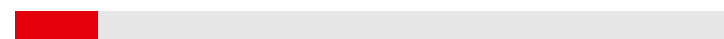


Elevating excellence:

AI drives continuous improvement



AI: WHERE IS IT?



Find out more information about AI in industry from the Mitsubishi Electric's podcast: **"AI: Where is it?"**.

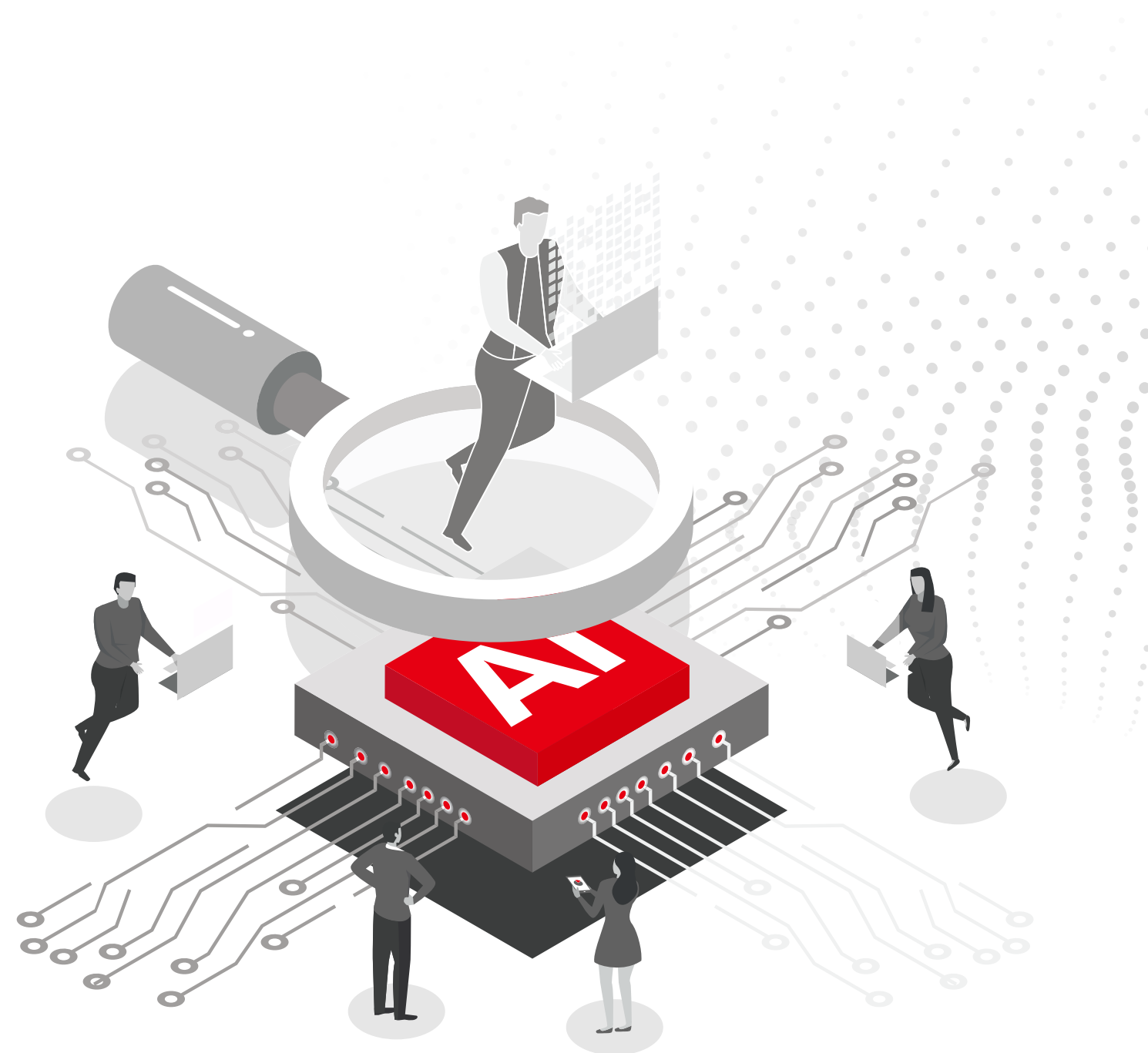


Table of contents:

- » Tailor-made solutions: the key to delivering the best AI tools
- » The simplicity in complex solutions
- » AI for every kind of industry
- » Kaizen or continuous process improvement
- » How to put Kaizen principles into practice?
- » 10 Kaizen principles
- » Small steps – the SMKL philosophy
- » The SMKL – evolution, not revolution
- » AI in the spirit of SMKL
- » AI development step-by-step

Tailor-made solutions

The key to delivering the best AI tools

For decades, Mitsubishi Electric has supplied customised industrial automation and robotics solutions. A complicated implementation is successful only when prepared based on an analysis of the customer's needs.

New components – production lines, automation or robots – will seamlessly integrate with the existing infrastructure and meet technology or process requirements only when carefully selected and configured.

Engineers engaged in the following activities must take special care concerning:

- programming PLCs (Programmable Logic Controller)
- configuring SCADA (Supervisory Control And Data Acquisition) software
- automating technological processes
- verifying utility software

Equally important is the acquisition of data that will be analysed by software implementing artificial intelligence.



The simplicity in complex solutions

Mitsubishi Electric prioritises designing devices and software for simple, intuitive configuration and implementation with low chances of occurring mistakes.

The challenge with artificial intelligence goes beyond designing a user-friendly interface. The crucial aspects include:

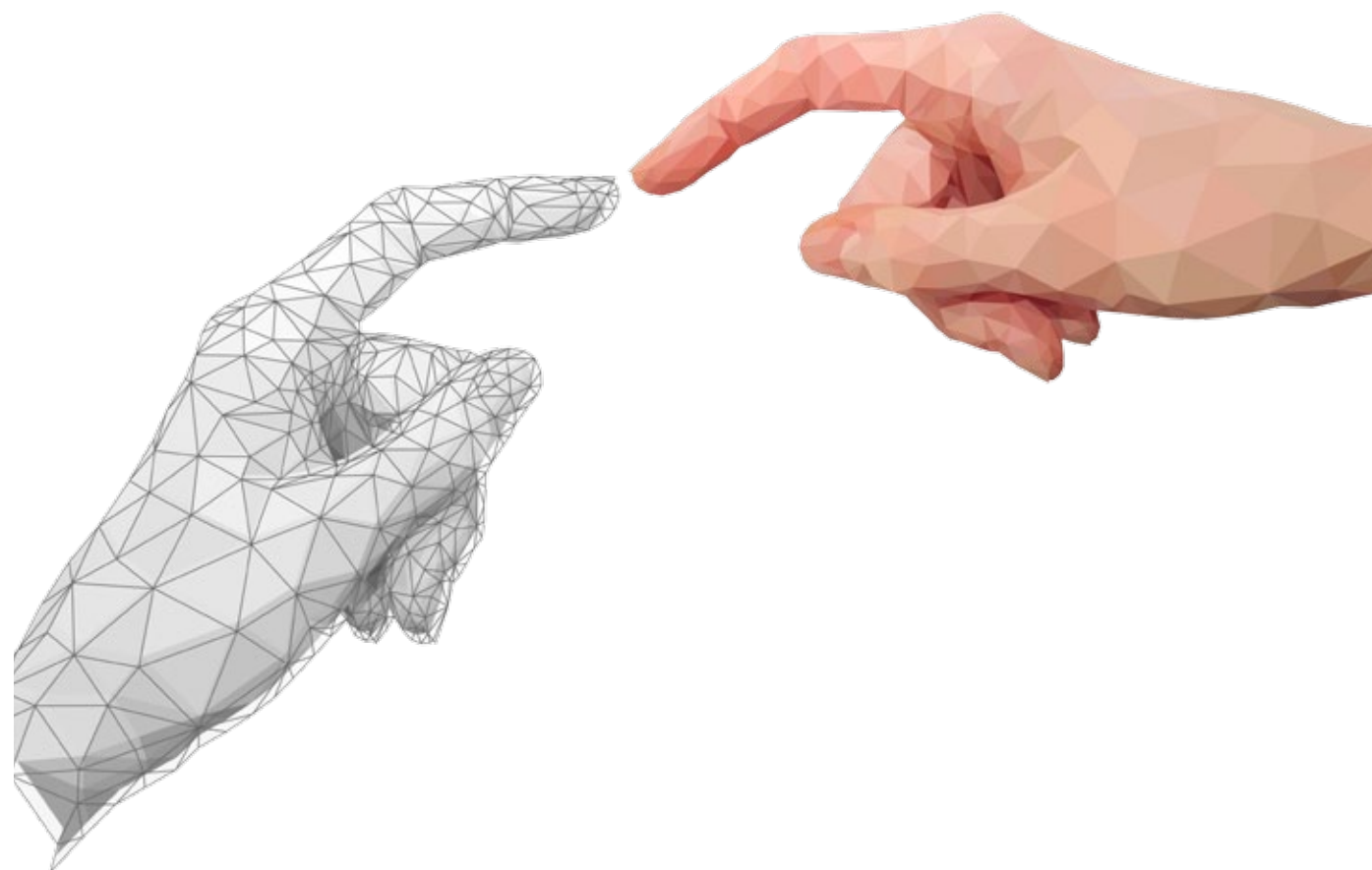
- AI is used to find correlations among data in large sets.
- Data nature, recording methods and relationships may vary, even for identical equipment or lines built to a single design. due to nuances in software configuration, environmental conditions at the manufacturing plant, worker skill levels etc.



The **MELSOFT MaiLab** analytics suite exemplifies an approach that combines a universal architecture with extensive customisation mechanisms.

The principle is clear: each companies, being unique, requires a tailored solution.

AI for every kind of industry



At the core of **MELSOFT MaiLab** is an artificial intelligence implementation mechanism.

To enable the entire configuration cycle, including on-site learning of algorithms, Mitsubishi Electric uses a unique approach based on experience and knowledge.

This speeds up the algorithm learning process and can run on standard PC architecture computers, eliminating the need for high-performance IT solutions (clouds, computing server farms) and reducing implementation costs.

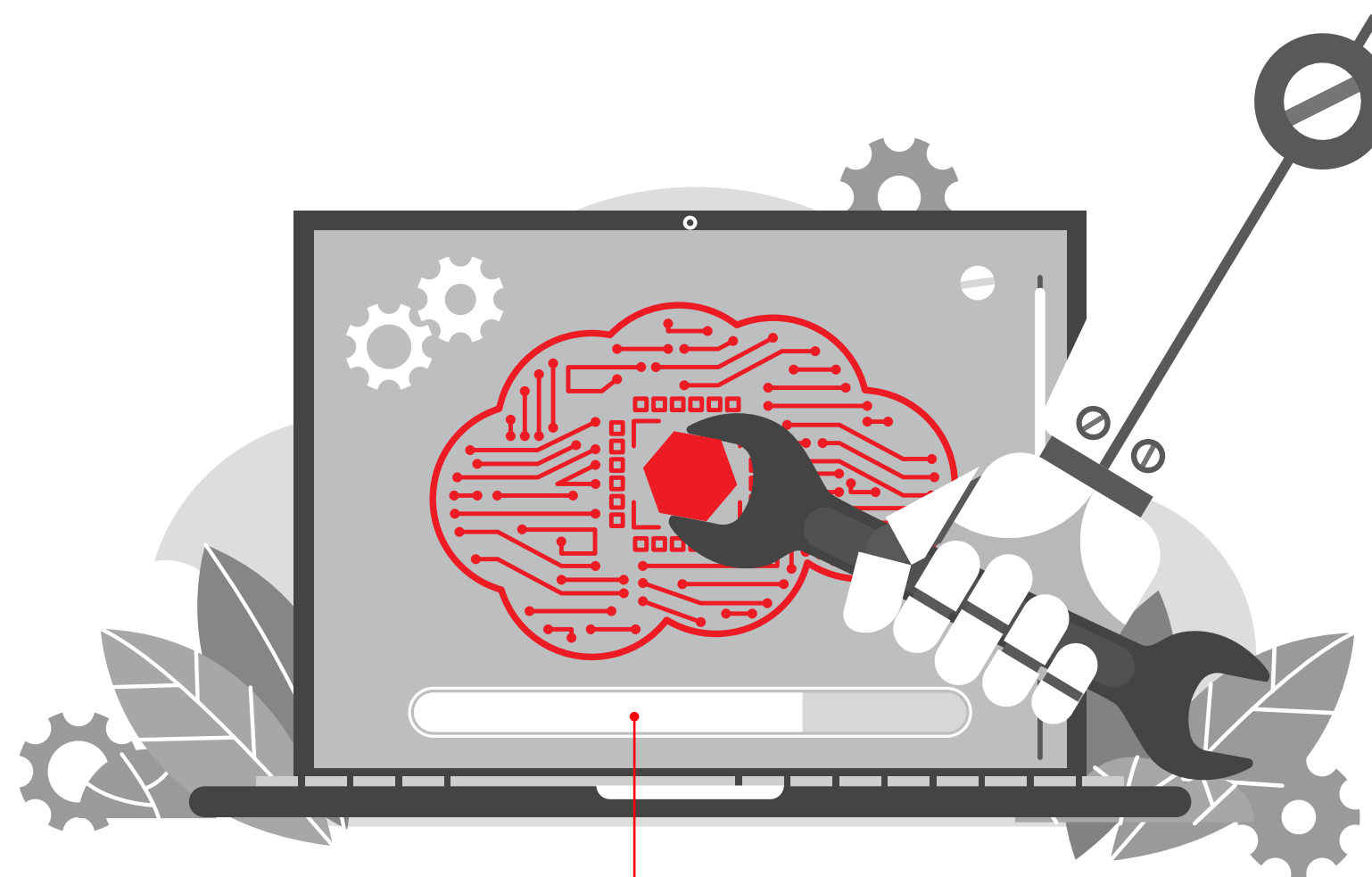
AI for every kind of industry



Find out more information about AI in industry from the Mitsubishi Electric's podcast: **"AI: Where is it?"**.

Performing the AI learning process in a specific factory, combined with extensive customisation of the user interface and the definition of unique reports, makes each AI implementation different.

The result is a personalised configuration that best meets the expectations of the specific customer and closely reflects the stages and complexity of production in their factory.



Kaizen or continuous process improvement

Kaizen, a Japanese philosophy of continuous improvement, is based on constant development in small steps. Applying its principles in business improves efficiency and the quality of products and services.

Kaizen involves all employees in the improvement process, encouraging contributions of ideas to enhance both specific workplaces and the entire system.

Is Kaizen innovative?

Kaizen has a positive impact on company development, but it shouldn't be confused with innovation. Innovation focuses on complex implementations and projects that can provide large technological leap in process functioning.

On the other hand, management according to the Kaizen philosophy, is based on a method of small steps implemented continuously.



How to put **Kaizen** principles into practice?

- Kaizen is **one of the most effective methods of improving competitiveness**, productivity and quality in a company. It achieves this by fostering a culture of continuous improvement at every employee level.
- The improvement process should be guided by **the company's goals and results vision**. Building team competence through training and workshops is equally crucial.
- It is important to develop **indicators to monitor implementation levels** and detect possible deviations promptly. These assumptions of the Kaizen philosophy make it similar to AI algorithms.
- **Kaizen and AI can support organisations in achieving more efficient and competitive operations** through continuous improvement based on data analysis and fact-based decision-making.

Mitsubishi Electric as an industrial automation company attaches great importance to improving its processes, products and services according to the Kaizen philosophy.



10 Kaizen principles

Problems create opportunities

Treat problems or errors as opportunities to improve the machine/process.

Take ideas from everyone

Use your employees' ideas for improvements as they are the ones familiar with the environment in which they perform daily duties.

Reject the status quo

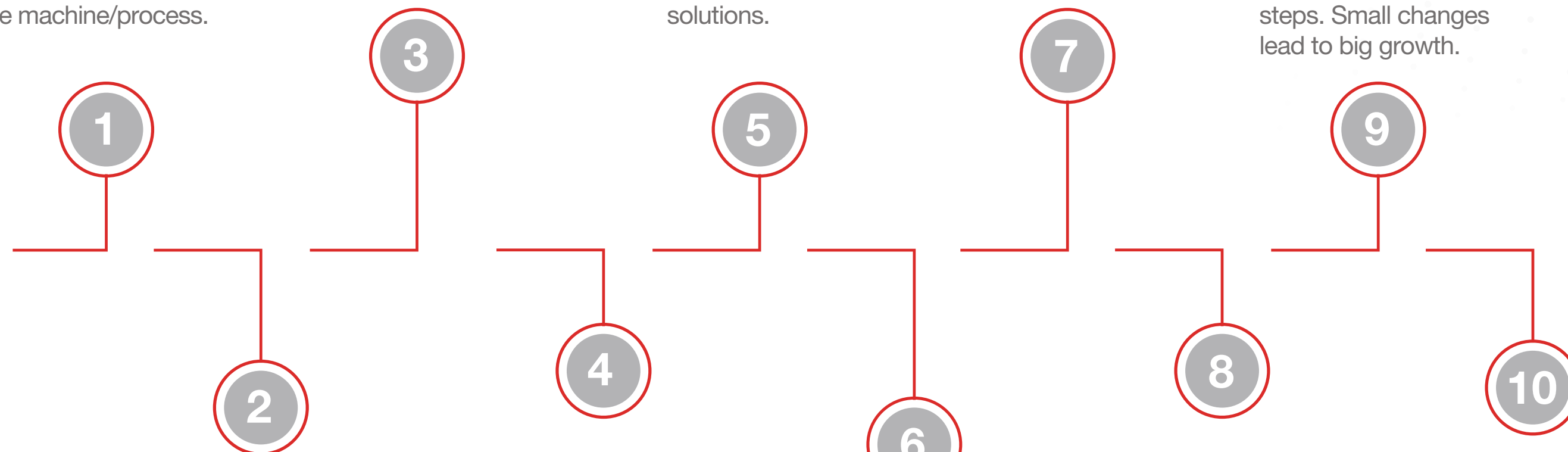
Go beyond the status quo and look for new solutions.

Simple solutions do not have to be perfect

Improvements don't have to be complicated. Sometimes all it takes is a small change to improve a process.

Use cleverness instead of money

No huge budget is necessary to make improvements in small steps. Small changes lead to big growth.



Use the “5 x why” method

Look for the source of the problem. You can use the “5 x why” method to do this.

Propose solutions that can be implemented

Analyse proposed solutions, do not judge them hastily.

Eliminate excuses

Look for ways to make improvements.

Correct on the fly

Monitor the improvements you make and correct mistakes on an ongoing basis.

Improvement has no end

Constantly evolve and look for more solutions that can improve processes.

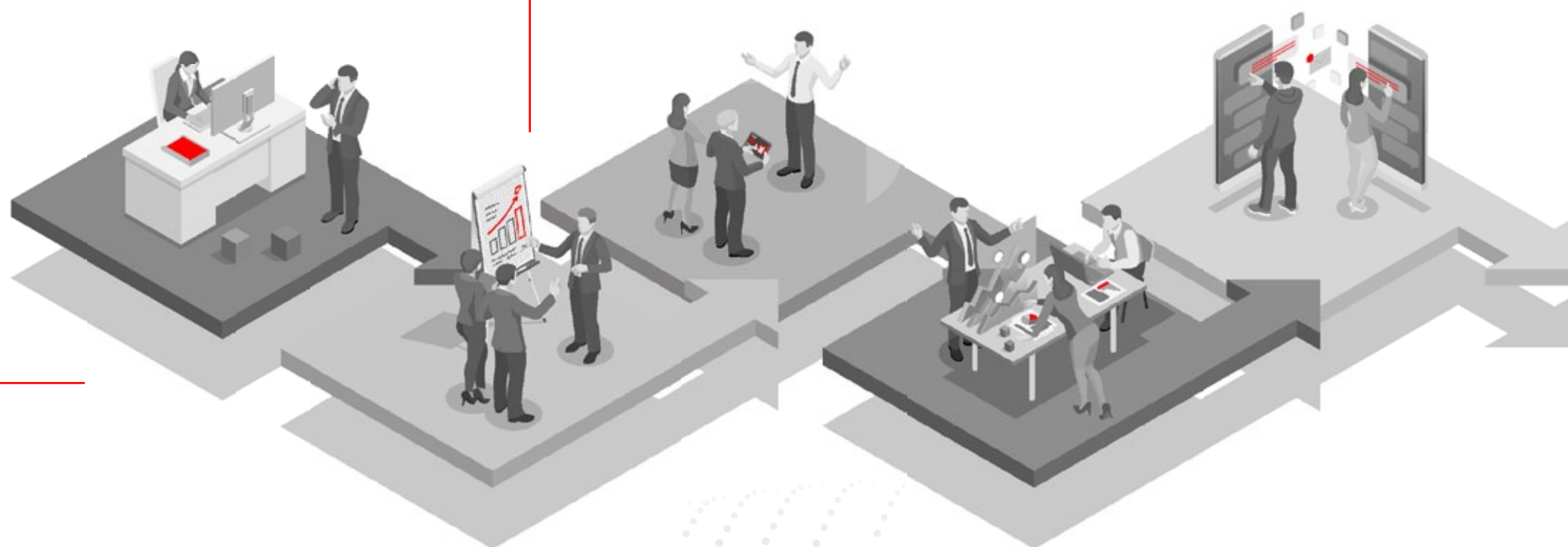
Small steps – **the SMKL philosophy**

Companies aim to enhance profitability, efficiency, and product quality. Mitsubishi Electric utilises **Smart Manufacturing Kaizen Level (SMKL)**. This method allows to analyse the current state of the company, identifies its issues and plans and implements improvements.

The modernisation of manufacturing processes and company operations is ongoing. Constantly evolving solutions and equipment aim to enhance production line efficiency and minimise costs. The gradual implementation of changes in an organisation is facilitated by the SMKL method.

The first task is to collect data

Smart Manufacturing Kaizen Level, based on data, enables improvements to be made at various levels of the organisation and supports management in making the right business decisions.



Small steps – **the SMK**L philosophy

The SMKL method is a very conscious way of introducing change and modernisation.

At the beginning of each project, the company's current situation in terms of resource management and data collection and processing is assessed.

The analysis takes place on several levels:

- individual operator workstation
- production line
- production plant
- the entire production chain

After analysing the situation in each of these areas, the level of implementation that is needed in these areas is determined, based on the four levels of the SMKL method:

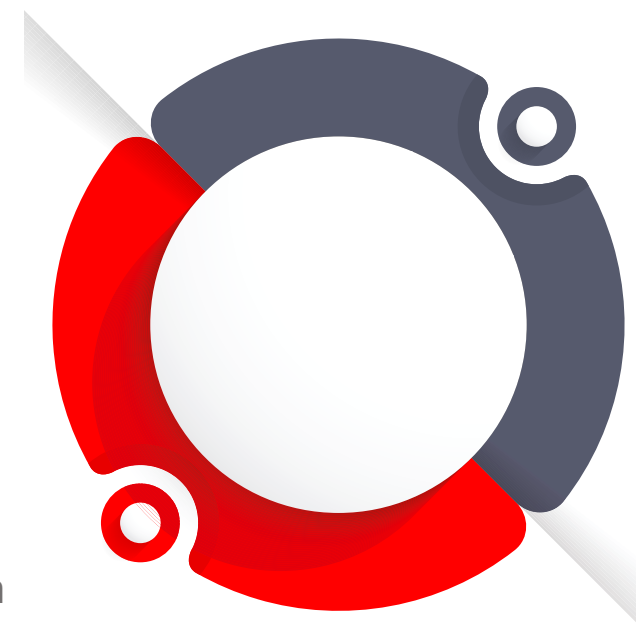
- data collection
- visualisation
- analytics
- optimisation

The SMKL method in practice



**An analysis
on several levels**

- individual workstation
- production line
- facility
- entire production chain



**Planning based
on the four levels
of the SMK**L

- data collection
- visualisation
- analysis
- optimisation

The SMKL – evolution, not revolution

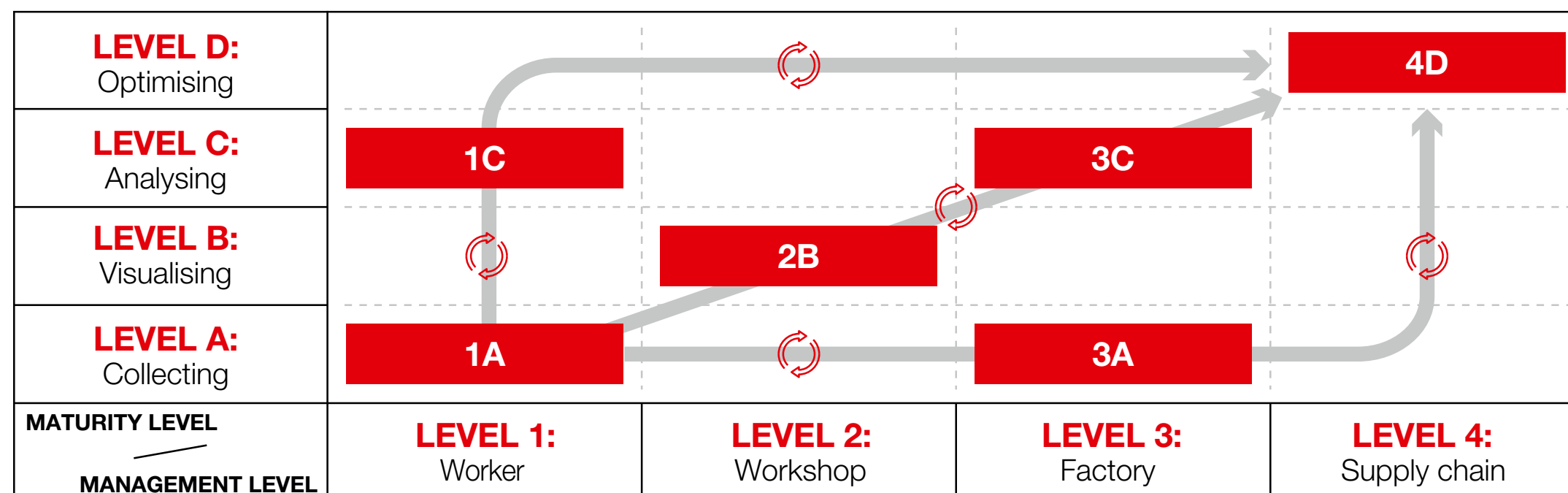
Changes are implemented one at a time, limited in scope, involving a small group of employees with relatively low financial outlay.

With a small scope, individual implementations can be easily monitored, minimising the impact of potential errors. Determining the results and learning lessons contribute to implementing further steps.

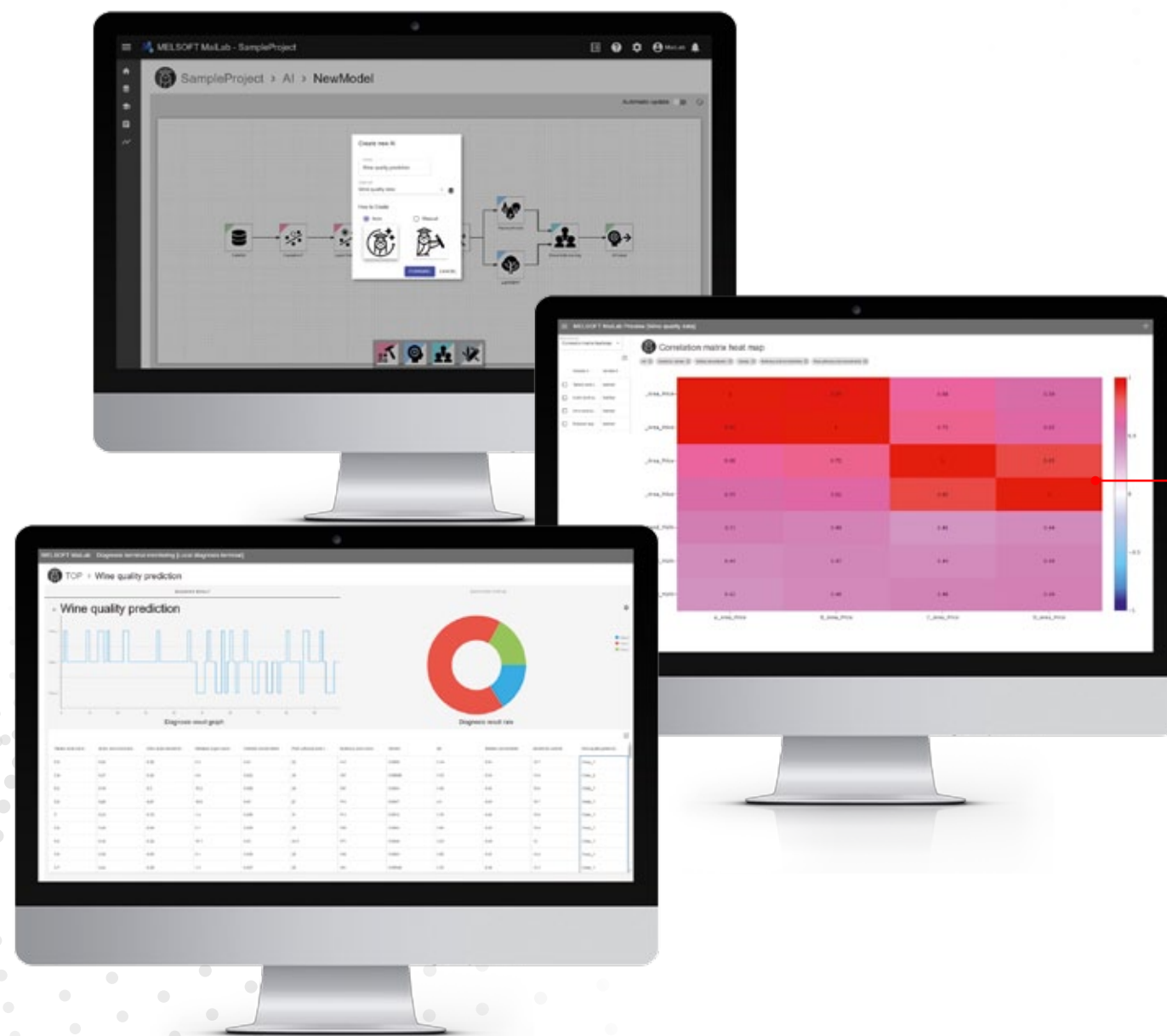
The SMKL method is a universal solution for implementing changes in all companies, regardless of size. It enables continuous process improvement at all organisational levels with minimal financial investment.



See examples of the implementation of the SMKL strategy and how the time spent on training new employees can be significantly reduced.



AI in the spirit of SMKL



Improvement by taking small steps is a method that works in many areas of a company's operations. The SMKL method helps both to improve productivity and reduce costs by implementing improvements on the production line and to apply AI solutions more easily to the same goals.

Artificial intelligence is becoming the answer to more and more business problems. Mitsubishi Electric uses the principles of the SMKL method when developing its AI-based solutions.

Solutions such as **MELSOFT MaiLab** are highly flexible and scalable. They also enable step-by-step improvements to be implemented in a way that is tailored to the company's current needs.

AI in the spirit of SMKL

MELSOFT MaiLab

- Is an **innovative tool** for analysing real-time and historical data collected to support businesses in improving their efficiency and productivity and enabling cost reduction.
- It is an **intuitive platform** that uses artificial intelligence (AI) and machine learning to automatically optimise and maximise equipment monitoring, visibility and diagnostics.
- Is **very easy to install** and intuitive, so it can be used by employees with different levels of experience.
- Can also be a **tool to facilitate knowledge transfer** between the most experienced specialists and operators and the new generation of employees.



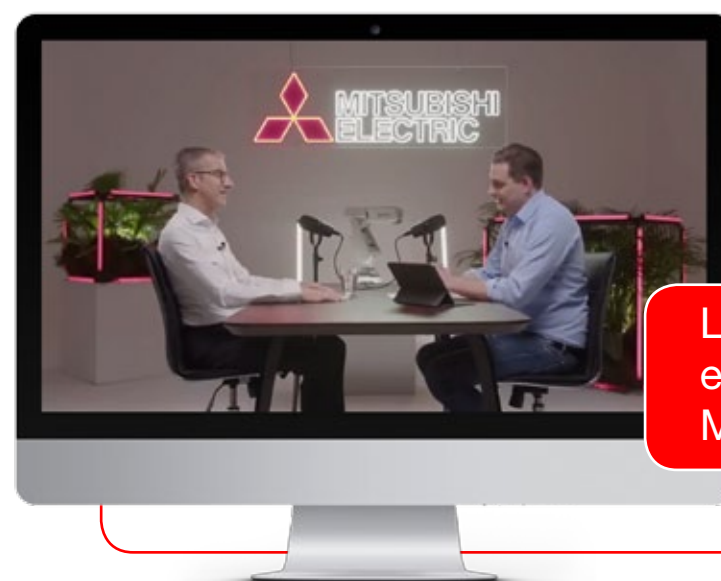
AI development step-by-step



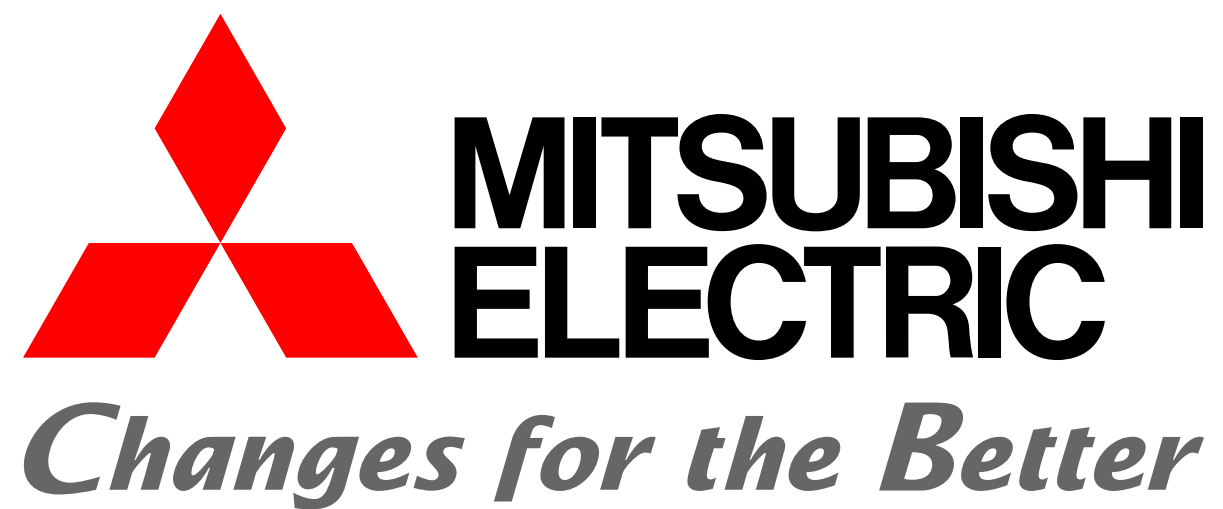
The **MELSOFT MaiLab** tool is designed in the spirit of SMKL:

- **it allows changes** to be made in small steps
- **it evolves** with the customer's expectations and needs
- **it can be extended** with additional functions

It is also a very flexible solution: employees without expertise in the field can use the automatic AI functions to guide the user step-by-step, while specialists and data analysts can make a number of changes manually. All this ensures that **MELSOFT MaiLab** evolves with the needs of the company and its employees.



Listen to what our experts have to say about MELSOFT MaiLab.



<https://emea.mitsubishielectric.com/en/>