Solid, rapid and efficient adoption of Data, AI & Robotics applications in production

SoliDAIR Training program
Phase 1: Awareness workshop

Introduction to Artificial Intelligence in Manufacturing

Funded by
the European Union

Workshop Objectives

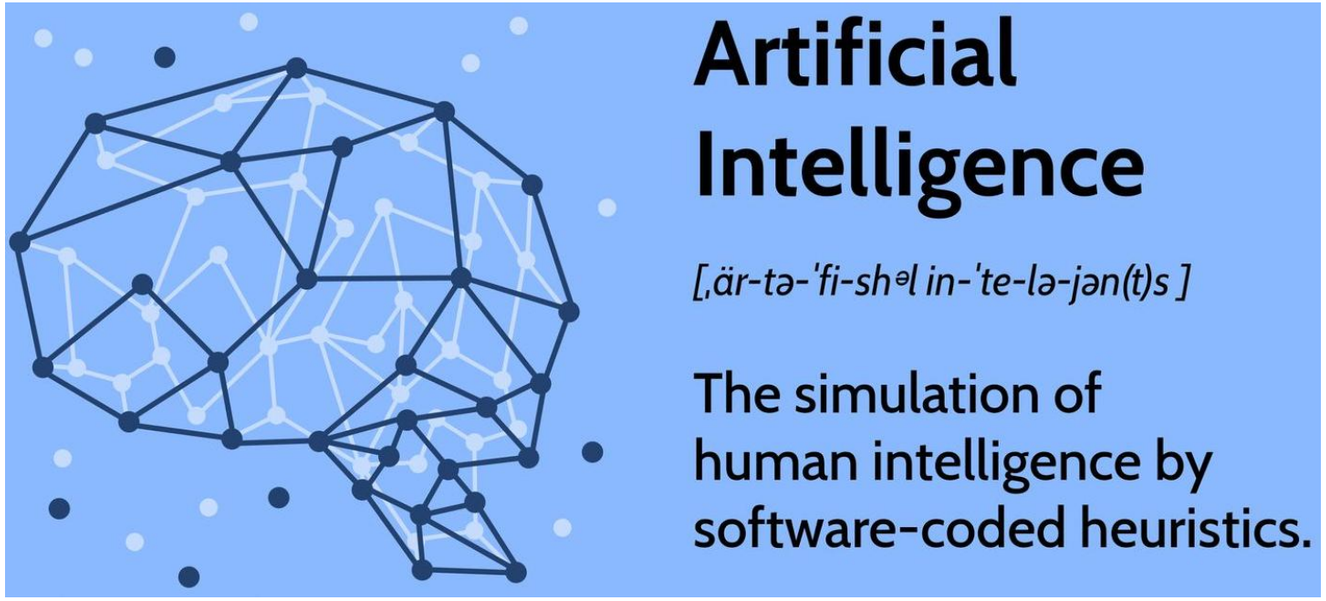
- **After this workshop you will:**
  - Understand AI in simple terms
    - What it is and how it actually works
  - See real AI use cases in manufacturing
    - From predictive maintenance to quality control
  - Spot opportunities in your own work
    - Identify where AI can save time or improve results
  - Be ready for the next steps
    - Apply your knowledge in upcoming training sessions

What is Artificial Intelligence?

Artificial Intelligence (AI) means:
Computers that can learn, recognize patterns, and make decisions – similar to humans.

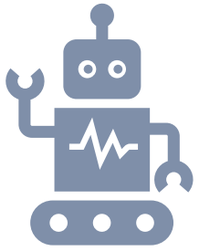
What AI can do:

- Recognize patterns
  - e.g. detecting defects in production
- Analyze large amounts of data
  - Faster than any human
- Support decision-making
  - Suggesting optimal actions
- Detect anomalies
  - Spotting problems before they happen



Most AI systems are based on Machine Learning
➔They improve automatically by learning from data

AI vs. Machine Learning

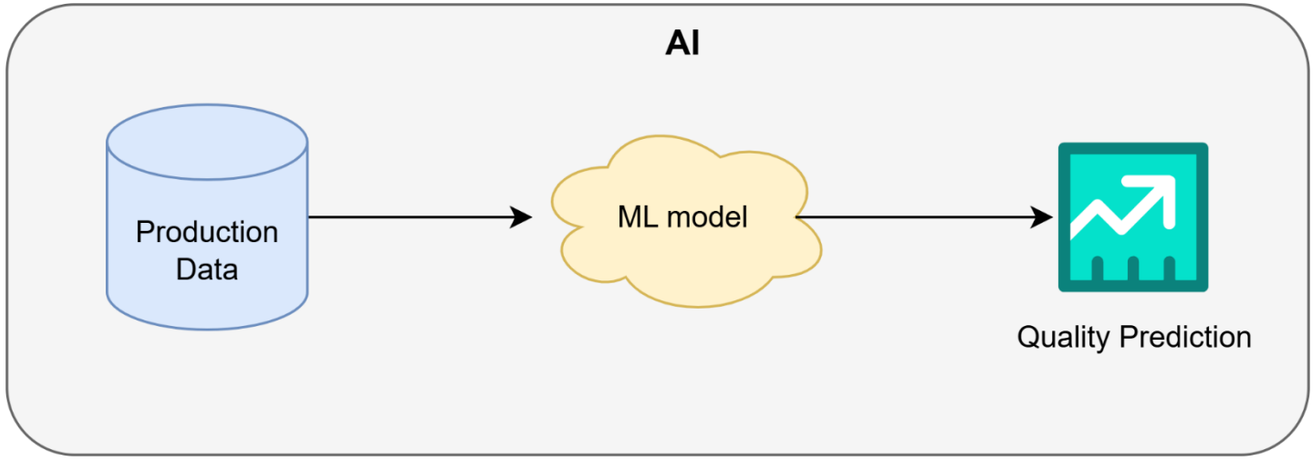


Artificial Intelligence (AI)

Machines performing intelligent tasks
Includes many approaches (rules, logic, etc.)

Machine Learning (ML)

Part of AI
Learns from data instead rules
Improves automatically over time



Why AI in Manufacturing?

The challenge:

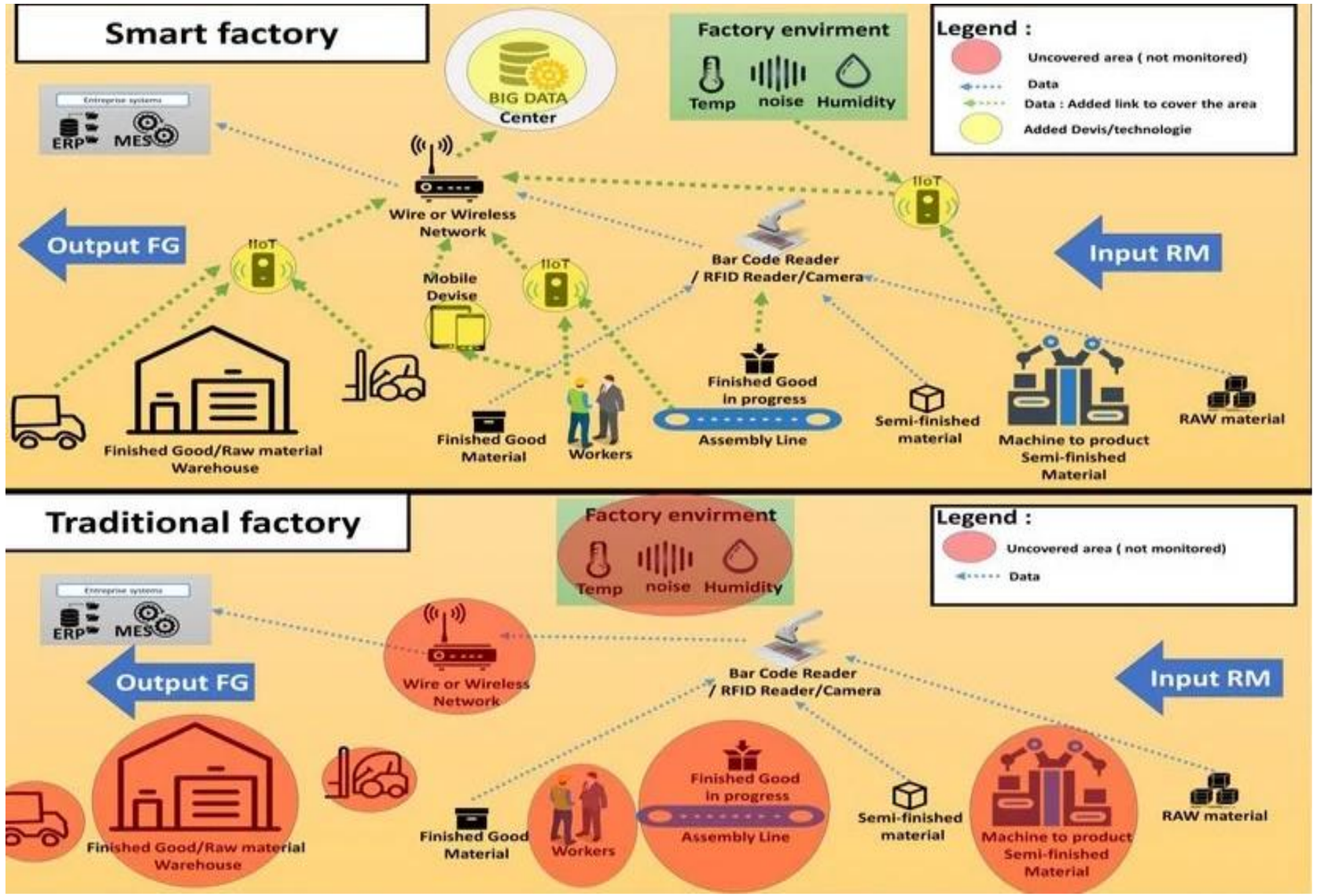
- Modern factories generate huge amounts of data – but most of it is not fully used.

What AI enables:

- Analyze complex data in seconds
- Increase efficiency across processes
- Detect defects earlier
- Support better decisions on the shop floor

The real impact:

- Higher product quality
- Less downtime
- Higher productivity



Typical AI Applications in Industry

🔧 **1. Predictive Maintenance**

📌 **What it is:**

AI predicts when machines will fail

⚙️ **How it works:**

Analyzes sensor & machine data

💡 **Example:**

Detecting wear before a breakdown

🚀 **Benefit:**

Less downtime, lower maintenance costs

👁️ **2. Automated Quality Inspection**

📌 **What it is:**

AI checks product quality automatically

⚙️ **How it works:**

Uses cameras + computer vision

💡 **Example:**

Detecting scratches or defects

🚀 **Benefit:**

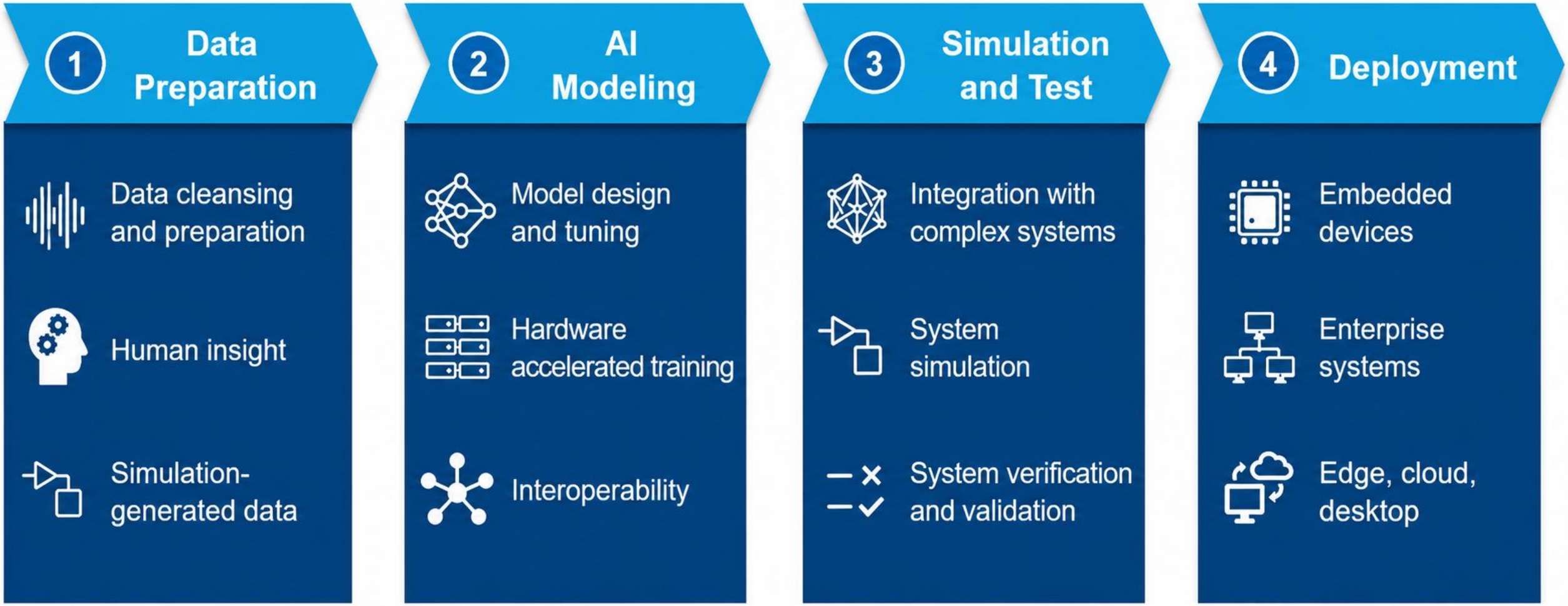
Higher quality, fewer errors

Typical AI Applications in Industry

📊 **3. Production Optimization**
📌 **What it is:**
AI improves production processes
⚙️ **How it works:**
Analyzes production & performance data
💡 **Example:**
Optimizing cycle times
🚀 **Benefit:**
Higher efficiency, better output

🤖 **4. Energy Consumption Optimization**
📌 **What it is:**
AI reduces energy use in industrial operations
⚙️ **How it works:**
AI analyzes data from machines, systems and the environment to find the most efficient settings
💡 **Example:**
AI adjusts machine parameters or schedules to lower energy consumption
🚀 **Benefit:**
Lower energy costs, reduced emissions

Example Industrial AI Workflow



AI supports people – it does not replace them

👷 Humans

- Make decisions
- Interpret results
- Improve processes

🤖 AI

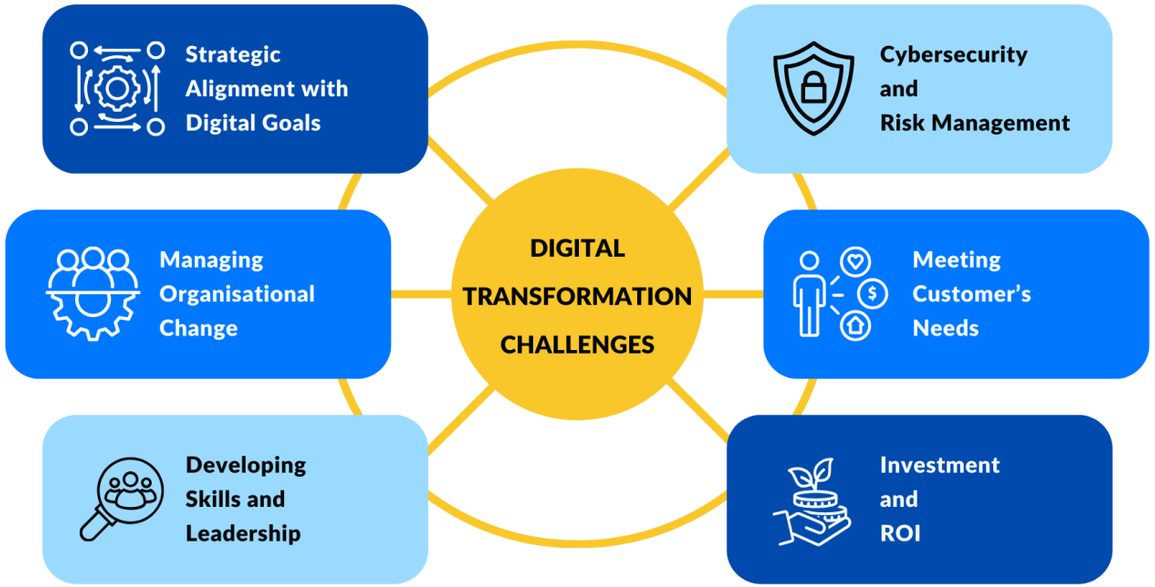
- Analyzes data
- Detects patterns
- Provides recommendations

The best results come from combining human expertise + AI insights

Challenges of AI Adoption

⚠️ Key challenges:

- 📊 **Data availability**
  → Not enough or poor-quality data
- 🔗 **System integration**
  → Connecting AI with existing systems
- 🎓 **Employee training**
  → Building skills and understanding
- 🤝 **Trust in AI**
  → Confidence in AI decisions



💡 How to overcome them:

Training + experience turn challenges into opportunities

AI success is not just about technology — it's about people and processes

Let’s Discuss: AI in Your Work Environment

💬 Your perspective matters:

🏭 **Where do you see potential for AI?**
→ Which processes could benefit?

🔁 **What tasks could be automated?**
→ Especially repetitive or time-consuming ones

⚠️ **What are your concerns?**
→ Trust, complexity, job impact?

Quick Quiz

❓ **1. What is the main goal of AI in manufacturing?**

A) Replace human workers
B) Support decision-making and improve processes
C) Reduce the need for data

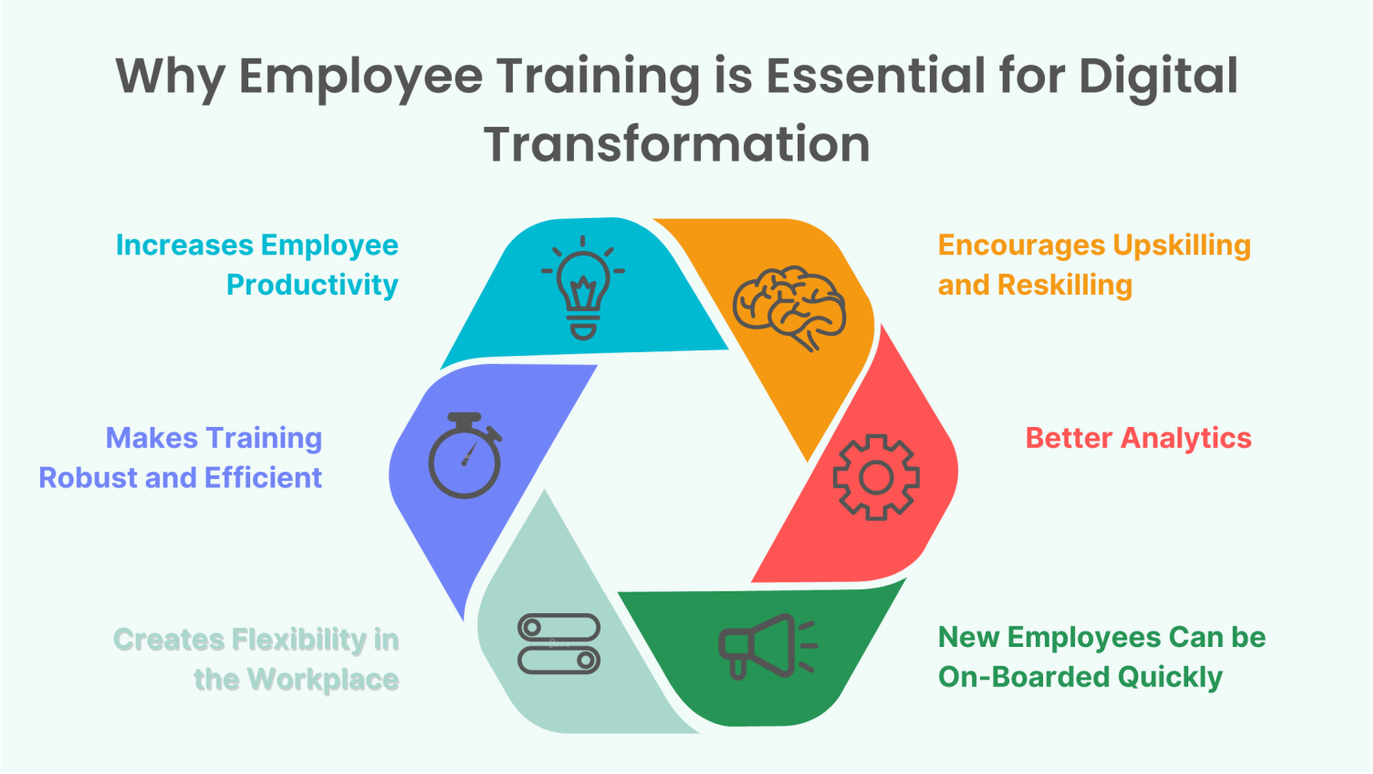
❓ **2. What is Machine Learning?**

A) A method where systems learn from data
B) Manual programming of every rule
C) A type of mechanical automation

❓ **3. Which is a typical AI application in industry?**

A) Predictive maintenance
B) Manual inspection
C) Paper-based reporting

What's Next?



🎯 **Next Training Phase**
Phase 2 – Fundamentals

📚 **What you will learn:**
- 🧠 **Machine Learning basics**
- 👁️ **Computer Vision**
- 🏭 **AI architectures in manufacturing**

💡 **Why it matters:**
Build the foundation to **apply AI in your daily work**

Thank you for your attention!