Exploring the relationship between headquarters and plants

Tao Huang（tao@business.aau.dk）
Center for Industrial Production, Aalborg University, Aalborg, Denmark

Yang Cheng
Center for Industrial Production, Aalborg University, Aalborg, Denmark
School of Business Administration at the Jiangxi University of Finance and Economics, China

John Johansen
Center for Industrial Production, Aalborg University, Aalborg, Denmark

Lei Ma
Department of Public Administration, School of Public Affairs, Nanjing University of Science & Technology

Abstract

Extant studies have provided useful theories and empirical documentation on the relationships between headquarters and subsidiaries. However, much attention has been paid to marketing/sale branches and distributed R&D centers, no prior research has examined the relationships between headquarters and plants within the same international manufacturing network (IMN). This is an important omission because it is fundamental to explore the relationships between headquarters and plants in the IMN, in order to better understand how to design and manage a manufacturing network. In this paper, we use an exploratory case study methodology for a taxonomy of relationships between headquarters and plants and an identification of impact factors of relationships between headquarters and plants.

Keywords: International Manufacturing Network; Relationships; Headquarters; Plant

Introduction

In the face of a growing and increasingly globalized international marketplace, managing an integrated international manufacturing network (IMN) has become an increasingly important task for multinational corporations (MNCs) to gain competitive advantages (Ferdows, 2009).

The main responsibility for designing and managing the network is on headquarters level. The headquarters should have a good understanding of, and insights in, its network to be able to manage it and make the best use of it. Nevertheless, managing a manufacturing network is not an easy task, especially when there are many plants in the network. These plants can actually play different roles. For example, some are referred to as lead factory, or main plant (Ferdows, 1997; Feldmann et al., 2013), which take a leading role in production development and are responsible for the generation and transfer of knowledge. The others might be merely responsible for production and less active in terms of knowledge generation and transfer. It is therefore expected the headquarters will have different attitudes towards plants with different roles and consider them with different degrees of

importance. In other words, the relationships between headquarters and plants in the manufacturing network can be diversified, which might further influence the decisions made by the headquarters on plants. Therefore, it is fundamental to explore the relationships between headquarters and plants in the same manufacturing network, in order to better understand how to design and manage a manufacturing network.

In the remainder of this paper, we first review the literature on HQS relationships and relate it to plants in the context of MNCs, leading to the central research question guiding our empirical study. We then present our methodology, after which we continue to present our case discussion and analysis. In the final sections of our paper, we outline the implications of our findings for theory and MNC managers, in addition to presenting suggestions for future research.

Literature review

On the one hand, there are two main levels of analysis within the IMN research, adopting a plant and a network perspective, scholars have largely ignored the important role of headquarters in the whole network management (Cheng et al., 2015), in the OM area, only one paper was recognised that investigated the impact of distance on the HQ's network management capabilities in the context of a global organisation's evolution (Mykhaylenko et al., 2017). On the other hand, research on headquarters-plant relationship is rare in the IB area. For instance, e Silva and Hewings (2012) analysed the locational and managerial decisions as interdependent choices in the headquarter-manufacturing plant relationship. However, according to the literature, headquarters–subsidiary (HQS) relationships are one of the central research topics in the IB area (Kostova, et al., 2016), which provide a lot of reference to the research on headquarters-plant relationship in OM area. In this section, we therefore review the evolution of literature related to IMN in OM area and HQS relationships in IB area and then formulate our research framework.

Evolution of literature related to IMN

Initially, **during the late 1970s and the early 1980s**, the literature review shows that the research mainly was concerned with **plant location decisions** and merely referred to the selection of the least costly site from the plant level (Meijboom and Voordijk, 2003). However, subsequent research argued that cost evaluation seldom tells the complete story nor does it sometimes differ significantly enough to make a location choice strictly on its merit (Cheng et al., 2015). In response, **during the later 1980s and 1990s**, much research has attempted to identify the possible drivers for allocating production facilities in specific locations (e.g. Golini et al., 2014). For instance, Ferdows (1997) identifies three potential drivers for allocating manufacturing facilities in specific locations: low cost production, access to market, and access to skills and knowledge.

Theory on **plant roles** can be said to have started with the focused factory by Skinner (1974). Schmenner (1979) introduced the concept of product or process oriented organisation. This gives plants very different tasks depending on whether they are product or process oriented, resulting in a differentiation of roles. Ferdows (1989) firstly introduced the concept of plant roles, however, discussion of plant roles usually began with the roles of subsidiaries in multinational companies (e.g. Bartlett and Ghoshal,1989). The strategic classification of a subsidiary was translated by Ferdows (1989, 1997) into a taxonomy of plants. His model distinguishes plants based on plant capacity and positional advantages, and identifies six types of plants: offshore, source, server, contributor, outpost, and lead plant. **During the later 1990s and 2000s,** Ferdows' model was recognized by academics and was used by many scholars as a starting point for their research (Maritan et al., 2004). Vereecke et al. (2006) categorised plants along the dimensions inbound and outbound flow of knowledge. Their analysis showed four types of plants with different network roles: isolated plants, receivers, host network players and active web players.

Generally, research on the network level of IMN did not attract much attention in the OM community **until the later 1990s**, it is clear to identify two dominating areas with regard to the decision-making process—research on configuration issues and research on coordination issues (Colotla et al., 2003). **On the one hand, configuration** addresses the plants' locations and the inter-facility allocation of resources along the value chain (Meijboom and Vos, 1997). **On the other hand, coordination** is related to managing a network and refers to the question of how to link or integrate the production and distribution facilities in order to achieve the firm's strategic objectives (Pontrandolfo and Okogbaa, 1999).

Evolution of literature related to HQS relationships

HQS relationships refers to "what goes on inside the corporation between the home country firm (parent company or headquarters) and the local firm (subsidiary or affiliated company)", more than sixty articles were selected on HQS relationships based on the preliminary search. Afterwards, concerning with manufacturing industry-level, twenty related studies were reviewed. In order to develop further understanding of these articles, we followed the analysis process, namely identifying research themes and classifying the articles according to the identified themes. Overall, our analysis reveals that (a) scholars have always been interested in researching the HQS relationship of multinational corporations, and (b) have examined HQS relationships from different perspectives based on different conceptual approaches (Kostova et al., 2016).

In terms of the research themes, it includes six aspects: (1) organizational design and control systems (Wolf and Egelhoff, 2013); (2) subsidiary role and region structure (Conroy and Collings, 2016); (3) power and mandate (e Silva and Hewings, 2012); (4) expatriate management and global HRM (Lagerström and Andersson, 2003); (5) knowledge creation and transfer (Ishihara and Zolkiewski, 2017); (6) host and home country context (Miao et al., 2016), which are the main impact factors of HQS relationships.

Tracing of the evolution process of the research, **early articles on HQS relationships** took a clear subsidiary manager perspective and stressed the relationship of coordination, control, and conflict to the effectiveness of the HQS relationship (Roth and Nigh, 1992). Further, Wolf and Egelhoff (2013) focused on the MNC matrix structure firms and discussed which types of matrix structure lead to greater conflict and which do not. **During 1990~2000**, the journal also started to pay more attention to the other two issues: subsidiaries role and region structure, power and mandate. For example, Birkinshaw and Morrison (1995) explored the ways in which subsidiary 'structural context' varied across the three-fold typology of subsidiary roles (world mandate, specialized contributor, local implementer).

During 2000~2010, research attention shifted to the three aspects: expatriate management and global HRM, knowledge creation and transfer, host and home country context. For instance, regarding of the first aspect, Lagerström and Andersson (2003) examined how global teams contribute to the creation and sharing of knowledge in MNCs. As to the second topic, some papers explored the consequences of knowledge transfer for foreign subsidiaries (Colakoglu et al., 2014). In addition, in an effort to further unpack the factors of HQS relationships in the host and home country context, Harzing and Noorderhaven (2008) provided a comparison of country-of-origin effects for a very wide range of aspects of the HQS relationship. Afterwards, regarding language barrier as a unique factor of HQS relationship, Björkman and Piekkari (2009) empirically tested how foreign subsidiaries with varying degrees of language competence were controlled. **During 2010-2018**, Miao et al. (2016) stressed cultural differences at the sub-national level by examining how cultural distances at both the within- and cross-country levels simultaneously influence headquarters resource allocations for innovation transfer projects between subsidiaries.

Literature analysis, research gap and research questions

In the literature of OM area mentioned previously, it is possible to recognise that the relevant discussions are usually based upon single subsidiaries/plants, addressing the location advantages of plants, site competences, plant roles, and knowledge flows among plants (Vereecke et al., 2006). In fact, it seems that these research themes have always been the focus in the plant-level analysis in the context of IMN, and the headquarters-level is generally neglected (Mykhaylenko et al., 2017).

Meanwhile, comparing the above reviewed literature on HQS relationships, even though research attention was focused on the manufacturing industry level, it is obvious that R&D and marketing are generally considered as two main functions in the research of HQS relationships (e.g. Miao et al., 2016), and production/manufacturing function is largely ignored (e Silva and Hewings, 2012). Therefore, it is not clear how the headquarters manage the plants in the network, and how this leads to their relationships changes. To our knowledge, this present paper is one of the first studies to examine the relationship between headquarters and plants from both headquarters and plants perspectives.

Addressing the above gap, this present paper aims to investigate the relationships between the headquarters and plants in the context of the IMN and to explore how such relationships are influenced by different impact factors. We expect to address the research aim by:

identifying the taxonomy of relationships between headquarters and plants in the IMN,

combining headquarters and plants level analyses, and examining how the relationships are affected by different factors.

Design/methodology/approach

In order to meet the research objective indicated above, a case study approach was selected as the primary research method, as it is appropriate when explorative questions are asked and when a contemporary phenomenon is in focus (Yin, 2003). Our study, therefore, relied on a series of interviews with related managers and staffs in the field to obtain detailed accounts of their operation activities between headquarters and plants for analysis.

The relevant literature was investigated beforehand, based on which a research framework was derived (See Table I for details of each dimension) and research gaps were identified. Two cases, i.e. one Danish and one Chinese company were selected based on different sampling criteria, including industry, product, process and plant location. Moreover, in order to ensure the feasibility of case selection, some practical factors such as distance, cost, accessibility, and willingness to participate were also taken into consideration. In doing so, we expected the conclusions drawn from this study to be further strengthened (see Table II for the key characteristics of each case company).

Table I: Analysis framework for headquarter and plant

Dimension	Detailed variables	Related sources (example)
Plant characteristics	● Product/process ● Location driver, e.g. cost, market, or knowledge ● Capabilities/competence ● Plant role, e.g. offshore, source, server, contributor, outpost, lead plant	● Vereecke and Van Dierdonck (2002) ● Maritan et al. (2004) ● Feldmann et al. (2013) ● Golini et al. (2014) ● Cheng et al. (2015)
Network characteristics	● Manufacturing network configuration ● Degree of coordination between facilities	● Colotla et al. (2003) ● Pontrandolfo and Okogbaa (1999)
Link headquarter and plant	● Interdependence ● Language barriers, i.e. language competence ● Culture distance	● Harzing and Noorderhaven (2008) ● Miao et al. (2016) ● Wolf and Egelhoff (2013)
Headquarter characteristics	● Control mechanisms, e.g. centralization, formalization, output control and socialization	● Harzing and Noorderhaven (2008) ● Björkman and Piekkari (2009)

Table II Key characteristics of the case companies

Company	Company A	Company B
Home country	Denmark	China
Industry sector	Manufacture of machinery and equipment	Manufacture of machinery and equipment
Size(employees)	19,280	28.000
Product	Pumps	Construction machinery
Manufacturing footprint	83 companies(production and sales) in 56 countries	In 11 countries
Plant role mentioned in this paper	Server	Leader
Plant location mentioned in this paper	India	Germany

In the present study, empirical data was collected through semi-structured interviews and all kinds of second-hand documents, such as annual reports, press releases. Semi-structured interviews were conducted with headquarters managers, plant managers, and shop floor workers, covering several aspects such as forms of interactions and types of information exchange, perceptions of the network structure and the plant roles, plant capabilities, and decision making process and structures. The interview guide was first produced in English by the first author in collaboration with the second author and then translated into Chinese by the first author, who is a Chinese native speaker and fluent in Chinese and English.

All the interviews were conducted by the second author and the fourth author, with the permission of all interviewees, the interviews were taped, and afterwards, typed. Interviewees were offered a choice of interview languages. Most managers were interviewed in their native language. In details, for the Danish companies located in the India, the interviews were conducted in English by the second author, for the Chinese company located in China, the interviews were conducted in Chinese by the fourth author. This approach was purposefully chosen so as to allow a direct exchange of views without the use of an intermediary. A second advantage of this approach is that it is easier to build rapport when interviewing in the interviewee's native language. Finally, authenticity, richness, and accuracy of the data can normally be expected to be higher when interviewing in the interviewee's native language.

The data needed to be understood by all four authors. Therefore, Chinese transcripts were translated into English by the first author, who had also transcribed the Chinese interviews. We considered the loss of data quality by translating from Chinese to English as less significant than the problems associated with interviewing an executive in a language that they were not comfortable with. A meaning-based translation technique was used, in which the original meaning of the interviewee takes centre stage and translation is conducted through paraphrasing and interpretation rather than mechanical translation, which might lead to a quote that is stilted and awkward to read.

Data analysis was carried out simultaneously with data collection, enabling the researchers to take advantage of a flexible data collection, make relevant adjustments along the way and performed in two stages, a within-case analysis followed by a cross-case analysis. Data analysis in this study follows the five key steps (Lacey and Luff, 2001): transcription; identifying a thematic framework; coding; charting; identifying themes, mapping, and interpretation.

Results and Discussion

In this section, we briefly present the case report of each selected company. At the end of each case description, the key information of that case about the different HQP relationships is summarised in terms of the aspects listed in Table I. In order to understand the link between

headquarters with plants located in different countries, comparisons amongst the two different companies are needed.

Case A: Grpumps

As one of the world's leading pumps and trendsetters in water technology, Grpumps was founded in 1945 and got its present name in 1967. Annually, more than 16 million pump units are produced. The company's main product groups are circulation pumps, dive pumps and centrifugal pumps. Within these product groups, Grpumps covers about half of the world market. After two years of modest sales growth in 2015 and 2016, sales grew in 2017 by 5.3% measured in local currencies. Net turnover reached a record high of DKK 25.6 billion. Today, with around 19,000 employees, Grpumps aims to "successfully develop, produce and sell high-quality pumps and pumping systems world-wide, contributing to a better quality of life and a healthy environment." To reduce the complexity of the studies, only the Grpumps production base in India will be described in detail.

Grpumps India started in 1998 from rented space inside AVM Studios in Chennai with warehousing and assembly operations. It is responsible for sales of Grpumps products in India, Bangladesh, Bhutan and Maldives. After eight years of growth in India, the Grpumps Group is expanding its Indian sales company to include a production plant. The Danish headquarters has invested DKK 20 million in a 5000 sq m facility in Chennai. Grpumps says its primary focus will be on the industrial product range, including product types like Hydro Boosters for pressure boosting and CR pumps, NB and NK pumps for industrial applications. Afterwards, a prototype solar pump for domestic purpose has been developed by Grpumps India which is currently being evaluated by Grpumps, Denmark for aesthetics, pricing and market feasibility. Submersible solar pumps have also been developed for irrigation purpose.

The India plant has close collaboration with other plants in the network and particularly those from Denmark and Hungary as those plants are both suppliers and customers to Grpumps India. Similarly, process improvement ideas are also shared and received from plants in China and Taiwan. In case of problems, other plants can be called and contacted to address those problems. In terms of the control from headquarters level, process management is done at group level with guidelines for Shop Floor Excellence followed informally at global level with KPI reporting using the same software tool. Every employee has 5 KPIs with focus on profitability, customer satisfaction and employee motivation. Employees of Grpumps India handling processes such as production planning, sales order execution, warehouse management, logistics have contacts and discussion forums with global counterparts and reach out to them for advice and knowledge sharing.

It is obvious that expanding into a new geography had brought with it issues of ownership, responsibility, hierarchy and other people-related issues. Grpumps responded to the challenge through structural interventions. The revised structure moved from a head office centric delivery structure to a more decentralized delivery structure. Such a structure simultaneously addressed the issue of hierarchy and ownership in terms of the final sign-off authority in delivery-related issues. Therefore, to some extent, the India plant has the initiative to make decision but should get the support from headquarters all the time. In details, Grpumps changed the mechanism and moved to a Delivery Model and made each location responsible for delivering a specific aspect of the software. They moved to a different structure with different Centers of Excellence depending on competence. So plants in India could be the authority in one area. For instance, now India is the Centre of Excellence for Communication Software. So whoever in the world needs help with this aspect of the software will contact the India office. This also ensures that the deliverable is available at the right time.

Case B: XG

XG is a Chinese multinational Government-owned, heavy machinery manufacturing company, which was founded in 1943. Since then, XG has stood at the forefront of the Chinese construction machinery industry and developed into one of the domestic industry's largest, most influential, and most competitive enterprise groups with the most complete product varieties and series. XG is dedicated to its core value of "Taking Great Responsibilities, Acting with Great Morals, and Making Great Achievements" and its corporate spirit of being "Rigorous, Practical, Progressive, and Creative" in order to keep moving towards its ultimate goal of becoming a leading world-class enterprise capable of creating real value. To reduce the complexity of the studies, only the XG production base in Germany will be described in detail.

Since 2010, through the acquisition of machinery companies including the Netherlands-based AMCA Hydraulic Fluid Power BV, the Germany-based Fluitronics GmbH and Schwing GmbH, XG is making full use of Europe's advanced technologies and apply the resources to implement the company's internationalization as well as self-innovation strategy efficiently.

XG now owns three subsidiaries in Europe – XS Holding GmbH (wholly-owns Schwing GmbH), XG European Research Center GmbH and AMCA Hydraulic Fluid Power BV. Among them, XG scooped up German concrete equipment maker Schwing GmbH in 2012, which is one of the world's leading suppliers in its field, in order to get its hand on technology, brand and a worldwide distribution network. With respect to their operations was concerned there was absolutely no change. It continued to work in same way and they report to their German office. To some extent, XG headquarters initially maintained a strategic partnership with Schwing GmbH. However, culture- and language-related issues along with mechanisms for localization have been some of XG' biggest challenges in XG's plants in Germany. It is clearly the factor that has been most difficult to bridge between the headquarters of XG in China and local plants in Germany. Later, in order to resolve the cultural and language barriers, XG adopt a dual manager mode, in details, China general manager is responsible for human resources, budget target, performance evaluation, staff management, the German general manager is responsible for the daily operation and dealing with the local government or people. In such situations, face-to-face meetings between China general manager and German general manager became reality and it really helped to build a bond on which the relation can grow further.

The other thing that seriously affects performance is lack of communication between headquarters of XG in China and plants in Germany in terms of what needs to be done in a particular situation. Standard operating procedures cannot be quite standard across different locations and these are different in each country. These need to be looked into and addressed pro-actively. Often, XG allow teams from headquarters and plant level to be together for 3-4 days so that they understand each other better and then allow them to go back to their respective places. Despite the costs, bringing people together to meet each other really helps. Especially, people with higher levels of EQ are able to handle it better.

As the case description above, the key factors of HQP relationships is summarised in Table III.

Table III Key factors of HQP relationships in Case A and B

Analysis level	Dimensions	Case A	Case B
Plant level	Plant location	Developing country	Developed country
	Location driver	Market	Knowledge
	Plant role	Server; active	Lead; isolated
	Plant capabilities	Low	High
	Product variety	All components/products	Simple products

	Product volume	High	Low
	Process variety	Assembly	All processes
	Process complexity	Low	High
Network level Plant level	Network configuration	Market area plant strategy	Global-integrated
	Degree of coordination	High	Low
Link headquarter and plant	Interdependence	High	Low
	Language barriers	Low	High
	Culture distance	Low	High
Headquarter level	Headquarter location	Developed country	Developing country
	Control mechanisms	Centralization	Decentralization

Case Analysis

As shown in Tables III, the factors of HQP relationships in case companies are recognised by capturing four different points. The comparison and analysis of these dimensions allow us to examine how the relationships between headquarters and plants are affected by different factors and furthermore, to identify the types of the relationships between headquarters and plants.

HQP relationship: differences by country

As presented in Section 4.1, Case A and B are from similar industries but different countries. They showed different approaches in globalising their production. The Danish company, Grpumps establish production in India for the new market. The Chinese company, XG relied on the Europe advanced technology, brand and a worldwide distribution network, acquiring the famous concrete equipment maker Schwing GmbH. In addition, from plant location level, the plants in Case A are from developing country, while the plants in Case B are from developed country. The comparison between them might allow us to indicate the differences in the HQP relationships by country.

In Case A, due to the limitations of the Danish domestic market, it was imperative for the company to set up overseas production to exploit foreign potential markets in India. As mentioned above, Grpumps India had a similar culture background with its headquarters in Denmark, there is nearly no language barrier or cultural distance between the headquarters and plants. Therefore, plants in Grpumps India keep a kind of coordination with the headquarters and other plants in the IMN. In contrast, in Case B, compared to the headquarters of XG in China, plants in XG Germany are from a different cultural background. Even though, the headquarters of XG tried to deal with the issue by dual manager mode, the management of plants in Germany is independent.

In summary, the tentative proposition with regard to HQP relationships can be formulated as follows:

P1. Companies from different countries tend to follow different control mechanisms to their plants located in different countries. Specifically, companies from developed countries (such as Denmark) might adopt the centralization approach in coordinating the plants from developing countries (such as India). Companies from developing countries (such as China) might tend to decentralize their power to the production units, in terms of getting technology knowledge from plants in developed countries (such as Germany).

HQP relationship: differences by plant role and capability

Once the case companies chose which approach to manage of the IMN, they then had to face a long-term, slow, iterative, sequential and progressive evolution process of the HQP relationship, which seemed to be affected by two aspects all the time: plant role and plant capability, according to the two case studies.

In Case A, the main market of India plant is in India, Bangladesh, Bhutan and Maldives. It

plays a server role for the specific region. But it is active in the collaboration with other plants in the network. Process improvement ideas are also shared and received from other plants. The India plant only needs to assemble the all components supplied by other plants to attain a certain quality level to meet the demand of customers. Their own production capabilities are low, and therefore they will rely more on products and technologies from the headquarters. In Case B, the plant in Germany is isolated, it produces the total concrete equipment in all processes, and the process complexity is high. In this type of plant is managed at a distance and provided the formal procedures and targets are followed, the unit will be allowed some local adaptation and will not be fully integrated into their headquarters' operations. Site capability was still observed to play an important role in its production. The result may be more integration into host economies with local sourcing and adaptation of products to local markets. Therefore, plants in Case A showed a higher level of interdependence with HQ than plants in Case B.

Derived from the above analyses, another tentative proposition with regard to the impact factors of HQP relationships can be formulated as:

P2. The degree of interdependence between the headquarters and plants is determined by the role and capabilities of the plant. The role and capabilities of the plant are also caused by many factors, such as product, process.

Conclusion

The study analysed how the relationships vary between headquarters and plants with the impact of different factors in the IMN based on the two case studies. A taxonomy of relationships between headquarters and plants is identified based on the case studies: centralization VS decentralization. It can further be concluded that the relationships between headquarter and plants are dependent on parameters such as personal contacts, cultural distance, established processes and routines, the network structure and home country and host country, plant role and plant capabilities in the network.

Not surprisingly, the results indicate that the physical locations of the headquarters and the plants have a large impact on their relationships. In other words, there are large differences in nearly all aspects of the HQP relationship between different countries. However, the negative effects of large physical distances could often be compensated or overcome by well-established personal connections between headquarters and plants.

Furthermore, the study contributes to the literature on manufacturing networks and plant roles as an empirically driven research study on the relationship between the headquarters level and the plant level within the IMN. The study analysed how the relationships vary between headquarters and plants with different role and capabilities in the IMN. The relationships between headquarters and plants in an IMN are not static but dynamic, which can vary over the change of plant role and capabilities.

With its explorative approach, this paper describes and classifies the relationships between the headquarters and the different types of plants in IMNs. It contributes in the fields of operations management and international business by widening the understanding of the relationships between headquarters and plants in the manufacturing network, which is considered as fundamental for developing further understandings on how to design and manage an IMN.

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