Accepted manuscript

The role of leadership in organizational learning in multinational companies

SCHOLARONE™
Manuscripts

The role of leadership in organizational learning in multinational companies

Abstract

Purpose: This paper aims to conceptualize the role of leadership in organizational learning processes in multinational companies (MNCs). We present a model describing how managers in an MNC facilitated transitions between sub-processes of organizational learning at several organizational levels.

Design/methodology/approach: We collected data from the plants of a global process company in Norway, Brazil and China. Observation, in-depth interviews and archival material enabled us to reconstruct the organizational learning process over a period of 30 years as the company developed its own tailor-made improvement programme.

Findings: Based on the data, we describe the role of leadership in linking the sub-processes of organizational learning as orchestration, sponsoring and persistence. Orchestration included creating faith and optimism and designing the organization to allow close cooperation between operators and managers in the sub-process of experimenting. This eased transferring and institutionalizing in the global organization. Sponsoring included structural changes to support transferring and the demonstration of dedication to improvement programme values. These factors were important for institutionalizing. Persistence involved the continuous focus on adjustment of the improvement programme, which then facilitated further experimenting.

Originality/value: First, our study suggests that activities and decisions in one sub-process have important implications for the following sub-processes. Second, our study indicates that leaders' role in facilitating the transitions between sub-processes extend beyond their individual traits and behaviour which previous research had focused on, and includes decisions concerning organizational structure and culture that help link social and organizational learning.

Keywords: multinational companies, organizational learning, leadership, sub-process transition

Paper type: Research paper

Introduction

Organizational learning is often portrayed as an intentional process where managers and employees engage in explicit learning activities. Even though the influential 4I framework (Crossan et al., 1999) depicts organizational learning as consisting of learning at the individual, group and organizational level through four sub-processes of intuiting, interpreting, integrating and institutionalizing, empirical research has typically focused on one of these sub-processes at a time (Brix, 2017). While this has increased our understanding of important sub-processes of organizational learning, we know less about how these sub-processes are linked together and how they play out at, and in the interface between, individual, group and organizational levels (Crossan et al., 1999, 2011). This is unfortunate because the interlinkages between the sub-processes are crucial for organizational learning (Brix, 2017).

The importance of tying the sub-processes of organizational learning together points to leadership to facilitate the transitions across sub-processes. However, empirical research about the role of leadership in organizational learning is scarce and fragmented (Berson et al., 2006; Do & Mai, 2020). Theoretical and conceptual research build on a contingent view of leadership and suggest that leaders should perform transformational and transactional leadership behaviours at different stages of the organizational learning process (Vera & Crossan, 2004; Berson et al., 2006). Transformational leadership behaviour is suggested to have positive effects on organizational learning that challenge existing knowledge, while transactional leadership is better to reinforce existing learning (Vera & Crossan, 2004, p. 228). However, a recent review of empirical research testing the relationship between leadership and organizational learning identified that most studies either tested transformational or transactional leadership behaviour, while only a few studies tested both (Do & Mai, 2020). In addition, organizational learning is differently conceptualized and measured across studies: "a considerable number of studies treated organizational learning as a single construct" (Do & Mai, 2020, p. 1210). Studies that have tested hypotheses of the relationship between transformational leadership and organizational learning are typically cross-sectional (e.g. Jansen et al., 2009) and therefore less suited to understand whether and how leadership could facilitate the transition between sub-processes of organizational learning.

To address these gaps in the literature, we set out to explore the following research question: How do managers facilitate transitions between sub-processes of organizational learning in a multinational company? Rather than testing hypotheses, we aimed to understand whether and how the actions of managers facilitated organizational learning by linking the sub-processes.

We offer an account of the successful efforts of a multinational company to improve production performance, involving several sub-processes of organizational learning at various organizational levels. Thus, our study makes an empirical contribution to the understanding of how leaders connect the sub-processes of organizational learning across levels (Crossan et al., 2011). We contribute to the organizational learning literature in two ways. First, our data suggest that the sub-processes of organizational learning interact. For example, because there was extensive involvement across organizational levels and international plants in the process of experimenting, there were fewer problems in transferring and institutionalizing than previous studies have suggested. Second, our data suggest that leaders' role in facilitating the transitions between sub-processes of organizational learning extend beyond their individual traits and behaviour, which previous research about organizational learning has focused on. For example, top managers adjusted organizational structure and organizational culture in a way that linked social and organizational learning.

Theoretical framework

In this section, we discuss the concept of organizational learning followed by a discussion of how the relationship between leadership and organizational learning has been studied.

Organizational learning

We build on Crossan and colleagues' view that organizational learning is "a process of change in thought and action both individual and shared – embedded in and affected by the institutions of the organization" (Vera & Crossan, 2004, p. 224). Their 4I framework (Crossan et al., 1999) suggests that organizational learning occurs through four processes at three levels of analysis:

> "Learning begins with individuals at the intuiting stage as a subconscious process and later becomes conscious at the interpreting stage, where it is often shared with other group members. Group members' input gets integrated at the group and organization level, where information is institutionalized and imbedded in systems, structure, or routines." (Berson et al., 2006, p. 580)

The 4I framework illustrates organizational learning as a complex, multi-level process, and links to the classic distinction between the two learning modes of exploration and exploitation (March, 1991). While exploration emphasizes searching for new knowledge (e.g. through intuiting and interpreting), exploitation helps utilizing what has been learned (e.g. through integrating and institutionalizing).

Organizational learning research is commonly divided into sub-processes of knowledge search, knowledge creation, knowledge retention and knowledge transfer (Argote et al., 2020), enabling researchers to target one sub-process at a time. For example, research about organizational learning

in multinational organizations has mostly been preoccupied with knowledge transfer (Sturdy et al., 2019), which relates to interpreting and integrating across organizational sub-units, and less concerned with how the knowledge to be transferred has emerged (Hotho et al., 2015), which relates to intuiting and interpreting in one organizational sub-unit.

While previous research about sub-processes of organizational learning certainly has increased our knowledge (Argote et al., 2020), a criticism of this approach is that research have developed in different specialized streams with little cross-fertilization across research streams (Brix, 2017). This is unfortunate because it could limit our understanding of how the sub-processes of organizational learning affect each other. Thus, there is still a need for more research incorporating all the sub-processes as well as the interplay between levels (Crossan et al., 2011). The two most problematic moves are from intuiting to interpreting and from institutionalizing to intuiting (Crossan et al., 1999). The first problem "requires a shift from individual learning to learning among individuals or groups" (Crossan et al., 1999, p. 532), or what we could call social learning (Argote, 2011). The second problem concerns the difficulty of experimenting at the individual level when the results of previous organizational learning have been institutionalized in the organization: "This is extremely difficult because the language and logic that form the collective mindset of the organization and the resulting investment in assets present a formidable fortress of physical and cognitive barriers to change" (Crossan et al., 1999, p. 533).

Empirical studies drawing on research about several sub-processes are few. However, Brix (2017, p. 122) found that knowledge created by individuals and teams were not always "disseminated to decision makers to make possible organizational learning" in an innovation project in the public sector within national boundaries. Thus, in this paper, we extend previous research and explore the role of leadership in bridging sub-processes of organizational learning in a multinational company.

Leadership and organizational learning

Leadership is commonly portrayed as a process where leaders influence followers to work towards mutual goals and enable organizations to overcome challenges (Northouse, 2018; Yukl, 2013). Leaders control resources that they can mobilize to facilitate a range of processes, including organizational learning. The link between leadership and organizational learning has commonly been described through transformational and/or transactional leadership. Through transformational leadership (Bass & Reggio, 2006), leaders provide their followers with a collective purpose as well as the direction, energy and support to achieve goals (Garcia-Morales et al., 2012). Leaders do this by inspiring followers, acting as role models (idealized influence), fostering creativity through intellectual stimulation and showing followers individualized consideration (Bass & Riggio, 2006). Through

transactional leadership, leaders engage in "establishing objectives and monitoring and controlling the results" (Garcia-Morales et al., 2012, p. 1040). Empirical studies have established positive relationships between transformational leadership and exploration and between transactional leadership and exploitation (Jansen et al., 2009; Waddel & Pio, 2015), supporting a contingent view of leadership in organizational learning (Vera & Crossan, 2004).

However, a recent review of empirical studies about the relationship between leadership and organizational learning questions the conceptual clarity in studies (Do & Mai, 2020). In our study we aim to shed more light on two such challenges.

First, it seems that most studies link leadership to single organizational learning sub-processes and not to organizational learning from intuiting to institutionalization (Do & Mai, 2020). For example, the empirical studies included Berson et al.'s (2006) review demonstrate how leaders facilitate either exploration or exploitation. While existing studies help us understand how managers can facilitate organizational learning in one sub-process, Crossan and colleagues (Crossan et al., 1999, 2011) call for studies of the role of leadership in linking sub-processes and levels in organizational learning. This call has led to conceptual and theoretical research about the role of senior leadership in organizational learning (Berson et al., 2006; Hannah & Lester, 2009; Vera & Crossan, 2004). No studies, to the best of our knowledge, have focused on whether and how leadership facilitates transfer from one sub-process of organizational learning to another. Given that organizations need learning for both exploration (associated with intuiting and interpreting) and exploitation (associated with integrating and institutionalizing), managers should facilitate both and ensure movement between different sub-processes. Thus, a manager aiming to facilitate organizational learning should first provide followers with contextual support to develop their creativity to allow searches and provide meaning for new ideas, and then provide a shared understanding that makes it possible to integrate new and existing knowledge in organizational practice (Berson et al., 2006).

Second, the most frequently used conceptualization of leadership is transformational leadership (Do & Mai, 2020). While transformational and transactional leadership behaviours are important in leaders' repertoires, leaders also control organizational resources such as human resource practices, organizational structures and organizational cultures that can facilitate learning (Berson et al., 2006). For example, although not drawing on the concept of leadership styles, Brix (2017, p. 125) claims that a key link between individual and team knowledge creation (intuiting and interpretation) and organizational learning is "a formal decision to use, rework or reject the new knowledge" (integration and institutionalization). This suggests that the role of leadership in linking sub-processes of

organizational learning extends beyond transformational and transactional leadership styles. Thus, empirical studies should explore other dimensions of leadership in organizational learning.

Research methods

Organizational learning takes time and may progress at different paces and at different times in various parts of the organization. This makes it difficult to assess when to enter an organization to observe organizational learning. For example, Brix (2017) notes that knowledge creation may be goal-free or goal-driven. If knowledge creation is goal-free, or if it happens "by accident" or as a by-product of other processes, researcher access to these processes may be challenging. We address this challenge by drawing on historical accounts from actors who were involved in the process. While retrospective accounts may be biased by hindsight, the sensemaking efforts they contain may identify important lessons based on the hands-on experiences of the actors involved. Inspired by process research (Langley, 1999) and case designs (Yin, 2011), we developed a case study where we reconstructed an organizational learning process.

The case company, Norwegian Multinational Process Company (a pseudonym, in the following abbreviated to NMPC) was on the brink of bankruptcy in 1991. Net income had dropped to negative NOK 700 million, and the company's debt exceeded NOK 6 billion. With 25 wholly and partially owned production units in Norway, Iceland, and North America and around 5,000 employees, the company was facing safety issues and poor physical working conditions due to outdated production facilities and a lack of investment in future growth and development. There was mistrust within the organization, poor communication between top management and the global plants and no corporate strategy to handle the crises in the company. The newly appointed CEO became a key actor in the turnaround process. In 1991 he initiated several processes aiming towards the ambition to become the "world's leading low-cost producer of ferro alloys and aluminium". Two central keys in the transformation were transforming the organization into a participating organization and initiating several production improvement projects. Today NMPC is one of the world's leading suppliers of silicon-based materials. It has grown to 31 plants around the world with close to 7,000 employees. Revenues passed more than NOK 25 billion in 2019 and safety standard had raised to world-class in terms of work-related injuries. The objective in 1991 was related to increase operational performance. We argue that, in retrospect, the initiatives taken in NMPC to increase operational performance, how they involved and empowered managers and operators, how they collectively made sense of and shared their experiences with new ways of working, how they standardized and formalized learning outcomes in a formal improvement program, and how they implemented and integrated this program, illustrate an organizational learning process of intuiting, interpreting, integrating and institutionalizing as described by Crossan et al.

(1999). This makes NMPC a relevant and interesting case to explore the research question of how managers facilitate the transitions between sub-processes of organizational learning.

The overall data collection strategy was a qualitative approach aiming to produce rich accounts of NMPC's transformation from 1991 to 2021. The data cover themes related to production improvement such as initiatives taken, actors involved, discussions, conclusions, implementation, and results. For interviews with key actors we started with snowball sampling strategies before we could target informants more purposively. Data included 81 interviews with 81 participants, 3 work groups, six weeks of observation, and 37 internal documents. Document data were used to check the accuracy of interview data where informants described historical events, and observation data provided an understanding of how the ideas of production improvement were implemented and how this facilitated organizational learning. See Table 1 for an overview of the data.

-Table 1-

To ensure that we did not force data into an organizational learning terminology, we started to re-analyse our data by inductively extracting it to investigate whether the process could be interpreted as one of organizational learning. In the first step, we used temporal bracketing (Langley, 1999) emphasizing that "if there is a certain continuity in activities within a period, temporal bracketing might be used to facilitate the examination of how actions in one period change the context of action in subsequent periods" (Langley, 1999, p. 703). The data indicated three distinct sub-processes, experimenting (1991 – 1999), transferring (1999 – 2006) and institutionalizing (2006 – 2021), which align well with descriptions of organizational learning (Crossan et al., 1999; 2011). See Table 1 for a description of sub-processes.

Second, we identified accounts of what leaders did to encourage and facilitate organizational learning. Applying thematic analysis, we grouped accounts of similar leadership behaviour into 18 first-order concepts (Gioia et al., 2013), see Figure 1. Third, we tied these first-order concepts to leadership behaviour discussed in the literature. Through this process, we asked whether the data or the literature, or both, "suggest concepts that might help us describe and explain" (Gioia et al., 2013, p. 16) leadership behaviour that we observed in MNPC. By repeated iterations between the data and the literature, and through discussions in the research team, we condensed the first-order concepts into eight second-order themes. Fourth, we thematically grouped the second-order themes moving back and forth between the data and the literature and labelled three aggregate dimensions describing what managers did and the order in which they did it. The data structure model (see

Figure 1) provides a graphic representation of how we moved from raw data to three aggregated dimensions.

-Fig 1-

Finally, we addressed the research question directly by tying the sub-processes of organizational learning identified in the first step to the leadership behaviours identified in the fourth step. The result of this process was a model (see Figure 3), illustrating that leadership behaviour not only encouraged and facilitated organizational learning within one sub-process but also supported the transition from one sub-process to another.

Findings

We present our data showing the role of leadership in organizational learning within and between each of the identified sub-processes.

Sub-process 1 experimenting: the role of leadership

The first sub-process, experimenting (1991-1999), related to the organization's testing of new production ideas and new ways of organizing work to ensure longer term competitiveness in the aftermath of the initial cost cutting programme to avoid bankruptcy. These initiatives resemble intuiting and interpreting in the first phases of organizational learning (Crossan et al., 1999). Through the testing of new ideas in some organizational units, individuals and teams learned that continuous improvement ideas increased efficiency and quality of production, and that organizing work in semi-autonomous teams improved the quality of work and improvement suggestions. Managers consolidated these lessons before they were transferred to the global organization. Four aspects of the role of leadership facilitated experimenting and transition to the second sub-process of organizational learning, transfer: (1) creating faith and optimism, (2) co-creating, (3) reorganizing, and (4) consolidating.

Creating faith and optimism

Top management created faith and optimism for avoiding bankruptcy and laying the groundwork for future competitiveness. They did this first by cutting costs, then by establishing a vision which became key for how they worked with production improvement. Through these efforts, top management installed a sense of collective hope that made it worthwhile for managers and employees to engage in experimentation.

Cutting costs: In 1991, to avoid bankruptcy, top management hired renowned management consultants to help identify and implement an extensive cost reduction programme involving the sale

of plants and business areas, restructuring and downsizing. By hiring external help, top management communicated that they were committed to solving the financial problems.

> **In that situation, we had to cut costs, the market didn't allow much more. (Former CEO 1, 2019)**

By 1994, NMPC delivered positive results. Thus, these structural changes yielded immediate financial results, showing shareholders and creditors the viability of the rescue plan, and preparing managers and employees for long-term production improvement work.

Establishing a vision: Through the cost cutting programme, top management learned that variation in the production line created enormous waste, quality problems, safety problems and a lack of dedication among operators. Therefore, the key to a sustainable cost structure was to scrutinize the production process:

> Understanding that this was not about costs and downsizing but getting the [electrochemical] process under control. That was the breakthrough. Getting the process under control had much more economic value than cutting costs. (Former CEO 1, 2019)

The new CEO became known for his enthusiasm and his persuasive selling of the vision, "getting the process under control". The vision served as a description of an idealized future and created faith and optimism among managers and employees.

Co-creating

Co-creating refers to how managers and operators experimented together to learn how production could be improved and processes controlled. Top management empowered operators at the shop floor and ensured that top managers and board directors got hands-on production experiences. In addition, they established a "Management Forum", a decision forum where managers from all global plants met to discuss how to improve production stability by involving the whole organization. These efforts from top management were important because they bridged individual and collective learning, easing the interpreting phase of organizational learning (Crossan et al., 1999).

Developing a participative organization: **A main theme emerging from the efforts to increase production performance was how NMPC developed a participative organization. For example, in 1991, local management in a Norwegian plant with poor results, decided to participate in a project initiated and financed by the Norwegian government.** The project financed an action researcher to promote the ideas of socio-technical system theory (STS) (Trist, 1981) and Scandinavian working traditions (Ingvaldsen, 2013; Thorsrud & Emery, 1969). One of the central ideas was to secure participation. Operators, plant managers and technical personnel was invited to several conferences

where they together elaborated how to improve production volume, safety improvement, quality and new market opportunities. Managers and teams learned that giving more responsibility to work teams resulted in greater productivity, fewer work-related injuries and an increase in production capacity (internal documents). These results were shared and adopted in other plants.

Another example started with impulses from a quite different environment. In 1994, a group of Norwegian managers visited one of NMPC's business partners, a subcontractor to Toyota, and learned how Toyota Production System (TPS) principles of continuous improvement could be translated to the process industry. An important dimension of TPS is the commitment and participation of operators at the shop floor. At their return, the managers experimented with TPS-principles in two Norwegian plants, encouraging operators to suggest and implement production changes, creating a more participating organization (internal documents). The learning outcomes of experimenting with a more participative work organization were constantly discussed with top management and the owners. These discussions allowed collective interpreting of the co-created lessons learned.

The CEO's extensive plant visits: The CEO visited all 30 plants across the world twice each year from 1994 to 2000, amounting to more than one visit per week to a company plant. These visits involved two learning activities. First, the CEO taught managers and operators about TPS principles, stressing the vision of getting the processes under control. Second, the CEO joined the teams on the shop floor, participating in and observing how they worked with continuous improvement and experimented with new organizational forms, allowing the CEO to learn hands-on how TPS and STS could be combined at the shop-floor level. Both learning activities had important collective dimensions: they learned together across hierarchical levels and the CEO communicated these lessons learned to operators and managers in the global organization.

> I left [plants] in a good mood, thinking: Here, the management has a good understanding and will drive it [process control] forward. Then I found out later that there were so many things. And the ones who were actually driving it forward were the operators. (Former CEO 1, 2019)

Board meetings in production areas: The CEO also insisted that the board meetings in NMPC should be held in a plant location and include visits to the production areas. The aim was to enhance understanding among board directors about how to develop production performance in the long-term perspective. By enabling interaction with operators and hands-on production experience, improvement ideas and principles were anchored among board members. This initiative is still a vital principle in the NMPC's board meetings.

> You had to lead in a different way. We made a few rules, one of which was the board meetings. Half should be outside [in the production line] and half in the meeting room, then observations

10

should be made, and all should take part in improvement development (Former CEO 1, interviewed 2019)

NMPC Management Forum was established in 1996 on initiative from the new HR director. Her idea was to develop a global arena for dialogue, sharing of experience, learning and trust building, securing global production excellence (Internal documents). The Management Forum consisted of all plant managers in the global organization and the top management team had two main targets (internal document): (1) involve and anchor the vision and strategy of getting processes under control, (2) share experience and learning between the global plants. The Management Forum structured their work according to a conceptual learning model building on STS principles, organized in three phases (internal document): First, plant managers met in workshops discussing possible work structures (preparation). Second, they developed action plans that were brought back to the plants where they were refined through co-creating processes before being implemented (action). Third, the plant managers met to share learning from the co-creating processes in each plant (evaluation).

These co-creating efforts ensured involvement across hierarchical levels, from the shop floor to the board of directors, and facilitated meetings allowing collective interpretation of the lessons from the ongoing experiments.

Re-organization

To capitalize on the lessons learned from experiments across the organization, top management initiated two re-organizations, both allowing more co-creating.

Relocating staff closer to the production halls (around 1994): The main argument was that to learn how production could be improved, it was important to physically co-locate staff personnel with employees with production knowledge and skills. This ensured collective learning because it eased communication and enabled learning across the value chain, encouraging collective intuiting and interpreting.

> We changed the organization and transferred the sales function to the plants. Everyone involved in sales [in one district] was re-located to the plant. We did the same with purchases. So, the plants were given full control and we were then able to connect closer with suppliers and customers. (Former CEO 1, interviewed 2019)

More authority to the shop floor (around 1996): **Based on the lessons learned from experimenting with TPS, the management of two plants decided to remove shift managers.** They had learned that as the TPS-tools for continuous improvement were introduced, operators were challenged to suggest measures for improvement. However, plant management discovered significant variations in the

actual implementation of these ideas between the various shifts. As a former shift manager explained, this was related to shift managers' distrust of improvement suggestions from operators. Thus, there was a breach between operators' intuiting and group level interpreting (operators sharing with their shift manager), which prevented organizational learning. By removing shift managers, operators were empowered to implement production improvement ideas. This re-structuring contrasted with TPS-principles but resonated with the lessons learned about semi-autonomous teams from the STS-experiments:

> Operators were used as a communication channel to communicate the problems in the system. Several shift managers did not take the problems further and then nothing was done about the problems. We then realized that the problem was the shift managers. (Former shift manager NMPC plant, 2018)

Based on these results, team-based organization was implemented at all plants during 1998 and 1999, a structural move that eased the transition between intuiting and interpreting. The key idea was restructuring the shop-floor organization into semi-autonomous teams and defining the role of middle managers and technical personnel as a "help chain" whose aim was to support the value-creating process at the shop-floor level.

> We started reshaping and training the traditional production shifts into self-led work teams associated with help chains. (Former manager NMPC interviewed 2019)

Consolidating

The top management team, after having discussed the ideas with the MMPC Management Forum, made formal decisions to consolidate what had been learned. Two features of these formal decisions had a major impact on the subsequent sub-processes of organizational learning.

Transforming learning into a formal improvement programme: While experimenting, a substantial number of documents had been produced by operators and managers in different parts of the global organization that described routines, tools, principles and values enhancing production performance. In 1999, the top management team decided that this myriad of documents should be consolidated in one formal improvement programme.

> The improvements at [different plants] were noticed and led to a meeting of [NMPC] management team in [Norwegian city] in 1999. Here it was formally decided that the [written

material] should be expanded to include all units in the company under the name [NMPC] Business System. (Former manager NMPC, interviewed 2019)

The NMPC improvement program thus consolidated and standardized lessons learned in different parts of the organization. This was done through the development of "rules in use". "Rules in use" explained how to coordinate operations between each station in the value stream and was supported by illustrations and text in documents that were shared in the global organization (internal documents).

Integrating learning principles to company values: **The top management team acknowledged that the team-based operating mode challenged existing power structures.** To complement the structural changes emphasizing the shop floor's authority, these ideas were made operational and rooted in the core values of the organization. Thus, lessons learned were translated into values that could guide further production improvement and learning in the company. In 1999, "Processes in control" was added as a company value. "Empowered people" was also regarded as a strong value describing desired management behaviour, due to its fundamental recognition of employee involvement. Today, this value is placed in the centre to emphasize the importance of the people dimension in NMPC. Integrating these learning principles into values, benefitted the coming sub-processes of organizational learning, transfer and institutionalizing.

-Figure 2-

To sum up: We interpreted the role of leadership we observed in sub-process 1 as orchestrating. Orchestrating resembles the leadership functions of an orchestra conductor who instructs, inspires and capitalizes on every orchestra member's competency while at the same time ensures the pace and dynamics of the collective performance, and has previously been applied to describe leadership in innovation (Teece, 2007). In our study, top management orchestrated experimentation by ensuring immediate results and establishing a vision (creating faith and optimism), capitalizing on internal resources and their ability to absorb new knowledge (co-creating, re-organizing), and consolidating lessons learned, ensuring the transition to the subsequent organizational learning sub-processes. Thus, orchestrating relates to encouraging collective intuiting and collective interpretation (Crossan et al., 1999) as well as capitalizing on lessons learned and preparing the organization to implement those lessons.

Sub-process 2 transferring: the role of leadership

In the second sub-process, the improvement programme developed in sub-process 1 was transferred to and adopted in the global organization (1999-2006). This resembles integrating in Crossan et al.'s (1999) model of organizational learning. The foundations for transferring were built in sub-process 1, and now top management established dedicated organizational units to make the knowledge developed ready for transfer and to ensure that the transferred knowledge was implemented worldwide. Two aspects of the role of leadership facilitated transferring and transition to the third sub-process of organizational learning, institutionalizing: (1) educating and, (2) assessing.

Educating

The top management team established two connected organizational units that facilitated transfer by educating improvement coaches to drive and support implementation at the plants.

The Improvement Centre was established in 2000 and tasked to organize assessments of annual plant performance, to train improvement coaches to be placed in each division, to support and conduct workshops in the plants and coordinate the development of material for the learning processes (internal document). Thus, the responsibility for implementing the improvement programme was assigned to a new organizational unit that were to interact closely with the established plants. The manager of the Improvement Centre reported directly to the CEO and was part of the top management team. In 2019, 49 people worked in the Improvement Centre, stationed across plants and divisions worldwide. Thus, the Improvement Centre connected the top management team and the teams at the shopfloor at the plants and enabled the preserving of the collective learning efforts from the first sub-process. The HR-manager, who played a central role in initiating and sharing lessons from experiments, was assigned to lead the Improvement Centre, ensuring continuity across sub-processes.

The global company university was established by the top management team and supervised by the Improvement Centre in 2000 to educate operators, managers and technical staff in how to further adapt the improvement program in their organization (internal document). Each course mixed participants from each of these employment categories to stress the importance of co-creating and empowerment, thus capitalizing on lessons learned in the first sub-process. The courses were held at different locations, close to a plant, so that real production observations could be part of the course. By 2019, close to 3000 managers, operators and technical staff had participated.

Managers and operators were trained in practical problem solving, as well as approaches to educate and provide operators with the autonomy to solve their own problems. In addition to learning tools for implementing the Improvement Programme, the practical approach with "hands on" experience from a plant reinforced belief in the Improvement Programme and helped to convince some sceptics

among participants. This enthusiasm that the new improvement coaches brought back, was central to the transfer of knowledge between organizational units.

> I'd heard a lot about this programme, and everyone returning seemed brainwashed. Now I understand why. This is the best course I've ever attended. (Operator attending the university course, September 2017)

Assessing

Top management reinforced improvement programme values, developed in sub-process 1, by allocating resources to the Improvement Centre to develop and implement a global assessment programme, securing adoption of the improvement program in the global organization.

Assessing to control: The Improvement Centre developed a global annual assessment programme in 2000 to control the implementation of the Improvement Program. They developed a written assessment template, describing in detail the behaviour required to fulfil the standards of the Improvement Programme.

> Establishing the assessment program became an important tool for testing the degree of the improvement program implementation. (Top manager interviewed 2017)

From 2000 to 2014, the assessment program was conducted as a typical audit, controlling and reporting variation from the standards developed to assess the level of improvement activities. A typical assessment session lasted for five days and started with an information session, describing the assessment process for plant managers and key personnel. Then an assessment team from the Improvement Centre assessed performance in different areas. After four days, the assessment team presented their evaluation to the plant management team. The plant was then given three weeks to respond by outlining measures to be taken to improve the plant's performance. This formal assessment practice facilitated transfer and implementation of the Improvement Program in the global organization.

Assessing to learn: The values supporting assessment changed in 2014 from audit and control-based to a learning approach. The assessors used much of their time explaining and educating plant managers and operators about the core ideas of the Improvement Program, emphasising the empowerment dimension, and describing how to involve the operators in problem solving and continuous improvement.

> We don't like to call it audit, so we renamed it assessment and reduced the number of topics. Today, the people dimension is fully integrated in the assessment document, and, yes, it's

important to sell the idea of people involvement in the assessment programme, so it becomes their own. (Head of improvement centre NMPC, interviewed 2017)

This learning approach to assessment, was possible because of the values of empowerment and the structural decisions made previously to delegate responsibility for production improvement to the shop floor.

To sum up: We interpreted the role of leadership in sub-process 2 as sponsoring. Sponsoring involves resource allocation and financial support for activities that support and market ideas that top management wants to promote. In our study, top management sponsored transferring by allocating dedicated financial and human resources, to the transfer of the improvement programme. For example, they established organizational units and procedures intended educate operators and managers as well as to assess their performance related to implementation of the Improvement Programme. However, the success of transferring was directly related to the extensive involvement and structural foundations established in the previous sub-process, which also facilitated the transition to institutionalizing.

Sub-process 3 institutionalizing: the role of leadership

The third sub-process, institutionalizing (2006-2021), related to efforts of making the transferred knowledge stick, ensuring that the Improvement Programme would define and develop how NMPC continuously improved production performance. This resonates well with how Crossan et al (1999) describe institutionalization as the final sub-process or organizational learning. The foundations for institutionalizing were built in the previous sub-processes where managers, and in particular the top management team, had emphasized the importance of continuous improvement (through extensive plant visits and interaction with employees and managers), adjusted organizational structures (e.g. new organizational units, formalizing the Improvement Programme) and incorporated organizational values such as empowering people. In addition to these efforts, two aspects of the role of leadership facilitated institutionalization, and, more importantly, encouraged further experimentation ensuring continuous organizational learning: (1) internalizing core values and (2) encouraging experimenting.

Internalizing core values

Two initiatives contributed to promote and internalize values among new and existing organizational members: an onboarding programme for new managers, and a formal reporting system.

Onboarding new managers: When new managers were onboarded, they learned about organizational values. For example, all new CEOs had to attend a training programme at the Improvement Centre, stressing the improvement programme values.

> It was intense training. [the first CEO] wanted this so [co-worker] and I have been responsible for training all the CEOs who have been hired after [the first CEO] (Head of NMPC improvement centre, interviewed 2019)

The CEO, serving 30 years after the CEO who initiated the development of the improvement programme in 1991, expressed how he had learned and internalized the core values.

> I had to understand the [people] dimension, and how strong it is. The enormous energy you can release through the organization when people are properly trained and made responsible… and your decisions are decentralized. (Former CEO 2, 2017)

Top management's continuous promoting of core values maintained a strong corporate culture, which to some extent resembled a shared religious belief. A top manager even related NMPC's success to this internalization of values:

> This is spot on, but we have never addressed it like this before. Yes, it is a religious belief, and you [the researcher] have described something that has been right in front of our eyes. And, yes, that's why we succeed. (Top manager, MNC corporate manager team)

Reporting system: The core values in the improvement programme were also built into and reflected in formalized organizational processes. A reporting and measurement system was developed by the top management team. Its roots goes back to the consolidation of the improvement program in 1999 but evolved continuously throughout institutionalizing (2006-2021). The reporting system ensured vertical coordination by breaking down strategic targets to every level in the organization. These targets were operationalized with key performance indicators, and continuous improvement work was performed to reach the targets. This allowed the top management team to follow closely the progress of production performance in the global organization and to address any deviation from the strategic plan. The top management team used this reporting system in their weekly meetings:

> We meet every week for a meeting lasting an hour and a quarter. The schedule is very tight. One agenda is mandatory: the reporting of operational progress. (Member of the top management team, 2019)

This reporting system, once in place, did not depend on key actors but ensured that the organization regularly evaluated performance. The reporting practice ensured collective assessment of performance, but, more importantly, collective decisions about how to further improve performance. The organizational learning implications of this include a collective interpretation of the results of

previous learning, and a collective understanding of which parts of the production process that could benefit from future organizational learning.

Encouraging experimenting

Even though the improvement programme was successfully transferred and implemented, top management continued to encourage experimentation throughout the organization.

Maintaining continuous improvement as every operator's responsibility: Through the reporting system, operational progress was visualised at all organisational levels, and helped top management to maintain and reinforce basic assumptions about the constant ability to enhance performance by solving problems on the shop floor. The reporting system not only structured meetings but also reminded the organization daily that continuous improvement was part of each operator's job:

> The biggest change in the last five years in my workplace is knowledge about how to continuously improve my work. (Operator, Chinese plant, 2019)

Thus, it was a collective mindset supporting continuous organizational learning that was institutionalized, not necessarily the specific knowledge that was a result of organizational learning.

Adding new elements to the Improvement Programme: Managers at all levels encouraged operators to integrate new knowledge from daily operations back to the improvement programme, allowing experimentation after institutionalizing. Based on the results of new experimentation, new elements were added to the improvement template and re-transferred to the global organization. For example, metallurgical upstream processes have many variables that influence output and to ensure stable production, these variables must be defined, controlled and stabilized. One division, still struggling to get their upstream processes under control after implementing the Improvement Programme, started to experiment with Critical Process Management (CPM), a scientific method to reduce variation in a work process using statistical methods predicting output within statistical variation. CPM was not an original tool in the Improvement Program but was introduced to this division by an external consultant. In 2006, after implementation and good results in this division, the concept was added to the improvement template and spread to the global organization through the established channels. Today, CPM is one of the pillars in the Improvement Programme.

> CPM gave the system measurable substance and was quickly incorporated into the Improvement Centre. CPM became one of the most important drivers in the rollout of the Improvement Programme. (Former manager, Improvement Centre, 2020)

In 2013, management in the same division, tested a new concept, "Cost Roadmapping" (CRM), aiming to achieve the best possible cost position among its competitors. CRM was directly designed to connect

the improvement work to the finances, with a cost target of a 7% annual decrease compared to the baseline from the previous year. It was based on the idea of involving the whole organization. It started with a collective brainstorming, bringing up new ideas for cost cuts in the division. Then the management team picked the best suggestions and sent them back to the operators for execution. The division managed to reduce its cost position every year from 2013 to 2021, according to target, and today the cost roadmap concept is part of the improvement template, having been transferred to the global organization.

Summing up, we interpreted the role of leadership in sub-process 3 as persistence. Persistence describes top management's simultaneous focus on maintaining and reinforcing key values and at the same time encouraging employees and managers at all levels to continue experimentation and new collective learning. In our case, top management showed persistence in organizational learning through their continued support for improvement values over decades, maintaining a strong corporate culture of continuous improvement and ensuring that the improvement template was continually updated based on new knowledge. This persistence enabled institutionalizing as well as the transition between institutionalizing and continued experimentation.

Figure 3 summarizes our findings and illustrates how leadership facilitated each sub-process of organizational learning and the transitions between the sub-processes. The OSP-model reflects the role of leadership as orchestrating, sponsoring and persistence.

-Fig 3-

Discussion

Our findings suggest that managers facilitated organizational learning in each sub-process by orchestrating, sponsoring and persistence, but more importantly, they facilitated the movement from one sub-process to another. These findings suggest two implications for future research on organizational learning: (1) research should include more than one sub-process of organizational learning and explore how leaders facilitate the transitions between sub-processes and (2) studies of leadership in organizational learning should be extended beyond transformational and transactional leadership styles.

The interaction between sub-processes of organizational learning

In our case, the sub-processes of organizational learning (e.g. Argote, 2020; Crossan et al., 1999) were best labelled experimenting, transferring and institutionalizing. The practical challenges of organizational learning concern the relationships between these sub-processes. Interestingly, we did not observe the problems between experimenting and transfer and between institutionalizing and experimenting identified by Crossan et al. (1999).

We argue that one reason why the interface between the experimenting and the transferring processes was rather smooth was the characteristics of the experimentation. While Crossan et al. (1999) describe the initiating processes as largely individual, the experimenting process in our case was a collective process involving managers at different levels, operators and support staff (as described above through *co-creating* and *re-organizing*), reducing the usual barriers of transferring lessons learned from the individual to a collective level and across organizational units. In addition, all managers participated in *consolidating* knowledge outcomes from experimenting in their formal decision to develop an improvement programme. The importance of formal decisions echoes Brix's (2017) finding of formal decisions as necessary for moving forward in an organizational learning process. We argue that, in our case, it was important that there was broad involvement from a wide array of actors in reaching this formal decision. While learning through participation is described as a Nordic way of organizational learning (Dahl & Irgens, 2022), our study suggests that this can be transferred to other cultures.

The second problem identified by Crossan et al. (1999) concerns the challenges to continue learning when the outcomes of organizational learning are institutionalized. In our case we discovered that when new knowledge emerged from ongoing experimentation it was continuously incorporated in the Improvement Programme. The learning outcomes in all sub-processes were involved in a continuous search for ways of improving production performance (*encouraging experimenting*). We argue that this reduced the problems of moving from institutionalizing to experimenting. Such evolutionary organizational learning capability (Fujimoto, 1999) has a long theoretical tradition within operational production theory. By codifying the lessons learned, the improvement template functioned analogously to the way standard operating procedures should function in a shop floor learning environment (Adler & Cole, 1993; Spear, 2004).

Our findings suggest that challenges or successes in one sub-process may stem from previous sub-processes. This calls for organizational learning studies that cover more than one sub-process (Brix, 2017). Even though we did not identify the problems of sharing learning outcomes across levels and encouraging new learning after institutionalization of learning outcomes (Crossan et al., 1999), we

encourage further research in other contexts to explore these challenges and how they can be overcome.

Leadership in organizational learning – beyond transformational leadership

Previous research on leadership in organizational learning has emphasized the personal characteristics of the manager, most notably managers' transformational and transactional behaviour (e.g. Jansen et al., 2009; Waddel & Pio, 2015). We did not explicitly test transformational or transactional leadership behaviour in our study, but our findings suggest that top managers provided visions and inspired managers and operators to search for new ways to improve production performance (*creating faith and optimism*). Such behaviour displays some of the characteristics of transformational leadership (Bass & Reggio, 2006; Waddel & Pio, 2015) and may serve as an important prerequisite in how leaders can enhance organizational learning. However, our findings suggest that this is not enough. In our case, the top management team also made formal decisions that related to organizational structure (relocating staff closer to production halls, more authority to the shop floor, creating a formal template, establishing new organizational units, reporting system etc.)

These structural measures communicated the beliefs, values and norms that senior management considered important for continued organizational learning and enabled employees and managers to share experiences and develop shared beliefs and understandings (intuiting and interpreting). In this way, the decisions about organizational structure reinforced an organizational culture of continuous improvement, closely resembling an organizational learning process.

Our study suggests that managers' toolkit to enhance organizational learning may be more comprehensive than previous research has concluded with. Our findings confirm previous findings suggesting that transformational leadership may enhance exploration (creating faith and optimism in the early phases of organizational learning) and transactional leadership may enhance exploitation (ensuring transfer and institutionalization of the lessons learned). However, our study extends previous research in two ways. First, by implying that managers should master both transformational and transactional leadership but also understanding when to rely on which one. Second, by suggesting that managers should complement transformational and transactional leadership with mobilizing other resources that they control. Managers in this case used their power to change organizational structures, establish new organizational units and removing layers in the hierarchy. Further, they reinforced these structural changes by infusing the improvement program with key values. It is difficult to point to one of these efforts to explain how managers facilitated organizational learning in this case, rather it seems to be the combination of efforts that contribute to explain the success of this company.

This suggests that if managers only recognize and apply one tool (leadership behaviour, organizational structure, organizational culture), this can get in the way of their efforts to facilitate organizational learning.

We acknowledge the limitations of generalization of a case study and encourage more research about how leadership facilitates organizational learning. Our findings suggest that the role of leadership extends beyond leadership behaviour and includes decisions on organizational structure and culture. While such decisions are leaders' responsibilities, there have been less focus on this in research about the role of leadership in organizational learning. Thus, future research could take a fresh look at the toolkit available to managers in promoting organizational learning. We need more research about how managers at all levels in the organization can facilitate organizational learning through their decisions about how to structure work, allocate resources, ensure strong sponsorship, and involve others in making decisions throughout the organizational learning process. Future research could thus help us understand how managers contribute to building and reinforcing organizational structures and cultures that facilitate organizational learning.

Conclusion

In this paper, we aimed to study how managers facilitate transitions between sub-processes of organizational learning in a multinational company. We found that managers did this by orchestrating, sponsoring and showing persistence. Our findings suggest that managers' toolkit for promoting organizational learning extends beyond leadership behaviour and includes formal decisions about organizational structure and efforts to develop and maintain organizational culture across organizational levels and across international plants.

Based on our findings, we make three recommendations to researchers of organizational learning. First, we encourage designs that enable us to understand more about the links and interactions between sub-processes. This calls for longitudinal studies and long-term dedication to field work. In doing so, future research could address a limitation of our study because retrospective research always comes with a risk of hindsight bias. We would therefore encourage researchers to delve into real-time studies even though organizational learning in practice may be messy and time-consuming. **Second, we recommend** further studies where researchers link sub-processes of organizational learning in other contexts, for example contexts where professional workers may be less eager to respond to management's ideas and assessment and control activities, for example in hospitals or knowledge-intensive firms. **This will address another limitation of our research that depended on a single case approach and analysed organizational learning in an organization where the starting point was a struggle for survival. Third, we recommend that future studies of the role of leadership**

in organizational studies investigates more than transformational and transactional leadership. While we, in line with previous research, find that the top manager's personal characteristics impact organizational learning, we also find that managers' decisions concerning organizational structure and organizational culture are of vital importance for organizational learning.

The most important **recommendation for practitioners that can be drawn from** our study is that managers acknowledge that they have a larger toolkit for organizational learning than they may think. Thus, managers should not embark on organizational learning processes believing that it is sufficient to show transformational leadership behaviour. **Our findings suggest that managers'** decisions to standardize, formalize and organize organizational learning processes are important to complement the communication to employees of vision and inspiration to learn. **Another recommendation for practitioners relates to the timing of interventions in organizational learning**. Managers should carefully consider when to do what as our study suggests that the order of orchestrating, sponsoring and persistence was decisive for facilitating organizational learning. **This requires context-specific knowledge of what is going on when at various levels and in different parts of the organization.**

References

Adler, P. S., & Cole, R. E. (1993). Designed for learning: A tale of two auto plants. *Sloan Management Review, 34*(3), 85-94.

Argote, L. (2011). Organizational learning research: Past, present and future. *Management Learning*, *42*(4), 439–446.

Argote, L., Lee, S., & Park, J. (2020). Organizational learning processes and outcomes: Major findings and future research directions. *Management Science.* DOI: doi.org/10.1287/mnsc.2020.3693.

Bass, B. M. & Riggio, R. E. (2006). *Transformational leadership* (2nd ed.). Lawrence Erlbaum Associates.

Berson, Y., Nemanich, L. A., Waldman, D. A., Galvin, B. M., & Keller, R. T. (2006). Leadership and organizational learning: A multiple levels perspective. *Leadership Quarterly*, *17*(6), 577-594.

Brix, J. (2017). Exploring knowledge creation processes as a source of organizational learning: A longitudinal case study of a public innovation project. *Scandinavian Journal of Management*, *33*(2), 113-127.

Crossan, M. M., Lane, H. W., & White, R. E. (1999). An organizational learning framework: From intuition to institution. *Academy of Management Review*, *24*(3), 522-537.

Crossan, M. M., Maurer, C. C., & White, R. E. (2011). Reflections on the 2009 AMR decade award: Do we have a theory of organizational learning? *Academy of Management Review*, *36*(3), 446-460.

Dahl, T., & Irgens, E. J. (2022). Organizational learning the Nordic way: Learning through participation. *The Learning Organization*, *29*(3), 229-242.

Do, T. T., & Mai, N. K. (2020). Review of empirical research on leadership and organizational learning. *Journal of Knowledge Management*, *24*(5), 1201-1220.

Fujimoto, T. (1999). *The evolution of a manufacturing system at Toyota.* Oxford University Press.

Garcia-Morales, V. J., Jimenez-Barrionuevo, M. M., & Gutierrez-Gutierrez, L. (2012). Transformational leadership influence on organizational performance through organizational learning and innovation. *Journal of Business Research, 65*(7), 1040-1050.

Gioia, D. A., Corley, K. G., & Hamilton, A. L. (2013). Seeking qualitative rigor in inductive research: Notes on the Gioia methodology. *Organizational Research Methods, 16*(1), 15-31.

Hannah, S. T., & Lester, P. B. (2009). A multilevel approach to building and leading learning organizations. *The Leadership Quarterly*, *20*(1), 34-48.

Hersey, P., & Blanchard, K. (1969). Life cycle theory of leadership. *Training and Development Journal*, *23*(2), 26-34.

Hotho, J. J., Lyles, M. A., & Easterby-Smith, M. (2015). The mutual impact of global strategy and organizational learning: Current themes and future directions. *Global Strategy Journal*, *5*(2), 85–112.

Ingvaldsen, J. A. (2013). *Democratic Lean?: Work systems in Norwegian industry* [Unpublished PhD thesis]. Norwegian University of Science and Technology (NTNU).

Jansen, J. J. P., Vera, D., & Crossan, M. (2009). Strategic leadership for exploration and exploitation: The moderating role of environmental dynamism. *The Leadership Quarterly*, *20*(1), 5-18.

Langley, A. (1999). Strategies for theorizing from process data. *Academy of Management Review, 24*(4), 691-710.

March, J. G. (1991). Exploration and exploitation in organizational learning. *Organization Science, 2*(1), 71-87.

Northouse, P. (2018). *Leadership: Theory and practice* (8th ed.). Sage.

Spear, S. (2004). Learning to lead at Toyota. *Harvard Business Review, 82*(5), 78-86.

Sturdy, A., Heusinkveld, S., Reay, T., & Strang, D. (Eds.) (2019). *The Oxford handbook of management ideas.* Oxford University Press.

Teece, D. J. (2007). Explicating dynamic capabilities: the nature and microfoundations of (sustainable)enterprise performance. *Strategic management journal*, *28*(13), 1319-1350.

Thorsrud, E., & Emery, F. E. (1969). *Mot en ny bedriftsorganisasjon. Eksperimenter i industrielt demokrati, fra Samarbeidsprosjektet* LO/NAF [Towards a new business organization. Experiments in industrial democracy from the collaborative project between the main Norwegian employer and employee organizations]. Tanum.

Trist, E. (1981). *The evolution of socio-technical systems: A conceptual framework and action research program.* Occasional Paper No. 2, Ontario Quality of Working Life Centre.

Vera, D., & Crossan, M. (2004). Strategic leadership and organizational learning. *Academy of Management Review*, *29*(2), 222-240.

Waddel, A., & Pio, E. (2015). The influence of senior leaders on organizational learning: Insights from the employees' perspective. *Management Learning*, *46*(6), 461-478.

Yin, R. K. (2011). *Applications of case study research.* Sage.

Yukl, G. (2013). *Leadership in organizations* (8th ed.). Pearson.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
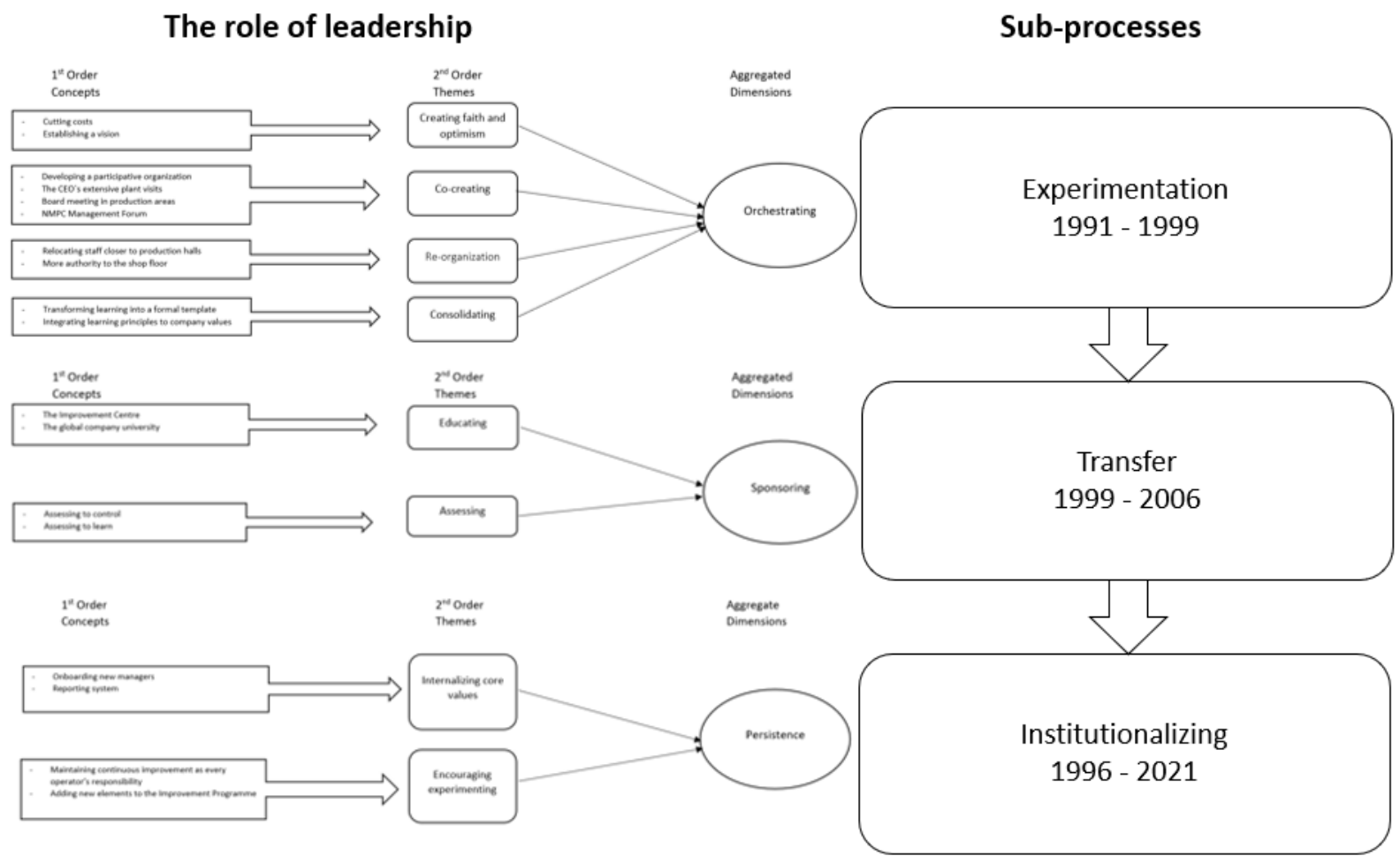27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
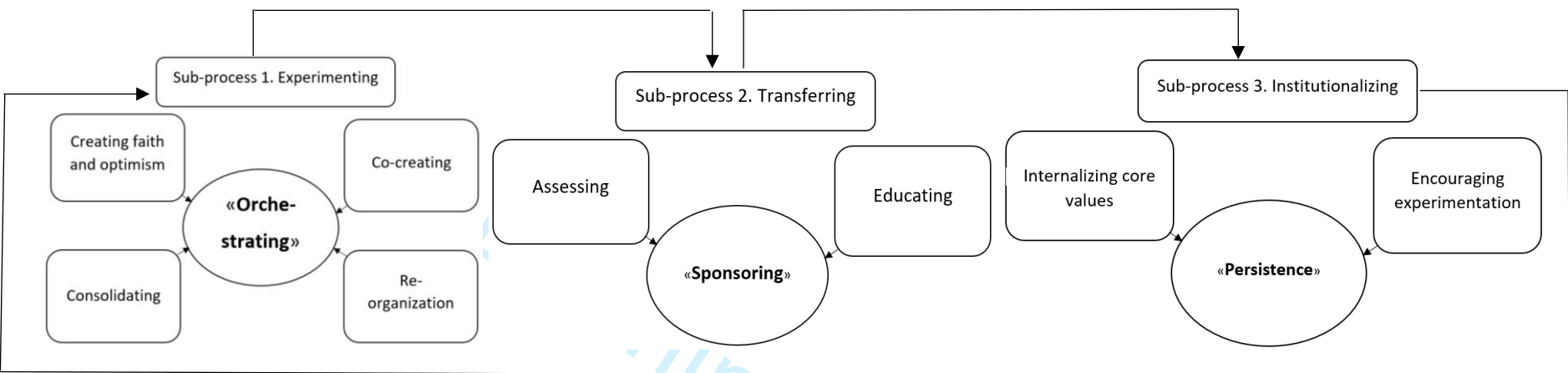48
49
50
51
52
53
54
55
56
57
58
59
60

Table I: Overview of the data material

Research question: How do managers facilitate transitions between sub-processes of organizational learning in a multinational company?	Interviews	Observations	Archive data
Sub-process 1, experimentation (1991-1999) Relates to the organization's testing of new production ideas and new ways of organizing work. These initiatives resemble intuiting and interpreting in the first phases of organizational learning (Crossan et al., 1999).	Historical data collection Snowball sampling strategy. 12 Semi-structured interviews with former top managers and middle managers in NMPC 3 work groups, (former managers and operators NMPC improvement team). The interviews provided insight into how NMPC experimented to increase production performance and how they discussed and followed up the results. The informants provided examples and accounts of how managers facilitated these efforts.		Presentation of the company history. Descriptions of NMPC Improvement Program. Written historical material documenting development of the Improvement Program. Research report from the NMPC organizational change 1991 – 1999. Documented events was cross checked with data from interviews and work groups.
Sub-process 2, transfer (1999 – 2006) The foundations for transferring were built in the improvement program in sub-process 1. In sub-process 2, top management established organizational units to make the knowledge transfer to the global organization.	Purposive sampling strategy. 46 semi-structured interviews with 4 top managers, 22 middle managers and 20 operators in NMPC. The informants' accounts provided information about how NMPC transferred learning outcomes to the global organization, and the role of leadership in this process.	One week at each of three NMPC plants in Norway : Observations at morning meetings, critical process (CPS) meetings, union meetings, day and night shifts, two guided tours of the plant. One plant visit also included the NMPCs Assessment program. Observations in the plants gave first-hand knowledge of the degree of transfer of improvement program in the global organization. NMPC University one week: Class education and observation of improvement program in NMPC plant. Observation at the University gave first-hand knowledge on one activity initiated from top management, securing transfer of knowledge in the global organization	NMPC written material about the assessment program. Plant performance presentation. The company's financial results.
Sub-process 3, Institutionalizing (2006 – 2021) Top management secured the institutionalization of how NMPC continuously improved production performance. This resonates well with how Crossan et al (1999) describe institutionalization as the final sub-process or organizational learning	Qualitative data collection approach. Purposive sampling strategy. 27 Semi-structured interviews with: 2 Top managers 15 middle managers 10 operators The informant provided accounts of how NMPC worked with the improvement program over time, how they internalized the values, and how new elements were added based on new experiences. They also described how managers facilitated this process.	One week at each of two NMPC plants in Brazil and China Morning meetings, critical process (CPS) meetings, union meetings, day and afternoon shifts, two guided tours of the plant. Observations in the plants gave first-hand knowledge of the report and control system and how the values of the improvement program were institutionalized in the global organization.	NMPC written material Assessment program written material. Plant performance presentation.
	In total: 81 semi-structured Interviews and 3 work groups	**In total: 6 weeks observation**	**In total: 37 documents**

Figure 1. Data structure.

Figure 2. Values of NMPC

Figure 3. The OSP-model: the role of leadership in and between the sub-processes of organizational learning