



**The role of leadership in organizational learning in multinational companies**

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# 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.

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

## 24 Theoretical framework

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

### 30 *Organizational learning*

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

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

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

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

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3 in multinational organizations has mostly been preoccupied with knowledge transfer (Sturdy et al.,  
4 2019), which relates to interpreting and integrating across organizational sub-units, and less concerned  
5 with how the knowledge to be transferred has emerged (Hotho et al., 2015), which relates to intuiting  
6 and interpreting in one organizational sub-unit.  
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10 While previous research about sub-processes of organizational learning certainly has increased our  
11 knowledge (Argote et al., 2020), a criticism of this approach is that research have developed in  
12 different specialized streams with little cross-fertilization across research streams (Brix, 2017). This is  
13 unfortunate because it could limit our understanding of how the sub-processes of organizational  
14 learning affect each other. Thus, there is still a need for more research incorporating all the sub-  
15 processes as well as the interplay between levels (Crossan et al., 2011). The two most problematic  
16 moves are from intuiting to interpreting and from institutionalizing to intuiting (Crossan et al., 1999).  
17 The first problem “requires a shift from individual learning to learning among individuals or groups”  
18 (Crossan et al., 1999, p. 532), or what we could call social learning (Argote, 2011). The second problem  
19 concerns the difficulty of experimenting at the individual level when the results of previous  
20 organizational learning have been institutionalized in the organization: “This is extremely difficult  
21 because the language and logic that form the collective mindset of the organization and the resulting  
22 investment in assets present a formidable fortress of physical and cognitive barriers to change”  
23 (Crossan et al., 1999, p. 533).  
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34 Empirical studies drawing on research about several sub-processes are few. However, Brix (2017, p.  
35 122) found that knowledge created by individuals and teams were not always “disseminated to  
36 decision makers to make possible organizational learning” in an innovation project in the public sector  
37 within national boundaries. Thus, in this paper, we extend previous research and explore the role of  
38 leadership in bridging sub-processes of organizational learning in a multinational company.  
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#### 44 *Leadership and organizational learning*

45 Leadership is commonly portrayed as a process where leaders influence followers to work towards  
46 mutual goals and enable organizations to overcome challenges (Northouse, 2018; Yukl, 2013). Leaders  
47 control resources that they can mobilize to facilitate a range of processes, including organizational  
48 learning. The link between leadership and organizational learning has commonly been described  
49 through transformational and/or transactional leadership. Through transformational leadership (Bass  
50 & Reggio, 2006), leaders provide their followers with a collective purpose as well as the direction,  
51 energy and support to achieve goals (Garcia-Morales et al., 2012). Leaders do this by inspiring  
52 followers, acting as role models (idealized influence), fostering creativity through intellectual  
53 stimulation and showing followers individualized consideration (Bass & Riggio, 2006). Through  
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3 transactional leadership, leaders engage in “establishing objectives and monitoring and controlling the  
4 results” (Garcia-Morales et al., 2012, p. 1040). Empirical studies have established positive relationships  
5 between transformational leadership and exploration and between transactional leadership and  
6 exploitation (Jansen et al., 2009; Waddel & Pio, 2015), supporting a contingent view of leadership in  
7 organizational learning (Vera & Crossan, 2004).  
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12 However, a recent review of empirical studies about the relationship between leadership and  
13 organizational learning questions the conceptual clarity in studies (Do & Mai, 2020). In our study we  
14 aim to shed more light on two such challenges.  
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18 First, it seems that most studies link leadership to single organizational learning sub-processes and not  
19 to organizational learning from intuiting to institutionalization (Do & Mai, 2020). For example, the  
20 empirical studies included Berson et al.’s (2006) review demonstrate how leaders facilitate either  
21 exploration or exploitation. While existing studies help us understand how managers can facilitate  
22 organizational learning in one sub-process, Crossan and colleagues (Crossan et al., 1999, 2011) call for  
23 studies of the role of leadership in linking sub-processes and levels in organizational learning. This call  
24 has led to conceptual and theoretical research about the role of senior leadership in organizational  
25 learning (Berson et al., 2006; Hannah & Lester, 2009; Vera & Crossan, 2004). No studies, to the best of  
26 our knowledge, have focused on whether and how leadership facilitates transfer from one sub-process  
27 of organizational learning to another. Given that organizations need learning for both exploration  
28 (associated with intuiting and interpreting) and exploitation (associated with integrating and  
29 institutionalizing), managers should facilitate both and ensure movement between different sub-  
30 processes. Thus, a manager aiming to facilitate organizational learning should first provide followers  
31 with contextual support to develop their creativity to allow searches and provide meaning for new  
32 ideas, and then provide a shared understanding that makes it possible to integrate new and existing  
33 knowledge in organizational practice (Berson et al., 2006).  
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46 Second, the most frequently used conceptualization of leadership is transformational leadership (Do  
47 & Mai, 2020). While transformational and transactional leadership behaviours are important in  
48 leaders’ repertoires, leaders also control organizational resources such as human resource practices,  
49 organizational structures and organizational cultures that can facilitate learning (Berson et al., 2006).  
50 For example, although not drawing on the concept of leadership styles, Brix (2017, p. 125) claims that  
51 a key link between individual and team knowledge creation (intuiting and interpretation) and  
52 organizational learning is “a formal decision to use, rework or reject the new knowledge” (integration  
53 and institutionalization). This suggests that the role of leadership in linking sub-processes of  
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3 organizational learning extends beyond transformational and transactional leadership styles. Thus,  
4 empirical studies should explore other dimensions of leadership in organizational learning.  
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## 7 8 Research methods 9

10 Organizational learning takes time and may progress at different paces and at different times in various  
11 parts of the organization. This makes it difficult to assess when to enter an organization to observe  
12 organizational learning. For example, Brix (2017) notes that knowledge creation may be goal-free or  
13 goal-driven. If knowledge creation is goal-free, or if it happens “by accident” or as a by-product of other  
14 processes, researcher access to these processes may be challenging. We address this challenge by  
15 drawing on historical accounts from actors who were involved in the process. While retrospective  
16 accounts may be biased by hindsight, the sensemaking efforts they contain may identify important  
17 lessons based on the hands-on experiences of the actors involved. Inspired by process research  
18 (Langley, 1999) and case designs (Yin, 2011), we developed a case study where we reconstructed an  
19 organizational learning process.  
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27 The case company, Norwegian Multinational Process Company (a pseudonym, in the following  
28 abbreviated to NMPC) was on the brink of bankruptcy in 1991. Net income had dropped to negative  
29 NOK 700 million, and the company's debt exceeded NOK 6 billion. With 25 wholly and partially owned  
30 production units in Norway, Iceland, and North America and around 5,000 employees, the company  
31 was facing safety issues and poor physical working conditions due to outdated production facilities and  
32 a lack of investment in future growth and development. There was mistrust within the organization,  
33 poor communication between top management and the global plants and no corporate strategy to  
34 handle the crises in the company. The newly appointed CEO became a key actor in the turnaround  
35 process. In 1991 he initiated several processes aiming towards the ambition to become the “world’s  
36 leading low-cost producer of ferro alloys and aluminium”. Two central keys in the transformation were  
37 transforming the organization into a participating organization and initiating several production  
38 improvement projects. Today NMPC is one of the world's leading suppliers of silicon-based materials.  
39 It has grown to 31 plants around the world with close to 7,000 employees. Revenues passed more than  
40 NOK 25 billion in 2019 and safety standard had raised to world-class in terms of work-related injuries.  
41 The objective in 1991 was related to increase operational performance. We argue that, in retrospect,  
42 the initiatives taken in NMPC to increase operational performance, how they involved and empowered  
43 managers and operators, how they collectively made sense of and shared their experiences with new  
44 ways of working, how they standardized and formalized learning outcomes in a formal improvement  
45 program, and how they implemented and integrated this program, illustrate an organizational learning  
46 process of intuiting, interpreting, integrating and institutionalizing as described by Crossan et al.  
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3 (1999). This makes NMPC a relevant and interesting case to explore the research question of how  
4 managers facilitate the transitions between sub-processes of organizational learning.  
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7 The overall data collection strategy was a qualitative approach aiming to produce rich accounts of  
8 NMPC's transformation from 1991 to 2021. The data cover themes related to production improvement  
9 such as initiatives taken, actors involved, discussions, conclusions, implementation, and results. For  
10 interviews with key actors we started with snowball sampling strategies before we could target  
11 informants more purposively. Data included 81 interviews with 81 participants, 3 work groups, six  
12 weeks of observation, and 37 internal documents. Document data were used to check the accuracy of  
13 interview data where informants described historical events, and observation data provided an  
14 understanding of how the ideas of production improvement were implemented and how this  
15 facilitated organizational learning. See Table 1 for an overview of the data.  
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23 -Table 1-  
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25 To ensure that we did not force data into an organizational learning terminology, we started to re-  
26 analyse our data by inductively extracting it to investigate whether the process could be interpreted  
27 as one of organizational learning. In the first step, we used temporal bracketing (Langley, 1999)  
28 emphasizing that "if there is a certain continuity in activities within a period, temporal bracketing  
29 might be used to facilitate the examination of how actions in one period change the context of action  
30 in subsequent periods" (Langley, 1999, p. 703). The data indicated three distinct sub-processes,  
31 experimenting (1991 – 1999), transferring (1999 – 2006) and institutionalizing (2006 – 2021), which  
32 align well with descriptions of organizational learning (Crossan et al., 1999; 2011). See Table 1 for a  
33 description of sub-processes.  
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42 Second, we identified accounts of what leaders did to encourage and facilitate organizational  
43 learning. Applying thematic analysis, we grouped accounts of similar leadership behaviour into 18  
44 first-order concepts (Gioia et al., 2013), see Figure 1. Third, we tied these first-order concepts to  
45 leadership behaviour discussed in the literature. Through this process, we asked whether the data or  
46 the literature, or both, "suggest concepts that might help us describe and explain" (Gioia et al., 2013,  
47 p. 16) leadership behaviour that we observed in MNPC. By repeated iterations between the data and  
48 the literature, and through discussions in the research team, we condensed the first-order concepts  
49 into eight second-order themes. Fourth, we thematically grouped the second-order themes moving  
50 back and forth between the data and the literature and labelled three aggregate dimensions  
51 describing what managers did and the order in which they did it. The data structure model (see  
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3 Figure 1) provides a graphic representation of how we moved from raw data to three aggregated  
4 dimensions.  
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9 Finally, we addressed the research question directly by tying the sub-processes of organizational  
10 learning identified in the first step to the leadership behaviours identified in the fourth step. The  
11 result of this process was a model (see Figure 3), illustrating that leadership behaviour not only  
12 encouraged and facilitated organizational learning within one sub-process but also supported the  
13 transition from one sub-process to another.  
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## 17 Findings 18

19 We present our data showing the role of leadership in organizational learning within and between  
20 each of the identified sub-processes.  
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### 23 Sub-process 1 experimenting: the role of leadership 24

25 The first sub-process, experimenting (1991-1999), related to the organization's testing of new  
26 production ideas and new ways of organizing work to ensure longer term competitiveness in the  
27 aftermath of the initial cost cutting programme to avoid bankruptcy. These initiatives resemble  
28 intuiting and interpreting in the first phases of organizational learning (Crossan et al., 1999). Through  
29 the testing of new ideas in some organizational units, individuals and teams learned that continuous  
30 improvement ideas increased efficiency and quality of production, and that organizing work in semi-  
31 autonomous teams improved the quality of work and improvement suggestions. Managers  
32 consolidated these lessons before they were transferred to the global organization. Four aspects of  
33 the role of leadership facilitated experimenting and transition to the second sub-process of  
34 organizational learning, transfer: (1) creating faith and optimism, (2) co-creating, (3) reorganizing, and  
35 (4) consolidating.  
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### 45 Creating faith and optimism 46

47 Top management created faith and optimism for avoiding bankruptcy and laying the groundwork for  
48 future competitiveness. They did this first by cutting costs, then by establishing a vision which became  
49 key for how they worked with production improvement. Through these efforts, top management  
50 installed a sense of collective hope that made it worthwhile for managers and employees to engage in  
51 experimentation.  
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55 Cutting costs: In 1991, to avoid bankruptcy, top management hired renowned management  
56 consultants to help identify and implement an extensive cost reduction programme involving the sale  
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3 of plants and business areas, restructuring and downsizing. By hiring external help, top management  
4 communicated that they were committed to solving the financial problems.  
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6 **In that situation, we had to cut costs, the market didn't allow much more. (Former CEO 1,**  
7 **2019)**  
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10 By 1994, NMPC delivered positive results. Thus, these structural changes yielded immediate financial  
11 results, showing shareholders and creditors the viability of the rescue plan, and preparing managers  
12 and employees for long-term production improvement work.  
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16 Establishing a vision: Through the cost cutting programme, top management learned that variation in  
17 the production line created enormous waste, quality problems, safety problems and a lack of  
18 dedication among operators. Therefore, the key to a sustainable cost structure was to scrutinize the  
19 production process:  
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23 Understanding that this was not about costs and downsizing but getting the [electrochemical]  
24 process under control. That was the breakthrough. Getting the process under control had  
25 much more economic value than cutting costs. (Former CEO 1, 2019)  
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29 **The new CEO became known for his enthusiasm and his persuasive selling of the vision, "getting the**  
30 **process under control". The vision served as a description of an idealized future and created faith**  
31 **and optimism among managers and employees.**  
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35 Co-creating

36 Co-creating refers to how managers and operators experimented together to learn how production  
37 could be improved and processes controlled. Top management empowered operators at the shop  
38 floor and ensured that top managers and board directors got hands-on production experiences. In  
39 addition, they established a "Management Forum", a decision forum where managers from all global  
40 plants met to discuss how to improve production stability by involving the whole organization. These  
41 efforts from top management were important because they bridged individual and collective learning,  
42 easing the interpreting phase of organizational learning (Crossan et al., 1999).  
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49 Developing a participative organization: **A main theme emerging from the efforts to increase**  
50 **production performance was how NMPC developed a participative organization. For example, in**  
51 **1991, local management in a Norwegian plant with poor results, decided to participate in a project**  
52 **initiated and financed by the Norwegian government.** The project financed an action researcher to  
53 promote the ideas of socio-technical system theory (STS) (Trist, 1981) and Scandinavian working  
54 traditions (Ingvaldsen, 2013; Thorsrud & Emery, 1969). One of the central ideas was to secure  
55 participation. Operators, plant managers and technical personnel was invited to several conferences  
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3 where they together elaborated how to improve production volume, safety improvement, quality and  
4 new market opportunities. Managers and teams learned that giving more responsibility to work teams  
5 resulted in greater productivity, fewer work-related injuries and an increase in production capacity  
6 (internal documents). These results were shared and adopted in other plants.  
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10 **Another example started with impulses from a quite different environment.** In 1994, a group of  
11 Norwegian managers visited one of NMPC's business partners, a subcontractor to Toyota, and learned  
12 how Toyota Production System (TPS) principles of continuous improvement could be translated to the  
13 process industry. An important dimension of TPS is the commitment and participation of operators at  
14 the shop floor. At their return, the managers experimented with TPS-principles in two Norwegian  
15 plants, encouraging operators to suggest and implement production changes, creating a more  
16 participating organization (internal documents). The learning outcomes of experimenting with a more  
17 participative work organization were constantly discussed with top management and the owners.  
18 These discussions allowed collective interpreting of the co-created lessons learned.  
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22 The CEO's extensive plant visits: The CEO visited all 30 plants across the world twice each year from  
23 1994 to 2000, amounting to more than one visit per week to a company plant. These visits involved  
24 two learning activities. First, the CEO taught managers and operators about TPS principles, stressing  
25 the vision of getting the processes under control. Second, the CEO joined the teams on the shop floor,  
26 participating in and observing how they worked with continuous improvement and experimented with  
27 new organizational forms, allowing the CEO to learn hands-on how TPS and STS could be combined at  
28 the shop-floor level. Both learning activities had important collective dimensions: they learned  
29 together across hierarchical levels and the CEO communicated these lessons learned to operators and  
30 managers in the global organization.  
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34 I left [plants] in a good mood, thinking: Here, the management has a good understanding and  
35 will drive it [process control] forward. Then I found out later that there were so many things.

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37 And the ones who were actually driving it forward were the operators. (Former CEO 1, 2019)  
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40 Board meetings in production areas: The CEO also insisted that the board meetings in NMPC should  
41 be held in a plant location and include visits to the production areas. The aim was to enhance  
42 understanding among board directors about how to develop production performance in the long-term  
43 perspective. By enabling interaction with operators and hands-on production experience,  
44 improvement ideas and principles were anchored among board members. This initiative is still a vital  
45 principle in the NMPC's board meetings.  
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49 You had to lead in a different way. We made a few rules, one of which was the board meetings.

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51 Half should be outside [in the production line] and half in the meeting room, then observations  
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3 should be made, and all should take part in improvement development  
4 (Former CEO 1, interviewed 2019)  
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7 NMPC Management Forum was established in 1996 on initiative from the new HR director. Her idea  
8 was to develop a global arena for dialogue, sharing of experience, learning and trust building, securing  
9 global production excellence (Internal documents). The Management Forum consisted of all plant  
10 managers in the global organization and the top management team had two main targets (internal  
11 document): (1) involve and anchor the vision and strategy of getting processes under control, (2) share  
12 experience and learning between the global plants. The Management Forum structured their work  
13 according to a conceptual learning model building on STS principles, organized in three phases (internal  
14 document): First, plant managers met in workshops discussing possible work structures (preparation).  
15 Second, they developed action plans that were brought back to the plants where they were refined  
16 through co-creating processes before being implemented (action). Third, the plant managers met to  
17 share learning from the co-creating processes in each plant (evaluation).  
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26 These co-creating efforts ensured involvement across hierarchical levels, from the shop floor to the  
27 board of directors, and facilitated meetings allowing collective interpretation of the lessons from the  
28 ongoing experiments.  
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### 31 *Re-organization*

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33 **To capitalize on the lessons learned from experiments across the organization, top management**  
34 **initiated two re-organizations, both allowing more co-creating.**  
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37 Relocating staff closer to the production halls (around 1994): The main argument was that to learn  
38 how production could be improved, it was important to physically co-locate staff personnel with  
39 employees with production knowledge and skills. This ensured collective learning because it eased  
40 communication and enabled learning across the value chain, encouraging collective intuiting and  
41 interpreting.  
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46 We changed the organization and transferred the sales function to the plants. Everyone  
47 involved in sales [in one district] was re-located to the plant. We did the same with purchases.  
48 So, the plants were given full control and we were then able to connect closer with suppliers  
49 and customers. (Former CEO 1, interviewed 2019)  
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54 More authority to the shop floor (around 1996): **Based on the lessons learned from experimenting**  
55 **with TPS, the management of two plants decided to remove shift managers.** They had learned that  
56 as the TPS-tools for continuous improvement were introduced, operators were challenged to suggest  
57 measures for improvement. However, plant management discovered significant variations in the  
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3 actual implementation of these ideas between the various shifts. As a former shift manager explained,  
4 this was related to shift managers' distrust of improvement suggestions from operators. Thus, there  
5 was a breach between operators' intuiting and group level interpreting (operators sharing with their  
6 shift manager), which prevented organizational learning. By removing shift managers, operators were  
7 empowered to implement production improvement ideas. This re-structuring contrasted with TPS-  
8 principles but resonated with the lessons learned about semi-autonomous teams from the STS-  
9 experiments:

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

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

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

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39 Consolidating

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

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

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56 The improvements at [different plants] were noticed and led to a meeting of [NMPC]  
57 management team in [Norwegian city] in 1999. Here it was formally decided that the [written  
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3 material] should be expanded to include all units in the company under the name [NMPC]  
4 Business System. (Former manager NMPC, interviewed 2019)  
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7 The NMPC improvement program thus consolidated and standardized lessons learned in different  
8 parts of the organization. This was done through the development of “rules in use”. “Rules in use”  
9 explained how to coordinate operations between each station in the value stream and was supported  
10 by illustrations and text in documents that were shared in the global organization (internal  
11 documents).  
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16 Integrating learning principles to company values: **The top management team acknowledged that the**  
17 **team-based operating mode challenged existing power structures.** To complement the structural  
18 changes emphasizing the shop floor’s authority, these ideas were made operational and rooted in the  
19 core values of the organization. Thus, lessons learned were translated into values that could guide  
20 further production improvement and learning in the company. In 1999, “Processes in control” was  
21 added as a company value. “Empowered people” was also regarded as a strong value describing  
22 desired management behaviour, due to its fundamental recognition of employee involvement. Today,  
23 this value is placed in the centre to emphasize the importance of the people dimension in NMPC.  
24 Integrating these learning principles into values, benefitted the coming sub-processes of organizational  
25 learning, transfer and institutionalizing.  
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34 -Figure 2-  
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36 To sum up: We interpreted the role of leadership we observed in sub-process 1 as orchestrating.  
37 Orchestrating resembles the leadership functions of an orchestra conductor who instructs, inspires  
38 and capitalizes on every orchestra member’s competency while at the same time ensures the pace and  
39 dynamics of the collective performance, and has previously been applied to describe leadership in  
40 innovation (Teece, 2007). In our study, top management orchestrated experimentation by ensuring  
41 immediate results and establishing a vision (creating faith and optimism), capitalizing on internal  
42 resources and their ability to absorb new knowledge (co-creating, re-organizing), and consolidating  
43 lessons learned, ensuring the transition to the subsequent organizational learning sub-processes. Thus,  
44 orchestrating relates to encouraging collective intuiting and collective interpretation (Crossan et al.,  
45 1999) as well as capitalizing on lessons learned and preparing the organization to implement those  
46 lessons.  
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## 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

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3 among participants. This enthusiasm that the new improvement coaches brought back, was central to  
4 the transfer of knowledge between organizational units.  
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7 I'd heard a lot about this programme, and everyone returning seemed brainwashed. Now I  
8 understand why. This is the best course I've ever attended. (Operator attending the university  
9 course, September 2017)  
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11

### 12 Assessing

13 Top management reinforced improvement programme values, developed in sub-process 1, by  
14 allocating resources to the Improvement Centre to develop and implement a global assessment  
15 programme, securing adoption of the improvement program in the global organization.  
16  
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18 Assessing to control: The Improvement Centre developed a global annual assessment programme in  
19 2000 to control the implementation of the Improvement Program. They developed a written  
20 assessment template, describing in detail the behaviour required to fulfil the standards of the  
21 Improvement Programme.  
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24 Establishing the assessment program became an important tool for testing the degree of the  
25 improvement program implementation. (Top manager interviewed 2017)  
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28 From 2000 to 2014, the assessment program was conducted as a typical audit, controlling and  
29 reporting variation from the standards developed to assess the level of improvement activities. A  
30 typical assessment session lasted for five days and started with an information session, describing the  
31 assessment process for plant managers and key personnel. Then an assessment team from the  
32 Improvement Centre assessed performance in different areas. After four days, the assessment team  
33 presented their evaluation to the plant management team. The plant was then given three weeks to  
34 respond by outlining measures to be taken to improve the plant's performance. This formal  
35 assessment practice facilitated transfer and implementation of the Improvement Program in the global  
36 organization.  
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39 Assessing to learn: The values supporting assessment changed in 2014 from audit and control-based  
40 to a learning approach. The assessors used much of their time explaining and educating plant managers  
41 and operators about the core ideas of the Improvement Program, emphasising the empowerment  
42 dimension, and describing how to involve the operators in problem solving and continuous  
43 improvement.  
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46 We don't like to call it audit, so we renamed it assessment and reduced the number of topics.  
47 Today, the people dimension is fully integrated in the assessment document, and, yes, it's  
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3 important to sell the idea of people involvement in the assessment programme, so it becomes  
4 their own. (Head of improvement centre NMPC, interviewed 2017)  
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7 This learning approach to assessment, was possible because of the values of empowerment and the  
8 structural decisions made previously to delegate responsibility for production improvement to the  
9 shop floor.  
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12 To sum up: We interpreted the role of leadership in sub-process 2 as sponsoring. Sponsoring involves  
13 resource allocation and financial support for activities that support and market ideas that top  
14 management wants to promote. In our study, top management sponsored transferring by allocating  
15 dedicated financial and human resources, to the transfer of the improvement programme. For  
16 example, they established organizational units and procedures intended educate operators and  
17 managers as well as to assess their performance related to implementation of the Improvement  
18 Programme. However, the success of transferring was directly related to the extensive involvement  
19 and structural foundations established in the previous sub-process, which also facilitated the transition  
20 to institutionalizing.  
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29 Sub-process 3 institutionalizing: the role of leadership

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

51 Two initiatives contributed to promote and internalize values among new and existing organizational  
52 members: an onboarding programme for new managers, and a formal reporting system.  
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55 Onboarding new managers: When new managers were onboarded, they learned about organizational  
56 values. For example, all new CEOs had to attend a training programme at the Improvement Centre,  
57 stressing the improvement programme values.  
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3 It was intense training. [the first CEO] wanted this so [co-worker] and I have been responsible  
4 for training all the CEOs who have been hired after [the first CEO] (Head of NMPC improvement  
5 centre, interviewed 2019)  
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9 The CEO, serving 30 years after the CEO who initiated the development of the improvement  
10 programme in 1991, expressed how he had learned and internalized the core values.  
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13 I had to understand the [people] dimension, and how strong it is. The enormous energy you  
14 can release through the organization when people are properly trained and made  
15 responsible... and your decisions are decentralized. (Former CEO 2, 2017)  
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19 Top management's continuous promoting of core values maintained a strong corporate culture, which  
20 to some extent resembled a shared religious belief. A top manager even related NMPC's success to  
21 this internalization of values:  
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24 This is spot on, but we have never addressed it like this before. Yes, it is a religious belief, and  
25 you [the researcher] have described something that has been right in front of our eyes. And,  
26 yes, that's why we succeed. (Top manager, MNC corporate manager team)  
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31 Reporting system: The core values in the improvement programme were also built into and reflected  
32 in formalized organizational processes. A reporting and measurement system was developed by the  
33 top management team. Its roots goes back to the consolidation of the improvement program in 1999  
34 but evolved continuously throughout institutionalizing (2006-2021). The reporting system ensured  
35 vertical coordination by breaking down strategic targets to every level in the organization. These  
36 targets were operationalized with key performance indicators, and continuous improvement work was  
37 performed to reach the targets. This allowed the top management team to follow closely the progress  
38 of production performance in the global organization and to address any deviation from the strategic  
39 plan. The top management team used this reporting system in their weekly meetings:  
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46 We meet every week for a meeting lasting an hour and a quarter. The schedule is very tight.  
47 One agenda is mandatory: the reporting of operational progress. (Member of the top  
48 management team, 2019)  
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52 This reporting system, once in place, did not depend on key actors but ensured that the organization  
53 regularly evaluated performance. The reporting practice ensured collective assessment of  
54 performance, but, more importantly, collective decisions about how to further improve performance.  
55 The organizational learning implications of this include a collective interpretation of the results of  
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3 previous learning, and a collective understanding of which parts of the production process that could  
4 benefit from future organizational learning.  
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### 6 7 *Encouraging experimenting*

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9 Even though the improvement programme was successfully transferred and implemented, top  
10 management continued to encourage experimentation throughout the organization.  
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13 Maintaining continuous improvement as every operator's responsibility: Through the reporting  
14 system, operational progress was visualised at all organisational levels, and helped top management  
15 to maintain and reinforce basic assumptions about the constant ability to enhance performance by  
16 solving problems on the shop floor. The reporting system not only structured meetings but also  
17 reminded the organization daily that continuous improvement was part of each operator's job:  
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22 The biggest change in the last five years in my workplace is knowledge about how to  
23 continuously improve my work. (Operator, Chinese plant, 2019)  
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26 Thus, it was a collective mindset supporting continuous organizational learning that was  
27 institutionalized, not necessarily the specific knowledge that was a result of organizational learning.  
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30 Adding new elements to the Improvement Programme: Managers at all levels encouraged operators  
31 to integrate new knowledge from daily operations back to the improvement programme, allowing  
32 experimentation after institutionalizing. Based on the results of new experimentation, new elements  
33 were added to the improvement template and re-transferred to the global organization. For example,  
34 metallurgical upstream processes have many variables that influence output and to ensure stable  
35 production, these variables must be defined, controlled and stabilized. One division, still struggling to  
36 get their upstream processes under control after implementing the Improvement Programme, started  
37 to experiment with Critical Process Management (CPM), a scientific method to reduce variation in a  
38 work process using statistical methods predicting output within statistical variation. CPM was not an  
39 original tool in the Improvement Program but was introduced to this division by an external consultant.  
40 In 2006, after implementation and good results in this division, the concept was added to the  
41 improvement template and spread to the global organization through the established channels. Today,  
42 CPM is one of the pillars in the Improvement Programme.  
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52 CPM gave the system measurable substance and was quickly incorporated into the  
53 Improvement Centre. CPM became one of the most important drivers in the rollout of the  
54 Improvement Programme. (Former manager, Improvement Centre, 2020)  
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58 In 2013, management in the same division, tested a new concept, "Cost Roadmapping" (CRM), aiming  
59 to achieve the best possible cost position among its competitors. CRM was directly designed to connect  
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3 the improvement work to the finances, with a cost target of a 7% annual decrease compared to the  
4 baseline from the previous year. It was based on the idea of involving the whole organization. It started  
5 with a collective brainstorming, bringing up new ideas for cost cuts in the division. Then the  
6 management team picked the best suggestions and sent them back to the operators for execution.  
7  
8 The division managed to reduce its cost position every year from 2013 to 2021, according to target,  
9  
10 and today the cost roadmap concept is part of the improvement template, having been transferred to  
11  
12 the global organization.  
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15 Summing up, we interpreted the role of leadership in sub-process 3 as persistence. Persistence  
16 describes top management's simultaneous focus on maintaining and reinforcing key values and at the  
17 same time encouraging employees and managers at all levels to continue experimentation and new  
18 collective learning. In our case, top management showed persistence in organizational learning  
19 through their continued support for improvement values over decades, maintaining a strong corporate  
20 culture of continuous improvement and ensuring that the improvement template was continually  
21 updated based on new knowledge. This persistence enabled institutionalizing as well as the transition  
22 between institutionalizing and continued experimentation.  
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26 Figure 3 summarizes our findings and illustrates how leadership facilitated each sub-process of  
27 organizational learning and the transitions between the sub-processes. The OSP-model reflects the  
28 role of leadership as orchestrating, sponsoring and persistence.  
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42 -Fig 3-

## 43 Discussion

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

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3 encourage further research in other contexts to explore these challenges and how they can be  
4 overcome.  
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### 6 7 *Leadership in organizational learning – beyond transformational leadership*

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9 Previous research on leadership in organizational learning has emphasized the personal  
10 characteristics of the manager, most notably managers' transformational and transactional  
11 behaviour (e.g. Jansen et al., 2009; Waddel & Pio, 2015). We did not explicitly test transformational  
12 or transactional leadership behaviour in our study, but our findings suggest that top managers  
13 provided visions and inspired managers and operators to search for new ways to improve production  
14 performance (*creating faith and optimism*). Such behaviour displays some of the characteristics of  
15 transformational leadership (Bass & Reggio, 2006; Waddel & Pio, 2015) and may serve as an  
16 important prerequisite in how leaders can enhance organizational learning. However, our findings  
17 suggest that this is not enough. In our case, the top management team also made formal decisions  
18 that related to organizational structure (relocating staff closer to production halls, more authority to  
19 the shop floor, creating a formal template, establishing new organizational units, reporting system  
20 etc.)  
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23 These structural measures communicated the beliefs, values and norms that senior management  
24 considered important for continued organizational learning and enabled employees and managers to  
25 share experiences and develop shared beliefs and understandings (intuiting and interpreting). In this  
26 way, the decisions about organizational structure reinforced an organizational culture of continuous  
27 improvement, closely resembling an organizational learning process.  
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30 Our study suggests that managers' toolkit to enhance organizational learning may be more  
31 comprehensive than previous research has concluded with. Our findings confirm previous findings  
32 suggesting that transformational leadership may enhance exploration (*creating faith and optimism* in  
33 the early phases of organizational learning) and transactional leadership may enhance exploitation  
34 (*ensuring transfer and institutionalization of the lessons learned*). However, our study extends  
35 previous research in two ways. First, by implying that managers should master both transformational  
36 and transactional leadership but also understanding when to rely on which one. Second, by suggesting  
37 that managers should complement transformational and transactional leadership with mobilizing  
38 other resources that they control. Managers in this case used their power to change organizational  
39 structures, establish new organizational units and removing layers in the hierarchy. Further, they  
40 reinforced these structural changes by infusing the improvement program with key values. It is difficult  
41 to point to one of these efforts to explain how managers facilitated organizational learning in this case,  
42 rather it seems to be the combination of efforts that contribute to explain the success of this company.  
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3 This suggests that if managers only recognize and apply one tool (leadership behaviour, organizational  
4 structure, organizational culture), this can get in the way of their efforts to facilitate organizational  
5 learning.  
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9 We acknowledge the limitations of generalization of a case study and encourage more research about  
10 how leadership facilitates organizational learning. Our findings suggest that the role of leadership  
11 extends beyond leadership behaviour and includes decisions on organizational structure and culture.  
12 While such decisions are leaders' responsibilities, there have been less focus on this in research about  
13 the role of leadership in organizational learning. Thus, future research could take a fresh look at the  
14 toolkit available to managers in promoting organizational learning. We need more research about how  
15 managers at all levels in the organization can facilitate organizational learning through their decisions  
16 about how to structure work, allocate resources, ensure strong sponsorship, and involve others in  
17 making decisions throughout the organizational learning process. Future research could thus help us  
18 understand how managers contribute to building and reinforcing organizational structures and  
19 cultures that facilitate organizational learning.  
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## 28 Conclusion

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30 In this paper, we aimed to study how managers facilitate transitions between sub-processes of  
31 organizational learning in a multinational company. We found that managers did this by orchestrating,  
32 sponsoring and showing persistence. Our findings suggest that managers' toolkit for promoting  
33 organizational learning extends beyond leadership behaviour and includes formal decisions about  
34 organizational structure and efforts to develop and maintain organizational culture across  
35 organizational levels and across international plants.  
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41 **Based on our findings, we make three recommendations to researchers of organizational learning.**  
42 **First, we encourage designs that enable us to understand more about the links and interactions**  
43 **between sub-processes. This calls for longitudinal studies and long-term dedication to field work. In**  
44 **doing so, future research could address a limitation of our study because retrospective research**  
45 **always comes with a risk of hindsight bias.** We would therefore encourage researchers to delve into  
46 real-time studies even though organizational learning in practice may be messy and time-consuming.  
47 **Second, we recommend** further studies where researchers link sub-processes of organizational  
48 learning in other contexts, for example contexts where professional workers may be less eager to  
49 respond to management's ideas and assessment and control activities, for example in hospitals or  
50 knowledge-intensive firms. **This will address another limitation of our research that depended on a**  
51 **single case approach and analysed organizational learning in an organization where the starting**  
52 **point was a struggle for survival. Third, we recommend that future studies of the role of leadership**  
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3 **in organizational studies investigates more than transformational and transactional leadership.**  
4 **While we, in line with previous research, find that the top manager's personal characteristics impact**  
5 **organizational learning, we also find that managers' decisions concerning organizational structure**  
6 **and organizational culture are of vital importance for organizational learning.**  
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10 The most important **recommendation for practitioners that can be drawn from** our study is that  
11 managers acknowledge that they have a larger toolkit for organizational learning than they may think.  
12 Thus, managers should not embark on organizational learning processes believing that it is sufficient  
13 to show transformational leadership behaviour. **Our findings suggest that managers' decisions to**  
14 **standardize, formalize and organize organizational learning processes are important to complement**  
15 **the communication to employees of vision and inspiration to learn. Another recommendation for**  
16 **practitioners relates to the timing of interventions in organizational learning.** Managers should  
17 carefully consider when to do what as our study suggests that the order of orchestrating, sponsoring  
18 and persistence was decisive for facilitating organizational learning. **This requires context-specific**  
19 **knowledge of what is going on when at various levels and in different parts of the organization.**  
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The Learning Organization

Table 1: Overview of the data material

<b>Research question:</b> How do managers facilitate transitions between sub-processes of organizational learning in a multinational company?	<b>Interviews</b>	<b>Observations</b>	<b>Archive data</b>
<p><b>Sub-process 1, experimentation (1991-1999)</b></p> <p>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).</p>	<p>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).</p> <p>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.</p>		<p>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.</p> <p>Documented events was cross checked with data from interviews and work groups.</p>
<p><b>Sub-process 2, transfer (1999 – 2006)</b></p> <p>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.</p>	<p>Purposive sampling strategy.</p> <p>46 semi-structured interviews with 4 top managers, 22 middle managers and 20 operators in NMPC.</p> <p>The informants' accounts provided information about how NMPC transferred learning outcomes to the global organization, and the role of leadership in this process.</p>	<p>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.</p> <p>Observations in the plants gave first-hand knowledge of the degree of transfer of improvement program in the global organization.</p> <p>NMPC University one week: Class education and observation of improvement program in NMPC plant.</p> <p>Observation at the University gave first-hand knowledge on one activity initiated from top management, securing transfer of knowledge in the global organization</p>	<p>NMPC written material about the assessment program. Plant performance presentation. The company's financial results.</p>
<p><b>Sub-process 3, Institutionalizing (2006 – 2021)</b></p> <p>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</p>	<p>Qualitative data collection approach. Purposive sampling strategy.</p> <p>27 Semi-structured interviews with: 2 Top managers 15 middle managers 10 operators</p> <p>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.</p>	<p>One week at each of two NMPC plants in Brazil and China</p> <p>Morning meetings, critical process (CPS) meetings, union meetings, day and afternoon shifts, two guided tours of the plant.</p> <p>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.</p>	<p>NMPC written material Assessment program written material. Plant performance presentation.</p>
	<p><b>In total:</b> <b>81 semi-structured Interviews and 3 work groups</b></p>	<p><b>In total:</b> <b>6 weeks observation</b></p>	<p><b>In total:</b> <b>37 documents</b></p>

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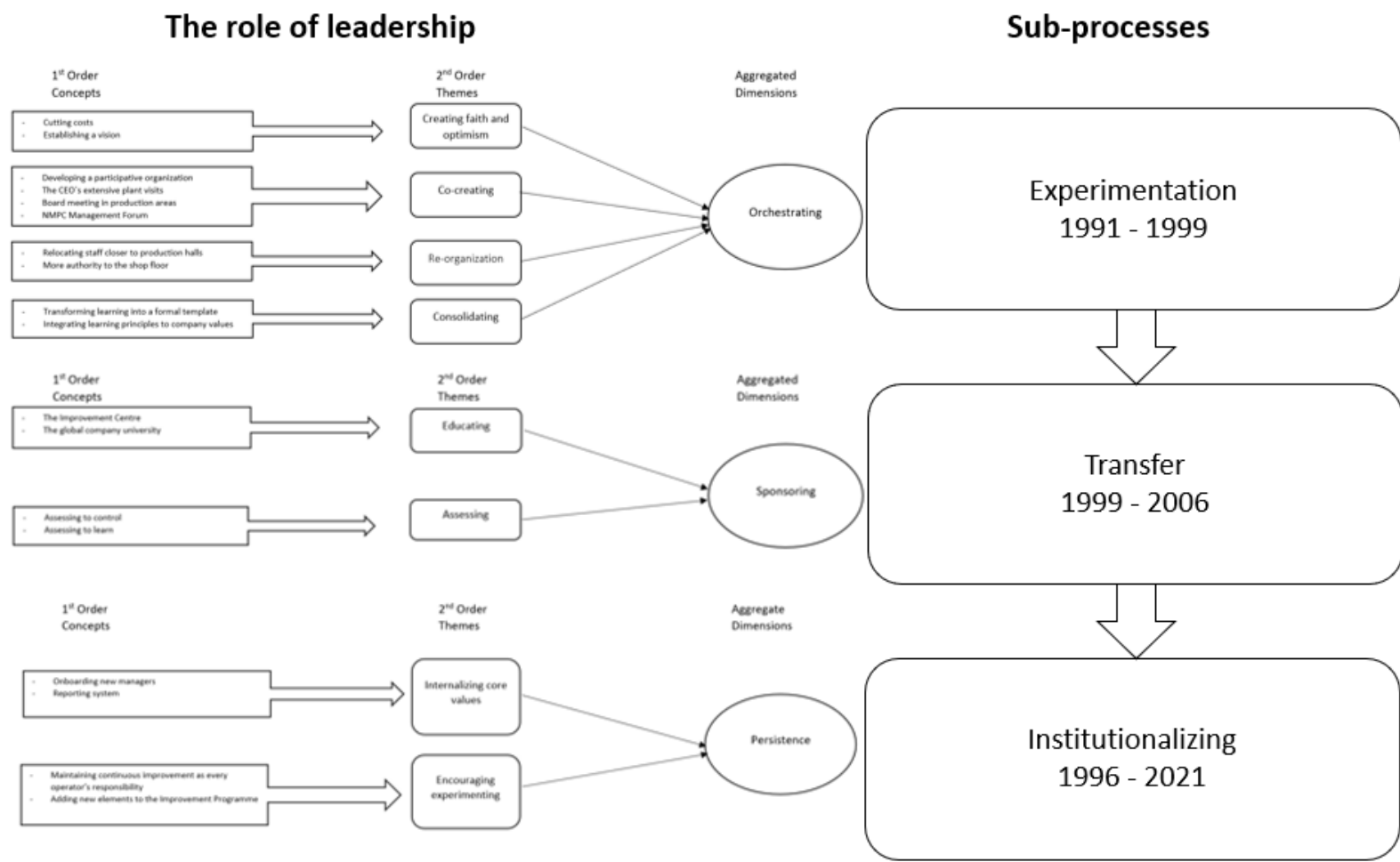


Figure 1. Data structure.



Figure 2. Values of NMPC

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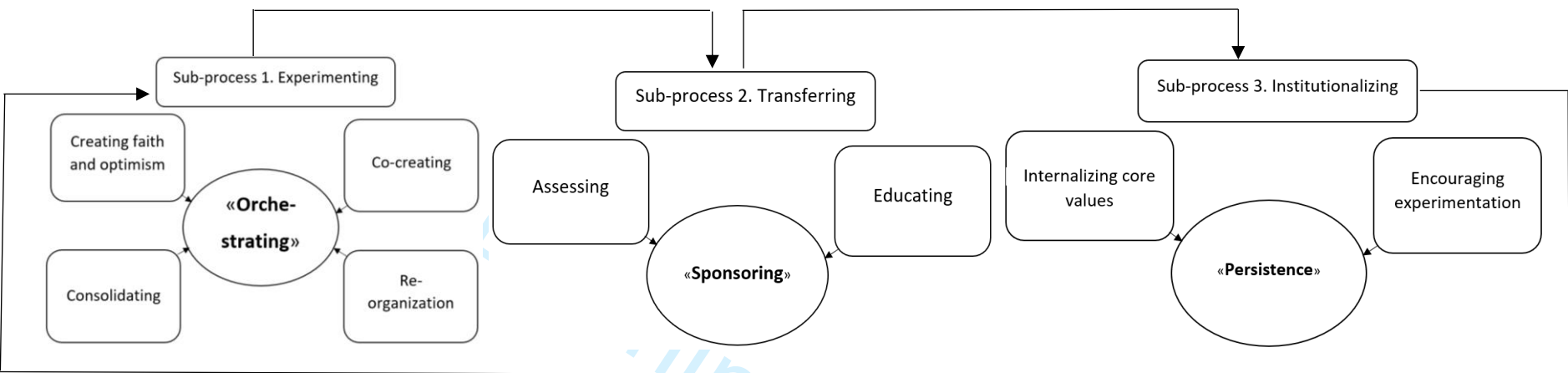


Figure 3. The OSP-model: the role of leadership in and between the sub-processes of organizational learning

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