

ABSTRACT

Assessing the Stages of Lean Implementation in the Context of Healthcare Services

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In general, adapting Lean Thinking (LT) in an organisation consists of broadly three stages: getting ready for implementing LT by satisfying the prerequisites, implementation of LT principles and practices, and finally the assessment of extent of leanness attained by the organization. Though several studies exist in literature discussing the implementation of LT in both manufacturing and service organization(Hines et al., 2004; Moyano-Fuentes & Sacristan-Diaz, 2012; Stone, 2012; Bhamu&Sangwan, 2014; Jasti&Kodali, 2015), relatively very few studies are available on readiness and assessment. It has also been stated that the concept of lean implementation has been clearly defined with the passing of time but the way to assess it has not been (Pilkington & Fitzgerald 2006). Review of leanness assessment revealed that most of these assessment studies were recent and related to performing the leanness evaluation of manufacturing organizations. Hardly any research has been reported on assessing leanness in service sector. Hence in this proposed research study, an attempt is made to develop assessment procedures to evaluate the leanness level attained by a service organization during its lean journey.

Design/methodology/approach

A detailed literature review is conducted to identify the assessment methodology used, and lean practices and lean performance measures considered to assess the leanness attained by the organisation. Different assessment methods varying over the temporal dimension of three-stages of lean implementation, namely pre-implementation, implementation, and post-implementation is proposed. Assessment techniques developed for different stages of lean journey will be validated in hospitals as no detailed study exists in literature documenting the leanness assessment procedure to be followed for hospitals. On the contrary, maximum number of lean implementation studies in service sector has been reported in the domain of healthcare. It is also supported by the existing literature review studies on lean implementation in healthcare (De Souza et al., 2011; Mazzocato et al., 2010).

Following research questions were answered in this dissertation:

- RQ 1:** Are there any unique assessment techniques to assess the leanness attained by an organisation (a hospital in this case) while travelling through its lean journey?
- RQ 2:** What are the prerequisites that need to be satisfied by an organization that is getting ready for lean implementation? How can these prerequisites be assessed to infer the readiness of a hospital to implement LT?
- RQ 3:** What are the lean practices that need to be considered for assessing the degree of leanness, while implementation? How are these lean practices related to each other? How can these interrelationships be captured while assessing the degree of leanness?

RQ 4: What procedure can be used by an organization to assess its lean status in comparison to other organizations post lean implementation? How can we rank the assessed hospitals based on certain common performance measures? Is there a procedure to identify the obstacles and challenges that hinder the hospital from improving the extent of leanness attained?

Findings

To answer the first research question, a thorough literature review was performed to understand the characteristics of various assessment methodologies proposed that have guided measurement, implementation and assessment of leanness. To answer the second research question, prerequisites (readiness factors) were identified by reviewing the literature on case studies describing implementation of LT in hospitals and a Stakeholder-Based Readiness Framework was developed. Fuzzy input based similarity to ideal assessment technique was used to conduct the assessment of a healthcare unit which was planning and preparing to implement LT. Third research question on assessing the lean implementation was answered by applying graph theoretic approach to assess the various lean practices that were identified from literature. Relationships between lean practices were also established by drawing support from literature. Finally to answer the fourth research question, lean performance measures were identified by reviewing the lean implementation in hospital literature and were grouped into standard set of input and output measures for assessing and comparing the leanness level of hospitals. Data Envelopment Analysis was used to assess the list of hospitals on a common set of measures and rank them based on their leanness (efficiency) scores. A case hospital was chosen from the ranked hospitals and studied further to explain and establish the linkage between its performance measures and leanness score. Table 1 presents the summary of the dissertation.

Implications

Leanness assessment techniques developed in this research would assist organization – particularly an organisation in the service sector such as hospital in performing assessment during various stages of lean implementation. The continuous assessment of leanness over the three stages of lean journey is expected to reveal the areas of improvements to the implementing organization at different time points and also deliver future action plan for that particular stage. Study also contributes by identifying important leanness factors for different stages of lean implementation.

Table 1 – Summary of the Dissertation

3 Stages of Lean Journey	Pre-implementation	Implementation	Post-implementation
Purpose of assessment technique	Readiness assessment	Leanness assessment	Relative leanness assessment
Questions answered by the assessment technique	Is organization ready for lean implementation?	How much leanness has the organization attained through this lean implementation journey?	What is the lean status of the organization in comparison to others?
Assessment method	Fuzzy Input Based Similarity to Ideal Assessment	Graph Theory Approach (GTA) based assessment	Input-oriented constant-returns to scale “Slacks-Based Measure of Super-Efficiency” DEA based assessment
Input factors Validation	Lean prerequisites Case hospital (H1) planning to implement LT	Lean practices Case hospital (H2) implementing LT	Lean performance measures Comparison across multiple hospitals
Time period	t_0	t_1	t_2

Keywords: Leanness, Assessment, Healthcare, Hospital, Fuzzy, Graph theory, Data envelopment analysis, USA, India.

References

1. Bhamu, J., & Sangwan, K. S. (2014). Lean Manufacturing: Literature review and research issues. *International Journal of Operations & Production Management*, 34(7), 3-3.
2. De Souza, L. B. (2009). Trends and approaches in lean healthcare. *Leadership in Health Services*, 22(2), 121-139.
3. Hines, P., Holweg, M., & Rich, N. (2004). Learning to evolve: a review of contemporary lean thinking. *International Journal of Operations & Production Management*, 24(10), 994-1011.
4. Jasti, N. V. K., & Kodali, R. (2015). Lean production: literature review and trends. *International Journal of Production Research*, 53(3), 867-885.
5. Mazzocato, P., Savage, C., Brommels, M., Aronsson, H., & Thor, J. (2010). Lean thinking in healthcare: A realist review of the literature. *Quality and Safety in Health Care*, 19(5), 376-382.
6. Moyano-Fuentes, J., & Sacristán-Díaz, M. (2012). Learning on lean: a review of thinking and research. *International Journal of Operations & Production Management*, 32(5), 551-582.
7. Pilkington, A., and Fitzgerald, R. (2006). Operations management themes, concepts and relationships: a forward retrospective of IJOPM. *International Journal of Operations & Production Management*, 26(11), pp. 1255-1275.
8. Stone, K. B. (2012). Four decades of lean: a systematic literature review. *International Journal of Lean Six Sigma*, 3(2), pp. 112-132.