



Exploring the focus of lean interventions?

Preliminary results from an ongoing study.

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In Lieu of Money, Toyota Donates Efficiency to New York Charity



Mr. Foriest was skeptical at first of the Toyota engineers' efforts.

“The line of people waiting to eat is too long,”
“Make the line shorter.”

An example of lean in a service environment.

It even works in a soup kitchen.



Overview

Background;

Theory;

Methodology;

Data;

Preliminary findings;

Discussion and conclusion.



Background...

Earlier project

Lean interventions and their effects on throughput time performance.

Finding

Lean increased throughput time performance.

However a 'narrow' Lean approach became apparent, i.e. focused on direct waste reduction.

Consequence

New project to investigate Lean focus in healthcare.

RQ. What is the current focus of lean interventions and can this be influenced (extended)?

New study with 2 phases, today we focus on phase 1.



Theoretical framework

Generally accepted Lean theory is lacking.

Authors agree Lean entails direct waste reduction and variability.
(e.g. Hopp and Spearman, 2004; De Treville and Antonakis, 2006; Shah and Ward 2007)

Healthcare oriented literature tends to implicitly address buffers and variability through emphasizing flow.
(e.g. Fillingham, 2007; Snyder and McDermott, 2009; Graban, 2009)

Focus: the disquisition by Hopp and Spearman (2004) of Lean at Toyota, and the definitions of leading scholars to help build our theoretical framework.



An examples of direct waste:

- Unorganized work space (movement);
- Keeping private safety stock (inventory)

Theoretical framework

Target direct waste

Exchange
inventory
buffers for
capacity buffers

Reduce
variability

Reduce capacity

In healthcare, time buffers fulfil the roles originally linked to inventory buffers.

Continuous
improvement

(Hopp, 2008)



Theoretical framework

Based upon the available theory we decided on 4 subgroups where lean interventions should relate to.

| Group | Intervention focus |
|---------------------|--|
| Other | Intervention has no obvious link with lean. |
| Direct Waste | Intervention obviously relates to the reduction of direct waste. |
| Buffers | Intervention obviously relates to the exchange of buffers. |
| Variability | Intervention obviously relates to the reduction of sources of variability. |



Methodology

Our current study design is typified by two phases.

phase

1

Evaluation (finished)

Classification of interventions.

Semi – structured interviews.

Goal: determine current lean focus.

phase

2

Knowledge stimulus

Small scale training.

Goal: create broader scope interventions.

{ Today we'll be presenting the results of the 1st phase. }



Methodology



Interventions from practice are classified in groups:

Other

Direct
waste

Buffers

Variability

| Researcher 1 | Researcher 2 |
|-------------------------------|--|
| Classifies all interventions. | Classifies random sample of 10% of interventions. (>90% agreement) |

Semi-structured interviews with most active employees to determine:

What is considered Lean?

When is a Lean intervention considered successful?



Methodology



Findings from phase 1 used to develop a training for practitioners.

Training session of 3 hours, aim: broaden scope of current interventions.

Subjects: employees generating most interventions.

Content: presentation on the roles of buffers and variability
the 'dice game' with different levels of buffers and variability.

For the remainder of the presentation we will focus on phase 1.



Case

Medical laboratory in the Netherlands considered 'leading in Lean'.

Main task: conduct research on human materials (e.g. blood).

Started their 'Lean journey' late 2006.





Data

Laboratory provided us with access to:

- intervention data from the years 2009 to 2013
- employees for interviews and a small scale field experiment

Raw data: 324 interventions.

Data cleaning: documents that did not report on an intervention, double entries, appendices to other interventions.

Data for analysis: 275 (85%).

Three different formats: **Small Improvements**, **Kaizen**, and **A3**.

8 semi-structured interviews: 30 minutes each.

Transcribed and put into matrices to facilitate processing.



Data: Intervention formats

Small Improvement

Kaizen

A3

...describe the current situation
 (process, problem).

...describe the new situation
 (process, solution).

...list actions (to be) taken.

...report on the results.

...describe the current situation
 (process, problem).

...specify and quantify the types of
 waste.

...provide a list of possible causes.

...contact the team leader and seek
 approval to continue towards the
 'solution' phase.

...list possible improvement
 opportunities (7 are desired), and
 state which action is taken "ad hoc".

...state which actual improvements
 will be applied.

...describe the context of the
 problem.

...describe the current situation
 (process, problem).

...provide a problem analysis.

...state the goals of the current
 intervention.

...describe the future situation
 (process).

...state the recommendations.

...provide a planning.



Results: interventions over the years

| Year | 2009 | | 2010 | | 2011 | | 2012 | | | 2013 |
|-------------|------|----|------|----|------|----|------|----|----|------|
| Type | SI | A3 | SI | A3 | SI | A3 | SI | A3 | KZ | KZ |
| Other | 7 | 2 | 3 | 7 | 3 | 3 | | 1 | | |
| Waste | 53 | 9 | 16 | 8 | 41 | 16 | 8 | 1 | 57 | 41 |
| Buffers | | 1 | 1 | 3 | 1 | | | | | |
| Variability | 1 | | 2 | | | | | | | |

SI: Small Improvement, KZ: Kaizen

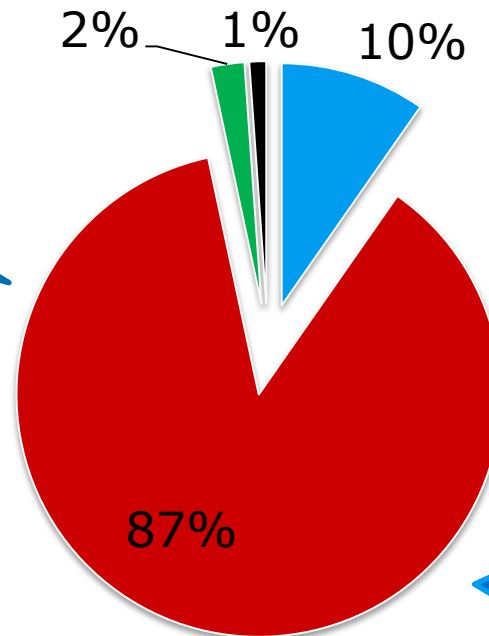


Results: focus of interventions

Of these direct waste oriented interventions, +- half focus on defects.

Notice how attention is almost exclusively to direct waste.

Direct Waste
 Buffers
 Variability
 Other



As soon as Kaizen are introduced, waste is all that matters..



Results: lessons from classification

- More structured Kaizen has not (yet) resulted in interventions relating to buffers or variability.
- The type of intervention (SI, A3, KZ) does not seem to determine which type of direct waste is targeted.
- Of the 66 employees in the dataset, 4 are responsible for over 30% of the total of interventions.



Results: lessons from interviews

- The healthcare professionals do not refer to buffers or variability when asked 'What is Lean?'
- The healthcare professionals do agree that process improvement is central to Lean, and name waste reduction.
- Even in our exemplary case, there is no shared concept of Lean.
- The healthcare professionals tend to stress the 'human factor', and continuous improvement culture.
- The healthcare professionals had no clear idea on when a Lean intervention was successful.
- Lean is seen as a way to make work more fun...
I.e. remove the tedious parts, keep the fun parts.



Discussion

The role of buffers, and variability within Lean seems not well known in our healthcare case.

Lean interventions almost exclusively relate to direct waste. A lot of attention to defects (quality).

Even in our 'leading in Lean' case, a general understanding of both Lean, and Lean intervention success seems to be lacking.



How could we make sure that concepts like Lean are used to their full extent? Could a training help? Does it even matter if concepts like Lean are applied to their full extent?



Future research



WORK IN PROGRESS

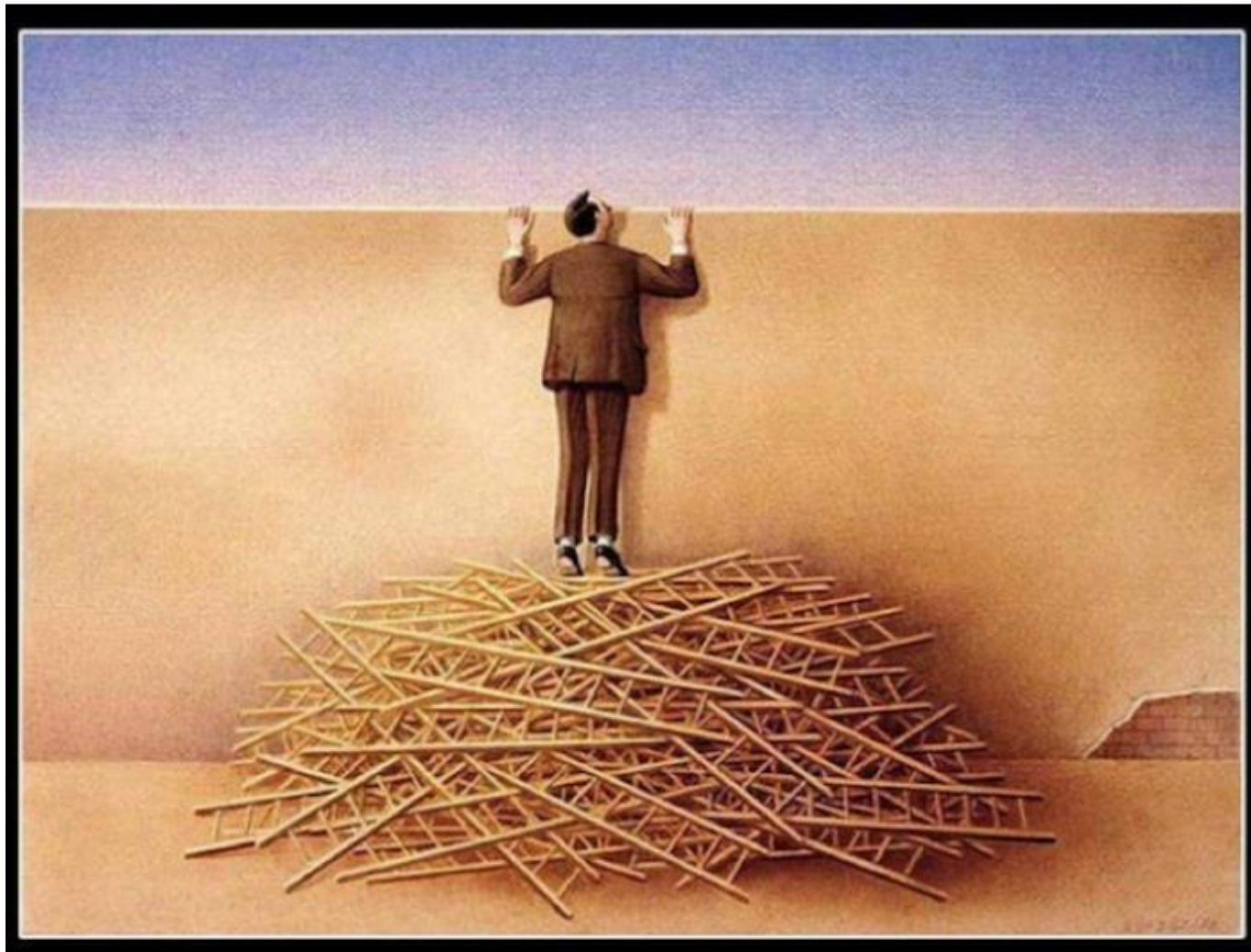
Our current project is still ongoing.

We've applied our 'knowledge stimulus' and are now waiting to collect results. (Expected to complete in January of 2015.)



New project: lean interventions and continuous improvement.

In a multiple case study in a regional hospital, we try to determine *when* to consider lean interventions to be successful.





Selected references

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