sample size. We, on the other hand, use the complete set of subsidiaries for specific MNCs for a period over time, and provide a more detailed understanding of the alliance formation behavior of all subsidiaries rather than of a subset. Our final dataset consists of 3802 subsidiary-year observations containing 616 unique subsidiaries.

Dependent variable

After identifying all alliance formations that were announced in the SDC Platinum database for a specific firm, we have, based on the name and the location of the alliance partners mentioned in the announcements, assigned the alliances to either specific subsidiaries or to

Regulation S-K (http://www.ecfr.gov/cgi-bin/text-idx?node=17:3.0.1.1.11#se17.3.229_1601, accessed on 11 December 2014).

³ The selected firms are Daiichi, Eisai, Kyowa, Lonza, Novartis, Novo Nordisk and Taisho.

⁴ We have conducted several robustness tests with different time frames, which showed stable results.

the headquarters. We have verified our coding with additional sources, such as Lexis Nexis and company websites, in case it was unclear in the SDC database. By considering all firms' alliances, we are able to evaluate the occurrence of alliance formation by subsidiaries relative to the headquarters. To operationalize the dependent variable (Alliance Formation) we have counted the total number of strategic alliances that a subsidiary formed in the previous five years. This measure includes manufacturing, marketing and R&D alliances.

Independent variables

In our first hypothesis, we study the impact of the geographical distance between the headquarters and the subsidiary (Distance to HQ) on the extent of subsidiary alliance formation. We identified in the annual reports the location (i.e. city) of both the headquarters and the subsidiary. Next, we collected the latitudes and longitudes of all the identified cities. To calculate the geographical distance between the headquarters and the subsidiaries, we followed Bouquet and Birkinshaw (2008) by applying the 'geodist' function in Stata, which computes the length of the shortest curve between two points along the surface of a mathematical model of the earth. Finally, the distance was transformed into a logarithm and a squared term was calculated to account for non-linear effects.

The second hypothesis states that full ownership of the headquarters in the subsidiary (Ownership) is positively related to the extent of alliance formation by the subsidiary. A dummy variable is created, which is coded as 1 when the headquarters has full ownership in the subsidiary (i.e. 100%), and 0 if otherwise. In this way, we clearly distinguish between the impact of having one or more owners of a subsidiary. We collected information on the level of ownership from the annual reports.

The third hypothesis argues that the relative size of the subsidiary in the intra-firm network (Relative Subsidiary Size) has an effect on the extent to which a subsidiary will form an alliance. Size is measured in terms of the investments made in stocks or capital reported in

the annual reports. Investments reported in local currencies have been converted to dollars. The relative size of a subsidiary is calculated by dividing the subsidiary size by the total firm size.

Control variables

As stated previously, the impact of inducements and opportunities on alliance formation has been frequently analyzed at the firm-level. To test whether they also explain alliance formation at the subsidiary-level, we include these variables in our analysis as control variables. First, subsidiaries should have inducements or incentives to form strategic alliances. We argue that knowledge-intensive subsidiaries will be more likely to search for external knowledge, because of the higher likelihood that the necessary complementary knowledge and resources might not be available in-house. We proxy the inducements of a subsidiary by looking at the function of the subsidiary as indicated in the annual report (Function). We have identified four types of functional activities and coded them in dummy variables: (1) research and development, (2) manufacturing, (3) sales and marketing and (4) other activities, such as financing or a holding. The fourth category is used as the reference category. Subsidiaries involved in research and development activities are expected to have the greatest incentives to collaborate with external partners, followed by subsidiaries conducting manufacturing activities.

In addition, a subsidiary needs to have alliance opportunities meaning being able to find partners it can form a strategic alliance with. We will proxy alliance opportunities by the size of the pharmaceutical sector in the country in which the subsidiary is located (Local Industry Size). A larger size will indicate more potential partners to collaborate with. To measure the size of the pharmaceutical industry per country per year, we obtained the number of employees in pharmaceuticals, medical or chemicals industry (ISIC category 2423) from

the database INDSTAT 4 2013 ISIC Rev. 3. Missing year values have been imputed by using country averages. This measure was logarithmically transformed.

In addition, we want to control for host-country characteristics. First the GDP per capita of the host country (GDP per Capita) was included as measure of economic munificence (Dickson and Weaver, 2011). Several studies have already shown that the host country in which the subsidiary operates can be a source of valuable and unique knowledge (Almeida and Phene, 2004; Berry, 2013; Frost, 2001). In this way, we control for the fact that pharmaceutical firms might also collaborate with firms outside the pharmaceutical sector. The data was collected from the World Development Indicators from the World Bank. This measure was transformed into a logarithm.

Second, the level of foreign direct investment (FDI) in a given country indicates its openness to foreign firms. Local firms in countries with high levels of FDI might be more willing and open to collaborate with subsidiaries of foreign firms. This measure is operationalized by dividing the net inflows of FDI in the country of the subsidiary by the level of GDP in the country of the subsidiary (Percentage of FDI). To calculate this measure we used information from the World Development Indicators.

Third, as Teece (1986) already indicated, national policies can influence the extent to which firms are able to reap the benefits from their innovations. We expect that subsidiaries in countries with a weak appropriability regime are less likely to get fiat from the headquarters to collaborate with external parties because of the potential misappropriation of knowledge. We operationalize this measure (Intellectual Property Rights) by using the Intellectual Property Rights component from the Economic Freedom Index⁵, which indicates on a scale from 0 to 100 the extent to which a country's laws protect intellectual property rights and the enforcements by the government of these laws.

⁵ The Economic Freedom Index can be accessed via the following website: <http://www.heritage.org/index/explore?view=by-region-country-year>, accessed on 14 January 2014.

Fourth, several studies (e.g. Dickson and Weaver, 1997; Steensma, Marino, Weaver, and Dickson, 2000; Yenyurt, Townsend, Cavusgil, and Ghauri, 2009) have already stressed the importance of differences in national cultures when forming alliances. We have obtained the scores on the four cultural dimensions of Hofstede for each subsidiary and each headquarters. Subsequently, we have used the well-known measure of Kogut and Singh (1988: 422) to calculate the cultural distance between the subsidiary and the headquarters (Cultural Distance to HQ).

Finally, we control for two unit-level characteristics. First, we control whether strategic alliances are formed by a subsidiary at the headquarters location. The central headquarters has most of the control and power within the MNC, implying a higher likelihood that strategic decisions will be taken at this location. Moreover, subsidiaries located at the same location as the headquarters are found to substantially receive more attention and knowledge inflows (Parmigiani and Holloway, 2011). The HQ Location Dummy is coded as 1 if the subsidiary has the same location as the headquarters, 0 if otherwise. Second, we controlled for subsidiaries that were acquired from other companies. Acquired units were found to operate more independently and experience lower levels of control by the headquarters (Harzing, 2002). The dummy variable Acquired Unit is coded as 1 if the subsidiary was acquired, and 0 if otherwise. An overview of the used databases and the operationalization of the variables can be found in Table 1.

Insert Table 1 about here

Estimation method

To analyze the data we used the negative binomial regression estimation technique, because our dependent variable (Alliance Formation) is a count variable and overdispersed. Moreover, our dependent variable has a large number of zero values (94,32%), with 216 (5,68%) observations having a positive value (i.e. a subsidiary has a strategic alliance in that particular

year). The results of the analyses have been reported with robust standard errors. We included firm and year fixed effects to account for firm-level characteristics and macro-economic changes over time.

RESULTS

Table 2 shows the descriptive statistics and the pairwise correlations for the variables in our dataset. From the descriptives, we can observe that a substantial share in firms' alliance activities is carried out by subsidiaries at the headquarters location, however, still about 30% of the alliance activities are carried out by its other subsidiaries. We also observe that relative few subsidiaries conduct R&D activities compared to manufacturing and marketing activities and that subsidiaries are on average located in countries with a relatively large pharmaceutical sector. Moreover, the majority of the observed subsidiaries are fully owned. The relative size of a subsidiary as well as the distance to the headquarters vary substantially across subsidiaries.

In general, Table 2 shows relatively low correlations between the independent variables. The only correlation above the common threshold of 0.6 is the correlation between GDP per capita and the level of Intellectual Property Rights (0.8436). The correlation indicates that well-developed countries have on average a more developed intellectual property rights system. When looking at the VIF values⁶ of the independent variables, we find no evidence of multicollinearity as the values are well below the threshold of 10, with a mean VIF value of 2.21.

Insert Tables 2 and 3 about here

Table 3 presents the results of the negative binomial regression analyses. Model 1 is the baseline model and only includes the control variables. Model 2 adds proxies for alliance

⁶ The calculation of the VIF values is based on the OLS estimation technique.

inducements and opportunities. Model 3 and 4 further extend the analyses by adding the linear and non-linear terms of geographical distance to the headquarters. The ownership dummy is added in Model 5. Finally, Model 6 introduces our measure for the relative size of the subsidiary in the intra-firm network. To discuss the findings of our analyses, we will make use of the results in Model 6.

First, we discuss the control variables. GDP per capita has a negative and significant effect ($p < 0.01$) on the extent of subsidiary alliance formation. Economic growth might point to alternative priorities, which decrease the inducements to ally. Consistent with our expectations, the level of intellectual property rights has a positive and significant effect ($p < 0.01$) on alliance formation. The results also show a highly significant and positive coefficient ($p < 0.01$) for the headquarters location dummy, as subsidiaries located at the headquarters carry a relatively large share of the alliance activities. In our analysis, we do not find support for the effect of the percentage of FDI, cultural distance and acquired units.

The existing literature has stressed the importance of inducements and opportunities when explaining the alliance formation behavior of firms. Our results confirm that these conditions are also relevant when explaining alliance formation behavior of subsidiaries as the pseudo R-squared increases from 0.197 to 0.237. To estimate the effect of inducements, we used the type of activities of the subsidiaries as a proxy. Table 3 shows significant and positive results for R&D ($p < 0.01$) and manufacturing activities ($p < 0.05$) (compared to the reference category of other activities). When looking at the size of the coefficients, we clearly see that subsidiaries that conduct R&D activities are substantially more engaged in strategic alliance formation supporting our expectations. To estimate the effect of opportunities, the size of the pharmaceutical industry in the country of the subsidiary was used to measure the availability of alliance partners. The results demonstrate a positive and significant effect ($p < 0.01$).

Hypothesis 1 states that geographical distance to the headquarters has a negative, but diminishing effect on subsidiary alliance formation. We find that the linear term is negative and significant ($p < 0.01$) and the non-linear term is positive and significant ($p < 0.01$). When analyzing the marginal and predicted effects of geographical distance on subsidiary alliance formation (see Figures 2 and 3), we clearly observe a U-shaped relation rather than the hypothesized negative, but diminishing effect. Hence, we find no support for Hypothesis 1. Subsidiaries that are located far away from the headquarters are also engaged in alliance formation despite the fact that it is difficult for the headquarters to monitor and support these subsidiaries. We will elaborate on this finding in the discussion section.

Insert Figures 2 and 3 about here

In hypothesis 2, subsidiaries that are fully owned by the headquarters are expected to engage more in strategic alliances compared to subsidiaries that are only partially owned by the headquarters. Model 6 in table 3 provides support for this hypothesis as the coefficient for ownership shows a positive and significant effect ($p < 0.05$) on extent to which subsidiaries form strategic alliances.

Finally, hypothesis 3 states that the relative size of the subsidiary in the intra-firm network increases the extent to which the subsidiary is engaged in strategic alliance formation. The coefficient for relative size is positive and significant ($p < 0.01$). Hypothesis 3 is therefore supported. Adding the three variables representing the headquarters-subsidiary relationship increases the pseudo R-squared statistic from 0.237 to 0.254. In sum, our findings stress the importance of considering intra-firm relations when explaining why inter-firm relations emerge at the subsidiary-level.

Robustness tests

To check the robustness of our results, we have conducted additional analyses. First, we re-estimated our models by using the Poisson estimation technique. The results of the Poisson

analysis are highly similar to the results of the negative binomial regression, namely we find support for hypotheses 2 (ownership) and 3 (relative subsidiary size) and a U-shaped effect of geographical distance on subsidiary alliance formation.

Second, we have conducted additional analyses by limiting the sample size of the dataset. For some firms we were able to find data for more years than for other firms. In the original analyses, all of the available data is used. To check whether the number of included years has an effect on our results, we have conducted additional analyses with restricted time frames (only including observations since respectively 2001, 2004 and 2006). The results of these analyses also show a U-shaped effect of geographical distance and a positive effect of relative subsidiary size. The effect of ownership is positive, but slightly less significant (e.g. at the 10%-level) than the results based on the original sample.

Third, rather than measuring ownership as a dummy variable, we re-estimate the models by including a continuous variable, which is measured as the level of ownership of the headquarters in the subsidiary. These results show support for the positive effect of the level of ownership on subsidiary alliance formation ($p < 0.05$). The coefficients and significance levels for the other variables do not change when including this alternative measure of ownership.

In sum, the results of the robustness checks show that our findings remain highly similar when using a different estimation technique, different sample sizes and a different ownership measure. The results of our robustness checks are available upon request.

DISCUSSION

While previous literature has focused on alliance formation at the firm-level, ignoring that MNCs actually consist of different but interrelated subsidiaries located in a variety of countries, this paper has focused on identifying conditions explaining the alliance behavior of

MNC subsidiaries. Our empirical results show that subsidiaries need to have inducements to form alliances as well as opportunities to find alliance partners, conditions that are also found to be important at the firm-level in prior alliance formation research. However, when moving from the firm-level to the subsidiary-level, we identify a third important condition explaining subsidiary alliance formation, namely its intra-firm relation with the MNC headquarters. The empirical results provide strong support that the relationship with the headquarters affects the formation of inter-firm relations by subsidiaries. More specifically, we find that the level of ownership of the headquarters in the subsidiary and the relative size of the subsidiary in the intra-firm network positively influence the extent to which subsidiaries form strategic alliances, which confirms our second and third hypothesis respectively.

The results do not support our first hypothesis (e.g. which proposed a negative, but diminishing effect of geographical distance on subsidiary alliance formation), instead we find a U-shaped effect of geographical distance on the extent to which subsidiaries form strategic alliances. Moving from close to more distant locations, subsidiaries decreasingly form alliances until a threshold is reached. Beyond this threshold, geographical distance from the headquarters increases the extent to which subsidiaries form alliances. A potential explanation has been suggested by the existing literature, which argued that the lower levels of control and support could be compensated for by the increased novelty of knowledge in distant locations. Several studies (e.g. Dellestrand and Kappen, 2012; Rosenkopf and Padula, 2008; Zaheer and Hernandez, 2011) find that the more distant locations provide access to more unique and novel knowledge. This access to distant knowledge is found to stimulate the diversity of a firm's existing knowledge base (Alnuaimi, Singh and George, 2012). Accordingly, subsidiaries that have access to unique knowledge might be more likely to get fiat from the headquarters. In addition, subsidiaries that are located far away from the headquarters might find it more difficult to make use of the resources in the intra-firm network increasing their

inducements to form alliances with external parties. These opposing forces suggest that geographical distance can be both a liability and an asset (Grabher and Ibert, 2013, Nachum, 2010), and that the headquarters needs to consider the trade-off between the search for unique knowledge and the risk of unintended knowledge flows (Oxley and Sampson, 2004), when considering alliance formation by its subsidiaries.

Theoretical implications

This study contributes to the alliance literature by showing that alliance formation behavior does not only differ between firms, but also within firms. Previous alliance formation literature has taken a monolithic perspective by aggregating all alliance information to the firm-level, thereby ignoring the internal structure of firms. A number of recent studies (e.g. Collinson and Wang, 2012; Regner and Zander, 2011; Walter, Lechner, and Kellermans, 2007; Zaheer and Hernandez, 2011) have already stressed the importance of simultaneously studying intra-firm and inter-firm networks, but have not studied in what way and to which extent intra-firm relations impact the creation of inter-firm relations. In this paper, we show that alliance formation at the subsidiary-level is theoretically and empirically different from the firm-level as we demonstrate the importance of including a third condition, namely intra-firm relations with the headquarters, which only becomes apparent when studying alliance formation at a more detailed level. The way in which firms internally organize their alliance activities might impact the extent to which the firm can benefit from alliances (Argyres and Silverman, 2004).

Second, our study contributes to the transaction cost theory by focusing on the understudied concept of fiat. Alliance literature has heavily relied on transaction theory, using concepts as transaction costs, asset specificity and opportunity costs (e.g. Hennart, 1988; Tsang, 2000). The concept of fiat, however, has received less attention. This paper shows the relevance of this concept in explaining alliance formation at the subsidiary-level. Williamson

(1991) explained in his seminal paper that parties (e.g. subsidiaries) within firms have to solve their conflicts internally and, in this way, the firm acts as their own court. We have discussed that operating in an intra-firm network implies that, when the formation of a strategic alliance is considered, managers should not only take into account the potential benefits and risks for the involved subsidiary, but also consider the interests of the firm as a whole. When the formation of a certain alliance will harm certain parts of the organization or the firm as a whole, the headquarters could exercise its fiat and prevent the alliance from being formed. In this way, we bring in the concept of fiat in the alliance literature.

Finally, our results contribute to the MNC literature, providing more insights on the important role of the headquarters in explaining subsidiary behavior. The existing MNC literature has positioned the role of the headquarters either as a ‘avoiding the negative’ or as ‘value creator’ (Ciabushi, Dellestrand, and Holm, 2012: 215). In line with Foss (1997), we have argued that the controlling and supporting roles can be used simultaneously. For each hypothesis, we have evaluated how the controlling and supporting roles of the headquarters affected alliance formation by the subsidiaries. When analyzing the existing literature, we noticed that the effects of both roles moved in the same direction. For instance, partial ownership of the headquarters in the subsidiary was argued to limit the controlling function, but also to reduce the amount of support received during the alliance formation process. By focusing on both roles simultaneously, we are able to integrate arguments from different perspectives, which advances current research on the role of the HQ in the modern MNC.

Limitations and avenues for further research

This study has several limitations, which also provide interesting avenues for further research. First, the sample of our study only includes a small number of large pharmaceutical firms, which could limit the generalizability of our results. By focusing on the alliance behavior of all subsidiaries rather than on a subset of larger subsidiaries, we have minimized a selection

bias with regard to the included subsidiaries. On the other hand, this implied that we were limited in the amount of firms for which we could find detailed information. Since the focus of this study is on within firm differences rather than on between firm differences, it was more interesting for us to analyze the complete sample of subsidiaries from a limited number of firms rather than a limited set of subsidiaries from a larger set of firms. Future research could, however, expand the selection of firms as well as explore different industry settings in order to test the generalizability of our findings.

Second, as demonstrated by Schilling (2009), alliance databases such as the SDC Platinum database do not cover the complete set of all the alliances in which a firm engages. However, this bias is stated to be less present for the pharmaceutical industry as this industry is widely represented in the SDC database. In order to further increase the reliability of the findings, future research could extend our sample of alliances by also including information from other alliance databases.

Third, to measure the inducements and opportunities of subsidiaries to form strategic alliances, we used two proxies, namely the function of their activities and the size of the local industry. Previous studies have suggested alternative measures based on patents and network data (Ahuja, 2000; Gulati, 1999). Testing the impact of these alternative measures would be an avenue for further research.

Finally, in the current study, we studied how the relationship with the headquarters influenced alliance formation by subsidiaries. Studying the influence of relationships with other subsidiaries within the same MNC-network would be an interesting avenue for future research as it might reveal additional issues such as the influence of internal competition (Mudambi and Navarra, 2004) or knowledge transfer (Alnuaimi, Singh, and George, 2012; Gupta and Govindarajan, 1994).

CONCLUSION

This paper shows that alliance formation by subsidiaries is theoretically and empirically different from alliance formation by firms. At both levels, inducements and opportunities are important conditions to explain alliance formation. However, based on transaction costs economics and recent MNC literature, we show that a third condition becomes apparent when studying alliance formation at the subsidiary-level. The relationship with the headquarters is found to have a substantial impact on the extent to which subsidiaries engage in strategic alliance formation. In this way, our study derives implications for understanding how MNCs access external resources and knowledge and how they internally structure their alliance activities.

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TABLES

Table 1: Operationalization of variables

Variable	Operationalization	Data source
Alliance formation (#)	Number of alliances formed by subsidiary in the past five years	Thomson SDC Platinum Database
Distance to HQ (Logarithm)	Latitude and longitude of subsidiary location are used to compute the length of the shortest curve between two points along the surface of a mathematical model of the earth	Subsidiary and HQ location is reported in annual reports. Latitude and longitude coordinates from Maxmind database.
Ownership	Dummy variable, 1 if subsidiary is 100% owned by the headquarters, 0 if otherwise	Annual report
Relative subsidiary size	Subsidiary size / Total firm size. Size is measured in terms of investments in shares or capital.	Annual report
Function-R&D	Dummy variable, 1 if subsidiary engages in R&D activities, 0 if otherwise	Annual report
Function-Manufacturing	Dummy variable, 1 if subsidiary engages in manufacturing activities, 0 if otherwise	Annual report
Function-Sales	Dummy variable, 1 if subsidiary engages in sales or marketing activities. 0 if otherwise.	Annual report
Function-Other	Dummy variable, 1 if subsidiary engages in financing or holding activities. 0 if otherwise.	Annual report
Local industry Size (Logarithm)	The number of employees (in millions) in pharmaceuticals, medical or chemicals (ISIC category 2423) per country per year. Missing year values have been imputed using country averages.	INDSTAT 4 2013 ISIC Rev. 3
GDP per Capita (Logarithm) *	Gross Domestic Production / Population of the country in which the subsidiary is located.	World Development Indicators from The World Bank
Percentage of FDI *	Net inflow of FDI in country of subsidiary/GDP in country of subsidiary	World Development Indicators from The World Bank
Intellectual Property Rights *	This index measures on a scale from 0 to 100 the extent to which a country's laws protect intellectual property rights and the enforcement of the government of these laws	Property Rights component from Economic Freedom Index.
Cultural Distance to HQ *	Cultural distance measure of Koput and Singh (1988), which calculates the differences in the scores on the four dimensions between the subsidiary and the headquarters.	The four cultural dimensions of Hofstede.
HQ Location dummy *	Dummy variable, 1 if subsidiary is the headquarters, 0 if otherwise	Annual report
Acquired unit *	Dummy variable, 1 if subsidiary was acquired, 0 if otherwise.	Annual report, Lexis Nexis, company websites

* Control variables

Table 2: descriptive statistics and pairwise correlations

	Mean	S.D.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1) Alliance Formation	0.2417	1.6572	1.0000													
(2) GDP per Capita (Log)	10.0564	1.0611	0.0762	1.0000												
(3) Percentage of FDI	3.5795	5.4724	-0.0241	0.0425	1.0000											
(4) Intellectual Property Rights	73.2546	21.8578	0.0700	0.8436	0.0852	1.0000										
(5) Cultural Distance to HQ	1.7316	1.7396	-0.1101	-0.4234	0.2237	-0.3898	1.0000									
(6) HQ Location Dummy	0.0194	0.1380	0.7278	0.0807	-0.0440	0.0578	-0.1402	1.0000								
(7) Acquired Unit	0.0685	0.2526	-0.0226	0.0639	0.0128	0.0198	-0.0652	-0.0382	1.0000							
(8) Local Industry Size (Log)	10.8192	1.4275	0.0245	-0.1208	-0.3473	-0.1438	-0.2013	0.0082	0.0363	1.0000						
(9) Function – Other	0.1982	0.3987	0.0672	0.2253	-0.0441	0.2334	-0.1891	0.0257	-0.0641	0.0261	1.000					
(10) Function – Sales & Marketing	0.7318	0.4431	0.0587	-0.1904	-0.0093	-0.2016	0.1406	0.0766	-0.0094	-0.1253	-0.5549	1.0000				
(11) Function - Manufacturing	0.3688	0.4825	0.1505	-0.1318	-0.0838	-0.1204	-0.1371	0.1841	0.0727	0.2276	-0.2318	0.1619	1.0000			
(12) Function – R&D	0.1895	0.3820	0.1445	0.1837	-0.0179	0.1823	-0.1600	0.1309	0.0518	0.1554	-0.0449	-0.0851	0.1815	1.0000		
(13) Distance to HQ (Log)	6.4148	3.2171	-0.2027	-0.3320	0.1735	-0.2230	0.5621	-0.2807	0.0768	-0.0064	-0.2639	0.1506	-0.0537	0.0148	1.0000	
(14) Ownership	0.9122	0.2829	-0.0178	0.0743	0.1105	0.0446	0.1364	-0.0455	-0.1552	-0.0785	0.0643	-0.0067	-0.1327	0.0637	0.1881	1.0000
(15) Relative Subsidiary Size	1.8186	6.7227	0.3111	0.0530	-0.0530	0.0335	-0.0764	0.5833	-0.0255	0.1177	0.0299	-0.0068	0.1872	0.0653	-0.1626	-0.1365

Table 3: Regression results

Alliance Formation		Model I	Model II	Model III	Model IV	Model V	Model VI
Control variables	GDP per Capita (Log)	-0.732*** (0.223)	-0.573** (0.225)	-0.597*** (0.231)	-0.635*** (0.226)	-0.686*** (0.222)	-0.803*** (0.225)
	Percentage of FDI	-0.069*** (0.022)	-0.022 (0.024)	-0.022 (0.025)	-0.016 (0.025)	-0.017 (0.026)	-0.011 (0.024)
	Intellectual Property Rights	0.081*** (0.012)	0.070*** (0.012)	0.072*** (0.013)	0.073*** (0.013)	0.074*** (0.012)	0.081*** (0.013)
	Cultural Distance to HQ	-0.067 (0.066)	-0.074 (0.078)	-0.034 (0.068)	-0.020 (0.064)	-0.031 (0.064)	0.005 (0.067)
	HQ Location Dummy	5.242*** (0.196)	4.678*** (0.194)	4.607*** (0.230)	4.254*** (0.217)	4.323*** (0.226)	3.587*** (0.250)
	Acquired Unit	0.524 (0.369)	0.203 (0.327)	0.211 (0.328)	0.236 (0.333)	0.290 (0.335)	0.340 (0.338)
Inducements and opportunities	Function – R&D		1.251*** (0.174)	1.247*** (0.173)	1.142*** (0.178)	1.131*** (0.180)	1.174*** (0.175)
	Function - Manufacturing		0.406** (0.204)	0.393* (0.202)	0.410** (0.201)	0.430** (0.196)	0.397** (0.191)
	Function – Sales & Marketing		0.182 (0.222)	0.201 (0.215)	0.324 (0.199)	0.317 (0.197)	0.290 (0.193)
	Local Industry Size (Log)		0.375*** (0.085)	0.399*** (0.090)	0.402*** (0.084)	0.403*** (0.083)	0.405*** (0.082)
HQ-subsidary relationship	Distance to HQ (Log) (H1)			-0.024 (0.032)	-0.611*** (0.120)	-0.609*** (0.120)	-0.651*** (0.120)
	Distance to HQ (Log) (Squared) (H1)				0.062*** (0.0124)	0.062*** (0.012)	0.065*** (0.012)
	Ownership (H2)					0.450* (0.268)	0.784** (0.320)
	Relative Subsidiary Size (H3)						0.031*** (0.006)
Constant	-1.594 (1.620)	-7.142*** (2.055)	-7.319*** (2.021)	-6.851*** (1.875)	-6.602*** (1.876)	-6.814*** (1.860)	
Ln Alpha	1.625*** (0.213)	1.194*** (0.260)	1.183*** (0.262)	1.109*** (0.253)	1.122*** (0.250)	1.046*** (0.251)	
Number of Observations	3,802	3,802	3,802	3,802	3,802	3,802	
Firm Fixed Effects	YES	YES	YES	YES	YES	YES	
Year Fixed Effects	YES	YES	YES	YES	YES	YES	
Pseudo R-squared	0.197	0.237	0.237	0.246	0.247	0.254	

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

FIGURES

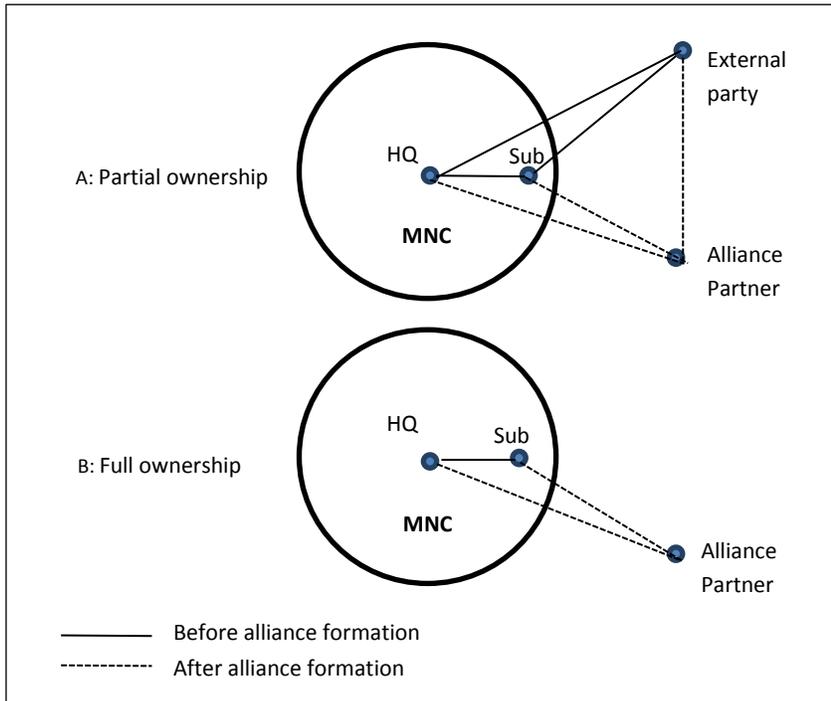


Figure 1. Number of relationships monitored by HQ

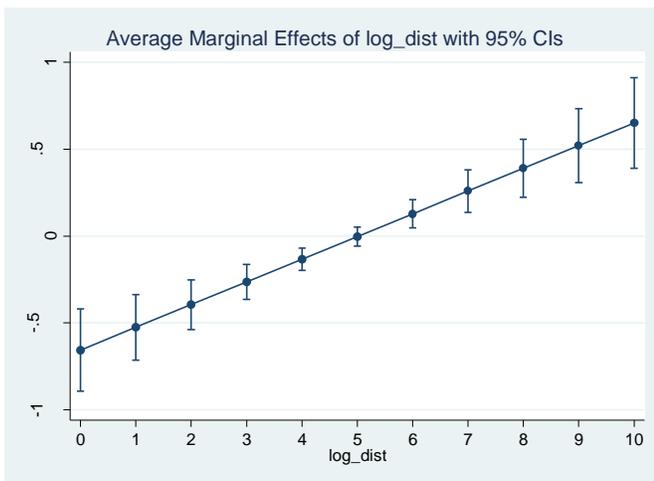


Figure 2. Marginal effects

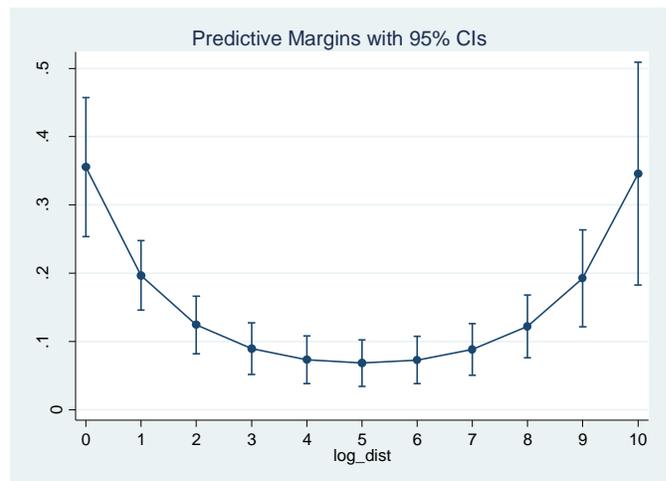


Figure 3. Predictive effects