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THE

MANUFACTURING TRANSFORMATION CHECKLIST

20 things to do when starting a **transformational journey** in **manufacturing operations**

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MANUFACTURING TRANSFORMATION CHECKLIST

This checklist serves as a guide on how to launch a transformational journey in manufacturing operations. This lays out a roadmap on how to generate the strategic operational results and the story you envision as a company and checking off steps in the process along the way.

This guide is broken into multiple sections: Preparation, Current State Analysis, On-the-Job Training, Vision Design, Return Calculation and Timeline. Each section includes details on how to achieve that step and create an intentional and successful Continuous Improvement Programme.

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THE MANUFACTURING TRANSFORMATION CHECKLIST

20 Steps at a Glance

PREPARATION

- ☐ **Choose** the **flows, product families** or **sections** to do the **deep-dive**
- ☐ **Establish** the **project team** with decision-makers from key areas
- ☐ Define an internal **high-ranking sponsor**
- ☐ **Gather** the necessary **data**
- ☐ **Define** SMART **goals**

CURRENT SITUATION ANALYSIS

- ☐ **Visually map** the main flows: **material** and **information**
- ☐ **Collect evidence on-site**
- ☐ **Calculate** the baseline of the **performance indicators** and **analyse collected data**
- ☐ **Identify** the **gaps** with the highest impact on business performance

ON-THE-JOB TRAINING

- ☐ **Review** with the team the **KAIZEN™ manufacturing principles**
- ☐ Understand the **complementarity between procedural solutions** and **digital/ technological solutions**
- ☐ **Share success stories and best practices** from other areas of the company and/or other players in the industry

VISION DESIGN

- ☐ Leverage the current state analysis and KAIZEN™ concepts to **design the new paradigms** for the operation
- ☐ **Design detailed solutions** to improve the metrics defined
- ☐ **Test solutions o**n the shopfloor with prototypes and proof of concepts

RETURN CALCULATION AND TIMELINE

- ☐ **Perform a cost-benefit analysis**
- ☐ Look for **partners/ suppliers for the digital solutions and technologies** to be incorporated in the manufacturing arena
- ☐ **Prioritise** the initiatives with the **highest return on investment** and **shortest payback period**
- ☐ **Define the initiative sequence** based on priority, organised into implementation sprints **of 3 to 6 months**
- ☐ Plan the implementation of **projects in pilot workshops** as well as their **deployment across the plant(s)**

PREPARATION

Observe, define and measure

1. Choose the flows, product families or sections to do the deep-dive

A transformation journey has to start with a narrow scope in order to be effective. The first step should be to prioritise the organisation's processes according to the improvement objectives.

To accomplish with that, the value streams should be listed and quantified in terms of impact on metrics to improve. The value streams in manufacturing environment are, typically, product families or production sections (clusters of equipment performing similar operations).

2. Establish the project team

Organising a constructive and progressive team within your company can be one of the most empowering and valuable moves on your transformation journey.

The participants must have thorough knowledge of the processes, have good analysis capabilities, be open to change and have good decision-making abilities. They should be the leaders from the selected value stream who will be responsible for making the future state design a reality.

The team may include the plant manager, logistics manager, quality manager, maintenance manager, IT manager as well as production supervisors and team leaders.

3. Define an internal high-ranking sponsor

Such a demanding programme needs a high-ranking sponsor - strategically aligned and supported by leadership.

The sponsor acts as champion, supporting the improvement team's methods and solutions, steering and counselling infrastructures and governance to ensure success.

Eventually, the scope and objectives of the programme should be validated with the sponsor.

4. Gather data

Talking with data is a fundamental KAIZEN™ principle, so it all starts with visualising data to gather insights from the current manufacturing reality.

At this stage, the project team should gather data regarding operational performance, demand and production strategy, and organisational structure.

Example:

PERFORMANCE INDICATORS
OEE and downtime
Scrap, rework, non-quality costs
Productivity
MTTF, MTBF and MTTR
OTIF and service level
Set-up time

ORGANISATIONAL STRUCTURE
Organisational chart
Work pattern (shifts) and paid overtime
Staff turnover and absenteeism
Span of control

DEMAND AND PRODUCTION STRATEGY
Demand by product family
Annual sales forecast
Stock of raw material, WIP and finished goods
Production strategy per product family (MTS, MTO, ATO, etc.)
Suppliers - quantity, geographic distribution and frequency
Customers - quantity, geographic distribution and frequency
Description of factory capacity planning and planning execution algorithms
Process bottlenecks

5. Define SMART goals

The key metrics to improve should be defined based on the strategic objectives. The metrics should be relevant, limited, measurable and the targets should be achievable and time-bound.

The goals can be organised in terms of QCD (quality, cost, delivery) impact:

Q

- Reduction of nonconformities
- Reduction of complaints
- Reduction of rework

C

- Increase in productivity
- Increase in equipment efficiency
- Stock reduction

D

- Reduction of lead time
- Increase in flexibility of response
- Improvement of service levels

II CURRENT STATE ANALYSIS

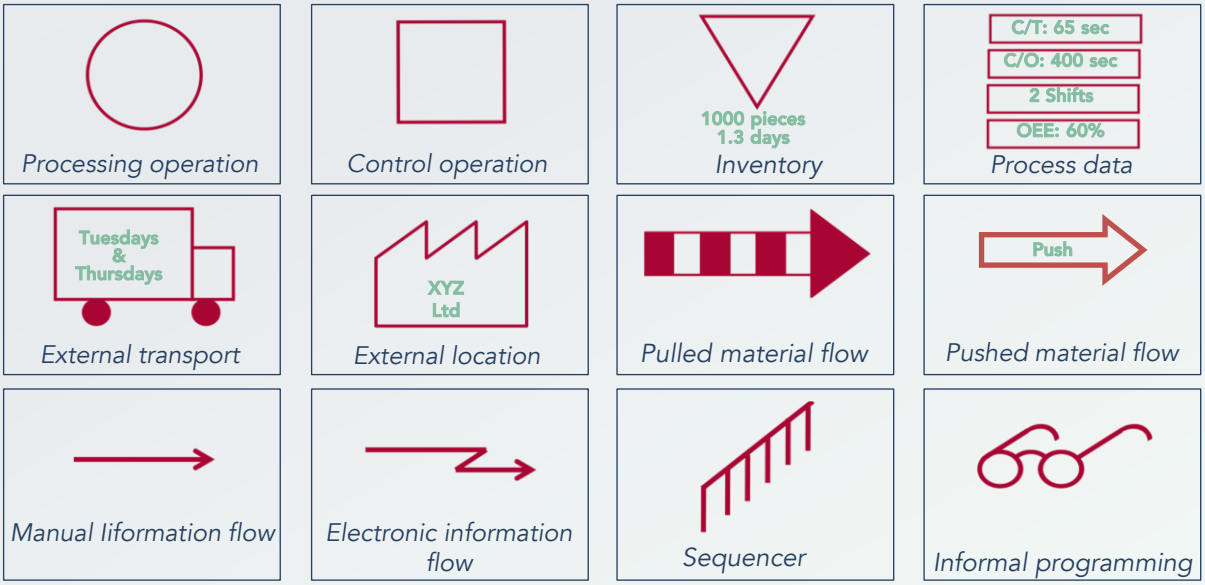
Identify the starting point and opportunities

6. Visually map the main flows: material and information

The current state mapping aims to create a comprehensive assessment of a value stream. It is used to identify all steps in the process, highlighting potential flow interruptions.

The course of the two core flow units in a manufacturing environment - material and information - can be mapped using standard nomenclature.

Value Stream Mapping symbols:



To understand the planning process, the information flow should be mapped on top of the material flow. This gives insights on the process lead time as well as helps with quantifying the resources involved, and evaluating the methods adopted for production planning and material sourcing.

7. Collect evidence on-site

Although the Value Stream Mapping is done in a room, this exercise is only complete with perceptions from the shopfloor (Gemba). Collecting evidence on-site is relevant to raise awareness among the project team on existing process waste.

At this moment, three analyses are a must: 1) operators value added/non-value added tasks and unbalanced work, 2) equipment unplanned stoppages, and 3) planned stoppages such as start, changeovers or end of shifts. This all need to be well planned in order to address the critical equipment and operators at the time they are running the respective operations.

8. Analyse collected data

Apart from the initial state mapping, there are some other complementary analyses to perform:

- ABC analysis (quantity and value) of product references and the demand profile;
- Layout analysis detailing means of production, storage and transport;
- Inventory level to quantify the lead time of the supply chain;
- Pareto charts with efficiency and quality losses.

At this stage, the KPIs' baselines should also be established.

9. Identify the gaps with the highest impact on business performance

The last step of the current state analysis is a primary tour of improvement opportunities detected by the team.

Example of opportunities:

High rework time

Downtime due to equipment failures and changeovers

Too much complexity and too little effectiveness in production planning

Difficulty in meeting delivery times

III ON-THE-JOB TRAINING

Understand the sector's best practices

10. Review with the team the KAIZEN™ manufacturing principles

Having a clear vision on 'what a winner looks like' as well as a change mindset is critical to define a breakthrough vision.

The team should be trained in KAIZEN™ manufacturing methods and principles:

1. **Basic reliability**: KAIZEN™ foundations, manpower, machine, material and method reliability;
2. **Production flow**: line and layout design, border of line, standard work, SMED and low-cost automation;
3. **Internal logistics flow**: supermarkets, mizusumashi, synchronisation with kanban and junjo, levelling and production pull planning;
4. **Productive maintenance**: autonomous, predictive and planned maintenance strategies.

11. Understand the complementarity between procedural solutions and digital/technological solutions

To achieve best-in-class performance, management and technology must work together. Understanding the complementarity between procedural improvements and technological solutions is key to leverage business operations digitally while avoiding waste automation.

Example of KAIZEN™ and digital solutions to consider:

- *Digitisation of reception flows and dispatching of goods;*
- *Real-time data capture to shorten event-to-action lead times;*
- *Automation of operational tasks: material handling, internal logistics, storage, unloading of trucks, quality control;*
- *Use of data analytics tools for predictive analysis and process optimisation.*

12. Share success stories and best practices from the other areas of the company and/or other players in the industry

As an inspiration for vision design, analysing benchmark cases is highly recommended. This can be done internally or looking for best practices in the industry. This is relevant, not only in terms of solutions implemented, but also to understand the path trailed by forerunners and their lessons learned.

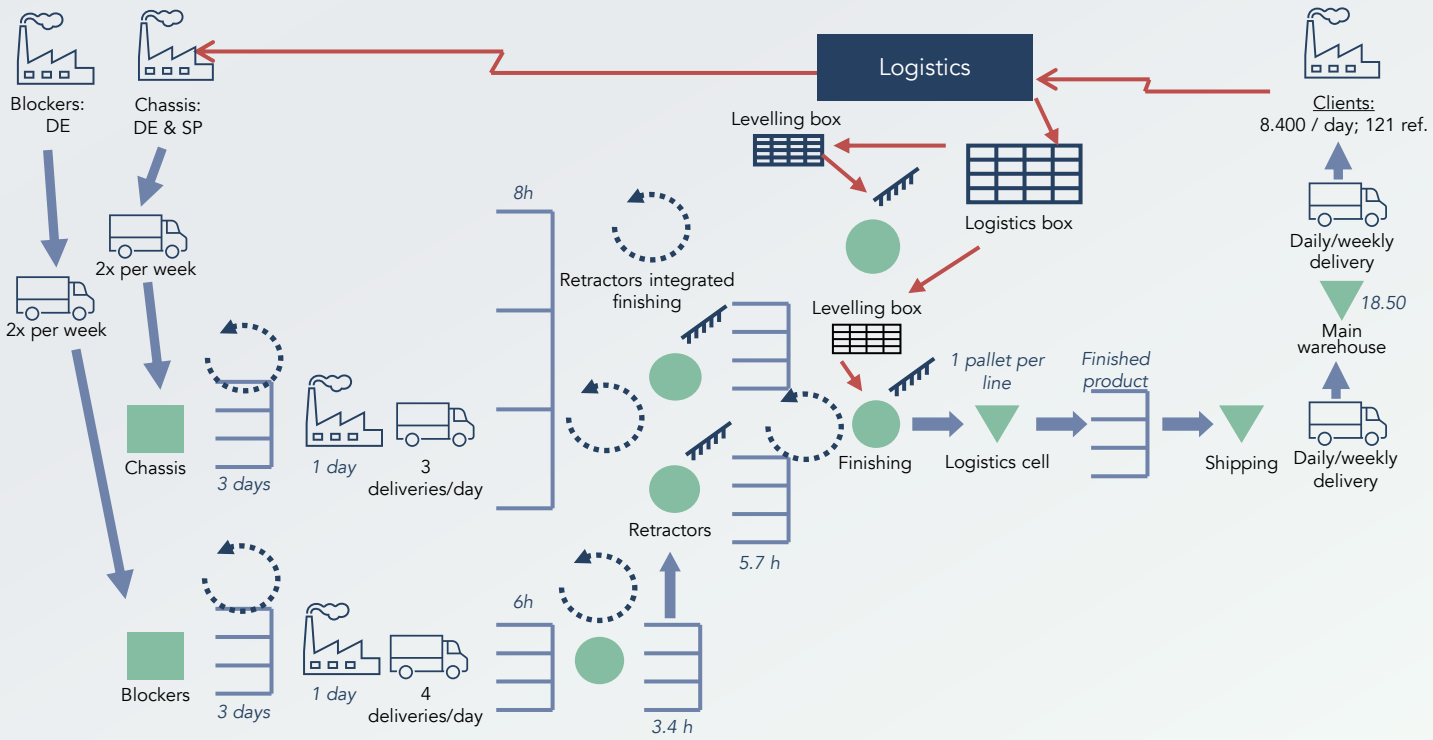
13. Design the new paradigms for the operation

Once the current state has been mapped, data confirmed and knowledge shared, the team can design the future state. The ideal state has zero waste and no constraints as well as perfect flow, world-class quality, low cost and on-time delivery.

The vision should be designed with the following disruptive principles in mind:

- Creating production flow: high productivity and high flexibility in changeovers;
- Clear internal logistics loops: levelled and synchronised;
- Production pull planning: strategy, capacity and execution;
- Source flow strategy: involve suppliers to maximise results;
- Sustainability: environmental sustainable operations.

This is the time to identify, visualise and break down the paradigms disrupting the ideal vision, which implies a change in the way of thinking. The result is the future state map of the value stream that incorporates clear solutions for the improvement opportunities identified previously.



14. Design detailed solutions to improve the metrics defined

To prepare an accurate business case and align expectations among the project team, it is crucial to detail the solutions that ensure a transformation from the current situation to the vision designed.

To feature solutions, the following information should be compiled: problem(s) to be solved, KAIZEN™ tool and/or digital solution, metric to improve and improvement potential.

15. Test solutions in the shopfloor with prototypes and proof of concepts

It is normal to have some questions about the applicability and/or success of some solutions identified. Teams should make a tests plan to validate concepts, such as SMED time saving potential, line mock-up, pull flow simulation, mizusumashi route simulation, etc.

This can be done through prototypes, in-field measurements or simulations.

V RETURN CALCULATION AND TIMELINE

Quantify and plan | From vision to action

16. Perform a cost-benefit analysis

For each solution, it is advisable to make a list of needed investment, calculate financial benefits and determine the return on investment. Moreover, intangible results should also be considered.

There are some solutions that are enablers and should not be put away just because it is not possible to determine their ROI. Example of this kind of initiatives are online data capture or daily management routines.

17. Look for partners/suppliers for the digital solutions and technologies to be incorporated in the manufacturing arena

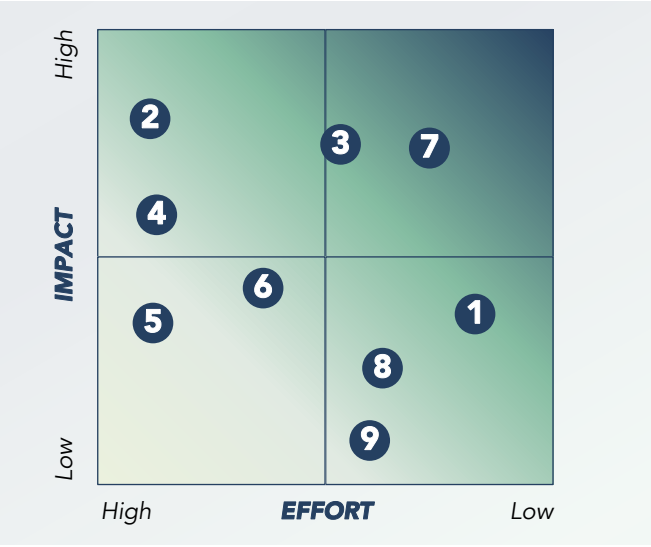
Most digital solutions have multiple variants supplied by different suppliers. In these cases, to prepare an accurate business case, the team should analyse the available options and narrow down the improvement concept. This is critical to fix the investment range and establish requirements for further developments.

18. Prioritise the initiatives

Solutions, which are most likely to impact targets to improve and that require less effort, should be given priority.

To sort initiatives, the team can place them in a priority matrix.

- Low effort/high impact - **quick-wins**
- High impact/high effort - m**ajor projects**
- Low impact/low effort - t**hankless tasks**
- High effort/ low Impact - a**ction cancelled**



19. Define the sequence of initiatives and organise into implementation sprints

Combining priority solutions into workshops or KAIZEN™ events is one of the last steps. Each workshop should have one leader and multidisciplinary team, well-defined duration and clear goals, and focus on a specific topic/ process to improve.

To ensure a successful execution of disruptive improvements and to maximise attained results, KAIZEN™ events should be run in sprints of 3 to 6 months depending on the organisation's maturity and culture. Therefore, ultimately, workshops are sorted in sprints. Typically, a broad manufacturing transformation takes 1 to 2 years, which means planning around four sprints.

20. Plan the implementation of projects in pilot workshops as well as their deployment across the plant(s)

The final step is building the project roadmap. Change never comes easy, so the projects should be organised to change, at first, a process or area that acts as a pilot. After the proof-of-concept, the deployment plan can be activated.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