

# Reasons for Operational Excellence Deployment Failures and How to Avoid Them

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Received 7 July 2015; accepted 21 August 2015; published 24 August 2015

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## Abstract

Globalization of business accompanied with increased margin squeeze has been leading many companies in western Europe during the last decade to deploy substantial Operational Excellence (OPEX) programs to remain competitive. Mainly proven Six Sigma and Lean techniques for quality and process improvement have been adopted however with variable lasting success. What are the reasons for success or failure? Which are the applied approaches? What are the circumstances leading to the outcome? This paper shows that management competence as well as the selected approach is decisive for success or failure. In addition, an optimized deployment approach to achieve a sustainable implementation of the OPEX program is presented.

## Keywords

Operational Excellence, Lean, Six Sigma, OPEX Deployment

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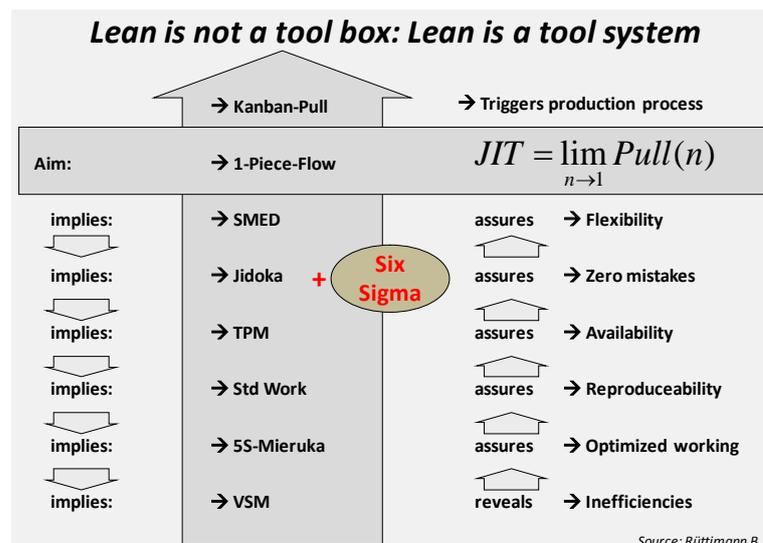
## 1. Introduction

To be successful one needs to know the rules of the game and play better than the others. In business, the rules of the game are the classical market success factors, such as innovation, low cost production and customer satisfaction. Especially, the last two factors are essential for the medium-term survival of companies. Competition theory shows that to become a leader one needs to master best the present rules or to reinvent new rules for changing the game. Two companies have successfully practiced the second way in the 1980ies: Motorola and Toyota. Motorola improved the quality level by a factor of 20 introducing Six Sigma based DMAIC problem solving method, a method brought to perfection mainly by GE. The method has been also adopted by other

North American companies, developing it into a tremendous cash-generating “machine”. Toyota perfected its production system [1] named accordingly TPS (Toyota Production System)—this production theory has been called afterwards Lean Manufacturing by the Americans [2] [3], focusing on Just-in-time (JIT) and Kaizen-based shop floor teams, a management philosophy which in the meantime has been internalized by every automotive manufacturer. The competitive advantage gained by Motorola and Toyota leads to an increased number of followers adopting these methods and techniques also in other businesses, different from electronics and automotive. Later, the OPEX term was born in order to strive for perfection and dominance. The competitive advantage gained through these techniques has been so high that we can state that weak companies without unique selling propositions (USP) not sticking to these new production methods will disappear from the competitive scene in the course of the next ten years.

In Europe, the dissemination of Six Sigma and Lean techniques gained momentum after the beginning of the new millennium, mainly driven by American and Japanese subsidiaries. Whereas at the beginning the two approaches, *i.e.* Lean and Six Sigma, were considered separated, a Lean Sigma symbiosis gained momentum [4]. This combination has been highly successful due to its structured DMAIC phase model merging elements of both approaches, Lean and Six Sigma, into a synergic approach. Nevertheless, during the last five years we have noticed again a shift to the pure Lean approach. This is not surprising, being Lean a new comprehensive manufacturing theory focusing, among others, on JIT single-piece-flow (SPF) opposed to the classic batch and queue manufacturing theory, whereas Six Sigma has a mere quality orientation, with quality being a part of the manufacturing system. However, this does not mean that the Six Sigma approach will become obsolete. It is rather considered a “*conditio sine qua non*” to do business. Although it should be a “*conditio sine qua non*”, it is not yet widespread among many European companies, being far away from Six Sigma quality level or the Japanese zero mistake aim. Therefore, for these companies it has to become an integral part of the Lean theory with the Six Sigma concept not being neglected, but integrated complementary into the Japanese Jidoka principle (Figure 1) [5].

On the wave of success of Lean and Six Sigma techniques, mainly in the assembly-based industry environment, the dissemination of these principles expanded to other businesses, such as metal transformation, pharma, and other industrial companies, but also to service companies, such as banking, insurance and telecom. Meanwhile, it also reached the transactional support departments, *i.e.* sales, accounting, human resources and so on. Especially in non value-add administrative functions, Lean Six Sigma (LSS) has a big impact; in fact, the main cost block in a P&L statement after raw materials is personnel cost, on which high-cost Western companies should focus on [6]. The non-adapted application of Lean and Six Sigma techniques, not only but mainly, in service companies led often to failures when Lean and Six Sigma OPEX techniques were applied. These failures are not attributable to Lean and Six Sigma itself. These techniques are meanwhile proven, but they are attributa-



**Figure 1.** Six Sigma has not to be neglected but has to be conceptually integrated into Lean [5].

ble to the contingent circumstances of the business and the management, as we will see later. In service companies, this may also be ascribed to the fact that the manufacturing tailored tools cannot be transferred to office jobs without reinterpreting the tools, or their application has been limited in the past to merely eliminate waste in the transaction processes: we have to pinpoint that the relational Office Model does not correspond to the procedural Shopfloor Model [7]. The way how it has been applied in service companies only corresponds to a limited exploitation of what Lean in the original sense of the TPS can do [7]. Indeed, intending waste reduction when talking about Lean is a far too simplified and restricted view about Lean, but often practiced; alone this shows that the real Lean has not been understood by everybody. The initial enthusiasm may therefore evolve into wide-spread disillusion with consequent full or partial abandon of the OPEX program, such as happened, among other companies, recently at UBS corporate level [8]. In the following, we will focus our attention on the topic why certain OPEX initiatives have been crowned with success and why others finally lead to a failure. The focus will therefore be on the deployment approach rather than on the boundary conditions, such as deployment organization and resource dedication, which are well treated in the literature and in internet blogs.

## 2. Investigating Applied OPEX Approaches

In principle, different approaches are imaginable and possible to deploy OPEX programs which have also been applied in the past. Due to the lack of specific knowledge of the management regarding new manufacturing theories and process improvement approaches, the selection of the OPEX approach may have been less guided by the suitability of the approach to the situation of the company but may have been more influenced, or better driven, by the specific standard approach applied by the selected consultancy company. This may have been leading to unsatisfactory results within the whole organization as well as a considerable amount of spending for consultants, which were not worth the money. A failure, *i.e.* the non achievement of the set target, at the extreme can even lead to an abandon of the OPEX program, can bring drastic consequences for the company, because it is difficult to restart a new effort bearing in mind the last flop, which may even have had consequences for the program leader. In the following, we show a non exhaustive list of potential initiatives:

- Systems re-engineering.
- Total quality management.
- Application of partial six sigma concepts.
- Restricted lean-type initiatives.
- Six Sigma DMAIC problem solving.
- 8D approach.
- Lean Six Sigma DMAIC.
- Lean introduction.
- Lean transformation.

Let us focus on the last three, which are presently increasingly adopted in pure or partial format within Swiss companies. Before entering into the comparison, let us make the following upfront remarks. In certain industries, such as automotive, a single piece flow has already been applied since the launch of the Ford T-model, whereas other mass-type productions are still in the “batch & queue” mode. A similar paradigm is also applicable for quality level and quality orientation. Six Sigma as a methodology has both a wider and different scope than Jidoka has, a part of Lean, which is rather a technique aiming at inline quality production. Therefore, having a single-piece-flow installed—one of the main Lean tools—does not mean to have a Lean approach and applying statistical process control (SPC) quality control technique does not mean to have necessarily a Six Sigma approach. Lean and Six Sigma are much more than a sum of tools. They are a production and management approach how to run a company. This is important, because having already a kind of flow production in place allows to select a different approach. Let us give a short summary of the three approaches (Table 1).

### 2.1. Lean Six Sigma DMAIC

This approach bases on the structured Six Sigma DMAIC problem solving method but not limited only to product quality problems but extending the scope of application with Lean tools and concepts also to logistics and manufacturing problems. Being a problem solving approach, it necessitates a problem for which the root causes are unknown and therefore no solution is presently identified. The problem resolution is based on Green Belt (GB) and Black Belt (BB) LSS teams, where GB and BB are denoting the mastering degree of analysis and reso-

**Table 1.** Comparison of alternative OPEX deployment approaches.

Deployment	Advantage	Disadvantage	Requirements
LSS DMAIC	<ul style="list-style-type: none"> <li>• General problem solving method</li> <li>• Structured training</li> <li>• Immediate dissemination of Lean Six Sigma culture</li> <li>• Fast financial return</li> </ul>	<ul style="list-style-type: none"> <li>• Gate reviews sometimes cumbersome</li> <li>• Exhausting potential</li> <li>• No sustainable change of culture</li> </ul>	<ul style="list-style-type: none"> <li>• Coaching of first project teams by experienced consultant is recommended</li> <li>• Suitable project selection is necessary</li> </ul>
Lean Introduction	<ul style="list-style-type: none"> <li>• Sustainable change of culture starting from shopfloor</li> <li>• Kaizen-team based</li> <li>• Beginning with 5S</li> </ul>	<ul style="list-style-type: none"> <li>• Slow setup</li> <li>• High cost and initially lack of financial benefit</li> <li>• Quality not priority</li> </ul>	<ul style="list-style-type: none"> <li>• Requires patience</li> <li>• Needs long consultant assistance if knowledge is not internalized fast</li> </ul>
Lean Transformation	<ul style="list-style-type: none"> <li>• Fast conversion of production to Lean (from Push to Pull)</li> <li>• Immediate visible success</li> </ul>	<ul style="list-style-type: none"> <li>• High risk of initial production failures</li> <li>• Big cultural shock</li> <li>• Quality issues not fixed</li> </ul>	<ul style="list-style-type: none"> <li>• Requires strong leadership of management</li> <li>• Has to be accompanied by consultants</li> </ul>

lution techniques. Once the problem has been fixed the teams are dissolved. Through the available LSS toolbox, product quality related problem as well as problems of production interruption, On-time-delivery (OTD), stock-out nature are solvable making it a powerful problem solving approach.

## 2.2. Lean Transformation

This approach is value stream based, but not as other limited Value Stream Mapping (VSM) approaches restricted merely to identify a little bit of muda (Japanese word for waste) and eliminating it but applying the “present state—future state—action plan” approach, *i.e.* aiming generally at a profound transformation of a push-based to a pull-based production system design. The future state solution is mainly a customer-pull single-piece-flow, modeled with the drum-buffer-rope technique. The implementation is performed by experienced Lean transformation teams obviously with the involvement of the shopfloor people. The drastic conversion and reorganization bears the inherent risk of a non-flawless change, a situation to be managed. The attention is fully focused on the conversion of the production system and no or minor attention is paid to existing maybe urgent quality issues which may persist, as experience has shown. I leave the questionable priority setting to the attentive reader.

## 2.3. Lean Introduction

This approach is based on the deployment of the basic continuous improvement philosophy of the TPS, *i.e.* the Kaizen mindset. The shift team leader leads the self-directed improvement teams; these shopfloor teams are permanent, opposed to these of the former two approaches, which are project team based.

Often Lean introduction starts with a limited lean-type initiative, consisting of a basic training comprising elements of VSM, Muda, 5S and maybe Single-minute-exchange-of-die (SMED) and culminates for the training participants with a “Lean expert” certificate, a title which is quite exaggerated in this case. Indeed, only the knowledge of important concepts such as standardized work, Total Productive Maintenance (TPM), Poka Yoke, Autonomation (Jidoka), flow, Kanban pull, Heijunka, visual management (Mieruka), cell design, etc., may allow to claim a title such as “Lean expert”. The same can be said to GB trainings; you do not always get what you expect. Therefore pay attention to low-profile consultancy companies with trivial in-house training offering not teaching the comprehensive Lean contents. The comprehensive introduction of Lean following the systematic construction from bottom-up assures a flawless introduction of a Kanban-pull SPF. The theoretic bottom-up approach of **Figure 1** guarantees a flawless conversion of a push to a customer-pull production system without production interruption, because all necessary conditional steps are accomplished before the next step has started. Please note, the aim of Lean is not the introduction of Kanban supermarkets, as sometimes wrongly stipulated, the aim is rather the introduction of a single-piece-flow triggered by Kanban. Indeed, wrongly applied Kanban-stocks can even lead to an increase in Work-in-process (WIP).

As mentioned before, several approaches exist to deploy Lean, also hybrid approaches of the above mentioned. The deployment approach applied is often influenced by the consultancy company chosen. Nevertheless,

the company-optimal approach depends on different factors.

### 3. Reasons for Failure

The first LSS survey carried out in Switzerland revealed that from 80 inquired Swiss companies having introduced an OPEX deployment approach 41% were happy, 52% were passably happy, and 7% were not satisfied at all and had abandoned the initiative. It is interesting to note that the difference between industry or service or company size was statistically not significant [9]. However, correlation analysis between the answers of two questions revealed that the enthusiasm or the reluctance for the LSS adoption by the employees were significantly related to the leadership behavior of their superior, *i.e.* if their superior did not support the OPEX initiative neither did their employees. This result was not surprising but has now become a proven fact. The survey revealed also that managers from multinational companies throughout the hierarchy had absolved a sort of quick LSS training whereas CEOs of SME either didn't know anything about LSS or were experienced with Lean or Six Sigma techniques. Interesting was, that the type of approaches selected were statistically significant different between industry and service companies. Service companies applied rather the LSS DMAIC approach, whereas industry companies applied rather a pure Six Sigma or a pure Lean or partial approaches.

The effect of a failed OPEX initiative has two forms:

- a shrinking convincement with reduced management support but keeping the program alive, or even
- the complete abandon of the program.

Although the second alternative is worse than the first, it is obvious, that working without convincement impedes the achievement of extraordinary results. According to the survey, both outcomes can be attributed to two main causes:

- the non-supportive behavior of management, *i.e.* lack of leadership (60% - 62%), and
- issues with the deployment approach and its implementation (24% - 31%).

The first cause is also supported by other studies and internet blog discussions showing the crucial importance of change management. Due to the fact that LSS theories are not wrong, the main pitfall is given by the ignorance of management related to LSS theories, their implementation and finally their revolutionary impact to the resulting improvement of business competitiveness.

The question may arise why the initial enthusiasm has turned into disillusion in some companies. The potential root causes have only partly be explained by the participants of the survey [9] with lack of suitable projects (DMAIC approach) but might also be ascribed to merely partial fulfillment of high and fast-rewarding expectations. Indeed, the limited fulfillment of high expectations can be attributed to the wrong management of deployment and the delayed materialization of financial benefits starting with the "wrong" approach *e.g.* by starting with 5S or process lead time reduction. Indeed, 5S and Process Lead Time (PLT) reduction do not have an immediate financial impact but are necessary for a proper workplace organization and a customer oriented supply. These initiatives have to be seen within a broader context of improvement of the whole production system with the implementation of the whole Lean system. This shows: Lean is not a tool box from which to select to implement some isolated tools—Lean is a tool system which has to be implemented as a whole (Figure 1).

### 4. Proposing an Optimized Approach

What could be a successful approach? To answer this question we have to investigate the reasons to launch an OPEX program. The mentioned survey [9] answered also this question. The participants to the survey stated, among others: because it is a systematic approach (64%), because it is our new management philosophy (58%), because it brings competitive advantage (58%), but also because it is prescribed by our parent company (22%), and because others are doing it (20%). This resulting scope of answers is symptomatic for the farsightedness or the lack of understanding for the changing competitive environment that an OPEX initiative can have to change the way how to manage a company. Further, the necessity, or rather the forcing pressure, to launch an OPEX program depends mainly on:

- Presence of a burning issue (short term necessity),
- Increased competition intensity (medium term necessity),
- Or simply originated by the insights of a business sector performance comparison (first adopter or follower).

The optimal approach has to take into consideration the business characteristics and therefore the application suitability and the urgency to change. The intention of this paper is not to enter into the specific characteristics

of each business, but rather to give a solid approach which suits to most business realities, matching all necessities which may be present in concomitance.

Inspire, a technology transfer institute and a strategic partner of ETH, the Swiss Federal Institute of Technology, is therefore proposing the following holistic OPEX deployment approach, a synergic approach consisting of a stepwise combination of the considered partial LSS deployment approaches (Figure 2). This approach tries to bridge the short and medium term. It consists firstly of a structured problem solving approach to tackle the burning issues by spreading at the same time the Lean Six Sigma basics within the company. Then, when the major issues have been fixed, it moves to change the production system while at the same time beginning to change the shopfloor organization to a continuous improvement culture which takes usually a longer time, striving to achieve a sustainable operational excellence.

Indeed, if a company is confronted with a burning issue, employees hardly understand the launch of an additional widespread Lean OPEX program, perhaps in presence of other already running initiatives and are overwhelmed or simply overloaded by facing recurring problems which have not yet been fixed. Although the LSS DMAIC approach may lose in the market its initial favored position to other pure Lean deployment approaches, it still remains one of the best problem solving approaches based on a fact based root cause analysis (RCA). To solve the problems, Six Sigma as well as Lean tools help to fix the issues. DMAIC applicability is based on well selected improvement projects where the root cause and potential solution is not known. Through training of GB and BB the dissemination of suitable RCA tools and many Lean elements, the LSS culture is sparked off through the entire organization. Usually each project has a potential improvement benefit of a magnitude of a six-digit figure paying largely the cost for the GB and BB training of selected employees. As soon as the major issues have been solved, DMAIC loses its primary reason for existence because DMAIC is not apt to perform the cultural change. This is the right time to switch over to the second step, *i.e.* to perform the Lean Transformation. Nonetheless, DMAIC will remain a helpful tool in certain situations and will not lose its reason of application.

Lean Transformation is a Kaikaku based transformation, *i.e.* an improvement of big change. Systematically each value stream is being illustrated via VSM. Each value stream is put under severe scrutinee to eliminate waste first before being transformed. Afterwards, the usually batch & queue MRP scheduled process is modeled into a customer-pull taked process and visually captured on a VSM. The gap between present state and new future state value stream is described by a master implementation plan containing a list of rapid improvement projects to materialize the new solution. The change may bring production disruption during the process is going through the transitory phase and the run-in phase has not yet terminated. Nevertheless, it represents the base of a modern production system which may lead also to a consistent competitive and financial improvement. This transformation may lead to a cultural shock for which the employees have to be prepared for.

To assure a sustainable cultural change, in parallel, the third step is initiated, *i.e.* the shopfloor Kaizen based continuous improvement, which means improvement in many small steps, performed by self-directed teams of production. The shopfloor employees have to be trained with the new production philosophy of PDCA and Kaizen boards, 5S and Mieruka, Andon based communication, complying to imposed customer takt, etc. We have to pinpoint that these actions may not give a visible immediate monetary reward but are necessary for a long-

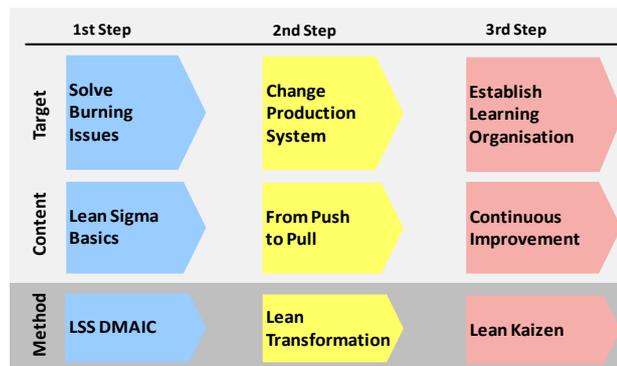


Figure 2. The inspire synergic and holistic OPEX deployment approach.

term sustainable operation with a continuous improvement culture. Different from DMAIC, where the benefit is usually quantifiable in each project, this will not be the case for Lean! You will find the benefit impact later through systemic interaction of several synergic effects on the bottom-line of your P&L.

## 5. Conclusion

Failure of an OPEX program deployment is mainly attributable to management incompetence, due to the lack of knowledge or the lack of leadership. Often consultants are employed to introduce Lean. To be able to evaluate the LSS deployment proposal of a consultancy company, management has to be knowledgeable about LSS. At the same time, the program has to be top-down driven, meaning “walk the talk” showing leadership. Considering the fact that a serious OPEX initiative is not “the flavor of the day”, but is a long-term program, initiated by a management who intends to improve the way how to manage a company. It has to be stressed that the way how to proceed is crucial. The here proposed comprehensive systematic OPEX approach comprises three steps. Each step aims to bring the company to a sustainable step forward regarding cultural change but also considers the necessary financial return; this systematic approach is suitable to most business realities. Due to the fact that the inspire OPEX deployment approach shows a systemic and holistic character, there is a very high chance for a far reaching and lasting OPEX implementation success.

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