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Organizing for Spaces and Dynamics of Multipolar Learning in Multinational Corporations

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Peer Hull Kristensen & Maja Lotz

Abstract: Limited research has been conducted on how MNCs organize conditions and spaces for recursive learning to facilitate the practice of innovation across dispersed units as well as how organizational members at all levels may become involved in innovations through the engagement in ongoing multipolar learning dynamics. Based on longitudinal case studies in two MNCs this paper contributes with insights into how spaces and dynamics of multipolar learning are organized and governed across dispersed MNC units at the micro level of everyday work practices. The paper shows that it is possible to organize spaces and dynamics that can organize recursiveness and continuity in multipolar learning by way of experimentation with new coordination components and governance architectures. Against the previous literature, however, it becomes evident that these are not the outcome of spontaneous interactions in a tacit community of practices that operate on an ad hoc basis parallel to the formal organization. The spaces and dynamics must become a body in their own right, with a set of recursive steps or routines that produce distinct types of results. The system of multipolar learning itself must become formalized, yet autonomous and oriented toward a long-term continuous perspective in contrast to traditional hierarchical models.

Key words: multipolar learning, multinationals, organizing, recursive routines and experimental governance

Introduction

Research suggests that MNCs' competitive advantage increasingly derives not from traditional hierarchical models of multinational organization (e.g. Vernon, 1966; Egelhoff, 1991), but rather from their potential to innovate in lateral collaborative networks by transferring, sharing, and re-combining knowledge that was previously compartmentalized around the world (Ghoshal et al., 1994; Nobel & Birkinshaw, 1998; Doz et al., 2003; Singh, 2005). Yet, limited research has been conducted on how MNCs create and organize conditions for joint learning to facilitate the practice of such innovation across dispersed units. Scholarship on knowledge transfer and global innovation networks (Bartlett & Ghoshal, 1990; Chesborough, 2003, 2007 describes the potentially enormous gains of knowledge sharing (Foss & Pedersen, 2004;

Foss, 2006) as well as the numerous barriers to creating, transmitting, integrating, and deploying innovation in MNC knowledge-sharing networks (Kogut & Zander, 1993; Belangér et al, 1999; Gupta & Govindarajan, 2000; Grandori & Kogut, 2002). Literature also emphasizes that collaborative activities among individuals, teams, and units are crucial for MNCs' innovative capabilities (Persaud, 2005) because they magnify the ability to accumulate knowledge and co-create new innovations through interactive learning (Lundvall, 1992; Lundvall et al., 2009; Prahalad, 2008). Accordingly, studies show how MNCs are redefining their roles (Herrigel, 2007; Barlett and Ghoshal, 1989), making organizational structures (Hedlund, 1994; Lord and Ranft, 2000) and governance practices (Ghoshal & Barlett, 1990; Kristensen & Zeitlin, 2005; Whitley, 2001) more horizontal, and facilitating collaborative co-practices of innovative learning (Frost & Zhou, 2005; Ghoshal et al., 1994). To date, however, we have a limited understanding of how such distributed innovative practices can become collaborative across various organizational and institutional contexts or of how organizational members at all levels may become involved in innovations. Studies that have addressed the mechanisms and management of distributed innovation (e.g., Frost & Zhou, 2005; Singh, 2005), as well as the paradox that inducements for innovative activity often also become barriers to collaboration and sharing (Foss, 2006; Chesborough, 2003), typically consider only the aggregated firm level, the role of management (Bartlett & Ghoshal, 1989), or of R&D based innovative forms (e.g. patent citation evidence (Rosenkopf & Almeida, 2003), competence-exploiting (Cantwell, 1995; Cantwell & Zhang, 2009) or firm external innovative search strategies (Laursen & Salter, 2006)). These studies contribute important insights into the gains and barriers to making innovation global within MNCs, but we lack micro-founded explanations of how the organizational space that offers mechanisms for ongoing collaborative learning should look, the multipolar dynamics such spaces may give rise to, and how problems of distributed innovation across dispersed units embedded in different contexts are solved (Foss & Pedersen, 2004). This paper contributes to the literature on innovation and knowledge in MNCs by applying insights from social learning theory and organizational studies to cultivate our understanding of how spaces and dynamics of multipolar learning are organized and governed across dispersed MNC units at the micro level of everyday work.

We define multipolar learning as the ability to share knowledge and make inquiries effectively via social practices that are distributed across multiple and polarized organizational, temporal, geographic, political, and cultural boundaries. This concept draws on social learning theory, which understands learning (and knowing) as both the process and result of participation and engagement in social practices (Brown & Duiguid, 1991; Wenger, 1998; Gherardhi, 2000; Orlikowski, 2002; Easter Smith, 2011; Elkjær & Brandi, 2011). It seeks, however, to overcome three limitations or "blind spots" identified within social learning theory related to the concept of communities of practice (Lave & Wenger, 1991, Wenger, 2000). These blind spots are a bias in favor of socialization, harmony, and proximity as key ingredients of learning. Our argument is not that these three ingredients do not matter, but rather that these biases blind us to the ways in which other categories, such as inquiry, conflict, and distance, may have equal relevance for understanding current (and future) learning relations (including their barriers and dynamics) within global work contexts. Within this view, innovation (e.g., the generation and implementation of new ideas, procedures, or work routines) is understood as a collective act that depends upon knowledge sharing and learning in (distributed) social practices (Berends et al., 2003; Hargadon & Bechky, 2006; Rennstam & Ashcraft, 2013).

The challenge of organizing for multipolar learning in MNCs

It is a classical tenet in organization theory that different groupings, departments, and hierarchical levels hoard knowledge to protect themselves and to keep possible organizational opponents in a state of uncertainty (Crozier, 1964; Crozier & Friedberg, 1980), a phenomenon that has been re-observed recently, even in the context of national business systems, and even in Danish businesses, which have notoriously been known for their flat hierarchies and decentralization of autonomy (Michailova & Minbaeva, 2012: 67). The creation of a multipolar learning, coordination, and governance system thus seems likely always to be introduced into an organizational framework in which mutual games of positioning and struggles for power, and the construction of idiosyncratic narratives and phantom communities (Athens, 2007; Kristensen, 2015), take place simultaneously—to a larger or minor extent. Recent research on multinationals (Dörenbacher & Geppert, 2011; Kristensen & Zeitlin, 2005 Birkinshaw, 2001; Birkinshaw & Hood, 1998) shows that they are ripe with all kinds of opportunistic, if not subversive, micro-political games at different levels and among subsidiaries in different countries. As pointed out by Kristensen and Zeitlin (2005), these games are, on the one hand, an important stimulus for local innovative activities, but as they are also used simultaneously to improve the mandate of different levels or subsidiaries, innovative activities are typically introduced as a part of opportunistic strategic games that are played out tacitly and only become visible *post festum*.

To engineer an organizational setting that promotes knowledge sharing and recursive learning is, therefore, neither easy nor effectively sustained by normal tools based on extrinsic rewards (Bock et al., 2005: 98):

Contrary to commonly accepted practices associated with knowledge management initiatives, a felt need for extrinsic rewards may very well hinder—rather than promote—the development of favorable attitudes toward knowledge sharing.

Instead, it seems as if an organization has to undergo what might, in many cases, be a cultural revolution. Bock, et al. (2005: 101), state that knowledge sharing entrepreneurs should: First, emphasize efforts to nurture the targeted social relationships and interpersonal interactions of employees before launching knowledge sharing initiatives. In particular fostering a work context characterized by high levels of organizational citizenship is likely to nurture the mutual social exchange relationships that are apparently important in driving knowledge sharing intentions. Second, actively support the formations and maturation of robust referent communities within the workplace. In particular, be sure to provide appropriate feedback to employees engaged in (or not engaged in) knowledge sharing.

A number of authors have argued that in order to achieve knowledge sharing and recursive learning, multiunit organizations should build on the interactive communication that is already present within "communities of practices" (Wenger, 1998, 2000) or "multidisciplinary teams" that are populating organizations (Oborn & Dawson, 2010; Herrigel, 2014). Knowledge sharing is, therefore, in many respects, a question of turning tacit into codified knowledge that can be processed as information so that informal communities of practices may become visible and able to communicate and engage in mutual learning across organizational units. However, codifying tacit knowledge and formalizing informal networks may cause new formal group constellations and divides to emerge that, in turn, make it more difficult to integrate, coordinate, and learn across diverse communities of practice than it was previously, when the informal groups did not see individuals of alien communities as potential threats in the internal struggle over organizational resources and positions. Thus, it has been suggested that multinationals, instead of building in an organic way, based on informal groups hosting tacit knowledge and an up to date knowledge sharing system, tend to build knowledge sharing systems that simply reflect their current contingencies. Global MNCs with high degrees of global integration and low local responsiveness typically have created hierarchical systems in which staff at headquarters act as senders, while staff at subsidiaries act as receivers, of knowledge. Multidomestic MNCs with low global integration and high local responsiveness should create best practice systems by sharing knowledge between subsidiaries through social learning. Finally, transnational MNCs with a high degree of global integration and high local responsiveness create self-organizing learning, from the bottom up, especially by recycling knowledge gained in previous projects, according to Kasper et al. (2012).

Though Kasper et al. (ibid.), at first glance, seem to have solved the problem of how to integrate organizational structure with knowledge sharing forms, their solution, on closer inspection, is, in fact, not a solution. Tsai (2002) has found that multiunit competition within MNCs makes it very difficult, if not impossible, to organize knowledge sharing among units in such organizational forms as multidomestic and transnational companies have, whereas it is much easier to create bonds of knowledge sharing among firms that are competing over the same market, probably because opposing communities of practices at the market sphere are much more similar to each other than those opposing each other within the MNC (Kristensen, 2015), and because firms competing over the same market not only compete for market shares but also engage in political maneuvering over mandates, positions, and resources within the headquarters of the MNC.

The outcome is that there is not a single solution, but that it seems as if current practices produce very different solutions in different industries. Thus, Kasper et al., studying several industries, found (Kristensen, 2015: 7ff) that while high tech firms that offer a standardized product were able to centralize knowledge and diffuse it down the hierarchy to other subsidiaries as they chose, companies within industrial materials that had been constructed by mergers combined a formal system, benchmarking best practices based on the financial performance of subsidiaries, with a personalized transfer of best practices in process technology promoted through the formation of networks. The latter cases (noted in Kasper et al.'s citation of subsidiary responses) produce the same games reported by Kristensen and Zeitlin (2005). These opportunistic games make disclosure of information very selective, as hiding substantial knowledge may provide a subsidiary with a competitive edge compared with other subsidiaries from the same MNC. Kasper et al.'s most complex cases, management consultancies, had to be very local in their orientation but tried to integrate by setting up IT systems and forming communities of practices:

> Yet at both companies, for all the formal efforts at promoting the sharing of technical knowledge (through IT-systems) and personal knowledge (through organized communities of practice), interviewees consistently considered knowledge to flow more through informal channels.….In sum, management encouraged knowledge sharing in official ways, yet in practice these MNCs relied on decentralized, "self-organizing" behavior to share knowledge. (Kasper et al., 2012)

Thus, despite growing interest in knowledge sharing in the scholarly community of international business in recent years, it has not been easy to come up with cases that demonstrate how and under what conditions learning can be organized as a multipolar system, in which there is mutual interaction between units and no central apex from which learning and innovation takes place. Given that nearly all industries and organizations are evolving in the direction of becoming similar to management consultancies (organizations internally are decomposed into teams that constitute complex communities (Kristensen & Lotz, 2011) and operate in a world of highly different contexts), local adaptation provides not only a source, but also a need, for creating spaces in which learning can accumulate through a continuous process (Sabel, 2006).

How will organizational spaces that offer the opportunity to organize continuity in multipolar learning look? How will they be ordered, if not solely by hierarchical principles? Will they be able to overcome some of the opportunistic games that all complex organizations struggle with? And is it possible to imagine an evolutionary process in which multipolar systems become increasingly important as organizing devices as organizations evolve?

Searching for generic solutions to co-development and multipolar learning among advanced forms of MNCs: Approach and methodology

As we were searching for answers to such questions, we came into contact with two Danish MNCs engaging in an experimental search for solutions to similar organizational problems, as they both had subsidiaries in numerous countries. Pharco, a pharmaceutical MNC, was, in particular, interested in implementing best practices in production across subsidiaries and organizing continuous improvement on a global scale. Fem, a flow equipment MNC, having established subsidiaries and R&D departments in numerous countries, was searching for ways to organize global collaboration in innovative projects quickly and cost-effectively.

In the past, both companies had decentralized competencies to operative levels and had gained the benefits of continuous improvements through team-based work practices and employee involvement, only to discover that they risked developing diverse local practices across sites.

For Pharco, the problem of being unable to capitalize on best practices across sites was greatly reducing efficiency, and was also highly risky, because a failure in one of Pharco's subsidiary's production procedures could harm the reputation of the whole company. Consequently, the challenge was to institutionalize a system so that potential problems in production could be diagnosed, best practices could be identified and shared between sites, and a new level of codified practices could be constituted, based on which monitored improvements could happen on a wide basis among subsidiaries. During fieldwork, we observed the introduction of three organizational components: 1) an organizational form of global communities of practice, 2) a cookbook representing a common set of guidelines, and 3) a set of explicit governance procedures giving rise to multipolar learning dynamics. Informed by this empirical landscape, this paper illustrates how organization members experiment with such new organizational forms and governance procedures to facilitate learning and co-creation across localities.

For Fem, the problem was different. Operating with an assembly of dispersed R&D departments that belong to highly different technical cultures, the challenge has been to nurture multipolar learning dynamics that help all departments search for technical solutions that live up to common standards of quality, energy efficiency, use of best practices, and design process pieces/modules. This includes the additional challenge of developing a common language in which to frame the scope of each project, a way to make use of former best practices and solutions, and a way to measure and define targets of progress.

The case studies were conducted from 2011 through 2014 by a team of two researchers in an attempt to understand how organization members learn and co-create through co-located, harmonious relationships and everyday interactions in distributed and sometimes contested organizational settings of MNCs. Drawing on ethnographic methods, research focused on what people actually do, how they collaborate and compete, how they connect (and disconnect), how they share knowledge and learn, and how they manage and coordinate their work within and across geographically dispersed settings (Van Maanen, 1988, 2011). To achieve this, research triangulated between three different data sources: talk, observation, and documents (Stake, 1998), including four to seven day long site visits in four of Pharco's plants and in Fem's Danish and Chinese plants, interviews, participation in meetings, and participant observation. In this way, we have tried to access a global phenomenon: multipolar learning dynamics across multiple sites (Jarzabkowski et al., 2015). At Pharco, we focused on the development of global training standards, formal and informal interviewing of community members in the training group as well as other stakeholders, observation and shadowing of HR managers and other staff from different production sites involved in global training work, company documents, and other secondary data (Spradley, 1979; Fetterman, 1989). At Fem, we focused on how the Danish R&D manager interacted and communicated with Chinese R&D employees in meetings, how assessment of technical progress was constructed, how R&D managers in Denmark experimented with new organizational solutions to problems of effective collaboration, and interviews with "stream-leaders" responsible for practicing new procedures and governance.

Pharco: the Pharmaceutical Multinational

For Pharco, the challenge was to institutionalize a procedure so that potential problems in production could be diagnosed, best practices could be established and diffused, and a new level of codified practices could be created, based on which monitored improvements could happen on a wide basis among subsidiaries. The focus was on monitoring production and securing a risk-minimizing, disciplined form of innovation and continuous improvement in all plants. Consequently, in 2008, the company started standardizing its work operations in all production areas. The plan was to build the standards on existing best practices and to develop one global standardization approach to ensure the integration and further development of best practices for its operations across plants. The company began in one operational area and then rolled out the standardization approach to other areas (now involving 4,000 employees). During the first phase of the process, many people were involved in developing and applying standards, and many best practices, insights, tools and templates were generated from this work, which was captured, documented, and described in a “cookbook” to ensure a common approach to ongoing and future standardization projects. The cookbook is continuously updated and functions as a forum for dialogue and interactive learning in regard to the identification and alignment of best practices across projects and sites. It serves as a “living document,” providing the supporting guidelines, tools, and templates needed to facilitate the co-development and continuous improvements of the standards. As part of this standardization process, the company developed an organizational architecture of “global communities of practices,” which made it possible for people from different plants to work jointly with the standardization projects to co-develop systems and feedback mechanisms to ensure continuous improvement. The global communities typically consist of a mix of 15 to 20 engineers, operators, technicians, and specialists working within a specific area of expertise/operations. The persons responsible for driving the standardization process in a global community include one project director, one global project manager, one site project manager, workshop facilitators, and various other staff members working in specific operational or support management roles (which often shift between group members). Each community holds bi-weekly webcam meetings and meets regularly in workshops. The institutionalization of these global communities of practice, based on a structure of recurrent face-to-face workshops and virtual meetings, offers a central arena for diagnostic search, mutual knowledge sharing, and interactive learning across different areas of expertise and sites.

The procedures the company has installed to support the standardization process and co-development of continuous improvements are highly inspired by lean principles and Toyota practices. They consist of a seven-step cycle, also called “the improvement wheel”:

1. Find problems early: have a system that detects and registers errors, near accidents and failures early.
2. Solve problems at their root cause: have procedures for conducting root-cause analysis that can diagnose where problems are located, and what their cause and composition is.
3. Develop a better practice: have procedures for developing better practices to eliminate these problems and their causes.
4. Document and store standard operating procedures (SOP): solutions are codified in the form of standard operating procedures and are stored in a cookbook of best practices for the company.
5. Train to ensure compliance: a scheme for systematic training of operatives in the new standard operating procedures and best practices is followed and improved.
6. Share learning systematically: diffusion of the new codified best practices to similar or related activities.
7. Finally, put into place a method for calibrating the early warning system to the new best practices so it is able to better detect and register errors.

Embedding these procedures within an organizational architecture of global communities of practice prevents a company's system of standards from becoming fixed and determined by one central apex. Instead, the system is continuously co-developed, revised, and refined in a diagnostic dialogue among multiple communities that cuts across different domains of expertise and geographical boundaries, and is governed by new roles of shared leadership that can move horizontally as well as vertically (i.e. through more polyarchic management principles). Hence, we argue that the company's standardization approach can be seen as a multipolar learning system. This multipolar learning system:

1. Provides an infrastructure within which to integrate best practices and co-develop standardized practices across sites to improve stability and quality.
2. Serves as a "catalyzer" to identify problems and differences across sites, confronting them and using them productively.

3. Works as an arena for knowledge sharing/creation—e.g. of tacit knowledge, best practices, tools, and templates.
4. Offers a space for recursive learning processes informed by everyday operations and improvements.
5. Provides a framework for anchoring future improvements.
6. Serves as the platform for the development of distributed and crisscrossing management roles and responsibilities through horizontal and vertical governance structures.

As an example, the development and continuous improvement of the company's global standardized training system embodies many of the above dynamics. In 2010, Pharco initiated a project focused on developing a global training system based on the global communities of practice. Similar to the standardization of work operations, the global training project has been rolled out to cover more and more areas to ensure flow and stability in production as well as productivity improvements (this work is still ongoing).

Stakeholders/representatives from different plants meet regularly to discuss and co-develop training activities, in order to create a common training practice in accordance with the latest updated standards. The global training community is governed by a set of management roles consisting of a project director, a global training partner, local site training partners, shop floor trainers, and various other more temporary support staff who help to drive the process (e.g. operators, technicians, specialists, and so on). The community is responsible for developing standardized training practices and training materials, identifying problems and differences across sites, sharing knowledge about best practices, and searching for joint solutions. Moreover, the community is also responsible for updating the training standards as needed. For example, observations of training operations and checks on whether the codification of best practices are understandable may lead to improvements in best practices, and to revision of the cookbook and of the training scheme itself. When the cycle of learning has been finished, a new level of best practices has been established, and the community must assess whether a suggested improvement should be adopted and implanted by, in principle, evoking a new circular flow of learning.

In this way, the training system is closely linked to the company's standardization and continuous improvement approach. The global training partner words it as follows: "Whenever we make a training initiative, we need to be able to link this specific initiative to the big picture, to the overall strategy—The improvement wheel." Connecting the global training system to the overall continuous improvement strategy not only entails that training is one of the seven procedures in the cycle, but also implies that the training practices themselves are driven and governed by the seven-step-cycle.
For instance, because Pharco is an MNC with similar plants in a number of countries and had previously decentralized competencies to operatives, the more trained those operatives were, the more existing practices, in the main, had been concealed from the staff who became responsible for implementing the seven-step-cycle. Prioritizing such problems led to errors or near failures in some plants; the MNC could diagnose problems and search for solutions via its global communities of practice set-up, collecting operatives from relevant operations across plants from different countries to participate in workshops in order to discuss why some problems occurred in some plants and not others, and to use these explanations to suggest tentative solutions.

However, before the standardized training system was initiated in each individual plant, the global training group would gather trainers and representative operatives together to discuss how solutions had been codified into standard operating procedures and whether these procedures could be taught in different national environments and made sense within the divergent practices previously in place in different countries. In this way, nearly each step in the cycle itself becomes a participatory process of critical reflection and continuous improvement within the larger overall cycle of large scale continuous improvement.

Pharco sees the unfolding of these cycles as an evolution from being a "firefighting culture" to "creating an army of scientists," working systematically to improve and innovate on top of best practices—in every field and at every level. In its internal material, Pharco describes what it takes to create an army of scientists: (1) employees must take responsibility for their own development in relation to the competence matrix; (2) employees must contribute to the continuous improvement of training; and (3) the trainer must drive the continuous update of training materials and contribute to updates of standard operating procedures. The interaction between different groupings of employees in the organization takes on a new form of systematic enquiry: (A) challenger meetings focus on improving action proposals to prevent problems from re-occurring, (B) leaders on a daily basis use problems as an opportunity to train direct reports, (C) process confirmation is perceived as training by reports, and (D) leaders train employees in how to free up time to solve problems.

Working in the global community creates unexpected opportunities for members to meet and engage in collective inquiry, and to identify problems and solutions by recombining knowledge to come up with ideas about improved training effectiveness that no one could have generated, working alone. A few empirical vignettes may illustrate the places and moments of such multipolar learning encounters.

Training Material Workshop – DK, August 2011

The training partners are organizing a five day workshop in the GCP focused on the development of training materials that can be used as standard documents to guide training in local production areas. Thirty-three operators, technicians, and trainers are gathered from the different sites to co-create job training plans (JTP) for a filling line. A JTP is used by trainers to train new operators in a specific task on the line. On the third day of the workshop, people have been split into five groups, each working on the development of a JTP for a particular area on the filling line (e.g. the assembly offload station, closing station, outlet wheels, and piston station). In the group working on the piston station, two operators, two technicians, and two certified trainers discuss what exact information is necessary to train new operators to be able to perform the tasks at the station. Trainers ask questions while one operator demonstrates how to perform the tasks: “How do you know that this is the exact thing that needs to be done? What do you have to be careful with here? How would you know if you were not trained in this task?” Often the operators and technicians engage in discussions about differences and similarities in how they normally would run the piston station in their respective localities as they try to agree on a common training procedure. Such collective inquiry is a typical start. During the rest of the day the group develops the JTP by articulating, re-combining, and documenting their local experiences and tacit knowledge about their work: First, they observe as the trained operators perform the task several times. Second, they split the process into small steps and write descriptions of how the training should be conducted at each step. Third, they talk about the wording of the description and make adjustments. Fourth, one operator and a trainer test the JTP to see if anything is missing. Fifth, they ask a trainer and an operator from one of the other groups to test the JTP and comment on it.

Site visit: Implementation and assessment of a training maturity model—US, April 2012

The global community has developed training standards and modules that have been implemented locally. The next step is to develop assessment tools to ensure alignment and continuous improvement of training activities. As a training partner explains: “We need to create measurements that show the impact and thus the value of our training system.” Building on a lean project, the training group has developed a maturity model and set of indicators to measure the level of standardized practices. Local-site people who have invested a lot of resources in the training activities are anxious that the assessment may rank them lower than other sites. They wonder, who will do the assessment? How will transparency and reliability be ensured? How will good qualitative indicators be developed? How will a root cause analysis that explains the assessment results be enabled? These are typical questions of concern. To answer them, the global training partner visits each site to inform about and gather ideas for the assessment. Visiting the US site, she tells the local training team: “My role is to bring in experiences from the other sites—your role is to find a way to drive the process that works best for you. We have created an overall frame together that is not final. Within this frame you should decide how you would like to measure and manage the training at your site going forward.” The team then gathers material (interview guides, PowerPoint presentations, etc.) and experiences from other sites and uses this to co-create their own approach to the assessment and make it useful for mapping future training needs. The outcome of this work is documented and shared with other sites at later meetings and workshops.

Global training partner workshop—Alignment and preparation of the assessment of training at local sites—DK, March 2013

Each site has done a pilot project, mapping its training system using a maturity model as the common assessment standard. Because training activities had been organized and implemented in different ways among sites, the particular operation area being assessed is chosen locally. Although not directly comparable, the announcement of assessment scores creates serious tensions across sites, but also a stronger managerial awareness and focus on the importance of cultivating an effective training system locally. This pilot phase is finalized by a training partner’s workshop aimed at sharing “best and worse experiences” in order to improve future assessments. Each training partner presents posters and talks about what has and has not worked well in implementing the maturity model as an assessment tool; knowledge is shared and the workshop is characterized by a joint search for better solutions. As different approaches taken towards the assessment model at the sites are compared, new ideas for how to best align the assessment process are co-created by re-combining and re-framing previous experiences.

As the first vignette illustrates, the search for a best practice goes through a process in which a job is carried out and demonstrated tacitly, and then is described vocally and illustrated graphically so it can enter a cookbook. A reflection follows on how best to teach the newly codified practice given that teachers come from varying tacit practices and will have to move their employees at home from previous tacit practices to the newly codified practices, and that the issue of translation from multiple and diverse practices constitutes an assessment of codifications made. This process thus is an elaborate way to construct a language that is both the outcome of and helps to consolidate a transnational community of practice, while it creates a platform for making continuous improvements in the future. The process makes it possible to expose disagreements and make opportunistic disagreements visible, but because it is simultaneously embedded in a procedure that searches for a way to settle disagreements and define a shared result, it copes with opportunism. Instead of opportunistic games leading to a vicious circle of cumulative misunderstandings, the search for a new understanding becomes possible. This is especially well illustrated by the latter two vignettes.

Fem: The flow engineering multinational

Our second case is that of a major Danish MNC within flow engineering. Here we have focused on how development engineers in Denmark and China organize collaboration so that two places come up with products that satisfy standards in both, and on how Fem organizes interactive learning “loops” between geographically dispersed R&D units.

A core reference-point at Fem is mathematical models that simulate flow dynamics within or around the product and in the larger environment of which it shall later be a part. Fem uses these models to measure and map the performance of an existing product under various environmental conditions, to establish what the characteristics of best practice products are. Using this measurement and map as a benchmark, engineers are able to formulate performance targets for the new product that is going to be invented in a coming development project. By making use of the huge company database of previously designed products, components, parts, and control systems, a range of sequential and systematic testing can be entered into simulation programs to identify and detect which kind of recombination produces the best improvement effects.

With this in place, the next step is to take the promising parts, components, and control systems and improve them experimentally, first as pure virtual designs, next as micro-models, and finally as full scale products operating under different environmental conditions.

Having observed interactions between the leader of the Danish research and technology department and the R&D staff in China, we were surprised by how well the combination of mathematical models, systematic product design, and testing procedure functions in terms of creating a language that makes it possible to collaborate, identify possible problems and unsatisfying elements in the design, and, simultaneously, identify where people should be allocated in order to search for better solutions in the next round.

When new solutions have been found, not only can a new product be launched, but the company database is supplied with new part designs, components, and control systems that might enter into simulations of how future products should be designed. Failures (unsuccessful designs) can also be stored so that unproductive avenues of exploration can be eliminated in the future.

In a parallel arrangement, the company has also institutionalized an exchange to foster knowledge sharing and learning across units so that staff from the Chinese department regularly visit the Danish department to work on relevant projects within their area of expertise and vice versa. Mentoring interactions among staff members is also a typical procedure for knowledge exchange across the two departments. Mentorship relations involve both vertical (leader-employee) and horizontal (peer-to-peer) interaction. Through these encounters, the engineers draw on each other’s experience and expertise as they discuss and share ideas, problems, and methods. For instance, we observed how the Danish leader had one-on-one meetings with his team members in China—just as a principal investigator of a scientific research lab would meet with his/her lab members. During these meetings, team members present their latest work, inform the team of their most recent experiments, interpret results, look at data, search for alternative approaches, and plan the next steps in the project. We also observed several encounters of peer-to-peer mentoring between engineers, which took place within and across different domains of expertise as well as between the Danish and Chinese units. All these encounters enhance the possibility for diagnostic dialogue and interactive learning. They therefore serve as a crucial loop for knowledge sharing to accompany the company's practice of searching for better solutions through mathematical models and test procedures.

Although core elements of a system for knowledge sharing and wider continuous learning were in place by 2012, the functional unit, Structural and Fluid Mechanics (SFM), in charge of processing development projects was not satisfied with the situation, partly because they were being blamed by other organizational units for delaying projects and felt misunderstood by many of their collaborators. Consequently, they set out to build stronger relationships with the science and technology people, production and project managers, etc.; that is, they took on a deliberate stakeholder approach to improve their function's standing within the larger organization. SFM, being responsible for delivery of hydraulic designs, mechanical concepts, and specialist support (e.g. simulation- and design-tools), wanted to continuously improve these services to achieve faster lead time in product development. But SFM also wanted to search for a more systemic approach. As they saw it, their tools and services were often demanded by accident, when long into a project a project manager suddenly found that a project needed a new tool or service from SFM, thus almost necessarily creating delay, waste of time, and less than best practice solutions. Instead, SFM wanted to develop tools and services on top of best practices and to have a set of development tools that could be used worldwide, placed on an SFM-communication platform.
SFM's plan was gradually put in place as a function that should streamline practices and provide a monitoring center for the search for continuous improvement across involved subsidiary development departments. However, shifting toward a systemic approach based on a common set of procedures, tools, and services that could make the entire global organization work in a way that would allow learning taking place in one location to be used to improve the next round for all, was in no way easy. Fem had gained its

worldwide reputation in the past by adhering to a very different approach, in which practical experience was collected gradually as the challenges of developing a new product emerged, building a design gradually by testing physical parts, pieces, and entire products after having manufactured prototypes. In this system, the community of practices, so to speak, was constituted and expanded as project members discovered new challenges and searched, often in an arbitrary and idiosyncratic way, for new expertise to get problems solved. Constituting such communities sometimes led to either ill-informed knowledge of alternatives, or deliberate attempts to favor insiders against outsiders, making a development project an exercise in invisible micro-level power games. SFM had, up to then, only provided tools and services that could complement this way of working, but now, SFM thought the time was ripe for letting the new tools and services serve as a platform for an entirely new practice.

After a lengthy re-organization process, SFM changed position and essentially took charge of organizing the entire stream of Mechanical Hydraulic Development (MHD), working on the interface with the Department of Research and Technology (R&T), which would provide priority road maps for major development projects to be “streamed” by MHD. R&D departments of different foreign subsidiaries would still be engaged in applying and adapting existing products for local markets, but at the same time they were re-defined as local pools of specialists, mapped by levels of qualifications, who could be called upon to be engaged in major projects that the MHD “streamed.” With engineering employees sorted by specialty (such as hydraulics, mechanics, structural construction, software, motors, etc.) and rated by level of knowledge, a matrix of people, specialties, and locations could be used to help find the right staff for a project.

With this organizational structure in place, MHD would organize the stream of development and engineering as a succession of eight steps (with a planned total duration of 33 months), in which the first four were frontloading (12 months), the next two would define the project and assign work tasks and responsibilities in the form of work-package agreements (six months), and the

final two would include execution and the preparation of production (15 months). The frontloading phase would involve the successive construction of new concepts that would feed into platforms owned by the stream.
The platforms were ordered in a five layer model in which it was understood that the first three should be the core of any new development of products:

> *Core-technology*: on this platform an inventory of tools (simulation tools, design tools and templates, tools for measuring interactions between motors, mechanics and hydraulics. optimization, etc.), manufacturing principles, design guides, materials and procedures for design steps would be created with a special view to the tools, etc. that served a certain domain (all assembled from the library of past experiences, designs, etc.).
>
> *Core platforms*: lists of vital Fem components, best practice design guides, guides for optimization of re-usability, pieces that can be scaled in size and be of relevance for the imagined product, etc. The core platform is actually a collection of core platforms covering the specialties that are expected to be brought together in the stream (hydraulics, mechanics, etc.).
>
> *Domain platform*: the place where the core platforms are assembled in a preliminary view showing the components that will work together in the "engineering view" (showing quality level, energy efficiency, costs, user friendliness, range of applicability) that is planned to dominate the new design.

In this way, a preliminary selection of solutions can be appropriated from the wider range of the set of core-platforms, making it possible to define a range of more or less important problems to be solved on the coming product development platform.

These three platform layers simultaneously create an inventory of past knowledge, and make it possible to identify possible voids and share new knowledge about tools, competitor products, and more, through a joint knowledge base. They also make it possible, through a number of iterative steps, to identify relevant specialties and persons who should be invited to join the product team. The stream actors are encouraged to communicate more broadly about their reflections during the process through the online system, Yammer. The process strongly invites broader participation across subsidiaries. Furthermore, while working these platforms, participants see how useful it is to put past knowledge to novel use, so that it becomes evident that working on a given project also means having the chance to make useful contributions to the continuous improvement of the libraries from which future platforms shall be built. Knowledge sharing, so to speak, becomes embedded in the very procedural steps that a stream undergoes.

The fourth platform layer is the development of the product. It starts with a period in which risks are gradually eliminated through 3D modeling, simulations, and prototype simulations. During this work, possible participants are identified and stream managers experiment with various ways of structuring commitment, estimating how much time, resources, and labor is needed in different phases of the project. At this point, work packages are defined and contracts signed to clarify what is expected to be delivered from whom at a given time. Thus, during this initial phase, the stream managers use a participatory process to manage, renegotiate, and stream the project. In this phase, frequent contacts to potential customers are also in play.

Let us observe, in passing, that the procedural steps and construction of platforms have the potential to break with the typical dualism of formal systems for knowledge sharing and the community of practice that is generally described in the literature. In previously reported cases, the community of practice forms a network around a given project and makes only rudimentary use of formal systems of knowledge sharing. In contrast, Fem seems to have created a system in which a community of practices emerges simultaneously with the construction of the various platforms, and becomes committed to itself as a community during the preparatory phase of product development. During the frontloading process, participants receive a demonstration of how useful it is to have properly designed, tested, and described product and tool libraries. It becomes a standing challenge to reflect on what they can contribute to make these libraries more viable and to improve the basis for constructing various platforms in the future. However, it is too early to assess to what extent these longer term issues will work, as we are speaking of an organizational template that had been operational for less than a year when we last visited Fem.

However, for some product types, cookbooks are already in place to describe the succession of best practice steps in developing a new product through the use of the tools supplied by the core technology platform. The cookbook describes what types of problems can be solved by which tools, where those tools can be found in the library, and at what junctures work can be guided by previous designs. By integrating work with this system, each new design, its various simulations, and its performance comparative to other similar designs can be documented. The cookbooks are continually refined as new experience is gained. Such cookbooks are assembled for each specific product category, and, in a way, serve as a stream for the human collaborative process and its interaction with the larger system.

The final and fifth platform layer departs from the product after it has been fully developed and put into production. The platform maps the potential for variants and the flow systems they can be built into. In this way, the platform becomes a space in which the potential for the product to contribute to technical solutions in a variety of situations can be gradually codified, in relation to other products from Fem, and to the whole swarm of third party products and solutions. Thus, in this phase, Fem audits the product in order to contribute to the improvement of process areas for an increasing number of customers. In this way, both the potential and the limitations of existing products can be assessed and used to identify the need for new development projects.

General observations and discussion

Contrary to an organization in which political and other opportunistic games may be played out either to foreordain a discrete solution or to selectively implement a decision, actors engaged in both Pharco's and Fem's organizational architectures know they are engaged in a continuous, long term process and that their actions now have consequences for what they can do in the future. Opportunistic behavior of the type observed by Jackall (1988) and Kristensen and Zeitlin (2005) may thus have less space (see also Helper et al., 2000), as both forms of collaborative interaction are more intensive and because the search for root causes could easily detect such behavior and make it visible, undermining the reputations of those who play opportunistically.

Thus, from a functional perspective, Pharco and Fem have moved quite radically in the direction of institutionalizing what Herrigel (2014) also found in German MNCs—Pharco and Fem have moved toward recursive organization-wide processes that constitute an experimentalist governance architecture:
… where all actors are aware of the formal rules and obligations. First, there is joint or collective goal setting. Relevant stakeholders commonly affected by a given problem openly deliberate about solutions and future goals of their common interactions. Second, these goals and solutions are then implemented/pursued by the stakeholders in their local milieu. Application or realization of the common standard in the local environment invariably requires discretion by local players: unanticipated problems emerge; intermediate benchmark goals are not fulfilled, local conditions differ from the stylizations used under the general deliberations, etc. Local discretion—deviation from agreed upon practice or norms—is permitted in order to solve the problem or make changes to allow the local organization to achieve the goal target. But the deviations must be transparent…and, in a third step, the norm deviation must be explained and defended among the peer parties to the central goal agreement. Finally, fourth, successful local experiments are then used to review the effectiveness and desirability of central/common goals and standards. If the local innovation is compelling enough, this can result in modification of the central standard (Herrigal, 2014: 10).

The direct comparison of standards and practices and the search for root causes to problems directs the attention of an organization in a very different direction than is usually the case. Typically, financial metrics have played a dominant role in directing attention and setting the rules for the game (Kasper, op cit.; Belanger, et al., 1999). Financial benchmarking has long been at the center of identifying where to look for best practices and, conversely, which subsidiary to blame or favor. It has played an important role in investment bargaining among subsidiaries and has often also determined which managers to promote and which to sack. The art of manipulating financial metrics has, in this way, become the dominant game, and has been seen as the primary way to create a governance architecture. But as has been shown (Jackall, 1988; Kristensen & Zeitlin, 2005), such a governance architecture is very incomplete, short term-oriented, and very open to all kinds of shirking and opportunism—in which financial occupations can gain the upper hand against engineers, production workers, and sales staff.

The new governance architectures described above focus attention on tacit practices that used to be some of the secret weapons that made it possible for a subsidiary to achieve comparative competitiveness in games of financial positioning among subsidiaries. Of course, previously superior subsidiaries risked having their practices revealed, if the MNC decided to investigate why and how this performance was achieved. But choosing such subsidiaries as sources for learning might also lead to very wrong learning processes. Some high performers may have achieved high financial success by lowering quality and safety standards, or by ignoring environmental or occupational health consequences, etc. Short run financial success or failure may have many obscure causes, which is why it is highly risky to make short term success the navigator for how to improve organizational practices.

The observed governance architecture changes the way an organization searches and what it may learn. It creates a process in which both aims and means can be constantly revised in light of earlier findings, and in which metrics can be perfected and calibrated as the understanding of an operational arena or a product moves out from under the shadow of tacit practices and becomes enlightened by codifications and transparency, a process that makes it increasingly difficult for financial games to be played by opportunists and careerists.

We do not think the new systems are quick cures to all problems of organizing multipolar learning systems. Observations made during our field studies have revealed that different institutional environments and corporate cultures make subsidiaries more or less willing to engage in multipolar processes of learning and adopt new forms of collaborative interaction (for similar findings see Lam 1997, 2000, 2004; Tregaskis et al., 2010). This reflects deep cultural differences in how innovation was performed in the past (Westney, 1993). The barriers for lateral collaboration that Crozier (1964) identified as a peculiar French phenomena can still be observed, as seen against the approach of Danes coming from a much more collaborative institutional setting (Kristensen & Lotz, 2011; Kristensen & Rocha, 2012) based on decentralized competence and individual learning possibilities (Lorenz & Valeyre, 2003). But the recursive process of the new architecture here plays a role in creating a more international community of practices, rather than just a composite set of national communities that game against each other. However, constructing the firm as a collaborative community involves a huge mass of transformations and the adoption of new ways of organizing (Adler & Heckscher, 2006; Sabel, 2006; Lotz, 2009).

It is too early to say whether or how the new governance architecture could lead to new forms of opportunistic games and unanticipated vicious circles and unintended effects. Obviously, as the new language systems that describe the previously tacit practices get constructed, new power positions will arise for those who understand and direct the cultivation of these language systems. To maintain their constructive principles, the organizational routines that secure the recursive processes that expand their reach will probably constitute new social groups of professionals. Whether the governance systems are sufficiently open to revision to compensate for the arbitrariness on which their construction necessarily rests is probably highly important for whether they will host a more or less useful organizational actor group within the bodies of these large and complex organizations. However, at this moment in the evolutionary development of organizational forms, they seem to harbor an agency that may serve to civilize, discipline, and restrict the powers of finance and create more social space for groupings that are engaged in the long term development of better products and services. These groups depend on the power that they gain from working with each other, rather than depending on having power over others.

Conclusion

Our two case studies show that it is indeed possible to organize spaces that can organize continuity in multipolar learning. Against the previous literature, however, it becomes evident that these are not the outcome of spontaneous interactions in a tacit community of practices that operate on an ad hoc basis parallel or as an exception to the formal organization. The spaces must become a body in their own right, with a set of recursive steps or routines that produce distinct types of results (a distinct language that codifies tacit knowledge, a cookbook of best practices, and improvement of a platform for collaboration). The system of multipolar learning itself must become formalized.

By organizing recursiveness, the system becomes autonomous and independent from the hierarchical system and its principal agent problems and opportunistic games, as repetition of learning cycles creates a civilizing, if not self-disciplining, device that encourages members to cultivate day to day interactions with a view to their future reputation within the space.
In this way, the organizational space for multipolar learning tends to be more oriented toward a long term, continuous perspective than does the hierarchical, which has been created to make discrete—and often unconnected—decisions, and which, because of the financial orientation of multidivisional corporations, has become increasingly short term oriented. It is too early to say how the two modes of organizing will compete, which will gain in importance, and which will come to dominate, but it will be interesting to watch the future evolution of MNCs that organize continuous spaces for multipolar learning.

Of particular interest is that MNCs that are institutionalizing internal organizational processes of multipolar learning also cultivate an approach that, applied to the context of an emerging economy, can be used to involve multiple external stakeholders (interest groups, professional groups, customers and suppliers, government bodies and institutions) in similar processes through which they might better co-construct mutually beneficial markets (Girschik, 2014).

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