Practical considerations for applying Lean thinking in hospitals

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ASOK, I NEED YOU TO CREATE A POWERPOINT PRESENTATION THAT WILL SAVE OUR DEPARTMENT FROM BEING ELIMINATED.

YOU MUST QUANTIFY THE UNQUANTIFIABLE. AND THAT CAN ONLY BE DONE BY A PROCESS THAT I CALL LYING.

LYING IS A PROCESS?

IT CAN BE, IF YOU USE ENOUGH SLIDES.
Meet TIM WOOD ...

Hi!!!
Can TIM WOOD make a mistake?
Can TIM WOOD make a mistake now?
What is Lean thinking?

• A management approach
• To identify and successfully resolve operational problems
• While reducing inefficiency and cost (Zidel, 2006)
• Focus on reducing waste, synchronizing flows and managing variability in (process) flows (Casey, 2007)

Where did Lean originate from?

• “The Machine that Changed the World” (Womack, Jones and Roos, 1990)
• “Lean” originally coined in 1988 by John Krafcik (MIT student under Womack) – former Hyundai CEO
• 1948-1975 – Taiichi Ohno and the Toyota Production System (TPS): eliminates waste and does more with less in their production and service processes (Womack & Jones, 1996)

Lean Principles

Let us visit TIM WOOD again...

Hello again!
I feel sick...
The 7 Deadly Wastes

- **Defects**: Not right first time, repetition or correction of a process.
- **Overprocessing**: Processing beyond the standard required by the customer.
- **Overproduction**: To produce sooner, faster or in greater quantities than the customer demands.
- **Transportation**: Unnecessary movement of things (parts or machines) between processes.
- **Inventory**: Raw material, work in progress or finished goods which is not having value added to it.
- **Movement**: Unnecessary movement of people within a process.
- **Waiting**: People or parts that wait for a work cycle to be complete.
How far does the average person walk per day?

- Dataset consisting of 68 million days of physical activity for 717,527 people, giving a window into activity in 111 countries across the globe.
- Global average person took **4,961 steps per day ≈ 3.72km** per day (stride length ≈ 0.75m)

How far does the average person walk per day?

And how much do nurses walk?

- Study by Welton et al. (2006):
  - Average distance walked by an RN during a 12-hour shift in 4 adult medical-surgical units was 10,333 steps (6.6 ± 2.3km).
- This is almost double the distance which an average person walks.
- Supporting evidence: Croteau (2016): 10,398 steps (7.7km) per day

Unnecessary movement in a process: A Deadly Waste

Treatment for T.M. WOOD...

Lean Tools

- Poka-Yoke
- Value stream mapping
- 5S
- Andons & kanbans
- Visual factory
- 5 Why
- A3 Chart
- Takt time
- Gemba walks

Available time for production
Required units of production
Murphy's Law...
With Poka-Yokes...you can't go wrong!
Title: What are you talking about?

I. Background
Why are you talking about it?

II. Current Conditions
Where do things stand today?
- Show visually using charts, graphs, drawings, maps, etc.
What is the problem?

III. Goals/Targets
What specific outcomes are required?

IV. Analysis
What is the root cause(s) of the problem?
- Choose the simplest problem-analysis tool that clearly shows the cause-and-effect relationship.

V. Proposed Countermeasures
What is your proposal to reach the future state, the target condition?
How will your recommended countermeasures affect the root cause to achieve the target?

VI. Plan
What activities will be required for implementation and who will be responsible for what and when?
What are the indicators of performance or progress?
- Incorporate a Gantt chart or similar diagram that shows actions/outcomes, timeline, and responsibilities. May include details on specific means of implementation.

VII. Followup
What issues can be anticipated?
- Ensure ongoing PDCA.
- Capture and share learning.

Source: John Shook *Managing to Learn*
Value Stream Mapping

- Patient Placement
- Admit
- Diagnose
- Treat
- Discharge

Cycle time: 10, 30, 60, 10 (total: 110 min. 285 min. 395 min.)
Wait time: 75, 90, 120 (total: 395 min.)

Suppliers
- Patients
- Supplies

Pharmacy
- incomplete orders
- no ride home!

Customers
- Patients
- Referring MD's

Waiting for bed
5S

Sort
When in doubt, move it out

Set in Order
A place for everything and everything in its place

Shine
Clean and inspect or Inspect through cleaning

Standardize
Make up the rules, follow and enforce them

Sustain
Part of daily work and it becomes a habit
Sounds good?

So what’s hampering us from applying Lean?
The intervention-implementation gap

How do we initiate Lean?

• Embrace the Critical Success Factors for Lean!

• CSF defined as “the limited number of areas in which results, if they are satisfactory, will ensure successful competitive performance for the organisation” (Rockart, 1979: 57).

• 3 CSF’s have been identified (2016-2018 study: Predictors for the Successful Implementation of Lean in Public Hospitals in KwaZulu-Natal, South Africa: The Genesis of ‘Lean SPRInT’)


• Observational, descriptive study with quantitative methods
• 211 senior managers across 73 public hospitals in KZN
• Self-administered, semi-structured questionnaire with mixed categorical, open-ended and variable Likert-scale questions

Predictors for the Successful Implementation of Lean in Public Hospitals in KwaZulu-Natal, South Africa: The Genesis of Lean SPRInT’

• EFA to identify latent constructs;
• CFA to determine the reliability and validity factors;
• SEM fit indices applied to assess acceptability of the model

<table>
<thead>
<tr>
<th>Construct</th>
<th>Composite Reliability (should be &gt;0.7)</th>
<th>Cronbach’s Alpha (should be &gt;0.7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor 1</td>
<td>0.932</td>
<td>0.934</td>
</tr>
<tr>
<td>Factor 2</td>
<td>0.775</td>
<td>0.715</td>
</tr>
<tr>
<td>Factor 3</td>
<td>0.773</td>
<td>0.763</td>
</tr>
</tbody>
</table>

CSFs for Lean in Hospitals

- **CSF 1:** Strategic Leadership and Organisational Attitude
- **CSF 2:** Integration of Lean elements, tools and techniques
- **CSF 3:** Basic stability in operational processes

CSF 1: Strategic Leadership and Organisational Attitude

- **Leadership** at all levels in the organisation must drive, live and demonstrate Lean behaviour.
- Lean philosophy and principles must be reflected in the organisation’s [business strategy](#).
- There must be a clear link between the organisation goals, key objectives and Lean activities ([alignment](#)).
- The [mind-set](#) and attitude or behaviour of people is fundamental to Lean success.
CSF 2: Integration of Lean elements, tools and techniques

- The application of Lean tools and techniques will ensure Lean success
- The organisation must use the goals, methods, techniques and foundation elements/ tenets of Lean in combination
CSF 3: Basic stability in operational processes

- **Stability** in operating systems is a pre-requisite for Lean transformation
- It is important to **understand the organisation’s processes** and only apply the Lean tools and techniques applicable to that specific process type
- Demand scheduling (takt time); patient booking systems
- Resource levelling/smoothing, based on bed occupancies, patient acuity levels, case mix and case management.
- Treatment protocols, algorithms, formularies
Prerequisites for Lean in hospitals

- Commitment on the part of senior administration
- Linkage to the organization’s strategic plan
- Introduction of Lean concepts to staff members (Zidel, 2006)

How does one assess readiness for Lean in hospitals?

- Familiarize oneself with the CSFs for Lean implementation in hospitals;
- Measure current state against the CSF constituents (gap analysis);
- SWOT analysis;
- Narrow or close the gaps.
Lean success prediction assessment tools: The Lean SPRInT

- **Success Predictor for Rapid Initiation Tool**
- Developed through EFA, CFA and SEM to identify CSFs
- Measures the current status of readiness for Lean initiation (success prediction)
- Provides managers with a practical conduit to deploy resources without having to embark on the Lean journey blindly
- Uses Likert scale ratings and fuzzy logic
• Fuzzy logic (c.f. Boolean logic)
• A form of logic; truth values of variables may be between 0 and 1 inclusive
• Based on observation that people make decisions based on vague information ("fuzzy");
• Considers variable answers and provides graded readiness levels for Lean implementation
Instructions: Please complete the all boxes which are shaded Orange. After completing each page please tab over to the next page and complete the next set of inputs.

### Basic Demographics

<table>
<thead>
<tr>
<th>Hospital Name:</th>
<th>XYZ Hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEO Name:</td>
<td>Dr. Joe Soap</td>
</tr>
<tr>
<td>User's Name:</td>
<td>Mrs. Just Testing</td>
</tr>
<tr>
<td>Job Title of User:</td>
<td>Systems Manager</td>
</tr>
<tr>
<td>Date:</td>
<td><strong>2018/09/28 09:42</strong></td>
</tr>
<tr>
<td>Comments:</td>
<td>There are no projects in the hospital utilizing Lean methodology.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of Hospital</th>
<th>Regional &amp; Tertiary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Beds</td>
<td>530</td>
</tr>
</tbody>
</table>

Developer: Dr. L. Naidoo
Copyright (2018)
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<table>
<thead>
<tr>
<th>Strategic leadership and organisational attitude</th>
<th>User’s Rating</th>
<th>SRW²</th>
<th>Calculated Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1: Does leadership at all levels in your organisation drive, live and demonstrate Lean behavior currently?</td>
<td>0.693</td>
<td>#N/A</td>
<td>#N/A</td>
</tr>
<tr>
<td>A2: Does your organisation face and embrace the various attitudinal aspects of Lean?</td>
<td>0.555</td>
<td>#N/A</td>
<td>#N/A</td>
</tr>
<tr>
<td>S1: Is Lean philosophy and principles reflected in your organisation’s business strategy?</td>
<td>0.682</td>
<td>#N/A</td>
<td>#N/A</td>
</tr>
<tr>
<td>L2: Is there a focus on Lean leadership which leads to Lean thinking in your organisation?</td>
<td>0.599</td>
<td>#N/A</td>
<td>#N/A</td>
</tr>
<tr>
<td>S3: Is Lean driven as a high priority strategic business initiative in your organisation?</td>
<td>0.671</td>
<td>#N/A</td>
<td>#N/A</td>
</tr>
<tr>
<td>L4: Does leadership in your organisation recognise that the difference between Lean success and failure starts with leadership?</td>
<td>0.615</td>
<td>#N/A</td>
<td>#N/A</td>
</tr>
<tr>
<td>A1: Is the mindset and attitude or behavior of people in your organisation attuned to Lean success?</td>
<td>0.562</td>
<td>#N/A</td>
<td>#N/A</td>
</tr>
<tr>
<td>S2: Is there a clear link between your organisation goals, key objectives and Lean activities?</td>
<td>0.679</td>
<td>#N/A</td>
<td>#N/A</td>
</tr>
</tbody>
</table>

Assessment of CSF 1: Readiness of your hospital with regard to Strategic Leadership and Organisational Attitude

Available when rating done

Integration of Lean elements, tools and techniques

<table>
<thead>
<tr>
<th>User’s Rating</th>
<th>SRW²</th>
<th>Calculated Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>T4: Does your organisation use all of the goals, methods, techniques and foundation elements of Lean in combination?</td>
<td>0.854</td>
<td>#N/A</td>
</tr>
<tr>
<td>T4: Does your organisation face and embrace the various attitudinal aspects of Lean?</td>
<td>0.425</td>
<td>#N/A</td>
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</tbody>
</table>

Assessment of CSF 2: Readiness of your hospital with regard to Integration of Lean elements, tools and techniques

Available when rating done

Basic stability in operational processes

<table>
<thead>
<tr>
<th>User’s Rating</th>
<th>SRW²</th>
<th>Calculated Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>T3: Do your staff understand the organisation’s processes and apply the Lean tools and techniques applicable to that specific process type?</td>
<td>0.551</td>
<td>#N/A</td>
</tr>
<tr>
<td>B4: Does your organisation have stability in operational systems?</td>
<td>0.709</td>
<td>#N/A</td>
</tr>
</tbody>
</table>

Assessment of CSF 3: Readiness of your hospital with regard to Strategic Leadership and Organisational Attitude

Available when rating done

Global Assessment

Available after all above assessments done
### Lean SPRInT v1.0

#### Success Predictor Input

<table>
<thead>
<tr>
<th>Strategic leadership and organisational attitude</th>
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</tr>
</thead>
<tbody>
<tr>
<td>L1 Does leadership at all levels in your organisation drive, live and demonstrate Lean behavior currently?</td>
<td>Agree</td>
<td>0.693</td>
<td>2.079</td>
</tr>
<tr>
<td>A2 Does your organisation face and embrace the various attitudinal aspects of Lean?</td>
<td>Disagree</td>
<td>0.555</td>
<td>1.11</td>
</tr>
<tr>
<td>S1 Is Lean philosophy and principles reflected in your organisation’s business strategy?</td>
<td>Strongly Agree</td>
<td>0.682</td>
<td>2.728</td>
</tr>
<tr>
<td>L2 Is there a focus on Lean leadership which leads to Lean thinking in your organisation?</td>
<td>Strongly Agree</td>
<td>0.599</td>
<td>2.396</td>
</tr>
<tr>
<td>S3 Is Lean driven as a high priority strategic business initiative in your organisation?</td>
<td>Agree</td>
<td>0.671</td>
<td>2.013</td>
</tr>
<tr>
<td>L4 Does leadership in your organisation recognise that the difference between Lean success and failure starts with leadership?</td>
<td>Strongly Disagree</td>
<td>0.615</td>
<td>1.845</td>
</tr>
<tr>
<td>A1 Is the mindset and attitude or behavior of people in your organisation attuned to Lean success?</td>
<td>Strongly Agree</td>
<td>0.562</td>
<td>0.562</td>
</tr>
<tr>
<td>S2 Is there a clear link between your organisation goals, key objectives and Lean activities?</td>
<td>Strongly Agree</td>
<td>0.679</td>
<td>2.716</td>
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#### Assessment of CSF 1: Strategic Leadership and Organisational Attitude

**Readiness level 3**

<table>
<thead>
<tr>
<th>Readiness of your hospital with regard to Strategic Leadership and Organisational Attitude</th>
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<tbody>
<tr>
<td><strong>Assessment of CSF 1</strong></td>
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<tr>
<td>15.449</td>
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#### Integration of Lean elements, tools and techniques

<table>
<thead>
<tr>
<th>User's Rating</th>
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<th>Calculated Score</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Disagree</td>
<td>0.854</td>
</tr>
<tr>
<td>T4 Does your organisation face and embrace the various attitudinal aspects of Lean?</td>
<td>Agree</td>
<td>0.425</td>
</tr>
</tbody>
</table>

#### Assessment of CSF 2: Integration of Lean elements, tools and techniques

**Readiness level 2**

<table>
<thead>
<tr>
<th>Readiness of your hospital with regard to Integration of Lean elements, tools and techniques</th>
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<tbody>
<tr>
<td><strong>Assessment of CSF 2</strong></td>
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<tr>
<td>2.983</td>
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#### Basic stability in operational processes

<table>
<thead>
<tr>
<th>User's Rating</th>
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<tbody>
<tr>
<td>T3 Do your staff understand the organisation’s processes and apply the Lean tools and techniques applicable to that specific situation?</td>
<td>Strongly Agree</td>
<td>0.551</td>
</tr>
<tr>
<td>B4 Does your organisation have stability in operational systems?</td>
<td>Strongly Agree</td>
<td>0.709</td>
</tr>
</tbody>
</table>

#### Assessment of CSF 3: Basic stability in operational processes

**Readiness level 3**

<table>
<thead>
<tr>
<th>Readiness of your hospital with regard to Strategic Leadership and Organisational Attitude</th>
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</thead>
<tbody>
<tr>
<td><strong>Global Assessment</strong></td>
</tr>
<tr>
<td><strong>Grey's Hospital: Readiness level 3</strong></td>
</tr>
<tr>
<td><strong>23.472</strong></td>
</tr>
</tbody>
</table>
Deployment of Lean SPRInT

Obtain Department of Health Senior Management and hospital stakeholders' buy-in

Establish Lean (promotion) offices or assign Lean facilitators in health districts and in hospitals

Conduct Lean SPRInT assessments in hospitals (hospital management teams)

Train and empower hospital Quality and M&E Managers as Lean facilitators in hospitals

Address gaps identified in Lean SPRInT assessments

Initiate phasic implementation of Lean once Lean SPRInT Global Readiness Level 3 is achieved

Transforming into a Lean organisation

The Shingo transformation model: Shingo diamond

Summary

• Impetus for implementing Lean in hospitals
• 7 Deadly wastes
• Principles, tools and techniques of Lean
• 3 CSFs:
  - Strategic Leadership and Organisational Attitude
  - Integration of Lean elements, tools and techniques
  - Basic stability in operational processes
• 7 step Lean roadmap
• Lean success prediction (Lean SPRInT)
• Deployment of Lean SPRInT and sustaining Lean
Conclusion

• Lean is a journey, not an event.
• Consideration of CSFs (and barriers) is crucial when embarking on Lean journey.
• Leadership, Lean office, Lean tools and standard work are key to Lean implementation.
• Use success predictor tools like Lean SPRInT.
• Shingo diamond is a useful framework to use for transforming into a Lean organization.
Thank You