1. Traditional Lean

Customer Value:
- Quality known per product or customer
- Lead-time – standard (problems covered over with FG, Raw or WIP inventory)
- Price – economies of scale for both raw materials & operations to gain price improvements

2. Identify/map the Value Stream:
- Management of problem solving (A3, 6-sigma, etc.)
- TAKT – std. for customer of type of product
- Value Streams can be fixed long term
- Process Mapping less importance (less lead-time & cost in info. flow)
- Information flow: standard & repeatable
- Lead time: mostly influenced by supply chain & operations

3. Flow – how to create flow across all processes: Value Stream Management
- Pacemaker – heavier operations focus (i.e. level every process to takt)
- Lead-time (can be overcome with inventory)
- SMED
- OEE
- 5S
- Quality

4. Pull – work towards pull & no need forecast (is only a solution when can not arrive at 1 piece flow)
- Planning – plan pacemaker (long CT), manage inventory (Raw, WIP, FG)
- Leveling – small batch, JIT
- Kanban – where you can not reduce change-over, consider Supermarkets for Raw & WIP

5. Perfection – kaizen (continuous improvement)
- Applies to specific products & standardizing before next kaizen step

1. Customer Value:
- Quality (per part/project spec.)
- Lead-time (OTD) – entire value stream (Quote, schedule, purchase, logistics, order fulfill, ship, install/debug, invoice (cash flow))
- Price - maintain & manage against quote
  Profit better understood per project & customer

2. Identify/map the Value Stream:
- Determine which problems deserve the effort to root cause problem solve (ABC)
- TAKT = planning/managing with quoted time
- Value Stream: more flexible as projects/customers change, only by type of part/product (i.e. cross training matrix)
- Process Mapping: more important to improve lead-time (OTD) & cost for entire value stream
- Information flow: varies depending on project type, customer, market
- Lead time (value adding): influenced by workload at every step of information & material flow (less influence w/ supply chain)

3. Flow – how to create flow: push order in & maint. flow
- Bottlenecks:
  Flow of information: real time manage
  Flow of material: manage in real time (day by hour, FIFO boards, etc.)
- Lead-time competitive advantage
- SMED
- OEE
- 5S
- Quality

4. Pull – only a consideration based on ABC (runners, repeaters, strangers analysis)
- Planning – launch based on agreed lead-time, bottlenecks (capacity vs. demand) identified by ‘day by hour’ & FIFO boards
- Leveling – you are already JIT (only applies if you have runners)
- Kanban – only applicable if ABC analysis identifies ‘runners’, can use conWIP?, then apply to raw & WIP (never FG for runners)

5. Perfection -
- Applies to general ‘processes’
- Focus is bottleneck processes
- Heavier focus on lead-time (no FG to hide issues)
- Bottlenecks in both flow of information & flow of material (both have demand vs. capacity issues)
- Lean accounting (Activity Based Costing)
In High Mix / Low Volume
Lead-time is Dramatically Influenced Outside of Operations

High Mix – Low Volume Lean

1. Customer Value:
   • Quality (per part/project spec.), might need to evolve understanding
   • Lead-time (OTD) – entire value stream (Quote, schedule, purchase, logistics, order fulfill, ship, install/debug, invoice (cash flow))
   • Price – maintain & manage against quote, profit varies more by product & customer, therefore require a better understanding per project & customer

Lead-time has less to do with operations

Operations is only a small portion of total lead-time, Therefore Low Volume Lean specialized methodologies focus both on the entire value stream
Takt time & the Pace-maker Principals are addressed with 
Quoted Times & Real-Time Bottleneck management

High Mix – Low Volume Lean

2. Identify/map the Value Stream:
   • Determine which problems deserve the effort to root cause problem solve (Intuitive, ABC, etc.)
   • TAKT = planning/managing with quoted time
   • Value Stream: more flexible as projects/customers change, only by type of part/product (i.e. cross training matrix)
   • Process Mapping: more important to improve lead-time (OTD) & cost for entire value stream
   • Information flow: varies depending on project type, customer, market
   • Lead time (value adding): influenced by workload at every step of information & material flow (less influence w/ supply chain)

Takt Time = \[
\frac{\text{Time Available (per period)}}{\text{Customer Demand (per period)}}
\]

Use your quoted times (your link to the customer) & visually monitor planned to actual time with ‘day by hour’

Pacemaker = Traditionally the process with the longest cycle time, it’s typically based on standard products or product families.

Instead

Identify and minimize the impact of the Bottle-neck in real time
These are a few simple examples of how Lean being applied to

High Mix – Low Volume differs from lean’s traditional applications to

Low Mix – High Volume Scenarios