Insights from a Top-Down Lean Subprogram Deployment in a Production Group: A Tactical Perspective

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Abstract. Global production companies spend a noticeable amount of resources on developing lean subprograms deployed within the corporate group. Despite the objective of achieving overall improvements, the expected performance might default due to inefficient deployment processes. Unforeseen lag or resistance to centralized programs has in previous studies shown to be influenced by contextual characteristics of the recipient, such as absorptive capacity, national culture, and factory size. How should deployment plans be designed while considering the characteristics within the corporate group? The research purpose here, is to explore the intentions and reasoning behind the designed deployment plan within a corporate group. Based on insights from a real case, this paper presents three various tactical deployment approaches of possible eight theoretical configurations, here called 'horizontal,' 'parallel,' and 'delegated' deployment. They differ principally by cascading approach, degree of freedom, and centralization of targets. The concept of 'deployment tactics' is introduced as a way to understand how the deployment plans are arranged given the contextual characteristics, and shows that the context dependency in lean subprogram deployment can be managed in various ways within a company.

Keywords: Sustainable Implementation, Global Operations Management, Strategy Management.

1 Introduction

Many corporate production groups develop a tailored lean program as a way to coordinate and reach consensus about the company's dialect on lean [1]. Ideally, the benefits from a shared program come with making an impact and improving business performance in all sites within the corporate group. However, developing and deploying such a corporate lean program is a challenging task when it comes to creating a balance between global conformity and local adaptation [2]. Can we assure that centralized attempts to implement lean in corporate groups do not become a waste in itself?

The existing lean transfer literature emphasizes mainly major lean implementation programs [3–5]. The research presented in this is paper investigates implementation on the next level, i.e. how strategic *lean subprograms* are deployed within a corporate group *as part of* their overall lean program. This view is somewhat highlighted in Danese *et al.* (2017), who recognize different types of transfer approaches in a global lean setting [6]. Lean subprograms support the lean journey in different ways, e.g. by

campaigns to reinforce a shared mindset, or by deploying assessment frameworks to track and steer the development progress. It also implies that the corporate production group could have several lean subprograms deployed at the same time, all to achieve overall business improvements. The number of failed lean subprogram cascading in the organization is somewhat unknown, but the success rate of lean subprograms that can be inferred from previous research is not higher than 30 % [7]. With the widespread impact lean has on global production companies, it is necessary to gain further understanding and knowledge to improve the efficiency of the deployment programs. The exploratory research presented here aims to attain further insight on intentions and reasoning behind top-down lean deployment approaches by investigating different deployment arrangements within a corporate production group. We suggest that the managerial perspective of sustainable production in corporate groups includes how to utilize deployment tactics to improve the efficiency of such top-down deployments.

2 Theoretical Framework

2.1 Lean Management in Global Corporations

As already mentioned, many global corporations develop a company-specific production system (XPS) conceptualized in structures considerably inspired by the Toyota Production System [1]. Despite the plethora of definitions, this study views lean production as a holistic system combining tools, methods, principles, and strategies [8]. In contrast to the well-known challenges of lean implementation [9], the management of lean in global settings derives additional challenges. A network composed of multiple production sites allocated worldwide leads to rather complex structures to manage since the sites are not isolated from each other [10]. Previous research often investigates the challenges with integration and organization among the production sites, as well as the balance in decision-making between headquarters and sites, thus, takes primarily a coordination perspective [2, 10]. Balancing the decision-making vertically is dominantly deciding the degree of autonomy of the site in either centralized, integrated, or decentralized structures [10]. However, inspired by Danese *et al*. (2017), this study takes primarily a configurational view to learn about the joint influence of contextual characteristics in lean deployment [6].

Structured processes for implementing or reinforcing lean through corporate programs can achieve positive global outcomes [11]. Such tailored XPS programs aims for a reduced heterogeneity in mindset and increased global conformity of the corporation's lean journey [2]. However, a single program is seldom sufficient [5], and a lean journey builds on the implementation of several subprograms to continuously improve the business in a strategic way [12]. Since a deployment process of subprograms relies on its recipients, a business' competitive advantage relies on how well institutionalized they are by the production sites within the corporate group [2]. Thus, the deployment process becomes crucial to realize the strategic purpose of the program.

A lean subprogram is for this paper defined as a multi-site improvement program to improve the business performance by reinforcing the global structure for XPS or harmonization of lean mindset within the network. Examples of lean subprograms are maturity assessments, capability assessments, and innovative implementation processes.

The stream of lean transfer literature has presented several variables influencing the transfer of lean practices within a corporate group [6, 12]. Coordination aspects are dominantly in focus by investigating the challenges with a resource-based view [9, 13]. In contrast, this study focusses on joint effects of the absorptive capacity of the recipient [13], factory size [8, 14], and national culture [6, 14]. For instance, a collectivistic culture (e.g., in China) is characterized by precedence to follow orders that could somewhat facilitate the deployment of a program initially [6, 14, 15]. Similarly, previous studies showed initial resistance to deployed programs in individualistic cultures (e.g., in the US) [ibid.].

3 Methodology

A single case study, aligned with views of Yin (2009), has been followed approximately for one year [16]. The case was bounded to the deployment of a centralized lean subprogram within the production branch of the corporate group. The globally initiated lean subprogram had the purpose of assessing and improving a particular set of lean capabilities in the entire organization, which implies both operational and service functions. The lean capability assessment framework (LCF) was cascaded from the global lean office via lean managers at a division's level to a large number of sites in 17 countries. Delimitations of the scope resulted in inclusion of the three divisions clustered geographically by the market (Asia, America, and Europe).

The collection of data was gathered with a mixed-method approach. Five semi-structured interviews with global decision-makers in lean promoting functions were conducted. Interviews were executed face-to-face or virtually (approx. 1-1.5 h). Intentions behind the decisions of the designed deployment plan, and the expected outcomes of the arrangement was the main focus during interviews. Furthermore, questions gathering insight regarding any issues or ad-hoc solutions was asked. The data collection consisted of a transcript of the recorded interviews, documents, and communication material used internally. Triangulation of data assured verification of contradictory statements and was after that, deductively analysed with a focus on the decisions and intentions behind the plan for deploying the LCF.

4 Results

4.1 Global Deployment of a Lean Subprogram

The case company had more than a decade of lean experience, although a more centralized corporate lean program was initiated about 2016. The lean journey consisted of several deployed lean subprograms before the LCF studied here, such as lean maturity

assessments and campaigns. A shift from a rather tool-based framework resulted in the categorization of lean practices into bundles called basic requirements, business process management, Six Sigma, and additional elements. Inadequate lean capabilities, recognized as a general point to improve in the corporate group, triggered the strategic decision to develop a lean capability framework (LCF). The LCF had the purpose of assessing and elevating lean knowledge based on a certification system where the employees' theoretical knowledge, and for some, a demonstration in practice, was tested.

The assessment framework was highly standardized, with no room for local adaptation. The framework included sets of criteria clustered in 10 different categories, which together constituted the bundle of 'basic requirements.' Depending on a set of intra-organizational roles, various assessment requirements were formulated in the criteria.

Together with the launch in early 2019, the decision that 80 % of all targeted employees should complete the basic requirements until the end of 2020 got communicated. A global directive was that leaders should go first to acquire the sufficient prerequisites needed to coach the employees in their teams. However, the execution details for the deployment of the LCF to a local level (i.e., the sites) was delegated to the division's lean managers to decide. The assessment progress was regularly followed-up globally. Further description of the deployment plans is found in the following section.

4.2 Deployment plans

The reasoning behind the plan for the deployment is described for the three divisions Asia, America, and Europe separately. Some of the contextual characteristics are similar between the division, such as the dominant individualistic culture in America and Europe (see Table 1). Table 1 also presents the decided deployment variables, which includes cascading approach, degree of freedom, and centralization of target.

Table 1. Contextual characteristics and deployment variables at the various divisions.

Context characteristics	ASIA	AMERICA	EUROPE
National Culture*	Majority collectivistic	Majority individualistic	Majority individualistic
Factory Size**	Small/ Medium/ Large	Small/Medium/ Large	Small/Medium/ Huge
Deployment Variables			
Cascading Approach	Top-down cascading with a focus on the deployment sequence among hierarchical levels	Cascading with a focus on the timing for initiation of the program among different roles.	Delegation of the responsibility to the sites, to plan the deployment. A focus on enhancing integration.
Degree of freedom	*Low* Steering on the division level. Common categories on site level. Recommendation provided. Lower levels could not choose.	*High* Steering on the division level. Option to choose on individual level. Recommendations provided.	*High* No steering on the division level. Option to choose on site level. No recommendations provided.

Centralization of Target (amount of completed categories)	1st year: 3 2nd year: 7	1st year: 5 2nd year: 5	2nd year: 10 (same as global target)

* Based on the same categorization as Netland (2016) [14].

**Small (<49), Medium (<249), Large (<1000), and Huge (>1000).

Asia: The deployment plan was to rigorously cascade the LCF, starting with the management team at the division level, which included all factory managers. The management team on site level was then responsible for choosing three categories that the whole site should mutually focus on for the first year. The option to choose was to enable adjustments for lean maturity at the site level, local site needs, and ensure engagement by enhancing the ownership of the program. The intention was not to deploy the LCF further vertically in the organization until a completed horizontal deployment. The horizontal deployment was a deliberate approach and explained to be essential to ensure sufficient capability among the leaders. Two of the most lean mature sites were located within the Asian division and there where pilots prior to the deployment.

America: The deployment plan focused mainly on the time when the LCF should be introduced to the various roles. Factory managers were prioritized to start ahead by getting introduced to the LCF first. After some months, the LCF was introduced to support functions in parallel, and at the same time, individuals on the shop floor in parallel. The freedom to choose among the categories was deliberately to adapt to 'the entrepreneurial spirit of the population.' The population within the production network in the American region was generally lean immature due to many new acquisitions (60 % of the people within the last three years), meaning that many sites were entirely new to the corporate production program. The segregated population was considered as a significant factor in the planning of the deployment approach within the region. The plan to deploy the LCF to various roles in parallel to each other was believed to avoid slowing down the sites that were further in their lean transformation, and therefore, would want to progress quicker in the LCF deployment. Insights from pilots within the division were expressed to be important and had influenced the deployment plan.

Europe: The deployment plan of deliberately letting the sites be responsible for their own deployment plan meant that no steering took place at the division level. The idea of deliberately delegating the responsibility for the deployment to the sites was decided with consensus among the sites in the European division. The reasoning behind the decision was to integrate the deployment of the LCF to existing plans at the site level. An rigorous work with local plans for elevating lean maturity were developed prior the LCF without the steering of the regional lean team, and thus, the reasoning was not to interfere with those plans through top-level steering. Also, another underlying purpose of not steering the deployment from division level, was to prevent 'deployment-inertia,' meaning that the sites had experienced several previous deployments of centralized programs and experienced frustration of performing additional activities that interfered with existing plans. The lean maturity within the region is roughly classified as medium. There were no pilots prior the deployment of LCF, unlike the other division.

5   Analysis and Discussion

Despite a centralized global deployment, a partially delegated decision-making for the cascading approach at a divisional level yielded in three various deployment plans. These plans differed prominently in the cascading approach, degree of freedom, and centralization of targets. Interestingly, the deployment plans were arranged to fulfill the strategic purpose of the centralized lean subprogram with the intention to prevent predicted deployment inefficiencies caused by the contextual characteristics within the division. For instance, the American division predicted that 'a very heavy-handed centralized approach' would not work for their employees. Therefore they had a higher degree of freedom when choosing among the various categories (classified as *low* in Figure 1.). This reasoning aligns with the findings by Danese *et al.* (2017) regarding the dominance of the individualistic culture within the division [6].

Taking contextual variables into account when planning the arrangement of the deployment could be described as a tactical deployment approach (see Figure 1). To exemplify this further, the Asian division planned a rigorous top-down cascading deployment with a tactical stage-gate principle. With a focus on the sequence when deploying top-down along the organization hierarchy, the stage-gate principle promoted a completed horizontal deployment before the program was cascaded vertically (classified as a *strong* cascade approach in Figure 1). The importance of leaders' capability to support employees were highly motivated and aligned with Liker's principle 'grow leaders that thoroughly understand the work, live the philosophy, and teach it to others' [17]. However, the top-down cascading was presumably enabled by the significant large proportion of the collectivistic culture within the Asia division, perhaps avoiding issues with stickiness in the initiation phase [6]. Also, the 'horizontal' deployment tactic could work oppositely, to hold back, as a tactic to prevent workers to routinely implement practices without involvement by managers. Another enabler that supported the 'horizontal' tactical approach was the initial focus on a rather low amount of categories, considering the time needed to adjust for the impact of the change that a new program made. The freedom of choice regarding the option to choose categories was rather narrow, however, not absent.

The American and European tactical approach differed from the Asian by having a weaker cascading approach. The similarity could be related to the similar dominance of individualistic national culture since both the American and European predicted a possible resistance to a centralized global subprogram. However, the European 'delegated' tactical approach could probably be related to the large/huge factory sizes in this division. The American 'parallel' tactical approach differs in that sense with a high degree of centralized common targets in the division. Moreover, since large production sites have a more complicated structure with administrative tasks, it may affect the implementation of lean practices negatively [8]. It could, therefore, imply requirements of a higher degree of coordination to deploy a lean subprogram to large or huge production sites successfully. Thus, the reasoning behind the delegated deployment tactic in Europe could be valid, considering the risk of superficial implementation, and thus, the absence of expected performance improvement, as discussed in [2].

	Cascading Approach (Strong/Weak)	Degree of Freedom (High/Low)	Centralization of Targets (High/Low)
Horizontal	Strong	Low	High
Parallel	Weak	High	High
Delegated	Weak	High	Low

Fig. 1. Framework for the arrangement of deployment plans for three tactical deployment approaches.

6   Conclusion

Many corporations that aim for centralized efforts to deploy lean within the production group, experience challenges with resistance and unexpected inefficiencies while doing so [15]. Sustainable implementation implies that centralized lean subprograms cascaded within the corporate group should not result in superficial implementations, nor cause inertia for global initiatives [2]. The tactical view presented here helps to cope with the challenges of polishing deployment plans to fulfill the strategic purpose of the program by minimizing deployment inefficiencies. The three various tactical deployment approaches, of eight theoretically possible configurations, highlights variables seen as important in the planning phase of the deployment. However, further research would provide more comprehensive generalizations and validate the relevance of the remaining five theoretical configurations. Beyond the need to strengthen the external validity, investigating which of the various deployment tactics are most successful and under what circumstances, deeper discussions are required.

Although some early findings indicate following recommendations to managers; (1) It could be valuable for the corporate management to closely consider the vitality of a global completion target, since undesirable effects, such as 'certification-hunting', might counteract the strategic purpose and lead to superficial implementation, (2) Site level management could benefit from being aware of the global approach to understand local requirements, for instance, decentralized goal setting, and (3) The global lean office could consider how to mitigate possible risks with resistance to programs with a tailored deployment approach, i.e. allow different intra-organizational arrangements. However, at the same time consider support for various requirements of particular cascading approaches, for example, with deployment principles (e.g. stage-gate principle) to enable flexibility in the arrangements, rather than 'one size fits all'. In other words, one approach is not necessarily the most suitable for all. The tactical perspective allows for more thoughtful arrangements where the influential contextual characteristics of each site within a corporate group could be taken into consideration. One must remember, the ultimate purpose of excelling in efficient and sustainable deployment is to avoid the paradoxical situation of lean deployment become a waste in itself.

8

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