

LEAN MANAGEMENT AS A HOUSE FROM THE PAST TO THE PRESENT

Milan Fekete¹ - Jaroslav Hulvej²

Abstract

It is right to know the history and development of the field of management or some concept, because based on this knowledge we can better understand why the current level of knowledge is as it is, and at the same time, we can better plan our own company future direction. The concept of lean management will be presented in this article in the form of a historical development of the graphical display of the houses, formerly taken from Toyota Company. The focus of this article is to present understanding of the three most important lean management houses that represent valid and current understanding of lean management concept itself.

Key words: Lean management, waste elimination, concept, Toyota house, lean organization pyramid

Introduction

Lean production and lean management was pioneered by Toyota even before WWII. Lean management is [currently characterized as] a business system for organizing and managing product development, processes and operations, and supplier and customer relations that requires less human effort, less space, less capital, less material, and less time to make products with fewer defects to precise customer desires, compared with the previous system of mass production (The Lean Enterprise Institute, 2008).

Lean management was and still is graphically described as a house. In the history of lean management, altogether, four houses were developed until current period. There are often called Toyota houses. In this paper, we will be describing all these four depictions of houses. The last two houses are the same, only they are made from two different organizations.

The resemblance to the house has a meaning. Basically, every house consists of three major parts. The first is a foundation base, the second are walls or can be pillars, and the third part is a roof. All parts of the house have significance and can be related to the company. The foundation base represents stability, the more robust it is, the more stable is a house and also the more stable processes the company have. The walls are where we live in a house; but in the company, walls or pillars represent the basic principles, methods, and tools based on them

¹ doc. Ing. Milan Fekete, PhD., Comenius University in Bratislava, Faculty of Management, Department of Strategy and Entrepreneurship, Odbojarov 10, Bratislava 820 05, e-mail: milan.fekete@fm.uniba.sk

² Ing. Jaroslav Hulvej, PhD., Comenius University in Bratislava, Faculty of Management, Department of Strategy and Entrepreneurship, Odbojarov 10, Bratislava 820 05, e-mail: jaroslav.hulvej@fm.uniba.sk

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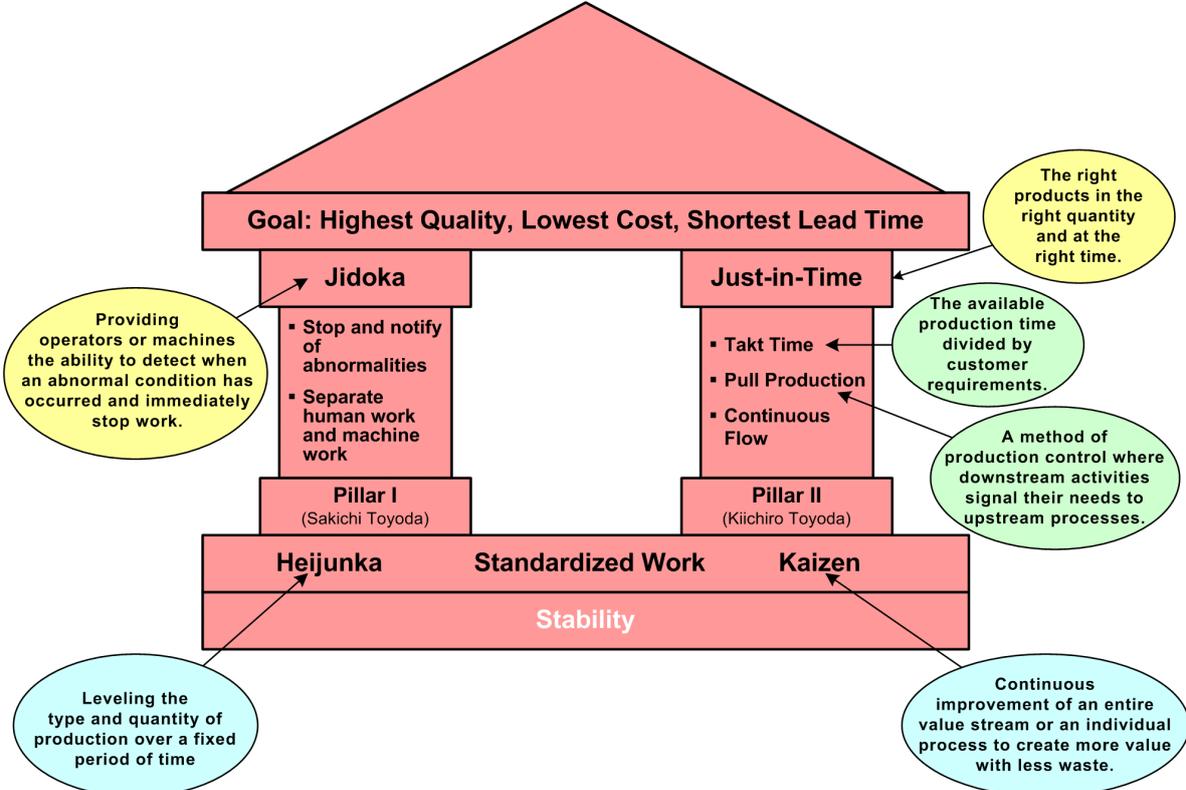
or with the help of them products are produced or services are provided to the customers or clients. The roof is on the top of the house and is usually drawn in a triangle shape. In the company, the roof is what the company should strive for, what should focus on. In essence, it can represent two things: (1) the first are key performance indicators or goals that the production system and the company itself want and need to achieve in producing goods in order to be efficient and productive (internal focus), and (2) the second are customer needs that the company should meet (external focus). It means that the roof represents internal and external performance goals that the company should appropriately determine and then follow. Both external and internal focus is materialized in the company strategy and strategic goals. It means that all the effort, employees exert in the production system, must be aimed at achieving these two focuses – key performance indicators and customer needs.

After introducing the general meaning of the house and its relation to the company, we can proceed to describing the five lean management houses in their historical development.

1 Prescriptive models of Toyota houses

1.1 Two-pillar model of the Toyota house

Picture 1 shows the original, two-pillar model of the Toyota house. In the foundation base, there are three methods or concepts that ensure stability of company’s production system. It means that more stable is the production system, less problems, errors, and defects will occur. It also means that the production will flow smoothly, without interruptions. And that is what we need to achieve in the production system.



Picture 1: Two-pillar model of the Toyota house of lean management

Two pillars represent original two production concepts that Toyota formerly designed and implemented in its production system. They tell us what way the production is organized. The pillars also explain what these concepts mean and some methods that belong to these two concepts. In the picture, there is a short version of JIT definition, the broad definition is JIT is to produce:

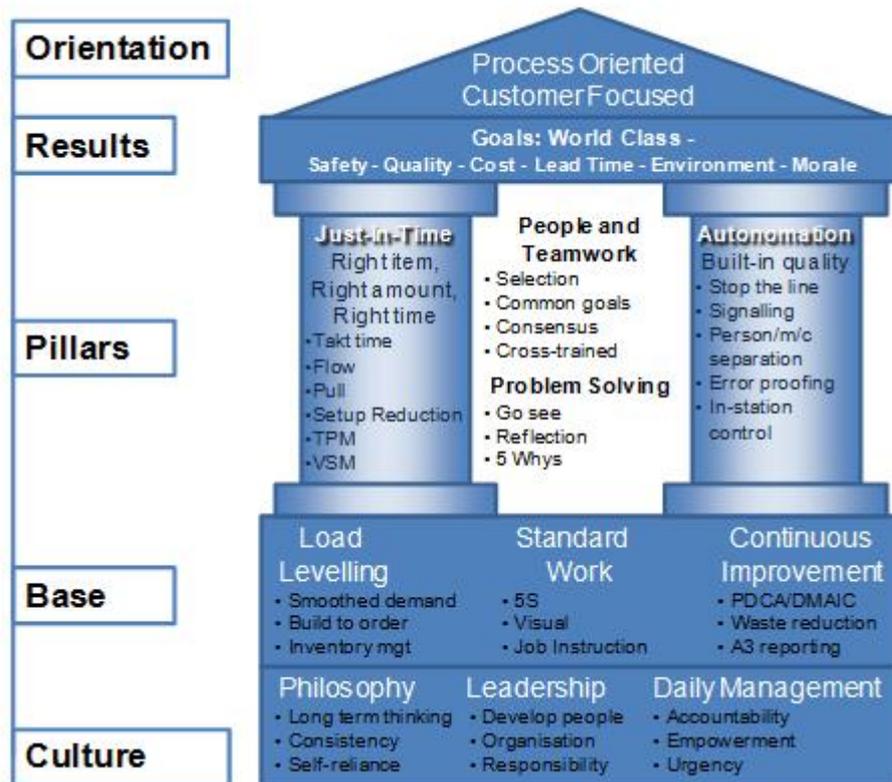
- the right products,
- at the right time,
- in the right volume,
- in the right sequence,
- with as much quality as possible,
- with as least cost as possible, and
- with as short lead time as possible,
- with as much work safety as possible, and
- with as much environmentally-friendly as possible.

Jidoka or automation, in essence, means to equip a machine with a technical device that is able to recognize alone if a machine has performed an operation correctly and, thus, a product was produced with required quality or if some defect has occurred. In case of defect, this technical device will stop the machine automatically so that a more defects are not produced. Operator then does not need to watch a machine if it performs an operation correctly, and he or she can handle more machine than just one. In that case, an operator work could be separated from a machine work. It was at that time a revolutionary step by Toyota that ensured increased quality and productivity. Before introducing jidoka concept, operators attended only one machine and had to watch every machine if it performs smoothly.

1.2 Three-pillar model of the Toyota house

In the meantime, two-pillar model showed up as insufficient. It stressed only technical side of production system and ignored people and their management. Therefore, Toyota has come up with a three-pillar model where a third pillar was added up representing people side of the production system. In Picture 2, the third pillar is depicted by a slope with a title People and Teamwork.

To JIT, JIS (Just In Sequence) was added up, meaning producing products in right sequence. Original title Jidoka was transformed into the principle of build-in quality into processes in the whole production system. This essence of this principle is to assure product quality in all processes so that any defect would get into the next processes once it has occurred. It means enhance this principle with another methods and tools that are in the pillar Automation. Also the foundation base has expanded by other methods and tools and every organization must decide which are appropriate and then implement them. The three pillar model of the Toyota house is also well explained by Hoefl (2010).



Picture 2 Three-pillar model of Toyota house of lean management

The house in Picture 2 is more complex in comparison to Picture 1, but still, it aims mostly at the production system and not at the organization as a whole.

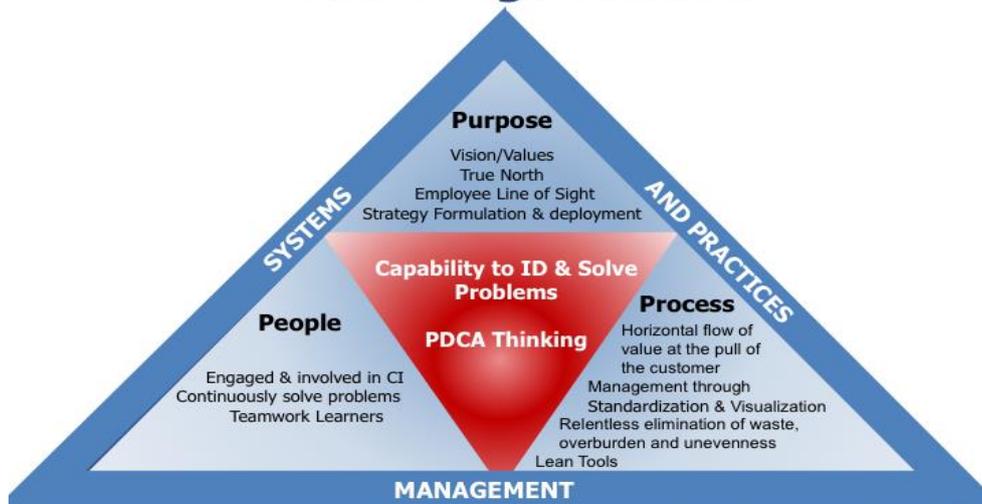
2 Situational models of Toyota houses

2.1 Model of Toyota house as a triangle

Nowadays is lean management understood as a concept for managing the whole organization, not only in the production system. So, the principles, methods, and tools are applied both in production and administration, and both in production and service companies.

Model of Toyota house in Picture 3 represents the current state of view. This time, it is depicted in a triangle shape. That is because lean organization is described as a unity of three elements – Purpose, Process, and People (three corners of a triangle). These three elements also demonstrate how to build the culture of continuous improvement – the essence of lean organization as it is currently recognized – which depends on the alignment between Purpose, Process, People, and the scientific method of PDCA.

Lean Organization



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Picture 3 Lean Organization as a Triangle (Lean Enterprise Institute)

When we compare Picture 3 with Picture 2, we can recognize similarities. In Picture 3, Process represents technical side of production system and includes both JIT and Jidoka pillars from Picture 1. People represent social side of production system as in Picture 1. Purpose corner represents the roof of a house, what the company and its production system strives for. The effective production system is a socio-technical system. We have to work both the social (people) side and the technical (process) side to be successful with it. It has to be an integrated, balanced, total system.

So, lean organization is a culture of continuous improvement and collaborative problem solving by aligning Purpose, Process, People, and regularly practicing the scientific method of PDCA:

- The right value (purpose)
- The best method (process)
- The highest sense of accomplishment (people)

Building up the lean organization means managing the process for formulating and deploying an organizational strategy by policy deployment aimed at delivering maximum value to the customer, making visible the horizontal flow of value to the customer, and learning about the critical importance of developing employee problem solving capabilities at all levels. Policy deployment is the method for communicating strategic goals and achieving horizontal and vertical alignment of all organizational departments and employees with the aim of supporting strategy and vision of the organization. Focus on three key areas – People, Process and Purpose – and the alignment between those three is what creates a lean organization.

Let's now explain what these three elements of lean organization actually mean.

Purpose

The basic question is: „what is the purpose of the organization? Purpose of the organization always has these two aspects:

- What you need to do better to satisfy your customers?
- What you need to do better to survive and prosper as a business?

So the answer to the basic question can be another question: What customer problems will the production system solve to achieve its own purpose of prospering? Or solving customer problems or needs by providing what the customer wants, when it wants, where it wants, with the highest quality and lowest costs. This segment encompasses all functions, individuals, and systems and how they work together to deliver true value to customers while creating competitive advantage and lasting business results. Topics include:

- Key values of lean organization
- Key focus on and the Line of Sight to the organizational goals
- Hoshin Planning or Policy Deployment and its role as a management system for deploying strategic goals throughout lean organization
- The challenges organizations face in implementing a lean transformation and suggested methods to deal with those challenges.

Process

How will the production system assess each major process to make sure each step is valuable, capable, available, adequate, flexible, stable, improvable, and that all the steps are linked by flow, pull, and leveling? A process is simply a value stream – all of the actions required to go from start to finish in responding to a customer, plus the information controlling these actions. Value is the end result of some process and that processes can only produce what they are designed to produce. Process maps are the most useful tool for evaluating the current and future state of any process. In order to get real sustainable results in safety, quality, cost, delivery, and morale, one must bring all the lean tools of to work together as a system. Topics covered include:

- Stability, flow, leveling, pull, standard work
- Visual company and how to manage visual systems in different departments of the company
- Value-streams and value-stream mapping as a continuous improvement tool
- Continuous removal of waste.

Processes are those activities that we have to perform in the right sequence and right time with the aim of creating value for the customers by solving their problems or needs. The perfect process and each step within the process have some challenging attributes:

- Valuable – creates value for the customer
- Capable – provides good result (process output) every time in view of quality parameters
- Available – ready to work whenever needed
- Adequate – just enough capacity as far as volume in predetermined period

- Flexible – able to switch quickly at low cost from one product or operation to the next
- Stable – smooth production, no hinders in the form of unacceptable deviation
- Improvable – being able to always improve

People

How can the production system insure that every important process has someone responsible for continually evaluating that process in terms of business purpose and effective process? Effective processes addressing business purpose are created by teams led by some responsible person. So the questions to ask about people are (Womack, 2007):

- Does every important process have someone responsible for continually evaluating that process in terms of business purpose?
- Is everyone performing the process actively engaged in operating it correctly and continually improving it to better address business purposes?

Lean organization is, at heart, a people-based system, and the success of any lean transformation depends on the engagement of every employee in the continuous process improvement, and their willingness and ability to solve increasingly complex problems. Topics in this category include:

- selection, training, and people involvement,
- supervisory practices, and
- leadership mindsets and behaviors that support the development of the culture of continuous improvement that create the foundation for lean organization.

A cornerstone of Respect for People is the conviction that all employees have the right to be successful every time they do their job. Part of doing their job is finding problems, making improvements, and working according to standardized procedures. With standardized work, each worker on the workplace knows precisely what his or her job is. He or she is given the knowledge and skills (Womack, 2007):

- to know when he has encountered a problem (an abnormality that prevents him from successfully completing his SW),
- to know what to do when he's found such a problem, that is, what it takes to enable workers to build in quality and to be engaged in problem-solving and making improvements by applying PDCA cycle.

PDCA cycle (plan, do, check, act)

Lean organizations depend of developing the problem solving capabilities of the entire workforce allocating specific categories of problems to each layer of the organization. While there is still a need for deep expertise in specialty departments the emphasis is on the performance of the entire value stream and the customer which it serves. Leadership in this type of organization is less focused on being the problem solver and more focused on building the problem solving muscle of the workforce. PDCA is a discipline that holds all organizational processes together and improves them on a continuous basis. Topics are:

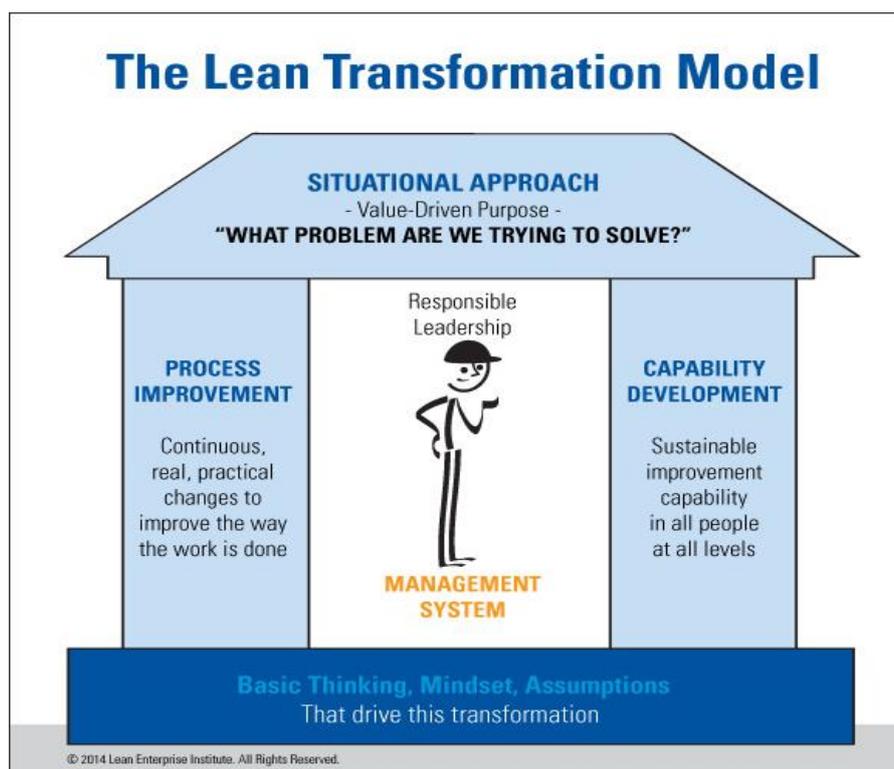
- The work of management to support PDCA.

- Structured problem solving to close organizational gaps.
- A3 as a problem solving, management and communication tool.

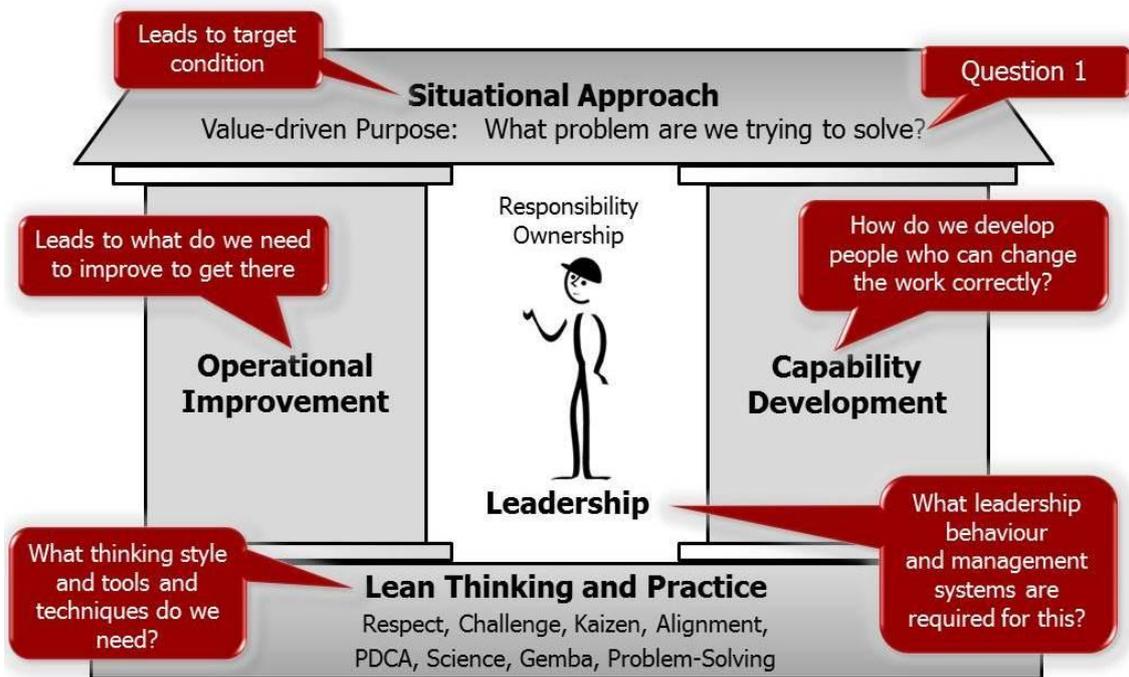
2.2 Toyota House as a lean transformation model

We are all trying to transform. At the company level a transformation is a big experiment, at process level, it is a daily-hourly-immediate work itself. To transform the way people think and behave within an organization to be more of a problem-solving mindset is no easy task and varies from industry-to-industry, company-to-company, person-to-person. It requires discipline, investment and a belief that we can make things better.

What we mean here is the transformation of some organization into a lean organization. In the lean management community, this transformation is explained through the lean transformation models and illustrated based on the examples of Toyota houses. Two these models are showed in Picture 4 and 5. Basically, they represent the same, only just they come from different institutions. Model in Picture 4 is designed by the Lean Enterprise Institute from USA and Model in Picture 5 is designed by the Lean Enterprise Academy from Great Britain. These models are the latest version of Toyota houses and latest understanding of the lean organization based on the situational approach.



Picture 4 The House of Lean Transformation (Lean Enterprise Institute)



Picture 5 Situational Approach to Lean Transformation (Lean Enterprise Academy)

Successful transformation calls for a situational approach that is based on innovating key dimensions of any organization through addressing a series of questions. These questions are fractal, meaning that the same questions apply whether working at the macro enterprise level or the level of individual responsibility as you dive progressively deeper into each dimension. But, while the transformation model that has emerged through years of experience is situational, the nature of the questions represent a clearpoint of view: If an organization fails to address each question, and with a sense of how each relates to the others, the transformation is headed for trouble (www.lean.org).

There is also a prescriptive approach which former houses presented in Pictures 1 and 2 embody. Prescriptive approach is characterized by exact design of a house and within it exactly defined concepts, methods, and tools. It is then considered that when an organization exactly follows these exactly prescribed concepts, methods, and tools, it will with a great probability establish a lean management and become a successful lean organization. Effective total transformation entails transforming five fundamental dimensions – Lean thinking and practice, Capability development, Operational improvement, Leadership, and Purpose of the organization – through continuously addressing key questions associated with each (www.lean.org):

1. What is our purpose, what is the purpose of the change, what value to create or what situational problem are we trying to solve?

Have you made the purpose or mission clear to everyone? Does everyone know their value to create? Does each person know their specific, situational problem to solve?

2. How are we improving the actual work?

Have you defined the work to be done? Is it being improved? How, by what means, to what end?

3. How are we developing capability?

Do you have the necessary capabilities? Have you defined them? What is your approach to capability building? How are you developing people?

4. What management system and leadership behaviors are required to support the new way of working?

Have you designed the management system and do your leaders exhibit the needed behaviors (to develop capability to do the work to accomplish the mission)?

5. What basic thinking, mindset, or assumptions comprise the existing culture, and drive or underlie this transformation?

Do you understand the current basic thinking (mindsets, assumptions, as well as values) and grasp its impact on the organization and its culture? What are you going to do to change the basic thinking and culture in desired directions?

By tackling each dimension through continually and thoroughly addressing questions, we avoid the pitfall of prescriptively giving solutions as is typical of most consultancy approaches to transformation and is both necessary and sufficient for a successful enterprise-wide transformation. Thus, we can have a dynamic approach to transformation in which each organization creates its own unique approach, one that helps them achieve their unique purpose through practical utilization of the deep wisdom embedded in the lean practices that have evolved over decades of rigorous PDCA.

The lean transformation model, depicted in Pictures 4 and 5, can be compared with a model of lean organization in Picture 3. Lean transformation starts by defining the business problem (a gap in performance terms) that the organization wants to close. For that purpose, the Lean Transformation Model is used. The process for each situation is as follows (Lean Enterprise Academy):

I. Create flow of value through systematic PDCA by all team members (Purpose)

- Initially, we define “Purpose.” In the roof of the house, we are asking:
 - a) “What is the purpose?”
Of the organization?
Of the activity or process in question?
 - b) “What is the problem we are trying to solve?”
What is the gap in performance?
What is the gap in capability?
 - c) “What is the organization’s capability for change?”
At each level – senior management, middle management and front lines and horizontally along the process.
At the system level and at individual point level.
In the pillars of the house, we focus on:

II. Operational improvement “How will we improve/change the work?” (Process and People)

- Start with the work (Process.)
- At either individual (Standard Work) or system (value stream or total enterprise) level.

III. Capability development “How will we develop the people (at all levels) to improve continuously?” (Process and People)

- Develop kaizen mind and systematic problem-solving capability (Process and People.)
- Kaizen mind, challenging spirit – never-resting, always challenging.
- Problem-solving capability – what is a “problem” and what is your problem-solving process?

IV. In the centre of the house we focus on the role of leadership and management. “What leadership behaviours and management system is required to support the transformation?”

- Defining the management system.
- Developing leadership behaviours.

V. The foundations focus on the basic thinking. “What basic thinking drives this transformation?”

- Understanding the assumptions and mindsets that we have to drive the transformation.

Great advantage of the Lean Transformation Model is that doing this is “situational” – that is, the work is not a prescriptive, one-size-fits-all solution, but instead is about taking a balanced view of Purpose, Process, People and Problem Solving. All five of these areas (and questions) need to be thought through to be successful in this transformation.

Conclusion

Certainly, the future will bring in other models of Toyota houses, but the latest model with situational approach will be valid to the near future at least. Knowledge of latest versions is important for the organization in order to keep in touch with current times. Of course, appropriate modification of the model is probably necessary when implementing to reflect in exact conditions in which every organization exists. Of course, currently known concepts, methods, and tools from prescriptive approach are still valid, however, what is changing is the way of how they are implemented.

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