



Prepared by group A2

# *Lean Methodology*

Streamlines processes, reduces costs, and improves customer satisfaction.



# *Definition of Lean*



“Lean” is a methodology that aims to create the most value for customers using the fewest resources. It revolves around identifying and removing activities that don’t add value—often called “waste.” By streamlining processes, we can focus on delivering the right product or service at the right time, in the right quantity, and at the right quality level. It is now considered an integral part of the Agile Software Development methodology.



# History of Lean :

The Lean manufacturing concept emerged in the mid-20th century out of a production process Toyota developed as part of its Toyota Way philosophy.

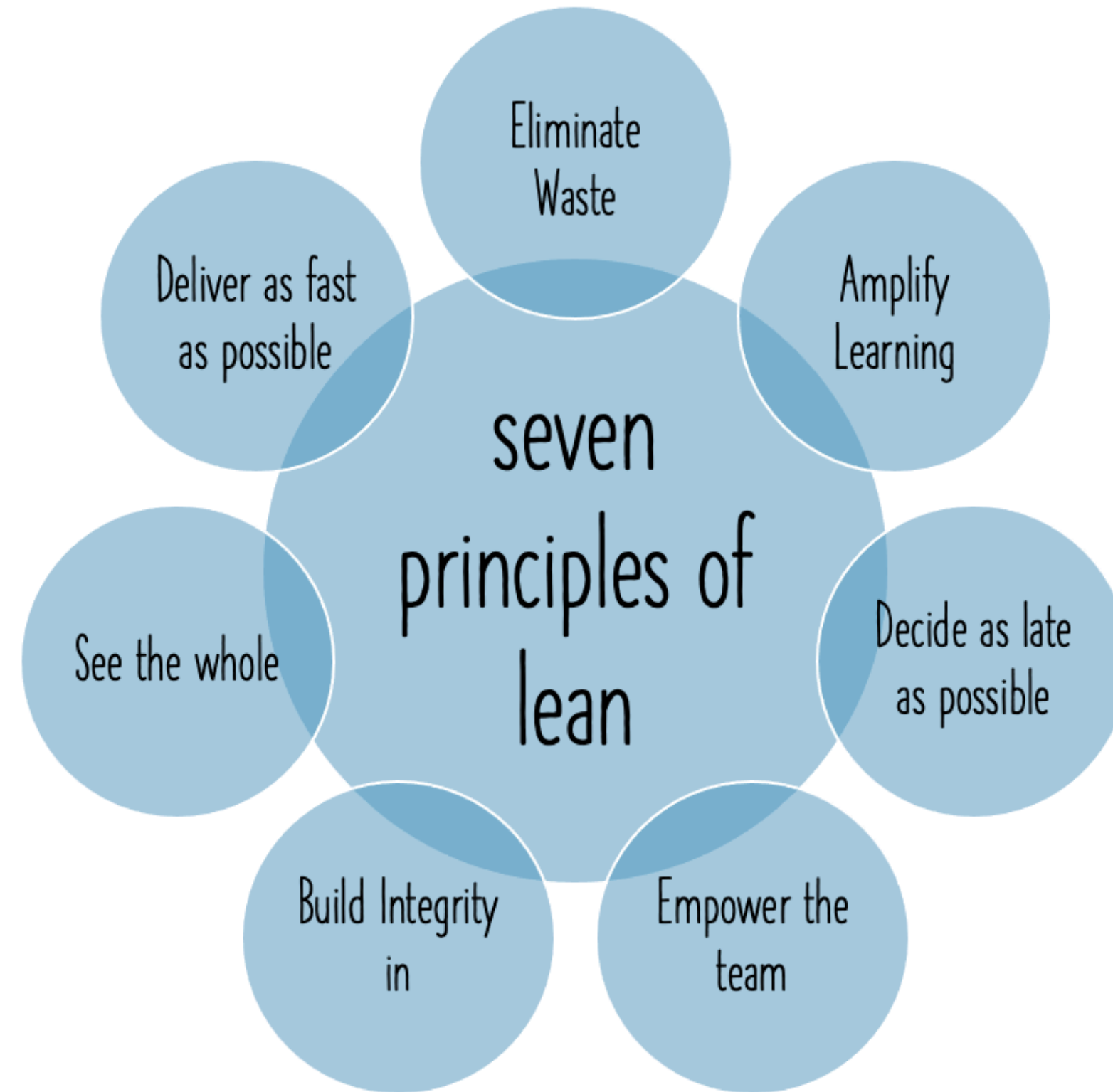
Lean manufacturing aimed to reduce product defects, cut out waste, increase productivity, and encourage accountability and innovation. The approach eventually spread to other industries.

Mary and Tom Poppendieck used the term Lean software development in the book they published (**Lean Software Development: An Agile Toolkit**) in 2003. It applied the seven Lean principles to software engineering and the development process.

# History of Lean Methodology

Timeline	Milestone	Description
1980s	Lean Manufacturing Principles	Toyota Production Systems (TPS) developed by Taiichi Ohno and Shigeo Shingo emphasizes on eliminating waste, improving quality, and continuous improvement. These were the foundation principles for lean thinking.
1990s	Emergence of Lean Thinking	The book “The Machine That Changed The World” by James P. Womack, Daniel T. Jones, and Daniel Roos describes the principles of lean manufacturing.
Early 2000s	Lean Principles in Software Development	The book “Lean Software Development: An Agile Toolkit” by Mary Poppendieck and Tom Poppendieck outlines the key principles of LSD.
2000s	Adoption and Spread	Lean principles started becoming popular in the software industry.
2010s	Integration with Agile	LSD becomes more integrated with Agile methodologies.
2020s	Continuous Evolution	Lean principles continue to evolve and influence modern software development practices.

# *Core Lean Principles*



# *Core Lean Principles*

- The main concept behind lean is that efficiencies can be applied and waste can be managed at all levels of the process - this includes individual levels, as well as departments, in interdepartmental operations, in the overall organization and between the organization and its customers and suppliers.
- The seven core lean principles are:
  - a. Eliminate Waste
  - b. Build Quality
  - c. Amplify learning
  - d. Delay commitment as long as possible
  - e. Deliver fast
  - f. Respect people
  - g. Optimize the whole



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## Principle 1: Eliminate Waste

- Lean philosophy defines wastes as anything that doesn't add value to the product.
- After each development iteration, project managers and developers discuss bottlenecks, identify waste and develop a plan to eliminate it.
- An examples includes:
  - Unnecessary code or software features

## Principle 2: Build in Quality

- Various tactics are employed to ensure that quality has been achieved such as:
    - Paired programming - this is a concept of two programmers who work on the same code together at the same time, one is a driver and the other the navigator
    - Test driven development
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## Principle 3: Amplify Learning

- This is a concept of knowledge sharing such that the knowledge that one software developer or engineer gains must be shared with other engineers and developers and this is done through:
  - Code reviews
  - Sharing knowledge during meetings
  - Asking questions in the face of ambiguities

## Principle 4: Delay commitment as long as possible

- The goal in this case is to experiment and learn as much as possible before committing to an irreversible change.
  - Developers incorporate features and functionalities as late as possible to avoid re-doing the work as the market needs changes.
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## Principle 5: Deliver Fast

- This is where developers launch a product quickly, receive customer feedback fast and use that feedback to create a strategy for improvement.
- The idea behind this strategy is to fail fast and learn from the results.
- This strategy contrasts with other methodologies used to design complex products since they take up a lot of time and still end up failing.

## Principle 6: Respect People

- Lean encourages healthy conflict, proactive communication and constant feedback.

## Principle 7: Optimize the whole

- The team examines the process from start to finish to make the lean value stream as efficient as possible.
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# *LSD Process*

- Identify Value: Understand the customer values and focus on delivering features that meet these needs.
- Map the Value Stream: This involves mapping out the entire software development process to identify and eliminate wasteful activities that do not add value.
- Create Flow: Ensure a smooth and continuous flow of work by minimizing delays and interruptions.
- Establish Pull: Develop features based on customer demand rather than pushing features through the process.
- Seek Perfection: Regularly review and refine the development process. Always encourage the team members to identify the areas of improvement and implement changes iteratively.
- Build Quality In: Use practices such as test-driven development (TDD) and continuous integration to integrate quality assurance throughout the development process.
- Empower Teams: Empower development teams by providing them with the necessary tools, resources, and autonomy to make decisions.



# Practical Lean tools



## 1 Kanban – Visualizing Work for Efficiency

A visual system for managing work, emphasizing continuous flow and limiting work in progress (WIP). It uses boards or charts to track tasks through stages like To Do, In Progress, and Done.

Example:

- A Kanban board (Trello, Jira, or Asana) is used to track tasks in To Do → In Progress → Done columns.
- Teams limit work in progress (WIP) to avoid overloading developers.

Benefits:

- ✓ Provides real-time task visibility
- ✓ Reduces bottlenecks by limiting WIP
- ✓ Helps teams prioritize critical tasks

## 2 Kaizen - Continuous Improvement

It is a philosophy that emphasizes continuous improvement through small, incremental changes. It encourages all team members to contribute ideas for improvement, fostering a culture of collaboration and innovation.

Example:

Regular team does reviews in Agile SDLC to identify and implement small improvements after each sprint.

Benefits:

- ✓ Encourages innovation through incremental changes
- ✓ Promotes a culture of collaboration and accountability
- ✓ Improves processes over time with minimal disruption

### 3 Just In Time - On Demand Resource Allocation

A strategy where resources are acquired or produced only as needed, reducing waste and excess inventory. This approach helps optimize resource utilization and lower operational costs.

Example:

Allocating server resources only during the testing phase of SDLC to save costs.

Benefits:

- ✓ Reduces waste by avoiding overproduction or idle resources
- ✓ Lowers operational costs
- ✓ Enhances focus on current needs without overstocking

### 4 5 S - Organising the workspace

A method for organizing the workspace by focusing on five key steps: Sort, Set in order, Shine, Standardize, and Sustain.

Example:

A development team organizes their workspace by sorting tools, arranging design software, and cleaning up unnecessary files.

Benefits:

- ✓ Improves efficiency by reducing time spent searching for resources
- ✓ Enhances team productivity and morale
- ✓ Creates a safer, clutter-free environment

## 5 Value Stream Mapping

A tool for visualizing the flow of materials and information through a process. It helps identify bottlenecks and areas for improvement.

Example:

- Mapping the SDLC phases to find inefficiencies in testing or deployment stages.

Benefits:

- ✓ Highlights inefficiencies in workflows
- ✓ Optimizes resource allocation
- ✓ Improves project delivery timelines

## 6 PDCA Cycle (Plan-Do-Check-Act) – Iterative Problem Solving

A four-step iterative process for continuous improvement. It involves planning a change, implementing it, checking the results, and acting on them.

Example:

- Refining a software feature based on user feedback during the maintenance phase.

Benefits:

- ✓ Encourages systematic problem-solving
- ✓ Ensures continuous product refinement
- ✓ Reduces risks by testing changes incrementally

# Implementing Lean in Organizations: Steps, Challenges, Change Management & Best Practices

Implementing Lean in an organization requires a strategic approach, cultural shift, and commitment to continuous improvement. Here are the key steps, challenges, change management strategies, and best practices for successful Lean adoption.





# Steps for Implementing Lean in an Organization

## *Step 1: Establish a Lean Mindset & Leadership Commitment*

- Gain executive sponsorship and leadership commitment.
- Educate key stakeholders on Lean principles, benefits, and impact.
- Align Lean with the organization's strategic goals.
- Foster a culture of continuous improvement and customer value focus.



## *Step 2: Identify Value from the Customer's Perspective*

- Engage with customers to define what they truly value.
- Prioritize features, processes, or services that directly benefit the customer.
- Avoid unnecessary functionalities that do not provide real business value.

## *Step 3: Map the Value Stream (Value Stream Mapping - VSM)*

- Analyze the end-to-end process to visualize how work flows through the system.
- Identify bottlenecks, inefficiencies, and non-value-adding activities (waste).
- Use Lean tools like Kanban, process flowcharts, or SIPOC diagrams to improve transparency.

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## Step 4: Eliminate Waste

- Remove unnecessary tasks, excessive documentation, redundant approvals, or inefficient workflows.
- Focus on automating repetitive tasks and improving resource allocation.
- Apply techniques like Just-in-Time (JIT), 5S (Sort, Set in Order, Shine, Standardize, Sustain), and error-proofing.

## Step 5: Implement Pull Systems & Improve Flow

- Shift from a push-based system (where work is scheduled based on forecasts) to a pull-based system (where work is done based on actual demand).
  - Use Kanban boards to track work progress and ensure a steady, optimized flow.
  - Minimize waiting times, delays, and task-switching.
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# Step 6: Empower Teams & Foster Continuous Improvement

- Encourage self-managed teams that take ownership of improvements.
- Conduct regular retrospectives and feedback loops to refine processes.
- Use Kaizen (continuous improvement) events to identify and implement changes.
- Train employees in Lean tools (Six Sigma, Kanban, Agile, CI/CD, Value Stream Mapping, TDD, DevOps practices, etc.).

# Step 7: Measure, Optimize, and Sustain Lean Practices

- Define KPIs (Key Performance Indicators) to measure improvements:
  - Lead Time (time taken to complete a task)
  - Cycle Time (time spent on a task)
  - Defect Rates (bugs, errors)
  - Customer Satisfaction Scores
  - Employee Productivity
- Establish a feedback culture where teams continuously learn and adapt.
- Integrate Lean with automation and DevOps for long-term sustainability.

# Advantages of Lean Methodology:

- **Reduced Waste and Costs**
  - Identifies and eliminates non-value-adding activities
  - Streamlines workflows, leading to cost savings and higher profit margins
- **Improved Efficiency**
  - Encourages faster turnaround times through Just-In-Time (JIT) and other lean tools
  - Simplifies complex processes, minimizing delays and bottlenecks
  - Higher Quality Products/Services
  - Focus on continuous improvement (Kaizen) promotes consistent quality checks
  - Prevents defects rather than just detecting them
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# Advantages of Lean Methodology:

- **Enhanced Customer Satisfaction**
  - Delivers value more effectively by prioritizing customer needs
  - Shorter lead times, fewer errors, and better service lead to improved experiences
- **Scalability and Adaptability**
  - Flexible enough to apply in manufacturing, services, healthcare, IT, etc.
  - Easily scaled or adapted to meet changing market demands and organizational goals
- **Better Risk Management**
  - Systematic identification and elimination of inefficiencies reduces the chance of errors
  - Proactive approach to problem-solving helps avoid crises and surprises

# Challenges in Implementing Lean

Implementing Lean is not always straightforward. Some common challenges include:

## I. Resistance to Change

- Employees may resist Lean due to fear of job loss, increased accountability, or new work expectations.
- **Solution:** Implement change management strategies, ensure clear communication, and offer training.

## *2. Lack of Leadership Support*

- If leadership does not actively support and drive Lean adoption, it will fail.
- **Solution:** Involve executives in Lean initiatives and establish clear goals aligned with business strategy.

## *3. Cultural Shift Takes Time*

- Lean requires changing mindsets toward continuous improvement.
- **Solution:** Foster a culture of experimentation, celebrate small wins, and reinforce Lean principles through training.

## 4. Poor Value Stream Visibility

- Many organizations struggle to identify waste and inefficiencies.
- **Solution:** Use Value Stream Mapping (VSM) and data analytics to analyze processes.

## 5. Over-Engineering & Unnecessary Automation

- Some companies over-engineer Lean, adding too many rules and automation layers.
- **Solution:** Keep Lean simple, iterate gradually, and focus on actual efficiency gains.



# Change Management for Lean Adoption

Implementing Lean successfully requires an effective change management strategy to overcome resistance and ensure smooth adoption.

## Key Change Management Strategies:

### *Communicate the Vision Clearly*

- Explain why Lean is being adopted, its benefits, and how it improves work.
- Address employee concerns about job security and workload.

# Provide Training & Upskilling

- Offer Lean training in Agile, DevOps, Six Sigma, Kanban, TDD, CI/CD.
- Organize workshops and knowledge-sharing sessions.

# Pilot Small, Scale Gradually

- Start Lean adoption in small teams or departments before scaling across the organization.
- Conduct trial projects, measure results, and refine the approach.

# Encourage a Growth Mindset

- Reward experimentation and innovation rather than punishing failures.
- Make continuous improvement a shared responsibility.

# Monitor, Evaluate, and Adapt

- Set KPIs (Lead Time, Defect Rate, Customer Feedback, Productivity Levels).
- Use dashboards and real-time tracking to monitor Lean implementation.
- Iterate based on data-driven insights.

# Best Practices for Lean Adoption

- **Start Small & Scale** – Begin with a pilot project before full implementation
- **Adopt Lean-Agile & DevOps** – Combine Lean with Agile & DevOps for better efficiency.
- **Visualize Work** – Use Kanban boards & Value Stream Mapping to track progress.
- **Prioritize Customer Value** – Focus on features & services that truly impact customers.
- **Promote Cross-Functional Collaboration** – Encourage interdepartmental teamwork.
- **Automate Where Necessary** – Use CI/CD pipelines, automated testing, and cloud computing to streamline development
- **Encourage Experimentation** – Allow teams to innovate without fear of failure.
- **Track & Measure Performance** – Define key metrics for tracking Lean success.
- **Continuous Learning** – Conduct regular Lean retrospectives & Kaizen events.

# *Case Studies*

## **Toyota Production System (TPS)**

- Toyota pioneered Lean manufacturing through its Toyota Production System (TPS).
- By focusing on waste reduction, continuous improvement (Kaizen), and Just-in-Time (JIT) production, Toyota significantly improved efficiency and product quality.
- The system minimized overproduction and excess inventory, optimizing resource utilization.

# *Case Studies*

## **Safaricom – Lean in Telecom & Digital Services**

- Safaricom, Kenya's leading telecom provider, incorporates Lean-Agile methodologies in product development and customer service.
- They use AI-driven data analytics to streamline M-Pesa transactions, reducing system downtime and fraud risks.
- By automating customer support through chatbots and self-service platforms, they reduce inefficiencies and enhance user experience.

# *Case Studies*

## **Equity Bank – Lean in Financial Services**

- Equity Bank applies Lean principles in its digital banking transformation.
- By leveraging mobile banking and agent banking, the bank minimizes the need for physical branches while improving financial inclusion.
- Automation in loan processing and risk assessment speeds up decision-making, reducing bottlenecks in financial services.

# *Case Studies*

## **Kenyatta National Hospital (KNH) – Lean in Healthcare**

- KNH, Kenya's largest referral hospital, has implemented Lean principles in patient flow management.
- Through triage systems and digital patient records, the hospital reduces waiting times and improves service delivery.
- Lean practices have also been adopted in inventory management, ensuring efficient drug distribution with minimal wastage.



# *Emerging Trends and the Future Impact of Lean Methodology*

## **Integration of Lean with AI & Automation**

- Kenyan banks and telecoms are using AI-driven Lean solutions for fraud detection and customer engagement.
- Chatbots, robotic process automation (RPA), and AI-assisted loan approvals are making financial services more efficient.

# *Emerging Trends and the Future Impact of Lean Methodology*

## **Lean and Smart Agriculture (Agri-Lean)**

- Agribusinesses are adopting precision farming techniques, using data analytics to optimize water usage, fertilizer application, and yield forecasting.
- Drone technology and IoT sensors are reducing waste and improving productivity for Kenyan farmers.

# *Emerging Trends and the Future Impact of Lean Methodology*

## **Lean Healthcare & Digital Health Systems**

- Hospitals are integrating electronic medical records (EMRs) to reduce paperwork and improve efficiency.
- Telemedicine and mobile health apps are helping streamline patient care in rural areas.

# *Emerging Trends and the Future Impact of Lean Methodology*

## **Sustainable Lean (Green Lean) for Energy & Waste Management**

- Kenya's focus on renewable energy (solar, wind, and geothermal) aligns with Lean's waste reduction principles.
- Waste-to-energy projects, like converting Nairobi's Dandora dumpsite into a renewable energy hub, are gaining traction.

# *Emerging Trends and the Future Impact of Lean Methodology*

## **Lean Logistics & E-Commerce Growth**

- Companies like Jumia Kenya and Sendy are using Lean strategies to optimize last-mile delivery.
- Demand-driven supply chains powered by AI are improving logistics efficiency.

# Conclusion



Kenya is rapidly adopting Lean methodology across multiple sectors, from finance and healthcare to agriculture and government services. With advancements in AI, automation, and sustainable practices, Lean will continue to drive efficiency, reduce waste, and improve service delivery in Kenya's digital economy.





*Thank you*

