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ORCHESTRATING INTERNATIONAL PRODUCTION NETWORKS WHEN FORMAL AUTHORITY SHIFTS

We investigate how a brand-owning MNE can orchestrate its international production network following a loss of formal authority and a shift in 'hub firm' status to another member of the network. Our empirical material is drawn from a case study of a Norwegian shipbuilder who, despite formal authority shifting to another network member, faces a continuing imperative to coordinate and safeguard exchanges to ensure that network-wide performance objectives are met. We illuminate *what* mechanisms are used by a network orchestrator with limited formal authority, *when* they are used, and *by whom* they are developed and deployed. Our findings question theorizations that assume a single, stable orchestrator, and that give primacy to the 'executive suite'. We show network orchestration as contingent and underpinned by adaptations, interdependencies and tensions.

Keywords: Network orchestration; coordination and safeguarding; orchestration mechanisms; international production network; qualitative case study

1. Introduction

The architecture of multinational enterprises (MNEs) increasingly involves a complex network of relationships between differentiated units within the MNE, as well as external relationships across borders. MNEs create and appropriate value by *orchestrating* their international production networks, coordinating and safeguarding exchanges across diverse network members and locations. The metaphor of a 'controlling intelligence' (Buckley, 2009b) has been used to describe the headquarters of the brand-owning MNE that is the 'lead firm' or 'hub firm' in such networks (Capaldo, 2007; Dhanaraj & Parkhe, 2006; Yeung & Coe, 2015), but the management style required for network orchestration is unlike the traditional 'command and control' approach (Buckley, 2009b, p. 233). Notably, the lead firm must often devise ways to 'control without ownership' (Buckley, 2010, p. 67), and instead rely on a combination of contractual and social mechanisms (Buckley & Strange, 2015; Kano, 20017). Moreover, the assumption of stable control by a single, omnipotent MNE or headquarters is itself increasingly challenged. Network orchestration – both within the MNE and with external network members – is seen as a contested phenomenon (Alfoldi, McGaughey & Clegg, 2017; Andersson, Forsgren & Holm, 2007; Yamin, 2011). With the growing presence and increasing complexity of international production networks (Buckley, 2009a; Larsen, Manning, & Pedersen, 2013; Larsen & Pedersen, 2014; Mudambi, 2008), understanding the actual mechanisms and challenges in their orchestration takes on elevated importance.

In this paper we, too, challenge assumptions of a single, stable network orchestrator and ask the intriguing question: *How can a brand-owning MNE continue to orchestrate its international production network following a loss of formal authority and a shift in 'hub firm' status to another member of the network?* Theoretically, our question relates to mechanisms for coordinating exchanges and safeguarding the MNE's firm-specific advantages under circumstances of (1) limited formal (i.e. contractual or ownership) authority, where authority previously existed, and (2) from a peripheral network position, despite previously being a clear 'network hub' or 'lead firm'. Our question thus speaks to notions of differentiated networks and shifting or contested roles, and

contrasts markedly with current conceptualizations of network orchestration that imply a single, stable orchestrator (Buckley, 2009a,b; Buckley & Strange 2015; Kano 2017).

Empirically, our question was inspired by our research on a Norwegian shipbuilder, ShipCo (a pseudonym). ShipCo has long been a 'hub firm' in a network of maritime companies renowned for supplying advanced and highly customized vessels for operations in the rugged North Sea. At the time of our study ShipCo was introducing new business models for series production of more standardized vessels. ShipCo designs and generally sells the vessel, but when the vessel is ready to be constructed, the contract "hub" becomes the partner yard in the emerging market, rather than the traditional home-based (and often in-house) construction. That is, the external yard enters the primary contract with the ship buyer, and ShipCo is simply one of many suppliers to the yard. While the yard thereby acquires the network hub status, customers are attracted by the ShipCo brand. ShipCo's reputation and customer relations – and hence future business – is at risk if the yard fails to deliver the vessel on time, within the agreed costs and with the requisite quality. ShipCo therefore seeks to orchestrate the international production network, despite its limited formal authority and seemingly peripheral network position.

Foreshadowing our findings, we identify a bundle of mechanisms ShipCo uses to coordinate and safeguard exchanges. These mechanisms cluster in two domains: network architecture (i.e. mechanisms that shape access to the dual network we identify and prescribe exchanges within it) and network operations (i.e. mechanisms used to build a macroculture, manage functional interfaces, and foster knowledge retention and renewal). The mechanisms in each domain come into play at different times, thereby highlighting distinct temporal elements of network orchestration that have hitherto not come to the fore. Moreover, they are devised, adapted and put into practice by organisational members at differing levels in the MNE's hierarchy. This contrasts with Kano's (2017) assignment of sole responsibility for orchestration to the MNE headquarters' 'executive suite' and notions of the MNE's headquarter as the 'controlling intelligence' (Buckley, 2009b).

While our findings clearly demonstrate distributed roles and responsibilities in network orchestration, they also point to orchestration challenges in implementing new business models. Further, our analysis reveals interdependencies and tensions between mechanisms, and the influence

of home and host location characteristics. Our analysis thus points to the importance of *context* and cautions against over-estimating the transferability of more generic models or frameworks guiding orchestration of international production networks. We thereby contribute to the broader literatures of network orchestration (Dhanaraj & Parkhe, 2006; Jones, Hesterly, & Borgatti, 1997; Paquin & Howard-Grenville, 2013), as well as the emerging stream of literature exploring aspects of network orchestration in the globally dispersed firm (e.g. Kano, 2017; Lampel & Bhalla, 2011; Larsen et al., 2013; Larsen & Pedersen, 2014; Buckley, 2009ab; 2010; 2011; Buckley & Strange, 2015).

2. Conceptual and Empirical Background

2.1. Network orchestration

Deliberately assembled inter-organizational networks are pervasive, and effective network orchestration can lead to individual and collective gains over extended periods of time (Paquin & Howard-Grenville, 2013). Network orchestration involves "deliberate, purposeful actions undertaken by a hub firm as it seeks to create value… and extract value from the network" (Dhanaraj & Parkhe, 2006, p. 659). Orchestration suggests active agency by a central unit in the network referred to with terms such as 'strategic center' (Lorenzoni & Baden Fuller, 1995), 'hub firm' (Dhanaraj & Parkhe, 2006), or 'lead firm' (Capaldo, 2007; Provan & Kenis, 2008). Previous studies on innovation networks have described how orchestrators take actions to maintain network stability (Dhanaraj & Parkhe, 2006); facilitate integration and establish common platforms (Nambisam & Sawhney, 2011); and actively shape network formation (Doz, Olk, & Ring, 2000). Knowledge sharing and appropriability is a particular concern in network orchestration of innovation networks (Dhanaraj & Parkhe, 2006). While mobility of knowledge among network members promotes value creation, free-riding and opportunism undermine members' willingness to participate in joint knowledge sharing activities and heighten efforts to safeguard firm specific advantages. Dhanaraj and Parkhe (2006) argue that it is a specific responsibility of hub firms to ensure equitable distribution of value and mitigate appropriability concerns by fostering trust and procedural justice. Empirical studies of supply chain networks similarly show how the hub firm motivates members to share knowledge and

take actions to prevent free-riding (Dyer & Nobeoka, 2000), carefully select members based on the value of their network and resources (Nobeoka, Dyer, & Madhok, 2002), and prevent unwanted behaviour through monitoring, incentives, partner selection and socialization (Wathne & Heide, 2000).

Using examples from another knowledge-intensive industry – the film industry – Jones et al. (1997) theorise social mechanisms of network orchestration under conditions of asset specificity, demand uncertainty, task complexity and repeat interactions. These include restricting access to exchanges and developing a macroculture. Restricted access refers to a strategic reduction or limitation in the number of exchange partners. It reduces coordination costs by minimising the variance in partners' expectations and skills, and facilitates safeguarding through more targeted monitoring (Jones et al., 1997). A macroculture is a "system of widely shared assumptions and values […] that guide actions and create typical behaviour patterns among independent entities" (Jones et al., 1997, p. 929). Macrocultures are socially constructed and reinforced through webs of social and repeated interactions. Abrahamson and Fombrun (1994) argue that because social ties diffuse through macrocultures, organisations that occupy a central position in a network are more likely to have a disproportionate, homogenising and potentially self-serving influence on a network's macroculture. Macrocultures thereby help coordinate interdependent activities in the completion of complex tasks.

Overall, these studies emphasise social mechanisms for network orchestration (e.g. macro-culture development, trust building, partner selection) to coordinate and safeguard exchanges across the network, although this does not preclude use of formal mechanisms (e.g. ownership and contacts). In this literature, orchestration is an activity construed as an ongoing accomplishment, with adjustments in the orchestrator's activities and focus often triggered by new demands (and dilemmas). The need to balance short- and long-term membership and projects is ongoing (Paquin & Howard-Grenville, 2013). Nonetheless, studies tend to assume the presence of an undisputed central hub firm that coordinates and safeguards exchanges (e.g. of information, product, people) in a network of suppliers, firms organized for innovation, or stakeholders organized around realization of a project or shared set of goals. Shifts in 'hub status' or *who* is the lead firm over the duration of a project are not considered. Nor are orchestration challenges for production networks operating across international

borders and diverse locations a primary focus. For the latter, we turn to conceptualizations of the dispersed global firm.

2.2. Orchestration challenges in the internationally dispersed firm

Internationally dispersed firms undertake some activities at offshore locations rather than in the home country through, for example, captive subsidiaries, joint ventures or the use of external contractors (Jensen, Larsen & Pedersen, 2013; Kumar, van Fenema, & von Glinow, 2009). Internationalization typically comes with elevated search, coordination and transaction costs (Contractor, Kumar, Kundu, & Pedersen, 2010). It may thus involve a substantial organizational reconfiguration (Lampel & Bhalla, 2011; Jensen et al. 2013), resulting in greater complexity in the network of relationships that must be orchestrated to achieve performance objectives. Adding to this complexity are diverse location characteristics, and heightened inter-task interdependence as activities are disaggregated and globally dispersed (Kumar et al., 2009; Larsen & Pedersen, 2014) with the fine-slicing of global value chains. Whereas global value chains are usually related to a specific product, international production networks are related to a specific 'lead firm' (Yeung & Coe, 2015), 'flagship firm' (Rugman & D'Cruz, 1997) or 'global flagship firm' (Ernst & Kim 2002). Lampel and Bhalla (2011, p. 356) thus argue that a key success factor in international production networks involving high value activities is the "presence of a unit that acts as a hub to manage the configuration." Notably, Larsen and Pedersen (2014) point to the need to accumulate architectural knowledge over time, observing that the successful design of a firms' international activities is not always knowable in advance (see also Manning, 2014) – pointing to the importance of experiential learning by the network orchestrator.

Buckley and colleague's depiction of the 'global factory' (Buckley 2009a, 2009b, 2010, 2011; Buckley & Ghauri, 2004; Buckley & Strange, 2011) is one of several recent conceptualizations that elaborates the role of the 'lead firm' in co-ordinating and safeguarding exchanges across an international production network. Headquarters of the brand-owning MNE is the orchestrator of an internationally dispersed set of operations (Buckley, 2011). Core functions, such as design, engineering, branding, R&D and marketing are typically controlled through ownership. In contrast,

assembly, parts sourcing and distribution are more likely to be offshored and outsourced to other firms in different locations using contractual arrangements (Buckley & Strange, 2015). Hence, formal authority or control is derived through both ownership and contracts. Knowledge is increasingly internalised and operations increasingly externalised (Buckley, 2011), although this decision must be revisited on a continuing basis in the dynamic international business environment. Regardless of the precise configuration, the brand-owner maintains control over the entirety of activities in the global factory (Buckley & Strange, 2015). Buckley (2010) proposes that the power of a brand-owner in the global factory rests on a combination of factors. These include entrepreneurship fostered by home country institutions and decision-making skills, access to capital, and an overall information and knowledge advantage secured by being 'system integrators' and by virtue of the orchestrators central position in the network (see Casson, 1997). Small and medium enterprises, often from emerging economies, suffer from power imbalance and dependencies of the central MNE in the global factory. Buckley and Prashantham (2016) thus point to the importance of relationship management, meeting places and intellectual property protection to facilitate coordination and safeguarding of exchanges across the varied network members of the global factory. Nonetheless, the central question of how to control the global factory remains a choice over whether the activity should be managed by the market via a contract and price relationship, or internalised under common ownership (Buckley, 2011). Much remains to be uncovered about *how* the production network of the global factory is orchestrated beyond ownership and contractual control.

In a recent conceptual study of network orchestration, Kano (2017) uses an internalisation theory perspective to explore relational and structural mechanisms in international production networks. Kano conceptualizes a network of central and more peripheral partners, where the central orchestrating firm occupies a strategic position. Other network participants partially relinquish control over their own organizations' strategic directions in return for access to the lead firm's firm specific advantages (FSAs), such as brand names, technologies and organizational capabilities. Network interactions have a relational component and are long-term, and the orchestrator's role involves being an architect, strategic leader, value distributor and caretaker. Six distinct social mechanisms are theorised: selective inclusion of network members, involvement of non-profit

organisations and intermediaries, joint strategizing, generating relational capital, provision of multilateral feedback and equitable value distribution. These mechanisms relate to both the composition of the network (e.g. the selection of partner firms by the orchestrator, based on their ability to perform particular core tasks) and the operations of the production network (e.g. joint strategizing, whereby the orchestrating firm's head office influences and shapes the strategies of the partners, and partners engage in routines and collaborative problem solving with a common strategic intent underscoring partner interdependence). The responsibility for devising and deploying these mechanisms of global value chain governance is argued to rest with executives in the orchestrating firm's head office (Kano, 2017).

Whether formal authority or social mechanisms are at the fore, the ability to coordinate and safeguard exchanges across a globally dispersed production network is not divorced from considerations of power. Power advantages can arise through the creation of dependency relationships related to, for example, information advantages associated with understanding and organizing the totality of the chain of activities, R&D resources, brand relations, and the superior finance resources of the lead firm compared to external network actors (Brass & Burkhardt, 1993; Buckley, 2010; Casson, 1997; Kano, 2017). However, inter-dependencies may also arise, adding complexity. A network member's local embeddedness, for example, can create asymmetric knowledge advantages over a central network hub (Yamin, 2011; Andersson, Forsgren & Holm, 2007), thereby decreasing the control and power of the central MNE (Boussebaa & Morgan, 2015). International dispersion and externalisation of some activities can lead to contested power games where knowledge-advantaged actors challenge the central hub (Ghoshal & Bartlett, 1990; Mudambi & Navarra, 2004). Such coordination challenges can be in part mitigated by the 'glue' of shared activities (Ferner, Edwards, & Sisson, 1995) and developing a culture of reciprocity sustained through strategic, organizational and normative processes within the MNE or network (Ghoshal & Nohria, 1997; Greenwood, Morris, Fairclough & Boussebaa, 2010). Overall, the power of the hub firm to influence other's actions rests on their dependence – or interdependence (Emerson 1962) – on the capabilities and oversight the hub

(Buckley, 2010), the contractual controls in place (Buckley & Strange, 2015), and the ability to develop long term relations (Greenwood et al, 2010; Kano, 2017).

Despite our deepening understanding of mechanisms and processes of network orchestration, much of the orchestration of international production networks remains a 'black box'. In particular, the above discussed literatures tend to construe the 'lead firm' or brand-owning network orchestrator as a relatively stable entity, even if there may be adjustments in its specific activities (Paquin & Howard-Grenville, 2013) or changes in the balance between ownership and contracts over time (Buckley, 2011). Related, the 'hub firm' or lead MNE in an international production network is typically assumed to have ownership or contractually derived authority, which it can use *in conjunction* with a variety of other social or informal mechanisms to orchestrate the network. We have limited insight into mechanisms available to other actors in the networks (Casson & Wadeson, 2013), including those outside the 'executive suite' of the lead MNE. Moreover, we know of no prior studies that have examined the implications of shifting hub status and a loss of formal authority for continued orchestration of the international production network. In short, neither the literature on network orchestration nor on dispersed global firms adequately answers our research question, individually or jointly. Nonetheless, they help inform our data collection and analysis by pointing to what is known, and by fostering sensitivity to what may be novel or in need of deeper understanding as we investigate our core research question.

3. Methods

3.1 Rationale for case selection

Our study is part of a broader project investigating the managerial challenges of increasing globalization among companies in the maritime sector in Norway. In the early stages of our study, we identified the new business models of ShipCo and the specific challenges they posed. ShipCo's approach to offshoring with these new business models did not seem to 'fit' with the existing literature on network orchestration in dispersed multinational organizations. Our study is aptly described as phenomenon-based research in the sense that we began our process of inquiry by observing an interesting phenomenon, and then sought to identify, describe and conceptualize its

salient aspects (von Krogh, Rossi-Lamastra & Haefliger, 2012; Doh, 2015). Our approach may be best described as abductive (Alfoldi et al., 2017; Timmermans & Tavory, 2012; Dew, 2007) in the sense that we started with a novel yet incomplete observation about a phenomenon, and sought plausible explanations from existing theory, but with a preparedness to abandon old convictions and to seek new ones.

3.2. Data

Our case study analysis relies heavily on rich interview data, augmented with workshops involving company executives and employees to discuss emerging findings, observations at corporate strategy meetings, internal company documents that generated naturally occurring data, and publicly available information (e.g. concerning industry trends, competitors, market conditions and company-specific reports). As shown in table 1, we draw on 27 interviews from HQ and operational units in Norway, China and Turkey. This includes interviews at two external partner yards (external partners), with other interviewees being ShipCo employees. Interviewees include top managers, regional managers, project managers as well as designers and yard management. Project managers have experiences from several locations and types of projects. We collected data from 2012 to 2014; 3 interviews the first year, 10 in year two, and 14 in year three.

[Insert table 1 about here]

Throughout our data collection, we sought to understand how ShipCo coordinates and safeguards exchanges in co-located as well as dispersed settings. These exchanges include exchanges in goods (e.g. equipment packages), services (e.g. design consultancy), or skills and knowledge (e.g. shipbuilding techniques or new inventions). As the concept of network orchestration is not used daily by our respondents, the qualitative interviews greatly facilitated our access to the interpretations and experiences of each respondent (Maitlis, 2005). Our main information is from projects in three locations: Norway as the home location, and offshore operations in China and Turkey. In addition, the case includes information from engineering services that were offshored to locations in Poland, Turkey and Croatia, and a design subsidiary in China. Each location contained multiple projects. The

baselines for comparison was projects performed at home with full ownership and/or contractual authority over all key activities.

Our interviews centered around some major themes: What activities are undertaken and how were they coordinated? What benefits and risks arose with the new business models, and how did ShipCo manage the process? Who were involved in the different business models and what were their responsibilities? What were the major lessons learned so far? Each interviewee was asked to describe their experiences with the traditional and newer business models. Some informants shared and contrasted experiences from several locations and different types of international production networks. The interviews allowed us to probe the effect of variations in projects, stages of the value chain and geographic contexts. Four people were interviewed multiple times, and were able to give us information about how major initiatives in a given year had unfolded one year later. The interviews were performed by a team of researchers, including both authors, and transcribed prior to analysis. We also had four company presentations where we presented our emergent findings for top management representatives.

3.3. Analysis

Data collection and analysis was concurrent. We drafted rich case narratives to generate a deep understanding of the company context and its approach to network orchestration. This was a challenging and ongoing process, as ShipCo was continually experimenting with its business models and interviewees differed in their evaluations. Our primary unit of analysis was exchanges between actors in the international production network. Importantly, our concern was not only with exchanges where ShipCo is one member of the exchange dyad. Rather, to ensure that the key performace parameters of timliness of delivery, quality and cost objectives were met in the final delivery of the vessel, ShipCo often took an interest in exchanges between network partners where it was *not* a direct participant; that is, we examined chains or sequences of exchange. At times, understanding how ShipCo coordinates and safeguards such exchanges as the network orchestrator also required us to understand the nature of activities (e.g. specific production processes of a shipyard) that preceded an identifiable exchange. With such complex data, workshops and meetings with executives and

employees provided an opportunity for us to check that we had interpreted the data correctly, for new issues to be raised by participants, and to serve as a testing ground for theoretical ideas.

To better understand specific mechanisms[1] at play we used the Atlas.ti software to support the qualitative analysis, adapting the methodology described by Gioia, Corley and Hamilton (2013). A first cycle of data reduction by thematic coding drew on the extant literature and interview protocols, but also allowed unanticipated meanings to emerge around the use and content of mechanisms. For example, we noticed how coordination and safeguarding shifted in different stages of a shipbuilding project, which in turn triggered further reading of extant literature. We then identified first-order themes arising from our data. These reflected specific activities that seemed intended to coordinate and safeguard exchanges (even if not labelled as such by interviewees). We clustered these activities, identifying fourteen more aggregate mechanisms through an iterative process of moving between theory/empirical studies and existing or new data, but still with a continuing strong emphasis on respondent interpretations in our analysis. Next, our second-order analysis moved to a more theoretical level, involving the identification of specific mechanisms of network orchestration and a search for underlying explanatory dimensions. This second-order analysis again relied on iterations between data and the extant literature, but also embodied creative conjecture and imagination as we sought to develop a more theoretical understanding of network orchestration. The 'macroculture' mechanism, for example, was identified in close interaction with extant literature (Jones et al, 1997), but extended it to include the development of shared norms and expectations *within* the MNE as well as *between* diverse network members. We also searched the data across informants for similarities and differences, and sought explanations for each. This included comparing across locations, phases of the value chain, time, and business model variations. As shown in table 2, a number of tactics were used to minimise threats to the trustworthiness (Guba & Lincoln, 1994) of the results and enhance the transferability of our findings.

[Insert table 2 about here]

[1] By 'mechanisms' we mean established, replicable processes or actions by which the network orchestrator seeks to coordinate and safeguard exchanges in order to secure performance objectives.

4. Case description

4.1 Traditional market segments

ShipCo is a fully integrated company with all main value-creating activities in-house and co-located. These include design, engineering, provision of core supplies (e.g. power, control, and deck handling equipment) and shipbuilding in their own yard in Norway, with a capacity to deliver three to five supply ships (e.g. to offshore oil rigs) a year. The Group's headquarters are in Norway. The Norwegian maritime clusters are characterized by strong ties between yards, shipowners, designers, equipment suppliers, training and education providers and supporting institutions, resulting in innovations and the development of advanced suppliers (Benito, Berger, de la Forest & Shum 2003; OECD, 2017; Økland & Croucher, 2017; Amdam & Bjarnar, 2015). In the 1920s, ShipCo began its internationalization as an agent for a German engine manufacturer, followed by cooperative agreements with a Swedish manufacturer in the 1950s. It established sales, servicing and production subsidiaries elsewhere in Europe from the mid-1970s. Sales and service offices were established outside Europe from the late 1970s and production facilities from 1984. At the time of our data collection, the company's 800 employees were internationally located, including Brazil, China, Poland, Netherlands, Norway, Singapore and Turkey.

Traditionally, ShipCo focused on the development of customized vessels, such as anchor handling tug supply vessels, platform supply vessels, seismic vessels, inspection, maintenance & repair vessels, light intervention vessels and standby rescue vessels. In ShipCo's traditional market segments, most commonly the customer (ship owner) initiates a project by specifying requirements and inviting companies to participate in tenders to offer their solution for the ship design. This traditional business model has two major drawbacks. The norm of "no cure, no pay" means that only the winner of the tender gets its costs covered, even if the development of a design most often includes innovation. Typically, ShipCo will spend around 3000 hours in developing a vessel concept which fits the customer needs, at a cost of 1-2 million NOK. The whole process thus places the designer at considerable financial risk. Second, by customizing vessels, ShipCo is unable to take advantage of economies of scale and learning effects. Recognising these vulnerabilities – as well as the over-supply of shipyards worldwide – ShipCo has developed new business models involving entry

into new market segments for more standardised vessels built by external shipyards. As explained by VP of International Operations: *"The cost for us to develop a vessel for one customer or a range of customers is almost the same. In addition, the learning effects realized through building a series of vessels reduce construction costs enormously."*

4.2. New offshore business models

Increasing pressures on cost and commodification characterize the shipbuilding industry: *"The commodity tendency is moving upwards, and that is going to hurt us"* (VP International Operations). Offshoring of various value creating activities is therefore integral to ShipCo's new business models. At times, design activities have been captive offshored to, for example, China or Turkey in order to tap into local design mentalities that emphasise simplicity and low cost. Some engineering services are also offshored (using captive offshoring or strong cooperative agreements) by ShipCo to Croatia, Poland and Turkey because they require more man-hours and are therefore more affected by labour costs, but much remains in house in Norway.[2] While the construction of steel hulls in lower cost locations of Poland and Romania has long been characteristic of the Norwegian Shipbuilding industry, shipyards in low cost locations such as China, Brazil and Turkey were becoming especially attractive for series production of standardised vessels.[3]

At the time of our study, ShipCo was introducing and experimenting with several business models based on standardized designs. The greatest departure from prior practice involves a shift from ship design and production initiated by a ship owner, to proactive series production and 'accelerated business development' initiated by ShipCo. In the series production model, ShipCo starts with an interpretation of the market itself and, based on this market analysis and forecast, develops a catalogue of standardized vessels. This is ideally done together with a "pilot owner" who could become a broker towards other ship owners for subsequent vessels in the series. After the design has been developed, including the "makers list" of suggested core suppliers, ShipCo's role consists of

[2] Between 2012 and 2015, Norway's labour costs in manufacturing was approximately EUR 51 per hour, while in the EU average labour costs were approximately 59% lower at EUR 21 per hour (EC, 2016).
[3] Production in China, for example, was estimated to reduce costs by 30-40%, creating more opportunities for promoting lower-cost vessels.

identifying potential external yards for the given project, and negotiating the settlement of contractual terms and engineering plans in collaboration with the selected yard and the pilot owner. The negotiated contract becomes part of the turnkey solution and serves as the default contract for subsequent customers. Thus, ShipCo performs a much more significant role as the "project maker", establishing the whole project and having a turnkey solution ready to be executed by the yard.

4.3. Challenges for coordination and safeguarding

In ShipCo's business models that involve external shipbuilding yards for series production, the contractual relations with the shipowner shift post-design. During development of the design, the future shipowner will interact directly with ShipCo. After the design is agreed, the contract for completion of the final vessel is between the yard and shipowner. As explained by the VP International operations: *"In most cases we always want the ship owner or investor to make the contract with the yard directly. The reason is primarily risk. To build a ship is such a risky thing and you are not compensated for the increasing risk."* Thus, in the series-production business model, ShipCo has limited formal authority with which to influence the shipbuilding process as the yard is ultimately liable to the owner, not to ShipCo. Formally, ShipCo becomes a *supplier* to the yard of design, equipment and related services, along with a number of other suppliers. This arrangement is attractive to ShipCo as all commercial risks related to completion and warranties are carried by the yard. Nonetheless, ShipCo remains the brand owner: the customer will buy a ShipCo design, and expects a product of the quality for which ShipCo is known, at the agreed price and in time. ShipCo's reputation, and hence future business, is dependent on these performance objectives being met. Thus, while reducing the risks of yard ownership or contractual obligations to the customer, other risks increase – especially in the turbulent markets used for the production of standardized vessels. The challenge faced by ShipCo in its new business models using offshore shipyards over which it has limited formal authority is to orchestrate the international production network such that exchanges are coordinated and ShipCo's firm-specific advantages – including knowledge and reputation – are safeguarded.

5. Findings and Discussion

5.1. Mechanisms for Network Orchestration

As ShipCo moved from a setting where they had full control over the coordination of activities and strong safeguards to one where activities were dispersed and where the formal coordinating role was held by the external shipyard, ShipCo found it needed to develop new (or adapt existing) mechanisms for network orchestration. This was particularly pronounced in the face of unanticipated challenges in emerging markets such as China and Brazil. Our data analysis reveals that mechanisms of network orchestration used by ShipCo to coordinate and safeguard exchanges cluster into two distinct domains: those related primarily to shaping the *architecture* of the production network, and to the ongoing daily *operations* and activities within the network. Figure 1 depicts our data structure and categories of orchestration mechanisms derived from our analysis.

[Insert figure 1 about here]

5.1.1. Network architecture

'Network architecture' refers to *who* takes part in ShipCo's international production networks, and *how* processes and interactions within these networks are formally expected to unfold.

ShipCo shapes its production network architecture by (1) selection and cultivation of firms as either long-term or more transient members of the international production network; and (2) prescribing or restricting how exchanges within the network are expected to unfold. As shown in figure 1, we label these categories of network orchestration mechanisms 'Restricted Access' (*who*) and 'Prescribed Exchange' (*how*) respectively. Table 3 provides an array of illustrative data for these various mechanisms.

[Insert table 3 about here]

Restricted Access to a network refers to a strategic reduction or limitation in the number of exchange partners within a network boundary (Jones et al., 1997). This can reduce coordination costs by minimising the variance in partners' expectations and skills, and facilitating safeguarding through more targeted and ease of monitoring. Repeat transactions fostered by small network numbers also foster network identification in which common or complementary goals are shared, thereby creating a

strong psychological mechanism for sustaining cohesion (Hatani & McGaughey, 2012). This both enables coordination and constrains self-interest. However, we found that the boundaries of ShipCo's international production network can be defined in *two* ways: a boundary encompassing all firms engaged in any one specific project, and a boundary encompassing the broader network of firms who are engaged in multiple (but not necessarily all) projects over time. Across both traditional and newer business models, ShipCo seeks a core pool of stable partner firms that can engage in successive projects. This stability enables experiences and relationships from one project to be carried to the next. At the same time, ShipCo seeks flexibility in the choice of partner for any one project. This flexibility arises through choices *within* the pool of stable partners, *combined with* more transient (and typically host country) partners without strong network identification. Hence, ShipCo's network orchestration aims to accommodate the dual needs of stability and flexibility. We identified four inter-dependent mechanisms by which ShipCo sought to coordinate and safeguard exchanges in this category of *Restricted Access*.

'Partner qualification' involved substantial investments in identifying and developing appropriate partners – especially in relation to yards and suppliers – with whom ShipCo could collaborate: *[T]his partner yard philosophy is crucial and the partner yard philosophy is also intended to create the basis for repetitive business"* (Regional Manager Turkey). As shown in table 3, criteria for qualification as a network member included measurable or observable technical and commercial capabilities, and tacit values and mindsets, involving a "*systematic process for screening.*"

'Influence over supplier selection' refers to efforts by ShipCo to determine the use of certain suppliers by the yard or ship owner. For ShipCo it was essential to control supplies of the core elements (see table 3). This includes equipment packages – using both inhouse production and outsourcing to key external suppliers – which were specified in the contract between the yard and the customer: *"We have the main supplier contacts to the integration package. These include the power motor, propellers, generators, DB systems, cargo systems etc. To some of these suppliers our relations go way back"* (Regional Manager, China). Through provision of a 'maker's list' in the pre-contract project-making phase, ShipCo was able to influence the selection of additional suppliers used

by the external, offshore shipyards. Shipowners are, however, interested in lowering prices, and for supplies that are not specified in the initial agreement, negotiations are ongoing between shipowners, ShipCo, the yard and suppliers. Ongoing quality of supply is not assured as yards attempt to reduce costs and supplier arrangements are contested for each new project: *"Both suppliers and the yard want a bigger share of the value chain, this is a constant struggle to fight for power"* (VP International Operations).

'Partner dependency' refers to the preference of ShipCo to select partners – and yards in particular – who were of lesser capabilities or status than ShipCo in key areas as a means by which to exert influence. Hence, in contexts where ShipCo had limited formal authority and the yard or pilot owner was not contractually obliged to conform to ShipCo's advice, ShipCo sought to limit access to the network to include only partners who perceived themselves to be dependent on ShipCo:

> *"The fact that the yard might be less developed in its organization and capabilities does not automatically lead to a rejection of the yard as a potential candidate. It actually benefits our business model. By offering assistance, ShipCo has more influence and control over the construction process"* (VP International Operations).

As shown in table 3, dependency on ShipCo was created by virtue not only of its superior technical capabilities, but also its reputation and customer networks. The more the ShipCo brand was of value to both pilot owners and yards in securing future sales, ShipCo's power in the network increased.

Similarly, expectations of future business – 'shadow of the future' – were key to building relations and orchestrating exchanges with pilot owners, partner yards and core suppliers. Appointing pilot owners who were also brokers, for example, ensured that their input to the initial design took account of the need to sell a ship to a diversity of potential owners. That is, the pilot owner's interest was not only in designing a ship to meet their own (potentially idiosyncratic) preferences, but also in creating future sales. Similarly, ShipCo actively sought shipbuilding yards who looked for a long-term partnership with ShipCo. In such circumstances, ShipCo even promoted the yard to potential customers (see table 3). For a large yard, ShipCo's business could be a relatively small share of the total value, and expectations of several, high reputation projects in the future secured more attention from the yard: *"The Chinese are looking into building series of vessels, 10 or more. And we need to*

convince them that ShipCo has the best design that can penetrate the market." (Regional Manager China).

Prescribed Exchange involves the strategic shaping of the flow of resources (physical and intangible) and activities across members of the network. We identified two primary mechanisms by which ShipCo sought to coordinate and safeguard exchanges in this theoretical category, which we label 'process planning' and 'role and responsibility designation'.

'Process planning' entails establishing agreement on the explicit steps to be followed throughout project delivery *in advance* of entering into the final contract between the yard and shipowner:

> *"The main problem to my experience is the sequence of doing things. The sequence affects quality. You can have good painters, good individual workers. The expertise of the craftsmen can be good. But if the sequence is wrong you e.g. destroy the paint. Doesn't have to do with individual quality, but it is about the organization of the process"* (Regional Manager Turkey).

Even ShipCo's series-built vessels were relatively advanced, containing high technology equipment fitted in small spaces. Each element must follow a certain order; otherwise there is no space. Related was the coordination of deliveries arriving just-in-time to avoid storage costs, and securing a safe and clean building environment.

'Role and responsibility designation' was closely related to process planning, and refers to explicit, often contractually embedded responsibilities and decision-making authority held by each member of the network throughout the project delivery process. Even where the final contract for delivery of the vessel in the newer business models is between the shipowner and the shipyard, ShipCo tried to ensure that the shipyard was bound by a series of contractual obligations that were agreed between ShipCo and the future owner prior to the signing of the final contract between the yard and owner. The shipowner may, for example, have required the yard to use consultancy services or experts provided by ShipCo throughout the fabrication of the vessel (i.e. at the operational level). ShipCo thereby seeks to ensure quality and timeliness of delivery, while avoiding being formally accountable with associated risks, as illustrated in table 3.

5.1.2. Network operations

After the yard had taken over the contractual relationship with the buyer, ShipCo became one of many suppliers to the yard, with limited formal authority. To orchestrate the network's ongoing exchanges, ShipCo used three key mechanisms: (1) the development of a network-wide *macroculture*; (2) *functional interfacing across* dispersed tasks in the value chain; and (3) ongoing investments in the *retention* and *renewal* of existing stocks of knowledge and acquisition of new knowledge, shown in figure 1. Table 4 provides illustrative data supporting each mechanism.

[Insert table 4 about here]

Macrocultures specify conventions and accepted approaches and solutions to be used by members of a group (e.g. industry, profession or network), foster a convergence in expectations and routines, and thereby help coordinate interdependent activities in complex tasks.

New 'communication protocols' – or mutually understood and accepted approaches concerning the medium of communication, its content, how much and with whom to communicate (figure 1 and table 4) – supported development of ShipCo's macroculture. Importantly, these protocols fostered a shared understanding of processes and responsibilities, in a manner similar to explicit contracting (Schepker et al., 2014). Establishing shared conventions also required 'skill and knowledge transfer' (figure 1) due to different levels of expertise and conventions across domestic and international locations. For example, one project manager in Norway described that *"Everyone here knows that when a pipe is drawn with a kink [i.e. a right angle], it is supposed to be curved."* He told of his unit's surprise when a kinked drawing resulted in a kinked pipe in China, which naturally would break easily. Partner yards were thus invited to ShipCo to gain a deeper understanding of ship building conventions and quality standards and gain tacit knowledge. However, some questioned the transfer of knowledge in this way:

> *"[Y]ou have to recruit also people who do not have a ShipCo background… [T]o develop and assist a poor Chinese yard most likely the best practice should be picked from the best Chinese yard and put it into the poor Chinese yard rather than bringing our practice from Norway"* (Regional Manager Turkey).

Finally, 'intra-MNE education' (figure 1) – that is, education of ShipCo's own managers and employees, as opposed to network partners – emerged in the analysis as essential to establishing a macroculture conducive to the new business models. In particular, not all members of ShipCo's various units held a shared understanding and acceptance of the goals and operations of the new business models, or of the value placed on the offshore partners (see table 4).

Functional Interfacing involved the coordination and safeguarding of exchanges across functional interfaces – for example, from concept development, to design, engineering and fabrication. These interfaces imply a qualitative difference between two activities such that they draw on different bundles of (disciplinary and practical) knowledge and related resources: *"We can absolutely sell a basic design, and that is it. The problem is that there are many interfaces between the design and the other activities, and if these are not clear, a lot of problems occur."* (Project Manager, Norway).

'Interpretation and problem solving' mechanisms were put in place to manage task interdependencies while maintaining partner dependency. These included site teams and consultancy services to help solve recurrent and novel problems at the interfaces of design, engineering, equipment supply and fabrication. The designs supplied by ShipCo were complex, and required a clear understanding of process and handling interdependencies between critical and expensive units of equipment. ShipCo's offshore business models exposed complex task interdependencies less visible in domestic operations, and site support was described as a 'filter' between headquarter expertise and the local, offshore operations. As explained by an engineer in Norway:

> *"Sometimes we need information from the yard to do the detailed engineering, in a circular manner. This process exposes dependencies, and makes the yard understand what they need to deliver. We have earlier underestimated this need for clarification."*

Essential to effective functional interfacing was the development of 'rapport', or empathetic understanding between network members. In interviews, many stories were told of how project managers had gained trust and developed rapport over time with counterparts in Brazil, Turkey and China: "*Everybody should go to China for free!*" (Regional manager, China). At the same time, 'monitoring' of exchanges across functional interfaces was necessary. While also undertaken by site teams, this was mainly the responsibility of designated project managers who set up regular meetings

to discuss progress and deviations from plans. At the same time, though, there was reluctance about high levels of monitoring of the yard by ShipCo. As one project manager mused: *"I do not think I should sit in China… I do not want to take responsibility for their mistakes. I deliver what I shall, I want to be friends with the shipowner, but it is difficult if mistakes happen."*

Knowledge Retention and Renewal (see figure 1) refers to the orchestrator's ability to identify, integrate and create knowledge from across inter- and intra-MNE networks, and to safeguard this knowledge from undesirable use by other network members. Mixed perceptions of success were identified among those we interviewed. For example, 'knowledge acquisition and recombination' – referring to the ability to locate and integrate knowledge between network partners for joint knowledge creation and innovation – was sometimes stymied by home-country maritime and corporate culture. At headquarters, here was pride in employees who, with a combination of academic and practical experience that is typical in Norway's maritime clusters, could intuitively understand novel and complex design ideas and their implications in the construction process. The new offshoring models gave access to very different types of knowledge, particularly knowledge of how to design and produce ships that were simple and of lower cost. Indeed, an important objective of the new business models was to access new design mentalities of offshore partners, not available in Norway:

> "*Designers in Norway, tend generally to the mind-set of that of Norway… [with a focus on quality, not price]. Therefore, it is important to have access to resources that have done "another school", worked in a shipyard in China or Turkey, that are used to work with solutions that are good, but not more than that.*"

However, several respondents in Norway told us how "*ugly*" and "*simple*" some offshore series-built ships were, and that these were clearly "*second rate*" when compared to those produced at home – which does not auger well for the adoption of new design mentalities. Similarly, balancing what information and knowledge could and should be shared was a constant concern, but there was no clearly dominant view within ShipCo on the best means of 'intellectual property rights protection' (see Table 4). For example, while one respondent felt that they were close to "*selling their soul*", others argued that copying was less of a threat as ShipCo would "*always stay a step ahead*." The real

level of protection arising from formal intellectual property rights protection was often debated, even among lawyers.

5.2 *Who* orchestrates and *when*?

Several of the mechanisms we identify resonate with prior studies. However, what is striking in our findings is the importance of *who* designs and implements these mechanisms of network orchestration, and *when* each comes into play. That is, mechanisms residing in each domain (*network architecture* and *network operations*) were enacted by managers and employees at different levels within the organisational hierarchy and at different phases of the shipbuilding project, thereby bringing an important temporal dimension to effective network orchestration overlooked in prior studies.

As shown in figure 2, mechanisms used to shape network architecture were the responsibility of top executives, primarily at head office in Norway but also at regional offices abroad. Although the network hub status and formal authority within a specific project shifts from ShipCo to the shipyard when the design is decided, the orchestrator's *early* efforts to shape the network architecture in the project making phase largely establishes *in advance* many of the conditions for ongoing exchanges at the operational level throughout the construction phase and (tentatively) during sales.

[Insert figure 2 about here]

ShipCo's ability to influence network architecture to their ongoing advantage hinges on the orchestrator's clear role as the 'hub firm' (Dhanaraj & Parkhe, 2006) or 'strategic-centre' (Lorenzoni & Baden-Fuller, 1995) in the project-making (i.e. early) phases of their business models. For example, ShipCo's early position as the strategic-centre, including good relations with ship owners, enabled it to incorporate its equipment packages into the final contract between the yard and ship owner. Further, through the provision of a 'maker's list' in the pre-contract phase, ShipCo was able to influence (if not control) the selection of some core external suppliers, leaving other suppliers to be contracted by the external, offshore shipyard as the formal network hub. The core suppliers to

ShipCo and those incorporated in the maker's list may well have been involved in developing the winning design (for traditional business model), or the design of more standardised vessels (for newer business models). They have thus made a significant investment with an uncertain outcome. The willingness of advanced suppliers to work with ShipCo in this manner is in part influenced by the prospect of repeat transactions by virtue of ShipCo's long-standing relationships with ship owners. Similarly, ShipCo limited the yard's discretionary behavior even after the yard had formally taken on the 'hub firm' responsibilities through, for example, restricting access to yards with some dependency on ShipCo (Emerson, 1962) and prescribing how exchanges should unfold over the life of the project. This includes building ShipCo's advisory role during construction into the contract between the yard and owner.

Effective deployment of mechanisms at the level of network architecture requires an overview of multiple projects and locations; a vision for and understanding of the relationships between the different business models; and an evaluation of strategic trade-offs such as balancing long-term stable relations with flexibility. That is, the use of mechanisms in the domain of network architecture to orchestrate offshore is thus early in the project-making phase *and* highly strategic. While diverse sources of power and influence are recognized in orchestration of the global factory (Buckley, 2009a), temporal dimensions such as these have not been brought to the fore.

In contrast, orchestration mechanisms in the operational domain were in a large part devised and carried out by operational managers onsite in foreign locations, and in Norway. Mechanisms directed particularly towards novel problem solving at the interfaces are illustrative, and were reported to have developed in the offshore subsidiaries of ShipCo. As explained by a design manager in a ShipCo subsidiary in China, this innovation in orchestration mechanisms emerged and operated in China well before receiving HQ's recognition, or its diffusion more widely to other locations: "*For this team, we support the yard on our account at the very beginning, for three years. Eventually [ShipCo's senior management at HQ] realised."* The development of mechanisms to support functional interfaces most commonly occurred in the operations, in contexts where people directly faced the challenge and could identify solutions. In the above instance, this adaptation arose under the guidance of a manager in the design subsidiary who was Chinese, knew the Chinese yards' norms

of operations through prior employments in China, but was educated and had worked previously in Norway.

This Chinese manager may best be described as a 'competence carrier' (Verbeke, 2013) due to his unique set of skills and experience, having worked and been educated in both China and Norway. Previous research has identified variation in management capabilities as a critical factor in networks involving offshoring and offshore-outsourcing (Doh, 2005; Lewin, Massini, & Peeters, 2009; Verbeke, 2013). Through this competence carrier, firm-level advantages of ShipCo (e.g. advanced design and problem-solving capabilities, combined with cross-cultural knowledge) were re-combined with knowledge acquired in the host country about work processes and needs to generate effective mechanisms to coordinate and safeguard exchanges in China. Of course, having such competence carriers with individual-level recombination capabilities alone is not enough: the orchestrator's decision makers also need to be able to recognise and diffuse these adaptations in mechanisms of orchestration throughout the organisation and network. Indeed, knowledge transformation that leads to long term creative solutions is rarely vested in a single individual: rather, collaborators from across the network "propose and apply one another's diverse knowledge in new ways," drawing on and synthesising expertise that is both geographically dispersed and invested in practice (Tippmann, Sharkey Scott & Parker, 2016, p. 473). Such innovation in orchestration thus requires a 'recombination capability' (Rugman & Verbeke, 2001; Verbeke, 2013) or 'combinative competence' (McGaughey et al., 2000) in drawing together bundles of resources and capabilities from throughout the MNE network to create, adapt and upgrade mechanisms for network orchestration. Our study points to the organizational challenges inherent in translating individual capabilities that support network orchestration into organisational capabilities across diverse locations, and hence a continuing role for top management even in the operational domain.

5.3 Interdependencies and tensions in network orchestration

Although our findings identify discrete theoretical categories of mechanisms for network orchestration, particularly striking in our data was the importance of a network orchestrators' understanding of the interdependencies, tensions and paradoxes surrounding various mechanisms

emphasised in the newer offshore business models. Consider, for example, interdependencies between 'partner qualification', 'shadow of the future' and 'dependency relationships' within 'restricted access', which resides in the domain of network architecture (see figure 1). ShipCo's approach to 'partner qualification' required extensive firm-specific investments in the yard, involving not only assessment of a yard's facilities and capabilities, but pre-qualification education of the yard in various contractual and operational conventions used in international ship building. Such firm-specific investments by a network orchestrator create positive expectations for ongoing projects (Jones et al., 1997; Axelrod, 1984; Schepker, Oh, & Poppo, 2014), thereby strengthening the 'shadow of the future' as an effective orchestration mechanism to safeguard exchanges, particularly in the context of excess capacity of the ship yards. Paradoxically, those same firm-specific investments made during 'partner qualification' can lead to the yard acquiring specialised knowledge from the orchestrator, thereby weakening 'partner dependency' as an effective mechanism by which to safeguard exchanges.

Similar interdependencies between mechanisms can be observed *across* the different domains of network architecture and network operations. For example, the mechanism 'prescribed exchange', which resides at the network architecture level, includes 'process planning' (see figure 1). As noted above, this involves ShipCo establishing an agreement on the explicit steps to be followed throughout project delivery *in advance* of entering into the final contract between the yard and shipowner. 'Prescribed exchange' thus supports the ongoing development of a macroculture at an operational level within the network by clarifying expectations about who should be doing what and when. While elements of these processes can be project-specific, the inclusion of network members from the stable pool of partners repeatedly across different projects means conventions may become diffused across network members and diverse projects over time (Abrahamson & Fombrun, 1994; Hatani & McGaughey, 2012). That is, there are positive interdependencies between process planning (architectural domain) and macro-culture development that occurs through repeat interactions (operational domain – refer figure 1). Prior research of international production networks has tended to emphasise either the strategic, architectural domain (Kano, 2017; Larsen & Pedersen, 2014) or the operational, day-to-day tasks (Kumar et al., 2009; Lampel & Bhalla, 2011), and have not emphasised the interdependencies between mechanisms. Our findings go beyond prior studies to jointly consider

mechanisms in both domains and uncover interdependencies – positive and negative – within and between them.

Our results also point to the importance of business model variation in shaping the requisite orchestration mechanisms, including tensions in their implementation. The new series-production in emerging markets drew on both a stable core network and a more transient (local) network. While relational coordination and the importance of trust-building within networks has been highlighted under conditions of ownership dispersion and the international distribution of activities (Greenwood, et al., 2010; Vivek et al., 2009; Kano, 2017), our findings suggest that it is not applied equally across all network members. In their home location, ShipCo was embedded in a network of relationships that fostered trust through shared culture, language and past experiences. In contrast, when allocating network members to specific projects, our respondents de-emphasized trust and prioritized flexibility. Rather than reliance on trust to safeguard exchanges, alternative mechanisms that demonstrated benefits of long-term, repeat transactions ('shadow of the future') and carefully selected firms ('partner qualification') took on heightened importance, along with, for example, mechanisms in the domain of network operations (e.g. 'communication protocols' and 'monitoring'). Inevitably, there are trade-offs between stability and flexibility.

While such mechanisms strengthen the influence or power of ShipCo within the network, the business model placed constraints on the extent to which these mechanisms *could* or *should* be overtly used. For example, ShipCo experienced limitations on how effective its site-support services are in the absence of formal authority over the yard:

> *"[W]e do not have the power to (use) force. Ultimately, the yard is contractually liable to the owner and not us. We don't have any management power at the ship yard – we just do consulting [for] them. We can tell them that "this is wrong and do it differently. But it happens that they are notified, but don't do anything. And this is really difficult."*
> (Regional Manager Turkey)

Giving up formal contractual control (i.e. with the shipowner) in the new business models also placed constraints on communication protocols and patterns of behavior, including management of loyalties and risks: *"…we must be careful not to interfere. We shall not be made responsible for actions done by the yard. I need to talk to the customer, but my professional relationship is with the yard"* (Project

Manager). Notably, the tactics used by the network orchestrator to influence the new network hub had to be subtle, consultative and, at the same time, not involve any risk-sharing with the yard. Our findings thus point to a delicate balancing act between accepting the yard's formal role and authority as the network hub, and deploying orchestration mechanisms that exert power in a manner that would support the brand owner's imperatives (i.e. quality, within-cost and timeliness) without taking on undesirable risks. Indeed, business model characteristics are an influential element of context affecting the orchestration of an international production network.

5.4 The international business context

Among the array of mechanisms used by ShipCo as it orchestrated its network, several distinguish its domestic orchestration from its offshore network orchestration. Our empirical findings thus contrast with conceptual models in which location differences are not brought to the fore, even when considering global value chains (e.g. Gereffi, Humphrey, & Sturgeon, 2005; Kano, 2017).

For example, within the advanced maritime cluster of Norway characterised by dense social networks (Benito et al., 2003; OECD, 2017; Økland & Croucher, 2017; Amdam & Bjarnar, 2015), the use of reputation helps safeguard exchanges: a potential partner's reputation provides information about its resources, capabilities, values and goodwill, and the need to protect one's reputation in order to secure repeat exchanges deters deceptive behaviour and facilitates coordination (Jones et al., 1997). Reputation is not only based on word-of-mouth, but often by long-term and direct exchange relationships. Such reputational resources were not held by the emerging market firms. As a result, 'partner qualification' (see figure 1) criteria used for offshore yards needed to be codified and measurable. Similarly, while the industry-wide macroculture in Norway meant that "the typical ShipCo culture has relatively limited documentation" (senior HRM manager), instability of employees within partner yards heightened the need for documentation of processes ('process planning, table 3), as well as new 'communication protocols' and 'monitoring' (table 4). In the vastly different contexts of ShipCo's offshore operations, the absence of the home country shipbuilding macroculture made reliance on procedures used at home inadequate:

> *"In one project, the yard changed their management 5 times. Then we have to start over and over again. This means that we represent continuity. They simply have little knowledge how to organize the project"* (Regional Manager China).

Moreover, not all managers within ShipCo itself held a common understanding of the new business models, or how they were intended to take advantage of emerging market location characteristics – such as low-cost supplies and new design mentalities – or shifting hub status. Significant resistance to the new business models of series production was found both in Norway and in overseas operations, echoing the tensions Lampel and Bhalla (2011) observed between the benefits of offshoring and the potential disruption to the cohesion of the firm. Codified routines for partner qualification and processes were thus only necessary to achieve consistency in operations with external partners, but also to achieve *internal* (i.e. intra-MNE) consistency in objectives and implementation of the newer business-models.

Similarly, developing capabilities to implement the mechanism of 'functional interfacing' took on elevated importance in ShipCo's offshore markets. This is in part due to the challenges Kumar et al. (2009) identified in relation to the 'stickiness' of knowledge and task interdependencies in offshoring. In addition, we observed that the international dispersion of ShipCo's value chain severed links between key components of knowledge, such as links arising through the interactions between design and engineering, or between engineering and construction. In Norway, the full set of value creation activities is co-located – either within the firm or the maritime cluster. This co-location and geographic proximity increases communication and information sharing, increasing the efficiency of knowledge transfer within the firm and between network members (Phelps, Heidl & Wadhwa, 2012). Moreover, many ShipCo's employees have moved through the various activities in the shipbuilding value chain of integrated domestic operations. As such, knowledge of the links between functions – and activities within functions – is possessed by each individual or readily provided by peer networks and colleagues. In the emerging market series-production, the same depth of cross-functional knowledge was not readily available. This is not only due to different levels of shipbuilding expertise across locations, but also because some parts of the knowledge bundle were inevitably missing through fine-slicing of the value chain (Contractor et. al, 2010; McGaughey, 2002) – heightening the challenges and importance of orchestrating across functional interfaces.

These examples point to the importance of understanding context when interpreting and generalising research findings and conceptual frameworks of orchestration mechanisms. Whereas Jones et al. (1997) present the development of a macroculture as relatively unproblematic in their study of the Hollywood movie industry and Silicon Valley, our case shows otherwise. The high turnover in personnel at the Chinese shipyards mentioned above – and one of a range of deficiencies in labour practices in China's shipbuilding sector (Collins & Grubb, 2008) – undermines the relational continuity needed for macroculture development. Further, the finding that ShipCo selected yards of *lower* status is also in direct contrast to the relationship posited by Jones et al. (1997), who assert that restricted access arises in network governance through *status-maximisation.* That is, "partners seek to avoid partners of lower status" (1997, p. 927), with status based on past demonstrations of quality or associations with other high-status partners. However, ShipCo seeks *lower* status partner yards for its series-built vessels, thereby fostering dependency relationships to help safeguard exchanges. Instead, the partner qualification criteria and routines (described in table 3) are key to ensuring that offshore partners meet the threshold standard of performance across criteria of importance.

As our study shows, depictions of network orchestration abstracted from context – whether location characteristics, network composition and member attributes, or business model variation – inevitably mask the complexities and tensions involved, and can inadvertently foster an over-estimation of the transferability of mechanisms across contexts, networks and firms.

6. Concluding Remarks

International production networks are increasingly disaggregated and globally dispersed. The need to effectively balance the risks and flexibility associated with offshoring, to experiment with new business models, to develop new network configurations, and to transform knowledge from across diverse locations and fields of expertise in order to secure a competitive advantage is unlikely to abate. With the growing complexity of international production networks, being able to successfully

orchestrate such networks with only limited formal (contractual or ownership-derived) authority is likely to become of even greater importance for brand-owning MNEs, not less.

The findings of our study connect with and extend broader understandings bof orchestration in international production networks (Geletkanycz & Tepper, 2012). Many of the mechanisms of network orchestration we identify resonate, for example, with prior studies that capture the importance of partner selection and relational components (Kano, 2017; Nobeoka, Dyer, & Madhok, 2002; Paquin & Howard-Grenville, 2013; Wathne & Heide, 2000), of macroculture development and the sharing expertise, culture and systems across units (Greenwood et al., 2010; Jones et. al, 1997), and of carefully balancing knowledge is acquired, shared and appropriated (Buckley 2009a,b; Dhanaraj and Parkhe, 2006; Dyer & Nobeoka, 2000). However, our study also advances existing theoretical understandings in several ways.

The theoretical novelty in our research question relates to the *changing* hub status of a brand-owning MNE, accompanied by a *continuing* need to orchestrate international production networks but from a more peripheral position and with limited formal authority. That is, we sought to uncover how a brand-owning MNE could co-ordinate and safeguard exchanges across its international production network when formal (contractual or ownership) authority shifts to another member of the network who then becomes the 'network hub'. This differs significantly from recent theorizations of network orchestration in international business, where a single, stable and somewhat omnipotent orchestrator occupies a central position in the network (Buckley, 2009a,b; Buckley & Strange 2015; Kano 2017).

Our findings show how a brand-owning MNE can orchestrate from a peripheral position and with limited formal authority. Notably, we found that while mechanisms in the domain of *Network Architecture* were devised by senior executives, orchestration mechanisms in the domain of *Network Operations* were largely devised and carried out by operational managers onsite in foreign locations and in Norway. That is, actors at multiple organisational levels take on roles of network orchestration. These findings are in stark contrast to and challenge assumptions that it is the senior head office executives of the orchestrator who are responsible for deploying social mechanisms of network orchestration (e.g. Kano, 2017, p. 17), or that it is the HQ managers in the global factory who undertake network orchestration (Buckley, 2011). We also identified a temporal dimension to

network orchestration. Orchestration through 'network architecture' mechanisms shape the conditions for subsequent exchanges at the operational level. They therefore take on elevated importance *early* in an international production project because of the *anticipated shift* in formal authority and hub status post 'project making'. Our findings thus extend prior conceptualisations that largely ignore temporality.

Of course, in our study the central role of the network orchestrator in its *home*-location production network made it possible for it to accumulate the relational capital and experience needed for network orchestration in its newer business models, especially in relation to its stable network members. Its early and central role in the project-making phase in the series-production business models similarly enabled it to influence inclusion of desired network members (e.g. suppliers) and how exchanges were to unfold in specific projects. Initial conditions, history and business models inevitably shape possible strategies and futures, and we do not presume that an orchestrator without this prior accumulation of experience or relational capital, or with a very different business model can necessarily orchestrate from either a peripheral position or without formal authority.

Overall, our findings cast network orchestration as an evolving and ongoing set of actions, involving experimentation and re-combinations of resources and capabilities in an effort develop new and upgrade existing orchestration mechanisms. Inevitably, orchestration draws on diverse sources of power and influence as acknowledged elsewhere (Buckley, 2010), but how, when and by whom this power should be exercised is not always evident – even to the network orchestrators. Nor is there necessarily common understanding even within a single MNE of how best to orchestrate the international production network (cf. Andersson et al., 2007), or of the relative tensions and interdependencies between mechanisms. Hence, our study is not intended to provide a 'tool kit' of orchestration mechanisms that can simply be 'taken of the shelf' and 'plugged in'. The manner in which each mechanism of network orchestration that we identify is applied – individually and in concert – will inevitably vary across contexts, including different locations, industries, business models, and network members. Just as the organisational design most effective for offshoring activities is often unknowable in advance (Lampel & Bhalla, 2011; Larsen & Pedersen, 2014;

Manning 2014), knowledge of the most appropriate configurations of orchestration mechanisms is accumulated and developed over time.

Phenomenon-based research such as ours does not often lend itself to empirical generalisations (von Krogh et al., 2012): explanation is contingent and context forms an integral part of explanation. Nonetheless, we believe that our extensions to existing theorisations of network orchestration offer "principles that are portable" to an array of settings (Gioia et al., 2013, p.24) and can inform future theorisations and empirical research. Richly contextualised descriptions such as ours also foster "naturalistic generalisations" that draw on the prior experiences of the engaged reader to sense the covariations in phenomenon, contexts, issues and events (Stake, 1978, p. 6) – with implications for both theory and managerial practice.

6.1 Managerial implications

An enormous challenge for managers seeking to develop and deploy the various network orchestration mechanisms we have identified involves not only understanding each mechanism individually, but how they interact in the context of specific business models, relational histories and corporate capabilities, and diverse international location characteristics. That is, network orchestration needs to be understood within the 'system' in which it us used. As shown in our study, this understanding is ideally distributed and shared across organisational levels – top management at home or abroad who are principally concerned with network architecture, and those located in operational units. While adding complexity, variations in business models and locations increase the potential for learning (Eisenhardt & Martin, 2000) and may precipitate the development of creative solutions and new mechanisms for coordination and safeguarding exchanges. This implies the need to accumulate architectural network knowledge over time (Larsen & Pedersen, 2014) and to integrate it with diverse operational knowledge. Senior management, in particular, need a sensing and scanning capability (Teece, 2007) to recognise valuable orchestration mechanisms that are developed locally in offshore operations. How systematically network orchestrators throughout the organisation are able to then engage in knowledge transformation to create, apply and upgrade novel mechanisms of orchestration could well be a potential source of competitive advantage (Bertrand, 2011). In so doing, the challenge

may not only be in orchestrating exchanges with external partners across the international production network, but also within one's own organisation.

6.2 Limitations and future directions

With any study, there are limitation. Our study rests on insights from one case, and largely presents the (albeit varying) perspectives of those employed by the focal MNE. Research designs facilitating comparisons between orchestration in different contexts (e.g. locations, network composition, mega-projects, business models) and that includes the perspectives of more diverse network members would further enrich and extend our knowledge on network orchestration. Indeed, pursuing such 'multi-actor' research would complement perspectives of network orchestration as diffused and contested (Alfoldi et al., 2017; Andersson et al., 2007; Mudambi & Navarra, 2004) rather than a focus on a single, omnipotent orchestrator. Our data comes from individuals, and there are some indications that orchestration by 'the firm' is rooted in individual characteristics and behaviours. A micro-foundations perspective (Foss, 2011) could prove valuable for better taking into consideration individual-level heterogeneity when explaining firm-level actions and network orchestration. We encourage future studies to cater to include this perspective in seeking to understand the orchestration of international production networks.

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Table 1: Overview of Interviews

Position	**Year of interview**	**Gender**	**Joined company**	**Interviews**
VP Strategy	2012, 2013, 2014, 2014	Male	2007	4
HRM Manager	2013, 2014	Female	2006	2
Purchasing Manager	2014	Male	2010	1
Engineering Manager	2014	Male	2011	1
Design Manager	2014	Male	2000	1
Regional Manager Turkey	2012, 2013, 2014, 2014	Male	2009	4
Regional Manager China	2012, 2013, 2013, 2014	Male	2003	4
Regional Manager China	2014	Male	2012	1
Regional Manager China	2014	Male	2013	1
Project Manager	2014	Male	1998	1
Project Manager	2013	Male	2007	1
Project Manager	2014	Male	1995	1
Project Manager	2013	Male	2010	1
Project Manager	2013	Male	2000	1
Project Manager	2014	Male	2005	1
Yard Turkey	2013	Male	n.a	1
Yard Turkey	2013	Male	n.a	1
Total interviews				***27***

Table 2: Actions taken to minimize threats to trustworthiness

Threat	Actions Taken	Objective
Spurious relations & alternative explanations	• Generate and 'test' alternative explanations through thought trials and further data collection • Prolonged engagement in the field • Multiple interviews with the same respondent • Member checks through, e.g. presenting findings at workshops, respondent comments on case reports & manuscripts • Maximum variation sampling across business models, locations and over time, with constant comparisons; search for patterns and negative instances • Report discrepancies in the presentation of findings	• Identify previous premature theorizing; correct inaccuracies or misunderstandings • Rule out alternative explanations • Enhance credibility and trustworthiness
Researcher bias	• Multiple interviewers in each interview, where possible • Transcription & translation (as necessary) • Use Atlas.ti software for coding and causal network data displays • Separate persons performing interviews and analysis, with limited (but some essential) overlap • Check/ re-check coding over time	• Easy retrieval of data and verification by other researchers • Reduce salience of, for e.g., first impressions (in data collection & analysis); effect of researcher embeddedness; & skewing of analysis by fatigue or data overload in the field • Avoid unintended conceptual drift
Respondent bias	• Numerous and highly knowledgeable informants from multiple levels, functions and locations • Data triangulation, using multiple sources of 'evidence'	• Minimise unreliability of information from some sources • Ensure appropriate breadth of perspectives
Limits to transferablity	• Rich description and data displays (e.g. tables of data; in-text quotes) • Constant comparison of emergent concepts and theory with similar and conflicting literature • Comparison of findings with similar and contrasting literature	• Enhancing verisimilitude • Enable reader to transfer findings to other settings because of shared characteristics • Sharpen construct definitions

Sources: Alfoldi, et al., 2017; Eisenhardt, 1989; Gioia et al., 2013; Guba & Lincoln, 1994; Weick, 1989, 2007; Yin, 1994.

Figure 1: Data structure and analysis

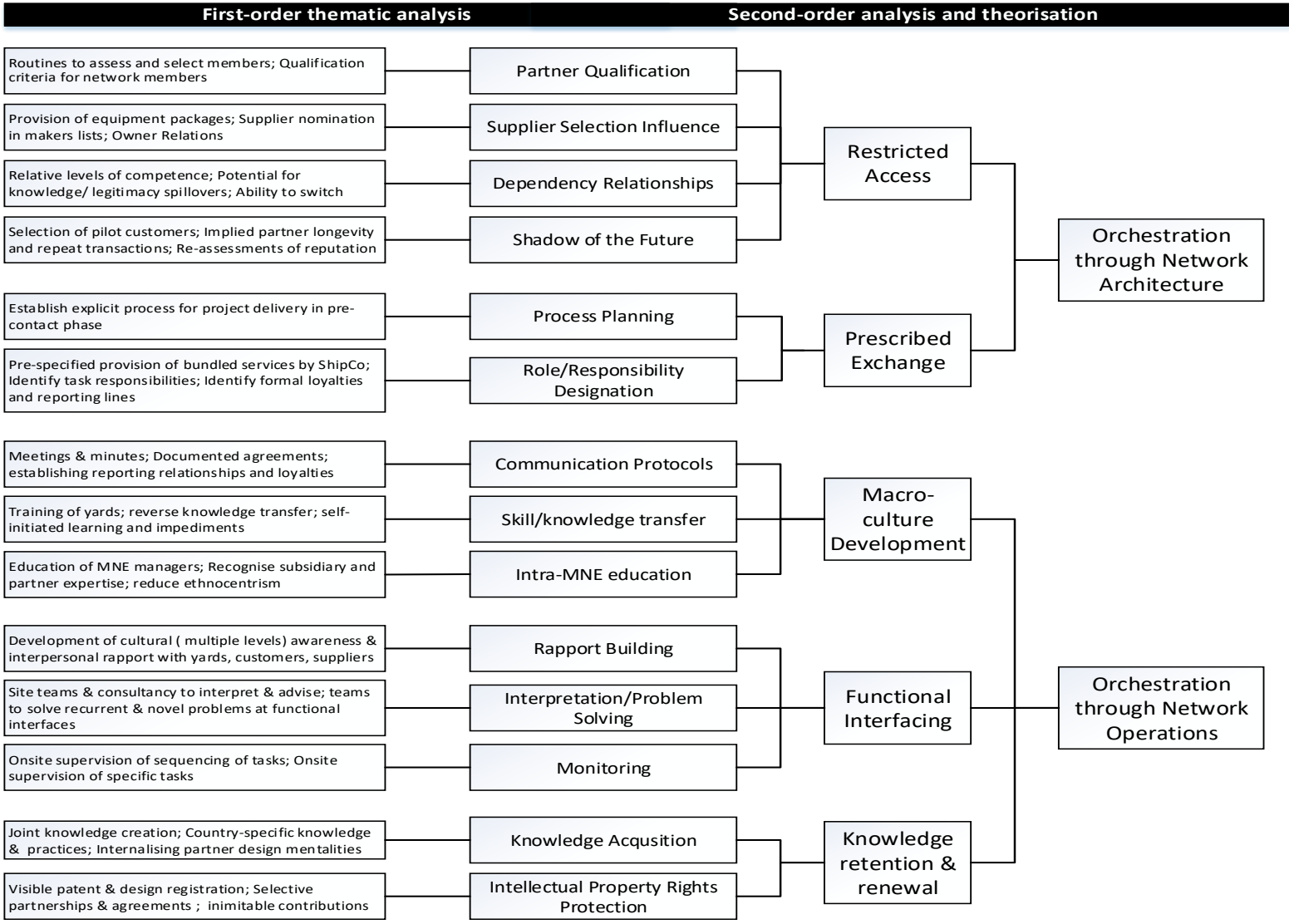

Figure 2: Temporal sequence and locus of responsibility for mechanisms of network orchestration

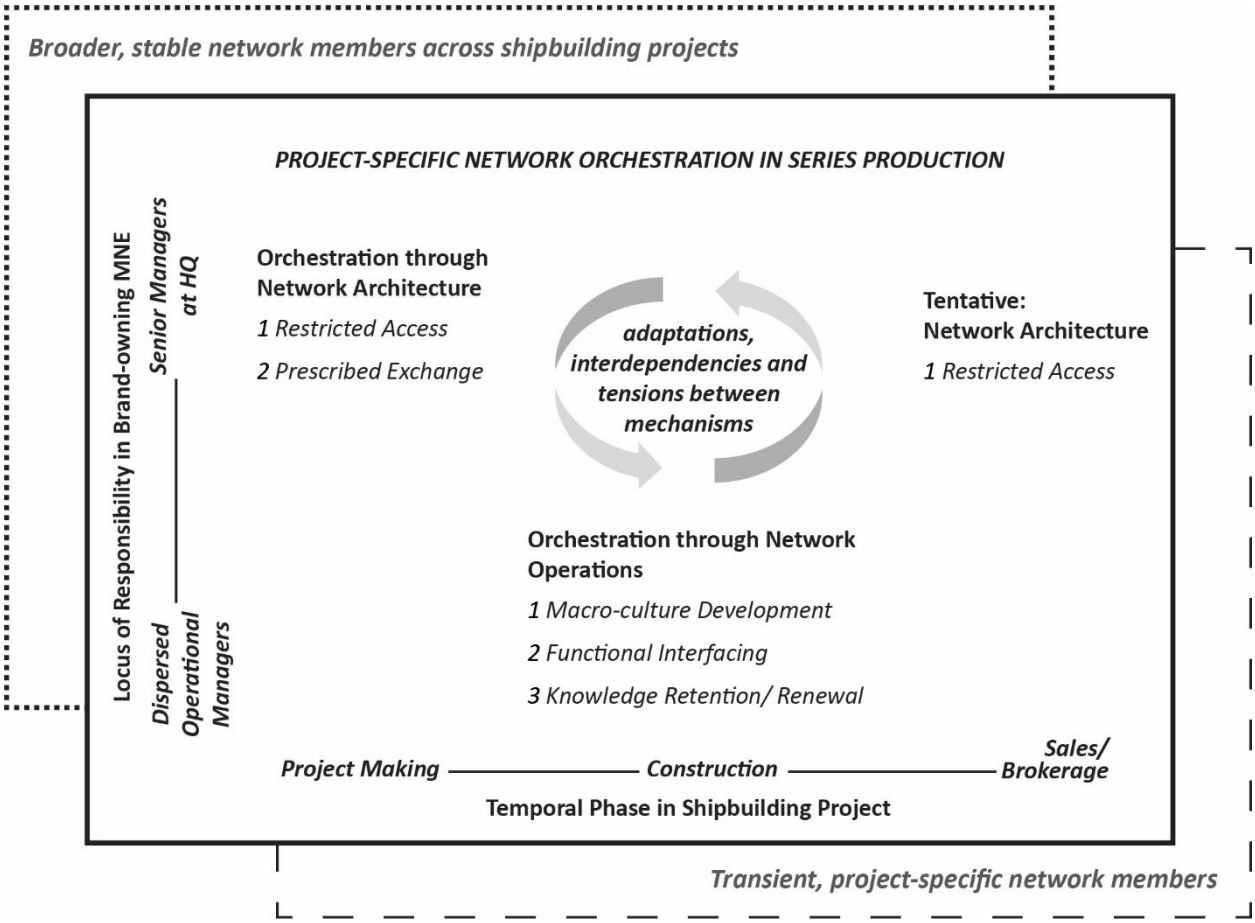

Table 3: Orchestration through Network Architecture

Restricted Access	
Partner Qualification "When we sell design, it has ShipCo's quality stamp on it, it is therefore important that the main suppliers are qualified (hold the right standard)" (Functional Manager Engineering) "In order to have fewer problems cooperating during the construction phase, it is crucial to settle things before the contract is concluded, during the construction phase it is too late. This makes a careful partner selection essential because this is the time where ShipCo can figure out if the yard has the capabilities and requirements to follow through with a project" (Project Manager) "The right yards have to be chosen, it is very resource demanding developing those relationship... [T]his is very different that in one-offs…. more transactional .... negotiating without caring about the future. So even within the same company we have very different strategies" (VP International Operations). "… It is important that the yard is able to see benefit and accepting these services and that requires an attitude that would be what we consider as Northern European… We have some systematic approaches that we develop. That is a systematic process for screening the management systems and management capability of a yard" (Regional Manager Turkey) "[A] criterion used was the saleability of the yard to ShipCo's clients which take the final decision to contract with the yard. This is an important criterion because after choosing the yard it is ShipCo's task to promote the yard to the owner" (Administrative Director). "The most important yard selection criterion is the management. A management that understands our strategy, and that they understand that they need to differentiate from the other yards, and as well as we can rely on long term (5 years at least)" (Regional Manager China). **Dependency Relationships** So we don't look for big yards. The more developed and integrated the less interesting for us. We look typically for small to medium sized yards, with not so well developed capabilities, because then we can also add our experience, to help them develop this vessel. " (VP International Operations) "The yards we work with, they are less complete. We a strong full-integrated competence because we have our own yard, and many years experience in all activities. This makes us more exclusive. … There are only a few actors who can offer the full package in the market …..Without us the yard has no chance, Without us the yard cannot manage to build these kinds of ships" (Regional Manager China) "Yes, the shipyards will we also replace from time and another. It is natural; their business interests will not always coincide with ours… Partnership means that you give away knowledge and competence" (Regional Manager, Turkey) "They have fantastic designs, such as the YShip. Building this would help us to open other doors, and we will be known for that." (Yard Manager, Turkey) "ShipCo knows the owners well through interacting over many years in Norway. This makes ShipCo attractive to the yards. Formally the yards have the relationship to the customers, but ShipCo also has some contact." (VP International Operations)	**Supplier Selection Influence** "ShipCo provides [the core equipment package] together with the design. And then, only the remainder of equipment purchases is done by the yard (30%/40%). But this is also within the framework of a makers list that normally gives some alternative. We are quite in control of it." (Regional Manager Turkey) "We control all supplies regarding the integration. This is the brains of the ship. The Chinese have tried to replace some suppliers, but have found this difficult. They can do things cheaply, but we will not renounce quality…..In China the supplier model is very different. They do not know how to handle our core suppliers" (Regional Manager China) "In China they do not have the advanced equipment that we produce here. They may get it some time, but it will take time. There is a strong culture here (in Norway), you need to know how to behave towards the suppliers, then you will gain high trust" (Functional Manager Design, Norway) "In the design phase we have to enter discussions with suppliers of key equipment and see if they can develop new solutions together with us. It is interesting to see how much work they put into these development projects that they are not rewarded for." (HQ Design manager) "A problem for us is size, if some of our larger competitors call, suppliers jump faster. We do not want to be larger. The network model makes us more attractive to customers. Our relation to suppliers depend on how well we are liked by our customers. Then we become interesting partners." (VP International Operations) "We bring strategic suppliers into the project. These supply the main parts of the ship, such as engine, propellers etc. We know these suppliers very well, they are here in Norway and we have worked with them for years". (Regional Manager China) **Shadow of the Future** "It is important to be able to offer a volume which meets the capacities of the yard in order to keep the yard satisfied and interested." (VP International Operations). "We want to have strategic partners now in the development stage that may offer more than just being a customer. We will use them for something more, and since they are a broker, it also means that they do not want to compromise or develop a boat that will be a [boat specific to them], because they know as brokers that they will not be able to sell the boat to others." (Regional Manager Turkey) "Becoming promoters of the yard and that is how we also make us attractive to the yards. When ShipCo is involved, we have that influence and we become in reality a marketing channel for the yard." (Regional Manager, Turkey)

Prescribed Exchange	
Process Planning "It is always a key when you are building a vessel that you have the correct points and documentation and that you are able to plan the project in details, so you don't end up in firefighting and just solving problems day by day. That you can easily see when observing the operations at the yard. Whether they are building it in the right sequences and so on (Regional Manager China) "Pre-contract it is important to make a) Overall plan b) building plan, c) Drawings and technology d) Purchasing plan e) tight commercial plan then signer all documents." (Functional Manager Engineering) "[In China we had problems of sequencing the work because] they [the yard] ordered equipment far too early. They store it but badly. Things start rusting. They don't know about just in time." (Project Manager 1)	**Role and responsibility designation** "How secure are we that all processes are taken care of by the responsible person? We can provide site-support and make recommendations, but we should never take responsibility, this is the risk of the owner. We are not, however, always clear on the interfaces. The customers think that they buy an ShipCo design. They should get an ShipCo quality project." (Functional Manager Design) "We make the prerequisite that the yard enters into an agreement with ShipCo not only for design and equipment but also for management support and supervision…hired to assist in terms of the project, to identify problems, to coordinate, finding solutions and let's say supervise that the yard they work the way they are supposed to work and the way they claim that they do". (Regional Manager Turkey)

Table 4: Orchestration through Network Operations

Macro-culture Development		
Communication Protocols "The typical ShipCo culture has relative limited documentation." (Senior Manager HRM manager) "In the project we have weekly meetings, with the project assistant managers on video conference. Then we have face-to-face meeting when needed. For the meetings with the yard, we have monthly meetings. In very hectic periods we may meet more often... In China they need more and more detailed drawings, many more details..." (Project Manager 4) "And also coordination meetings, depending on the complexity how often it would take part, but like now we have every fourth or sixth weeks in this project ... All parts should attend." (Project Manager)	**Skill/ knowledge transfer** "It is easier if you have people of the same mentality [regardless of] having different nationalities." (Project Manager) "Keep in mind that we have this ShipCo shipyard in Norway. That is more like a laboratory, or is more like a show stage, so that we bring - There's a lot of [the Chinese yard's] production people, they visit ShipCo's shipyard, visit on board to see how the finish is that the owner is expecting." (Functional Manager, Design) "Maybe if you keep the same management you will improve. But if they go you have to start all over again. The management takes the guys with them. We had 4-5 changes in management over 3, 5 years. Actually even sub suppliers left." (Project Manager)	**Intra-MNE education** We have now spent quite a lot of time documenting our project model, and outlined appropriate attitudes, but we need to follow this if it shall work" (Senior HRM manager) "There is a cultural and organizational transformation in going from customized to standardized. We simply cannot do it from Norway because cost and the willingness to cut cost is not there" (Regional Manager Turkey) "It is extremely important that we have a mix of top education with experience. We can manage experience, due to our location and tradition. The challenge is getting enough strategic competence to come and stay, and to get their voice through the organization […but] the organizational culture is strong…. I think we cannot only depend on HQ to develop critical competence, we need to build capabilities closer to the market, and away from HQ. Academic competence is actually stronger in our foreign locations" (Regional Manager Turkey)
Functional Interfacing		
Interpretation & Problem-solving Offshore vessels – that is more complex vessels, where Chinese have no experience, where we can go in a guide the yard through the building process and take a bigger role based	**Rapport** "Finally they understood that they had to hire a local project manager. Everyone that has been working internationally knows that you need to be present. Having a project manager in	**Monitoring** "ShipCo design delivers some of the equipment. At the warehouse or in our office, we have one girl who takes care of the delivery. She takes snapshots and opens the boxes when the stuff arrived at

on our experience in Norway (through offering site teams) (Regional Manager China) "If you sit down with them and go through it, they will do it. But it doesn't work if you just send it to them. Just email 'Do it', nothing happens. You have to work together with them." (Project Manager) "I was a senior advisor (on a site team in China), but I did not have any power. In the same role in Norway, I would have had power. If they do not want to listen, they do not need to listen." (Project Manager) "We have had several different experiences. In Spain we had no supervisors, which we should have had. In Brazil, they have a very different way of working. ShipCo looked at who is capable of what within the different yards… Some said they had the management, but few have that capability in Brazil." (Project Manager)	Norway – I call them pencil movers. That is the weakness of doing business somewhere else in the world…. In Norway, all actors speak the same language, even the same dialect, the importance of this should not be understated." (Project Manager) "A new guy has to understand the Turkish Mentality. Being together with them and understand the mindset. It is crucial to understand the mentality. Otherwise you stop before you start. In China it takes a long time….Trust is a very long process…. If they trust you, you are in." (Project manager)	the warehouse. She is employed by ShipCo to take care of the logistics". (Project Manager) "In the Yard they have no clean system for storage of supplies. We therefore have to document that if something is ruined, it is their fault, not ours." (Regional Manager China) "In the meetings with the Yard I have volunteered to keep minutes of meetings. This is to document what we agreed on and what we expect to be done next." (Project Manager)

Knowledge Retention and Renewal

Knowledge acquisition & recombination "The industry is developing rapidly. There are changing demands regarding safety and environment. Then they are exploring deep sea waters, then you need new equipment. This is not container shipping where the development is marginal. I do not these new demands will stop any time soon. Maybe we even are in the initial phase. The need for capabilities to innovate and integrate will be required." (Regional Manager China) "[At home at HQ in Norway] I think that we have forgotten to take into account whether the customer really wants this, or if he cares more for cost. It is necessary for us to build abroad to get access to a low-cost frame of mind. We do not have that at home." (Regional Manager Turkey) "Having a yard gives us an advantage, but then we need to use this advantage to promote collaboration. This includes sharing knowledge." (Regional Manager Turkey) "It is very difficult to distribute our design activities to several locations. History has shown that we have not succeeded. The knowledge sits in the walls here, and is based on our broad experience." (Functional Manager Design)	**Intellectual property rights protection** "We patent many designs, but we do not patent all, in fact we cannot. We have hire a lot of IPR lawyers who come here every month, and exploit trademarks, copyrights etc., patents on forms and the physics behind a solution. We try to protect, the most important means is the patent." (VP International Operations) "To avoid to be put aside and be substitute or marginalized we need to bring in something unique that we cannot be substituted. That makes the cooperation to sustain better. That is somehow a prerequisite to this partner yard setup." (Regional Manager Turkey) "It has happened that the Chinese has taken the design and built their own ships after they have done it a couple of times. They have market their product with pictures of the actual ships from ShipCo with information from the latter and other international companies. You have to be aware of that when you go to China, if not, you have to find another place to go." (Project Manager)