LCAMP

Learner Centric Advanced Manufacturing Platform

D7.2 “Cases studies of SME’s scans and implementations”

WP7 SME – VET connection

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LCAMP partners:

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GLOSSARY AND/OR ACRONYMS

5S – A workplace organization method from lean manufacturing
ADMA – ADMA Transformers EU Project - European Advanced Manufacturing Support Centre
AFIL – Associazione Fabbrica Intelligente Lombardia (Lombardy Intelligent Factory Association)
AFM – Advanced Manufacturing Technologies Association of Spain (Asociación Española de Fabricantes de Máquinas-herramienta, Accesorios, Componentes y Herramientas)
AI – Artificial Intelligence
BI – Business Intelligence
CAD – Computer-Aided Design
CAM – Computer-Aided Manufacturing
CMQE – Campus des Métiers et des Qualifications d'Excellence (Center of Excellence for Vocational Training and Qualifications)
CNC – Computer Numerical Control
CRM – Customer Relationship Management
CSR – Corporate Social Responsibility
ERP – Enterprise Resource Planning
ESG – Environmental, Social and Governance
EU – European Union
HR – Human Resources
ICT – Information and Communication Technology
IoT – Internet of Things
IT – Information Technology
KPI – Key Performance Indicator
LCAMP – Learner Centric Advanced Manufacturing Platform
MADE – Competence Center Industria 4.0 – MADE (Italian Digital Innovation Hub for Manufacturing 4.0)
MES – Manufacturing Execution System
R&D – Research and Development
SaaS – Software as a Service
SME(s) – Small and Medium-sized Enterprise(s)
VET – Vocational Education and Training

CONTENT TABLE

EXECUTIVE SUMMARY

This report summarizes the progress of the LCAMP project in applying the ADMA methodology to support digital transformation in European manufacturing SMEs. Through extensive training in the ADMA methodology, project partners have assessed the digital maturity of companies across key areas, such as operations, innovation, and resource efficiency. These assessments, conducted across multiple countries, have led to tailored implementation plans and highlighted diverse needs and approaches.

This report presents the progress made within the LCAMP project regarding the application of the ADMA methodology in SMEs in the European manufacturing sector. ADMA methodology provides a structured framework for assessing and guiding companies through their transformation into "Factories of the Future," focusing on both technological and organizational innovation. Digital transformation is one of the major challenges that SMEs are currently facing, and in this context, the LCAMP project aims to build strong bridges between these companies and the vocational education and training (VET) ecosystem, in order to support innovation, growth, and technological adaptation.

To achieve this goal, extensive training on the ADMA methodology has been carried out. This has enabled project partners to gain in-depth knowledge of the ADMA methodology, a framework that assesses digital maturity across seven transformation areas and several key topics. The methodology provides a structured approach to help SMEs develop personalized roadmaps toward a more human-centric, resilient, and sustainable Industry 5.0.

Following this training, significant outreach work was conducted to engage with SMEs across Europe. These efforts led to a series of digital maturity assessments that provided valuable insights into the level of advancement in areas such as digital operations, resource efficiency, people engagement, customer-focused innovation, and collaborative networks.

The report features representative case studies from Basque Country - Spain, Canada, France, Germany, Italy, Slovenia, Sweden and Turkey. Each case outlines both the outcomes of the ADMA Scans and the implementation plans co-developed with the participating SMEs. These cases highlight the diversity of approaches, needs, and levels of digital maturity across different countries and sectors, serving as a valuable foundation for future actions.

Overall, this work aims to strengthen the link between the VET system and industrial SMEs, equipping training centers with tools and methodologies to actively support companies in their transformation journeys.

1. INTRODUCTION

Digitalization has become a strategic necessity for SMEs in an increasingly competitive global environment. These companies, which represent a significant part of the European economy, face growing challenges in a globalized market that demands constant innovation and operational efficiency. The adoption of digital technologies improves internal efficiency, helps optimize the customer experience and fosters innovation, all of them key factors in ensuring competitiveness in a constantly changing market.

In this context, the LCAMP project plays a pivotal role in supporting SMEs through their digitalization journey, using the ADMA methodology. This methodology enables the assessment of companies' digitalization progress, providing a diagnosis and an implementation plan that outlines the necessary steps to improve their competitiveness. ADMA's holistic approach, aligned with the principles of Industry 5.0, considers technological, organizational and social aspects, ensuring that digitalization enhances both efficiency and worker well-being.

1.1. IMPORTANCE OF DIGITALIZATION FOR SMES

In an ever-changing global environment, digitisation is a strategic necessity for small and medium-sized enterprises (SMEs). SMEs, which represent a significant part of the European economy, face growing challenges in an increasingly competitive and globalised market. The adoption of digital technologies enables these companies to improve their operational efficiency, optimise the customer experience and, most importantly, foster innovation.

One of the immediate benefits of digitisation is the automation of tasks, which improves operational efficiency. Tools such as Enterprise Resource Planning (ERP) systems and process automation allow SMEs to reduce the risk of errors, save time and focus on more strategic tasks. This not only optimises internal resources, but also strengthens the competitiveness of companies in an increasingly demanding global market.

SMEs can greatly benefit from digitalisation to improve resource efficiency, optimising production and distribution processes, reducing waste and improving energy use. Tools such as digital twins and artificial intelligence drive innovation in industrial processes.

As digitalisation advances, the concept of Industry 5.0 is presented as an approach that goes beyond mere automation. Rather than replacing workers, Industry 5.0 emphasises collaboration between humans and machines. SMEs must adapt to this change, ensuring that technology is empowering for workers, improving their performance and skills, without compromising their welfare and rights. This requires a balanced approach that combines technological efficiency with consideration of the social and human aspects of industrial evolution.

The success of digitalisation depends to a large extent on the continuous training of employees. SMEs should invest in the development of digital skills, from the basic use of technological tools to specialisation in areas such as artificial intelligence or data analytics. This not only improves the competitiveness of companies, but also increases the employability of workers, giving them the tools they need to thrive in a digital and constantly evolving environment.

Digitalisation is the key for European SMEs to thrive in a highly competitive global market. By integrating technologies such as artificial intelligence, Big Data, and automation, SMEs can improve their efficiency, offer more personalised products and services, and be more resilient

to unexpected changes. At the same time, they must ensure that the digitalisation process does not dehumanise workers, but rather empowers them, contributing to a more sustainable and human-centred industrial model. In this context, Industry 5.0 represents an opportunity for companies as a whole to adapt their production, innovation and growth processes to the challenges of the future, balancing technological advances with social and environmental needs.

Aware of the importance of supporting SMEs in their digital transformation processes, the LCAMP Project has selected the ADMA methodology, which allows to analyse the situation of companies in terms of the degree of progress in digitisation. Once the diagnosis of the situation has been carried out, the implementation plan is drawn up, which will define the steps to be taken to advance in the desired digitisation process that will help to improve the competitiveness of the company.

1.2. SHORT INTRODUCTION TO THE ADMA CONCEPT

The ADMA (Advanced Manufacturing Support Centre) methodology, https://trans4mers.eu/, was developed within the framework of the European project of the same name, active from 2018 to 2021, with the aim of supporting manufacturing SMEs in their transition toward Industry 4.0. Its holistic approach, aligned with the principles of Industry 5.0, enables companies to transform their production models by considering technological, organizational, and social aspects.

Building on this experience, the ADMA TranS4MErs project was launched in 2021 and ran until 2024, expanding and deepening the methodology. It introduced the key role of the TranS4MEr, a trusted advisor who supports SMEs throughout the transformation journey—from the initial self-assessment to the implementation of actions—and facilitates access to the ADMA TranS4MErs xChange platform, which connects companies with experts, tools, and training resources.

The methodology is structured around three phases: ADMA Scan, Transformation Plan, and Implementation, and is based on seven Transformation Areas that guide the evaluation and prioritization process:

- Advanced Manufacturing Technologies
- Digital Factory
- ECO Factory
- End-to-End Customer-Focused Engineering
- Human-Centred Organisation
- Smart Manufacturing
- Value Chain Oriented Open Factory

The LCAMP project has adopted this methodology to assess and support SMEs across different countries. Since 2024, specific guidelines and templates have been developed to support the use of the methodology within the project context, particularly in cases where access to the official platform was restricted (e.g., Turkey and Canada). In addition, training sessions have been delivered both in-person and online, with a practical focus on implementing the methodology.

Thanks to this synergy between ADMA TranS4MErs and LCAMP projects - formalised through a Memorandum of Understanding (MoU) to foster collaboration between both projects - participating SMEs have been able to rely on a structured framework for their transformation,

along with expert guidance and tools that enhance their capacity to address future technological, ecological, and societal challenges.

1.3. COUNTRIES PARTICIPATING IN THE ADMA SCANS IN LCAMP PROJECT

In the context of the LCAMP project, several countries have contributed their expertise and knowledge, particularly through entities that have supported SMEs in the development of scans and implementation plans aimed at aiding the digitalization of companies. Below is the list of participating countries and the entities involved in these efforts.

Basque Country - Spain

- Entities supporting SMEs in the scans and implementation plans:

  AFM Cluster: Association of companies in the machine-tool and advanced manufacturing technologies sector.

  Invema: Technological foundation of AFM focused on research, development, and technology transfer for the machining and advanced manufacturing industry.

  Tknika: Applied innovation center of the Basque VET system, a benchmark in cutting-edge methodologies.

  Miguel Altuna LHII: Dual vocational training center strongly connected to local industrial companies, with a hands-on learning approach and focus on emerging technologies.

- Scans: 10
- Implementation Plans: 3

Canada

- Entities supporting SMEs in the scans and implementation plans:

  Camosun College: Technical college with a practical approach, focused on sustainability and educational innovation.

- Scans: 2
- Implementation Plans: 0

France

- Entities supporting SMEs in the scans and implementation plans:

  CMQE Industrie du Futur: Campus connecting training and business to boost competencies in industrial digitalization.

  Mecanic Vallée: Cluster grouping industrial companies and training centers in the mechanical and mechatronic sectors.

- Scans: 14
- Implementation Plans: 2

Germany

- Entities supporting SMEs in the scans and implementation plans:

  Duale Hochschule Baden-Württemberg (DHBW): leading higher education institution in Germany that combines academic studies with workplace training,

- Scans: 2
- Implementation Plans: 1

Italy

- Entities supporting SMEs in the scans and implementation plans:

  MADE Competence Center: National center with a pilot plant for training in Industry 4.0.

  AFIL (Associazione Fabbrica Intelligente Lombardia): Cluster promoting innovation in the manufacturing industry of Lombardy.

- Scans: 8
- Implementation Plans: 2

Slovenia

- Entities supporting SMEs in the scans and implementation plans:

  Skupnost-vss: The Association of Slovene Higher Vocational Colleges.

- Scans: 10
- Implementation Plans: 0

Sweden

- Entities supporting SMEs in the scans and implementation plans:

  Curt Nicolin High School: Technical institute with a practical methodology and strong connections with companies.

- Scans: 3
- Implementation Plans: 1

Turkey

- Entities supporting SMEs in the scans and implementation plans:

  Kocaeli Provincial Directorate of National Education: Regional educational authority responsible for VET.

  Gebkim VET: Vocational training center with strong ties to the chemical industry.

  Gebkim Organized Industrial Zone: Industrial park combining production, innovation, and training.

- Scans: 10
- Implementation Plans: 2

2. ADMA METHODOLOGY

ADMA Methodology was developed starting from 2018, within the activities of ADMA (ADvanced MAnufacturing Support Centre), a European project whose main goal was to provide help to future-oriented manufacturing companies embracing Industry 4.0 opportunities to their full extent.

Based on the efforts of ADMA project, implemented for three years, a new initiative called ADMA TranS4MErs (Advanced Manufacturing assistance and training for SME Transformation) was launched in October 2021 and then implemented until December 2024. LCAMP project partner AFIL has been involved in both ADMA-related initiatives. Since 2022, AFIL has ensured coordination and synergy between LCAMP and ADMA TranS4MErs initiatives, being Co-leader (together with AFM) of the Work Package 7 of the Erasmus-funded project.

The ADMA TranS4MErs methodology follows ADMA one, but emphasizes the importance of the Transformation Plan and its implementation. It introduces the TranS4MEr role, which is essential in this process as they assist SMEs throughout their transformation journey. TranS4MErs have a comprehensive understanding of the specific challenges that SMEs face and the most appropriate tools to use for their transformation.

Figure 1: SME journey within ADMA Methodology. Source: ADMA Transformers Project

During the **Design Phase** (which starts with the ADMA scan), the TranS4MEr co-creates, together with the SME, the Transformation Plan, which prioritizes implementation and jump-starts the company's transformation process. This is a crucial step where the SME establishes a relationship with the TranS4MEr and receives guidance on how to use the ADMA TranS4MErs xChange platform to seek out domain experts and toolkits, as well as to address the priority challenges listed in the Transformation Plan.

In the **Revamp Phase**, the SME looks for education modules, tech tools, expert advice and other resources, with a view to implement the Transformation Plan and to become a “Factory of the Future”.

ADMA methodology has chosen a holistic approach encompassing technological and non-technological aspects, and relying on 7 Transformation Areas, which are included in every step of the SME journey: **ADMA scan, Transformation Plan and implementation stage**.

2.1. ADMA METHODOLOGY - 7 TRANSFORMATION AREAS

The structure of the ADMA scan includes 7 Transformation Areas where to focus on (together with specific topics and sub-topics where to concentrate the attention):

- **T1 - Advanced Manufacturing Technologies**: analysing the state-of-the-art of manufacturing devices and machinery; focusing on the company vision, the level of capabilities and the level of implementation;
- **T2 - Digital Factory**: assessing how digital technology is implemented to transform the development of products and/or processes into physical products, systems or services; focusing on the enabling infrastructure and the digital capabilities;
- **T3 - ECO Factory**: analysing the approach towards cost and risk reduction and efficiency of raw material usage, as well as towards energy supply and consumption and use of renewable sources; focusing on the resource management and the compliance & innovation;
- **T4 - End-to-end Customer Focused Engineering**: assessing how customer expectations, as well as cross-functional and cross-departmental design, could lead to new developments and processes; focusing on the customer focus and value proposition, and robust engineering processes;
- **T5 - Human Centred Organisation**: analysing whether and how workers are given autonomy and space to channel their talent, creativity and initiatives, also through continuous/repetitive evaluation of their skills and update of their competencies; focusing on the individual employee, the team, the leadership and the internal organization;
- **T6 - Smart Manufacturing**: assessing the combination of the smart use of people's capabilities, the smart use of technology and the deployment of a (self-) learning production system; focusing on the human-machine interaction and the manufacturing planning & control processes;
- **T7 - Value Chain Oriented Open Factory**: analysing the capability of the company to develop products, manufacturing processes and services with the complete value chain in mind; focusing on the cooperation and partnerships, as well as on the external expertise and knowledge management.

Figure 2: ADMA Methodology three-step approach. Source: ADMA Transformers Project

While performing the **ADMA scan**, the SME has to auto-evaluate (with the support of the TranS4MEr) its internal processes and external interactions, based on the 7 dimensions. At the end, the company receives a report containing the answers and scores for each Transformation Area (highlighting strengths and weaknesses), as well as an average maturity score.

When preparing the **Transformation Plan**, it is recommended not to pick more than 3 out of 7 areas presenting potential for improvement or further exploitation need to be identified, with a view to concentrate suggested actions and necessary efforts on specific goals to achieve.

As a consequence, the **implementation stage** has a limited scope, relying on one or few of the areas selected as priority and detailed in the Transformation Plan.

2.2. ADMA METHODOLOGY USED IN LCAMP PROJECT – GUIDELINES

Within WP7, LCAMP partners from the Basque Country (Spain), France, Germany, Italy, Slovenia, Sweden, Turkey and Canada had to perform ADMA scans with several companies. In some cases, in synergy with WP4, some implementation needed to be drafted following the scans.

For this reason, since the beginning of 2024, WP7 Co-leader AFM and WP4 Leader TKNIKA have jointly worked at the preparation of several guidelines (in addition to those already existing

within ADMA TranS4MErs project) aimed at accompanying LCAMP partners during the process of performing ADMA scans, drafting the Transformation Plans and conduct the implementation.

Those working documents have been presented during the regular WP4-WP7 coordination meetings as well as shared via e-mail and on Sharepoint.

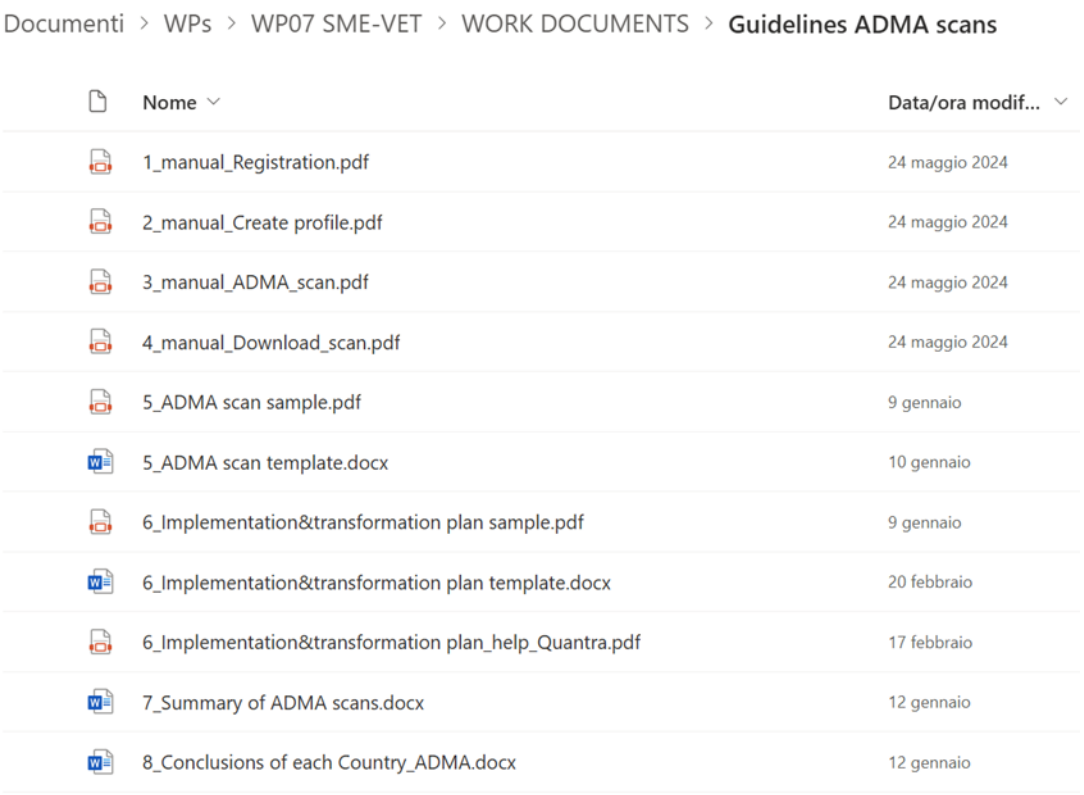


Figure 3: ADMA Methodology guidelines used in LCAMP project

The first set of manuals comprises instructions for:

- the registration of the SMEs on ADMA TranS4MErs xChange platform
- the creation of the company profile to be able to go through the ADMA scan on the platform
- the performing of the ADMA scan through the platform
- the download of the ADMA scan results from the platform

Given the impossibility for Turkish and Canadian partners and companies to use the ADMA TranS4MErs xChange platform (being non EU-27 countries not eligible for registration), the existing ADMA scan sample and template have been made available.

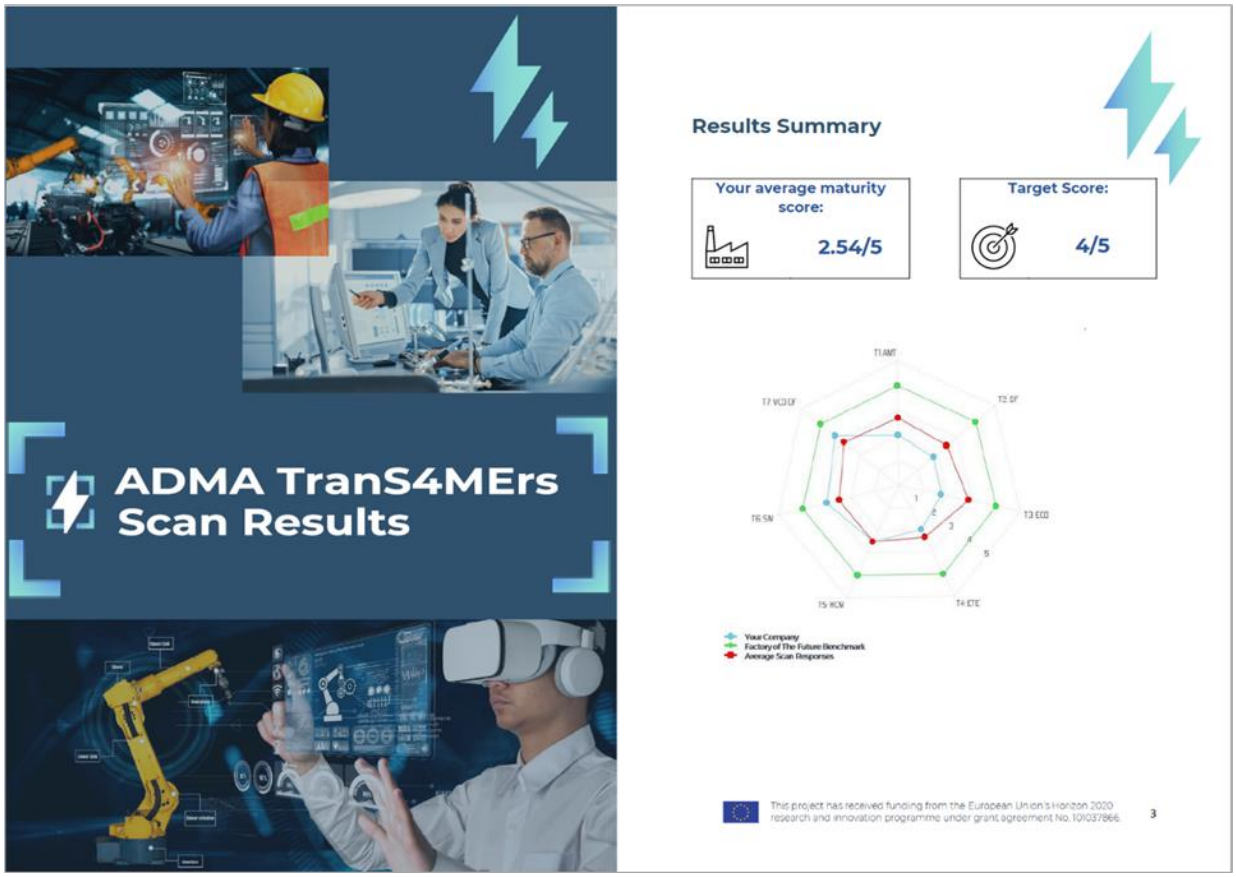


Figure 4: ADMA Scan Results sample. Source: ADMA Transformers Project

In order to facilitate the work of those LCAMP partners that had to deliver implementation to SMEs within WP4, also the existing Transformation Plan sample and template have been provided.

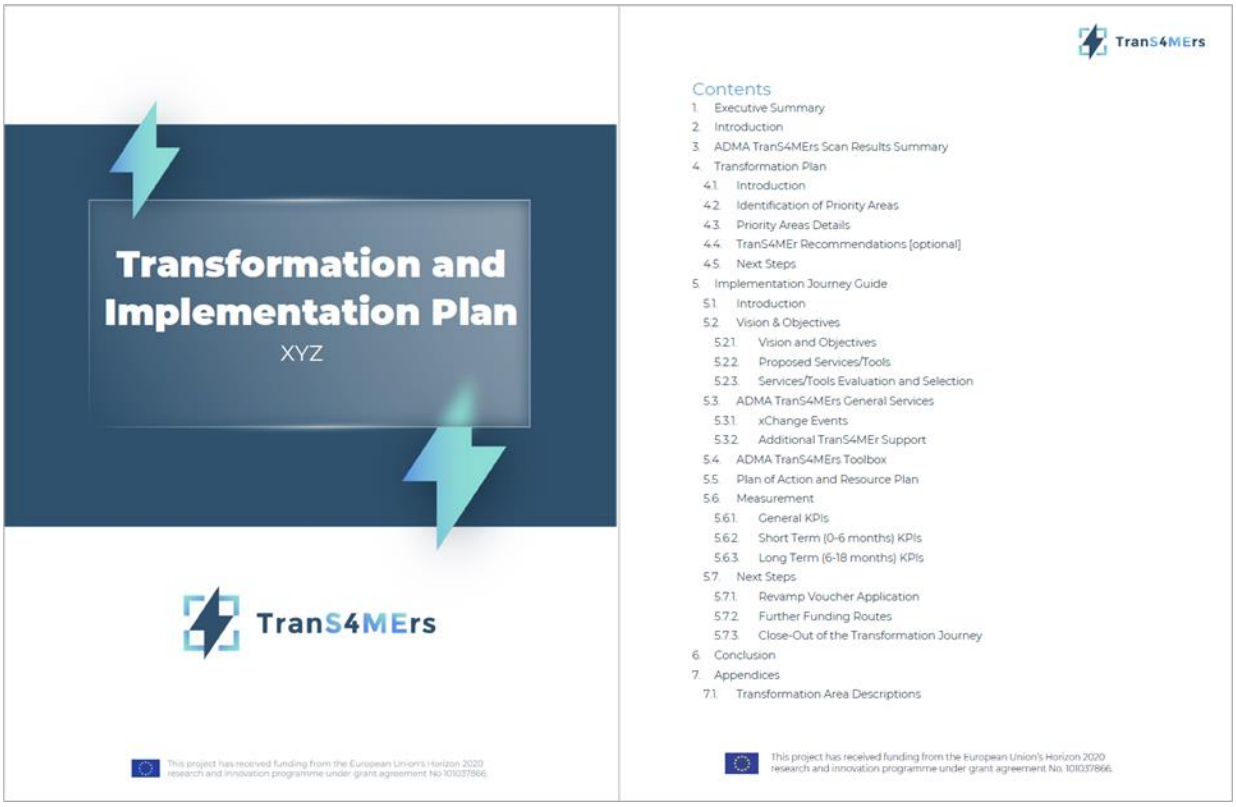


Figure 5: ADMA Transformation Plan template. Source: ADMA Transformers Project

However, the support to LCAMP partners did not end with the preparation and/or sharing of guidelines. Recurring WP4-WP7 coordination meetings have been planned by AFIL, AFM and TKNIKA in order to monitor the progresses of the partners. In some cases, one-to-one follow-up actions took place via e-mail or dedicated call.

In addition, since the beginning of 2024, a valuable support has been offered by Quantra, a service provider with several years of experience in performing ADMA scans with SMEs, drafting Transformation Plans and guiding companies through the implementation of corrective and/or improvement actions. Quantra has been responsible for the organization of training sessions on ADMA Methodology, delivered to project partners in two occasions: during the LCAMP Transnational Project Meeting in Milan on the 15th and 17th January 2024, with a main focus on ADMA scans, and during a dedicated webinar held on the 23rd October 2024, focusing on the Transformation Plan and implementation.

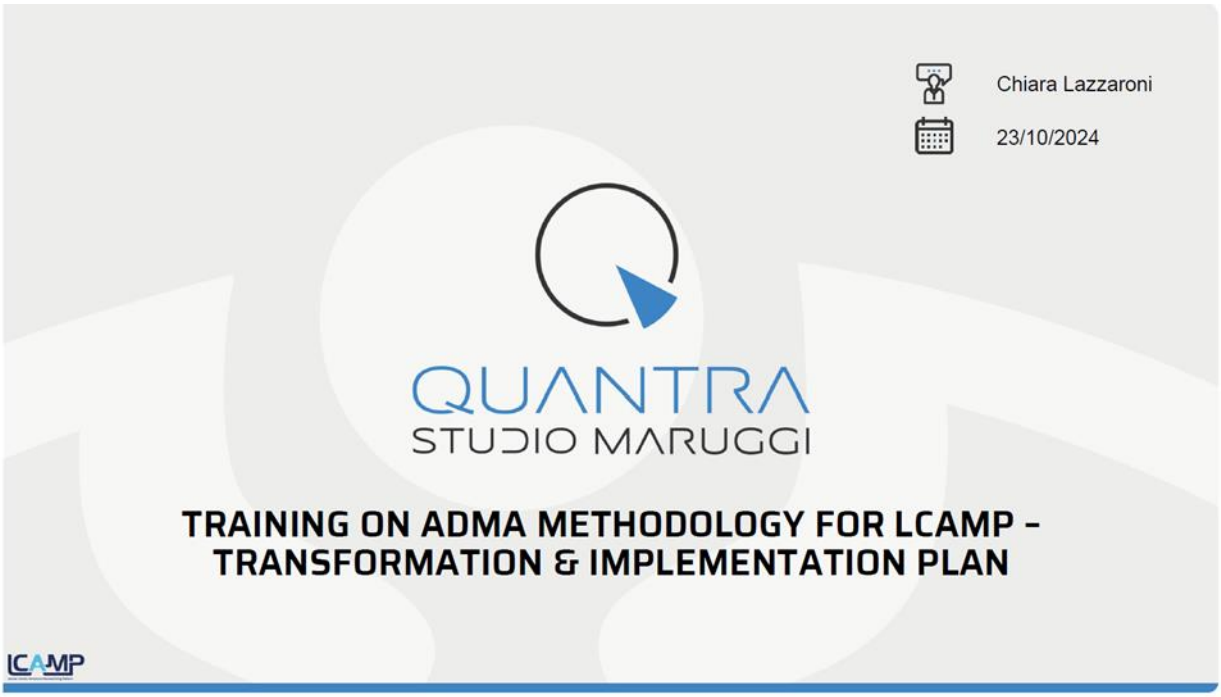


Figure 6: ADMA Methodology training for LCAMP partners

Further support to LCAMP partners has been provided through the presence of Quantra during the regular WP4-WP7 coordination meetings, as well as via restricted calls and exchanges of e-mails.

With a view to preparing the present deliverable and collect the necessary information from each partner, WP7 Co-leaders AFIL and AFM and WP4 Leader TKNIKA have jointly prepared two more templates, one for the summary of each ADMA scan and one for the overall conclusions related to the scans for each country.

3. ADMA SCANS

3.1. SUMMARY OF THE REPORTS BY COUNTRY

3.1.1.BASQUE COUNTRY - SPAIN

- **SUMMARY OF THE SCANS**

COMPANY 1

- **Size of the company:** 11-50 employees
- **Sector of activity:** Design and manufacturing of wood products (16.29)
- **Average Maturity Score:** 3,26/5
    - Advanced Manufacturing Technologies: 3/5
    - Digital Factory: 2,75/5
    - ECO Factory: 3/5
    - End-to-end Customer Focused Engineering: 4/5
    - Human Centred Organisation: 3,75/5
    - Smart Manufacturing: 2,66/5
    - Value Chain Oriented Open Factory: 3.66/5

- **Main conclusions:** This company excels in its 'Human-Centred Organisation' but needs to improve in 'Smart Manufacturing'. Specifically, it should focus on automating data sharing on the shop floor and improve cyber security through continuous monitoring and threat detection.

COMPANY 2

- **Size of the company:**11-50 employees
- **Sector of activity:** Research (72.19)
- **Average Maturity Score:** 2,4/5
    - Advanced Manufacturing Technologies: 2/5
    - Digital Factory: 1,75/5
    - ECO Factory: 2/5
    - End-to-end Customer Focused Engineering: 3,3/5
    - Human Centred Organisation: 2,5/5
    - Smart Manufacturing: 2/5
    - Value Chain Oriented Open Factory: 3,3/5

- **Main conclusions:** Within the framework of ADMA Scan, the strongest area for this company is identified as End-to-end Customer Focused Engineering and oValue Chain Oriented Open Factory.
  The company can enhance its digitalization and sustainability by fully automating data exchange, integrating advanced manufacturing technologies to remain competitive, and implementing eco-efficient production systems that optimize resource usage and minimize environmental impact.

COMPANY 3

- **Size of the company: 100-250 employees**
- **Sector of activity:** Food industry (10.71)
- **Average Maturity Score:** 3,4/5
    - Advanced Manufacturing Technologies: 3,2/5
    - Digital Factory: 3/5
    - ECO Factory: 4/5
    - End-to-end Customer Focused Engineering: 3,6/5
    - Human Centred Organisation: 3,6/5
    - Smart Manufacturing: 3,2/5
    - Value Chain Oriented Open Factory: 3,2/5

- **Main conclusions:** The company excels in eco-friendly manufacturing and customer-focused operations, fostering strong team collaboration. However, it should improve digital automation, smart manufacturing, and value chain integration to enhance efficiency and connectivity.

COMPANY 4

- **Size of the company:** 11-50 employees
- **Sector of activity:** Mechanical manufacturing engineering (25.62)
- **Average Maturity Score:** 2,21/5
    - Advanced Manufacturing Technologies: 1,67/5
    - Digital Factory: 1,25/5
    - ECO Factory: 2/5
    - End-to-end Customer Focused Engineering: 2,33/5
    - Human Centred Organisation: 2,75/5
    - Smart Manufacturing: 2/5
    - Value Chain Oriented Open Factory: 3,5/5

- **Main conclusions:**The company excels in value chain collaboration, leveraging partnerships and innovation networks. However, it should improve digital automation, advanced manufacturing technologies, and eco-friendly production to enhance efficiency, competitiveness, and sustainability.

COMPANY 5

- **Size of the company:** 100-250 employees
- **Sector of activity:** Metallurgy (25.50)
- **Average Maturity Score:** 3,11/5
    - Advanced Manufacturing Technologies: 2/5
    - Digital Factory: 3,5/5
    - ECO Factory: 2,5/5
    - End-to-end Customer Focused Engineering: 3,67/5
    - Human Centred Organisation: 3,75/5
    - Smart Manufacturing: 3,33/5
    - Value Chain Oriented Open Factory: 3/5

- **Main conclusions:**The company stands out for its customer-focused engineering and a people-centred organisation that fosters collaboration and innovation. However, it needs to improve advanced manufacturing technologies, environmentally friendly production and value chain integration to drive efficiency, sustainability and competitiveness.

COMPANY 6

- **Size of the company:** 1-10 employees
- **Sector of activity:** Manufacture of other fabricated metal products (25.99)
- **Average Maturity Score:** 3,6/5
    - Advanced Manufacturing Technologies: Indicate the score 3,3/5
    - Digital Factory: Indicate the score 3,25/5
    - ECO Factory: Indicate the score 5/5
    - End-to-end Customer Focused Engineering: Indicate the score 3/5
    - Human Centred Organisation: Indicate the score 4,5/5
    - Smart Manufacturing: Indicate the score 2,7/5
    - Value Chain Oriented Open Factory: Indicate the score 3,7/5

- **Main conclusions:** The company has basic IT/OT infrastructure with opportunities to improve software, monitoring, and automation. While connectivity is in place, better monitoring could enhance decision-making. Digitalization has begun, but more solutions need exploration. Sustainability is a priority, but stronger actions are needed. A system for gathering customer feedback would help align decisions with their needs.

COMPANY 7

- **Size of the company:** 51-100 employees
- **Sector of activity:** Manufacture of metal forming machinery (28.41)
- **Average Maturity Score:** 3/5
    - Advanced Manufacturing Technologies: Indicate the score 3,3/5
    - Digital Factory: Indicate the score 2,5/5
    - ECO Factory: Indicate the score 4/5
    - End-to-end Customer Focused Engineering: Indicate the score 3,5/5
    - Human Centred Organisation: Indicate the score 2,75/5
    - Smart Manufacturing: Indicate the score 1,7/5
    - Value Chain Oriented Open Factory: Indicate the score 3,3/5

- **Main conclusions:** The company has a strong IT/OT foundation but lacks terminals and software for full data exchange. Remote operation and predictive maintenance are limited, and connectivity improvements could enhance processes and monitoring. Automation is low, and ERP system potential is underutilized. Digitalization is underway, with a focus on sustainability efforts like ISO 14001 certification and resource reuse, though some projects are stalled. The investment strategy supports advanced manufacturing, with customer feedback playing a key role in decision-making.

COMPANY 8

- **Size of the company:** 11-50 employees
- **Sector of activity:** Computer consultancy activities (62.02)
- **Average Maturity Score:** 4,2/5
    - Advanced Manufacturing Technologies: Indicate the score 5/5
    - Digital Factory: Indicate the score 3,5/5
    - ECO Factory: Indicate the score 4/5
    - End-to-end Customer Focused Engineering: Indicate the score 4,7/5
    - Human Centred Organisation: Indicate the score 4,5/5
    - Smart Manufacturing: Indicate the score 3/5
    - Value Chain Oriented Open Factory: Indicate the score 4,7/5

- **Main conclusions:** The company has a strong IT/OT infrastructure but struggles with data transfer due to isolated implementations. Addressing compatibility issues is crucial for seamless integration. Cybersecurity needs improvement, with plans for secure remote access and specialist collaboration to protect assets.

COMPANY 9

- **Size of the company:** 11-50 employees
- **Sector of activity:** Manufacture of other special-purpose machinery (28.99)
- **Average Maturity Score:** 3,76/5
    - Advanced Manufacturing Technologies: Indicate the score 4,3/5
    - Digital Factory: Indicate the score 3,75/5
    - ECO Factory: Indicate the score 4/5
    - End-to-end Customer Focused Engineering: Indicate the score 4,33/5
    - Human Centred Organisation: Indicate the score 4/5
    - Smart Manufacturing: Indicate the score 2/5
    - Value Chain Oriented Open Factory: Indicate the score 4/5

- **Main conclusions:** The company has invested in digitalization but can improve project tracking and explore SCM software. Connectivity solutions remain a challenge, though costs are decreasing. More support may be needed as data capture expands. Automation is low, but staying updated on advancements is crucial. Digitalizing procurement could be beneficial long-term. The company follows a clear vision for advanced manufacturing, values sustainability, and systematically gathers customer feedback while staying informed on technology and market trends.

COMPANY 10

- **Size of the company:** 11-50 employees
- **Sector of activity:** Wholesale of machine tools (46.62)
- **Average Maturity Score:** 3,63/5
    - Advanced Manufacturing Technologies: Indicate the score 4/5
    - Digital Factory: Indicate the score 3,25/5
    - ECO Factory: Indicate the score 5/5
    - End-to-end Customer Focused Engineering: Indicate the score 3,5/5
    - Human Centred Organisation: Indicate the score 4/5
    - Smart Manufacturing: Indicate the score 1,7/5
    - Value Chain Oriented Open Factory: Indicate the score 4/5

- **Main conclusions:** The company has invested in digitalization but can improve project tracking and explore SCM software. Connectivity solutions remain a challenge, though costs are decreasing. More support may be needed as data capture expands. Automation is low, but staying updated on advancements is crucial. Digitalizing procurement could be beneficial long-term. The company follows a clear vision for advanced manufacturing, values sustainability, and systematically gathers customer feedback while staying informed on technology and market trends.

3.1.2.CANADA

- **SUMMARY OF THE SCANS**

COMPANY 1

- **Size of the company:** 1-10 employees
- **Sector of activity:** Aquaculture (03.21)
- **Average Maturity Score:** 1,85/5
    - Advanced Manufacturing Technologies: 1,33/5
    - Digital Factory: 1,75/5
    - ECO Factory: 2,5/5
    - End-to-end Customer Focused Engineering: 2,5/5
    - Human Centred Organisation: 1,5/5
    - Smart Manufacturing: 1,33/5
    - Value Chain Oriented Open Factory: 2/5

- **Main conclusions:**This company can improve by aligning investments, enhancing skills, optimizing maintenance, and strengthening digital transformation. Better data use, automation, and innovation networks will boost efficiency, while refining sustainability efforts and knowledge sharing will support growth.

COMPANY 2

- **Size of the company:**11-50 employees
- **Sector of activity:** Food and beverage (10.84)
- **Average Maturity Score:** 2,4/5
    - Advanced Manufacturing Technologies: 1,33/5
    - Digital Factory: 1,75/5
    - ECO Factory: 2,5/5
    - End-to-end Customer Focused Engineering: 2,5/5
    - Human Centred Organisation: 1,5/5
    - Smart Manufacturing: 1,33/5
    - Value Chain Oriented Open Factory: 2/5

- **Main conclusions:** This company can improve by strengthening investment alignment, employee training, and equipment maintenance. Enhancing digital transformation, data use, and automation will boost efficiency. Expanding sustainability efforts, product data analysis, and external innovation networks will support long-term growth...

3.1.3. FRANCE

- **SUMMARY OF THE SCANS**

COMPANY 1

- **Size of the company:** 11-50 employees
- **Sector of activity:** Sheet metal work (25.11Z)
- **Average Maturity Score:** 3.22/5
    - Advanced Manufacturing Technologies: 3.44
    - Digital Factory: 3.71
    - ECO Factory: 3.17
    - End-to-end Customer Focused Engineering: 4.40
    - Human Centred Organisation: 3.00
    - Smart Manufacturing: 2.00
    - Value Chain Oriented Open Factory: 2.25

- **Main conclusions:** The strongest area for this company is End-to-end Customer Focused Engineering. The weakest area is Smart Manufacturing. The company needs to develop Smart Manufacturing.

COMPANY 2

- **Size of the company:** 51-100 employees
- **Sector of activity:** Precision machining (25.62Z)
- **Average Maturity Score:** 3.13/5
    - Advanced Manufacturing Technologies: 3.22
    - Digital Factory: 2.71
    - ECO Factory: 2.57
    - End-to-end Customer Focused Engineering: 4.25
    - Human Centred Organisation: 4.33
    - Smart Manufacturing: 2.80
    - Value Chain Oriented Open Factory: 3.00

- **Main conclusions:** The strongest areas for this company are End-to-end Customer Focused Engineering and Human Centred Organisation. The weakest area is ECO Factory. The company needs to develop Smart Manufacturing and Digital Factory.

COMPANY 3

- **Size of the company:** 51-100 employees
- **Sector of activity:** Precision machining (25.62Z)
- **Average Maturity Score:** 3.38/5
    - Advanced Manufacturing Technologies: 3.44
    - Digital Factory: 3.43
    - ECO Factory: 1.83
    - End-to-end Customer Focused Engineering: 4.33
    - Human Centred Organisation: 3.00
    - Smart Manufacturing: 4.00
    - Value Chain Oriented Open Factory: 3.60

- **Main conclusions:** The strongest area for this company is End-to-end Customer Focused Engineering. The weakest area is ECO Factory. The company needs to develop ECO Factory.

COMPANY 4

- **Size of the company:** 100-250 employees
- **Sector of activity:** Precision machining (25.62Z)
- **Average Maturity Score:** 3.16/5
    - Advanced Manufacturing Technologies: 3.67
    - Digital Factory: 3.75
    - ECO Factory: 3.00
    - End-to-end Customer Focused Engineering: 3.67
    - Human Centred Organisation: 2.33
    - Smart Manufacturing: 4.00
    - Value Chain Oriented Open Factory: 1.67

- **Main conclusions:** The strongest areas for this company are Digital Factory and Smart Manufacturing. The weakest area is Value Chain Oriented Open Factory. The company needs to develop Human Centred Organisation and Supply Chain Management Oriented.

COMPANY 5

- **Size of the company:** 11-50 employees
- **Sector of activity:** Precision machining (25.62Z)
- **Average Maturity Score:** 3.71/5
    - Advanced Manufacturing Technologies: 3.80
    - Digital Factory: 3.71
    - ECO Factory: 3.50
    - End-to-end Customer Focused Engineering: 4.00
    - Human Centred Organisation: 4.50
    - Smart Manufacturing: 3.00
    - Value Chain Oriented Open Factory: 2.50

- **Main conclusions:**The strongest area for this company is Human Centred Organisation. The weakest area is Value Chain Oriented Open Factory. The company needs to develop Supply Chain Management Oriented.

COMPANY 6

- **Size of the company:** 11-50 employees
- **Sector of activity:** Precision machining (25.62Z)
- **Average Maturity Score:** 3.41/5
    - Advanced Manufacturing Technologies: 3.20
    - Digital Factory: 2.86
    - ECO Factory: 3.00
    - End-to-end Customer Focused Engineering: 4.00
    - Human Centred Organisation: 3.60
    - Smart Manufacturing: 3.33
    - Value Chain Oriented Open Factory: 4.67

- **Main conclusions:** The strongest area for this company is Value Chain Oriented Open Factory. The weakest area is Digital Factory. The company needs to develop ECO Factory and Digital Factory.

COMPANY 7

- **Size of the company:** 51-100 employees
- **Sector of activity:** Precision machining; Assembler (25.62Z)
- **Average Maturity Score:** 2.70/5
    - Advanced Manufacturing Technologies: 2.33
    - Digital Factory: 2.43
    - ECO Factory: 2.57
    - End-to-end Customer Focused Engineering: 3.86
    - Human Centred Organisation: 2.90
    - Smart Manufacturing: 1.80
    - Value Chain Oriented Open Factory: 2.80

- **Main conclusions:** The strongest area for this company is End-to-end Customer Focused Engineering. The weakest area is Smart Manufacturing. The company needs to develop Smart Manufacturing and Manufacturing Technologies.

COMPANY 8

- **Size of the company:** 11-50 employees
- **Sector of activity:** Design and manufacture of machine tools (28.41Z)
- **Average Maturity Score:** 3.45/5
    - Advanced Manufacturing Technologies: 3.67
    - Digital Factory: 2.33
    - ECO Factory: 2.60
    - End-to-end Customer Focused Engineering: 4.00
    - Human Centred Organisation: 3.67
    - Smart Manufacturing: N/A
    - Value Chain Oriented Open Factory: 5.00

- **Main conclusions:** The strongest area for this company is Value Chain Oriented Open Factory. The weakest area is Digital Factory. The company needs to develop Digital Factory.

COMPANY 9

- **Size of the company:** 11-50 employees
- **Sector of activity:** Stamping, welding, machining (25.73Z)
- **Average Maturity Score:** 3.32/5
    - Advanced Manufacturing Technologies: 3.00
    - Digital Factory: 3.00
    - ECO Factory: 1.83
    - End-to-end Customer Focused Engineering: 4.50
    - Human Centred Organisation: 4.50
    - Smart Manufacturing: 2.75
    - Value Chain Oriented Open Factory: 2.80

- **Main conclusions:** The strongest areas for this company are End-to-end Customer Focused Engineering and Human Centred Organisation. The weakest area is ECO Factory. The company needs to develop ECO Factory.

COMPANY 10

- **Size of the company:** 51-100 employees
- **Sector of activity:** Surface treatment (25.61Z)
- **Average Maturity Score:** 3.02/5
    - Advanced Manufacturing Technologies: 2.40
    - Digital Factory: 2.14
    - ECO Factory: 3.83
    - End-to-end Customer Focused Engineering: 2.80
    - Human Centred Organisation: 3.50
    - Smart Manufacturing: 3.20
    - Value Chain Oriented Open Factory: 3.60

- **Main conclusions:** The strongest area for this company is ECO Factory. The weakest area is Digital Factory. The company needs to develop Smart Manufacturing and Manufacturing Technologies.

COMPANY 11

- **Size of the company:** +500 employees
- **Sector of activity:** Automotive equipment (29.31Z)
- **Average Maturity Score:** 3.29/5
    - Advanced Manufacturing Technologies: 3.30
    - Digital Factory: 2.57
    - ECO Factory: 2.86
    - End-to-end Customer Focused Engineering: 3.86
    - Human Centred Organisation: 3.40
    - Smart Manufacturing: 3.80
    - Value Chain Oriented Open Factory: 3.40

- **Main conclusions:** The strongest area for this company is End-to-end Customer Focused Engineering. The weakest area is Digital Factory. The company needs to develop Digital Factory.

COMPANY 12

- **Size of the company:** 51-100 employees
- **Sector of activity:** Furniture designer and manufacturer (31.01Z)
- **Average Maturity Score:** 2.75/5
    - Advanced Manufacturing Technologies: 2.90
    - Digital Factory: 2.29
    - ECO Factory: 3.57
    - End-to-end Customer Focused Engineering: 2.29
    - Human Centred Organisation: 3.00
    - Smart Manufacturing: 2.80
    - Value Chain Oriented Open Factory: 2.00

- **Main conclusions:** The strongest area for this company is ECO Factory. The weakest area is Value Chain Oriented Open Factory. The company needs to develop Supply Chain Management Oriented.

COMPANY 13

- **Size of the company:** +500 employees
- **Sector of activity:** Aircraft equipment (30.30Z)
- **Average Maturity Score:** 3.82/5
    - Advanced Manufacturing Technologies: 3.60
    - Digital Factory: 3.71
    - ECO Factory: 3.57
    - End-to-end Customer Focused Engineering: 4.00
    - Human Centred Organisation: 3.90
    - Smart Manufacturing: 3.80
    - Value Chain Oriented Open Factory: 4.40

- **Main conclusions:** The strongest area for this company is Value Chain Oriented Open Factory. The weakest area is ECO Factory. The company has a high development score in all areas and does not require a significant implementation plan.

COMPANY 14

- **Size of the company:** 51-100 employees
- **Sector of activity:** Metal recycling and processing (38.32Z)
- **Average Maturity Score:** 1.06/5
    - Advanced Manufacturing Technologies: 0.80
    - Digital Factory: 1.29
    - ECO Factory: 1.57
    - End-to-end Customer Focused Engineering: 0.00
    - Human Centred Organisation: 1.50
    - Smart Manufacturing: 1.00
    - Value Chain Oriented Open Factory: 1.20

- **Main conclusions:** The strongest area for this company is ECO Factory. The weakest area is End-to-end Customer Focused Engineering. The company needs to develop all areas, as it has a low development score across the board.

3.1.4. GERMANY

- **SUMMARY OF THE SCANS**

COMPANY 1

- **Size of the company:** 11-50 employees
- **Sector of activity:** Manufacturer of metal structures (25.11) and production of elements for the metal finishing industry (25.12)
- **Average Maturity Score:** 1.64/5
    - Advanced Manufacturing Technologies: 1.33
    - Digital Factory: 1.50
    - ECO Factory: 2.00
    - End-to-end Customer Focused Engineering: 2.33
    - Human Centred Organisation: 2.00
    - Smart Manufacturing: 1.00
    - Value Chain Oriented Open Factory: 1.33

- **Main conclusions:** The strongest areas for this company are End-to-end Customer Focused Engineering and ECO Factory. The weakest areas are Smart Manufacturing and Advanced Manufacturing Technologies. The company needs to develop Digital Factory, with a focus on networking CNC machines and introducing a PDA system.

COMPANY 2

- **Size of the company:** 251-500 employees
- **Sector of activity:** Production of plastic sheets, films, tubes, and profiles (22.21)
- **Average Maturity Score:** 1.98/5
    - Advanced Manufacturing Technologies: 2.00
    - Digital Factory: 2.25
    - ECO Factory: 2.00
    - End-to-end Customer Focused Engineering: 2.33
    - Human Centred Organisation: 2.25
    - Smart Manufacturing: 1.00
    - Value Chain Oriented Open Factory: 2.00

- **Main conclusions:** The strongest areas for this company are End-to-end Customer Focused Engineering and Digital Factory. The weakest areas are Smart Manufacturing and Advanced Manufacturing Technologies. The company needs to develop Smart Manufacturing, with a focus on using collaborative robots to optimize the value stream in production.

3.1.5. ITALY

- **SUMMARY OF THE SCANS**

COMPANY 1

- **Size of the company:** 100-250 employees
- **Sector of activity:** Manufacture of electrical equipment (90.09)
- **Average Maturity Score:** 4.39/5
    - Advanced Manufacturing Technologies: 4./5
    - Digital Factory: 4.25/5
    - ECO Factory: 4/5
    - End-to-end Customer Focused Engineering: 4.5/5
    - Human Centred Organisation: 4.5/5
    - Smart Manufacturing: 4.67/5
    - Value Chain Oriented Open Factory: 4.33/5

- **Main conclusions:** The company performs well across all transformation areas, with particularly strong results in customer-focused engineering and smart manufacturing. To continue progressing, it should refine strategies in advanced manufacturing and sustainability to further align with industry best practices.

COMPANY 2

- **Size of the company:** 1-10 employees
- **Sector of activity:** Research and experimental development in the field of other natural sciences and engineering (19.09)
- **Average Maturity Score:** 2.69/5
    - Advanced Manufacturing Technologies: 2.67/5
    - Digital Factory: 3.25/5
    - ECO Factory: 2.5/5
    - End-to-end Customer Focused Engineering: 3.67/5
    - Human Centred Organisation: 3.75/5
    - Smart Manufacturing: 3/5
    - Value Chain Oriented Open Factory: 0/5

- **Main conclusions:** This company demonstrates notable weaknesses in digital transformation, particularly in value chain collaboration and sustainable production. The company should prioritize partnerships, innovation networks, and eco-friendly practices to align with future-ready manufacturing standards.

COMPANY 3

- **Size of the company:** 1-10 employees
- **Sector of activity:** Research and experimental development in the field of other natural sciences and engineering (19.09)
- **Average Maturity Score:** 1.99/5
    - Advanced Manufacturing Technologies: 2.33/5
    - Digital Factory: 1.25/5
    - ECO Factory: 0/5
    - End-to-end Customer Focused Engineering: 2.67/5
    - Human Centred Organisation: 4/5
    - Smart Manufacturing: 1/5
    - Value Chain Oriented Open Factory: 2.67/5

- **Main conclusions:** The company demonstrates a huge weakness in ECO factory and notable others in Digital Factory and Smart Manufacturing, while it excels in Human Centred Organisation. The company should start thinking about the enhancement of environmental sustainability strategies to align with future-ready manufacturing standards.

COMPANY 4

- **Size of the company:** 1-10 employees
- **Sector of activity:** Treatment and coating of metals (61.00)
- **Average Maturity Score:** 2.53/5
    - Advanced Manufacturing Technologies: 3.67/5
    - Digital Factory: 2.25/5
    - ECO Factory: 3/5
    - End-to-end Customer Focused Engineering: 1.67/5
    - Human Centred Organisation: 3.5/5
    - Smart Manufacturing: 1.33/5
    - Value Chain Oriented Open Factory: 2.33/5

- **Main conclusions:** There are significant gaps in End-to-end Customer Focused Engineering and Smart Manufacturing, scoring poorly across these areas. On the one hand, the company should foster the interdepartmental co-creation and focus on the stakeholder involvement; on the other hand, some innovation, related to automations and/or robotic systems in the shop floor should be introduced.

COMPANY 5

- **Size of the company:** 1-10 employees
- **Sector of activity:** n.a.
- **Average Maturity Score:** 1.46/5
    - Advanced Manufacturing Technologies: 1/5
    - Digital Factory: 1/5
    - ECO Factory: 1/5
    - End-to-end Customer Focused Engineering: 2.7/5
    - Human Centred Organisation: 2.5/5
    - Smart Manufacturing: 1/5
    - Value Chain Oriented Open Factory: 1/5

- **Main conclusions:** The company stands out in end-to-end customer-focused engineering, showing strong alignment with customer needs and project customisation. The ECO Factory aspect requires attention, particularly in implementing more efficient energy and waste management practices. The main areas to develop are related to strengthening sustainability initiatives and further integrating smart manufacturing solutions.

COMPANY 6

- **Size of the company:** 1-10 employees
- **Sector of activity:** Research and experimental development in the field of other natural sciences and engineering (19.09)
- **Average Maturity Score:** 1.80/5
    - Advanced Manufacturing Technologies: 1/5
    - Digital Factory: 1/5
    - ECO Factory: 1/5
    - End-to-end Customer Focused Engineering: 2.67/5
    - Human Centred Organisation: 3.25/5
    - Smart Manufacturing: 1/5
    - Value Chain Oriented Open Factory: 2.67/5

- **Main conclusions:** There are significant gaps in digital transformation, particularly in advanced manufacturing technologies, digital factory integration, and smart manufacturing, scoring poorly across these areas. The company should prioritize upgrading its technological infrastructure, enhancing digital processes, and fostering innovation to align with Factory of the Future benchmarks.

COMPANY 7

- **Size of the company:** 51-100 employees
- **Sector of activity:** Manufacture of knitted and crocheted hosiery (31.10)
- **Average Maturity Score:** 2.76/5
    - Advanced Manufacturing Technologies: 3/5
    - Digital Factory: 3.5/5
    - ECO Factory: 3.5/5
    - End-to-end Customer Focused Engineering: 3.33/5
    - Human Centred Organisation: 2/5
    - Smart Manufacturing: 2/5
    - Value Chain Oriented Open Factory: 2/5

- **Main conclusions:** The company has a low score in 3 transformation area, namely Human Centred Organisation, Smart Manufacturing and Value Chain Oriented Open Factory, where there is room for improvement. In particular, some efforts should be put with a view at improving the employees' autonomy and communication means, as well as their capacity to contribute to the innovation in the company.

COMPANY 8

- **Size of the company:** 51-100 employees
- **Sector of activity:** Machining (62.00)
- **Average Maturity Score:** 3.14/5
    - Advanced Manufacturing Technologies: 3.33/5
    - Digital Factory: 2,75/5
    - ECO Factory: 2.5/5
    - End-to-end Customer Focused Engineering: 3/5
    - Human Centred Organisation: 3,75/5
    - Smart Manufacturing: 2.67/5
    - Value Chain Oriented Open Factory: 4/5

- **Main conclusions:** The company excels in value chain collaboration but requires significant improvements in digital integration, sustainability practices, and smart manufacturing capabilities. Strengthening these areas will help align operations with modern industrial benchmarks and drive future competitiveness.

3.1.6. SLOVENIA

- **SUMMARY OF THE SCANS**

COMPANY 1

- **Size of the company:** +500 employees
- **Sector of activity:** Sale, maintenance & repair of motorcycles & related parts & accessories (45.20)
- **Average Maturity Score:** 2.18/5
    - Advanced Manufacturing Technologies: 1.67
    - Digital Factory: 2.50
    - ECO Factory: 1.50
    - End-to-end Customer Focused Engineering: 5.00
    - Human Centred Organisation: 1.25
    - Smart Manufacturing: 2.00
    - Value Chain Oriented Open Factory: 1.33

- **Main conclusions:** The strongest area for this company is End-to-end Customer Focused Engineering. The weakest areas are Human Centred Organisation and Value Chain Oriented Open Factory. The company needs to develop ECO Factory and Advanced Manufacturing Technologies.

COMPANY 2

- **Size of the company:** 251-500 employees
- **Sector of activity:** Manufacture of basic pharmaceutical products (21.10)
- **Average Maturity Score:** 3.00/5
    - Advanced Manufacturing Technologies: 3.25
    - Digital Factory: 2.50
    - ECO Factory: 3.00
    - End-to-end Customer Focused Engineering: 3.00
    - Human Centred Organisation: 3.00
    - Smart Manufacturing: 1.67
    - Value Chain Oriented Open Factory: 3.00

- **Main conclusions:** The strongest area for this company is Advanced Manufacturing Technologies. The weakest area is Smart Manufacturing. The company needs to develop Smart Manufacturing and Digital Factory.

COMPANY 3

- **Size of the company:** 51-100 employees
- **Sector of activity:** Manufacture of lifting and handling equipment (28.22)
- **Average Maturity Score:** 2.81/5
    - Advanced Manufacturing Technologies: 2.67
    - Digital Factory: 3.25
    - ECO Factory: 2.50
    - End-to-end Customer Focused Engineering: 3.67
    - Human Centred Organisation: 3.25
    - Smart Manufacturing: 2.00
    - Value Chain Oriented Open Factory: 2.33

- **Main conclusions:**The strongest area for this company is End-to-end Customer Focused Engineering. The weakest areas are Smart Manufacturing and Value Chain Oriented Open Factory. The company needs to develop Smart Manufacturing and ECO Factory.

COMPANY 4

- **Size of the company:** +500 employees
- **Sector of activity:** Manufacture of parts & accessories for motor vehicles & their engines (**29.32**)
- **Average Maturity Score:** 4.12/5
    - Advanced Manufacturing Technologies: 3.67
    - Digital Factory: 3.75
    - ECO Factory: 3.50
    - End-to-end Customer Focused Engineering: 4.33
    - Human Centred Organisation: 4.25
    - Smart Manufacturing: 3.33
    - Value Chain Oriented Open Factory: 5.00

- **Main conclusions:** The strongest area for this company is Value Chain Oriented Open Factory. The weakest area is Smart Manufacturing. The company needs to develop Smart Manufacturing and ECO Factory.

COMPANY 5

- **Size of the company:** 51-100 employees
- **Sector of activity:** Manufacture of other transport equipment (30.99)
- **Average Maturity Score:** 3.82/5
    - Advanced Manufacturing Technologies: 3.67
    - Digital Factory: 4.25
    - ECO Factory: 4.50
    - End-to-end Customer Focused Engineering: 4.00
    - Human Centred Organisation: 4.00
    - Smart Manufacturing: 3.00
    - Value Chain Oriented Open Factory: 3.33

- **Main conclusions:**The strongest areas for this company are ECO Factory and Digital Factory. The weakest areas are Smart Manufacturing and Value Chain Oriented Open Factory. The company needs to develop Smart Manufacturing and Value Chain Oriented Open Factory.

COMPANY 6

- **Size of the company:** 251-500 employees
- **Sector of activity:** Aluminium production (24.42)
- **Average Maturity Score:** 2.61/5
    - Advanced Manufacturing Technologies: 1.33
    - Digital Factory: 3.00
    - ECO Factory: 3.00
    - End-to-end Customer Focused Engineering: 3.00
    - Human Centred Organisation: 2.25
    - Smart Manufacturing: 2.00
    - Value Chain Oriented Open Factory: 3.67

- **Main conclusions:** The strongest area for this company is Value Chain Oriented Open Factory. The weakest areas are Advanced Manufacturing Technologies and Smart Manufacturing. The company needs to develop Advanced Manufacturing Technologies and Human Centred Organisation.

COMPANY 7

- **Size of the company:** 251-500 employees
- **Sector of activity:** General mechanical engineering of metals (25.73)
- **Average Maturity Score:** 3.74/5
    - Advanced Manufacturing Technologies: 3.67
    - Digital Factory: 4.00
    - ECO Factory: 3.50
    - End-to-end Customer Focused Engineering: 3.67
    - Human Centred Organisation: 4.00
    - Smart Manufacturing: 3.33
    - Value Chain Oriented Open Factory: 4.00

- **Main conclusions:**

The strongest areas for this company are Digital Factory and Human Centred Organisation. The weakest area is Smart Manufacturing. The company needs to develop Smart Manufacturing and ECO Factory.

COMPANY 8

- **Size of the company:** 1-10 employees
- **Sector of activity:** Computer programming activities (62.01)
- **Average Maturity Score:** 3.48/5
    - Advanced Manufacturing Technologies: 4.00
    - Digital Factory: 2.25
    - ECO Factory: 3.50
    - End-to-end Customer Focused Engineering: 4.00
    - Human Centred Organisation: 4.25
    - Smart Manufacturing: 3.67
    - Value Chain Oriented Open Factory: 2.67

- **Main conclusions:**

The strongest areas for this company are Human Centred Organisation and Advanced Manufacturing Technologies. The weakest areas are Digital Factory and Value Chain Oriented Open Factory. The company needs to develop Digital Factory and Value Chain Oriented Open Factory.

COMPANY 9

- **Size of the company:** 11-50 employees
- **Sector of activity:** Manufacture of plastics in primary forms (20.16)
- **Average Maturity Score:** 1.95/5
    - Advanced Manufacturing Technologies: 2.50
    - Digital Factory: 2.25
    - ECO Factory: 1.50
    - End-to-end Customer Focused Engineering: 1.33
    - Human Centred Organisation: 2.75
    - Smart Manufacturing: 1.67
    - Value Chain Oriented Open Factory: 1.67

- **Main conclusions:**

The strongest area for this company is Human Centred Organisation. The weakest areas are End-to-end Customer Focused Engineering and ECO Factory. The company needs to develop Smart Manufacturing and ECO Factory.

COMPANY 10

- **Size of the company:** 51-100 employees
- **Sector of activity:** Computer programming, consultancy and related activities (62.01)
- **Average Maturity Score:** 1.86/5
    - Advanced Manufacturing Technologies: 2.00
    - Digital Factory: 2.50
    - ECO Factory: 1.50
    - End-to-end Customer Focused Engineering: 1.33
    - Human Centred Organisation: 3.00
    - Smart Manufacturing: 1.00
    - Value Chain Oriented Open Factory: 1.67

- **Main conclusions:**

The strongest area for this company is Human Centred Organisation. The weakest areas are Smart Manufacturing and End-to-end Customer Focused Engineering. The company needs to develop Smart Manufacturing and ECO Factory.

3.1.7. SWEDEN

- **SUMMARY OF THE SCANS**

COMPANY 1

- **Size of the company:** 100-250 employees
- **Sector of activity:** Aluminum Manufacturing company (24.42)
- **Average Maturity Score:** 3.12/5
    - Advanced Manufacturing Technologies: 3/5
    - Digital Factory: 3,25/5
    - ECO Factory: 3/5
    - End-to-end Customer Focused Engineering: 3,67/5
    - Human Centred Organisation: 3,25/5
    - Smart Manufacturing: 3/5
    - Value Chain Oriented Open Factory: 1.67/5

- **Main conclusions:** The analysis highlights strong customer-oriented engineering and human-centred organisation among companies, but significant gaps remain in digitalisation, automation, and smart manufacturing. To achieve Factory of the Future standards, companies must prioritise investment in advanced technologies, improve connectivity, and enhance cybersecurity while fostering sustainability and innovation.

COMPANY 2

- **Size of the company:** 11-50 employees
- **Sector of activity:** Steel thread manufacturing company (24.34)
- **Average Maturity Score:** 2,61/5
    - Advanced Manufacturing Technologies: 2,67/5
    - Digital Factory: 2,5/5
    - ECO Factory: 2/5
    - End-to-end Customer Focused Engineering: 3,67/5
    - Human Centred Organisation: 2,75/5
    - Smart Manufacturing: 3/5
    - Value Chain Oriented Open Factory: 1.67/5

- **Main conclusions:** The analysis of this company reveals strengths in customer-focused engineering but significant gaps in automation, digital integration, and value chain collaboration. To advance toward the Factory of the Future, the company should prioritize digital transformation, invest in smart manufacturing technologies, and strengthen external innovation partnerships.

COMPANY 3

- **Size of the company:** 11-50 employees
- **Sector of activity:** Metal manufacturing company (24)
- **Average Maturity Score:** 3,42/5
    - Advanced Manufacturing Technologies: 2,33/5
    - Digital Factory: 3/5
    - ECO Factory: 3,5/5
    - End-to-end Customer Focused Engineering: 3,67/5
    - Human Centred Organisation: 3,75/5
    - Smart Manufacturing: 3/5
    - Value Chain Oriented Open Factory: 4.33/5

- **Main conclusions:** This company demonstrates strong performance in value chain collaboration and customer-focused engineering but lags in advanced manufacturing technologies and digital integration. To enhance competitiveness, it should focus on upgrading its manufacturing equipment, expanding automation, and further strengthening digital infrastructure and cybersecurity.

3.1.8. TURKEY

- **SUMMARY OF THE SCANS**

COMPANY 1

- **Size of the company:** 251-500 employees
- **Sector of activity:** Manufacture of medical drugs relating to pharmaceuticals (20.01)
- **Average Maturity Score:** 4.51/5
    - Advanced Manufacturing Technologies: 4.5/5
    - Digital Factory: 3.25/5
    - ECO Factory: 5/5
    - End-to-end Customer Focused Engineering: 4.67/5
    - Human Centred Organisation: 4.5/5
    - Smart Manufacturing: 4.67/5
    - Value Chain Oriented Open Factory: 5/5

- **Main conclusions:** The strongest areas within the scope of the company's maturity score are ECO Factory and Value Chain Oriented Open Factory. The weakest area is Digital Factory. No implementation plan is foreseen for this company.

COMPANY 2

- **Size of the company:** 100-250 employees
- **Sector of activity:** Manufacture of primary forms alkyl resin, polyester resin, epoxy resin, polyacetal, polycarbonate, and other polyether or polyester (16.02)
- **Average Maturity Score:** 3.63/5
    - Advanced Manufacturing Technologies: 4/5
    - Digital Factory: 3.5/5
    - ECO Factory: 3.5/5
    - End-to-end Customer Focused Engineering: 3.67/5
    - Human Centred Organisation: 3.75/5
    - Smart Manufacturing: 2.33/5
    - Value Chain Oriented Open Factory: 4.67/5

- **Main conclusions:** The strongest area for this company is Value Chain Oriented Open Factory. The weakest area is Smart Manufacturing. It is considered appropriate to include the company in the transformation plan in the field of Smart Manufacturing.

COMPANY 3

- **Size of the company:** 1-10 employees
- **Sector of activity:** Business and other management consultancy activities (22.02)
- **Average Maturity Score:** 1.38/5
    - Advanced Manufacturing Technologies: 1/5
    - Digital Factory: 2/5
    - ECO Factory: 1/5
    - End-to-end Customer Focused Engineering: 1/5
    - Human Centred Organisation: 2/5
    - Smart Manufacturing: 1/5
    - Value Chain Oriented Open Factory: 1.67/5

- **Main conclusions:** The strongest areas for this company are Digital Factory and Human Centred Organisation. The weakest area is Smart Manufacturing. The company has a low development score in all areas and needs transformation, especially in the fields of Advanced Manufacturing Technologies, ECO Factory, and Smart Manufacturing. It is considered appropriate to include the company in the transformation plan in these areas.

COMPANY 4

- **Size of the company:** 100-250 employees
- **Sector of activity:** Manufacture of basic organic chemicals (14.01)
- **Average Maturity Score:** 2.17/5
    - Advanced Manufacturing Technologies: 2.33/5
    - Digital Factory: 1.75/5
    - ECO Factory: 2.5/5
    - End-to-end Customer Focused Engineering: 2.33/5
    - Human Centred Organisation: 2.25/5
    - Smart Manufacturing: 1.67/5
    - Value Chain Oriented Open Factory: 2.33/5

- **Main conclusions:** The strongest area for this company is ECO Factory. The weakest area is Smart Manufacturing. The company has a low development score in all areas and needs transformation, especially in the fields of Digital Factory and Smart Manufacturing. It is considered appropriate to include the company in the transformation plan in these areas.

COMPANY 5

- **Size of the company:** 100-250 employees
- **Sector of activity:** Manufacture of soap, washing, and cleaning preparations (detergents) and preparations used as soap (41.04)
- **Average Maturity Score:** 4.55/5
    - Advanced Manufacturing Technologies: 4.33/5
    - Digital Factory: 4.5/5
    - ECO Factory: 4.5/5
    - End-to-end Customer Focused Engineering: 4.67/5
    - Human Centred Organisation: 4.5/5
    - Smart Manufacturing: 4.33/5
    - Value Chain Oriented Open Factory: 5/5

- **Main conclusions:** The strongest area for this company is Value Chain Oriented Open Factory. The weakest areas are Advanced Manufacturing Technologies and Smart Manufacturing. However, the company has a high development score in all areas, and it is assessed that the factory does not need a significant implementation plan.

COMPANY 6

- **Size of the company:** 100-250 employees
- **Sector of activity:** Retail trade of iron/steel bars and rods, profiles, tubes, and pipes in specialized stores (52.13)
- **Average Maturity Score:** 1.93/5
    - Advanced Manufacturing Technologies: 1.67/5
    - Digital Factory: 1.25/5
    - ECO Factory: 2/5
    - End-to-end Customer Focused Engineering: 1.67/5
    - Human Centred Organisation: 3.25/5
    - Smart Manufacturing: 2/5
    - Value Chain Oriented Open Factory: 1.67/5

- **Main conclusions:** The strongest area for this company is Human Centred Organisation. The weakest area is Digital Factory. The company has a low development score in all areas except for Human Centred Organisation and needs transformation, especially in the fields of Advanced Manufacturing Technologies, End-to-end Customer Focused Engineering, and Value Chain Oriented Open Factory. It is considered appropriate to include the company in the transformation plan in these areas.

COMPANY 7

- **Size of the company:** 100-250 employees
- **Sector of activity:** Manufacture of primary forms alkyl resin, polyester resin, epoxy resin, polyacetal, polycarbonate, and other polyether or polyester (16.02)
- **Average Maturity Score:** 3.70/5
    - Advanced Manufacturing Technologies: 3.67/5
    - Digital Factory: 3.5/5
    - ECO Factory: 3.5/5
    - End-to-end Customer Focused Engineering: 4.33/5
    - Human Centred Organisation: 3.25/5
    - Smart Manufacturing: 3/5
    - Value Chain Oriented Open Factory: 4.67/5

- **Main conclusions:** The strongest area for this company is Value Chain Oriented Open Factory. The weakest area is Smart Manufacturing. The company has an above-average development score in all areas. It is considered appropriate to include the company in the transformation plan in the field of Smart Manufacturing to increase the maturity score.

COMPANY 8

- **Size of the company:** 11-50 employees
- **Sector of activity:** Manufacture of basic organic chemicals (14.01)
- **Average Maturity Score:** 1.33/5
    - Advanced Manufacturing Technologies: 2.67/5
    - Digital Factory: 1/5
    - ECO Factory: 1/5
    - End-to-end Customer Focused Engineering: 1/5
    - Human Centred Organisation: 1/5
    - Smart Manufacturing: 1.33/5
    - Value Chain Oriented Open Factory: 1.33/5

- **Main conclusions:** The strongest area for this company is Advanced Manufacturing Technologies. The weakest area is Digital Factory. The company has a low development score in all areas and needs transformation, especially in the fields of Human Centred Organisation, ECO Factory, End-to-end Customer Focused Engineering, and Smart Manufacturing. It is considered appropriate to include the company in the transformation plan in all the mentioned weak areas.

COMPANY 9

- **Size of the company:** 100-250 employees
- **Sector of activity:** Manufacture of mortars (64.01)
- **Average Maturity Score:** 2.64/5
    - Advanced Manufacturing Technologies: 2/5
    - Digital Factory: 2/5
    - ECO Factory: 3/5
    - End-to-end Customer Focused Engineering: 2.67/5
    - Human Centred Organisation: 3.5/5
    - Smart Manufacturing: 3/5
    - Value Chain Oriented Open Factory: 2.33/5

- **Main conclusions:** The strongest area for this company is Human Centred Organisation. The weakest area is Digital Factory. The company has a low development score in all areas and needs transformation, especially in the fields of Advanced Manufacturing Technologies and Digital Factory. It is considered appropriate to include the company in the transformation plan in these areas.

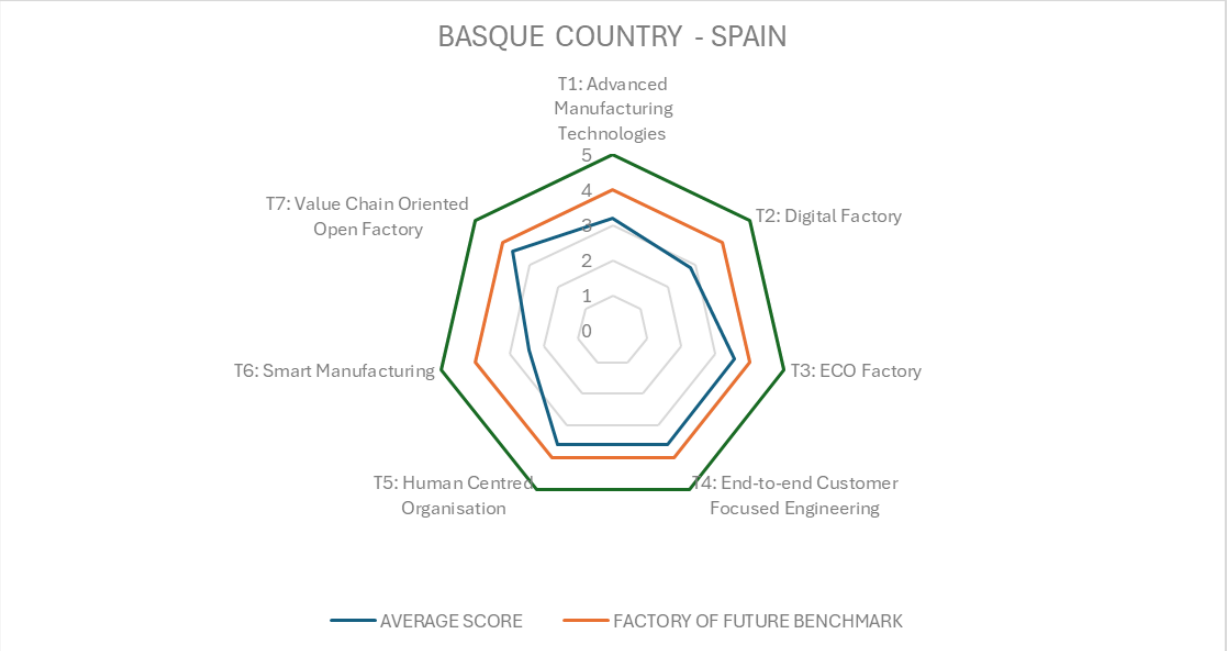
COMPANY 10

- **Size of the company:** 51-100 employees
- **Sector of activity:** Business and other management consultancy activities (22.02)
- **Average Maturity Score:** 4.18/5
    - Advanced Manufacturing Technologies: 4.67/5
    - Digital Factory: 4.5/5
    - ECO Factory: 4.5/5
    - End-to-end Customer Focused Engineering: 4.33/5
    - Human Centred Organisation: 4.25/5
    - Smart Manufacturing: 3.33/5
    - Value Chain Oriented Open Factory: 3.67/5

- **Main conclusions:** The strongest area for this company is Advanced Manufacturing Technologies. The weakest area is Smart Manufacturing. The company has a high or above-average development score in all areas. It is assessed that the factory does not need a significant implementation plan.

3.2. CONCLUSIONS OF THE SCANS

- **BASQUE COUNTRY - SPAIN**



BASQUE COUNTRY - SPAIN	T1: Advanced Manufacturing Technologies	T2: Digital Factory	T3: ECO Factory	T4: End-to-end Customer Focused Engineering	T5: Human Centred Organisation	T6: Smart Manufacturing	T7: Value Chain Oriented Open Factory
AVERAGE SCORE	3,2	2,9	3,6	3,6	3,6	2,4	3,6
FACTORY OF FUTURE BENCHMARK	4	4	4	4	4	4	4

Figure 7: ADMA Scan Results for Basque Country - Spain

A total of ten Basque companies were assessed to evaluate their maturity in various areas of digital transformation. The scans revealed a broad range of maturity levels, with **end-to-end customer-centric engineering (T4)** and **human-centred organisation (T5)** emerging as relative strengths. In contrast, **smart manufacturing (T6)** and **value chain-oriented open factory (T7)** require significant attention. This report summarises the main findings and provides practical recommendations for improvement.

Company Profiles

The companies analyzed vary in size:

- Two company have **1–10 employees**.
- Five companies have **11–50 employees**.
- One Company has **51-100 employees.**
- Two companies have **100–250 employees**.

This distribution shows a diversity of company sizes, with the largest groups being those with **11–50 employees** and **100–250 employees**.

Additionally, the scanned companies represent various sectors, including:

- **Metallurgy** (CNAE 2550)
- **Mechanical manufacturing engineering** (CNAE 2562)
- **Food industry** (CNAE 1071)
- **Research** (CNAE 7219)
- **Design and manufacturing of wood products** (CNAE 1629)
- **Manufacture of other fabricated metal products** (CNAE 2599)
- **Manufacture of metal forming machinery** (CNAE 2841)
- **Computer consultancy activities** (CNAE 6202)
- **Manufacture of other special-purpose machinery** (CNAE 2899)
- **Wholesale of machine tools** (CNAE 4662)

Transformation Areas with Higher Scores

Customer-focused integrated engineering (T4) consistently achieves high scores across most companies, indicating strong customer-oriented processes. Several companies also demonstrate strength in **Human-centred organisation (T5)**, highlighting a focus on employees and organisational culture.

Transformation Areas with Lower Scores

Smart Manufacturing (T6) frequently receives low scores, reflecting a need for improvements in automation and data-driven decision-making. **The Digital Factory (T2)** also shows gaps, with companies struggling to fully integrate digital tools into their production processes. **Advanced Manufacturing Technologies (T1)** varies widely among companies, with some significantly below the benchmark, indicating outdated machinery and a lack of investment in modernisation.

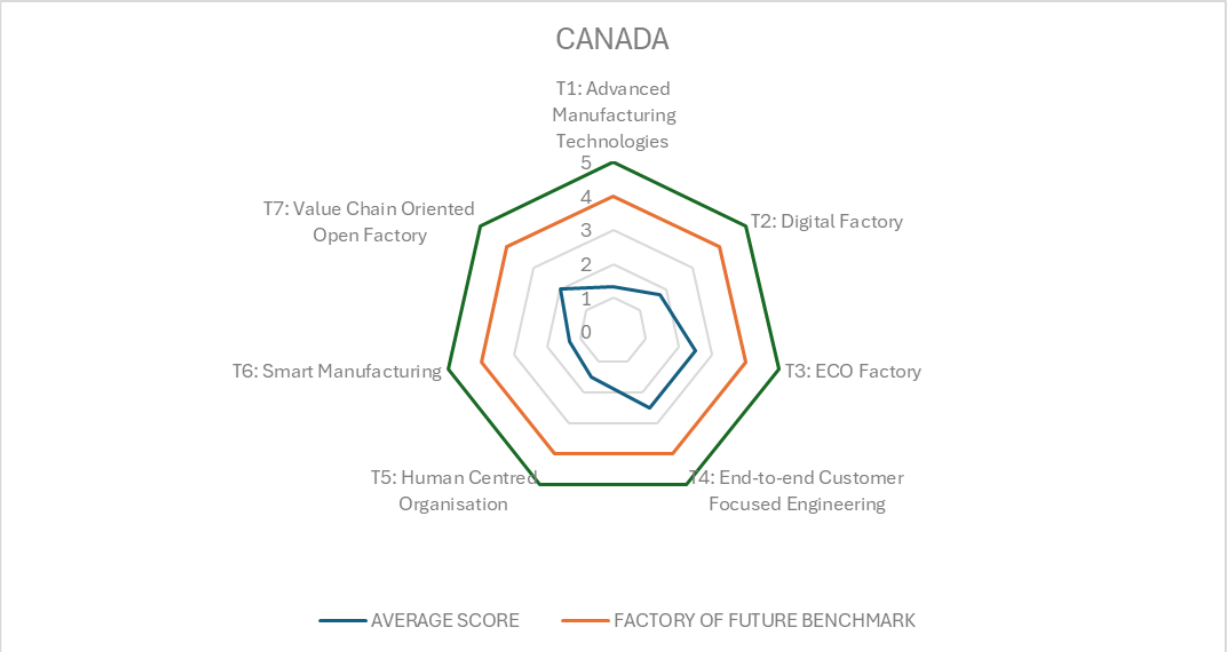
Common Themes and Areas for Development

- **Digitalisation Challenges**: Many companies, have low scores in **Digital Factory (T2)**, suggesting difficulties in integrating smart technologies and connectivity across the shop floor.
- **Automation Gaps**: **Smart Manufacturing (T6)** scores are consistently low, showing a reliance on manual processes and a lack of predictive maintenance strategies.
- **Sustainability Efforts**: While some companies score well in **ECO Factory (T3)**, others, need improvement in resource efficiency and sustainable practices.
- **Cybersecurity and Data Management**: Many companies need to enhance cybersecurity measures and ensure secure data exchange systems.

General Conclusions

Overall, the companies analysed show strengths in **Customer-oriented engineering (T4)** and **Human-centred organisation (T5)**, approaching the benchmark in these areas. However, significant gaps remain in digitalisation, automation, and smart manufacturing, with **Digital Factory (T2)** and **Smart Manufacturing (T6)** consistently receiving low scores. While some companies perform well across multiple areas, others face challenges in modernising manufacturing processes, optimising resource efficiency, and enhancing data security. Bridging these gaps will be essential for companies to fully transition into the Factory of the Future.

- **CANADA**



CANADA	T1: Advanced Manufacturing Technologies	T2: Digital Factory	T3: ECO Factory	T4: End-to-end Customer Focused Engineering	T5: Human Centred Organisation	T6: Smart Manufacturing	T7: Value Chain Oriented Open Factory
AVERAGE SCORE	1,3	1,8	2,5	2,5	1,5	1,3	2,0
FACTORY OF FUTURE BENCHMARK	4	4	4	4	4	4	4

Figure 8: ADMA Scan Results for Canada

These two Canadian SMEs are small-scale, sustainability-focused food producers with artisanal approaches to manufacturing. They prioritize eco-friendly practices and customer relationships over technological sophistication, operating with minimal automation and basic digital tools. While they demonstrate openness to innovation and efficient resource use, their small size limits formal R&D or advanced manufacturing capabilities. Their flat structures enable strong internal communication, but growth may require strategic tech adoption—particularly in digitalization and smart manufacturing—to enhance efficiency without compromising their hands-on, sustainable ethos. Both are well-positioned in niche markets but face scalability challenges typical of craft producers..

Company Profiles

The companies analyzed vary in size:

- One company have **1–10 employees**.
- One company have **11–50 employees**.

This distribution shows two company sizes, one of **10–11 employees** and another **11–50 employees**.

Additionally, the scanned companies represent various sectors, including:

- Food and beverage (1084)
- **Aquaculture** (0321)

Transformation Areas with Higher Scores

The assessment reveals consistent strengths in **ECO Factory** and **End-to-End Customer Focused Engineering** across both enterprises. These areas reflect robust sustainability initiatives and a market-oriented approach, underscoring a shared commitment to environmental stewardship and customer engagement.

Transformation Areas with Lower Scores

The assessment identifies consistent opportunities for improvement in **Advanced Manufacturing Technologies** and **Smart Manufacturing**, indicating potential areas for operational enhancement. These results suggest a shared need to strengthen technological integration and production efficiency across both enterprises.

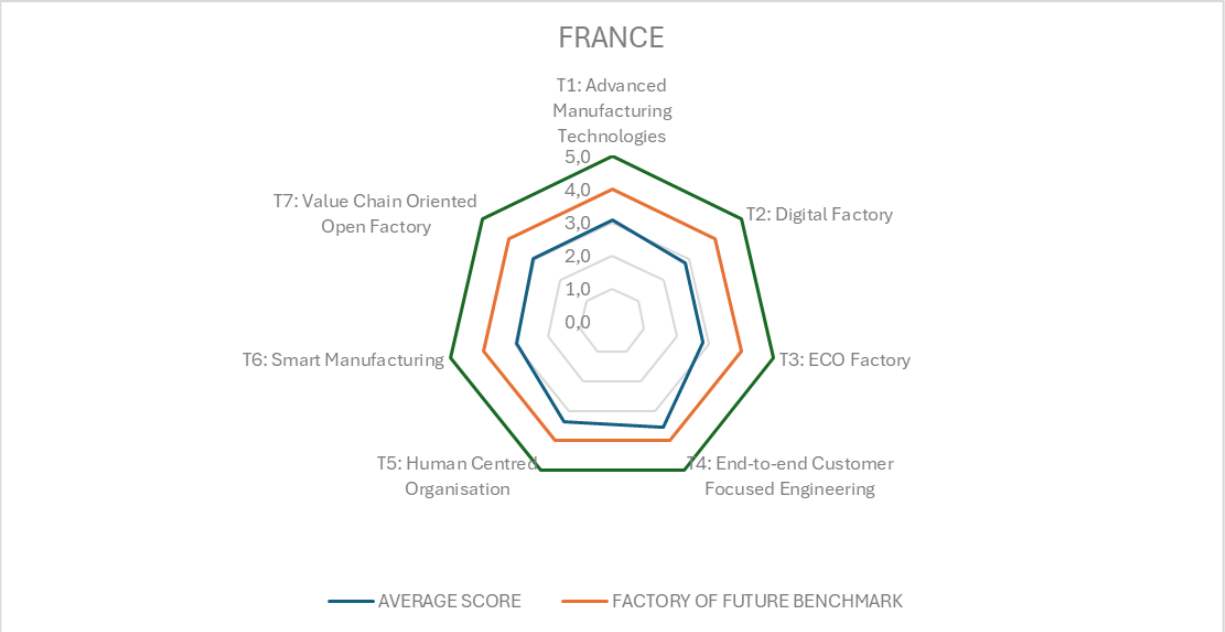
Common Themes and Areas for Development

- **Advanced Manufacturing**: Strengthening investment in equipment maintenance and employee skill development to improve overall production efficiency.
- **Digital Factory**: Enhancing digital integration and leveraging real-time data for informed decision-making and operational optimization.
- **Smart Manufacturing**: Expanding the adoption of automation and intelligent machinery to streamline production processes.
- **Value Chain & Innovation**: Improving the integration of external knowledge and fostering innovation networks to maintain a competitive edge.

General Conclusions

These small, artisanal food producers excel in sustainability (ECO Factory) and customer focus but lag in digital and advanced manufacturing adoption, with minimal automation and data-driven processes (Digital/Smart Manufacturing). Their human-centered approach fosters open communication, though knowledge-sharing structures are informal. While they show strategic innovation intent (Value Chain), external tech integration remains limited. To grow, they should preserve their artisanal strengths while selectively adopting scalable digital tools.

- **FRANCE**



FRANCE	T1: Advanced Manufacturing Technologies	T2: Digital Factory	T3: ECO Factory	T4: End-to-end Customer Focused Engineering	T5: Human Centred Organisation	T6: Smart Manufacturing	T7: Value Chain Oriented Open Factory
AVERAGE SCORE	3,1	2,9	2,8	3,6	3,4	2,9	3,1
FACTORY OF FUTURE BENCHMARK	4	4	4	4	4	4	4

Figure 9: ADMA Scan Results for France

A total of **14 companies** were assessed to evaluate their maturity in various areas of digital transformation. The scans revealed a broad range of maturity levels, with **customer-focused integrated engineering (T4)** and **human-centred organisation (T5)** emerging as relative strengths. In contrast, **digital factory (T2)** and **eco factory (T3)** require significant attention. This report summarises the main findings and provides practical recommendations for improvement.

Company Profiles

The companies analysed vary in size:

- **0%** of companies have **1--10 employees**.
- **43.75%** of companies have **11--50 employees**.
- **37.5%** of companies have **51--100 employees**.
- **6.25%** of companies have **100--250 employees**.
- **0%** of companies have **251--500 employees**.
- **12.5%** of companies have **+500 employees**.

This distribution shows a diversity of company sizes, with the largest groups being those with **11--50 employees** and **51--100 employees**.

Additionally, the scanned companies represent various sectors, including:

- **Sheet metal work** 25.11Z (7%)
- **Precision machining** 25.62Z (40%)

- **Design and manufacture of machine tools** 28.41Z (7%)
- **Stamping, welding, machining** 25.73Z (7%)
- **Surface treatment** 25.61Z (7%)
- **Automotive equipment** 29.31Z (7%)
- **Furniture designer and manufacturer** 31.01Z (7%)
- **Aircraft equipment** 30.30Z (7%)
- **Metal recycling and processing** 38.32Z (7%)

Transformation Areas with Higher Scores

Customer-focused integrated engineering (T4) consistently achieves high scores across most scans, highlighting a strength in customer-oriented processes. This is a key area that can be leveraged to share best practices across other domains. While **human-centred organisation (T5)** scores vary, it generally emerges as a relative strength, indicating a strong focus on people and organisational culture.

Transformation Areas with Lower Scores

- **Digital Factory (T2)** consistently receives low scores, underscoring the need for significant improvements in **digitalisation and smart technologies**.
- **Eco Factory (T3)** also scores low, indicating challenges in **sustainable practices and resource efficiency**.

Common Themes and Areas for Development

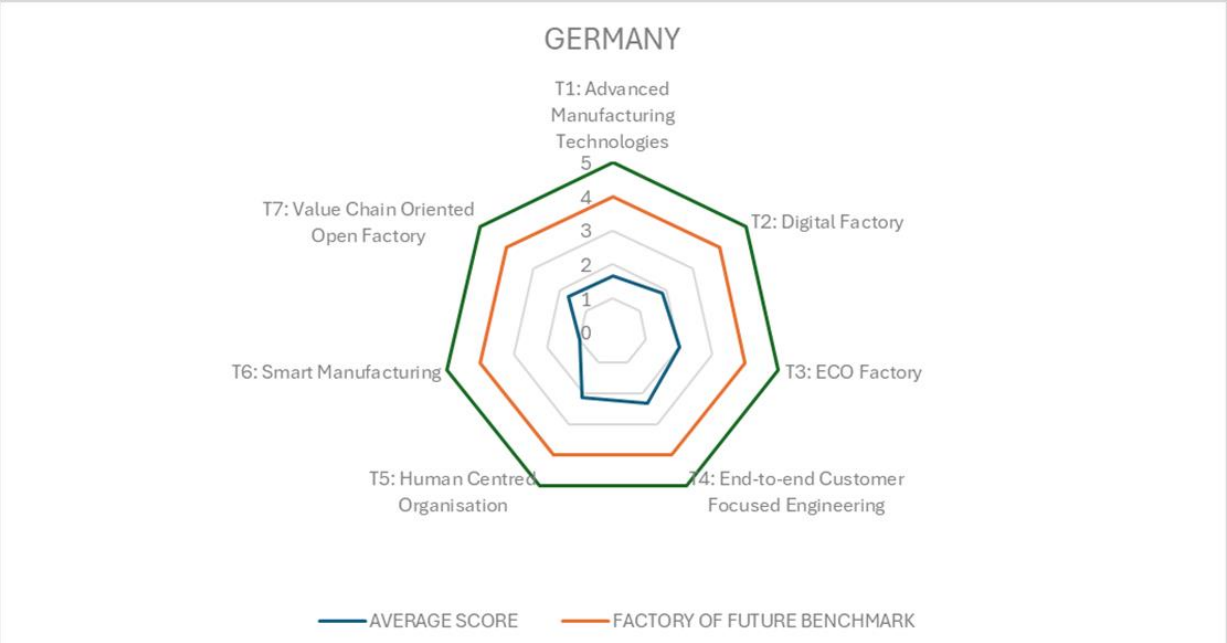
On average, the best-developed area, achieving the highest scores among the companies analysed, is **T4: Comprehensive customer-oriented engineering**. Conversely, the area with the lowest average score is **T2: Digital Factory**, highlighting significant opportunities for improvement in digitalisation and smart technologies.

General Conclusions

In conclusion, the analysis of the scores reveals that most companies demonstrate higher maturity in **comprehensive customer-oriented engineering (T4)** and **people-centred organisation (T5)**, approaching the ideal benchmark. However, **digital factory (T2)** and **eco factory (T3)** present significant challenges, with notably lower scores.

While some companies exhibit a more balanced performance, others face greater difficulties in their digital and industrial transformation. Overall, the gap between current performance and the benchmark indicates that, although progress has been made in certain areas, **there is still substantial room for improvement to reach an optimal level across all dimensions assessed**.

- **GERMANY**



GERMANY	T1: Advanced Manufacturing Technologies	T2: Digital Factory	T3: ECO Factory	T4: End-to-end Customer Focused Engineering	T5: Human Centred Organisation	T6: Smart Manufacturing	T7: Value Chain Oriented Open Factory
AVERAGE SCORE	1,7	1,9	2,0	2,3	2,1	1,0	1,7
FACTORY OF FUTURE BENCHMARK	4	4	4	4	4	4	4

Figure 10: ADMA Scan Results for Germany

Preliminary ADMA scans conducted with German industrial partners reveal strong customer-centric processes but significant untapped potential in smart manufacturing adoption. While limited data is available (2 completed scans), early findings highlight critical transformation opportunities during the current economic downturn.

Company Profiles

Size Distribution:

- Focus on **medium and large enterprises** (automotive Tier 1/Tier 2 suppliers)
- Includes **mechanical engineering** and **logistics** sectors

Key Sectors Represented:

- Metal fabrication (NACE 25.11/25.12)
- Rubber/plastics manufacturing (NACE 22.21)

Transformation Areas with Higher Scores

1. **Customer-Oriented Processes**
    a. Demonstrated strength across scanned companies
    b. Effective integration of client requirements in production planning
2. **Value Stream Optimization**
    a. Existing focus on lean manufacturing principles

b. Strong foundation for digital workflow enhancements

Critical Gaps Identified

1. **Smart Manufacturing (T6)**
   a. Limited in-house production facility networking
   b. Underutilization of IoT and real-time data analytics
2. **Predictive Maintenance**
   a. Low market penetration despite long-standing familiarity
   b. Reliance on traditional maintenance models
3. **Digital Factory Integration (T2)**
   a. Fragmented operational data acquisition systems
   b. Need for modern planning tools for scheduling

Strategic Development Priorities

Immediate Actions:

- Pilot **cost-effective robotics** in targeted production cells
- Implement **basic operational data capture** systems

Medium-Term Goals:

- Develop **modular digital twins** for high-value equipment
- Establish **supplier collaboration platforms** for Tier 2/Tier 3 partners

Cross-Sector Initiatives:

- Create **regional smart manufacturing hubs** under S3 Smart Specialisation
- Leverage DHBW's dual education system for **workforce upskilling**

General Conclusions

German manufacturers demonstrate:
Strengths in customer-focused production and lean methodologies
Critical gaps in Industry 4.0 adoption and predictive technologies

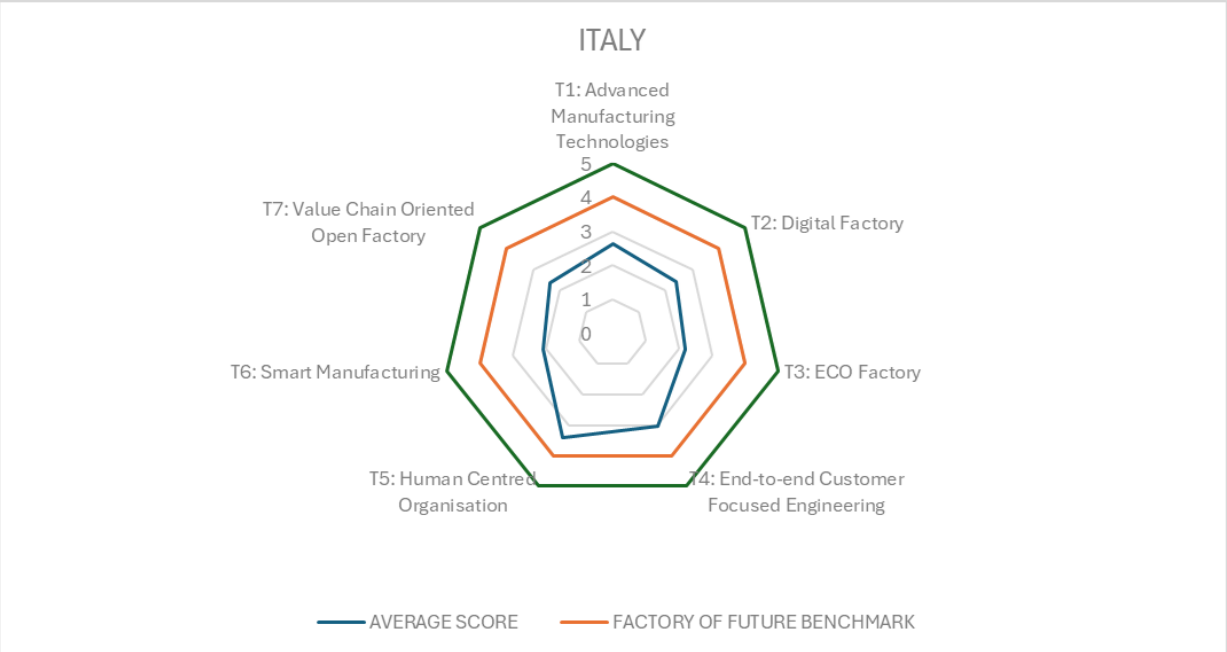
Unique Opportunity:
The current economic slowdown presents an ideal moment for:

- Process reorganization
- Targeted digitalization investments
- Supply chain resilience building

Recommendations:

1. Expand scan participation through **trust-based industry partnerships**
2. Develop **SME-friendly implementation roadmaps** for smart manufacturing
3. Align transformation projects with **regional specialization strategies.**

- **ITALY**



ITALY	T1: Advanced Manufacturing Technologies	T2: Digital Factory	T3: ECO Factory	T4: End-to-end Customer Focused Engineering	T5: Human Centred Organisation	T6: Smart Manufacturing	T7: Value Chain Oriented Open Factory
AVERAGE SCORE	2,6	2,4	2,2	3,0	3,4	2,1	2,4
FACTORY OF FUTURE BENCHMARK	4	4	4	4	4	4	4

Figure 11: ADMA Scan Results for Italy

A total of **8 companies** were assessed to evaluate their maturity in various areas of digital transformation. The scans revealed a broad range of maturity levels, with significant disparities requiring targeted attention. This report summarises the main findings and provides practical recommendations for improvement.

Company Profiles

The companies analysed vary in size:

- **5 companies** have **1–10 employees**.
- **2 companies** have **51–100 employees**.
- **1 company** have **100–250 employees**.

This distribution highlights a focus on very small and medium-sized enterprises, with no representation in the 11–50 employee range.

Additionally, the scanned companies represent the following sectors:

- **Manufacture of electrical equipment** (27.90.09)
- **Research and experimental development in natural sciences and engineering** (72.19.09)
- **Treatment and coating of metals** (25.61.00)
- **Manufacture of knitted and crocheted hosiery** (14.31.10)
- **Machining** (25.62.00)

Key Strengths

- **End-to-end Customer Focused Engineering (T4)**
  - Strong alignment with customer needs across most companies.
  - Integrated engineering processes are a standout capability.
- **Human-Centred Organisation (T5)**
  - Emphasis on employee development and collaborative culture.
  - Larger companies lead in structured training and autonomy.

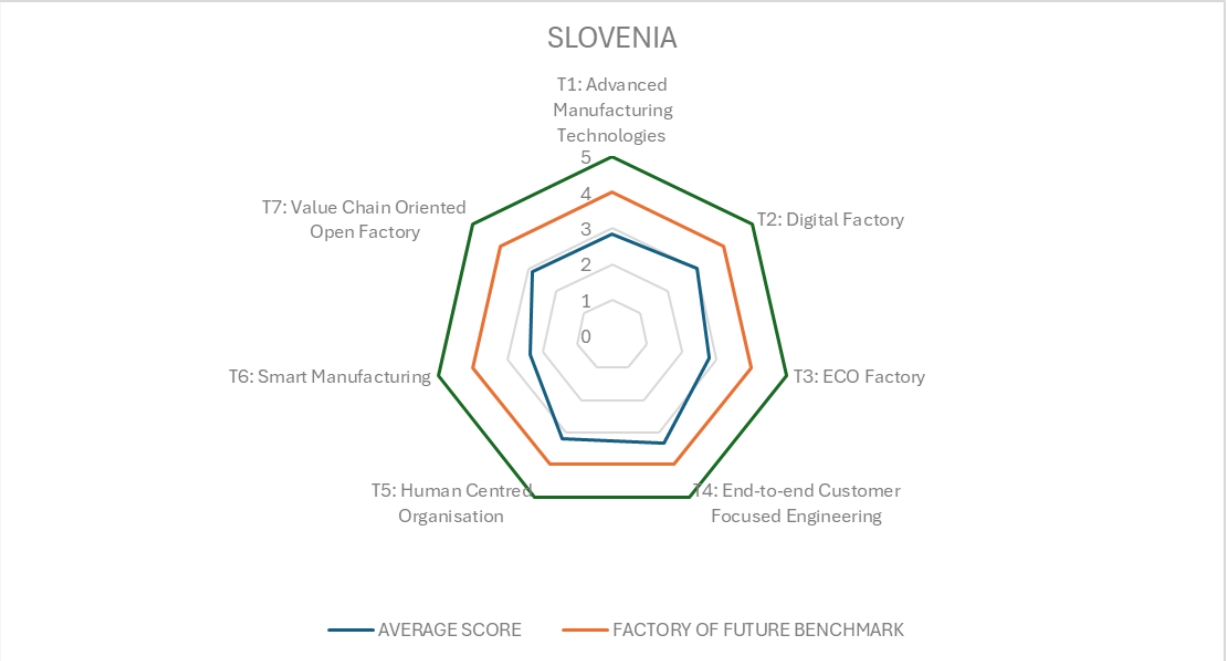
Critical Gaps

- **Advanced Manufacturing Technologies (T1)**
  - Need for major use of innovative technologies.
  - Poor attention to latest technology trends and capability to adopt new solutions.
- **Smart Manufacturing (T6)**
  - Limited adoption of automation and real-time data analytics.
  - Smaller firms face challenges in basic digital integration.
- **Digital Factory (T2)**
  - Fragmented digital infrastructure and cybersecurity risks.
  - Manual processes dominate, especially in smaller companies.
- **Value Chain Collaboration (T7)**
  - Weak external partnerships and innovation networks.
  - One company lacks any structured R&D collaborations.
- **ECO Factory (T3)**
  - Inconsistent sustainability practices.
  - Circular economy principles are rarely implemented.

General comments or conclusions after the scans:

While customer focus and organizational culture are strengths, **digital readiness** and **sustainability** require urgent attention. Smaller companies need targeted support to adopt basic technologies, whereas larger firms should lead in advanced innovation. Collaborative efforts, such as industry networks and policy incentives, will be essential to close these gaps.

- **SLOVENIA**



SLOVENIA	T1: Advanced Manufacturing Technologies	T2: Digital Factory	T3: ECO Factory	T4: End-to-end Customer Focused Engineering	T5: Human Centred Organisation	T6: Smart Manufacturing	T7: Value Chain Oriented Open Factory
AVERAGE SCORE	2,8	3,0	2,8	3,3	3,2	2,4	2,9
FACTORY OF FUTURE BENCHMARK	4	4	4	4	4	4	4

Figure 12: ADMA Scan Results for Slovenia

A total of **10 companies** were assessed to evaluate their digital transformation maturity. The scans revealed significant diversity in capabilities, with strong customer-centric practices but critical gaps in smart manufacturing and value chain integration. This report summarizes the findings and provides targeted recommendations.

Company Profiles

Size Distribution:

- **10%** Micro-enterprises (1-10 employees)
- **10%** Small enterprises (11-50 employees)
- **30%** Medium enterprises (51-100 employees)
- **10%** Large enterprises (100-250 employees)
- **20%** Major corporations (251-500 employees)
- **20%** Industrial leaders (500+ employees)

Key Sectors Represented:

- Sale, maintenance & repair of motorcycles & related parts & accessories (45.20)
- Manufacture of basic pharmaceutical products (21.10)
- Manufacture of lifting and handling equipment (28.22)
- Manufacture of parts & accessories for motor vehicles & their engines (**29.32**)
- Manufacture of other transport equipment (30.99)
- Aluminium production (24.42)
- General mechanical engineering of metals (25.73)

- Computer programming activities (62.01)
- Manufacture of plastics in primary forms (20.16)
- Computer programming, consultancy and related activities (62.01)

Transformation Areas with Higher Scores

1. **End-to-end Customer Focused Engineering (T4)**
    a. Standout strength across all company sizes
    b. Robust processes for customer needs integration
2. **Human Centred Organisation (T5)**
    a. Strong focus on employee development
    b. Larger firms lead in structured training programs

Transformation Areas Requiring Improvement

1. **Smart Manufacturing (T6)**
    a. Limited adoption of automation and IoT technologies
    b. Weak real-time data utilization for decision-making
2. **Value Chain Oriented Open Factory (T7)**
    a. Fragmented supplier collaboration
    b. Minimal open innovation initiatives
3. **ECO Factory (T3)**
    a. Inconsistent sustainability measures
    b. Rare implementation of circular economy principles
4. **Advanced Manufacturing Technologies (T1)**
    a. Outdated machinery in smaller enterprises
    b. Uneven adoption of predictive maintenance

Strategic Priorities for Development

For Micro/Small Enterprises:

- Implement basic digital tools for production monitoring
- Initiate partnerships for technology sharing

For Medium/Large Companies:

- Deploy Industry 4.0 pilot projects (e.g., digital twins)
- Develop closed-loop material recovery systems

For All Companies:

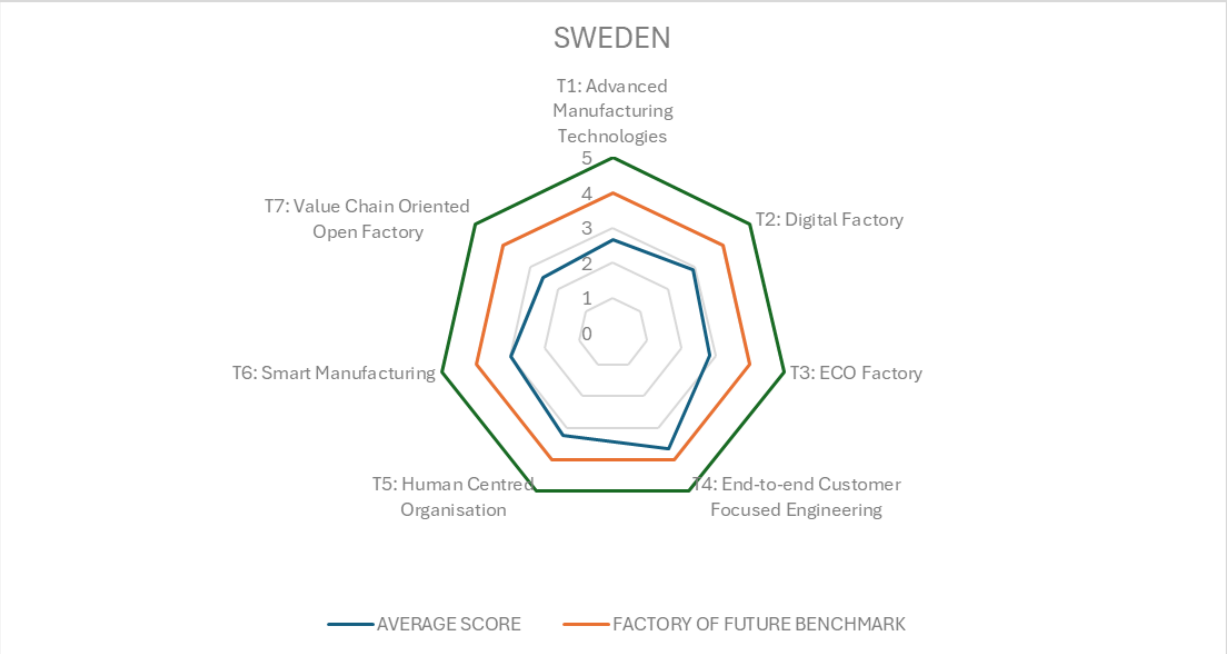
- Establish cross-sector innovation networks
- Create sustainability task forces with measurable KPIs

General Conclusions

Slovenian companies demonstrate **strong customer-centric cultures** but face systemic challenges in:

- **Digital transformation** (especially automation and data analytics)
- **Sustainable operations** (resource efficiency and waste reduction)
- **Collaborative ecosystems** (supply chain integration)

- **SWEDEN**



SWEDEN	T1: Advanced Manufacturing Technologies	T2: Digital Factory	T3: ECO Factory	T4: End-to-end Customer Focused Engineering	T5: Human Centred Organisation	T6: Smart Manufacturing	T7: Value Chain Oriented Open Factory
AVERAGE SCORE	2,7	2,9	2,8	3,7	3,3	3,0	2,6
FACTORY OF FUTURE BENCHMARK	4	4	4	4	4	4	4

Figure 13: ADMA Scan Results for Sweden

A total of **3 companies** were assessed to evaluate their maturity in various areas of digital transformation. The scans revealed a broad range of maturity levels, with **end-to-end customer-focused engineering** and **human-centred organisation** emerging as relative strengths. Significant attention is required in **value chain-oriented open Factory** and **digital Factory** areas. This report summarizes the main findings and provides practical recommendations for improvement.

Company Profiles

The companies analysed vary in size:

- **Two companies** have **11-50 employees**
- **One Company** has **100-250 employees**

This distribution shows a focus on small to medium-sized enterprises in the manufacturing sector.

Additionally, the scanned companies represent these sectors:

- **Aluminum manufacturing** (24.42)
- **Steel thread manufacturing** (24.34)
- **Metal manufacturing** (24)

Transformation Areas with Higher Scores

Customer-Focused Engineering emerges as the most developed capability across all companies, demonstrating strong customer orientation in product development and service delivery. **Human-Centred Organisation** also shows relative maturity, indicating effective people management practices and organizational culture development.

Transformation Areas with Lower Scores

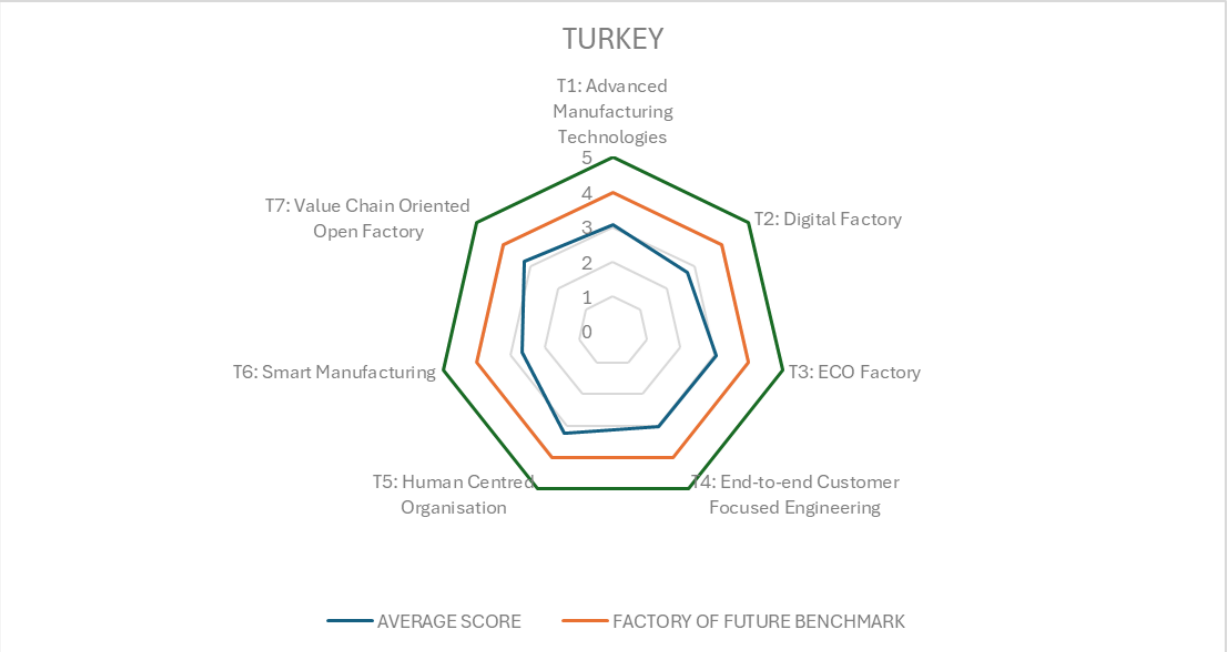
Value Chain Collaboration presents the most significant challenge, with all companies struggling with external partnerships and open innovation. **Digital Factory** implementation remains inconsistent, particularly in connectivity and data integration. While some companies show progress in **Advanced Manufacturing Technologies**, adoption levels vary considerably. **Sustainable Manufacturing** practices show potential but require more systematic implementation.

Common Themes and Areas for Development

The analysis identifies:

1. A strong foundation in customer-oriented practices that can be leveraged for broader transformation
2. Significant gaps in digital thread implementation across the value chain
3. Emerging but uneven capabilities in smart manufacturing technologies
4. Untapped potential in circular economy and sustainability practices.

- **TURKEY**



TURKEY	T1: Advanced Manufacturing Technologies	T2: Digital Factory	T3: ECO Factory	T4: End-to-end Customer Focused Engineering	T5: Human Centred Organisation	T6: Smart Manufacturing	T7: Value Chain Oriented Open Factory
AVERAGE SCORE	3,1	2,7	3,1	3,0	3,2	2,7	3,2
FACTORY OF FUTURE BENCHMARK	4	4	4	4	4	4	4

Figure 14: ADMA Scan Results for Turkey

Of the companies that were screened for ADMA, it was observed that:

- **60%** have **100-250 employees**,
- **10%** have **250+ employees**,
- **10%** have **50-100 employees**,
- **10%** have **10-50 employees**, and
- **10%** have **less than 10 employees**.

According to the screening results:

- **70%** of the companies are engaged in production in different fields in the field of **chemistry**,
- **20%** provide **business development and consultancy services**, and
- **10%** work in the field of **metallurgy**.

Areas where companies produce/especially work on:

- Manufacture of medical drugs (10%) – 1 company
- Manufacture of primary forms alkyd resin (20%) – 2 companies
- Manufacture of basic organic chemicals (20%) – 2 companies
- Business and other management consultancy activities (20%) – 2 companies
- Manufacture of soap, washing, and cleaning preparations (10%) – 1 company
- Manufacture of mortars (10%) – 1 company
- Retail trade of iron/steel bars and rods (10%) – 1 company

Areas of transformation that score higher in general:

- Value Chain Oriented Open Factory
- Human Centred Organisation

Areas of transformation that score lower in general:

- Digital Factory
- ECO Factory
- Smart Manufacturing
- Advanced Manufacturing Technologies

Common areas for improvement in almost every company:

- Digital Factory
- Smart Manufacturing

General comments or conclusions after the scans:

Although the areas that each company needs to improve vary in general, it has been observed that the **Digital Factory** and **Smart Manufacturing** areas are weak in our country. In this rapidly digitalizing age, the areas that need to be focused on first should be these two areas. It has been observed that improvements in these areas can also increase the scores of other low-scoring areas.

COMPARATIVE SUMMARY OF THE SCANS BY COUNTRY

The following comparative analysis of ADMA Scan results by country should be interpreted with caution. Firstly, the number of companies assessed in each country is very limited, ranging from just 2 to 14 firms per country, which makes it statistically inappropriate to draw definitive conclusions. Secondly, the profile of the companies involved is not homogeneous: they vary significantly in terms of sector, company size, and level of digital maturity. As a result, while this comparison offers some initial insights, it remains a highly limited exercise. It is important to note that the scans were not originally designed for inter-country comparison, and the sample used falls well short of what would be required for robust cross-national analysis.

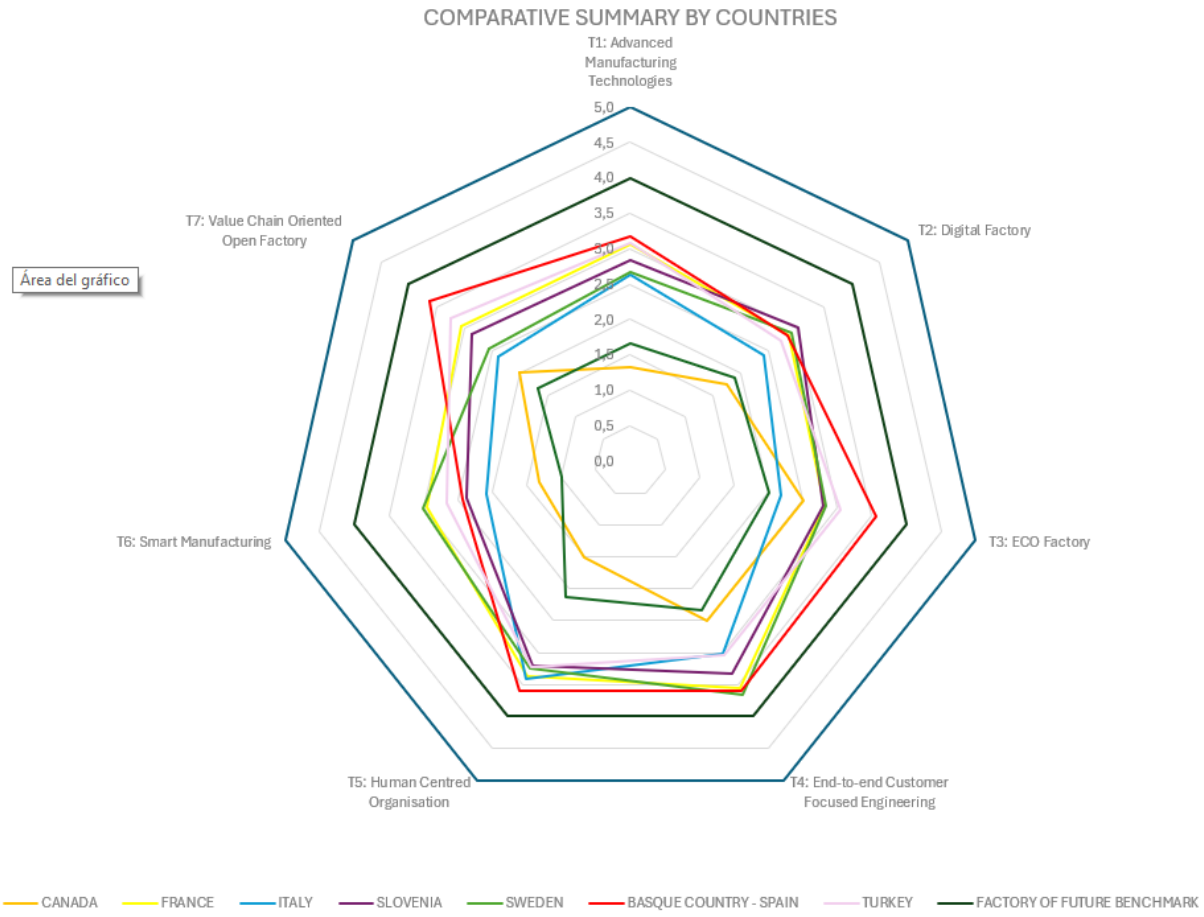


Figure 15: Comparative Summary of the Scan Results by Country

Common Strengths

- Customer Orientation (T4): All countries show high scores in Customer-Focused Integrated Engineering, reflecting a strong alignment with customer needs.
- Human-Centered Organization (T5): Both SMEs and large companies value talent development, internal training, and a positive organizational climate.

Recurring Weaknesses

- Digital Factory (T2): This is one of the lowest-scoring area in almost all countries indicating challenges in integrating digital tools into production processes.
- Smart Manufacturing (T6): Low levels of automation and limited use of real-time data. This is observed across all evaluated countries.
- Advanced Manufacturing Technologies (T1): Lack of investment in modern machinery, especially among microenterprises in several countries.
- Sustainability (ECO Factory, T3): Most countries show uneven results, suggesting that sustainability is not yet fully integrated into industrial strategy.

Cross-Cutting Recommendations

- Boost basic digitalization (T2): Prioritize the adoption of simple tools (sensors, data platforms, ERP software).
- Develop automation capabilities (T6): Promote accessible robotics and predictive maintenance pilots for SMEs.
- Support investment in advanced technologies (T1): Create public funding lines or consortia for equipment modernization.
- Encourage collaboration networks (T7): Especially useful for SMEs lacking internal R&D resources.
- Strengthen sustainability capabilities (T3): Incentivize energy efficiency and circular models through training and demonstration cases.

4. IMPLEMENTATION PLANS

Following the ADMA methodology, the initial scan phase provides a structured assessment of an SME's current situation across seven transformation areas. This diagnostic step identifies strengths, gaps, and priorities, serving as the foundation for the next stage: the development of a tailored implementation plan. In the framework of this project, scans have been carried out in several companies—approximately 10 per country—with 2 to 3 companies per country subsequently selected to develop detailed implementation plans. These plans are designed to translate strategic insights into concrete actions, supporting SMEs in their digital and sustainable transformation journeys. The following implementation plans reflect the specific needs and ambitions identified during the scan process, and outline the steps, resources, and timelines required to achieve the transformation goals.

4.1. SUMMARY OF THE REPORTS BY COUNTRY

4.1.1. IMPLEMENTATION & TRANSFORMATION PLAN BASQUE COUNTRY – SPAIN

This section covers three companies in the Basque Country region of Spain.

COMPANY 1

- **Industry:** High-precision clamping solutions for manufacturing.
- **Assessment Summary:**
  - Higher score area: Value Chain Oriented Open Factory.
  - Lower score area: Digital Factory.
- **Transformation Priorities:** Digitalization, Process Optimization, Workforce Training, and Sustainability.
- **Smart Manufacturing Details:**
  - Current Status: Partial digital tool integration, limited real-time data and automation.
  - Goals: Implement Industry 4.0 for real-time monitoring, automate key processes, and enhance data analytics.
  - Actions: Deploy IoT-enabled equipment, train staff on data-driven decisions, and integrate AI for predictive maintenance.
- **Process Optimization Details:**
  - Current Status: Inefficient workflows with waste and downtime.

- Goals: Streamline production to reduce waste, improve OEE, and enhance supply chain agility.
- Actions: Conduct value stream mapping, implement JIT inventory, and automate scheduling.

- **Other Priorities:** Workforce development (upskilling employees) and sustainability (reducing carbon footprint).
- **Implementation Journey:** Phases for assessment, pilot projects, scaling, and full integration.
- **Key KPIs:** Real-time data visibility, waste reduction, staff trained in digital tools, and energy reduction.

The improvement strategy of this COMPANY is based on specific digitalisation and automation implementations. For **digital factory enhancement**, IoT integration will include installing sensors on CNC machines to monitor spindle speed, vibration, and tool wear in real time, enabling predictive maintenance and minimizing downtime. Automated data collection from production lines will feed into a central dashboard for performance analysis.

Automation initiatives will include robotic arms for precision clamping tasks, reducing manual labor and errors. Automated guided vehicles (AGVs) will transport materials between workstations, optimizing workflow and reducing idle time.

For **process optimization**, implementing automated scheduling software will adjust production plans dynamically based on demand changes. Real-time quality control systems using vision sensors will detect defects during manufacturing, reducing waste.

Workforce training will focus on IoT device handling and data analysis, equipping employees to make data-driven decisions.

To improve **sustainability**, energy monitoring sensors will track machine consumption, identifying areas for efficiency improvements and carbon footprint reduction.

COMPANY 2

- **Industry:** Advanced polymer materials.
- **Assessment Summary:**
  - Higher score areas: Value Chain Oriented Open Factory, End-to-end Customer Focused Engineering.
  - Lower score area: Digital Factory.
- **Transformation Priorities:** Digitalization, Sustainability, Advanced Manufacturing, and Workforce Development.
- **Smart Manufacturing Details:**
  - Current Status: Partial automation with manual processes, data silos, and resistance to digital adoption.
  - Goals: Increase efficiency, enable real-time data access, and improve predictive maintenance.

- Actions: Automate tasks, establish a data governance framework, and adopt cloud-based systems.

- **Other Priorities:** Sustainability (reducing environmental impact), Advanced Manufacturing (Industry 4.0 integration), and Workforce Development (upskilling).
- **Implementation Journey:** Similar phases to Fresmak, including assessment, pilot projects, scaling, and optimization.
- **Key KPIs:** Real-time data visibility, energy reduction, waste reduction, and staff trained in digital tools.

The company's improvement strategy is focused on digitalisation, automation, sustainability, and workforce development. To enhance the **digital factory**, cloud-based systems will be implemented for centralized data access, breaking down silos and enabling real-time monitoring of polymer production. IoT sensors will track temperature, pressure, and mixing ratios during polymer synthesis, ensuring consistent quality and early detection of deviations.

For **automation**, automated batch processing will reduce manual interventions, while robotic arms will handle material mixing and packaging, increasing efficiency and safety. Implementing a data governance framework will standardize data collection and usage across departments, improving decision-making.

To boost **sustainability**, energy consumption sensors will identify inefficiencies in polymer extrusion, and waste tracking systems will quantify and reduce scrap rates.

Advanced manufacturing will focus on integrating Industry 4.0 technologies, such as AI-driven quality control, to detect defects in real-time.

Workforce training will address digital adoption challenges by teaching cloud system management and data interpretation skills.

COMPANY 3

- **Industry:** Production of other wood products; cork, basketry, and wickerwork articles.
- **Assessment Summary:**
  - Highest-rated area: End-to-End Customer-Focused Engineering.
  - Lowest-rated area: Smart Manufacturing.
- **Transformation Priorities:** Digitalization, process optimization, talent development, and sustainability.
- **Smart Manufacturing Details:**
  - Current Status: Low automation, limited data sharing, and cybersecurity vulnerabilities.
  - Goals: Increase automation, enhance cybersecurity, and improve data-driven decision-making.
  - Actions: Automate shop-floor data sharing, establish a Security Operations Center (SOC), and deploy AI-powered predictive maintenance.

- **Other Priorities:** Human-Centred Organisation (improve workforce digital literacy) and End-to-End Customer-Focused Engineering (strengthen customer involvement).
- **Implementation Journey:** Phases for each priority area, spanning from 0-6 months to 12-24 months.
- **Key KPIs:** Employees trained in digital skills, automation of repetitive tasks, "First Time Right" quality, and integration of feedback into developments.

The company's improvement strategy emphasises digitalisation, automation, talent development, and sustainability. To improve **smart manufacturing**, automating repetitive tasks like sanding, cutting, and finishing with CNC machines and robotic arms will enhance efficiency. Automating shop-floor data sharing through interconnected sensors will provide real-time insights into production rates and equipment health.

To address **cybersecurity**, establishing a Security Operations Center (SOC) will monitor data flow and protect against cyber threats, while staff will receive training on safe digital practices. AI-powered predictive maintenance will monitor machinery conditions (e.g., vibration, temperature) to predict failures and reduce downtime.

Talent development will include training workers on digital tools, enhancing skills in data analysis and machine handling.

For **customer-focused engineering**, creating digital customer portals will facilitate real-time order tracking and personalized product configurations, integrating customer feedback directly into the development cycle.

Sustainability efforts will include energy-efficient machinery and recycling wood waste into secondary products, reducing environmental impact.

4.1.2. IMPLEMENTATION & TRANSFORMATION PLAN FRANCE

The reports for France detail transformation plans for two companies, focusing on enhancing their technological maturity and adopting Industry 4.0 principles.

COMPANY 1

- **Industry:** Manufacture of precision mechanical parts.
- **Assessment Summary:**
  - Strengths: Human-Centred Organisation, Customer-Focused End-to-End Engineering.
  - Weaknesses: Smart Manufacturing, Value Chain Oriented Open Factory.
- **Transformation Priorities:** Smart Manufacturing, Value Chain Oriented Open Factory.
- **Smart Manufacturing Details:**
  - Current Status: Relies on traditional methods with limited digital integration and knowledge concentrated among a few key personnel.

- Goals: Implement real-time data monitoring and automated reporting.
- Actions: Data audit, BI tool deployment, staff training.

- **Value Chain Details:**
  - Current Status: Limited collaboration with external partners and no centralized platform for knowledge sharing.
  - Goals: Develop a digital collaboration portal and secure new international customers.
  - Actions: Pilot for collaboration portal, participation in B2B exhibitions.
- **Implementation Journey:** Includes BPi diagnostic, Data & AI Accelerator, and phases for implementation.
- **Key KPIs:** Reduction in manual reporting time, staff proficiency in new tools, reduction in production downtime, new contracts secured.

The objectives of the company's improvement strategy are aimed at smart manufacturing and enhancing the **value chain**. To modernize **smart manufacturing**, the first step is conducting a data audit to assess current reporting practices. Implementing **Business Intelligence (BI) tools** will automate data collection and generate real-time reports on machine performance and production metrics, reducing manual reporting time. Training staff to interpret data will improve decision-making and reduce downtime by identifying inefficiencies early.

For the **value chain**, a **digital collaboration portal** will centralize communication between internal teams and external partners, facilitating knowledge sharing and project coordination. To secure **new international customers**, the company will participate in **B2B exhibitions** showcasing its precision parts and digital transformation progress.

Employee training will focus on BI tool proficiency and portal usage, fostering a culture of data-driven practices. The implementation journey includes diagnostic assessments, data acceleration initiatives, and phased deployment, with KPIs tracking manual reporting reduction, tool proficiency, downtime, and new contracts.

COMPANY 2

- **Industry:** Not specified.
- **Assessment Summary:**
  - Higher score area: Not specified.
  - Lower score area: Not specified.
- **Transformation Priority:** Data Analytics Modernization.
- **Smart Manufacturing Details:**
  - Current Status: Data is siloed, with manual processes for reporting and no real-time insights.
  - Goals: Implement a unified data platform and enable automated reporting.
  - Actions: Data audit, BI tool deployment, development of standardized KPIs and dashboards.

- **Implementation Journey:** Phases for data audit, BI tool deployment, and user training.
- **Key KPIs:** Reduction in time spent on manual reporting, department adoption rate of BI tool, number of automated reports generated.

The company's improvement strategy focuses on **data analytics modernization**. The first step involves conducting a **data audit** to identify silos and assess data quality. Implementing a **unified data platform** will consolidate information from disparate sources, providing a single point of truth.

To achieve **automated reporting**, deploying **Business Intelligence (BI) tools** will allow real-time insights, reducing manual effort and increasing accuracy. Developing **standardized KPIs and dashboards** will ensure consistent performance tracking across departments.

Training employees on the new platform will facilitate adoption and enhance data literacy, promoting a culture of data-driven decision-making. KPIs include reduced manual reporting time, BI tool adoption rate, and the volume of automated reports generated.

4.1.3. IMPLEMENTATION & TRANSFORMATION PLAN GERMANY

COMPANY 1

- **Industry:** Manufacture of industrial and hangar doors.
- **Assessment Summary:**
    - Higher score areas: End-to-End Customer Focussed Engineering, Digital Factory.
    - Lower score areas: Smart Manufacturing, Advanced Manufacturing.
- **Transformation Priority:** Smart & Advanced Manufacturing.
- **Smart Manufacturing Details:**
    - Current Status: Semi-finished products are manually loaded into CNC milling machines with single-shift operation.
    - Goals: Automate loading with a cobot to extend machine uptime and reduce unit costs.
    - Actions: Develop a robotic hand prototype, reorganize the workspace for cobot integration, and ensure CE compliance.
- **Implementation Journey:** Collaboration with DHBW Heidenheim and QUANTEC Engineering.

Key KPIs: Reduction in manual labor hours, machine uptime increase, unit cost reduction, and production output increase.

The company's strategy focuses on **smart and advanced manufacturing** to enhance productivity. To improve **smart manufacturing**, a **collaborative robot (cobot)** will be developed to automate the loading of semi-finished products into CNC milling machines. This will extend machine uptime by enabling multi-shift operations and reduce unit costs by minimizing manual labor.

The first step involves designing a **robotic hand prototype** specifically for handling door components. The **workspace will be reorganized** to accommodate the cobot while maintaining safety standards. Compliance with **CE regulations** will be prioritized during integration to ensure operational safety.

Collaboration with **DHBW Heidenheim and QUANTEC Engineering** will support prototype development and deployment. Training will be conducted to familiarize operators with cobot handling.

KPIs include **reduction in manual labor hours**, **increased machine uptime**, **lower unit costs**, and **improved production output**, reflecting the efficiency gains from automation.

4.1.4.IMPLEMENTATION & TRANSFORMATION PLAN ITALY

The reports for Italy detail transformation plans for two companies.

COMPANY 1

- **Industry**:
  Household appliance components (washing machines, dryers, refrigerators, etc.)
- **Assessment Summary**:
  - **Strengths**:
    - Strong customer-focused engineering
    - Established Industry 4.0 adoption
    - Active R&D (R-Lab for mechatronics/smart devices)
  - **Weaknesses**:
    - Limited regulatory tracking for sustainability
    - Untapped potential in value chain integration
- **Transformation Priorities**:
  1. Advanced Manufacturing
  2. ECO Factory
  3. Value Chain Integration
- **Advanced Manufacturing Details**:
  - **Current**: Industry 4.0 partially implemented; AI/emerging tech underutilized.
  - **Goals**: Boost efficiency, integrate AI.
  - **Actions**:

Map existing technologies

Pilot AI for predictive maintenance

ECO Factory Details:

- **Current**: Focus on material reduction but reactive to regulations.

- **Goals**: Proactive compliance, microplastics reduction.
- **Actions**:

Train staff on regulatory monitoring

Adopt compliance tracking tools

Other Priorities:

- **Value Chain**: Digital integration with suppliers for circular economy.
- **Funding**: Leverage Lombardy Region grants (e.g., *Bando Filiere*).

Implementation Journey:

- **0-6m**: Tech assessment, regulatory training.
- **6-12m**: AI pilot, supplier mapping.
- **12-18m**: Full-scale circular economy integration.

Key KPIs:

- Production efficiency
- Regulatory compliance speed
- Supplier collaboration depth

The company's strategy focuses on **advanced manufacturing**, **ECO factory initiatives**, and **value chain integration**.

For **advanced manufacturing**, the company will map current technologies to identify gaps and pilot **AI-driven predictive maintenance** on critical equipment, aiming to reduce downtime and improve efficiency. Integrating emerging technologies like **machine learning** for defect detection will further optimize production.

In the **ECO factory** initiative, proactive compliance with sustainability regulations will be achieved by training staff on regulatory monitoring and implementing **compliance tracking tools**. Efforts will also focus on reducing **microplastics** in appliance components, improving environmental impact.

For **value chain integration**, digital collaboration platforms will connect suppliers to enhance traceability and foster a **circular economy**. To support these initiatives, the company will apply for **Lombardy Region grants** (e.g., Bando Filiere) to fund innovation projects.

KPIs will include **production efficiency improvement**, **faster compliance tracking**, and **increased supplier collaboration**, ensuring sustainable and efficient manufacturing.

COMPANY 2

- **Industry**:
  Textile manufacturing (knitting, dyeing, and finishing hosiery).
- **Assessment Summary**:
  - **Strengths**:
    - Advanced digital infrastructure.

        - Strong sustainability practices (ECO Factory).
    - **Weaknesses**:
        - Limited team collaboration.
        - Underutilized real-time production data.
        - Fragmented value chain integration.
- **Transformation Priorities**:
    1. Human-Centered Organization
    2. Smart Manufacturing
    3. Value Chain Integration
- **Human-Centered Organization Details**:
    - **Current**: Hierarchical work instructions; minimal teamwork.
    - **Goals**: Enhance collaboration, autonomy, and responsibility.
    - **Actions**:

Redesign organizational structure.

Train employees for cross-functional roles.

Smart Manufacturing Details:

- **Current**: Efficient but reactive production monitoring.
- **Goals**: Real-time data-driven decision-making.
- **Actions**:

Implement digital production planning tools.

Automate data flow between systems.

Other Priorities:

- **Value Chain**: Strengthen partnerships for innovation.
- **Funding**: Lombardy Region grants (e.g., *Bando Filiere*).

Implementation Journey:

- **0-6m**: Organizational review, digital tool mapping.
- **6-12m**: Pilot automation, supplier collaboration.
- **12-18m**: Full-scale integration.

Key KPIs:

- Employee collaboration metrics ↑
- Production planning efficiency ↑
- Supplier partnership depth ↑

The company's strategy focuses on becoming a **human-centered organization**, enhancing **smart manufacturing**, and improving **value chain integration**.

For the **human-centered organization**, the hierarchical structure will be redesigned to promote **collaborative teamwork** and shared responsibility. Cross-functional training will empower employees to take on versatile roles, fostering a culture of innovation and autonomy.

In **smart manufacturing**, the company will implement **digital production planning tools** to optimize scheduling and resource allocation. Automating data flow between knitting, dyeing, and finishing systems will enable **real-time decision-making**, reducing delays and improving responsiveness.

To enhance the **value chain**, establishing **strategic partnerships** with suppliers will support innovation. Digital platforms will facilitate **transparent communication**, boosting supply chain efficiency.

The company will leverage **Lombardy Region grants** (e.g., Bando Filiere) to fund these initiatives. KPIs will track **employee collaboration improvements**, **production planning efficiency**, and **supplier partnership depth**, ensuring a cohesive and data-driven approach.

4.1.5.IMPLEMENTATION & TRANSFORMATION PLAN SWEDEN

COMPANY 1

- **Industry:** Not specified.
- **Assessment Summary:**
  - Higher score areas: Human-Centred Organisation, Customer-Focused End-to-End Engineering.
  - Lower score areas: Smart Manufacturing, Value Chain Oriented Open Factory.
- **Transformation Priorities:** Smart Manufacturing and ECO Factory.
- **Smart Manufacturing Details:**
  - Current Status: Production relies on manual monitoring with no real-time data analytics and high downtime.
  - Goals: Implement AI-driven predictive maintenance and reduce unplanned downtime.
  - Actions: Conduct a data audit and pilot IoT sensors.
- **ECO Factory Details:**
  - Current Status: Energy-intensive processes with limited renewable energy use and no formal recycling program.
  - Goals: Achieve increased renewable energy usage and waste recycling.
  - Actions: Audit energy consumption and train staff on waste segregation.
- **Implementation Journey:** Includes services like Industrial Improvement Methodologies and Data & AI Accelerator.
- **Key KPIs:** Reduction in energy consumption, percentage of waste recycled, renewable energy usage, and downtime reduction.

The company's strategy focuses on **smart manufacturing** and establishing an **ECO factory**.

For **smart manufacturing**, the goal is to reduce downtime by implementing **AI-driven predictive maintenance**. The first step is conducting a **data audit** to identify equipment prone to failure. Installing **IoT sensors** on critical machines will enable real-time monitoring of parameters like temperature, vibration, and power usage, predicting breakdowns before they occur.

To develop an **ECO factory**, the company will audit energy consumption to identify inefficiencies. Increasing the share of **renewable energy** (e.g., solar panels) will reduce environmental impact. Additionally, implementing a **formal recycling program** with staff training on waste segregation will improve sustainability.

The implementation journey includes utilizing **Industrial Improvement Methodologies** and the **Data & AI Accelerator**. KPIs include **reduction in energy consumption**, **waste recycling percentage**, **renewable energy use**, and **downtime reduction**, indicating progress in operational efficiency and environmental responsibility.

4.1.6.IMPLEMENTATION & TRANSFORMATION PLAN TURKEY

The reports for Turkey detail transformation plans for two companies.

COMPANY 1

- **Industry**: Technology & Consulting (chemical compliance, carbon footprint, entrepreneurship).
- **Assessment Summary**:
  - **Strengths**: Digital tools, collaborative culture.
  - **Weaknesses**: Manual processes, no sustainability program.
- **Transformation Priorities**:
  1. Smart Manufacturing (automation)
  2. Process Optimization (workflow efficiency)
  3. Workforce Upskilling
- **Smart Manufacturing Details**:
  - **Current**: Manual document handling, no real-time data.
  - **Goals**: 50% faster retrieval, full CRM integration.
  - **Actions**: Deploy CRM/ERP, automate workflows.
- **Process Optimization Details**:
  - **Current**: Paper-based, slow approvals.
  - **Goals**: Cut manual work by 75%.
  - **Actions**: E-signatures, RPA for approvals.

- **Other Priorities**:
    - Employee certifications (Lean/WCM).
    - Carbon-neutral initiatives.
- **Implementation Journey**:
    - **0-6m**: Vendor selection, skills assessment.
    - **6-12m**: CRM pilot, first certifications.
    - **12-18m**: Full rollout, sustainability launch.
- **Key KPIs**:
    - Document processing time
    - % employees certified
    - Automated workflows
    - Digital customer interactions

The company's strategy focuses on **smart manufacturing**, **process optimization**, and **workforce upskilling**.

For **smart manufacturing**, the goal is to reduce document retrieval time by **50%** and fully integrate a **CRM/ERP system**. Implementing **workflow automation** will streamline document handling and enable real-time data access. Automating client interactions through digital customer portals will enhance responsiveness.

In **process optimization**, manual approval processes will be replaced with **e-signature solutions** and **Robotic Process Automation (RPA)** for faster document validation. This will cut manual work by **75%**, improving efficiency.

For **workforce upskilling**, employees will undergo training for **Lean and World Class Manufacturing (WCM)** certifications, boosting their skills in process improvement.

The company will also initiate **carbon-neutral projects**, such as energy-efficient operations and digital documentation to minimize paper usage.

KPIs include **reduced document processing time**, **increased certification rates**, **number of automated workflows**, and **enhanced digital customer interactions**.

COMPANY 2

- **Industry:** Cement chemicals production with integrated R&D and quality control
- **Assessment Summary:**
    - **Strengths**: Established advanced manufacturing techniques, In-house laboratory for quality assurance.
    - **Weaknesses:** Limited digital infrastructure, High environmental impact from production, Need for improved internal communication.

- **Transformation Priorities:**
  1. **Sustainable Production** (Eco Factory)
  2. **Employee Engagement & Communication** (Human Centered Organization)
- **Sustainable Production (Eco Factory) Details:**
  - **Current State**: Reliance on carbon-intensive 78linker in cement production, No formal sustainability program in place.
  - **Transformation Goals**: Reduce environmental impact of production, Lower material costs through alternative inputs.
  - **Key Actions**: Implement Supplementary Cementitious Materials (SCMs), Develop carbon emission tracking system, Pursue environmental certifications.
- **Employee Engagement Details:**
  - **Current State**: Top-down communication dominates, Limited cross-department collaboration.
  - **Transformation Goals**: Strengthen horizontal communication, Increase employee satisfaction and retention.
  - **Key Actions**: Leadership training programs, Regular team-building activities, Implement employee feedback system.
- **Additional Focus Areas:**
  - Future digital transformation of production monitoring.
  - Customer-focused process improvements (long-term).
- **Implementation Roadmap:**
  - **First 6 Months**: Research and test alternative materials, Launch initial leadership training, Establish baseline metrics.
  - **6-12 Months**: Begin material substitution in production, Implement team collaboration initiatives, Conduct first employee satisfaction survey.
  - **12-18 Months**: Full rollout of sustainable materials, Evaluate and refine engagement programs.
- **Performance Metrics:**
  - **Production Metrics**: % reduction in clinker usage, Tons of CO2 emissions reduced.
  - **Employee Metrics**: Training participation rates, Employee satisfaction scores, Cross-department project collaborations.

The company's strategy focuses on **sustainable production** and **employee engagement**.

For **sustainable production (Eco Factory)**, the company will reduce carbon emissions by replacing clinker with **Supplementary Cementitious Materials (SCMs)** like fly ash or slag. Implementing a **carbon emission tracking system** will provide real-time monitoring, while pursuing **environmental certifications** will enhance compliance and public image.

For **employee engagement**, the company will address communication challenges by introducing **leadership training programs** to encourage collaborative management. Regular

team-building activities will foster cross-departmental collaboration, and an **employee feedback system** will gather input for continuous improvement.

Additional efforts will include exploring **digital production monitoring** to enhance process efficiency and long-term **customer-focused improvements**.

The implementation roadmap includes initial **material testing**, **leadership training**, and **baseline metric establishment** in the first six months. By **6-12 months**, the company will start material substitution and team initiatives, with full material rollout and engagement evaluation by **12-18 months**.

KPIs include **clinker usage reduction**, **CO2 emission cuts**, **training participation rates**, and **employee satisfaction scores**.

4.2. CONCLUSIONS OF THE IMPLEMENTATION PLANS

4.2.1 Introduction

Each company underwent an assessment to evaluate its technological maturity, highlighting strengths and areas for improvement. A common thread across all cases is the recognition of the need to embrace Industry 4.0 principles to enhance competitiveness and efficiency.

4.2.2 Common High and Low Scoring Areas

While specific scores vary, there are recurring patterns:

- **High Scoring Areas:** Generally, companies demonstrate strengths in areas related to human-centered organization and customer-focused engineering. This indicates a solid foundation in employee engagement and customer relations.
- **Low Scoring Areas:** A frequent challenge is the implementation of smart manufacturing and the development of value-chain-oriented open factories. This suggests a need for better digital integration in production processes and more robust collaboration with external partners.

4.2.3 Overall Transformation Priorities

The transformation plans across all examples emphasize several key priorities:

- **Digitalization and Smart Manufacturing:** Implementing Industry 4.0 technologies to automate processes, enable real-time data monitoring, and improve decision-making.
- **Process Optimization:** Streamlining workflows, reducing waste, and enhancing efficiency through lean manufacturing principles and other optimization techniques.
- **Workforce Development:** Upskilling employees to handle new digital tools, fostering a culture of continuous learning, and improving collaboration.

- **Sustainability:** Adopting eco-friendly practices, reducing energy consumption, and implementing circular economy principles.

4.2.4 Transformation Area: Smart Manufacturing

- **Current Status:** A common starting point is the reliance on traditional production methods with limited digital integration. Data is often siloed, and real-time insights are lacking. There's a need to move away from manual processes and towards more automated, data-driven operations.
- **Transformation Goals:** The overarching goal is to implement smart manufacturing to achieve real-time monitoring, automated reporting, predictive maintenance, and increased efficiency. Companies aim to become more agile and data-driven in their production processes.
- **Suggested Areas for Improvement:**
    - **IoT Sensors:** Deploying IoT devices to connect machines and gather real-time data on their performance.
    - **BI Tools:** Adopting business intelligence tools for data visualization and analysis to support better decision-making.
    - **AI and Machine Learning:** Integrating AI for predictive maintenance, quality control, and other optimizations.
- **Recommended Actions:**
    - **Data Audit:** Conducting a thorough assessment of existing data sources and needs.
    - **Tool Deployment:** Selecting and implementing appropriate software and hardware solutions.
    - **Training:** Providing staff training on new tools and technologies.

4.2.5 Transformation Area: Value Chain Oriented Open Factory / Sustainability

- **Current Status:** Many companies face challenges in collaborating effectively with external partners and in optimizing their value chains. There's also a growing recognition of the need to adopt sustainable practices.
- **Transformation Goals:**
    - **Value Chain:** The aim is to develop more connected and collaborative ecosystems, fostering better communication and knowledge sharing with partners.
    - **Sustainability:** Companies are setting goals to reduce their environmental impact, increase energy efficiency, and adopt circular economy principles.
- **Suggested Areas for Improvement:**
    - **Digital Collaboration Platforms:** Implementing portals and tools to facilitate communication and knowledge sharing.
    - **Partnering with Experts:** Collaborating with technology providers, research institutions, and other specialists.
    - **Energy-Efficient Technologies:** Upgrading equipment and adopting renewable energy sources.
    - **Waste Reduction and Recycling:** Implementing programs to minimize waste and maximize the reuse of materials.
- **Recommended Actions:**
    - **Pilot Projects:** Launching pilot programs to test new technologies and processes.

- **Audits and Assessments:** Conducting energy audits, carbon footprint assessments, and value stream mapping exercises.
- **Training and Awareness:** Educating employees on sustainability practices and the importance of collaboration.

4.2.6 Implementation Journey and Measurement

Implementation Journey Guide

The transformation plans are typically structured into phases:

- **Phase 1 (Months 1-6):** Focus on assessment, planning, and initial implementation steps such as data audits, technology selection, and pilot projects.
- **Phase 2 (Months 7-12):** Scaling up pilot projects, implementing training programs, and further developing key initiatives.
- **Phase 3 (Year 2-3):** Full implementation of Industry 4.0 technologies, continuous improvement efforts, and achievement of long-term strategic goals.

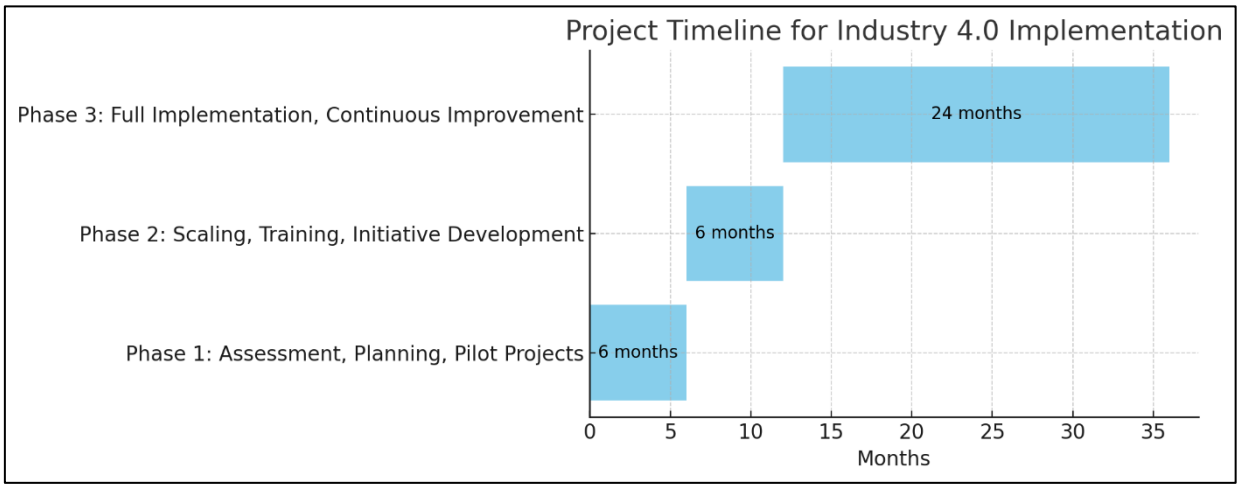


Figure 16: Phases in the transformation plans

4.2.7 Measurement and KPIs

- **General KPIs:** These metrics track the overall impact of the transformation, such as reductions in manual reporting time, energy consumption, waste, and improvements in efficiency.
- **Short-Term KPIs (0-6 Months):** These are used to monitor progress in the initial phases, such as the completion of audits, tool selection, and training programs.
- **Long-Term KPIs (6-18+ Months):** These metrics assess the achievement of strategic objectives, such as increased production output, cost savings, and the adoption of new technologies.

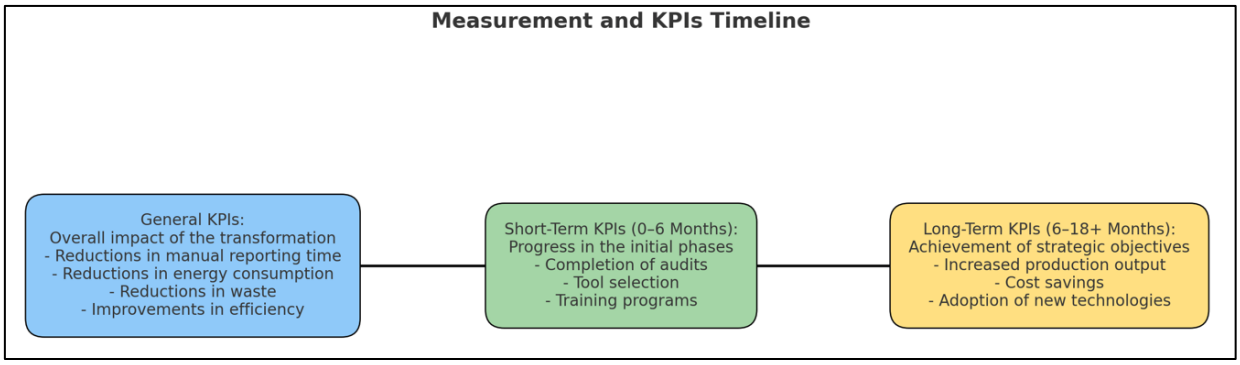


Figure 17: Measurement and KPIs Timeline

4.2.8 Governance, Support, and Next Steps

Governance and Monitoring

- **Steering Committees:** Establishing dedicated teams to oversee the transformation process and ensure alignment with strategic goals.
- **Quarterly Reviews:** Conducting regular reviews to track progress, assess KPIs, and adjust strategies as needed.
- **Benchmarking:** Comparing performance against industry standards to identify areas for further improvement.

4.2.9 Support and Services Utilized

- **External Expertise:** Companies often leverage external support for assessments, training, and technology implementation. This includes consultants, technology providers, and research institutions.

4.2.10 Next Steps and Funding

- **Next Steps:** The common next step is to further develop detailed implementation plans and secure funding for the transformation initiatives.
- **Funding Opportunities:** Companies explore various funding options, including national and EU grants, to support their transformation projects.

5. CONCLUSIONS

The report D7.2 presents a set of case studies based on scans and implementations carried out in different countries, within the framework of the LCAMP project. This project aims to support the digital transformation of SMEs in the European manufacturing sector, using the ADMA methodology.

General Conclusions

Diversity in Digital Maturity:

- The evaluated SMEs show a wide range of digital maturity levels, with significant differences between countries and sectors.
- The areas with the highest development are typically customer-focused engineering and human-centered organization.

Common Areas for Improvement:

- Digital Factory: Many companies struggle to fully integrate digital tools into their production processes.
- Smart Manufacturing: The adoption of automation technologies and real-time data analysis is limited.
- Value Chain Collaboration: Collaboration with external partners and open innovation are areas that require attention.

Sustainability:

- The implementation of sustainable practices and resource efficiency varies widely among companies.
- Some companies excel in adopting circular economy principles, while others need significant improvement in this aspect.

Conclusions by Country

Basque Country - Spain:

- Companies in the Basque Country excel in customer-focused engineering and human-centered organization.
- Areas for improvement include smart manufacturing and digital factory.

Canada:

- Canadian companies have strengths in eco factory and customer-focused engineering.
- Areas for improvement include advanced manufacturing technologies and smart manufacturing.

France:

- French companies have strengths in customer-focused engineering and human-centered organization.
- Areas for improvement include digital factory and eco factory.

Germany:

- German companies excel in customer-focused processes and value chain optimization.
- Areas for improvement include smart manufacturing and digital factory integration.

Italy:

- Italian companies have strenghts and potential in customer-focused engineering and human-centered organization.
- Areas for improvement include smart manufacturing, advanced manufacturning technologies, eco factory, digital factory, and value chain collaboration.

Slovenia:

- Slovenian companies show strengths in customer-focused engineering and human-centered organization.
- Areas for improvement include smart manufacturing, advanced manufacturning technologies, eco factory and value chain collaboration.

Sweden:

- Swedish companies show strengths in customer-focused engineering and human-centered organization.
- Areas for improvement include value chain collaboration and digital factory.

Turkey:

- Turkish companies show strengths in human-centered organization and value chain-oriented open factory.
- Areas for improvement include digital factory and smart manufacturing.

This report highlights the diverse levels of digital maturity among SMEs across different countries and sectors. Common strengths include customer-focused engineering and human-centered organization, while areas for improvement often involve digital factory integration, smart manufacturing, and value chain collaboration. Sustainability practices also vary widely, with some companies excelling in eco-friendly initiatives and others needing significant enhancement.

The implementation plans developed for these SMEs emphasize key priorities such as digitalization, process optimization, workforce development, and sustainability. Companies aim to adopt Industry 4.0 technologies to automate processes, enable real-time data monitoring, and improve decision-making. Additionally, efforts are focused on streamlining workflows, reducing waste, upskilling employees, and adopting eco-friendly practices to enhance overall efficiency and competitiveness.

To support these transformation goals, the plans outline structured phases for implementation, including assessments, pilot projects, scaling, and full integration. Measurement of progress is tracked through various KPIs, and governance structures like steering committees and quarterly reviews ensure alignment with strategic objectives. External expertise and funding opportunities are leveraged to facilitate the successful execution of these plans, ultimately aiming to create more agile, sustainable, and competitive SMEs.

The use of the ADMA methodology within the LCAMP project has proven especially useful for identifying key areas for improvement and guiding the development of implementation strategies tailored to each SME’s context. This structured approach not only supports company transformation, but also generates valuable insights that can inform the wider innovation ecosystem. Furthermore, the scan and implementation process creates opportunities for vocational education and training (VET) centres to develop new training offers, update curricula, and engage in applied research that directly addresses the evolving needs of industry.

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