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## New approaches in Lean Management

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### Abstract

This article explores the future of Lean Management, its implementation potential in other industrial sectors as well as Lean Management education process. At the same time it explains possibilities of its implementation in industries such as Public Administration, Healthcare and IT services. It describes how the various principles of Lean Management are transmitted to the service sector and what differences arise by this process. In conclusion the article describes and compares different ways of Lean education in various countries and finally the best teaching practice with regard to practice is suggested and proposed.

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### 1. Introduction

According to Sobek, Durward & Lang, (2010): “Lean is an approach to operations management that considers any resource expended that does not add value to the end customer to be waste. Lean emphasizes an array of tools and methods to aid managers and workers in improvement, each designed for specific types of problems to illuminate and remove sources of waste through systems redesign. These tools and methods include value stream mapping, Kanban and pull, demand levelling, single-piece flow, 5S, kaizen events, A3 reports, visual management and more.”

Implementing of Lean Management removes eight types of wastes; Transport, Inventory, Motion, Waiting, Over-processing, Overproduction, Defects, and Talent. It typically improves Quality performance, Fewer machine and Process Breakdowns, Lower levels of Inventory, Less Space Required, Higher efficiencies, Greater Customer Satisfaction, Improved employee morale and involvement, Higher Profits and more.

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Historically, we can conclude that industrial engineering gradually grows into different sectors of human activity. It is logical that its origins are associated with traditional manufacturing sectors. Most progression achieved especially in Automotive. Lean Management gradually penetrated industries of services and from the beginning of the 21st century it is used to manage Healthcare, IT services and Public Administration, see Fig 1.

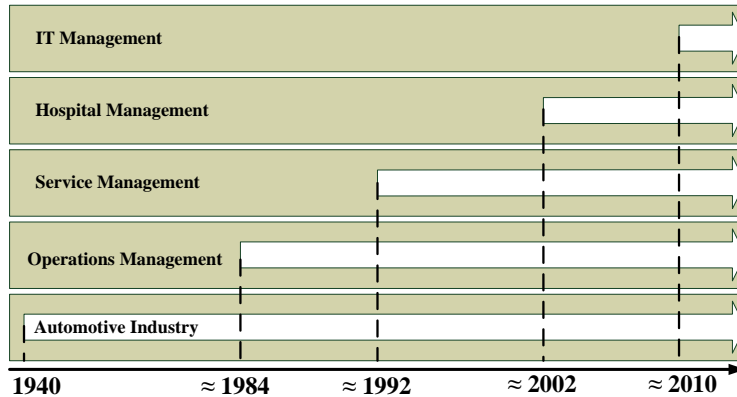


Fig. 1 Timeline of usage Lean Management in various industries, Source: Stohr (2013)

## 2. Lean Management in Healthcare

"Hospitals are waiting biggest crisis in next 25 years. Small ones drowning in debt." says Stanislav Fiala (2013) from the Association of Czech and Moravian Hospitals.

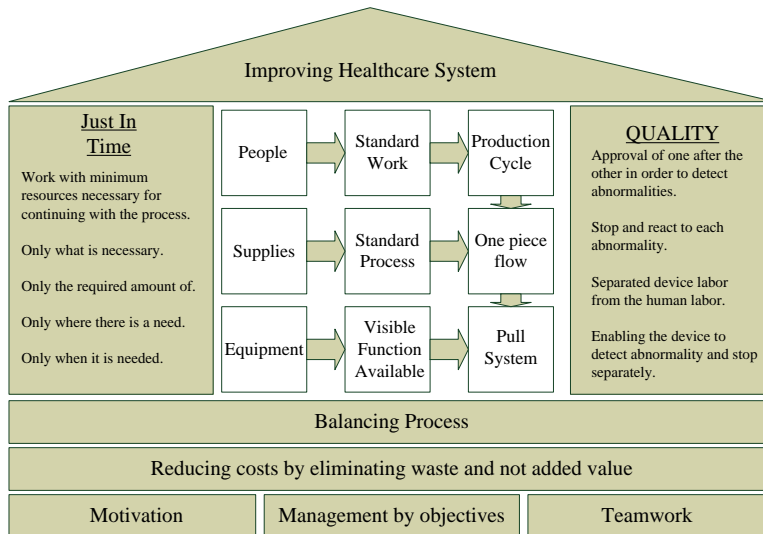


Fig. 2 Improving Healthcare System Source: Stohr (2013)

One of the ways to solve the current problems in the health is leaner processes (ie. Lean Healthcare) and achieve operational savings in health care facilities.

Although Healthcare is in many ways other than industry, there are also many similarities - whether it's manufacturing of cars or providing care to the patient, both the worker must stand up for many complex processes that will ensure added value and fulfil customer requirements. Lean thinking in healthcare demonstrates the potential

for positive impacts on productivity, cost, quality and timeliness of services provided to the public. Of course there are certain paradigms of health care, which it greatly differs from the traditional business, but it is possible to apply the principles of lean thinking.

Principles of Lean Healthcare evolve from the beginning of the 21st century and most of the early experiences come from the United States. In Europe, these methods began to develop around 2002 and today a leader in the implementation of lean thinking in healthcare is clearly Sweden.

When defining the basic building blocks of lean methods in healthcare uses a similar view as in the automotive field. The current form of improvements in health care takes the form of the house as in the case of Toyota, see Fig 2.

Research at the Georgia Institute of Technology found that 40% of total health care costs without added value. Among the major ones include waste: time, supply, material, medication, information, diet. The other, equally important waste include: unnecessary procedures, incorrect medication, delay treatment, misdiagnosis, failure to comply with good practice, sealing problems, lack of communication, and the resulting chaos, long waiting times on material, repair equipment, personnel and related activities, bad disposition of material, tools, poorly organized workplace, poorly organized processes, high energy losses, high inventories, unnecessary and long meetings, expiration times oversight of drugs and medical supplies.

By focusing to these flows and implementing lean methods in HealthCare we can show their contribution to patient subsequently the hospital or insurance company. Some of them are shown in table, see Table 1.

Table 1 Benefits of using Lean methods in Healthcare

Lean method	Benefits to the patient	Benefits to the hospital / insurance company
5S	quickly served, reduction of waiting	increase productivity, reduce costs and personal space
VSM	shortening the time, eliminate waiting, improve diagnosis and treatment	reducing downtime, operating and personnel costs, happier customers
Visual management	reduction in personnel error, improve patient orientation, improving the quality of patient care	reduction of errors in diagnosis and treatment, clarity and simplicity, faster incorporation staff
Work standardization	reduce the risk of human error	reduce the risk of human error, improve productivity and control
Pull system	faster treatment, improved availability of key tasks, reducing waiting	reduce inventory, better capacity utilization of workplaces, reduce the demands on surface

Many aspects of the Toyota production system and other methods PI can be applied to processes of health care delivery. This is lean thinking TNE 100% positive. PI method can improve the safety and quality, improve staff morale and reduce costs - all at once at the same time. With free human potential can increase the added value of care provided to patients. But you cannot just be positive. Slenderness requires strict discipline, needs leaders and leadership. It needs managers with vision and early loaded organizing different type of work than she was used to that. In return brings certainty for the future.

### 3. Lean Management in IT services

Lean IT concept which was the last time more often used is an extension of the principles of Lean management in the IT environment. This concept ultimately brings increased quality, shortening the time needed and cost reduction.

Table 2 Eight types of wastes in IT services Source: OMNICOM, s.r.o. (2014)

Waste	Examples of IT services environment
Defects	Low reliability in the operation of service - Incidents Implementation unauthorized changes Development software errors Poorly mapped user needs
Overproduction	Operation of services that no one is using

	Services are unnecessarily quality - unnecessary crossing SLA parameters or missing SLA Unnecessarily high priority in addressing requirements Unused application functionality
Waiting	A poorly adjusted collaboration between teams Inappropriate contracts with suppliers System failures - downtime, downtime end users Slow application response
Transport	The use of multiple data formats and the need for their interconnection Proprietary systems without the possibility of sharing data Search and detection of necessary information between the various professionals Existent models changes, undefined service request
Over-processing	Creating reports that no one reads Keeping records of Configuration Items that nobody used Categorization (eg. Change) which is no longer used but later Printed (eg. Reports) if sufficient electronic version
Inventory	The excess unused capacity - underused servers Subscribe for email attachments instead of sending only links Unused License Many "tickets in Inbox"
Motion	Lack of Knowledge Management Not updated database of known errors (KEDB) - unnecessary testing different workaround The application that forces the user to enter data in multiple locations - screens
Talent	Frustration High employee turnover Wrong people in job positions Unused human potential

The role of IT is not only bringing together the infrastructure and applications and ensures almost 100% availability and reliability, while the rapid implementation of various changes. Of course, it is with a lower budget than last year. From today, IT is increasingly expected efficiency, flexibility, innovation, cooperation on business itself. As IT departments and IT providers grow, identify similar problems as in the production area and Lean IT can help overcome these challenges and deliver the expected improvement (ie short-term but also long-term). Principles of Lean management are fully operated in an environment of IT services, even if their application requires some adaptation.

As in Lean manufacturing we also have eight types of wastes in Lean IT, see Table 2.

Principles of Lean IT are summarized in Manifesto for Agile Software Development. Highsmith (2001)

#### 4. Lean Management in Public Administration

Several types of waste are common for Public administration. Lean Management focuses on them and eliminates these wastes, see Table 3.

Table 3 Wastes in Public environment Source: Mungovan (2009)

Waste	Examples of Public environment
Defects	Data errors, Missing information
Overproduction	Unneeded reports, Doing work not requested
Waiting	Unnecessary approval cycles
Motion	Trips to remote printer of files
Complexity	Unnecessary process steps
Moving items	Report routing, File storage

At this time Public organizations face at least five key challenges: Monetary issues, creating a truly transformational government, meeting heightened constituent expectations, managing workforce transition, and minimizing the risk of implementing new technologies, Mungovan (2009).

Some emerging trends may help break the politicized cycle and short-term pressures in the public sector. These include the application of Lean manufacturing processes to public sector activities, the sharing of services among different government entities, the increased use of off-the-shelf software applications and the use of business intelligence technologies and techniques to analyse complex data and thus make better decisions. Each of these items plays an integral role in the concept of Lean Management Mungovan (2009).

Lean Management can bring these results: improve operational efficiency, improved processes, improved workflow, improved field service performance, enhanced citizen services, reduced wait time, improved citizen access, improved citizen satisfaction, better resource allocation, enhanced strategic communications, improved knowledge management, enhance reporting, transparency, and planning, Mungovan (2009).

## 5. Education of Lean management

Lean Management is a field of study of Industrial Engineering which is included in curriculum at many universities in almost every continent. The best is The Georgia Institute of Technology in the U.S. In Europe best known is international graduate program at Aalborg University in Copenhagen, Denmark. In Asia, the University of Moratuwa of Sri Lanka includes Industrial Engineering in its curriculum. Many universities in India, Pakistan, and Bangladesh also have such linked programs Kadarova (2014).

Educational process is different in every country, and it is adapted to each culture, see Table 4.

Table 4 Comparison of different educational styles by culture Source: (Charlesworth, 2008)

INDONESIAN	FRENCH	CHINESE
<ul style="list-style-type: none"> <li>• Tends to prefer the tried and tested practical ideas</li> <li>• Takes time to think things through very carefully, paying attention to others</li> <li>• Does not like to be rushed or have tight deadlines</li> <li>• Tends to reject new or wild ideas</li> <li>• A lot of respect for others including their feelings</li> </ul>	<ul style="list-style-type: none"> <li>• Enjoys the challenge of something new and different which they will seek out</li> <li>• More-or-less agrees to take time to listen but is not bothered by having to rush or work to a tight schedule</li> <li>• Does not waste time</li> <li>• Puts forth own interpretation if not convinced by others</li> <li>• Seems to be less self-disciplined</li> </ul>	<ul style="list-style-type: none"> <li>• Likes challenge to a certain extent, will seek out new experiences</li> <li>• Seems less comfortable with rules</li> <li>• Willing to take time to listen and puts stock by analysis</li> <li>• Interested in new ideas and ways of doing things</li> <li>• Respects people including their feelings</li> </ul>

In common, the best teaching practise is based on principle LEARN/DO. Education, of course, is never enough by itself. The next step must be implementation away from the classroom and even from teaching in the traditional sense. This transition involves incorporating the power of what participants hear and see and transforming that power into action Black (2008).

## 6. Conclusion

Lean management is not a new concept, but it is relatively new in Healthcare, IT services and Public administration. Sceptics will be right when they say, "Patients, citizens or code are not cars." On the other hand, the fact that the hospitals, cities and software are a complex systems with thousands of interconnected processes thus similarly complex organization such as the production organization of the same size.

Lean management requires strict discipline, needs leaders and leadership. It needs managers with vision. In return brings certainty for the future. Therefore principles LEARN/DO is the most recommended principle in education of Lean management in the world. This is the only way how to train great leaders.

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