

Agile Project Management



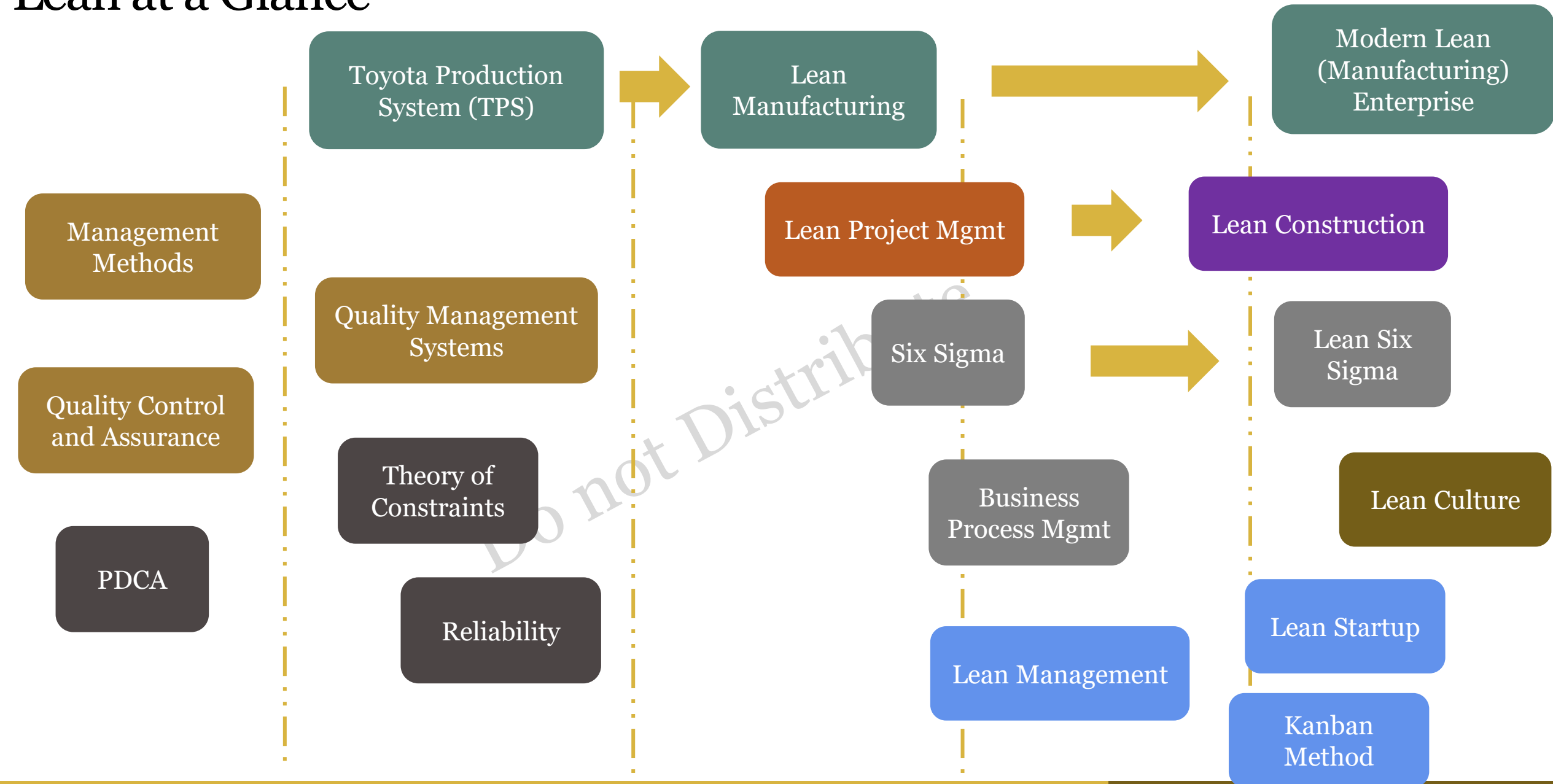
Managing Projects under Uncertainty

Nariman Dorafshan, 2023

Part 2.2

What is Lean?

Lean at a Glance



What kind of Lean?

Depending on who you talk to, Lean seems to mean several things:

1. A **body of knowledge** inspired by the Toyota Production System (TPS)
2. A **set of tools**, many of them with Japanese names or obscure acronyms
3. A cost-cutting approach, “**doing more for less**”
4. A framework **for continuous improvement**

Which one is the best definition?

Serious problems in each of those definitions:

Unfortunately, while there is truth in each of the above, none of them is an entirely satisfactory basis for a definition of Lean. In summary:

- **Definitions 1 & 2**, focused on Toyota's systems and tools, make the mistake of confusing the Lean of today for its origin story. Undoubtedly, Toyota's practices at the time were better than those that were then the norm, but they and world move keep moving on, and our job is not to entrench practices that are now decades old.
- **Definition 3**, focused on cutting costs, confuses Lean with just one of its potential outcomes. Cost control has its place of course, but to focus primarily on cost tends to take the organization in a very un-Lean-like direction, one that prioritizes resource efficiency at the expense of flow efficiency.
- **Definition 4** – Lean as synonymous with continuous improvement – isn't so much wrong as woefully inadequate, leaving out too much of what is necessary to be successful.

Definition 1 and 2

- Lean is indeed inspired by the Toyota Production System. And rightly so: the Toyota story is remarkable, well worth studying, and the company itself has been generous in facilitating that study. The TPS is a vital part of that story; so too are its tools.
- But **blind copying doesn't work**; Toyota themselves describe this behavior as embarrassing!
- Most of us don't work for motor manufacturers, and even if we did, by the time we had finished our implementation, our smarter competitors would have moved ahead of us long ago.
- Were you to try it, not only would you be replicating the tools of the past, but you'd be doing it **ignorant of whether they will be effective in your particular context**. Get that wrong, and the results will be horrible.

Definition 3

- Does “more for less” adequately describe the rise of Toyota from the ruins of post-war Japan to its position as one of the leading motor manufacturers in the world? Of course, it doesn’t.
- And it’s worse than inadequate: it’s highly misleading.
- When your focus is on squeezing the maximum out of existing resources, flow tends to get worse, not better.

Definition 4

- Lean **involves continuous improvement**. It's essential!
- Continuous improvement inside Toyota is highly developed, formalizing how they make changes ranging from small production line tweaks to large restructurings.
- The problem is that continuous improvement runs into **two serious problems** when it is **implemented on its own**:
 1. Running out of Steam
 2. Cannot substitute for Strategy

CI - Running out of Steam

- We've all seen continuous improvement initiatives run out of steam, and the truth is that
continuous improvement is **not naturally self-sustaining**.
- The textbooks describe **improvement as happening in cycles**, but it is not the case that one improvement must lead inevitably to another.
- How can we improve this?

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CI – as substitute for Strategy

- Unfortunately for the lazy manager, continuous improvement is no substitute for strategy.
- It's **not enough just to solve problems**; they **have to be the right problems**.
- For the right problems to be identified and addressed relentlessly, there must be a **shared understanding of the outcomes** to be achieved and **awareness of the obstacles** that stand in the way of those outcomes.

Stop concentrating on improvement cycles

- Stop concentrating on improvement cycles,
instead, think of these two as two distinct concepts:
 - the framing of improvements as experiments and
 - the organization of ongoing improvement-related work
- Describing something as a cycle does not automatically mean that it will sustain itself!

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two essential insights

- In order both to understand Lean both in its historical context and to apply it successfully today, these two essential insights must be recognized:
 - **Insight 1:** Improving the flow is the mutual interest of both customers and suppliers
 - **Insight 2:** The pursuit of flow is a serious, long-term endeavor.

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Insight 1

- It is in the **mutual interest** of both customers and suppliers **to improve flow**.
- Not only does faster and smoother flow improve the customer experience, it makes a wide range of efficiencies possible and creates opportunities that would not otherwise exist.

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Insight 2

- The pursuit of flow is a **serious, long-term endeavor**.
- No single change can be guaranteed to **deliver perfect results**
 - in fact, the majority of experiments deliver more in learning (revealing **new obstacles** to overcome) than they do in performance.
- This has some important **implications for organizational design**.

important implications for organizational design

At every level of the organization there will be a need for:

- **Engagement** – involving people with first-hand knowledge of where both the obstacles and the opportunities lie
- **Leadership** – guiding and continuing the journey even when each step is surrounded by uncertainty
- **Development** – equipping staff and leaders, ensuring that the next generation will continue a journey whose exact destination can't be known today

What underpins TPS?

- Toyota was the first to internalize these insights.
- In highly distilled form they're encapsulated in the twin 'pillars' of *Just in time (JIT)* and *Respect for people*, and they underpin TPS.
- Unfortunately, what first caught everyone's attention wasn't the insights, but just some of the tools Toyota had developed in order to act on them, the tools most visible to outside observers at that time.

Don't become **obsessed** with waste reduction,
so as to forget **the main point!**

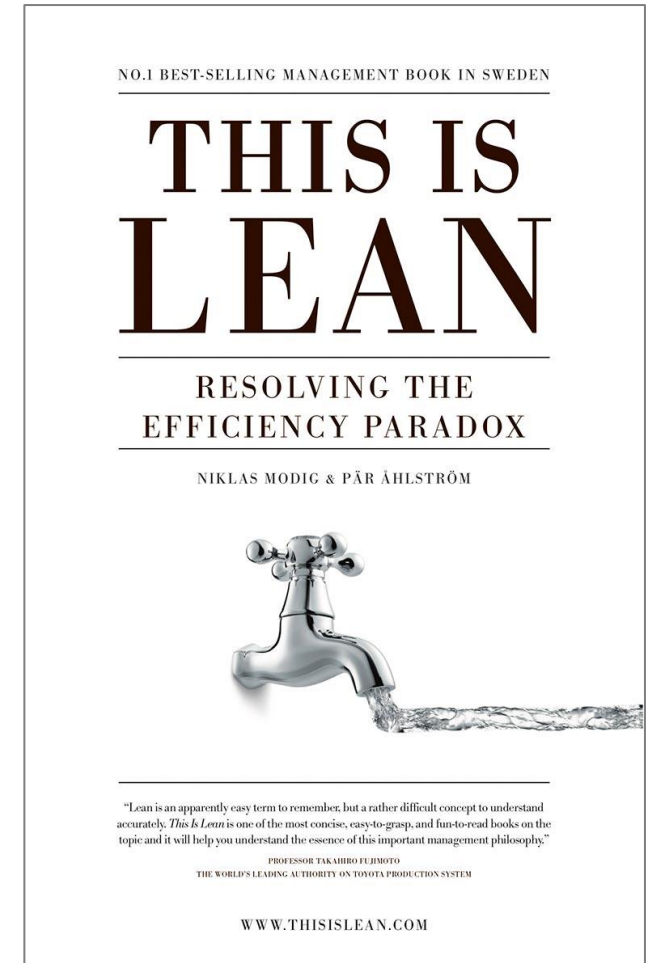
Which is **Delivering Value!**

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Lean:

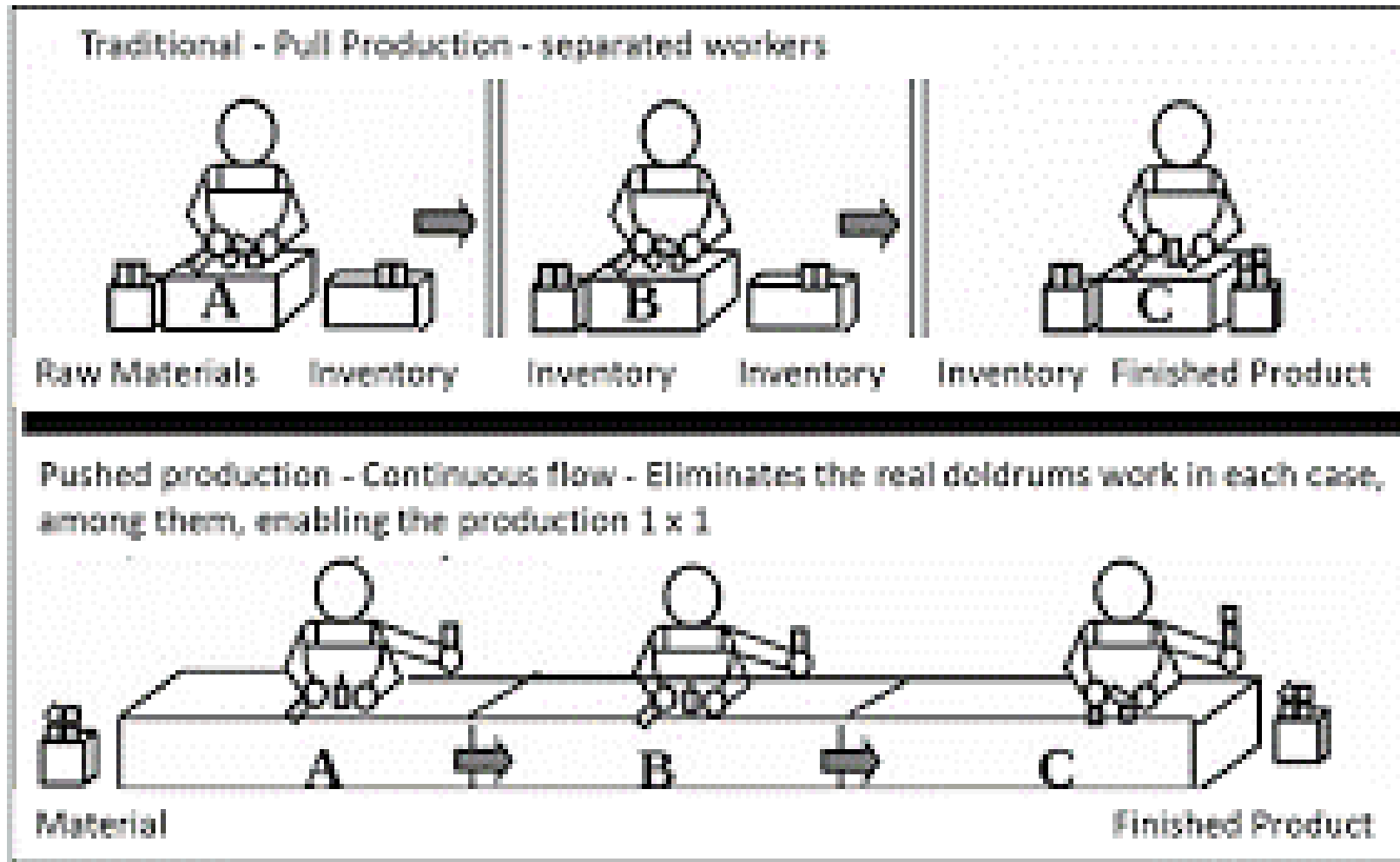
a strategy of flow efficiency

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Niklas Modig & Pär Åhlström, *This is Lean: Resolving the Efficiency Paradox*, Rheologica Publishing, 2014; <https://thisislean.com/>

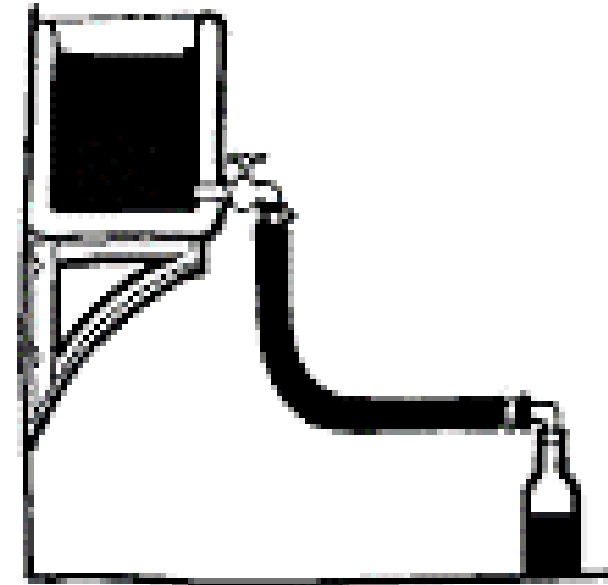
What is Flow?



What is Flow?



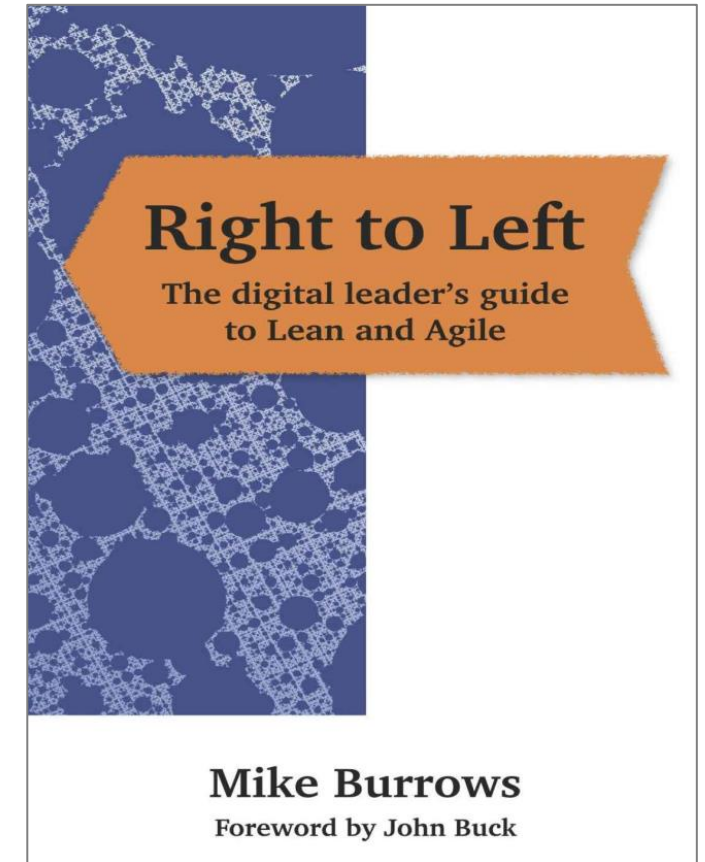
No continuous flow



Flow

Lean:

The **strategic pursuit** of **flow**,
a **deliberate** process of **organizational**
learning



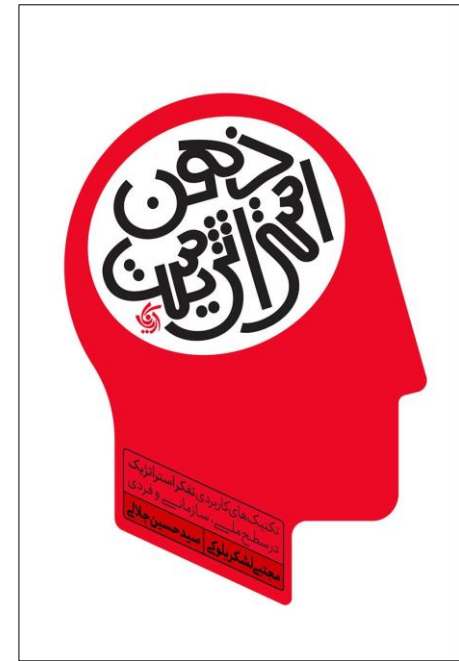
Mike Burrows, *Right to Left*,
New Generation Publishing, 2019

What does Strategic mean?

- Strategic /adj/

If something is strategic, it has a **meaningful impact** on **key result indicators (KRI)**

- KRIs (and KPIs) of different levels shouldn't be mixed together!



Level	Key Result Indicators
For-profit Organizations	Survivability, Profitability, Achieving its Mission
NGOs and Non-for-profits	Survivability, Achieving its Mission and Social Values
Governments	Economic Welfare, Social Equality, General Safety

Lean:

The pursuit of flow as **strategic imperative**,
an **open-ended** and **purpose-driven endeavor** that
continuously and **deliberately engages** people at **every level**
of the organization in a **learning process**

Mike Burrows, *Right to Left*,
New Generation Publishing, 2019

Tests of a good strategy

- Lean passes all the tests of good strategy:

it identifies real challenges,

it provides a clear framework for decision making, and

the actions it generates tend to reinforce each other.

- Demonstrably, it is also a strategy for the long term:

Toyota has been committed to theirs for decades already and they're not done yet.

Required several kinds of leadership for successful implementation

- **Product leadership**, conceiving and evolving products that **meet the needs of willing customers** and are rewarding to use
- **Technical leadership**, **designing products** that can be built, delivered, and supported effectively
- **Market leadership**, **connecting** people and products, managing demand
- **Process leadership**, finding **better ways** to operate and manage the delivery process
- **Change leadership**, **catalyzing change** through sponsorship, experimentation, facilitation, coaching, and coordination
- **Executive leadership**, **removing structural impediments**, ensuring that the organization pulls together, now and into the future

Lean Body of Knowledge | گستره دانش

- It is rare to find all of these dimensions fully developed and in perfect balance in one person.
 - Lean is therefore very much **a team sport**, even at the leadership level.
- two important components of the **Lean body of knowledge**:
 - a description of **the Lean improvement process** in the form of the **Lean principles**,
 - a model of the kinds of **obstacles** (or 'wastes') that the Lean improvement process typically must tackle.

Lean Principles

- Principle 1: Identify value
 - Principle 2: Map the value stream
 - Principle 3: Create flow
 - Principle 4: Establish pull
 - Principle 5: Pursue perfection
- Womack, Jones, & Roos, “The Machine That Changed the World”, 1991; brought the term *lean production* to prominence.

Principle 1: Identify value

- We begin by identifying value from the customer's perspective.
- You won't identify value by looking only at the production process.
 - To fully appreciate it, you need to look beyond the delivery or the transaction and discover what makes it valuable in the hands of the customer.
 - You will enter the territory of needs and outcomes, and it's helpful to learn its language.

Principle 2: Map the value stream

- Working backwards from those key moments of value creation, map out the steps of the process, distinguishing activities that add value from the customer's perspective from those that don't.
- If non-value-adding activities – *waste* – can be eliminated or minimized, flow will improve.

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Principle 3: Create flow

- Encourage work to flow smoothly through the process towards the customer, so that each work item progresses without delay through each activity and between activities.
- If you're not doing so already, now is also a good time to start measuring system performance, establishing a baseline against which future performance can be compared.

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Principle 4: Establish pull

- For a while, you might create flow through a combination of careful vigilance and a readiness to intervene whenever work stops flowing.

You'll gain some idea of what the process is capable of, but as a long-term strategy it is neither reliable, cost-effective, nor sustainable. In fact, all that interference may actually make things worse!

- A much more elegant, **efficient, and robust** approach is to **establish pull**
- Instead of '**pushing**' work into the system without regard to system **capacity** and then dealing with the consequences for flow, **the system is designed to 'pull' work into the system when it is ready.**

Pull systems

allow work to enter an activity only when two conditions are met:

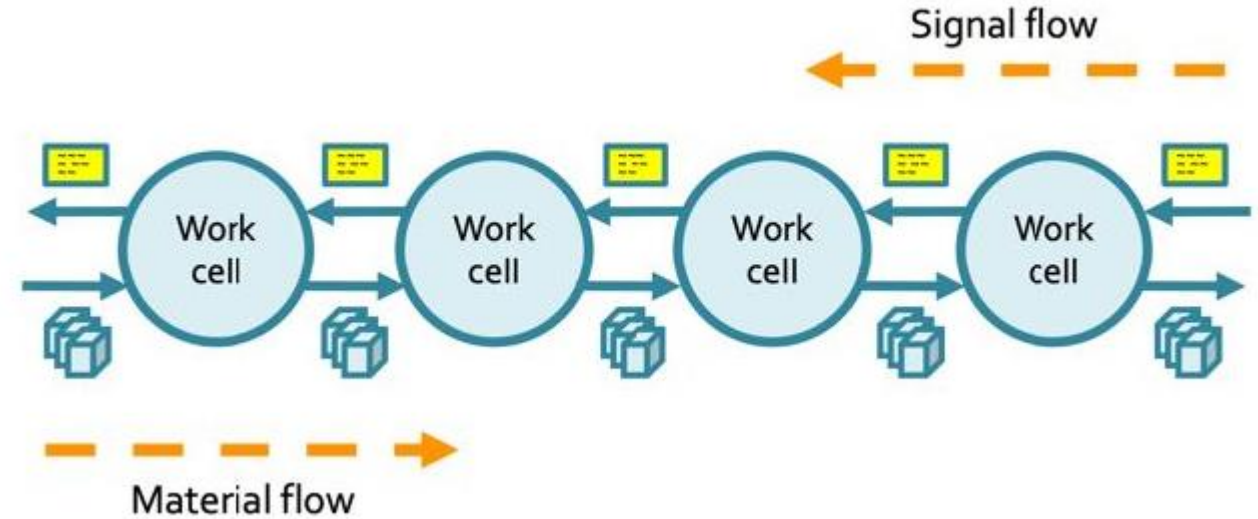
1. A **demand signal** has been received from the direction of the customer, so that **nothing is made prematurely or unnecessarily**
2. The activity itself has **capacity available**, ensuring that this new work won't inflict further delay on a part of the system that is already suffering

multiple pull systems

- When multiple pull systems are connected together, we see these **demand signals** cascade rapidly in a right-to-left direction.
- In order to complete their work, work cells close to the customer – **downstream**, or on the right – request whatever items they need from cells **upstream**, to their left.
- Those cells in turn request what they need from further upstream, and so it continues up the line, right to left.
- The work itself flows left to right, passing smoothly through activities that are operating continuously within **safe and effective limits of load**.

Kanban System

- Kanban systems represent an important **class** of pull system.



- A kanban system's design, policies, and parameters determine how many signal cards – the kanban – can be in circulation at any given time,
a **deliberately-introduced constraint** that **establishes pull** and **improves flow**.

Principle 5: Pursue perfection

- As pull becomes established, flow begins to happen more naturally, and *impediments to flow* become much easier to see.
- To the trained eye, waste is everywhere; Lean practitioners often joke that their inability to “unsee” waste is a curse!

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A change of management opportunity

- An opportunity for a significant change of management focus is created:
instead of **helping work through the system** and dealing with specific issues as they arise,
managers are now tackling systemic issues, **addressing underlying flaws** in the design of systems.

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The scope of improvement

- The scope of this improvement activity can be surprisingly broad and challenging: the 'system' isn't just the physical production line, but the way it is operated, managed, supplied, staffed, developed, and so on.
- This work must be done in the face of external pressures, social dynamics, and other factors that are impossible completely to control, making it truly a job for the long term.
- Consultants can get you started or help you over a hump, but **ultimately the pursuit of perfection must be owned internally** and made a recognized part of every manager's duties

A short Summary

These principles can be summarized as “*Understand, manage, and improve flow, right to left*”:

- **Understand** the delivery process, starting from the right, where needs are met
- **Manage** flow, embracing the mantra “*Stop starting, start finishing*”, helping to internalize flow and pull, and building trust in the process
- **Improve** the process by addressing *systemic impediments to flow*, tackling aspects of system design or behavior that get in the way of work being completed and meeting a need

The 7 wastes

Lean's *7 wastes* help to classify the various impediments to flow typically encountered when pursuing flow in **the material world**:

- **Waste 1: Transportation** – moving material from A to B (perhaps via C) when to do so adds no customer value.
- **Waste 2: Inventory** – **keeping more work in the system than necessary**, the result of **starting work prematurely** or in oversized batches.
 - Excess inventory causes **delay**, must be **financed** until value is realized, and introduces a host of **second-order effects** such as poor quality and the inability to understand the system's true potential.

The 7 wastes – continued

- **Waste 3: Motion** – inefficiencies introduced by poor ergonomics – tools and materials disorganized or out of reach, uncomfortable and even unsafe working environments.
- **Waste 4: Waiting** – work delayed behind other work (see Inventory above) or by the failure of supplies or other essential resources to arrive in time.
- **Waste 5: Overproduction** – producing something before it is needed, an act that may seem harmless but is frequently a root cause of excess inventory and its related problems.

The 7 wastes – continued

- **Waste 6: Over-processing** – performing activities that are unnecessarily elaborate, time-consuming or expensive, using equipment more sophisticated than necessary.
- **Waste 7: Defects** – the double, triple, or quadruple whammy! Effort is spent first on producing defective work, then on detecting the problem, and finally on rectifying it. It gets worse still – sometimes orders of magnitude worse – when the first person to notice the problem is your customer.

Lean production wastes

- It's important to recognize that these **are the wastes of Lean *production***.
- Away from the production of **material goods** – in product development, service delivery, or digital for example – some of these wastes can seem **far less relevant**.
- Even as metaphors they can **mislead**:
in the virtual world for example, what possible meanings could we attach to **transportation** and **motion**, and are they wasteful in every case?

Some wastes are universal

- **Excess inventory** is simultaneously a cause and a symptom of waste
- Whether you're **waiting** for something physical or virtual, the impact is much the same
- By definition, **over-production, over-processing**, and similar excesses must be wasteful
- **Defects** are so insidious that it usually pays to “*stop the line*” and deal with them at source the moment they are discovered

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Inventory

- Inventory is so fundamental that it features in a key mathematical relationship, *Little's law*.

- Averaged over suitable periods of time:

$$\textit{Time in process} = \textit{Inventory} / \textit{Throughput}$$

- Where:

- *Time in process* is the time taken for similar units of work to pass through the system (or part thereof)
- *Inventory* is the number of those units of work in the system
- *Throughput* is the rate at which those units pass through the system per unit of time

Why do obsessed with Inventory?

- Once you grasp Little's law, Lean's apparent obsession with inventory seems only sensible!
 - If you can reduce inventory without unduly impacting throughput, time in process must also reduce.
 - If you can eliminate delays, you will see inventory reduce or throughput increase (and perhaps both).

Variation and Overburdening

Not counted among the 7 wastes but in important categories of their own:

- *Variation* – inconsistency, unpredictability, unevenness, or irregularity – whether of demand, flow, quality or some other measure of system or product performance
- *Overburdening* – people and systems over-stressed and unable to perform at their best, the result of excess inventory, unexpected demand, management failure, or some other cause

Variation

- Variation is understood to be an important problem to tackle in its own right.
- Certainly, it's true that understanding and addressing **systemic sources of variation** can be a powerful way to improve a process.
- In two very real senses, the desire to eliminate variation seems entirely compatible with Lean:
 1. The more **smoothly** a process runs, the less inventory it needs to hold as insurance against disruption
 2. **Predictability** can be of value to the customer in its own right

Variation - Continued

- On the other hand:
 1. It would be foolish to eliminate variation whenever it's a source of significant **business opportunity**, customers willing to pay a significant premium for **their needs to be met in different** (and perhaps innovative) **ways**
 2. **Predictability can be an expensive substitute for speed**; “**slow and steady**” doesn't always win the race!
- The key is to **recognize and exploit the valuable forms of variation** at the same time as striving to eliminate the rest.

Variation - Continued

- Toyota provides a powerful example in its seemingly perverse choice to build a range of different products on the same production line in what seemed to be impossibly small batches.
- To deal with the unpredictability and delays this tactic introduced, they forced themselves to innovate new techniques such as *rapid changeover* and *single-minute exchange of die*.
- Faced with the apparent trade-off between predictability and opportunity, they chose a path of flexibility, achieving the best of both goals.

The 8th waste

- The name “*7 wastes*” seems to have stuck, but there is in fact a widely-recognized 8th waste, variously worded as **untapped creativity** and **unfulfilled human potential**.
- This is a late addition, and it must be said that in the eyes of some Lean practitioners its dissimilarity to the first 7 wastes causes it to sit rather **awkwardly** in that list.

More than just economics,

Whether or not it belongs with the others, it does reveal some of the intent behind *Respect for people* and speaks to another of Toyota's deep insights. The alignment of interests in the pursuit of flow is based on *more than just economics*:

- *Success* depends on people up and down the value stream *showing curiosity, creativity, and an appetite for experimentation*
- People can *find meaning and enjoyment in their work* when *appropriately challenged, empowered, and equipped*
- Customers and even society can *benefit in undreamt-of ways* when the right products continue to be conceived, created and delivered at the right time.

some serious challenges to leaders

- Too often, initiative is suppressed, too much reliance is placed on financial and other extrinsic rewards to the detriment of more intrinsic sources of motivation, and the opportunity to innovate is lost through lack of vision or a desire to control.
- These are reminders – if any were needed – that **most waste should be blamed not on the people doing the work, but on the design of the working environment.**
- If blame should be assigned to people at all, **start with the leaders responsible.** Better still, **focus on the systems that train those managers to be that way!**

psychological safety

- Closely related to the 8th waste is the concept of *psychological safety*.
 - People **won't give their best** if they **fear** that this will lead to **negative consequences**.
 - Teams will **never reach their full potential** if team members **expect new ideas to be received judgmentally**.
 - Few will **attempt anything challenging** if **failure** is widely regarded as something to fear.
- Psychological safety is very much **a team phenomenon**, but it's one in which leaders set a strong example.
- If your teams don't have it and you want to see improvement, start there.

Some Terms (1)

- *resource efficiency* refers to
the proportion of time a resource is kept busy, known also as its *utilization*.
- Typically, this is expressed as a percentage, a utilization of 100% describing a resource that is always busy, never idle.

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Some Terms (2)

- *flow efficiency*

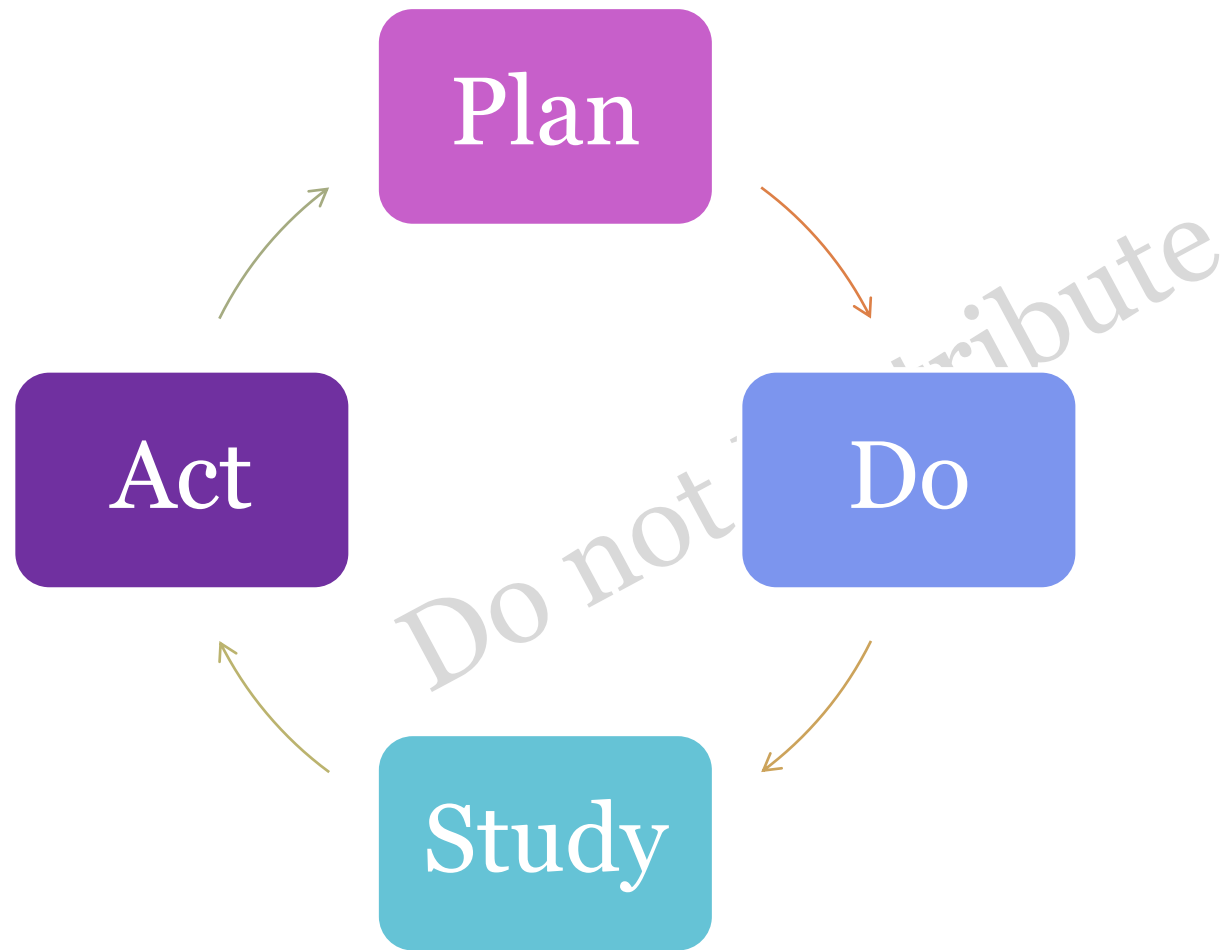
measures the **proportion (percentage)** of time that the product spends **actively being worked** on in ways that **add value**, relative to its overall **elapsed time** through the system.

- A flow efficiency of 100% would imply **perfectly smooth flow**, with value being added to the product the whole time it moves through the process.

Some Japanese Terms

- *Kaizen*: The Japanese term most often used for continuous improvement, literally “change for better”.
- *Muda* in Japanese, literally “futility” or “uselessness”
- In Japanese *variation* and *overburdening* are *mura* and *muri*. “Unevenness” is the more literal translation of *mura* and it does sometimes get used in the Lean literature; here we follow Deming and use “variation”.
- *Muda*, *mura*, and *muri* often appear together, referred to collectively as the 3M model

Shewhart & Deming - The PDCA Cycle



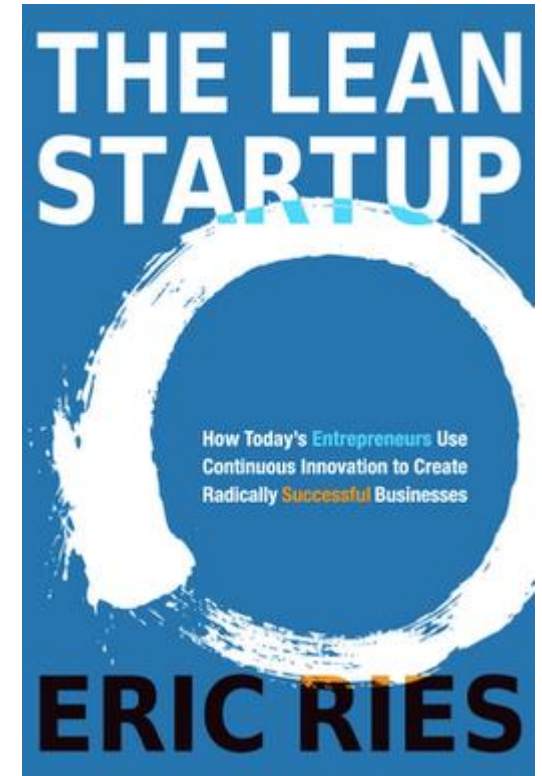
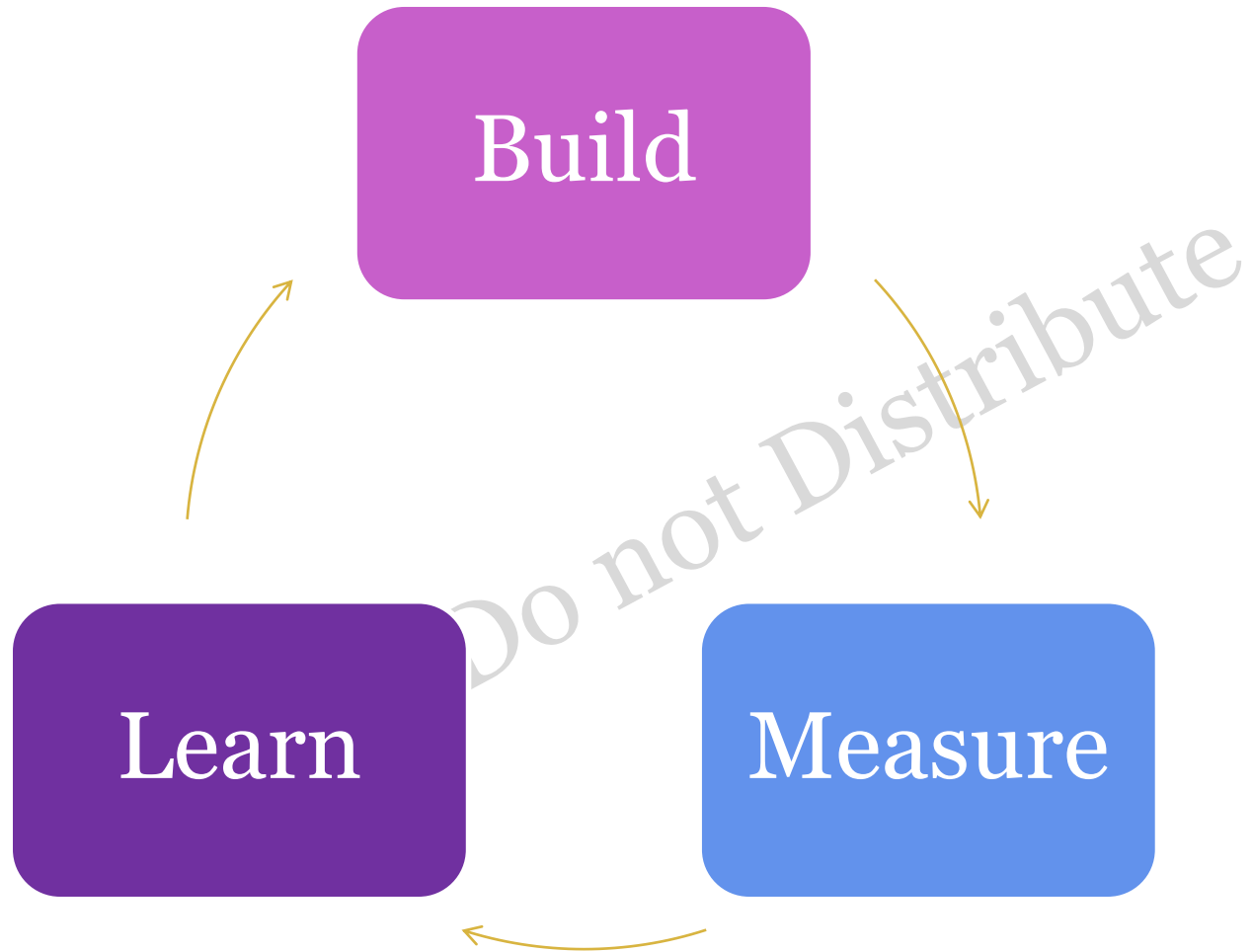
W.H. Shewhart
(1891-1967)



W.E. Deming
(1900-1993)



The Lean Startup (2011)



Eric Ries
(1978-)



Part 2.3

Kanban Method

What is Kanban

A **Method**

For knowledge work
management

... having

Principles and Practices

To guide you in managing work
and improving the way you do it

... using

Kanban Boards

Visualizing your work
and its flow

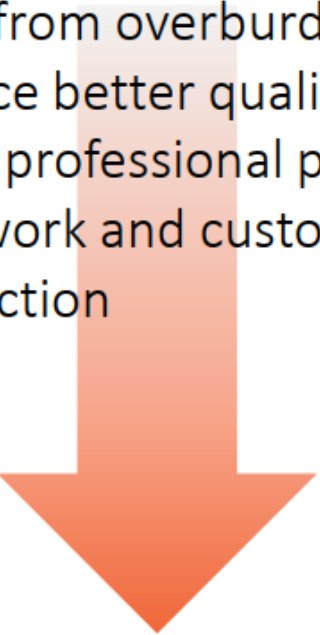
... and

Kanban Systems

to ensure work on an item starts
only when there is both customer
demand and system capacity

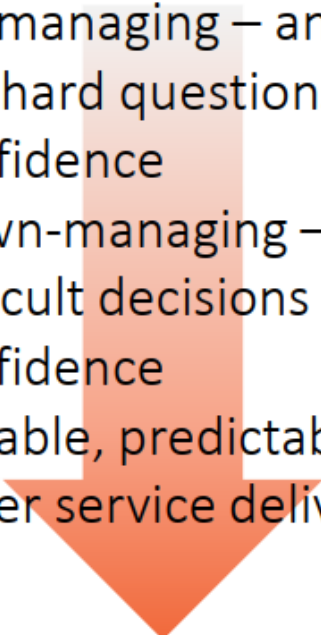
Motivation For The Kanban Method (The Kanban Agendas)

Line-Level, Individual Contributors

- Relief from overburdening
 - Produce better quality
 - Take a professional pride in their work and customer satisfaction
- 

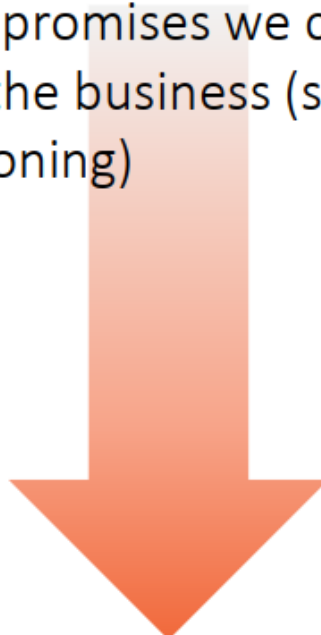
SUSTAINABILITY

Mid-Level Management

- Up-managing – answer the hard questions with confidence
 - Down-managing – make difficult decisions with confidence
 - Reliable, predictable, faster service delivery
- 

SERVICE ORIENTATION

Senior-Level Management

- Make promises we can keep
 - Lead the business (strategy, positioning)
- 

SURVIVABILITY

What does Kanban mean?

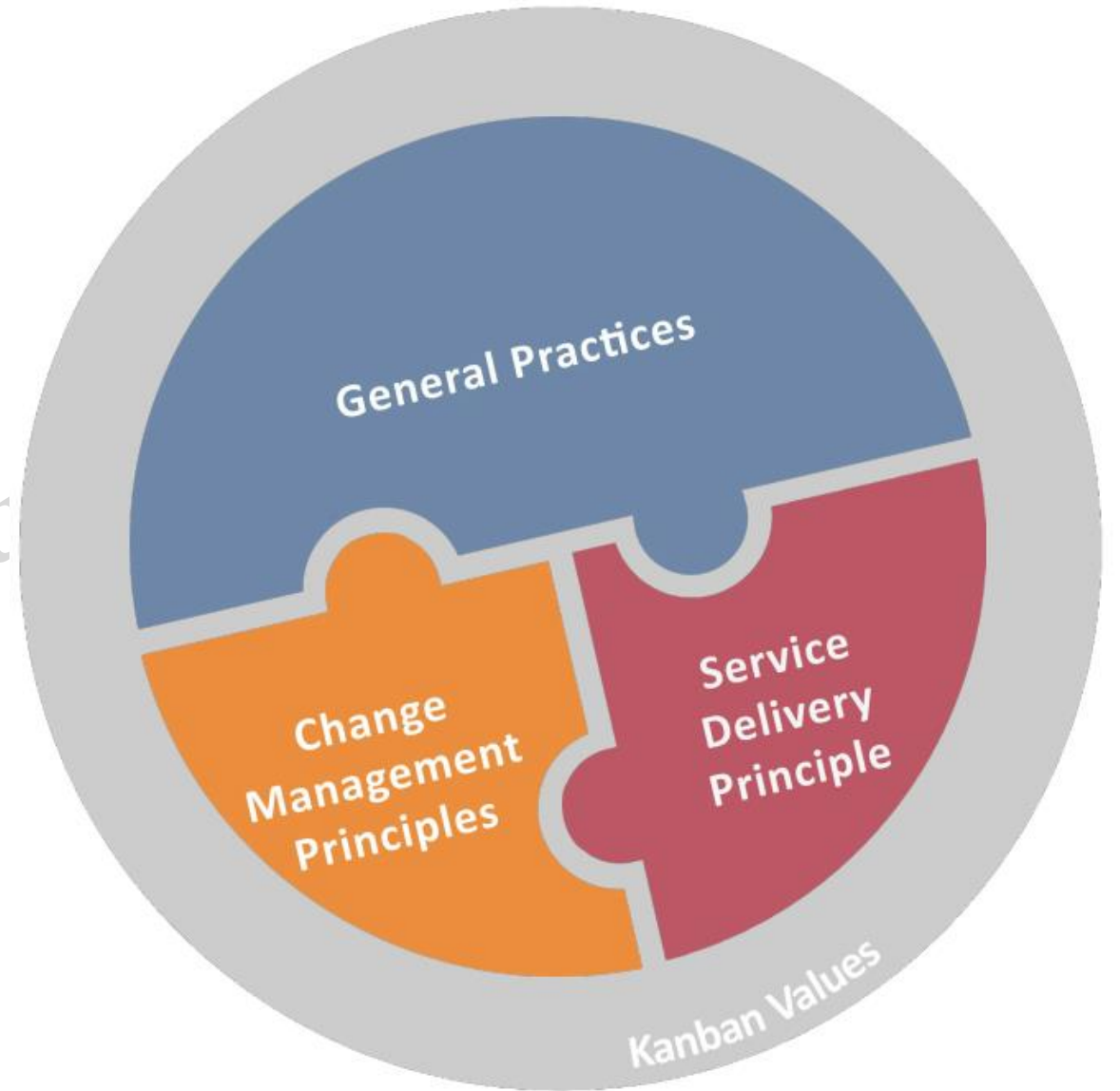
A Kanban System consists of a quantity of “kanban” (かんばん) signal cards in circulation.



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Elements of the Kanban method

Do not Disturb



Kanban Method Principles

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Change Management Principles

1. Start with what you do now
 - Understanding current processes, as actually practiced
 - Respecting existing roles, responsibilities, and job titles
2. Gain agreement to pursue improvement through evolutionary change
3. Encourage acts of leadership at all levels

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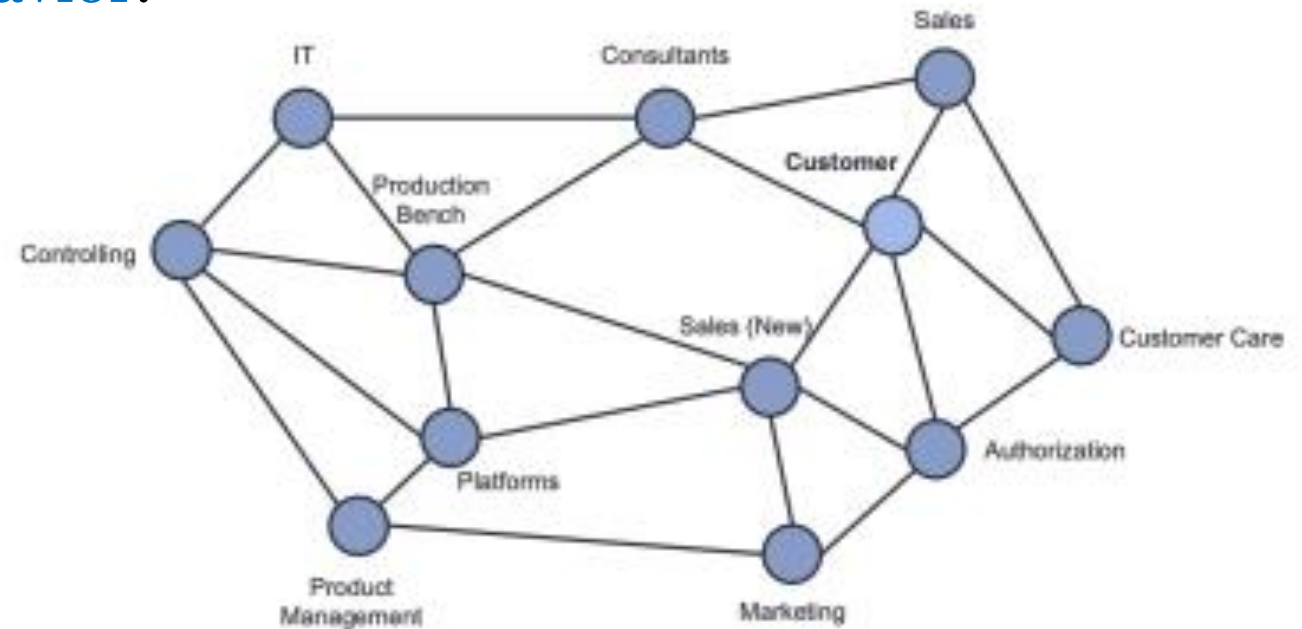
What is a Service?



Service Delivery Principles

Your organization is

a network of **interdependent** services
with policies that determine its **behavior**.



Service Delivery Principles

1. Understand and focus on the **customer's** **needs** and **expectations**
2. **Manage the work**; let workers **self-organize** around it
3. **Regularly review** the **network** and its **policies** to **improve outcomes**

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