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Corporate Lean Programs: Practical Insights and Implications for Learning and Continuous Improvement

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Abstract

Since Lean Production was popularized in the 1990s, many manufacturers have developed and deployed corporate lean programs across their global factory networks. However, research reports that up to 90% of lean programs fail to succeed. Drawing on practical insights gained from the deployment of one such program spanning multiple locations of a Norwegian multinational organization that has achieved quantifiable improvement over a five year period, this paper provides guidelines that may foster the sustainable deployment of corporate lean programs across an organization's international operations. We frame the investigation through the lens of Action Learning Research, making reflections around the implications for learning and continuous improvement in such an approach to lean deployment.

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1. Introduction

The promise of Lean Production is still enormous. Those that have successfully adopted it have witnessed labor productivity soar, errors and defects cut in half, and product development times slashed [1]. Research also shows that lean companies in comparable industries are at least 50% more profitable than their non-lean counterparts [2]. As such, many manufacturing firms have developed and deployed corporate lean programs with the purpose of increasing operational performance and competitive advantage [3]. However, up to 90% of such programs fail to deliver the expected results, and are subsequently terminated [4, 5]. In this paper, we explore learning as a critical success factor for the sustainable improvement latent in lean programs. We suggest that although expert-designed lean programs based on the implementation of lean best practices may in some cases help companies play catch-up with their competitors, they often fail to fulfil the true potential of Lean Production due to an over-reliance on compliance and static optimization rather than focusing on the

lean implementation as a process of discovery and learning, as demonstrated by Toyota Motor Co. and other successful lean exemplars. Afterall, seeing lean through the lens of traditional management will only generate traditional results.

The paper is structured as follows – we provide an overview of important theoretical themes in chapter 2 before introducing our research approach in chapter 3. Chapter 4 provides an overview of the quantitative data collection and generation process, before chapter 5 discusses the results using rich emergent data created by participants in the research. Finally, conclusions, contributions and limitations of the study are presented in chapter 6.

2. Theoretical Background

2.1. Lean Production and Corporate Lean Programs

Popularized in the 1990s by [6], Lean Production has emerged as the alternative approach to organizing and managing manufacturing firms. Its link with superior

performance and its ability to provide competitive advantage is well accepted among academics and practitioners alike [7, 8]. Given the triumph of Lean Production, many multinational firms have directed, developed and deployed so-called corporate lean programs – strategic improvement programs – across their global factory networks.

Corporate lean programs have helped manufacturers boost productivity [9], though many global manufacturers struggle to implement them throughout their production networks [10]. Typically, a corporate lean program has the aim of providing a clear and structured road map for implementing lean best practices (tools & techniques) to promote a culture of continuous improvement in all factories in the company's global production network. An overview of such tools and techniques are described in [11], which presents Lean Production as a set of practice bundles: Just-in-time (JIT), Total Quality Management (TQM), Total Productive Maintenance (TPM) and Human Resource Management (HRM).

However, many organizations that follow such a practice-based approach to lean implementation fail to realize the true promise of Lean Production [e.g. 12]. Rather than simply associating the implementation of lean tools with increased operational performance, an emerging theme in the extant lean literature is lean growth through learning. For example, [13] presents Lean Production as a system to gain competitiveness by continuously developing people, with learning at its core. They suggest that Lean Production is more accurately described as an education system than a production system. After all, being heavily influenced by [14], Sakichi Toyoda (the founder of Toyota Industries Co. Ltd.) exhibited a keen desire to learn from the outset, with knowledge, learning, improvement, and growth emerging as the prevalent themes of Toyota's alternative approach to business.

2.2. Action Learning

Action Learning (AL) has emerged as a radical process for increasing organizational knowledge and capacity for better adapting to change [15]. It can be considered as a lever for developing, improving and assimilating learning in organizations. [16] outlines the following assumptions that underpin AL:

- Learning is cradled in the task and formal instruction is not sufficient.
- (Solving) problems requires insightful questions.
- Learning involves doing, is voluntary, spurred by urgent problems or enticing opportunities and is measured by the results of action.

At the heart of AL is a distinction between different kinds of issues. Revans [16] distinguishes between puzzles and problems. Puzzles are those difficulties for which a solution exists, and which are amenable to expert advice. Solving puzzles is not amenable to AL. Problems, on the other hand, are difficulties where no single solution can possibly exist. Most complex organizational change projects fall into the category of a problem – where there is no single solution and where there are many opinions as to what the course of action might be. Problems are amenable to AL as, in response, different people can advocate different courses of action in

accordance with their own value systems, past experiences and intended outcomes.

[17] suggests that problem-solving is at the core of the Toyota Production System (TPS). As such, *Toyota Kata* [18] has emerged as an approach to create scientific thinking capabilities in people, in order to solve problems based on a commitment to taking action. In contrast, AL is both a philosophy and theory [19] that also requires a commitment to learning. AL aims to go beyond merely solving immediate problems. Its purpose is to develop, improve and assimilate learning in organizations. This different approach could hold some of the answers to the otherwise high rate of lean program failure.

2.3. Lean Assessments

Lean assessments are a popular way to guide a lean implementation, a prevalent example of which is the Rapid Plant Assessment (RPA) [20]. [21] suggests that an assessment tool is critical for any successful change program, as it provides focus for the improvement, fosters attention from management, and creates a desire for good scores throughout the organization. They state that the main objective of a lean assessment is to provide the organization with a roadmap to improve. A lean assessment determines where an organization is in respect to its intended destination and the state of readiness in which to progress forward.

[22] offers a much more critical account of lean assessments, suggesting that assessment-driven programs keep lots of people very busy, but without much to show for it. After all, lean is a learning system, not a management method: you train and develop people, and as they become better at what they do, performance improves. In this respect, [22] asserts that lean assessments can become bureaucratic exercises that can get in the way of deep thinking; and they can lead one to become grade-focused and miss the point of learning altogether.

2.4. Gemba Walks

If it is to achieve its potential, a lean assessment is not a desk exercise. A Gemba walk is an opportunity for managers to go and see the *real place*, in order to discover real challenges and understand actual problems in situ. Gemba walks make companies more competitive by clarifying a deeper understanding of the challenges it faces and by intensifying collaboration – from top to bottom (between executives and associates) and also across functions. The output of a successful Gemba walk should be a learning project that will enrich everyone's understanding of their job – from operator to chief executive officer (CEO) [13]. The resulting lean implementation becomes, in essence, a process of learning – where problems are discovered, explored and understood and where solutions are created, analyzed, selected and implemented. This results not just in improved operational performance, but also improved capability. Hence, "*an organization with an improved capability is an organization that has learned*" [15 p.35].

3. Research Method

Given the action-oriented nature of the study and the focus on learning, we use Action Learning Research (ALR) [15, 23] to inquire into how an organization may successfully achieve a sustainable lean implementation. We describe the deployment of a corporate lean program, providing insights from the five-year lean implementation of a Norwegian multinational organization serving the Maritime sector. One of the authors was responsible for the development and global deployment of the company's lean program, assuming the role of insider action-learning researcher [24] throughout the five-year period.

ALR is a related but different form of activity to Action Learning (AL). [15] suggests that the key to understanding this difference is in making the distinction between learning (through action) and actionable knowledge [25]. When engaging in AL, two commitments are relevant: commitment to action and commitment to learning [26]. There is no expectation, however, that on realization of these commitments, there will be a redeployment of that learning beyond the group, through creation and sharing of the emerging actionable knowledge. As such, ALR requires one further, related commitment – a commitment to adding to existing actionable knowledge. For the action-learning researcher, reflecting on the story of the action (from a theoretical perspective) aims to identify emergent theory so as to contribute to actionable knowledge. In ALR, data can be both collected and generated (created) in action.

The case company had been advancing with lean thinking and practice since 2015 across multiple locations (competing in diverse market segments) in Scandinavia, Europe and North America. In this paper, we focus on the company's international operations in Canada, Spain, the United Kingdom (UK), and the United States (US), where annual Gemba walks with local management teams combined with the application of an annual lean assessment have underpinned the approach to lean program deployment.

The lean assessment adopted by the company was the RPA [20]. The assessment was used to guide the Gemba walk, where participants typically included senior-, middle- and frontline management. As well as the results of the assessment, observations and key discoveries were recorded and summarized in a feedback report that was distributed to all locations at the end of each year – which identified common areas for improvement across all locations. As such, the report and subsequent program of actions were intended to foster local- and collaborative learning and improvement. The following section describes the results of the deployment of the corporate lean program at the case company's locations in Canada, Spain, the UK and the US during the period 2015-2019.

4. Data Collection

As described earlier, the first step in the lean program deployment was guided by the lean assessment. The RPA [20] was used as a visual test that gave a snapshot view of lean maturity on each factory floor by evaluating them over 11 categories: Customer satisfaction; Safety, environment,

cleanliness and order; Visual management system; Scheduling system; Use of space, movement of materials, and product line flow; Levels of inventory and work-in-process (WIP); Teamwork and motivation; Condition and maintenance of equipment and tools; Management of complexity and variability; Supply chain integration; and Commitment to quality.

Each category could score a maximum of 11 points, with a possible total score of 121 points. The development of scores from the lean assessments during the five-year period are shown in Fig. 1., which provides an illustration of the extent of adoption of various lean tools and techniques at the case company over time.

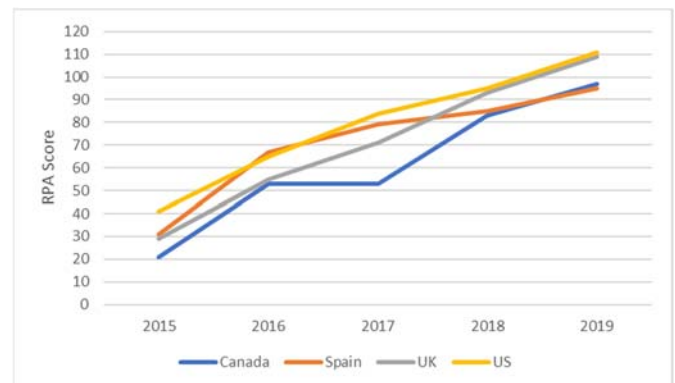


Fig. 1. RPA Results (2015-2019).

However, as [22] suggests, "*lean is a learning system, not a management method*". Therefore, it is important to indicate whether or not the consistent increase in lean score is reflected in consistent improvement in operational performance. As such, Fig. 2. illustrates the cost of poor quality (COPQ) indexed to 2015, which shows 60-80% improvement in quality performance across all four locations during the five-year period.

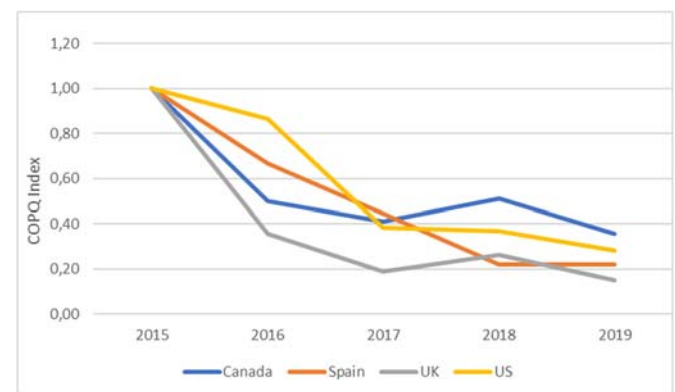


Fig. 2. COPQ (2015-2019).

In addition, Fig. 3. illustrates revenue growth at the four companies, while Fig. 4. shows growth in people productivity, both over the five-year period. Again, significant increase in revenues and labor productivity suggested that the organization had not only improved operational performance but had also improved its capability to solve more customer problems with less resources; suggesting that it was *an organization that has learned*.

As shown in Fig. 4., in the best case, the UK factory experienced a 400% increase in people productivity. The Canada factory saw an increase of around 200%, and the US and Spain witnessed growth in people productivity in the region of 30%.

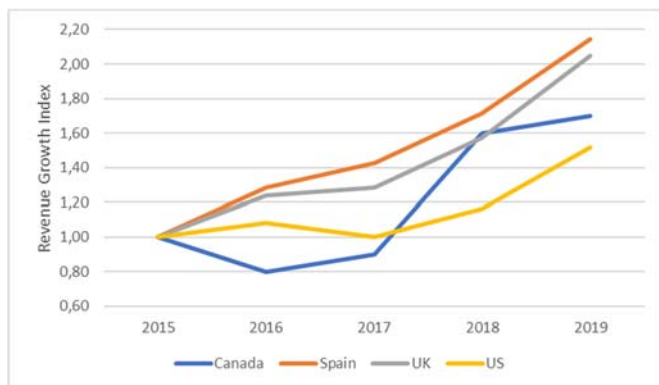


Fig. 3. Revenue Growth (2015-2019).

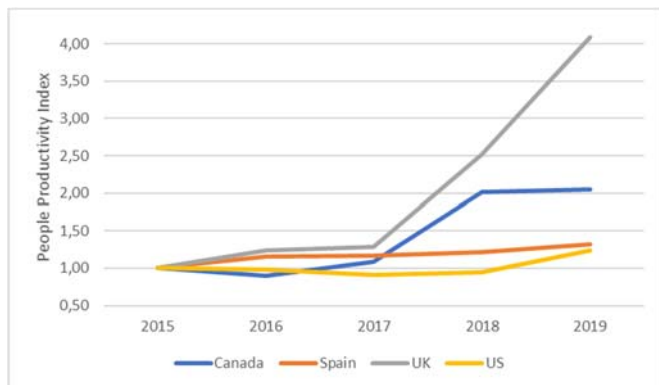


Fig. 4. People Productivity (2015-2019).

5. Discussion

The quantitative data that emerged as a result of the lean program deployment suggest that the corporate lean program in the case company has resulted in quantifiable improvement in both operational performance and capability of the firm. In this section, we reflect on these findings with a discussion that includes rich data from the discussions with local participants in the change program from all four locations.

Firstly, speaking in light of participating in the process as an insider action-learning researcher, one can reflect over the personal development of the researcher - in terms of the transition from an initial role as internal consultant, through one of an action-oriented individual engaged in reflective study of professional practice, to one of learning and transformational change. This development surfaced over two major phases in the lean program deployment. The first phase can be described as a tool-based implementation, heavily based on shop-floor lean audits and compliance (2015-2017); and the second as a product-centric process of company-wide discovery, problem-solving and learning (2017-2019). This is observable as a 'turning point' around 2017 in figures 2 & 4 specifically.

5.1. Tool-based lean implementation: Audits and compliance

The global deployment of the corporate lean program began with a tour of all facilities and the use of the RPA – a tool used

by many organizations during their lean implementations to benchmark operations and identify opportunities for improvement [20].

In 2015, the RPA provided an appropriate starting point and initial benchmark for the subsequent roll-out of the lean program – with all locations rated as "poor" or "below average" according to the assessment. To many it was described as an "eye-opener". Others were a little more skeptical, with one participant describing the process as "just another corporate initiative that will soon pass". Nevertheless, the outcome of the first benchmarking audit resulted in the identification of a common set of areas for improvement – the low-hanging fruits. For example, one outcome was to implement 5S workplace organization, while another was to establish routines for total productive maintenance (TPM). A third recommendation was to implement and visualize supplier evaluation and supplier development efforts.

During the second round of audits (in 2016), all factories had implemented the company's visual management handbook (which described the standardized approach to 5S). Each site had also adopted Kaizen whiteboards for gathering employee suggestions and hosting weekly team-based improvement meetings. The suggested areas for improvement for the next twelve-month period included the adoption of Kanban (to visualize work and to further drive Kaizen efforts) as well as the implementation of A3 management for problem-solving.

In 2017, there was again an increase in the adoption of lean best practices, and further improvement in operational measures. However, the rate of improvement had begun to stagnate in some areas, with one manager comparing the lean program to "putting lipstick on a pig". Something more was required. The move from poor to good was a relatively simple one. To advance from good to excellent would require much more than an annual lean audit and a set of best practices to implement. As such, the lean program took a shift in focus towards lean leadership, specifically Gemba-based management and the engagement of the entire enterprise in learning and improvement.

5.2. Company-wide discovery: Problem-solving and learning

Though many companies throughout the world are trying to find a way to engage employees in continuous improvement by using lean programs, [27] suggests that, unfortunately, there is usually something missing in these efforts. Such programs often begin with a "value stream mapping" exercise [e.g. 28] – to analyze the process of converting raw materials to finished goods – in order to lean out the process from the bottom up. Though these programs often lead to quick wins, they are by no means sustainable, and often end in failure. We suggest a primary reason for this is that companies attempting to replicate Toyota's success often overlook the importance of product-centricity in a blind attempt to improve processes.

As such, following the 2017 assessments, management teams at all locations were assembled to carry-out a form of extended value stream mapping, involving managers from product management, engineering, production, supply chain, customer support and sales to see the actual work from concept to launch, industrialization to volume-production, and

maintenance though end-of-life. This encouraged the managers to see the value stream in its entirety, rather than a constrained view of the material and information flow across the factory only. In doing so, a major discovery for the participants was that there are indeed technical reasons for all costs associated with product – be those costs value-adding or otherwise waste. The engineering manager at one of the companies summarized the learning: *"it is effortless to design in waste – but it requires a massive effort to remove it afterwards"*.

By adopting this new approach to the lean deployment, phase two witnessed an acceleration in the rate of improvement – both operationally and financially. The finance manager at one of the companies stated, *"the new way of looking at the value stream has enabled us to advance from focusing on moving from 'poor' to 'good', to focusing on how to go from 'good' to 'excellent'"*.

Management teams began conducting regular Gemba walks to proactively discover technical problems and support problem-solving and learning through direct engagement as well as by coaching frontline operators. Gemba walks began to be fueled out of curiosity and willingness to learn rather than compliance alone. The questioning and reflection characteristic of action learning were in evidence. *"People are seeing it works!"* proclaimed the continuous improvement engineer at one of the companies. Lean was now identified as a strategic matter for the entire organization rather than an operational issue for the production department in isolation. The general manager from one of the sites said *"lean is no longer a dirty word, it has become the new way [...] and is now pulled by the organization, rather than pushed"*.

A key to advancing the lean implementation appears to have been the combination of A3 problem-solving with Gemba walks. For example, the factories in the UK and Canada formally adopted A3 management to follow-up the problems discovered during Gemba walks. The Canada team specifically identified an "A3 Champion" to promote the use of A3 - as a standard approach to problem-solving as well as a means of communicating the results.

The production manager at one of the sites summarized the result by saying *"we are moving away from firefighting. We now take the time to discover individual problems at the Gemba – and create space to think – in order to learn how to solve them properly"*.

In addition to the program deployment at the individual sites, there was also a corporate-wide initiative to share the learnings from each site – by documenting the success stories and sharing them in the feedback reports, in newsletters and via an online platform. Progress was also discussed at the management meetings, where senior managers from each site reflected over the lean implementation and identified the next steps.

6. Conclusion

An organization with an improved capability is an organization that has learned. In the context of corporate lean programs, we suggest that learning must be seen as a process of deep thinking, reflection and improvement rather than simply learning and implementing lean best practices. Though the best practices themselves can help an organization move

swiftly from "poor" to "good", the advancement from "good" to "excellent" requires much more. This serves the basis for guidelines that may foster the sustainable deployment of corporate lean programs across an organization's international operations – *don't focus purely on implementing lean best practices, rather use the best practices as accelerators of cross-functional learning and improvement*.

In this paper, we describe the five-year journey of a Norwegian multinational organization deploying a corporate lean program across four factories in its global network. We identify two main phases – the first of best practice implementation and compliance, and the second a shift towards product-centric, enterprise-wide discovery, learning and improvement. We suggest that both are necessary, though they need not be executed sequentially. By looking at lean as a learning-based paradigm shift in business thinking, the lean tools must be seen as teaching aids and accelerators for learning. Lean best practices are not simply a means for achieving operational excellence, but a means of fostering discovery, deep thinking and sustainable improvement. Contrary to popular belief, the results of this study suggest that capability is not built by learning and implementing lean best practices alone (though this can lead to improved operational performance). Capability, on the other hand, is built by progressing beyond the implementation of best practices and using them as accelerators of learning. As such, we suggest that the sooner an organization embarks on the deeper process of discovery and learning, the sooner the organization can realize true, sustainable lean growth.

After 30 years of research on Lean Production, there is an abundance of literature that discusses its associated best practices [e.g. 11], how to implement them [e.g. 29, 30], and what to expect from adopting them [e.g. 9]. However, much less of the extant literature attempts to address the high rate of failure of lean implementation. Thus, in terms of a contribution to theory and in light of the results of this study, we propose that AL (which has traditionally been directed towards enabling professionals to learn and develop through engaging in reflections on their own experience as they seek to solve real-life problems in their own organizational settings) provides a much more suitable lens for investigating and contributing towards the successful deployment of lean programs. Furthermore, ALR – with its commitment to creating and sharing actionable knowledge in addition to the basic commitments to action and learning – provides an approach to problem-solving that is grounded in participative and pragmatic values, in which participants work on real organizational problems that do not appear to have clear solutions.

AL through Gemba walks and problem-solving emerges as a critical success factor for the deployment of Lean Production and in the sustainability of the resulting improvements. The explicit commitments to action and to learning by groups with the power and commitment to question and reflect on how activities are undertaken is at the core of this process. Solving such complex problems in this way requires trust, discussion, reflection and deep thinking; as well as a curiosity to learn and a desire to share the learning. By adopting such an approach to lean deployment, the results of this investigation suggest that

other organizations may indeed accelerate the effects of corporate lean program deployment through collaborative learning and improvement – with exponential growth in labor productivity, as well as significant improvement in operational- and financial performance.

We also argue that this work makes a contribution to methodology, particular in advancing the applicability of ALR in addressing complex organizational problems such as the implementation of Lean Production. This emerging paradigm of operations management research provides a rich and grounded approach to the creation of actionable knowledge that is rigorous, reflective and relevant.

Additionally, through analyzing the deployment of a corporate lean program through the lens of ALR, this work has strong implications for practice, given the otherwise high rate of failure of lean program implementation. During the five-year deployment of a corporate lean program across four factories in the global network of a Norwegian multinational organization, the company realized 60-80% improvement in quality performance, 50-100% growth in revenue, and 30-400% increase in labor productivity, which presents important insight for the success of corporate lean programs and suggests significant implications for learning and continuous improvement in multinational firms.

The limitations of the study are defined by the single organization perspective. Despite competing in several diverse market segments, the case organization participates in a particular industry with its particular benchmarks and dynamics. However, through comparing the AL approach with initiatives in other contexts where the insider action-learning researcher has an active role, this rigorous and reflective research can be extended in future work.

In conclusion, the ALR approach has engaged with real-life issues, it has been collaborative (with the members of the organizational system), the process has been reflective (both of the system and of the insider action researcher), and the research has contributed to actionable knowledge for sustainable lean deployment. "*Gemba is the best teacher!*".

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