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# A Method of Multi-Perspective Assessment of Lean Management

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**Abstract.** Lean Management (LM) can harm corporations when unconditional implementation takes place. This paper proves that LM implementation brings negative side effects. Main reason for this can be stated as dysfunctional assessment of projects. Neither management control nor any other known method or mechanism can prevent side effects at present. As outcome of this paper a method for multi-perspective assessment is proposed, to resolve this problem.

**Keywords:** Lean Management • Negative side effects • Lean Assessment

## 1 Introduction

For Japanese, LM means looking at the timeline, starting with placement of customer order to the end of process when the company collects the cash of produced product. The period in between has to become shorter by elimination of all activities, which are considered as waste and not value-adding for the customer [1-3]. Literature research reports about positive effects, which can be achieved by implementation of LM. In contrast experts with practical background and some journals exhibit that side- or negative effects frequently appear by wrong implementation of LM. The definition for westernized business environments is considered a rigid framework in a medium term lasting project to reduce resources, mainly cost and headcounts mostly within the field of production, while level of innovation and quality is kept steady or increasing

Its claimed that research about LM lacks credible qualitative data [4-5] to analyze and diagnose phenomena why companies rarely obtain planned objectives of LM programs, neither match performance of Toyota, known as best in class LM benchmark. The literature around LM, mainly stress positive effects. Observable attention is on dedicated areas in production or supply chains, but rarely considering effects in other departments, interfaces, nor in the companies' environment. This leads to an underestimation of side effects. Finally the problem of negative side effects remains hidden or achieves minor attention within publications.

The described problem leaves a research gap in relation to qualitative data studies, root cause analysis and diagnosing of positive or negative side effects.

The contribution of this paper is constructive research to build a method to tame unwanted side effects and dysfunctionality of assessment of LM. This method in con-

trast to other existing methods proposes a detailed way to assess LM projects ex-ante and a methodology of monitoring during implementation to exclude side effects.

## **2 Research Method**

Firstly a detailed analysis of qualitative data of a previous research in the machine building sector is exploited and summarized. It is used to reflect on structure and frequency of negative side effects of LM and their root causes.

Secondly dilemmas of controlling, which describe architectural shortcomings in performance management systems are researched to contribute to construction of multi-perspective method of assessment of LM.

Thirdly phenomenological research and abundant reasoning of side effects, root causes and dilemmas of controlling, lead to a conceptualization of structure and guidelines for method of multi-perspective assessment of LM. Additionally a methodology of decision making in case of detection of negative side effects is suggested.

## **3 Effects of Lean Management**

A majority of authors in the area of LM report and endorse positive effects when using LM principles, methods and philosophy [1-3]. Findings of frequently cited authors promoting increased business performance by LM, follow a similar pattern to obtain data and publish findings in recognized journals e.g. (a) questionnaire summaries from short interviews or large pools [4, 5] and (b) sophisticated analytical research methods i.e. Cronbach Alphas or Regression Analysis [6, 7]. None of those papers or contributions explain why assessment of LM implementation could be dysfunctional [8]. Besides, it is proven in professional magazines that turbulences appear as negative effects, which can be directly allocated to LM programs or methods [9, 10].

In reflection of this contrast, a series of 30 field cases, from 8 globally operating machine building corporations was obtained. Cases were developed with experts from senior and executive management. As outcome of a four year study it was concluded: Existence of negative side effects is unneglectable. In total, 40% of all cases exhibited negative effects higher than the initially planned positive effects. Furthermore 73% of all cases had a negative effect which is greater than 50% of the initially planned benefits. No case was without any negative effect. The structure of effects, typically reported are: (i) Fall-outs, i.e. late or cancelled deliveries, mainly due to internal problems in supply chains; (ii) Quality problems/issues; (iii) Increased stock/buffers; (iv) Customer dissatisfaction, or even damaged reputation; (v) Reduced sales; (vi) Misuse of experts outside of their professionalism/fluctuation of core employees; (v) Increased cost through i.e. exceeded budgets of Lean projects/initiatives [12, 13].

As main root causes for negative effects following items have been identified: (a) focus on direct effects i.e. cost, manpower (80% of all cases), (b) Time related inconsistency of planned effect (73% of all cases), (c) Non-holistic assessment of project and environment (70% of all cases), (d) Scope related effects i.e. bypassing

effects in other departments (67% of all cases), (e) Dysfunctionality in prior risk assessment (63% of all cases) [11].

It can be concluded, that most of the identified root causes are subject of management control; they manifest weaknesses in project assessment and project controlling. LM has synergetic side effects, which appear to be complex. Negative effects can accelerate or grow until financial losses for the companies appear. These dysfunctionality need a guiding structure to allow observance ex-ante and reduce risks, plus a methodology to identify appearing deviations from project plans and countermeasure them.

#### **4 Dilemmas of Controlling for Lean Management**

The research field of performance measurement also known as controlling, embraces various methods or approaches to control improvement programs [14-16]. Considering application, the subjects of control consider: Activities, processes, projects, value streams, etc. . The means of measuring are linked to accounting, intending to plan, monitor, predict and countermeasure effects. The nature of controlling is more quantitative in nature than qualitative. Qualitative approaches rooting from the Eastern hemisphere have not much importance. 5S, Poke Yoke or Hoshin Kanri [17] got introduced into westernized companies and became fashionable, lately. Others tried to align LM to number oriented measurement [18 ,19]. The research on performance management is generally positive towards LM controlling, while just a few authors summon that number based controlling might corrupt effects of LM [20].

In this relevance six dilemmas of controlling are outlined [21, 22]. (I) The look at management, indicating that effects of quantitative nature play a dominant role while LM is more qualitative in nature. (II) Control, with suggestions to plan targets and possible deviations i.e. through influence factors of scope, time, activities and aim of controlling, always under consideration of environment factors (internal and external) and deviations at any time. (III) The factor of risks and steady control of it. (IV) Measurement theory in particular to decompensate targets to certain levels of the company, needed to be successful with LM. (V) The decision making process based on information, referring to real data monitoring, the existing quality of information and process to handle deviations. (VI) The choice of method how to manage LM [22].

Concluding, it becomes evident that all six quoted factors have relevance in the planning stage and being important ex-ante to implementation. A secondary issue, are planning related parameters i.e. qualitative, quantitative and risk, which require assessment, monitoring and decision making in case of deviation, while the decision making requires clear rules, responsibilities and competences allocated.

## 5 Method of Multi-Perspective Assessment of LM

The method of multi-perspective assessment combines all researched weakness and overcomes the dilemmas of controlling in a structured way, exhibited in next figure.

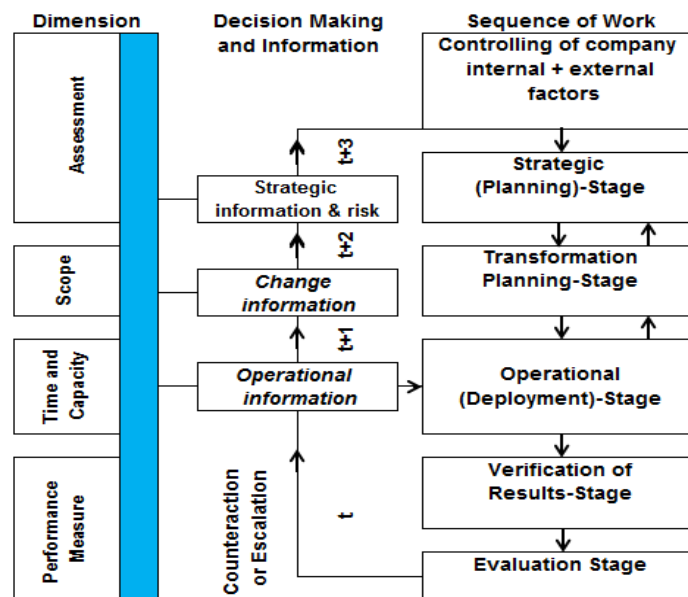


Fig. 1. Method of Multi-Perspective Assessment of Lean Management

A detailed description of the method in six stages is listed as follows.

1) Strategic alignment of executive management to strategic, operational controlling of internal and external factors is a prerequisite to lead in the strategic planning stage. This stage is prepared by financial advisors, the Chief Executive Officer and the head controllers, this relates to:

- a) Internal parameters, i.e. human resources, cost, benefits, safety, quality, delivery, productivity, products, services, etc.
- b) External parameters, i.e. markets, legislation, technology, competitors, growth, margins, etc.

2) Strategic planning stage, objectives and planning are rooting from information of controlling and being deployed into the organization. The executive committee or managing directors jointly steer decisions with head controllers. Following stages have to be covered:

- a) Objectives are decomposed or reversely aggregated in categories, i.e. quantitative, and qualitative, like quality, safety
- b) Hoshin Kanri is used to visualize planned efforts i.e. projects,

- corporate/divisional target allocation of priorities and capacities
  - c) Time frame to transform targets based on resources, i.e. milestones, phase planning, resource planning and recruiting
  - d) Methods of management adjusted to objectives, targets, etc., i.e. revolutionary/evolutionary, convergent/radical or other tactical
  - e) Risk assessment, i.e. interdisciplinary team to detect risks, visualization in comparison matrix, ranking or risk impact
  - f) Control strategic parameters, i.e. success/failure parameters a)-e), agreement on possible deviations a)-e)
- 3) Transformation planning stage is led by change agents, managers or mentors jointly with the divisional controllers. Following items are essential for success:
  - a) Targets planning and deployment, i.e. benefits or costs are mapped into business cases or provisional plans, layouts, timelines
  - b) Resource and team definition, i.e. structure of team, responsibility, roles and capacity planning
  - c) Capability analysis of team, i.e. experience, accuracy, willingness to change, drive or transform initiatives
  - d) Hoshin Kanri is used to visualize planned efforts i.e. projects, divisional/departmental objectives or allocation of priorities or sub-initiatives, etc.
  - e) Method and methodology of controlling and reporting, i.e. parameters like benefit, cost, man power or periods i.e. daily, weekly, monthly or medium of reporting like meeting, written, online, etc.
  - f) Risk control, i.e. defined risks
  - g) Reporting of actual, forecasted and planned results and risks
- 4) Operational (deployment) stage is consisting of team leaders, experts and project managers, executing change, being supported by operational controllers in stages :
  - a) Goals deployment, i.e. execution of change or tracking of performance indicator development
  - b) Scope and timeline for transformation
  - c) Hoshin Kanri is used to visualize planned efforts i.e. projects, departmental/team based objectives or allocation of priorities or sub-initiatives, etc.
  - d) Preventive action for risk related issues
  - e) Reporting of actual results
- 5) Verification stage, proven results by operational controller. In form of:
  - a) Qualitative control of operative/strategic parameters
  - b) Quantitative illustration and verification of results, i.e. charts
- 6) Evaluation stage and preparation of information for decision making. Information in form of operational, change or strategic relevant purpose is processed to right decision taker via steering committee, according sequence below:
  - a) Progress, stagnation, stop
  - b) Corrective action, regulation of objectives, targets, goals
  - c) Escalation/De-Escalation to defined stage

## 6 Validation of Method

The method has been used in improvement programs within the machine building sector and among the case study participants within the last 2 years. It is approximated that till now 100 projects (individual and multi-project approach) have been finished, without mentionable side effects.

Several critical elements define success or failure of proposed method. (i) It is suggested to run the method in co-existence of a project management department, consisting of a controlling specialist in charge of maintenance and tracking of improvement parameters, an experienced transformation manager and a LM specialist to observe transformation in practice, led project meetings and get a decision committee together, when needed i.e. progress report, escalation, etc. . (ii) LM has to be aligned to the strategic planning of the company, to ensure management attention and commitment. (iii) A Hoshin-Kanri approach to decompensate initiatives throughout the company. (iv) An interdisciplinary risk assessment in form of an effects evaluation is essential. A vital element to avoid risk is Hoshin Kanri, combined with a risk assessment matrix shown in next figure.

Risk/ Effekt	positive effect										negative effect					negative effect									
	positive effect					negative effect					negative effect					negative effect									
	in performance					in cost, side effect, etc					in Quality side effect, etc					in Quality side effect, etc									
Initiative	+	Q	D	I	P	PL	Group Work Flexibility	RND	Sales	Engineering	Purchasing	Logistics	Production	HRM	IT	Other	Cost	Sales	Engineering	Purchasing	Logistics	Production	HRM	IT	Other
Initiative 1	++	+	+	+	+	+	+										-								
Initiative 2	+																-								
Initiative 3							+																		
etc.																									

**KEY**

+	Safety	D	Delivery	P	Productivity	R&D	Research & Development
Q	Quality	I	Inventory	PL	Profit or Loss		

Fig. 2. Effect Risk Assessment and Trade Off

(v) The risk matrix compares risk/effect of every project against every initiative i.e. project 1, 2, 3, or 5S, Just in Time, TPM, etc. . The comparison suggests to multi-compare i.e. Q/Quality, D/Delivery, P/Productivity, others. In the columns displayed either positive or negative effects can be supervised on performance, department basis, etc. by indication positive or negative impact +/- . It is suggested to constantly update the matrix to derive changes over time. All negative correlations should be counter measured. (vi) Projects should be used as medium to carry transformation. (vii) Formation of work streams i.e. purchasing, production, etc. , business units or initiatives i.e. value stream improvement, just in time, etc., with particular responsibilities to enhance progress and contribute with senior expertise, is advised. (viii) Con-

trolling considers a decomposition and aggregation of effects in up- and downstream hierarchy, (ix) Controlling is not static, following budget or plans but allowing certain deviations until identified effect or problem is resolved or defined escalation bears progress.

(x) Lastly, a methodology of how to make decisions [21] in terms of deviations from planned effects is illustrated in next figure.

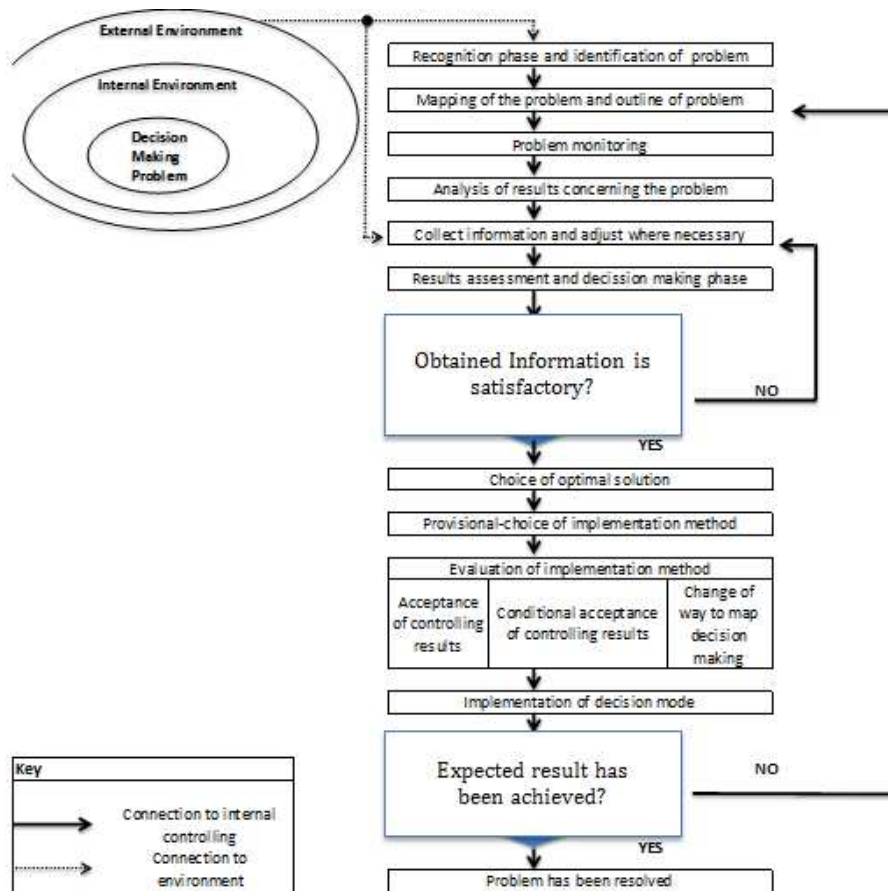


Fig. 3. Decision Making Process

The moment a side effects is recognized: A stage of visualization i.e. graphs, charts, etc. , is started, afterwards the problem is monitored, analyzed. If necessary at this point additional information from internal or external environment can be used to support the analysis. The decision making starts, but can just proceed if credible information is available. Afterwards a decision can be made but defined as acceptance, conditional acceptance or decision to provisionally stop and change the mapping or visualization method. To avoid negative side effects an understanding of impact should be aimed by decision maker/s.



## 7 Summary

A combination of the multi-perspective method and guidelines can monitor, detect, tame or overcome potential side effect of LM, ex-ante and during project implementation. This paper objects a broad based opinion of positive effects resulting from LM. It is evident that negative side effects exist. The proposed method, which is verified can be further developed in future research. This paper should motive other researchers to collect and study more qualitative data in the field of LM.

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