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The Issue of Corporate Mandatory Standards in Production Improvement Programmes

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Abstract:

Purpose: This paper aims to explore and describe how companies manage the level of standardisation of improvement practices in a multisite context. It seeks to explain the managerial strategies applied to change the standardisation level in manufacturing companies with multiple production sites worldwide.

Design/methodology/approach: This paper reports from a case based on data collected through semi-structured interviews, participant observations and company documents from a large multinational producing company and, specifically, from of the largest production sites in the company. The research design resembles a grounded theory approach by being reflexive and open to emerging themes. The standardisation strategy was analysed at a company that strived to increase the standardisation of problem-solving practices within about 20 production sites as part of their corporate lean programme.

Findings: Several managerial tools were applied at the corporate level to increase the standardisation level of problem-solving practices, such as developing standards and a company-specific toolbox aligned with an in-house maturity model. In addition, deploying change leaders and global implementation targets enabled audits and progress. However, consequences at the production-site level became minor adaptations of standards, the design of training models as a "roll-out", and a resource-demanding implementation process.

Originality/value: This paper empirically demonstrates strategic tools that corporate management teams apply to influence the company's standardisation level of practices. The study describes the purpose and consequences of the design of the toolbox, maturity model, training model, and implementation targets, which aims to simplify the complex task of managing standardisation in a corporate group. By applying a knowledge-based view, four processes (i.e. adaptation, integration, upskilling, and learning) were identified to improve the management strategies in multisite contexts.

Keywords: level of standardization, case study, knowledge management, lean management, multinational companies, grounded theory, XPS

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1. Introduction

Producing companies constantly seek ways to be competitive by improving their business into more productive and sustainable models. Often, corporations initiate improvement programmes to develop an organisation that actively transforms multiple production sites jointly into different ways of improving the business (Hermundsdottir & Aspelund, 2022; Netland & Aspelund, 2013; Zokaei, Manikas & Lovins, 2017). Lean transformations are good examples of corporate-wide improvement programmes and today, companies manage digital and circular transformations in parallel (Plekhanov, Franke & Netland, 2022; Rosin, Forget, Lamouri & Pellerin, 2020). Given that the top 25 multinationals control some 37,400 subsidiaries worldwide (OECD, 2021), manufacturing companies that effectively manage to mobilise their employees under the same umbrella for improvements will more likely succeed with their corporate-wide transformation (Kogut & Zander, 1993; Netland & Aspelund, 2014; Pellegrinelli, 1997). However, improvement work in a multisite context is often complex due to, for example, unavoidable variations of maturity levels and historical experience within the company. The varying needs at the production sites may hinder them from implementing the corporate improvement programmes due to a high level of standardisation.

Earlier publications report a low success rate of improvement initiatives, particularly in achieving lasting effects of the investments (Netland, 2016). Here, corporate-wide lean programmes are useful examples to study for understanding the strategic perspectives of improvement work in multiple production sites simultaneously (Danese, Romano & Boscari, 2017; Netland & Aspelund, 2014; Stålberg & Fundin, 2016). Particularly in the view of joint corporate resources for knowledge management (Boscari, Danese & Romano, 2016; Demeter & Losonci, 2019; Secchi & Camuffo, 2016). The knowledge-based view addresses, among other things, that normative transformations (e.g. lean) are challenging due to the need for multiple mechanisms to diffuse knowledge and change mindset among many people.

One major challenge associated with global efforts to coordinate improvement work is the influence on the standardisation of practices (Ansari, Reinecke & Spaan, 2014; Netland & Aspelund, 2014). The aim to standardise improvement practice differs from the standardisation of operation practices, for example, on the shop floor. Instead, the standardisation of improvement practices relates to harmonising the company's philosophy for improvement work, for example, ways of solving problems. However, the production sites do not necessarily appreciate an increased standardisation since they often already have their versions of improvement practices. Hence, strategies related to standardising improvement practices between production sites within the company must include ways to develop reference points globally but allow the practices to morph as they diffuse to the production sites. Although the issues mentioned above have been problematized by other scholars, e.g. (Ansari, Fiss & Zajac, 2010), there are minor in-depth publications given the frequency of corporate-wide improvement programs and long-term investments made in them. Since companies can spend about ten years to create a mature improvement programme (Hekneby, Ingvaldsen & Benders, 2022), the objective of the current investigation is to offer management teams the tools to decide on the level of standardisation to effectively progress in the improvement programmes with sustained results over time.

This paper aims to explore and provide an in-depth understanding of the management strategies to standardise improvement practices between production sites. It draws conclusions from an improvement programme that aimed to standardise problem-solving practices within the company and implementation at one of its largest production sites. The improvement programme was part of the corporations lean-based management system (corresponding to XPS, according to Netland (2013)).

The paper is organised as follows: first, the theoretical background frames the view on corporate-wide improvement programmes and knowledge management in a multisite context. Secondly, the research methodology and company context are described. Next, the findings from the study are presented, followed by analysis and discussion. In the final part, conclusions are provided together with implications to theory and practice, including study limitations.

2. Theoretical Background

2.1. Corporate-Wide Improvement Programmes in Production Companies

An improvement programme is defined in this paper as a long-term strategic initiative with a top management commitment to change the ways to improve business in all production sites simultaneously. Lean implementation sets a good example for improvement programmes due to the need for long-term investments. There is no single established definition for lean since the view on lean has evolved in industry and academia in the last decades (Danese, Hines & Powell, 2021). However, lean is understood to be the successful way of managing production observed at Toyota. Lean has been disseminated and described in countless publications (Liker, 2004; Shah & Ward, 2003; Womack & Jones, 2003; Womack, Jones & Roos, 1990).

Many producing companies with a global presence (in industry, sometimes called manufacturing footprint) have realised the increased opportunities to diffuse business know-how between production sites run under a corporate group (Netland & Aspelund, 2014; Voss, 1995). Hence, a more strategic perspective in the last decade has been included in lean research where corporations decide to implement lean, see e.g. (Netland & Aspelund, 2014; Scherrer & Deflorin, 2017). They explored how corporate-wide improvement programmes could simultaneously enable the transformation of improvement work in multiple production sites. As exemplified, some scholars have shifted focus from successful practices at Toyota to studying the development of the Toyota Production System and the processes for company-specific adaptations (Fujimoto, 1999; Miyake, 2008; Netland, 2013; Spear & Bowen, 1999), sometimes referred to as company-specific production/excellence systems, called XPS (X for company name, PS for production system).

A knowledge-based view has gradually become more and more popular with the increased focus on intra-company management of improvement work. For example, the XPS is recently described as a system for orchestrating learning and managing knowledge to enable strategic corporate-wide transformations (Hekneby et al., 2022; Secchi & Camuffo, 2016). Hence, lean transformations set out an appropriate context for studying knowledge management (such as managing standardisation of improvement practices) since the complexity is high when changing socio-technical systems.

2.2. Knowledge Management in A Multisite Context

A knowledge-based view of corporate-wide transformations emphasises knowledge as the most important strategic asset for a company, which includes processes to develop new knowledge and package that knowledge so that it can be transferred within the company (Grant, 1996; Kakabadse, Kouzmin & Kakabadse, 2001).

2.2.1. Development of New Knowledge

Generating new knowledge in a multisite context becomes complex since it should build upon the experience of many but is produced by a few (Kostova, 1999; Szulanski, 1996). The current paper defines knowledge workers as change leaders who mainly develop, package and transfer knowledge in the organisation as part of the improvement programme. Fellow researchers have identified that the change leaders at production sites are co-creating standards with global improvement offices to various extents (Danese et al., 2017; Demeter & Losonci, 2019).

2.2.2. Packaging of Knowledge

New knowledge needs to be packaged to a certain level to enable wide diffusion within the company. A central mechanism to formalise new knowledge is codifying standards for practices (here, improvement practices). Such standards provide a common reference point and streamline how to improve operations in multiple production sites, and the conservation of knowledge in standards is fundamental in lean management (Boscari et al., 2016). The main challenge in formulating global standards for improvement practices is to make them general enough to fit the local contexts but specific enough to challenge current ways of improving the business (Ansari et al., 2014; Netland & Powell, 2016). Besides standards for new practices, another common aim of packaging new knowledge is the development of expectations and criteria. For instance, maturity models or assessment frameworks are developed to support auditing at the production sites (Bellgran, 2014; Netland, Schloetzer & Ferdows, 2015; Sangwa & Sangwan, 2018).

The strategy for packaging knowledge differs between companies. Some develop more detailed instructions than others to guide the implementation (Secchi & Camuffo, 2016). Companies codifying knowledge to a large extent and on a detailed level in manuals and instructions indicate the use of a template-driven strategy for implementation, while companies codifying knowledge to a lesser extent often use a more principle-driven strategy. Templates are defined as explicit working or step-by-step instructions that conserve the company routines and expertise into an institutional memory that can be passed further in a codified form (Jensen & Szulanski, 2007; Oldroyd, Morris & Dotson, 2019). Using templates is assumed to be a cost-efficient way to transfer practices (Jensen & Szulanski, 2007; Oldroyd et al., 2019), but a template-driven strategy is not necessarily the most effective approach in improvement programmes since the learning processes might become too shallow (Secchi & Camuffo, 2016).

2.2.3. Transfer of Knowledge

The process of transferring knowledge from a source (here, global improvement office) to a recipient (here, production site) depends on the capability of the source to disseminate the knowledge and the recipient's willingness and ability to absorb the new knowledge (Szulanski, 2000). The type of knowledge (Easterby-Smith, Lyles & Tsang, 2008) and the relationships between the source and the recipient (Szulanski, 1996) influence the effectiveness of the knowledge transfer process. In this paper, knowledge transfer refers to a global-local perspective, although transfer also occurs with other production sites as sources. The global level represents that corporate improvement programme as a source, and the recipients are multiple production sites at different geographical locations and contextual situations, representing the local level.

Improvement practices combining social and technical attributes, such as problem-solving, standard work, and leadership, bring complexity to the transfer process (Demeter & Losonci, 2019; Secchi & Camuffo, 2016). The knowledge embedded in people (i.e. tacit knowledge) is more challenging to transfer compared to more technical know-how that is easy to document (i.e. explicit knowledge) (Boscari et al., 2016; Demeter & Losonci, 2019). Thus, technical practices are more straightforward to transfer in a codified format than social practices influenced by relationships and skills among people. Some general challenges in knowledge transfer are the motivation for learning (Szulanski, 1996), resistance to adopting "foreign" practices (Gupta & Govindarajan, 2000; Netland, 2014), and absorptive capacity (Ferdows, 2006). In a multisite context, additional challenges such as heterogeneity in maturity levels (Boscari et al., 2016), national culture (Danese et al., 2017; Hofstede, 1980), and politics/power dynamics (Easterby-Smith et al., 2008) further increases complexity. Therefore, companies apply multiple transfer mechanisms to succeed with global implementation to overcome the mentioned challenges, such as adding pressure and delivering training initiatives and sense-giving activities (Boscari et al., 2016). However, less is understood about the strategies for managing standardisation in a holistic matter, calling for more explorative research in the production management field.

3. Methodology

3.1. Research Approach

This paper aims to explore and describe the management strategies for standardising improvement practices in corporate-wide improvement programmes. A grounded theory approach was considered appropriate to empirically identify the core concepts for management strategies in a context associated with high complexity. The guiding research questions have been what and how management strategies are used to effectively achieve progress in corporate-wide improvement programmes (e.g. lean-based improvement programmes).

The research approach was abductive, with an inductive initial phase to collect and analyse data. Thus, a process that adopts many elements resembling a grounded theory methodology encourages the researcher to follow up on emerging themes in real-world settings (Corbin & Strauss, 1990; Gioia, Corley & Hamilton, 2013). Preconceptions stated in the literature were avoided as much as possible during data collection. However, in a later phase, the findings were related to existing theories in the research field. The ethnographic research methods enabled a deep insight into the dynamic phenomena of multiple actions to manage the level of standardisation, which is valuable when developing theory from process data (Langley, 1999; Marin-Garcia, Garcia-Sabater & Maheut, 2022; Säfsten, Gustavsson & Ehnsiö, 2020).

There are restraints to generalising the findings from a single case. However, an inductive logic of transferability is appropriate. The company under investigation was purposely chosen given two inclusion criteria: having a corporate-wide lean program with a high degree of global coordination (Danese et al., 2017; Netland, 2013) and explicitly expressing challenges with managing the level of standardisation. A high degree of global coordination assumes formulation of standards for improvement practices and some sort of pressure for conformity to harmonise among sites in a global network. Similar contexts has been described in this paper and have been shown to be a frequent context (Netland, 2013). However, yet little is understood how companies develop strategies to overcome known barriers of level of standardisation. Beyond the typical lean implementation, the findings could be transferred to other improvement programmes important for future transformation, e.g. those aiming for circular or digital manufacturing (Buer, Strandhagen & Chan, 2018; Hermundsdottir & Aspelund, 2022; Rosin et al., 2020).

3.2. Company Description

Company X is a large global process industry manufacturer with about 20 production sites in 10 countries and over $20.000 million in revenue. The study was bound to the implementation of a global problem-solving standard at one of the largest production sites (Site Y) with several factories in the same geographical area. The real-time investigation proceeded for approximately 1.5 years (November 2018 to March 2020). Problem-solving practices are appropriate to study since they embed several tacit features, making it challenging to diffuse and become an intangible process influencing the company's competitiveness (Esain, 2006). An example of tacit knowledge associated with problem-solving is defining the scope of problems and mastering good teamwork with supportive leadership.

3.3. Data Collection and Analysis Process

The data collection procedure was iterative and reflexive to emerging concepts (Birks, Hoare & Mills, 2019; Eisenhardt, 1989). Several data sources were deliberately used for triangulation purposes, such as six formal semi-structured interviews combined with weekly non-formal interviews with managers (senior and shop-floor) and change leaders (at global and local level). At Company X, the change leaders were dominantly lean practitioners due to the strategic focus on the corporate-wide lean programme. In addition, data was collected in regular participant observations at Site Y (e.g., during training and shop-floor visits), and relevant company documents were continuously collected during the study.

Over 64 documents (equivalent to about 450 pages of size A4), such as communication material, training material, and performance data, were part of the data collection. The documents were analysed together with transcripts of the audio recorded 6 hours interviews (58-106 min each). Notes from 11 hours of participant observations (30-90 min each) and extensive informal meetings and discussions were systematically recorded in a researcher logbook (about 30 pages). An example of an observation setting was when a first line manager meets the team to implement the new problem-solving practice.

The data analysis was inspired by Gioia et al. (2013) to build rigour in the process as the data collection proceeded. All collected data was constantly open-coded in NVivo and compared in an iterative process to identify and revise 1st order concepts that emerged into themes (Table 1). At a later stage, the core themes or aggregated dimensions were selectively coded to describe the core concepts in the management of the level of standardisation (see Figure 1).

4. Findings

4.1. Management Strategy for Standardisation at Company X

In 2010, Company X initiated the process to create a lean-based corporate management system. The process was similar to programme management with multiple implementation loops to explore and define the new improvement philosophy at Company X. Hence, it took several attempts and strong top management commitment until there was a formal global lean programme in 2015. An implementation loop could include but was not restricted to, the development of an organisation, training initiatives, and method standards. A global office for improvement was appointed with the vision of "centralised knowledge production and local execution". The top management clearly stated that implementing lean was not optional anymore, but all production sites within the network had to start transforming their business.

1st order concepts	2nd order themes	Aggregate dimensions
Three lean methods have mandatory global standards	Development of standards for improvement practices	Design for adaptations
Mandatory features at principle- and template-level		
Administrative issues relating to translation	Adjustments to local context	
Change leaders decrease opportunities for local adaptations to avoid blame from managers and global change leaders		
Standards available in a company-specific toolbox on a digital platform	Development of a toolbox	Ways for upskilling widely
Improvement practices from various management concepts		
Measures for non-conformity embedded in the maturity model	Development of a maturity model	
Changed demands of capabilities among change leaders- from developing local standards to adopt global standards		
Major efforts to communicate the change	Development of a training model	
Implementation with a roll-out approach to involve all employees in the training		
Training approach mostly based on information and creating awareness (e.g. e-learning for all)		
Lack of business case for the training initiative		
Global change leaders reviewing maturity	Conducting site visits	Learning environment
Local management teams visiting other production sites		
Integration of maturity targets with the performance management	Implementation targets	
Adopting global standards to satisfy stakeholders		
Most resistance among local change leaders	Implementation of a new standard	
Site-level implementation target for replacing old template with new template at a certain date		
No explicit plan to follow up on the business improvements		

Table 1. A display of the development of dimensions from 1st order concepts in data.

Company X developed a web of improvement offices at global, regional, and (for larger sites) production site levels to organise the strategic transformation. The improvement offices were primarily responsible for developing the framework and standards for improving practices throughout the organisation. The improvement framework at Company X consisted mainly of traditional lean principles and tools. Still, it included practices from other concepts such as Six Sigma, business process management, and total productive maintenance.

To package the chosen improvement practices, Company X developed a toolbox, a bank of online descriptions and training material (i.e., global standards) available for the entire network. Global, regional, and local change leaders collaborated in a method-specific network structure focused on different improvement practices, e.g., problem-solving, standardised work, and lean leadership. The change leaders could share experiences from implementation in the cross-site networks and contribute to standard development.

Besides the company-specific toolbox, Company X developed a company-specific maturity model to measure and benchmark maturity progress between the production sites. Global change leaders performed formal audits at site visits. The assessment activities followed a reference document in seven focus areas given criteria in 30 categories. Examples of focus areas could be "customer focus", "elimination of waste", and "just in time". During the audits, the assessed teams would receive a maturity score given the fulfilment of the written criteria. The maturity scores were used to measure the implementation level and identify gaps that should be included in future implementation plans.

In addition, the global improvement office decided on the same maturity level for the production sites, with some exceptions for new or very immature production sites in the network. The implementation targets were incorporated into the balanced scorecard. In that way, the requirements for implementing lean became embedded in the strategy deployment structure. Hence, all production sites were expected to reach the same maturity level simultaneously. This way, the managers had clear incentives to work with maturity development. The assessment framework enabled activities to follow up on progress in a standardised format. At Company X, the change leaders visualised the maturity scores in an aggregated view for all sites in a red-amber-green heat map.

Although the global lean programme was formalised in 2015, some production sites already had long lean implementation experience and had formalised local lean programs. For instance, *Site Y* had 9-13 years of experience managing lean implementation for several factories at the same location (factory sizes between 200-500 employees). The lean implementation evolved bottom-up at Site Y, first limited to isolated business units (lower Left Square in Figure 2). Eventually, in 2006, Site Y coordinated the lean implementation for all factories and initiated a local improvement office (lower Right Square in Figure 2). In 2015, Site Y was considered a leading lean site. That meant an informal role in sharing experiences within Company X and provided considerable input to the global improvement programme. As the global improvement programme matured, more practice standards were developed to streamline the improvement practice within the global network.

4.2. Global Standards for Problem-Solving Practices

A global standard at Company X for an improvement practice was a written description in terms of the purpose of the practice, the process steps and expected outcomes when applying the practice, and examples of application areas. In addition to the description, there was often a template available that could be used to improve the business. All global standards were stored in the toolbox available to the entire company. In 2017, the global improvement office decided to make some of the global standards mandatory to reduce the number of versions of problem-solving practices within the company. The problem-solving practices were categorised into three methods suitable for problems with various complexity levels. These were Six Sigma projects (high complexity), advanced problem-solving (medium complexity), and instant problem-solving (low complexity).

The problem-solving methods for high and medium-complex problems were mandatory to adopt, meaning that no local adaptations were accepted. These were described as hard and soft standards. Meanwhile, the method for low complexity was only partially mandatory. The global change leaders distinguished between mandatory process steps (e.g. including 5-why) and mandatory templates (e.g. A4 with headlines and checkboxes) supporting the practice in detail. The global change leaders explained the objective to mandate templates as follows:

- Problem-solving activities for complex problems involve many resources, ranging from weeks to months. Thus, the insights were expected *to be shared* to benefit multiple sites.
- Problem-solving activities for complex problems often involve several sites or support functions in the supply chain, and applying the same templates *simplifies the collaboration between production sites*.

4.3. Consequences of the Management Strategy for Standardisation at Site Y

In 2018, global change leaders performed maturity assessments at Site Y. As a result of the audits, several factories received a *no score* for the problem-solving category in the maturity model. The observations of the problem-solving practice did not fulfil the criteria for the mandatory standard for instant problem-solving. In the same period, the management team at Site Y had visited, at that time, the company's leading lean site. Shortly after, the site management team adopted the global standard template for instant problem-solving at Site Y and initiated training in problem-solving for all employees.

The site management's decision caused mixed responses. On the one hand, local change leaders appreciated the commitment from the site management since that implicated the allocation of resources for lean implementation. On the other hand, many change leaders did not believe in the decision to adopt the global standard. The initiative to replace the problem-solving templates was not anticipated to improve the practices:

"I do not understand what we put energy on. The good thing is that they [site management] took the decision and are responsible, but the template will not solve the problem." [change leader at factory-level]

Major challenges regarding communication, roles and responsibilities, and time planning emerged. The local change leaders in the "lean community" expressed most resistance to change. Before the decision to adopt the global standard, comprehensive initiatives to implement the local standard had already taken place. Similarly, a local template at Site Y was common for all factories, and many employees had been trained. Hence, many leaders and teams perceived the initiative as unnecessary and disruptive of existing plans. Due to several global decisions for mandatory standards, change leaders at Site Y experienced "*the global people are taking over",* and the additional hierarchy due to the global program after 2015 was considered unfavourable.

Nonetheless, the change leaders at Site Y were free to design a training model for implementing the global standard. Hence, there was no guidance on how the production sites should implement the global standards. Commonly used terminology during the implementation was "rolling out the template", "deploying the global standard", and "global template".

4.3.1. Adjustments to Local Context

Change leaders at Site Y tactically decided to *freeze* the new template, meaning that no adaptations to the new template were allowed. Only translations to the local language were done by local change leaders early in the adoption. The aim of freezing the template was to avoid discussions about editing the layout of the template and instead focus on the underlying problem-solving principles, explained as follows:

"Once employees reached a higher capability level, they would be able to modify the new template more purposefully… when people have a choice, they try to avoid the change, but now there was no other choice. It is the new template, and you have to follow it. I believe that it is a success factor." [change leader at Site Y]

However, the freezing tactics at Site Y also aimed to avoid any blame in case the implementation of the global standard failed to improve problem-solving capabilities. Hence, the change leaders reasoned that the source of failure would not be due to any local adaptations but rather the global standard.

4.3.2. Development of a Training Model

The implementation of the new template comprised training all employees at Site Y (~4000 people, including both shop floor and support functions). As a high-level estimate, the implementation activities in the three modules above corresponded to more than 6,000 person-hours in total, with an approximate distribution of 85 % on team members/employees, 10 % on managers, and 5 % on change leaders. The training model consisted of the three following modules:

The "buy-in" module aimed to set clear expectations for the managers to continuously support problem-solving practices as a natural part of their roles. This training module targeted all leaders at Site Y; after that, they were expected to train their teams with support from factory-level change leaders. Site Y called this a train-the-trainer approach.

The "training" module aimed to train the site-level change leaders and managers in the methodological steps in the new template, providing examples and explaining the principles in the global standard. In this module, a global change leader trained the site management team and the entire lean community (i.e. change leaders supporting crossways and within the factories at Site Y). The classroom-based training sessions mainly described the purpose, process and examples of applications with the practices (supported by the template). After the training session at an early stage, the factory-level change leaders were responsible for planning the implementation of the new template in their business within a specific period.

The "general awareness" module aimed to efficiently inform all employees at Site Y early on about the change in problem-solving practice with e-learning (an additional resource to the global toolbox). Another aim of the e-learning was to trace progress in completed training digitally.

4.3.3. Implementation of a New Standard

Many employees failed to understand why the global standard was adopted. Change leaders and leaders heavily emphasised compliance with global standards in all three training modules. All factories at Site Y replaced the template before the deadline. However, managers put major emphasis on the application of the new template rather than successfully solving problems. For example, managers followed up on the number of problem-solving templates. Some informants described how some operators were requested to fill in templates even though the problems were already understood and solved. Hence, a general pattern was that the main focus became learning the template rather than the template supporting the problem-solving practice.

A consequence of implementing the new template was a mismatch with other practices. The ways to follow up on ongoing problem-solving activities in the team needed to be adjusted. However, change leaders and managers hesitated to make the adjustments at the factory level. For example, one production manager said during a shop floor visit:

"Here [pointing at the whiteboard], I want to make changes to be able to follow up on the progress of the ongoing problem-solving activities in a better way. But, I will wait until there is a new global standard for this so I do not have to redo it later." [first-line production manager]

The wide-ranging implementation at Site Y included all employees and not only shop floor areas that historically had gained the most attention. As a result of the implementation of the template, there were testimonies of closer collaboration between the local improvement office and the quality function. Since the quality function also offered processes and training initiatives for problem-solving practices from a regulatory compliance perspective, several opportunities emerged to better coordinate and streamline training and documentation to the global standard.

5. Analysis and Discussion

5.1. Rationales for the Development of Global Standards

The development of standards for improvement practices is constituted at different abstraction levels. The findings demonstrate that improvement practices could be described at principle and template levels, and compliance with both levels may be mandatory. Two types of logic were identified as motivating standardisation at a template level: *scale-up logic* and *collaboration logic*.

The scale-up logic is based on the premise that business improvements that result from applying a standard can be scaled up by sharing the results from the improvements within the company. For example, with problem-solving practices, the logic would be that once a problem has been solved, others within the company may benefit from the solution instead of solving the same problem. Hence, standardised templates are a strategy for effectively diffusing knowledge within the company. Presumably, such logic is deducted from a resource-efficient perspective where the aim is to avoid multiple activities to solve the same problems within the company. However, from a knowledge-based view, the scale-up logic might overlook the competitive edge of developing problem-solving capabilities embedded in people and teams (Leonard & Sensiper, 1998).

The collaboration logic, however, relates to developing a common reference point within the company to streamline the more straightforward navigation of the improvement work between people between production sites. For example, the problem-solving practice in this study was expected to involve people from multiple production sites in solving complex problems. Here, value-creation relates to achieving a common terminology and improvement language with a company, which other scholars have identified as a success factor in multisite implementation (Hekneby, Ingvaldsen & Benders, 2022; T. Netland, 2014).

At first glance, mandatory global standards could seem like a successful strategy for the diffusion of practices to multiple production sites. However, the findings show that mandating features at a high detail level (i.e. templates) may be resource-demanding at the local implementation. The consequences appear to be an ineffective use of resources due to major resistance to change and people learning the features rather than the purpose of the practice. A hidden consequence is that change leaders may lose ownership of the implementation when their autonomy becomes restricted. Site Y decided to freeze the template and eliminate all opportunities to make

adaptations at the factory level to avoid superficial changes in the template and blame by stakeholders in the future. Change leaders not believing in the implementation is not optimal for obvious reasons. In the worst case, the company might experience a high turnover of change leaders and, thereby, possibly a "knowledge drain" of strategic capabilities. In turn, such a strategy might impede the long-term objectives of the improvement programme. Others have addressed the importance of practice ownership and employee empowerment in corporate-wide transformations (Hekneby & Powell, 2023; Secchi & Camuffo, 2016). However, the findings in the study presented in this paper contribute to further understanding of how the rationales for the standardisation at a corporate strategic level cause issues at a local level.

Restricting any adaptations at Site Y indicates that the relationship between the source that *develops the standard* and the recipient's *need for adaptations* is a non-intuitive process. The local change leaders who opposed the mandatory global standard and opposed the lower autonomy made the same decisions to restrict any adaptations at the site level. Despite the comprehensive training model, the training activities seemed to result in shallow learning, such as "learning the template" instead of "learning with the template". The findings show a poor understanding of the benefits of adapting practices already in the stage where knowledge is developed and formalised at both global and local levels (see Figure 1). Suppose the adaptation process is viewed as a necessity for the learning process. In that case, perspectives such as the influence of autonomy and ownership on diffusion and cost of implementation may be included before investments in packaging the knowledge are made.

5.2. Packaging Knowledge Into Company-Specific Frameworks

At Company X, two company-specific frameworks were essential tools to manage the standardisation of improvement practices: a toolbox and a maturity model. The toolbox enabled actions such as collecting, describing, and storing the practices (e.g. problem-solving methods) within the global network. The maturity model was designed to support production sites with an implementation roadmap and offer a standardised way to evaluate the overall implementation progress in the global network.

During the study, Company X's maturity model was an assessment framework aiming at a standardised internal benchmarking of maturity levels within the company. Since the transparency of maturity levels increased, the assessment outcomes shifted the power dynamic between the production sites. Hence, the assessment framework seemed to promote a competing environment within the company. Although power struggles are unavoidable within companies (Gupta & Govindarajan, 2000), the relationship between the design of the maturity models and the managerial action at a local level appeared to be poorly understood. Company X chose to embed requirements to implement a chosen set of tools (available in the toolbox) and thereby interlink the two frameworks. However, since mandatory standards were in the toolbox, the maturity model indirectly assessed conformity levels of practices. Hence, given the corporate-level management strategy, Site Y put major efforts into implementing a single practice or rolling out a method with a push approach. A similar pattern to an initial tool focus generally seen in lean implementation (Hines, Taylor & Walsh, 2020).

The design of the training model at Site Y required, in total, much time from individual team members. However, the data streams indicate that the change leaders became the broken link or the "knowledge bottleneck" in the adoption process of the new standard. The local change leaders expressed the most resistance to changing the standard to adjust to a different dialect of the problem-solving practice. The minor focus on upskilling the group of people expected to train the organisation suggests a poor insight into the "flow of knowledge" within the company. Perhaps a training model with intensive training efforts for the change leaders would add more value in that stage than wide initiatives, e.g. e-learning awareness sessions. Theoretically, the 6000 person-hours in the roll-out correspond to 3 weeks of full-time on-the-job training for 50 managers or change leaders. In summary, the findings suggest that the design of training models should embed a mix of training mechanisms, as suggested by e.g. (Boscari et al., 2016; Netland & Powell, 2016). Still, there is a priority for upskilling (e.g. by practical training) in target groups, given how the knowledge is expected to flow within the company (see Figure 1).

One could argue that a template approach with a high degree of codification is an efficient way to transfer knowledge (Jensen & Szulanski, 2007), and pressure for implementation may be motivated in immature areas, such as at an early stage (Boscari et al., 2016), or new acquisitions. However, Site Y was not immature but had "another

dialect" of the problem-solving practices. Hence, as a general strategy, the template-based approach might instead be a resource-demanding approach due to extensive control of details. Another risk might be increased content in the packaging of knowledge, which will require increased global coordination over time. Thus, the more knowledge packaged at a corporate level (e.g. practices and templates), the more local levels demand more details (e.g. for other practices or in maturity models). It may lead to a high-cost overhead organisation focused on toolbox maintenance rather than having change leaders improve the corporate management system. The findings in this paper provide a possible explanation of how a management strategy influences the design of the toolbox and maturity model on production site-level actions. This paper explains why a template-based approach appears less effective in the long term, supporting Secchi and Camuffo (2016). Template-based approaches could be cost-effective in short-term projects (Oldroyd et al., 2019). Still, in programmes with long-term objectives to improve the corporate management system, excessive template use becomes a disabler over time (Vlachos, Siachou & Langwallner, 2019).

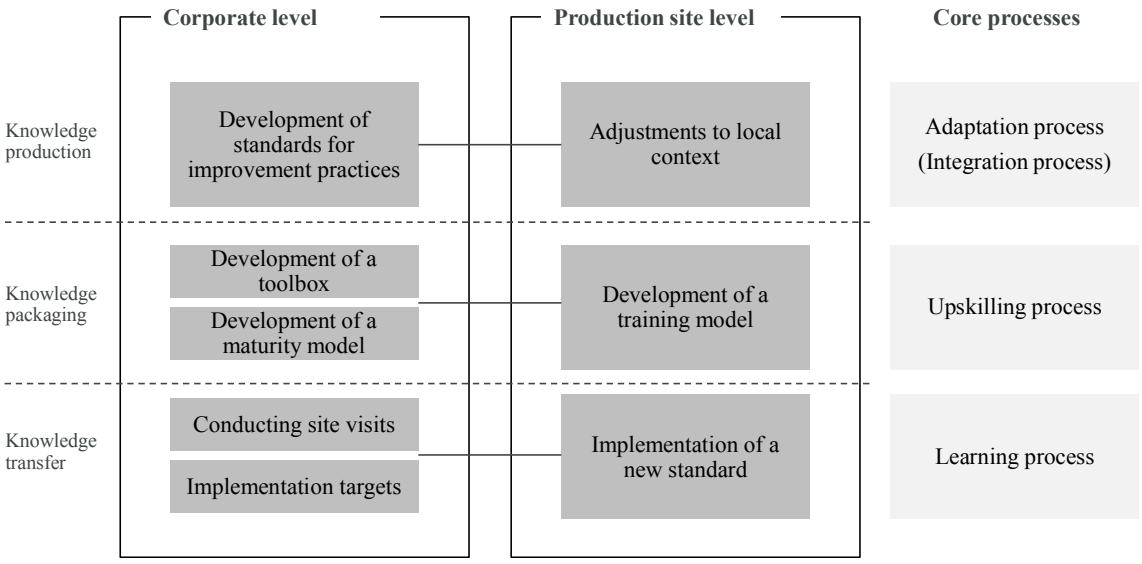

Figure 1. Management strategies for standardising practices in corporate-wide improvement programmes

5.3. Conducting Site Visits and Deciding the Speed of Implementation

In addition to the mandatory global standards and the maturity model at Company X, implementation targets were integrated into the balanced scorecard. The aim was to increase the implementation speed of the improvement programme within the company. The global improvement office decided on the same implementation target as the standard for all production sites. The combination of mandatory standards, maturity model, and implementation targets resulted in accelerated implementation due to extensive pressure to implement the improvement practices. Extensive pressure or changed power dynamics appear particularly challenging in a multisite context (Luo, Slotegraaf & Pan, 2006; Secchi & Camuffo, 2016).

A management strategy at Company X resulted in the implementation of practices being pushed upon production sites in isolation. In turn, the implementation process became decoupled from the effect of good problem-solving skills on business performance. However, since the implementation targets were integrated as part of the incentive system, a pseudo-performance system was created where maturity scores became the goal rather than the means (see Figure 1). These findings support other research recommending that lean implementation should not be steered with accounting-based controls (Netland et al., 2015; van der Steen & Tillema, 2018).

Several challenges with common initiatives, such as misalignment to local context and business needs, might affect long-term performance due to a lack of trust and poor relationships between global and local levels within the company (Danese et al., 2017; Ferdows, 2006). Thus, investments in common initiatives might still result in the superficial implementation of practices and minor changes in the "ways of thinking", which is the essential goal in normative transformations (Ansari et al., 2010; Kostova, 1999; Netland & Aspelund, 2014). However, the core of

the problem might not relate to the management strategy of setting implementation targets as such but rather to what organisational level (i.e. global or local levels) they are decided. Implementation targets decided at local levels are possibly more appropriate to achieve a "pull" implementation.

Another hidden consequence of push implementation was exemplified in the study when teams became unresponsive and waited with necessary local adaptations since they assumed that new global standards would be "rolled out" eventually. Holding back the local development process of practices demonstrates the consequences of what is sometimes called "ceremonial" implementation. It means that production sites symbolically adopt global standards for legitimacy reasons and not based on a belief that it will create real value (Netland & Aspelund, 2014).

In the investigated company, the lean coordinators were the primary change leaders, and managers were expected to train their teams in a so-called train-the-trainer approach. Involving managers in the implementation process is very often identified as a critical aspect (Netland, Powell & Hines, 2020; Secchi & Camuffo, 2016). However, full implementation ownership by managers was not observed at Company X, but the change leaders were still the main agents in implementing the new problem-solving template; thus, most of the leaders did not train the teams as intended. The "roll-out" became resource-demanding in various ways, such as extensive change management, administrative tasks (e.g. e-learning translation), disruption of existing plans, and communication. For example, the managers at the studied factories at the site were not independent in planning the implementation. The roll-out of the new template was added on top of existing improvement plans.

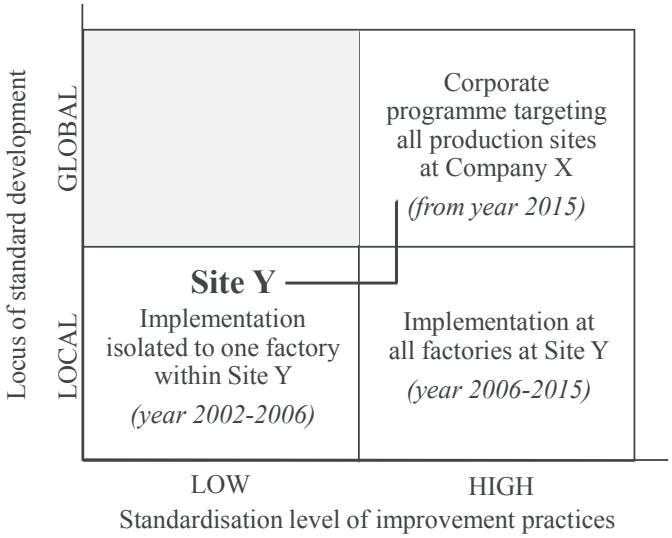

Figure 2. Historical context for Site Y between the years 2002 and 2015

5.4. The strong influence of local historical context

The historical aspects at Site Y (see Figure 2) strongly influenced the response to the standardisation strategy at Company X. The global office had assumed that developing and packaging knowledge is suitable at a global level for effective local implementation. However, Site Y already had an organisation of change leaders skilled in standard development. Hence, initiating the corporate programme changed the power dynamics between the global and local lean offices. Local change leaders may experience challenges with belonging issues as their roles as experts and responsibilities change, also identified in other studies when a new corporate management system is implemented (Gupta & Govindarajan, 2000; Maalouf & Gammelgaard, 2016). The findings in this paper suggest that the more mature the corporate lean programme becomes, the more the change leaders need to morph together with additions to the program and focus on upskilling (and possibly reskilling according to emerging operations strategy) to remain relevant. Examples of reskilling areas could be the application of new technologies (e.g. Cifone, Hoberg, Holweg & Staudacher, 2021), environmental strategies (Hermundsdottir & Aspelund, 2022), or circular economy principles in operations (Lindahl, Dahlin & Bellgran, 2023).

A changing locus of standard development might designate the organic growth of such programs as they are created by iterative loops of experimenting and learning at a corporate level (Hekneby et al., 2022). However, the historical aspects at Site Y became a superior context compared to the possible benefits of adopting global standards. Hence, designing for mandatory features, also sometimes called hard and soft aspects (Ansari et al., 2014; Netland & Powell, 2016), in the global standards, may not be the best management strategy from a knowledge perspective. The findings support Secchi and Camuffo's (2016) proposition that a higher autonomy of production sites is more effective for knowledge diffusion. Thus, based on the empirical findings, it is suggested that global standards should be kept at a low detail level (e.g. guiding questions or general headlines) to avoid resource-demanding management of compliance to standards, but could be standardised locally.

6. Conclusions, Implications and Limitations

6.1. Conclusions

Several managerial tools are developed to realise the management strategy for standardising improvement practices within a corporation. The empirical findings demonstrate that companies develop advanced company-specific frameworks to manage knowledge about improvement practices systematically. This paper describes actions at the corporate level, such as the development of improvement standards at both principle and template levels, which are stored in a bank of tools and controlled by a within-company maturity model. The strategy for standardisation influences the design of the company-specific frameworks and may therefore be adjusted as the corporate-wide improvement programme evolves.

At the production site level, there is a response to the management strategy, such as adjusting global standards to the local context, developing training models, and implementing new standards. We find that the role of change leaders is largely unexamined, even though they are essential for corporate-wide transformations. Thus, we propose that companies carefully develop internal processes to evaluate the actions in the standardisation strategy at corporate and production site levels to understand the effect of the design of the frameworks developed. This way, the revision of the standardisation strategy includes actions to develop and package knowledge and avoid a sole focus on transfer processes. Similarly, companies should consider systematic training initiatives for the change leaders to enable a flow of knowledge from a multisite perspective. Such initiatives may be particularly important when new operations strategies are formulated with implications on improvement work (e.g. lean, digitalisation and sustainability strategy) that increases the need for upskilling among change leaders.

Companies make major investments in developing and implementing managerial tools to manage the standardisation level of practices and systematically manage knowledge in the improvement programme. How the strategic decision points and the company-specific frameworks' design change the company's power dynamics has been poorly understood. However, this paper describes some connections between the deployment strategy of improvement programmes and managerial strategies for standardisation at global and local levels. Similar challenges have been reported in digital transformations (Plekhanov et al., 2022). Thus, the findings may apply to corporate-wide digital transformations.

6.2. Implications

The theoretical contributions are threefold. Firstly, this paper empirically identifies and describes company-specific processes that create a knowledge system part of the improvement programme. These processes were shown to be central in managing standardisation levels in a multisite context. Hence, global implementation is far from isolated to knowledge transfer processes since there are several processes related to knowledge development and packaging and additional control practices at the local production site level. Previous research has recommended that a standard's value-creating features should be replicated, and unessential details should be left out (Danese et al., 2017). However, the findings in this paper refine current theories by presenting the underlying rationales of how templates at the corporate level are considered value-creating.

Secondly, the findings suggest that the roles and tasks of change leaders need to evolve with the program to stay relevant. An aspect rarely highlighted in earlier publications. Otherwise, the change leaders may be potential knowledge bottlenecks, as seen in the study. By applying knowledge management theory, the corporate-wide

improvement programme has been shown to develop several building blocks that act as a system for knowledge management. The analysis identifies four knowledge-related processes that are proposed for more attention by the research and practice community interested in corporate-level transformations: the adaption process, the upskilling process, and the learning process. Although the integration process was not the primary focus in the studied context, the analysis reveals that an extensive focus on templates for single tools at a corporate level indicates a resource-demanding implementation strategy integration due to increased coordination and maintenance of practice descriptions.

Thirdly, this paper empirically suggests the influence of historical context (Figure 2) is superior in the local response to global conformity than the design for adaptations in global standards. In addition, Figure 2 offers a way to categorise various scopes of improvement programmes within multisite corporations to include the historical context of production sites. For example, researchers could use the dimensions in Figure 2 to compare various scopes of improvement programmes in multisite corporations. Examples of a changed scope could be expansion from single-site programs to multisite programmes (i.e. as in this paper), mergers or new acquisitions, or expanding the programme to new processes (e.g. from operations to R&D or marketing).

The implications for managers at the global improvement office that evaluate the standardisation strategy for the improvement programme are suggested to invest in upskilling change leaders within the multisite network. For example, companies could develop training initiatives to build a deeper understanding of the objectives with global standardisation and embed knowledge management theory to a greater extent. The core challenge in managing the standardisation of improvement practices appears to be mandating standards at a low abstraction level (i.e. templates). Hence, practitioners should restrict the mandated standards to a minimum, particularly at a low abstraction level (such as templates). In designing company-specific maturity models, practitioners should avoid embedding conformity measures as the model may become too powerful as a "push" mechanism for implementation. A push strategy with minor interest from the production sites may cause a knowledge system focused on conformity for tangible assets (e.g. templates) rather than long-term support in changing the ways of thinking among the employees. Also, the implementation targets should be decided locally and aligned with business needs and problems rather than globally. The global improvement office could instead support with recommendations for how and when implementation targets are useful to assure progress in the transformation.

6.3. Limitations

The proportion of multinational companies that develop their versions of excellence systems remains unknown. Still, indications are that when large multinational corporations set the trend (Netland, 2013), smaller MNCs follow (Secchi & Camuffo, 2016). Here, the manufacturing sector is ahead, but other sectors are also increasingly implementing improvement programs in corporate-wide transformations. Thus, the findings in this paper presumably apply to other industries, although it is an interesting area for future research to validate.

There are limitations to investigating only one company and one production site in the global network. However, the global-local dimension has been the primary priority in analysing the managerial actions at the global level and the response at the production site level that had previous experience implementing the improvement practices. This focus captures the continuous management of standardisation in corporate-wide improvement programmes to a greater extent. In addition, the investigated site was the largest within the company, which is the most interesting from an impact perspective. However, larger sites probably have more resources for knowledge management available. Thus, future research could use the described management tools in this paper and Figure 2 to explore the response to the standardisation strategy in multiple production sites within a corporation.

Although the current study examines a single company, the in-depth exploration identifies core processes possibly relevant to other improvement programs. Future research could focus on processes for adaptation, upskilling, and learning jointly to investigate the management of standardisation levels in other contexts and types of improvement programmes. For example, digital transformation appears to increase the implementation of templates. It would be interesting to investigate the influence of standardisation levels and responses within a multisite network of production sites. Also, this paper elaborates on the strategy to increase the standardisation level. It would be interesting to explore if the same strategic tools are applied in case of a strategy to decrease the

standardisation level. If new tools emerge or if some turn out to be irrelevant. Moreover, the identified managerial tools could inform fellow researchers of additional parameters in future research, e.g. in surveys and interview protocols for more detailed comparisons of companies' strategies for corporate-wide transformations.

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