

Hekneby, Torbjørn; Ingvaldsen, Jonas A.; Benders, Jos

Article

Managing adoption by cultural development: Exploring the plant level effect of a company specific production system (XPS) in a Norwegian multinational company

Journal of Industrial Engineering and Management (JIEM)

Provided in Cooperation with:

The School of Industrial, Aerospace and Audiovisual Engineering of Terrassa (ESEIAAT),
Universitat Politècnica de Catalunya (UPC)

Suggested Citation: Hekneby, Torbjørn; Ingvaldsen, Jonas A.; Benders, Jos (2020) : Managing adoption by cultural development: Exploring the plant level effect of a company specific production system (XPS) in a Norwegian multinational company, Journal of Industrial Engineering and Management (JIEM), ISSN 2013-0953, OmniaScience, Barcelona, Vol. 13, Iss. 2, pp. 402-416,
<https://doi.org/10.3926/jiem.3119>

This Version is available at:

<https://hdl.handle.net/10419/261725>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.



<https://creativecommons.org/licenses/by-nc/4.0/>

Managing Adoption by Cultural Development: Exploring the Plant-Level Effect of a Company-Specific Production System in a Norwegian Multinational

Torbjørn Hekneby¹, Jonas A. Ingvaldsen², Jos Benders^{2,3}

¹*School of Business and Law, University of Agder (ULA) (Norway)*

²*Department of Industrial Economics and Technology Management, Norwegian University of Science and Technology (NTNU) (Norway)*

³*Centre for Sociological Research (CESO), KU Leuven (Belgium)*

torbjorn@storform.no, jonas.a.ingvaldsen@ntnu.no, jos.benders@ntnu.no

Received: February 2020

Accepted: June 2020

Abstract:

Purpose: Company-specific production systems (XPS) are standardised improvement programmes, devised by and adjusted to a particular firm, generally a multinational corporation (MNC). A pertinent issue concerns the possibilities and constraints of putting them into practice in plants in different countries. This paper describes and analyses to what extent and how a Norwegian MNC succeeded in adopting an XPS in its local plants.

Design/methodology/approach: Brazilian, Chinese, and Norwegian plants of a Norwegian electro-chemical company were studied from 2017 to 2019. Our data consist of the results of the plants' XPS assessment programmes, combined with interviews and observations at different organisational levels.

Findings: The MNC largely managed to adopt the XPS in these plants. This was made possible by creating a strong corporate culture, shaping the managers' basic assumptions, and persuading lower-level management and operators to adopt the improvement programme. The corporate culture was the result of several initiatives, including the deployment of different human resource management practices, supported by top management teams and using the Norwegian plant as a laboratory visited by operators and managers.

Originality/value: This paper is, to the best of our knowledge, the first to study the actual use of an XPS intra-organisationally. It highlights the role of culture development and the basic assumptions for achieving global adoption. Global improvement programmes require constant managerial attention and actions at several levels in order to be adopted globally.

Keywords: company-specific production systems (XPS), local adoption, cultural development, basic assumptions, Toyota production system

To cite this article:

Hekneby, T., Ingvaldsen, J.A., & Benders, J. (2020). Managing adoption by cultural development: exploring the plant-level effect of a company-specific production system in a Norwegian multinational. *Journal of Industrial Engineering and Management*, 13(2), 402-416. <https://doi.org/10.3926/jiem.3119>

1. Introduction

Netland (2013) introduced the term ‘company-specific production system’ (XPS) to describe how multinational corporations (MNCs) create standardised improvement programmes, based on existing organisational concepts and adjusted to the MNC’s strategies and environments (Netland, 2014; Netland & Aspelund, 2014). An XPS is portrayed as an ‘own-best-way approach to the one-best-way paradigm’ of operations management (Netland, 2013: page 1093): a strategic and long-term programme, shared within the global production network, creating a common platform for improvement.

The strength of an XPS lies in the promise of realising superior performance throughout an MNC by achieving a high degree of intra-organisational adoption of the concept in the global network (Netland & Aspelund, 2014). However, a significant body of research points to the limits of realising substantial intra-organisational standardisation due to the fundamental challenges MNCs face when implementing improvement programmes globally (Ansari, Fiss, & Zajac, 2010; Ansari, Reinecke, & Spaan, 2014; Kostova, 1999; Kostova & Roth, 2002; Netland & Aspelund, 2014; Rolfsen, 2014; Wallace, 2004). When confronted with different political, social, and technological environments, MNCs are often forced to adapt their improvement programmes to local conditions. According to Ansari et al. (2014: page 1314), global adoption of improvement programmes is ‘an exception, not the rule’, and ‘hardly any management practice qualifies as a “one size fits all”’.

Given these tensions, more knowledge is required about subsidiaries’ actual use of an XPS in a global network (Netland, 2013). Since performance improvements can only be achieved through altered shop-floor practices, it is crucial to learn whether these are actually put into effect. To the best of our knowledge, there has been no in-depth empirical research on subsidiaries’ use of XPS. Hence, this study aims to address the following research question: *To what extent and how does the implementation of an XPS lead to homogeneous practices at subsidiaries?*

We address this question by examining how a Norwegian MNC implemented its XPS in three subsidiaries. Findings from Chinese, Brazilian, and Norwegian plants indicate that the subsidiaries adopted the XPS extensively. Adoption was made possible by creating a strong organisational culture (Schein, 2010), whereby subsidiaries developed a shared understanding of the basic assumptions and underlying values inherent in the XPS. By establishing a global XPS university, performing assessment programmes, and setting up a ‘laboratory’ to which visits were mandatory, the MNC actively shaped the belief systems of local managers and operators.

Our study contributes to understanding how MNCs successfully implement global improvement programmes in their networks. We highlight the importance of cultural development for achieving adoption at the subsidiary level, and our findings have practical implications for managers aiming for best practice in a global network.

2. XPS and Local Adoption

With his introduction of the concept XPS, Netland (2013) was referring to how manufacturers and other organisations create their own improvement programmes. These programmes are informed by one or more existing organisational concepts, typically taking inspiration from the Toyota Production System (TPS) (Fujimoto, 1999). Netland (2014) found that an XPS represents a lasting strategic programme, supporting diffusion of the core ideas across the organisational network. An XPS is meant to create a common strategy and language for production improvement in all parts of a global operations network, enabling transfer of ‘best practices’ among units. As a result, not every plant has to ‘reinvent the wheel’ (Netland, 2013). Intended to combine the strength of proven production improvement principles with the unique composition of the firm’s characteristics and needs, an XPS is labelled with the company’s name (the ‘X’ in the XPS) to make it the company’s ‘own’ programme.

A fundamental challenge when adopting improvement programmes in a global network is the subsidiaries’ political, social, and technological differences, which create a counterforce to the isomorphic pressure from the corporate level (Ansari et al., 2014). There is an extensive body of literature problematising the notions of local adoption (Ansari et al., 2010; Rolfsen, 2014; Wallace, 2004). According to Ansari et al. (2014), to ‘adopt’ is to ‘adapt’, and standardisation is ‘the exception not the rule’ since hardly any improvement programme qualifies as a ‘one size fits all’ solution (Ansari et al., 2014: page 1314). Consequently, MNCs are often forced to develop local variants or

hybrids (Wallace, 2004) of its improvement programme, and the ability to adjust and adapt to the local context is a fundamental capability for MNCs when diffusing improvement programmes in their network. Ansari et al. (2014) presented the case of an MNC's corporate improvement programme that was 'made to vary', arguing that adaptation may even be a necessary condition for diffusion rather than something that only happens during diffusion or as an outcome.

According to Netland and Aspelund (2014), subsidiaries might react differently when an XPS is introduced. They claimed that 'the corporation must carefully manage any legitimacy-seeking pitfall that leads to shallow implementation of practices and the trade-off between adoption and adaptation' (Netland & Aspelund, 2014: page 394). To 'adopt' is considered the ideal for an improvement programme because it entails the subsidiary embracing and implementing the transferred improvement practice in full. To 'adapt' means that, while profoundly implemented, the programme is adjusted to better fit the local contingencies (Netland & Aspelund, 2014: page 395).

As with generic organisational concepts, an XPS lends itself to various interpretations. The greater the interpretive space, the greater the possibility for local adaptation (Benders, van Grinsven & Ingvaldsen, 2019). By detailed specification of the different operational principles and practices, the XPS can narrow down the interpretive space compared to the organisational concepts on which it builds. To reduce unwanted local variation and ensure the core tenets of an XPS are put into practice, it is essential to instil the desired values and beliefs locally. Unless this happens, superficial implementation is likely to result. At a general level, this may be conceptualised as changing the organisational culture. Starting with Schein's (1990; 2010) classic definition and classification of cultural elements, the topic of organisational culture has recently gained renewed focus within operations management (e.g., Lagrosen & Lagrosen, forthcoming; Losonci, 2017; Taherimashhadi & Ribas, 2018). Besser (1996) provided strong empirical data on how Toyota developed its plant at Lexington (Kentucky, USA) and how a 'community of fate' was built into the organisational culture. This resulted in a culture where employees believed they shared common interests with management.

For an XPS to be adopted, the cultural understanding of the expressed practices is crucial. A single practice may have different meanings at different subsidiaries. For instance, the principle of problem-solving involvement at the shop-floor level could be interpreted as a method to make the blue-collar workers 'easier to handle' by implementing new work processes and methods. Another interpretation is that enhancing innovation and productivity can only be solved through shop-floor employees' participation. The basic assumptions about why to involve people therefore become vital to the way in which the practice is adopted at the subsidiary level. The example illustrates that the MNC's ability to influence cultural understandings is central to an XPS's promise of adoption and homogeneity (Taherimashhadi & Ribas, 2018). By creating a shared culture, the interpretations of the XPS become more similar and the practices become more homogeneous.

3. Research Method

3.1. Methodology

A multiple case study using the methodology of Eisenhardt and Graebner (2007) was conducted at a Norwegian multinational electro-chemical company that produces carbon materials for the global market. The production processes are highly automated, producing high volumes of standardised products. Non-participating observation was conducted by the first author who studied one Norwegian, one Brazilian and one Chinese plant of the MNC. This approach allowed us to investigate the process and level of XPS adoption at each plant, and to systematically compare the three plants in a search for patterns and explanations.

The original intention of the case studies was to investigate the variation in XPS use between the plants. However, when analysing the empirical data, we found that the variations were strikingly low, implying a shift in focus towards explaining the extensive adoption that had taken place. In the interviews, references to 'values', 'beliefs', and 'culture' were often made, which made *culture* a key emergent theme that called for further elaboration.

3.2. Data Collection

The first author collected data from 2017 to 2019. He started by interviewing the MNC's top management group and participating in the XPS global university and assessment programmes. This allowed us to establish the content of this XPS (see Figure 1) and address how it was intended to be diffused and implemented globally.

In the next phase, three plants were visited. We collected data from two main sources: the corporate assessment programme; and interviews and observations.

3.2.1. The Corporate Assessment Programme

Table 1 shows an overview of the content of the corporate assessment programme.

<p>Sponsorship to Achieve Change Management</p> <p>The objective of this category is to develop an environment that encourages and nurtures XPS. The hypothesis is that a management team who leads by example and spends much of their time at the Gemba to understand, support and challenge will create an improvement culture.</p> <ul style="list-style-type: none"> a) How leadership/management understands and demonstrates EBS in developing the people value chain b) How the organisation is challenged, coached, and trained to continuously improve c) How much time and resources are dedicated to improvement activities d) How management supports and challenges processes and activities.
<p>A3 Cascading/Strategy Deployment</p> <p>This category focuses on how PDCA thinking is integrated throughout the unit to reach the vision and goals.</p> <ul style="list-style-type: none"> a) How the strategic plan for the unit is developed, communicated, and linked to division goals b) How the plan for the unit is broken down in order to specify the sub-goals of all underlying departments c) How the strategic plan is the main driver of the improvement work, how it is monitored and followed up, and how deviations are handled d) How the organisation is involved to ensure the necessary participation and strong ownership.
<p>Learning and Competence Development</p> <p>Competence is defined as the combination of knowledge, skills and attitude/behaviour.</p> <p>The objective of this category is to develop employees with high levels of competence and precision in their work/discipline and in problem solving. The underlying hypothesis is that if all employees are more competent in, and more motivated to perform, problem solving, the speed of improvement will correspondingly increase. The HR department is accountable for a competence development programme to develop a learning organisation.</p> <ul style="list-style-type: none"> a) Strategic goals behind basic and key competence development b) How basic and key competence is built and documented c) How training is undertaken and followed up. <p>(The facilitation of problem solving is covered by category 7)</p>
<p>Daily Management</p> <p>The objective of this category is for teams to take responsibility for meeting expected goals, solve occurring problems, and make improvements. The hypothesis is that organising the right competence and developing communication systems and standards will enable the team members to take responsibility for meeting daily goals and to improve their daily work.</p> <ul style="list-style-type: none"> a) How the workforce is organised with roles and responsibilities b) How communication between management and teams is performed c) How to ensure stable and consistent work practices.
<p>5S and Visual Management</p> <p>The main objective is to lift work areas to a controlled and predictable state and identify and eliminate 'hidden waste'. The underlying hypothesis is that high 5S performance is a prerequisite for high standards in other processes and activities in the company. Visual management visualises system status and condition and makes it easier to achieve a shared understanding and to make fast, fact-based decisions on site. This category will assess:</p> <ul style="list-style-type: none"> a) How the workplace is cleaned and organised to ensure effective processes and activities b) How a clean and organised workplace is ensured over time c) How the condition of the workplace, process, and activities are visualised and ensured.

<p>Problem Solving and Continuous Improvement</p> <p>This category focuses on effective problem solving and continuous improvement. The objective is to have a continuously improving organisation that effectively identifies and solves problems. The hypothesis is that the rate of improvement will increase if all employees are involved with problem solving and continuous improvement on a daily basis.</p> <ul style="list-style-type: none"> a) What competence, methods and tools there are for problem solving and continuous improvement b) Who are involved in problem solving and continuous improvement activities c) How problems are identified and reported d) What is the result of problem solving and continuous improvement?
<p>Continuous Flow and Elimination of Waste</p> <p>This category focuses on one of the core elements in improvement work – reducing waste – and on continuous flow. By waste, we mean all activities that do not create value and that we, as a producer, have to pay for. Continuous flow connects the processes or activities to create a flow according to customer needs. The hypothesis is that, by reducing waste and optimising flow, we will increase cash flow, free up resources, and reach higher customer loyalty.</p> <ul style="list-style-type: none"> a) How waste is identified and eliminated b) How process and activities are linked and managed. <p>(Kanban JIT)</p>
<p>Critical-Process Management (CPM)</p> <p>The objective of this category is to ensure that processes are in control and capable to increase productivity and customer satisfaction. The hypothesis is that an organisation, structure, and a good way of working, together with collection, documentation, development, and sharing of process knowledge, will lead to stable, predictable, and capable processes. This category will assess:</p> <ul style="list-style-type: none"> a) How CPM and CPM teams are sponsored and interconnected with the whole value chain b) How processes are prioritised, and how customer and business requirements are identified c) How the overall process understanding is developed and maintained to assess, ensure, and improve processes d) How process parameters are measured.

Table 1. The XPS assessment content

The global XPS team has conducted plant assessments since 2004, which involve classifying the level of XPS adoption at the plants. The plants are assessed according to multiple variables, as outlined in table 1. Each variable is rated on a scale from 1 to 5, and each level is described textually. Importantly for the current study, we discussed the definition of ‘adoption’ and ‘adaption’ based on Netland and Aspelund’s (2014) criteria with the XPS team manager conducting the assessment programme. We then asked the team manager to classify the level of adoption (‘embraced and fully implemented’) related to the levels in the assessment programme. The level of adoption is rated at level 3, indicating that the subsidiary has embraced the concept. Transitioning from level 2 to level 3 represents a qualitative shift from resistance to adoption, while level 3–5 is ‘more of the same’, indicating that the subsidiaries conduct the activities more frequently. Level 3 was therefore established as the baseline for adoption in the assessment programme.

We are looking for those who have made it their own and are developing XPS to ensure enhanced performance. Level 3 describes this, I believe. But at levels 4 and 5 the culture is more developed, and more people in the plant are conducting continuous improvement. (XPS team manager)

3.2.2. Interviews and Observations

Table 2 shows an overview of the qualitative data.

At each plant, the first author started the interview process with the plant manager, proceeded with the rest of the organisation, and ended with a second interview with the plant manager. This allowed us to investigate the plant managers’ interpretations of the XPS, to observe actual adoption in each plant, and then to challenge the possible variations found in the plant during our data collection. Fifteen to twenty semi-structured interviews were conducted with top managers, middle managers, and lower-level employees at each plant.

Unit of enquiry	Management interviews	Shop-floor interviews	Observations	Words collected	Assessment data
Norwegian plant	5 managers	6 operators	One morning meeting Three critical-process management (CPM) meetings Union and environment meeting Day and night shift in control room Two guided tours of the plant	12,684 words in total	XPS assessment 2012 XPS assessment 2017
Brazilian plant	5 managers	4 operators	Three morning meetings Three CPM meetings Day and night shift in control room One guided tour of the plant	20,594 words in total	XPS assessment 2012 XPS assessment 2017
Chinese plant	6 managers	5 operators	Two morning meetings Two CPM meetings Day and night shift in control room Two guided tours of the plant	16,228 words in total	XPS assessment 2012 XPS assessment 2019
Top management	4 managers	N/A	N/A		XPS training documentation XPS assessment documentation XPS university programme
Top management	3 managers	N/A	N/A		XPS content document 1999 XPS content document 2019

Table 2. Overview of qualitative data. Words collected refer to interview transcripts

We used the content of the XPS as the main guide for the semi-structured interviews, together with the variables from the assessment programme (see Table 1) to create an interview and observation guide (see Table 3).

In our interviews (which lasted about 1.5 hours each) we asked managers and employees to describe work tasks and workplace conditions that related to the variables. For instance, investigating variable 4, 'Team and Daily Management', we asked the operators at the furnace: 'if something unexpected happens on your shift, to what degree do you and your team make your own decision to solve the problem?' We used a designated translator from the corporate HR department to translate the interviews with operators at the Brazilian and Chinese plants. The first author also participated in various improvement meetings and observed how the XPS was used in daily operations.

<p>1. Sponsorship to Achieve Change Management</p> <p>Identify managers at all levels and their ability to lead by example and spend their time at the Gemba to understand, support, and create an improvement culture.</p>
<p>2. A3 Cascading/Strategy Deployment</p> <p>Identify how the organisation is involved to ensure necessary participation in PDCA thinking to achieve the unit's vision and goals, and how this is linked to division's goals.</p>
<p>3. Learning and Competence Development</p> <p>Identify the managers' ability to develop employees with high levels of competence and precision in their work/discipline and in problem solving.</p>
<p>4. Team and Daily Management</p> <p>Identify the organisation's use of semi-autonomous teams on shop-floor level, and how the teams take responsibility for meeting expected goals, solve occurring problems, and improve their daily work. Identify span of control and the power structure on shop-floor level.</p>
<p>5. 5S and Visual Management</p> <p>Identify if work areas are controlled and in a predictable state, and whether there is the ability to identify and eliminate 'hidden waste'.</p>
<p>6. Problem Solving and Continuous Improvement</p> <p>Identify the organisation's effective problem solving and continuous improvement capacity, in teams and at different levels. The level of employees that are involved in problem solving and continuous improvement on a daily basis.</p>
<p>7. Continuous Flow and Elimination of Waste</p> <p>Identify the organisation's ability to secure the core elements in improvement work – reducing waste (all activities that do not create value and, as a producer, have to pay for) – and in continuous flow (connecting the processes or activities to create a flow according to customer needs).</p>
<p>8. Critical-Process Management (CPM)</p> <p>Identify the organisation's focus on getting critical processes under control and its capability to increase productivity and customer satisfaction.</p>

Table 3. Interview guide

3.3. Data Analysis

First, data from the top management group, the XPS university, and the variables in the assessment programme were analysed. Observations, corporate documents, and interviews were coded into categories, capturing the content of the XPS. Our categories were then taken back to the top management team to validate our interpretations. Secondly, we analysed data from the company's assessment programme in 2012 and 2017/2019.

Thirdly, we analysed the qualitative data from the plant visits to confirm the level of adoption from the assessment data. Recordings, notes, and observations were transcribed and coded by the first author. We categorised the data and used Netland and Aspelund's (2014) framework for subsidiaries' responses to improvement programmes as a theoretical framework for classifying adoption vs adaption. Based on the initial findings, we noted indications of local adoption within each case and homogeneity between cases. Our material indicated cultural explanations, and we then decided to analyse the cultural dimension systematically. We analysed how the subsidiaries' organisational culture had been developed and how the actions were taken at the corporate level to secure a homogeneous culture among the subsidiaries.

4. Findings

4.1. The XPS Content

The XPS was developed at the corporate level between 1991 and 1999, and it was based on TPS principles (Liker, 2004). It was also influenced by Norwegian working life norms (Ingvaldsen, 2013; Levin, Nilssen, Ravn, & Øyum, 2012). In 1999, a decision was made to implement the XPS in all divisions. The core idea of the XPS is to reduce variability so that processes are 'in control'. To do so, the XPS prescribes the application of lean-production tools, such as 5S, A3 problem solving, waste reduction and visual management. Furthermore, two important

organisational choices were made. First, decision-making was decentralised on the shop floor by establishing a broad span of control, removing supervisors, and increasing operators’ autonomy and ability to fix problems by themselves. Secondly, operators were engaged and involved in problem solving, process control management, and waste reduction. Engagement and involvement require investment in competency and training, and the XPS prescribes this clearly by addressing the ‘double integrated chain of value’, heavily focusing on personnel development as a fundamental part of the XPS (see Figure 1). In the words of the CEO:

I had to understand the [people] dimension, and how strong it is. The enormous energy you can release through the organisation when people are properly trained and are made responsible... and your decisions are decentralised. (CEO, Norwegian MNC)

IT’S ABOUT PEOPLE !

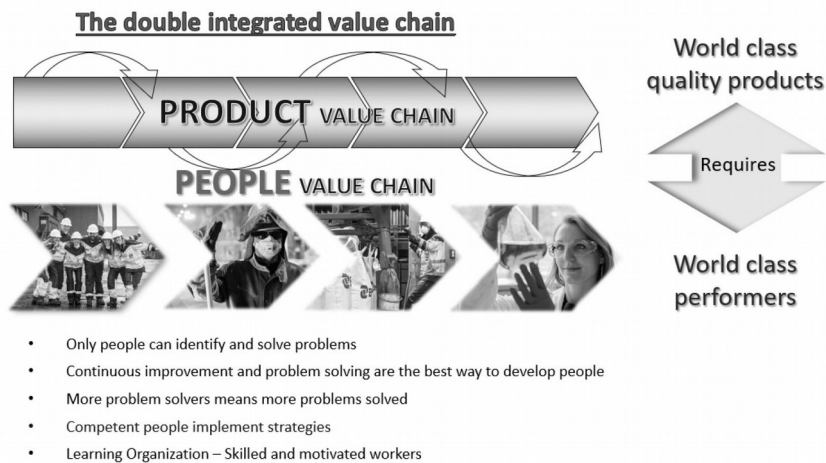


Figure 1. The corporate XPS: ‘It’s about people’

4.2. Plant-level Adoption

4.2.1 Assessment Findings

Table 4 shows the scores from the plant assessments.

	Dimension		Norway	Brazil	China
2012	1	Sponsorship	5.00	5.00	4.00
	2	Strategy, A3-hierarchy, PDCA	4.00	5.00	3.00
	3	Team Organisation	4.00	4.00	4.00
	4	Day-to-Day Team Management	4.00	5.00	3.00
	5	Learning, Practice, Competency Development	4.00	5.00	4.00
	6	Standardised Work, Routines	5.00	5.00	5.00
	7	Problem Solving, Continuous Improvement	4.00	4.00	2.00
	8	5S Controlled Critical Processes, Stability and	4.00	4.00	4.00
	9	Cap.	4.00	4.00	3.00
	10	Technical Maintenance	4.00	4.00	3.00
	11	Visual Performance Monitoring	4.00	3.00	4.00
	12	Continuous Flow, Elimination of Waste	3.00	3.00	4.00
Average			4.08	4.25	3.58
Standard deviation			0.51	0.75	0.79

	Dimension		Norway	Brazil	China
2017/2019	1	Sponsorship	4.00	4.00	4.00
	2	Strategy, PDCA	4.00	3.00	4.00
	3	Learning, Competence Development	3.00	5.00	3.00
	4	Work teams, Standards and Daily Management	4.00	4.00	4.00
	5	5s and Daily Visual Management	4.00	3.00	5.00
	6	Problem solving	3.00	3.00	3.00
	7	Waste Reduction and Flow	3.00	3.00	3.00
	8	Critical-Process Management	4.00	4.00	3.00
Average			3.63	3.63	3.63
Standard deviation			0.52	0.74	0.74

Table 4. Assessment data for XPS adoption

Assessment data from the plants in 2012 show an average score above level 3 at all plants (Norway: 4.08; Brazil: 4.25; China: 3.58). The Chinese plant reported level 2 on the variable ‘problem solving and continuous improvement’ in 2012, and this was the only score lower than level 3 in the dataset. Assessment data from the plants in 2017 (Norway and Brazil) and 2019 (China) report an average score above level 3 at all plants (Norway: 3.63; Brazil: 3.63; China 3.63).

The average scores for Norway and Brazil were lower in the second assessment. This could indicate that the implementation process stagnated during this period. The XPS department, after reviewing the data, attributed these lower averages to changes in the assessment instrument between the measurements rather than to an actual digression. According to the XPS department, the empowerment dimension in the XPS was significantly more integrated in the categories in 2017/2019.

Taken together, the assessment data indicates that the XPS was adopted at the different plants. Assessment data also indicate homogeneity between the plants. All three plants reported an average score of 3.63 in 2017/2019. As explained below, plant visits and other additional data corroborated the findings from the assessment scores.

4.2.2. Plant Findings

When visiting the plants in Norway, China, and Brazil, we found adoption of empowerment, expressed as the two organisational choices from the XPS, and adoption of the eight variables described in the interview guide (see Table 3). We also discovered important cultural elements that explained how managers used the XPS in daily management.

4.2.2.1. Decentralised Decision-Making

We found several indications of decentralisation that gave the blue-collar workers authority to make their own decisions about their daily work tasks on the production line. We found that plants managed, to a certain extent, their operations with broad spans of control, and that the operators took responsibility for daily operational decisions and continuous improvement. In two of the plants (Norway and Brazil), we found that supervisors were removed from the shop-floor level, and that there was a focus on greater responsibility for the operators, on the reduction of unnecessary information, and on better coordination when stabilising the critical processes at the production line. At the Chinese plant, the supervisors had not yet been removed, but preparations to do so were underway in 2019. Standard Operation Procedures (SOP) were established in all areas of the production line, but, due to the large amount of non-routine tasks, the operators were given the authority to make their own decisions.

Yes, [...] I needed to improve productivity. One way was to change the organisation and take out the layer of the supervisor. I could do it however I wanted, and I decided to do it via XPS, [...] because I have seen the plants in Norway and the maturity of the employees, and I could not see it in Brazil. (Plant manager, Brazilian plant, 2018)

I spend 90% of my working time by myself without any supervision of my manager. Most of my tasks I solve by myself. (Operator, Chinese plant, 2019)

4.2.2.2. Problem-Solving Competencies

We found that all plants had invested in competence and skills, enabling the blue-collar workers to handle more challenging work tasks and to conduct problem solving on their own. We found that variables 3 and 4, ‘Learning and Competency Development’ and ‘Team and Daily Management’, had to a certain degree been adopted at all three plants, giving the operator the necessary competency and skills to conduct problem solving. Competency investment included the ability to manage new technological set-ups in the production line combined with problem-solving skills, such as waste reduction, critical-process management, and 5S. This was especially visualised by variable 8, ‘Critical-Process Management’. This is likely one of the most important variables relating directly to production performance in process industry. In this variable, the subsidiary is supposed to ‘collect, document, develop and share process knowledge, [and this] will lead to stable, predictable, and capable processes’ (see Table 1). We found that the operators were given the responsibility to collect and document the variables on their own and then report back to the technical staff and managers, and *jointly* correct and stabilise the critical processes.

The people are more important in the company because people are responsible for making changes and improving. The most important part about the XPS is that it involves the people, gives them training and involves them. Competency and behavioural competence are very important, and we have strong procedures about how to increase the competence. (Head of HR department, Brazilian plant, 2018)

4.2.2.3. Continuous Improvement Participation

With regard to the variables in the interview guide, we found indications that all plants involved and engaged their employees in continuous improvement activities, and aimed for enhanced performance on critical output variables as well as on EHS and maintenance activities. We especially investigated the Chinese plant on variable 6, ‘Continuous Improvement’ (see Table 1), because it reported level 2 for this variable in 2012 (see Table 4). We found that ‘all employees were involved in problem solving and continuous improvement on a daily basis’ at the Chinese plant, indicating adoption of the variable. We also found indications that all plants had to a certain degree adopted variable 1, ‘Sponsorship’; variable 2, ‘Strategy and PDCA’; variable 5, ‘5S and Visual Management’; variable 7, ‘Continuous Flow and Elimination of Waste’; and variable 8, ‘Critical-Process Management’. We discovered minor variations between the self-assessment programme in 2017/2019 and our data from the plant visit.

The biggest change over the last five years in my workplace is the knowledge of how I should continuously improve my work. (Operator, Chinese plant)

4.3. The Adoption Process and Cultural Development

4.3.1. Local Managers’ Adoption Process

When visiting the plants, we discovered that the plant managers described a very similar management approach. Their year-long training within the company appeared to have resulted in a strong dedication to the XPS. In their interviews with us, the plant managers used the term ‘religion’ and ‘a way of thinking in all areas in life’, giving the impression that the XPS was so integrated in their mindsets that it might be regarded as a religious belief. All plant managers sought to persuade middle managers and engineers to follow the XPS. This was found in several areas: morning meetings, problem-solving meetings, lunch breaks, critical-process meetings, social arrangements, and in daily follow ups. Plant managers also manifested their beliefs by wearing the same work clothing as operators at the plant, showing that ‘we all share the same belief’ on the shop floor. When resistance arose among middle managers, mostly during morning meetings and critical-process meetings, this was often related to the level of involvement of the operators and when discussing how to conduct problem solving. Rituals were then conducted to manifest the XPS, symbolising the use of scientific tools and deductive methods, combined with an almost spiritual belief in the involvement of the people at hand. Instead of telling them how to solve the problem, top managers encouraged them to use the Lean Production (LP) tools and experience the effect. Through this ‘self-experiencing process’, middle managers gained a new understanding of problem solving and the potential of the XPS, making the operators self-driven in stabilising the critical processes for output performance.

The plant managers and operators also reported to have their own ‘Mecca’ to visit. The Norwegian plant was described as their visual confirmation that the improvement programme was a success and that their beliefs were correct. At the Chinese plant, most middle managers and several operators reported having been sent to Norway to see and learn about the improvement programme. The Chinese plant manager even claimed to have visited ‘Mecca’ at least 50 times during the last 10 years to study how the organisational choices at the shop-floor level played out at the Norwegian plant.

The preliminary findings were fed back to the MNC’s corporate level to validate them. There, respondents strongly recognised the description of the local managers. As one top manager said:

This is spot on, but we have never addressed it like this before. Yes, it is a religious belief, and you 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)

The top manager even recognised this ‘religious belief’ in his own management practice. During the interview, he was able to precisely pinpoint when the transformation into a belief system had occurred, and when he was ‘saved’:

At this point in my career in the company I am saved and in line with the XPS business system. But in the beginning, when the top management group discussed finger bandage injuries, I really questioned the focus. Today, I really understand the potential in investigating small injuries to prevent big injuries. And it is this inner journey that has become the salvation. (Top manager, MNC manager team)

The findings relating to managers’ understandings of the XPS and their almost religious beliefs in the concept became a central variable in the further investigation of the cultural dimension of the adoption process and how this adoption was made possible.

4.3.2. Corporate Adoption Process and Cultural Development

The findings indicated several mechanisms used at the corporate level to convey the content of and beliefs in the XPS to local plants. Following the creation of the XPS, the corporate level developed several strategic initiatives aimed at institutionalising the XPS. These initiatives, which are explained below, became important to secure the XPS adoption.

4.3.2.1. The XPS Centre

When the XPS programme was established in 1999, an XPS centre was immediately set up in the global organisation. The leader of the centre became part of the top management group, and the centre was given power and resources so that it could constantly develop and deploy the core ideas across the global network. It had two main objectives. First, it became the ‘corporate dynamo’ where ideas, concepts, and written material of the XPS were constantly maintained and interpreted, and where the concept was kept aligned to its original and core ideas. When analysing written material from 1999 and 2019, the expressed norms and organisational choices had not changed, and this kept the concept close to its original ideas. This manual has now been translated into nine different languages. Second, the XPS centre has been responsible for educating the organisation and hence manifesting the core ideas of the concept to the entire network. Together with the human resource management (HRM) department, the XPS centre has been responsible for the global XPS university, the assessment programmes, and the global XPS network, and it has developed the written materials and visual concepts used at the subsidiary level, resulting in XPS centre members spending between 150 and 200 days per year in travel.

The members of the XPS centre also represented a great variety of competence. Some had worked as team leaders on the production line, some had been responsible for the company’s technological division, some had been recruited from the management level, and some had been part of the global operational network. Most importantly, however, the members of the XPS centre understood the complexity of the production line and had extensive ‘real-life’ experience. This diverse, hands-on competence became essential to the global institutionalisation of the XPS content.

One particular task for the centre explains the framing of managers’ interpretation of the concept. Each time a new CEO entered the company, the leader of the XPS centre immediately began training the new CEO on the

implementation of the XPS ideas. This was regarded as a vital task, providing the ‘the right interpretation’ from top management to secure the necessary legitimisation of the XPS. In the XPS manager’s words:

My colleagues and I have been responsible for training all CEOs hired after the XPS was established, to help them understand the concept. (XPS head manager, MNC)

4.3.2.2. Global Structure for Improvement Work

We found one vital content of the XPS within the global network: sustaining the corporate pressure at the subsidiary level. Each day, operators visualised and reported, using large whiteboards, their performance on the shift, addressing safety, quality, and efficiency. This exercise was also termed ‘visual management’ in the XPS. Every week, top management teams analysed all performance data that were reported from plants to division managers. Serious deviations between reported and designated performance called for an explanation from division managers at a meeting. Serious injuries were root-cause analysed and, most importantly, the gradual development of bringing main processes under control was visualised at all organisational levels, leaving no doubt that top management demanded constant development and that this search for enhanced performance would never stop. We found that the establishment of this ‘push’ system, combined with visual management and regular weekly meetings of the global top team, helped to establish basic assumptions (Schein, 2010) about the constant ability to enhance performance by solving problems on the shop floor. In the words of the CEO:

You have to create some ‘push’ in the organisation to achieve ‘pull’. (CEO, Norwegian MNC)

4.3.2.3. Global XPS University

A global XPS university was established in 1997. This university was meant to educate the organisation in the main ideas of the XPS. A core principle was the diversity of participants. This was named the ‘1/3 principle’ because each programme should recruit one-third of participants from the shop floor, one-third from technical managers, and one-third from plant managers across the global network. This was a strategic decision made early during the XPS development, emphasising the importance of bringing different levels together in problem solving and discussing the core concept of the XPS. Today, approximately 1,500 people have completed the week-long programme, and some 800 to 1,000 have attended courses at local academies that are conducted by local plants.

We found that the training at the university was vital for establishing basic assumptions about the core ideas of the XPS. During the week-long training, managers and operators were trained in practical problem solving, which was combined with a constant focus on how to provide operators with the autonomy to solve their own problems. The university was located in different places globally, but it was always close to one or more plants. The plants were used as practical cases in the programme, demonstrating how the XPS had affected organisational choices at that particular plant. This further established basic assumptions and helped to convince some sceptics among participants.

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

4.3.2.4. Assessment Programmes

The assessment programme began in 2001 and has developed together with the XPS. Initially, the assessment was technically focused and audit oriented. Today, the assessment is described as a learning process. We found that during the three-to-five days of the programme, the assessment team interacted with the different organisational levels, educating the plants more than assessing them. A general format was followed, based on eight principles described by five levels of degree of implementation (see table 1). However, the assessors used much of their time explaining and persuading the staff about the core ideas of the XPS, 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 XPS department, MNC)

We found that the assessment programme helped to establish basic assumptions about the XPS and its core ideas among managers, operators, and engineers at the subsidiaries. This was done by following an ‘educational approach’ when assessing, as well as by letting the managers interpret and discuss results in meetings after the evaluation had been conducted. On the last day of the assessment week, all involved personnel assembled in a group meeting. Here, the results were presented one by one, according to the standards of the assessment board, and questions and comments were anticipated. Importantly, this openness contributed to a collective discourse and further established basic assumptions by allowing sceptics to rise to the surface, and by then using the values in the concept as guidelines for the discourse.

4.3.2.5. Network Organisation and Cross-Cultural Learning

The MNC also facilitated knowledge sharing between plants. XPS coordinators and teams were used to spread knowledge between the plants and were responsible for daily training and implementation of the core ideas. Travel was used extensively to transfer practical knowledge and core ideas across the plants in the global network. As noted earlier, the Norwegian plant was used as a ‘visual laboratory’, and several managers and operators from the global network were sent to visit and observe the XPS in practice.

5. Conclusion and Discussion

The findings suggest that the MNC managed, to a significant extent, to implement its XPS at the three plants. Plant visits supported the assessment findings, especially regarding adoption of empowerment as prescribed by the XPS. Based on this, it might be argued that the MNC is on its way to implementing the XPS in its network (cf. Marín-García, del Val & Martín, 2008). The data suggest that the Chinese and Brazilian plants, contextually very different from the Norwegian plant, significantly developed their organisation in a direction where empowerment had substantially influenced the workplace. Nevertheless, follow-up studies at the shop-floors may lead to differences in the intensities and forms in which this move towards increasing empowerment has become lived reality.

Findings indicate that the creation of an XPS in a global network contributed to increasing homogeneity among subsidiaries. The XPS clearly brought some ‘consistency and durability’ (Netland, 2013) to the subsidiaries’ improvement efforts. However, our findings also indicate that creating an XPS is necessary yet not sufficient. In our case, several corporate initiatives were taken to distribute and maintain the values supporting the content of the XPS. The creation of the XPS centre appears to have played a vital part in this. For more than 20 years, managers and operators have been trained and challenged by the idea that performance relies on the level of employee involvement and use of scientific tools. For some managers, especially the plant managers, this re-examination of basic assumptions, (Schein, 2010), resulted in an almost religious belief in the XPS. This belief then released a ‘religious energy’ in the organisation, encouraging all levels to adopt the XPS and make organisational choices relating to decentralisation and investment in training and competence at the shop-floor level. Our findings indicate that it is this strategic investment in people globally, supporting the content in the XPS, that leads to the adoption process and creates homogeneity at the intra-organisational level.

Our study has several practical implications. First, future managers must recognise the organisational choices needed to institutionalise the XPS in the global organisation and to allocate resources to the strategic initiatives. Key questions include: How should we organise the XPS work internally? How should we secure distribution of practical and tacit knowledge in our network? How do we educate and bring our managers and employees on board? How do we visualise and report performance vertically and horizontally in our network? And how do we assess and develop the XPS within the subsidiaries? These questions are fundamental for the institutionalisation process because they constantly challenge and re-examine the basic assumptions within the organisation, and, in this way, they create the culture needed to secure adoption and homogeneity.

Finally, top managers in the MNC must support the XPS in their daily management, becoming the primary ‘sponsors’ of the concept. This constant ‘push’ from top management is of vital importance in sustaining the normative pressure and securing the institutionalisation of the XPS.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

This work was supported by the Research Council of Norway.

References

- Ansari, S.M., Fiss, P.C., & Zajac, E.J. (2010). Made to fit: How practices vary as they diffuse. *Academy of Management Review*, 35(1), 67-92. <https://doi.org/10.5465/amr.35.1.zok67>
- Ansari, S., Reinecke, J., & Spaan, A. (2014). How are practices made to vary? Managing practice adaptation in a multinational corporation. *Organization Studies*, 35(9), 1313-1341. <https://doi.org/10.1177/0170840614539310>
- Benders, J., van Grinsven, M., & Ingvaldsen, J. (2019). The persistence of management ideas: How framing keeps lean moving. In Sturdy, A., Heusinkveld, S., Reay, T., & Strang, D. (Eds.), *The Oxford Handbook of Management Ideas* (271-285). Oxford: Oxford University Press. <https://doi.org/10.1093/oxfordhb/9780198794219.013.4>
- Besser, T.L. (1996). *Team Toyota: Transplanting the Toyota culture to the Camry plant in Kentucky*. Albany: State University of New York Press.
- Eisenhardt, K.M., & Graebner, M.E. (2007). Theory building from cases: Opportunities and challenges. *Academy of Management Journal*, 50(1), 25-32. <https://doi.org/10.5465/amj.2007.24160888>
- Fujimoto, T. (1999). *The Evolution of a Manufacturing System at Toyota*. New York: Oxford University Press.
- Ingvaldsen, J.A. (2013). *Democratic lean? Work systems in Norwegian Industry*. PhD thesis. Norwegian University of Science and Technology (NTNU).
- Kostova, T. (1999). Transnational transfer of strategic organizational practices: A contextual perspective. *Academy of Management Review*, 24(2), 308-324. <https://doi.org/10.5465/amr.1999.1893938>
- Kostova, T., & Roth, K. (2002). Adoption of an organizational practice by subsidiaries of multinational corporations: Institutional and relational effects. *Academy of Management Journal*, 45(1), 215-233. <https://doi.org/10.5465/3069293>
- Lagrosen, Y., & Lagrosen, S. (forthcoming). Creating a culture for sustainability and quality: A lean-inspired way of working. *Total Quality Management and Business Excellence*, 1-15. <https://doi.org/10.1080/14783363.2019.1575199>
- Levin, M., Nilssen, T., Ravn, J. E., & Øyum, L. (2012). *Demokrati i arbeidslivet. Den norske samarbeidsmodellen som konkurransefortrinn*. Bergen: Fagbokforlaget.
- Liker, J. K. (2004). *The Toyota Way*. New York: McGraw-Hill.
- Losonci, D. (2017). The impact of shop floor culture and subculture on lean production practices. *International Journal of Operations and Production Management*, 37(2), 205-225. <https://doi.org/10.1108/IJOPM-11-2014-0524>
- Marín-García, J.A., del Val, M.P., & Martín, T.B. (2008). Longitudinal study of the results of continuous improvement in an industrial company. *Team Performance Management*, 14(1/2), 56-69. <https://doi.org/10.1108/13527590810860203>
- Netland, T. (2013). Exploring the phenomenon of company-specific production systems: One-best-way or own-best-way? *International Journal of Production Research*, 51(4), 1084-1097. <https://doi.org/10.1080/00207543.2012.676686>
- Netland, T. (2014). Coordinating Production Improvement in International Production Networks: What's new? In *International operations networks* (119-132). London: Springer. https://doi.org/10.1007/978-1-4471-5646-8_8

Netland, T., & Aspelund, A. (2014). Multi-plant improvement programmes: A literature review and research agenda. *International Journal of Operations and Production Management*, 34(3), 390-418.

<https://doi.org/10.1108/IJOPM-02-2012-0087>

Rolfesen, M. (2014). A blueprint paradox: Successful but unintended cross-national translation of total productive maintenance. *Journal of Quality in Maintenance Engineering*, 20(4), 402-414. <https://doi.org/10.1108/JQME-07-2012-0024>

Schein, E.H. (1990). Organizational culture. *American Psychologist*, 45(2), 109-119. <https://doi.org/10.1037/0003-066X.45.2.109>

Schein, E.H. (2010). *Organizational Culture and Leadership*. San Francisco: John Wiley & Sons.

Taherimashhadi, M., & Ribas, I. (2018). A model to align the organizational culture to lean. *Journal of Industrial Engineering and Management*, 11(2), 207-221. <https://doi.org/10.3926/jiem.2511>

Wallace, T. (2004). Innovation and hybridization: Managing the introduction of lean production into Volvo do Brazil. *International Journal of Operations and Production Management*, 24(8), 801-819.

<https://doi.org/10.1108/01443570410548239>

Journal of Industrial Engineering and Management, 2020 (www.jiem.org)



Article's contents are provided on an Attribution-Non Commercial 4.0 Creative commons International License. Readers are allowed to copy, distribute and communicate article's contents, provided the author's and Journal of Industrial Engineering and Management's names are included. It must not be used for commercial purposes. To see the complete license contents, please visit <https://creativecommons.org/licenses/by-nc/4.0/>.