Instill Lean A3 Thinking into Healthcare IT Services

Jihong Zeng[1], John Zhang[2]

ARTICLE INFO

Available Online August 2014

Key words:
Lean,
A3 Thinking,
IT Service Management,
ITIL,
Continuous Improvement.

ABSTRACT

Healthcare information technology is a key enabler for care transformation to provide quality care at low cost and better population health. Many healthcare organizations have established IT Program Management and adopted ITIL best practice to manage IT services. However, ITIL and traditional project management are heavily process oriented, neither flexible nor effective enough for agile response to changing business demand. Lean methodologies are increasingly deployed by healthcare providers to improve workflow process management but only has limited use cases documented in healthcare IT services. This paper introduces the Lean A3 Thinking methodology and its value in identifying and eliminating wastes to provide agile and effective solutions in response to customer requests. We present a case study of applying Lean A3 Thinking to improve clinical informatics reporting service. The initial evaluation results are promising and indicate that both ITIL and Lean A3 Thinking focus on customer and service quality, complementing each other well. ITIL provides a framework for ITSM based on a set of best practice to manage IT services. Lean A3 Thinking specifies a set of framework and tools for improving quality of services and processes by eliminating wastes. Proper balance between Lean and ITIL principles for ITSM needs more research and further study.

1. Introduction

Information technology (IT) has increasingly taken vital role for business growth in all industries. Many organizations turn to the IT Service Management (ITSM) model for managing IT as services to deliver value to internal and external customers (van Bon, Pieper, van deer Veen, & Verheijen, 2005; Johnson, Hately, Miller & Orr, 2007). The Information Technology Infrastructure Library (ITIL) is the most popular framework for ITSM model. In healthcare industry, IT is a critical component for care delivery. With the implementation of electronic medical records (EMR) systems and health information exchange across the continuum of care, healthcare IT fundamentally changes the practice of medicine and the relationship between doctors and patients for decades or even centuries to come (Blumenthal & Glaser, 2007).Many healthcare organizations have established IT Program Management Office and adopted ITIL best practice to manage IT services.

The world of business is constantly evolving. Regulatory compliance requirements of emerging care models, such as Accountable Care Organization (ACO), Patient Centered Medical Home (PCMH), and Meaningful Use of EMR challenge healthcare IT to accommodate to these new business demands efficiently and effectively. If IT fails to respond to the evolving needs of business and customers, billions of dollars in IT investments could become costly waste. ITIL best practices are mostly rigorous, process-oriented, but not necessarily aligned to agile process for flexible and timely response to changes. Lean is a continuous improvement methodology that focuses on eliminating waste from processes. In this paper, we introduce Lean A3 Thinking and a use case of applying A3 Thinking to improve health IT services.

The paper is structured as follows. Recent research on ITSM adoption in healthcare IT is reviewed in Section 2. Then we introduce Lean A3 Thinking in Section 3. We discuss a use case of A3 Thinking for improvement of clinical informatics reporting service in a large healthcare provider organization in Section 4. The paper concludes in Section 5 with a discussion on the next step.

[1]Associate Professor, School of Management, New York Institute of Technology, Old Westbury, NY, USA Email: jzeng@nyit.edu
[2] New York City Health and Hospitals Corporation, New York, NY, USA, Email: john.zhang@nychhc.org

2. Literature Review

ITIL was initiated by the UK Office of Government Commerce in the late 1980s. It is a collection of best practices and focuses on theflow of process activities. Version 3 of ITIL describes almost thirty processes that explain various tasks that an IT service provider must perform (OGC, 2007). Over the years, ITIL has been adopted by IT organization across industries and become the de-facto standard framework for ITSM. Recent surveys with 623 responses conducted in the US, Europe and Australia confirms that organizations have benefited from adopting the ITIL framework (Marrone, Gacenga, Cater-Steel & Kolbe, 2014). Efficient ITSM has become a critical factor in augmenting the competitive advantage for the business. However, recent studies (Hoerbst, Hackl, Blomer & Ammenwerth, 2011; Lapão, 2011) reveal that adoption of ITIL and ITSM in healthcare environment remains limited. The ITIL may present significant challenges of very time-consuming implementation and over-complicated processes.

Business demands rapid time-to-market which may not fit well with the traditional ITIL. Therefore, certain ITIL implementations do not deliver the benefits or value as expected. Framework flexibility and timely response to business change are imperative factors that need to be considered during implementation of ITSM (Bell & Orzen, 2010). The fast pace in care delivery and rapid change of regulatory requirements on healthcare IT service also pose challenges to project management. Traditional project management success criteria focus on scope, time and cost (PMI, 2008). In addition to the traditional factors, healthcare IT project managers need to combine speed and a customer-centered project management approach to ensure project deliverables meet customer's need. Some typical gaps include lack of visibility into end user experience, inability to measure business impact of application performance and proactive problem detection.

Lean is about relentless and continuous removal of waste or non-value added activity from the processes within an organization. Lean is originated from the manufacturing industry, but its principles have been successfully applied to other industries, including healthcare for workflow process improvement (Fine, Golden, Hannam & Morra, 2009). While an organization begins a Lean transformation, IT service management is often not involved or even viewed as an obstacle (Bell & Orzen, 2010). Only limited research work has been done in process improvement and waste elimination in healthcare IT (Williams & Durray, 2012). To help address these challenges, we introduce Lean A3 Thinking and recommend instilling this technique into IT service management and project management to eliminate waste and deliver greater value to customers.

3. Lean A3 Thinking Methodology

Lean focuses on eliminating wastes while delivering more value to customers. A3 Thinking was developed by the Toyota Motor Company in the early 1960s as a tool for knowledge transfer, communication, consensus building, and transforming culture.It came to America in the 1980s and became a mainstream within the Lean community (Sobek and Smalley, 2008). The Plan-Do-Check-Act (PDCA) is a basic element of Lean. It is an iterative four-step cycle for continuous improvement (Womack and Daniel, 2005). The basic philosophy behind A3 Thinking is PDCA. A3 Thinking is a standardized, structured problem-solving methodology across organization to share thought process for improvement. The core content is arranged on a single-sheet A3 report on 11" x 17" paper (Figure 1).

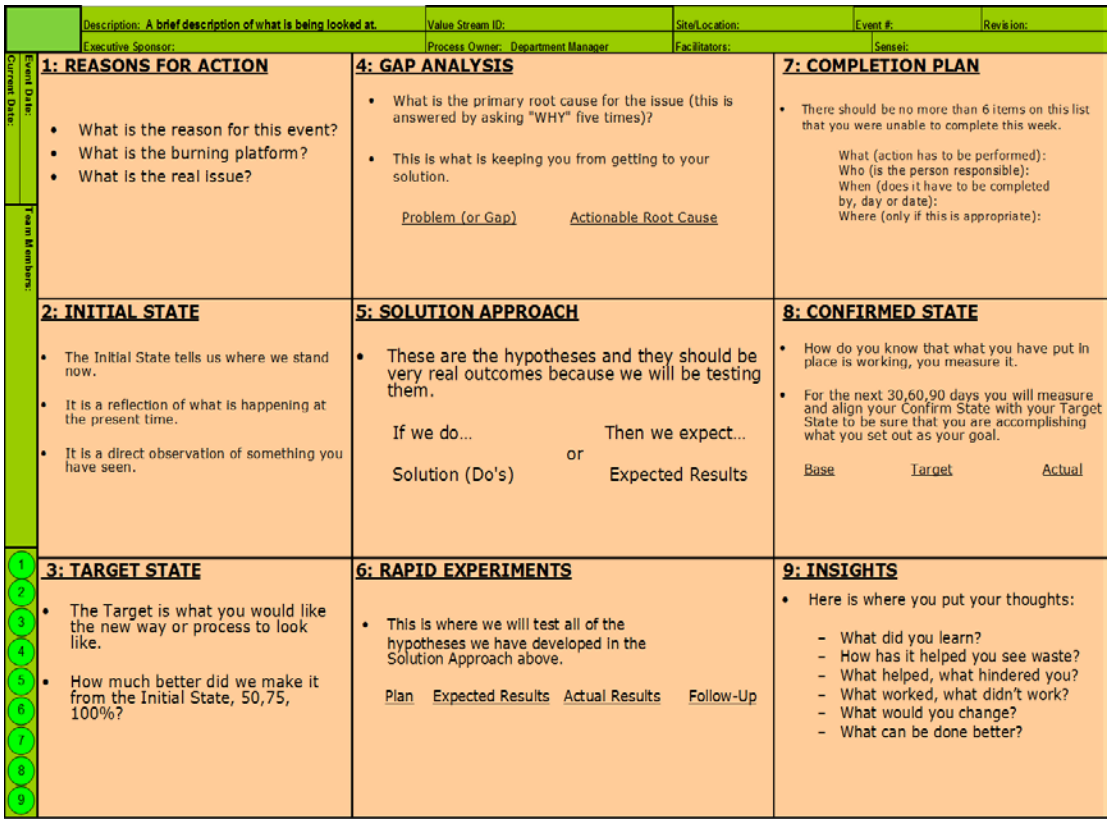

Figure 1: A3 Report Template

A3 Report is structured into several elements which are guided by the PDCA cycle. The improvement cycle starts with examining a current state process, condition or standard procedure and then refining and improving to create a new standard. A major element of PDCA is spending adequate time to develop a detailed understanding of the problem to be solved. In the Do step, the plan is put into action. The Check step involves measuring the effects of implementation and comparing to the target. The Act step refers to establishing a new process, solution, or system as the standard if the results are satisfactory, or taking remedial action if necessary (Sobek and Smalley, 2008).

4. Case Study

In this use case study, we discuss how A3 Thinking methodology is utilized by a clinical application development team in a large healthcare provider organization to improve IT services. This team is part of the Enterprise IT Services department and is responsible for developing clinical informatics reports based on request from customers including hospital executives and clinical service line leaders. The project team consists of project managers, business analysts, database administrators, application developers and solution architects. BMC IT Service Management Suite (BMC Software, 2014) has been deployed throughout the organization for ITIL best practice implementation. However, the current report development turn-around time for user request fails to meet business needs. The use case study illustrates that Lean A3 Thinking methodology and ITIL are complementary to each other for continuous process improvement. We walk through each element of A3 report as shown in Figure 1 for the process improvement project.

Reason for Action (Box 1)

So why are we doing this Lean project? To reduce clinical informatics report development turn-around time for better IT services and customer satisfaction.

Initial State (Box 2)

What is the current state baseline? Non-value added steps exist in the development cycle causing lengthy turn-around time and slow responses to customer requests for new reports and/or modification of existing reports. Value stream mapping analysis is utilized to provide workflow view of the current steps and root cause in a process. This is a critical initial step in deploying Lean because it reveals where the process could be improved and where the wastes and hidden costs could cause duplicate work (Bell & Orzen, 2010).

Target State (Box 3)

Eliminate non-value added waste and bottlenecks within report development cycle and project management to enable more efficient service to customers. This in turn helps the organization better prepare for the business challenges in care transformation. We set up a target to reduce report turn-around time by at least 25%.

Gap Analysis (Box 4)

Following up the results from value stream mapping, identify all possible wastes in report development and project management that do not add value to customers. Wastes may contain hidden cost that can cause duplicate work. Unfortunately, they are sometimes mistaken for normal and required work processes. On the other hand, over processing a perfect process may turn into unexpected waste. For example, BMC Remedy IT Service Management Suite (BMC Software, 2014) is a leading vendor tool for ITIL implementation. In Remedy, request for change (RFC) can start from the Incident Management, Problem Management, Continuity Management and Release Management. The off-the-shelf product interface is intended for generic implementation. When end users are required to submit their requests by filling out these lengthy forms (Figure 2), it may seem over-complicated, clumsy and obscure, thus may inevitably increase resistance from end users.

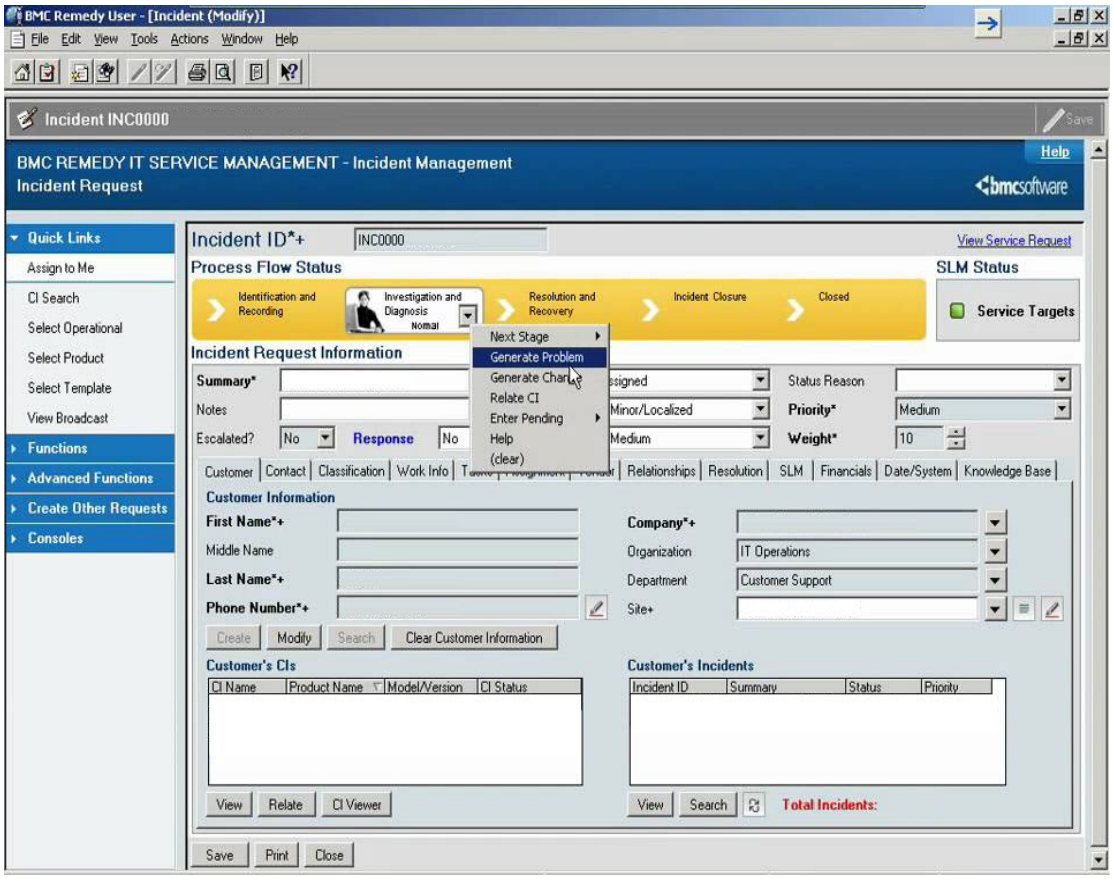

Figure 2: Example User Interface of BMC Remedy IT Service Management

Using 'DOWNTIME' style waste type model (Ohno, 1988), eight types of waste in the clinical report development and project management processes are identified and summarized in Table 1.

Table 1: Clinical Report Development and Project Management Waste and Solution Approach

Waste Type	Identified Waste	Solution Approach
Defects	Any deliverables that don't meet customer's needs. This could happen due to lack of agility in traditional project management in response to change business need	Adopt customer-centered project management methodology in addition to managing scope, cost, and time. Keep close communication and collaborate with customer to establish clear and reasonable expectation on deliverables
Over production	Adding extras into the report and functionality which are outside the scope of the deliverables, causing delay of project delivery	Design solution with future growth in mind; deploy via iterative PDCA cycle; focus on must-have rather than nice-to-have features; start with quick-wins; build customer trust with incremental enhancements; leave extras for future release
Waiting	Report development resource idle while waiting for response from customer; or waiting for output from other upstream processes due to improper planning	Understand that customers are clinicians with priority on caring patients; ask simple direct questions for clarity; better project management and resource planning; simplify change management process for agility and flexibility
Not utilized talent	Not involve appropriate subject matter experts in early customer communication may cause costly rework in later stage; not utilize skill-sets, knowledge sharing at right time	Get solution architects and developers involved earlier to help project manager and business analyst set appropriate expectation from customer and identify appropriate solution framework; engage team members and subject matter experts for cross-training and mentoring
Transport	Lack of centralized project document repository causing confusion and inefficient communication with customers and among project team members	Leverage existing IT systems, such as SharePoint to provide centralized document repository and project progress reporting dashboard portal for more efficient communication and better control on data security
Inventory	Lack of effective version control for project documents and deliverables	Utilize version control tools such as Microsoft Team Foundation for better collaboration and version control
Motion	Difficult for customer navigating around report to find relevant information; burden data update process; unnecessary meetings and conference calls without clear agenda and action items	Think as the customer, think for the customer; make information readily available to customer; develop intuitive user interface for reports that do not require extensive training; project managers need to respect customers and developers with better time management
Extra processing	Not leverage existing tools or reusable solution framework; re-inventing wheel; require customer submitting incident, change requests into BMC Remedy, sign-off repetitively	Take best practice from previous projects and leverage established logic structures, data models, reusable codes; maintain proper balance between ITIL governance and flexibility to improve IT service management

Solution Approach (Box 5)
Design and prioritize solutions to close the gaps and eliminate the identified wastes in previous stage. Table 1 also includes solution approachfor each waste type identified in previous step.

Rapid Experiments(Box 6)
This is atypically aweek-long improvement activity that aims to provide proof-of-concept prototype experiment on a selected waste type and proposed solution approach for a customer request. Quick-win is expected to foster the continuous improvement culture.

Completion Plan (Box 7)

Make a project plan for the rest of the identified tasks based on results from rapid experiments. The list of activities should be concise and not include any long term items. Timeline, milestone, roles, responsibilities and performance measures should be clearly defined and tracked.

Confirmed State (Box 8)

Compare the measure of turn-around time achieved in rapid experiments (Box 8) to the goal that we set earlier in the Target State (Box 3). The performance measurement comparison demonstrates that process improvement is accomplished as planned.

Insights (Box 9)

Summarize lessons learned from the improvement project. A3 Thinking is applied to clinical informatics report development process improvement in this use case study. It shows that A3 Thinking and ITIL are complimentary to each other. Proper balance between them should help improve efficiency and effectiveness of healthcare IT services.

5. Conclusion

This study introduces the Lean A3 Thinking methodology and presents its value for improving healthcare IT services. Both ITIL and Lean A3 Thinking focus on customer and service quality and they are complementary to each other. ITIL provides the framework for ITSM based on a set of best practice to manage IT services while Lean A3 Thinking specifies a set of framework and tools for improving quality of services and processes by eliminating wastes. The positive results of our use case study indicate that instilling Lean A3 Thinking along with ITIL helps improve clinical informatics reporting service.Further study is needed to improve this research. While the initial results from our use case study are promising, there are many potential enhancements in the future. Additional thorough user evaluation with subject matter experts is also needed and will be conducted in the future step.

References

Bell, S.C. & Orzen, M.A. (2010).*Lean IT: Enabling and sustaining your lean transformation*. New York, NY: Productivity Press.

Blumenthal, D. & Glaser, J.P. (2007). Information technology comes to medicine. The New England Journal of Medicine, 356, 24, 2527-2534.

BMC Software. (2014, June 25).Remedy IT service management suite. http://www.bmc.com/it-solutions/remedy-itsm.html

Fine, B., Golden, B., Hannam, R. and Morra, D. J. (2009).Leading Lean: A Canadian healthcare leader's guide.Healthcare Quarterly, 12(3), 26-35.

Hoerbst, A., Hackl, W.O., Blomer, R., &Ammenwerth, E. (2011). The status of IT service management in health care – ITIL in selected European countries. BMC Medical Informatics and Decision Making, 11(76).doi: 10.1186/1472-6947-11-76

Johnson, M. W., Hately, A., Miller, B.A., & Orr, R. (2007). Evolving standards for IT service Management. IBM Systems Journal, 46(3), 583-597. doi: 10.1147/sj.463.0583

Lapão, L.V. (2011). Organizational challenges and barriers to implementing IT governance in a hospital.The Electronic Journal Information Systems Evaluation, 14(1), 37-45.

Marrone, M., Gacenga, F., Cater-Steel, A., & Kolbe, L. (2014). IT service management: a cross-national study of ITIL adoption. Communications of the Association for Information Systems, 34(1), 865-892.

Ohno, T. (1988). *Toyota Production System: Beyond large scale production*. Portland, OR: Productivity Press.

Office of Government Commerce (OGC). (2007). *Service Operation Book*. London, England: The Stationary Office.

Project Management Institute (PMI). (2008). *A guide to the project management body of knowledge.* Newtown Square, PA: Project Management Institute, Inc.

Sobek, D.K.II, & Smalley A. (2008). *Understanding A3 thinking: a critical component of Toyota's PDCA Management System*. New York, NY: Productivity Press.

van Bon, J., Pieper, M. & van deer Veen, A. & Verheijen, T. (2005).*Foundations of IT Service Management based in ITIL*. Wilcon, Amersfoort, Netherlands: Van Haren Publishing.

Williams, H. & Durray, R. (2012). *Making IT lean: applying lean practices to the work of IT*. Boca, Raton, FL: CRC Press.

Womack, J. and Daniel, T.J. (2005).*Lean solutions: how companies and customers can create value and wealth together*. New York, NY: Free Press.