



# 6 TIPS FOR PRODUCTION MANAGEMENT THROUGH DIGITALIZATION

**PINJA**

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# To the Reader

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This guide is aimed at those interested in the increasing of production efficiency and digitalization. In it, we explain how digitalization can aid in production management and present 6 tips for the digitalization of production.

In our view, digital solutions and tools aimed simply at developing production offer no shortcut to productivity growth. The change also requires management based on real-time information, procedures in accordance with the Lean model, and at least some adjustments in organizational culture.

**Wishing you productive studies,**

**Pinja**



**PINJA**

**THE DIGITALIZATION OF PRODUCTION  
INCREASES EFFICIENCY BUT  
CANNOT REPLACE HUMANS**

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**PINJA**

# The digitalization of production increases efficiency but cannot replace humans

Digitalization is the order of the day, and some may even find it slightly intimidating. What use will I soon have in the face of increasing machinery and technology?

In fact, digitalization is impossible to achieve without a human touch. Although, the digitalization of production is done through various systems and automations, these are just tools implementing digitization and getting more power out of existing production machines.

In addition to these, the role of the employee should be kept in mind throughout the process. For example, an implemented system is prolix and difficult to operate, its use is easily forgone and any benefits the system could provide are left unattained. **In such a situation, the employee, the human has been forgotten.**

It is important to keep in mind that not all data can be extracted directly from a machine. For example, if the machine's operator has not kept a record of quality deviations or the causes for line stoppages, information get lost and does not coordinate action and development forward.

Once the same information is collected in digital form, the reporting and filing of data as well as the timely utilization of archived information is made easier. The operator has a vital role in recording their observations and comments.

# Industrial IoT and people

The industrial IoT is one of the current global megatrends in digitalization, but it actually has to do with matters that have already been relevant for a long while.

Since digitalization cannot be implemented without humans, it should be asked how that which is happening in cyberspace relates to hands-on work. Connecting people to the industrial internet allows for some human features in the otherwise so seemingly inanimate digitalization. How to make everything function according to the desired model, while taking into account any human errors?

New operating models are always met with some degree of resistance, before the new procedure becomes routine and an integral part of the daily management of production. Digitalization and the

various system solutions may at first feel difficult to use and learn. New procedures can also raise suspicion. These are all normal thoughts and feelings related to change.

Instilling digitalization as part of daily operations is easier when everyone is aware of the common objective and the purpose of the new operating model. On the other hand, the system operators should be made aware of the current model's shortcomings and problems, such as causing the unnecessary chasing of fires and reductions in indicators that affect the employees' performance bonuses.

Once the data received through digitalization and the new operating model is automatically accessible for analysis and used in developing production and management, production indicators are also directly influenced.

# 6 TIPS FOR PRODUCTION MANAGEMENT THROUGH DIGITALIZATION

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# 6 tips for production management through digitalization

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This chapter introduces five practical tips to help you improve the efficiency of your production management through digitalization.

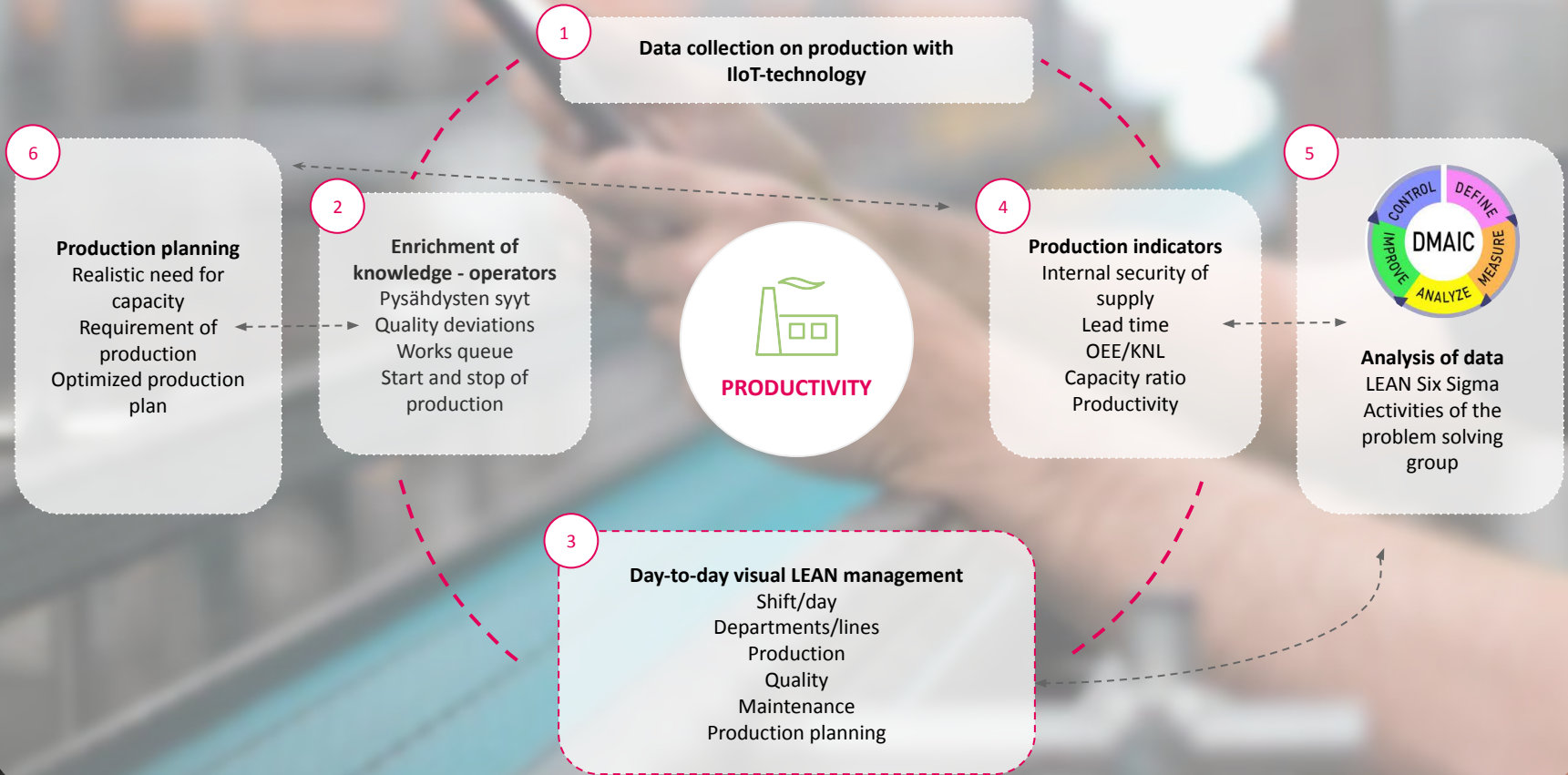
**Our 6 tips are:**

1. Use IIoT to its fullest
2. Actively collect data on productions
3. Lead with knowledge every day
4. Know and identify production meters and indicators
5. Invest in analyzing collected data
6. Bring production planning into shop floor management





## Digitalization of production - Lean daily management loop



# Analyze the current situation and set your objectives

Projects in production development and digitalization should always begin by analyzing the current situation and setting up objectives.

- What is the situation, and what should it be?
- How is the desired goal achieved?
- Which things should be changed?
- How should the results be measured?

As the digitalization of production is not achieved overnight, suitable intermediate objectives should be set for the process. These objectives are recorded and carefully reviewed with possible stakeholders such as system suppliers, other experts and naturally also with the company's own people.

**Examples of tangible objectives for a digitalization of production project:**

- Implementing real time production planning
- Implementing automatic data collection
- Mining “big data” from production for defined purposes
- Implementing Lean production and reducing wastage with the help of factual information
- Utilization of automatic reporting
- Efficient integration of different factory systems
- Visualization of data and various indicators
- Organization-wide transparency of data

# The "to be" operating model

Before starting any type of digitalization and development project, the analysis of the current situation is well supplemented with a future "to be" operating model and the steps required to achieve this. Defining such an operating model is not obligatory, but it is often proven to be useful.

One should keep in mind that even if digitalization is achieved but the employees' operating model remains unchanged, then the final goals cannot be reached and thus will not translate as positive development of production indicators.

In addition to technical changes, the required adjustments to for example reporting, roles, responsibilities and other practical matters should be carefully determined and documented.

- Analyze the current state for example by mapping it.
- Define the objective, and list all problematic procedures discovered during situation analysis.
- Create a target-oriented task list for example by defining a manager and a target time for each task. This will ensure that the change stays on track, and allows planning a schedule for testing the objective.
- When testing the objective, it is useful to monitor task times and list the new development targets.
- After testing the objective, re-evaluate the functionality, challenges, and success of the new process.

# 1. Use IIoT to its fullest

The digitalization of production and the industrial internet (IIoT) have to do with connecting production machinery as part of a network, i.e. the internet. With a unique IP address, machines are able to identify themselves in the network. This has been discussed at length under the IoT title, which refers to the internet of things. The industrial internet deals with the same matters from the point of view of industrial technology. People and processes are also an integral part of the industrial internet.

It is a common misconception that all data necessary for improving production efficiency can be attained by simply plugging into a machine. Data is needed from production machines, equipment, lines and other systems, but the information received from the operators, i.e. production employees themselves as well from management is also vitally important for the purposes of development.

When the digitization project includes the input of production line operators, any causes for stoppages that go beyond technical malfunctions can be identified. The operator may register the cause for a wait, such as a shortage of materials or other operative reason, to supplement information received automatically from the machine.

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## 2. actively collect data on production

With the help of a well-functioning data collection system, it is possible to draft reports, acknowledge operator maintenance work and perform 5S audits, in addition to data collection and monitoring.

### What data is worth collecting?

- Causes for malfunctions and stoppages
- Product switching times: target vs actual
- Deviations related to quality inspections
- OEE/KNL

### 3. Use data in daily management

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More than simply connecting machines to a network, the digitalization of production has to do with the data received through the IIoT, and **especially what this data is utilized for.**

The analysis of data and its use in management are the most important steps of the project. When, for example, the data collection system has supplied the top 5 causes for production line stoppages and this data has been analyzed as precisely as possible, it is then time to decide what action should be taken against such causes.

According to the Lean shop floor management model, the decision-making and analysis of the production state are done where production takes place: at the shop floor level. The fact that data can be visualized, accessed in real-time and collected from different sources is a fruit of digitalization, helping on the spot decision-making.

Lean shop floor management is implemented through routine daily, weekly and monthly production meetings. A common form of these is the brief "standing meeting", which utilizes visual and real-time data in accordance with a standard model.

In these daily meetings, the collected data also brings attention to any problems that require action. It is not always possible to solve matters on the spot. In such cases, it is best to transfer the issue to a separate problem-solving team.

## 4. Know and identify production meters and indicators

At the start, we set the objectives for a digitalization of production project. Production indicators or KPIs are a useful way to monitor the achievement of objectives and help further improve operations.

In previous sections, we have already referred to the role of production operators in implementing digitalization. The task of monitoring indicators in the short or long term should not fall solely to the company or production management.

Select the most important indicators for your company that can be monitored for example at the weekly or monthly level. Take also into account which indicators are suitable for monitoring at the operator level. They are interested in for example the difference between planned and actual production of their machine or line.

Long-term indicators reveal the overall direction of operations, while short-term meters such as turnover time show how well things have went today or this week.

**Common production indicators are:**

OEE/KNL

### **Productivity**

Ratio between produced goods and availability, e.g. kg/h or pc/day etc.

### **Internal delivery reliability**

Ratio between actual and planned production. Internal delivery reliability shows how reliable the production is at delivering orders to customers by the deadline confirmed at the time of order.

### **Turnaround time**

Turnaround time indicates the time required from receiving an order to its delivery to the customer.

### **Capacity utilization rate**

Utilization rate % =  $\frac{\text{Capacity utilized}}{\text{Theoretical maximum capacity}} \times 100$

## 5. Invest in analyzing collected data

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The analysis of data requires, besides good and reliable data itself, a person to perform the task. In addition to data collected from systems, a wealth of know-how and experience from previous situations can be found from production employees and management.

In accordance with the Lean shop floor management model, any problems that for example cannot be solved in shop floor meetings are transferred to a separate Lean Six Sigma problem-solving team for analysis and investigation.

Once data collected from production is analyzed systematically, it may for example come to light that line stoppages always have the same causes.

These causes may prove to be too substantial for any immediate fix, but on the other hand, problems have a tendency to escalate if not actively dealt with. For such challenges, the appropriate solution is the problem-solving team. Through routine use of the team, it is possible to achieve significantly lower expenses and greater productivity growth.

The problem-solving team's operations may, for example, yield justifications for the procurement of new equipment. It is easier for management to address an investment proposal when it has access to collected and analyzed data to aid in decision-making.

# Lean Six Sigma problem-solving method

In accordance with Lean, the objective of Six Sigma is to eliminate wastage and product flaws by reducing any fluctuation and operative errors present in the production. The Six Sigma *DMAIC problem-solving method* is used to assist the Lean model in solving problems.

**The phases of the DMAIC tool are:**

## **Define**

In the define phase, the production process is described as precisely as possible and any current problems in production are identified. The goals for the project are also set in this phase.

## **Measure**

In the measurement phase, problems that have been found are confirmed and the potential causes of the problem are identified with the help of data collected from production. The quality and reliability of the collected data are also ensured during the measurement phase.

## **Analyze**

In the analyze phase, data collected during the measure phase is put to use. Through careful analysis of the collected data, it is determined which factors in the process are causing the problem.

## **Improve**

The analyze phase results in identifying the causes of a problem, and the improve phase sets out to solve these. With improvement, fluctuation in the process is put under control and within the target range.

## **Control**

The final and often most difficult phase of the Six Sigma project is the control phase. In practice, this means directing the process in such a way that allows the achieved state to be sustained even after the improvement project.



# People are the core of Lean operations

One of the founding principles of Lean is that it is the task of every employee to produce both value to the customers and revenue to the company. Empowering employees and enabling autonomous decision-making, within budget limits, are tested methods of improving efficiency while increasing the staff's motivation. Through these means, coping at work is also improved and with it, the well-being of employees.

When a separate authorization is not needed for every small procurement or decision, results can be delivered faster and more efficiently. Once all required information is accessible to everyone, people can manage their own work with the help of existing data.

One goal of Lean production is shortening turnaround times, and this is achievable when decisions can be made on the so-called grass roots level and the processes are not too lengthy. In order to bring decision-making as close to operations as possible, however, it must be made clear to everyone where their responsibilities lie and what is the allotted budget.

## 6. Bring production planning into shop floor management

Changes in orders, products, practices, and supervision are very commonplace, and therefore knowledge-based production management requires a shift from reactive production planning to proactive management.

To achieve this, the production plan must always be based on accurate current information on product stage and change times as well as capacity. This is the only basis on which a reliable production plan can be built and the impact of any changes on it verified.

*Example:* A production plan is based on an average changeover time of 30 minutes, but in reality it takes 45 minutes to change certain products. When there are several such shifts for the same week, for example two a day, the difference in capacity is already considerable: 3.5 hours a week.

On the other hand, if production is planned solely through parameters, but resources are not sufficiently taken into account, the production plan itself may cause downtime. This happens if, for example, several machines are set at the same time or if several settings are made during evening and night shifts.

It is a good idea to bring production planning into shop floor management. A daily production management meeting brings transparency between the management and the production planner, and reveals possible needs for change. This will result in production planning that is more accurate and able to respond faster to changes.

### Good production planning:

- Accurate stage times for products
- Realistic picture of capacity
- Making changes is controlled
- Transparent for everyone
- Clear and understandable goals

# Questions to consider

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- How well are you aware of the actual situation in production?
- Can you allocate resources optimally?
- Is your production schedule based on actual stage times?
- How quickly can you cope with changes?
- Do you spend your days putting out fires?

# PINJA

A competent partner should be selected to aid in implementing digitalization. We offer system solutions for improving IIoT, production efficiency, maintenance and Lean daily management to the manufacturing industry. Our Operational Excellence concept focuses on improving productivity and day-to-day management through data digitization and visual management. At its best our customers have **increased productivity by 30%** with the help of our systems.

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