# D.T3.4.1 Educational concept for managers

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## Table of content

# Introduction

The 4STEPS project, which focuses on supporting the digital transformation of SMEs and supporting the RIS3 strategy, has created a concept for managers to help develop knowledge through a training workshop to strengthen their knowledge in areas such as strategy, risk management, digital transformations and new business models.

Digitization is a significant trend we are facing and which we have largely let into our personal and organizational lives. The key to success and "taming" digital trends is to build the right capabilities and use appropriate resources to maintain or strengthen competencies to not only maintain their relevance and eliminate competitive threats in the new digital environment, but also to achieve growth. Digitization enables companies and firms to streamline processes, in fact, is another key to increasing the performance of us humans in particular.

Digitization is a process is a transformation process and transforms the resources of the organization into competencies, the application of which brings new sources of income, growth and other operational results. These new resources bring value to organizations because they take advantage of the opportunities offered by digital technologies.

Digitization develops new business models, creates new products and services, and uses the organization's resources much more efficiently. These are magnets that attract the attention of organizations and their managers. Everything is done through a new combination of information, human capital and technological assets of the organization.

Digital transformation brings many challenges and that is why we have created our end to facilitate this process.

The concept proposes activities and their description for the implementation of a workshop, which is intended for managers of small and medium-sized enterprises who are interested in the development of their companies and are ready to embark on the path of digital transformation of their company. The training workshop is divided into modules, which are freely connected to each other and can be rearranged, based on the requirements of companies and the lecturer, who is responsible for conducting educational sessions.

# Preparation - Training and development of managers

Management development is "a continuous process that provides a wide range of opportunities, activities and resources for developing the practical skills and enhancing the performance of managers." [12]

It is based on an understanding of the organisation's business objectives and requirements. A subset of this is the education and training of managers.

It includes [12]:

- Anticipating needs and skills for different management levels and functions;
- the design and recommendation of professional and personal development programmes for managers, including career development, to help secure the above needs and skills;
- emphasises the active approach and responsibility of the manager;
- includes informal learning processes in addition to formal programmes, which are achieved purposefully or incidentally in the performance of work.

**Organisational development**

"Organizational development is the continuous process of planned development of an organization's internal resources with the goal of permanently improving its effectiveness. In contrast to leapfrog approaches (reengineering), it leads to a continuously evolving organisation that responds flexibly to changes in market conditions." [13]

This definition implies that organizational development contributes to improving the efficiency of the enterprise and to its further development with the help of the development of employees, including managers. Thus, it can be said that employee development and organisational development are interlinked. The aim of organisational development is to increase the efficiency of the enterprise by improving the quality of human resources.

**Questions to ask when preparing a development programme**

*Why develop it?*

Managers need to be competent to perform a wider range of functions. Manager development is a two-way process. On the one hand are the expectations and goals of managers, on the other the goals and objectives of the organization.

*Who will be educated?*

Managers in particular should be included in the development programme. It is often difficult to determine who is a manager in an organisation. So how do we find out who to develop? A thorough analysis of the qualification structure of managers will help us answer this question.

*What skills to develop?*

We can develop hard and soft managerial skills. Hard managerial skills include, for example, planning, analytical thinking and control. On the other hand, soft skills are those that deal with managing people, coaching, motivating and other interpersonal relationships. In recent years, the development of soft skills has become increasingly important. Managers are beginning to realise their importance. A good manager needs not only to have specialist knowledge, but also to be communicative, empathetic, self-critical, assertive and able to lead a team. Therefore, they need to master not only hard but also soft management skills.

*How to develop the skills and abilities of managers?*

To begin with, it is a good idea to determine which methods are suitable for developing managers in the first place. A method based on learning from experience has proven to be one of the most effective. Managers learn new skills mainly when they are exposed to real work situations; this must also be conditioned by good guidance, direction and coaching from their superiors. Other ways of development include formal training, job rotation, contact with other managers and learning from their experiences, coaching and many others.

**Different approaches to manager development**

*Formal approaches*

These are based on the identification of development needs through performance appraisals or assessment centres and include [14]:

- On-the-job development through coaching, counselling, mentoring and continuous feedback from senior managers;
- development through job rotation, job enlargement, active participation in projects, action learning and work placements;
- formal training through internal and external courses;
- structured self-development through individual learning programmes and personal development plans.

*Informal approaches* [15]

Informal approaches to manager development take advantage of the learning opportunities that managers encounter in their daily work.

*Semi-formal approaches* [15]

These approaches include:

- Requiring self-assessment and identification of development needs - managers are asked to evaluate their performance against set goals and analyse the factors that contributed to their success or failure in achieving them. This process is facilitated by a well-functioning system of manager evaluation within the performance management system.
- Requiring managers to draw up their own personal development plans and self-directed learning programmes.
- Motivating managers to openly discuss opportunities and challenges with their supervisors, colleagues, coaches or mentors to identify what they need to learn and do differently.

# M1 - Digital transformation of companies and I4.0

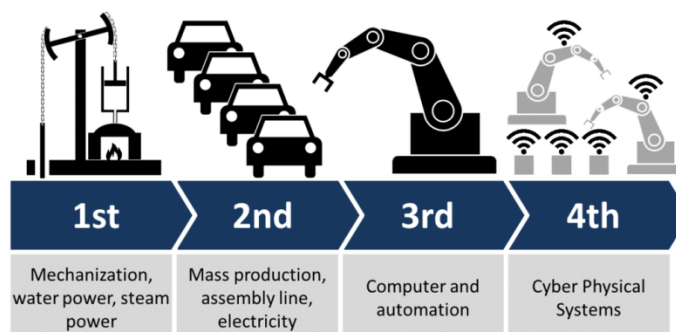| Module n. | 1 | Duration | | 3 hours |
|---|---|---|---|---|
| Name of Module: | Basics of I4.0 | | | |
| Aim: | The aim of the module is to introduce managers to the basic elements of Industry 4.0 and to understand how this approach has evolved. Furthermore, the module introduces the different technologies as well as other basic concepts necessary to understand the whole approach. | | | |

## Themes

**Digitisation of the industry**

Industry can be understood as the process of transforming materials through manufacturing processes and means into final products that are intended for end-users to facilitate their daily lives [6]. The previous centuries brought inventions that were new and modern for their time. With the passage of time, people learned to use the new technology and it became an integral part of their daily lives. Nowadays, almost none of us can imagine what it is like to live in a household without electricity and internet. All of this can be attributed to industry and constant technological development.

Industry 4.0 The concept of Industry 4.0 was launched in 2013 in Hannover, Germany. It was a Siemens initiative with the German government, This concept, called Industrie 4.0, aimed to promote the development of new technologies. Its main idea is to expand the use of technology not only in industry but also in the home [11, 5]

According to Kaminsky, the basic meaning of Industry 4.0 is the complete interconnection of production machines, product processing, semi-finished products and systems of an industrial enterprise by means of computer technology. The concept requires the design and creation of an intelligent distributed network capable of connecting all elements involved in the value-creating production chain. This network connects in particular the production, economic, commercial and logistics segments and processes. Each segment is represented by its own software module, which can work independently of the others, but are also capable of communicating with each other to meet a common goal or increase efficiency.



| 1st | 2nd | 3rd | 4th |
|---|---|---|---|
| Mechanization, water power, steam power | Mass production, assembly line, electricity | Computer and automation | Cyber Physical Systems |

The concept of Industry 4.0 is intended to highlight the fact that the interconnection described above does not only concern individual industrial processes, but all economic activities of our society. This applies in particular to cooperation between manufacturers and suppliers, traders and customers. In short, every economic activity, whether from the perspective of the manufacturer or the customer/user, can be monitored, measured and connected using data technology. For example, the relationship between trader and customer today often does not end with the mere sale of goods, but lasts longer and is even further developed (e-business, e-commerce, e-commerce). The use of 'intelligent' products nowadays has an impact on customer behaviour and actions, for example on their problems, wishes or requirements, which in turn are reflected in new business models, offers or product features. In other words, the two sides of supply and demand are linked and in a constant relationship with each other. Previously, data had to be laboriously collected, for example through market research, and then translated into development and production. In the era of Industry 4.0, the product, device or machine itself can already obtain data and data that is further analysed and processed.

As already mentioned, this is made possible in particular by the proliferation of 'smart' technology such as cars or industrial robots, wristwatches or lawnmowers, pacemakers or ultrasound machines. All these connected devices and products have three key elements in common:

- physical components, i.e. mechanical and electronic components,
- 'intelligent' components, i.e. sensors, microprocessors, data memory, control elements, software, integrated operating systems or visual user interfaces,
- interfacing components, antennas, interfaces, protocols and networks.

**Digitisation of company and information technology**

Digitalization is one of the most important aspects of Industry 4.0 and can be understood as a process that involves the transition to electronic working, using available computer technologies to simplify and improve work efficiency [1].

**Top 9 technology in industry 4.0**

Currently, Industry 4.0 is primarily built on 9 technological pillars. These pillars connect the digital and physical worlds and enable the emergence of autonomous and intelligent factories. Today, many companies and businesses are already using some of these innovative technologies, but the full completion of Industry 4.0 comes at the front end when they are used together.

Picture 2: https://medium.com/@shalinisreekanth/industry-4-0-the-top-9-technology-trends-28c1b3cf1a9a
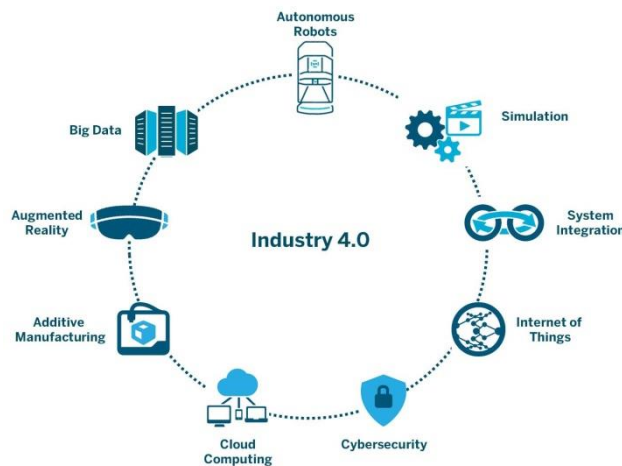
**Basic concept and components of Industry 4.0**

There is currently no single definition of what an Industry 4.0 factory should look like. It is only known which processes should be there and at what level. For the sake of easy applicability, these processes should be set up in a standard form. According to Bartodziej [20], one of the main processes is the supply chain connected to the service system based on value-added networks.

For this reason, concepts such as Big Data Analysis, Autonomous (adaptive) Robots, Cyberinfrastructure, Simulation, Horizontal and Vertical Integration appear here.

6 technological enablers of Industry 4.0 [4]

- Visualization (every physical object has a virtual twin, production takes place simultaneously in a virtual model)
- Decentralisation (the ability of the machine to evaluate the data obtained and convert it into specific requirements leading to production optimization)
- Real-time view (tens of milliseconds of response time of individual devices)
- Service orientation (focus on services purchased and provided)
- Modularity (ability of the production module to respond to changes in production or unexpected situations, e.g. a part of the line breaks, writes an error and is automatically replaced by another)
- Interoperability (ability of different systems to communicate in the same language)

## Methodological indications

1. Start with a general brainstorming about Industry 4.0 in smaller groups: What do you know about Industry 4.0? What comes to mind when you say Industry 4.0? Can you think of examples of companies that are successful in this? What are the benefits of Industry 4.0? Are there any disadvantages? The teacher's task will be to summarize and explain the diverse ideas and outputs from each group.
2. Introduce managers to the whole issue and its pillars, preferably using a PowerPoint presentation. Make sure managers understand all the concepts.
3. Discuss and take notes on the different ideas of the trainees. Use appropriate videos and practical examples.
4. In pairs: brainstorm and discuss. Do you already have an idea or potential idea for appropriate technology? What would you produce and how? What resources would be needed? Make a presentation of your ideas to the rest of the group.

# M2 - Workforce training and development

| Module n. | 2 | Duration | | 3 hours |
|---|---|---|---|---|
| Name of Module: | Workforce training and development | | | |
| Aim: | The module describes how the process of adopting enterprise digitalization takes place from the manager's point of view, how it must be approached and what is necessary from the manager's point of view. | | | |

## Themes

Successful workforce training is based on well-organized systematic training that takes place in the company. Its basis is, according to Koubek [17], "a constantly recurring cycle, based on the principles of education policy, pursuing the goals of straytegie education and relying on carefully designed organizational and institutional prerequisites for education". These can be understood as the existence of a group or groups of personnel (trainers) who provide training. Standard and special training programmes, suitably equipped training facilities and appropriate conditions for training in the workplace also play a major role.

The first step in effective training is the identification of training needs. It is an effort to recognize the mismatch between the qualifications of the worker and the demands of the job [17].

The second stage is training planning, it includes the program and the area in which the worker needs to be educated, analysis of the participants and determination of the objectives of the training program. In this phase, it is also necessary to elaborate the stages of the educational process, and to choose the methods of education (ibid.).

The third phase is the implementation of training and development. In this phase, the programme itself, the motivation of the staff, the training methods and the trainers play an important role. These elements influence the outcome of the training process (ibid). Worker training is a costly affair and the company will therefore be interested in the extent to which the stated training objectives have been met.

The following is therefore the evaluation phase. The evaluation process can answer questions as to whether the training process has met its objectives, whether the methods applied were appropriate, the performance of the trainers is also evaluated, therefore it is an important tool that can affect the success of the workers and therefore the company as a whole.

**Preparing managers for digitalisation**

"The managerial and academic communities are reflecting more or less systematically and purposefully on the changes that digitalisation will bring to industrial organisations. Part of this reflection is also the search for a new concept of leadership and people management." [7]

Agile leadership is one of the concepts that represents the most sophisticated model for leading people in a digitized industry. This concept was developed during 2016-2017, when research was conducted to identify competencies effective to manage in a "turbulent" environment. "Restlessness" was considered as

one of the main characteristics of a digitalized society, as technology is constantly improving, and this presents workers and managers with a constantly changing environment in which they find themselves. [7].

From the research, they concluded that an "agile leader" has the following 4 managerial competencies:

- humble: able to accept that other people have better knowledge and skills, ability to accept feedback and constructive criticism,
- adaptable: the manager is able to accept new information and change his/her views and approaches accordingly,
- visionary: forward-looking, driven by long-term goals,
- engaged: ability and willingness to listen, act and communicate.

Furthermore, this research has identified 3 types of managerial behaviours that help them to navigate more easily in a "turbulent" environment. These are:

- High sensitivity of managers in order to quickly identify new opportunities and potential threats. 18
- Informed decision-making, meaning the ability to use all available resources and information in order to make fact-based decisions.
- Agile action, then, is a manager's ability to prefer speed of work to perfectionism.

The digitalisation of society may bring a number of new challenges and dilemmas that the manager will need to be able to deal with. In study Herold suggests that "traditional" managerial skills such as formulating visions and goals, decision making, delegating work, and leading a group will be necessary. Other skills may include working effectively with different opinions, perspectives and theories. Managers are also required to be innovative, efficient, courageous and consistent.

McCauley [18] emphasize that comprehensive development programs for managers should cover a wide range of their skills and abilities. This means that development should focus on sub-areas relating to self-management, self-awareness, learning ability, people leadership, ability to stimulate and support the development of others, etc. The content of education is important, but successful management development also requires an environment that fosters learning and growth. Such an environment offers managers a variety of training courses, opportunities to engage in new tasks and projects. It also links the training programme to the practical context in which the manager manages.

During the process of change and management in a digital environment, the manager must also take into account the negative reactions of subordinates who perceive change as a negative. The process of adaptation of employees takes place in stages from rejection of the need for change and disagreement with the need for change to the final acceptance of change and active participation in its implementation. Managers are advised by Wakefield and Bunker [19] to behave authentically during the change process.

According to Pavlica [7], the balanced leadership elaborated by Kaplan and Kaiser [7] can provide a basic methodological basis for preparing managers to work in "turbulent" environments. The essence of this concept can be divided into three key principles of effective leadership:

1. The manager's weakness is both his inability to use a certain procedure to a sufficient extent and his use of it to an exaggerated extent. A balanced manager does not overuse any approach.
2. Effective management and leadership is contingent on the long-term balanced use of contrasting practices and behaviors. A balanced manager applies opposing practices in balance with each other.

3. A balanced manager can correctly assess a situation and respond appropriately. His/her decision on which course of action to use is based on a correct understanding of the situation and its requirements.

The next step is to define the skills for manager development into 3 basic areas:

1. Self-management and self-development: improving the skills of adaptability, commitment, responsiveness, awareness and developing managers' humility.
2. Leading and managing other people: the ability to self-awareness and knowing other people through interactions, listening and respecting other opinions, influencing and persuading other people, delegating and conflict resolution.
3. Managing organizations: the ability to manage ambiguous situations, developing creative thinking skills, broadening horizons as strategic leadership and the ability to plan work, using resources effectively as operational leadership.

The last step is the design of diagnostic tools to identify the development needs of managers and to measure the effectiveness of development activities. These tools should be used before, during or after the development process to determine the effectiveness of the development program [7].

Risk management is a field of project and process management that deals with the identification and assessment of hazards and undesirable consequences. When starting any project, it is important to determine the risks associated with that project and to remember that each project is unique. The risks associated with an ill-defined objective should be evaluated before the project is started. It is important to link the project to other projects, including timing. Following are the risks associated with people, their lack of qualifications and experience. Financial risks, including the timing of income and costs, are also serious.

## Methodological indications

1. Discussion on the topic - what competece should a manager have? Which ones will help him in implementing new processes?
2. Introduce types of managerial behaviour - presentations + examples.
3. Task: What is the purpose of which type of behaviour and why is it necessary?

# M3 - What transformation brings and what we can't do without

| Module n. | 3 | Duration | | 2-3 hours |
|-----------|---|----------|---|-----------|
| Name of Module: | What transformation brings and what we can't do without | | | |
| Aim: | The module focuses on the processes that digitalization of companies brings and the processes that help to implement this process. | | | |

## Themes

**Risk management** [23]

The discipline called risk management deals with the interrelated activities that seek to avoid or mitigate the occurrence of risks or unpleasant surprises. Risks threaten the achievement of objectives, can have a negative impact on our operations, and are likely to occur in any activity.

Risk management encompasses a wide range of issues that can include:

- Force majeure risks - random risks that cannot be avoided (armed conflicts, wars, natural disasters, etc.)
- Economic risks (market, trade and political, exchange rate and many others)
- Project risks
- Environmental risks

*Identification of responsible persons*

Responsible persons must be identified for careful risk management.
- Setting up a crisis team
- selection of persons with appropriate authority and decision-making capabilities
- leaders at the appropriate management level
- staff involved in the relevant part of the project
- expert consultants (risk management, technical staff, advisors)
- allocation of responsibilities and resources
- access rights (relevant documents, staff, technicians)
- decision-making powers
- adequate human and financial factors

Already here, however, the first personnel risks may arise - not every team member may have project management experience and may not be sufficiently qualified.

Risk management consists of four consecutive activities:

*Risk identification* - Risks should first be divided into internal and external risks. Internal risks are influenced and controlled by the project team. External risks are not influenced and controllable by the project team. Of course, there are a large number of risks, this article mainly describes the risks

associated with the project, but otherwise there are a variety of risks, for example financial risks, natural risks.

*Risk assessment* - The results of the risk identification need to be analysed and prioritised for resolution. This assessment is a subjective activity, so there can be multiple perspectives on it. If we have known risks that have come out of the previous identification, we can already assess these risks and give them appropriate importance. If we want to assess risks we need to establish some facts:

- Establish a tolerance - define some thresholds associated with a particular risk that we are able to tolerate.
- Determine the weight of the risk - if the risk occurs during the course of the project, how important it will be depends on the phase of the project in which the risk occurs.
- Determine the impact of the risk - what impact the risk will have on the project and its progress.
- Assign a probability - determine how likely the risk is to occur - a number from zero to one.
- Determine the value of the risk - this is the product of the weight of the risk to its probability.

*Risk Management Strategy* - After a thorough risk assessment, a risk plan must be developed to determine a strategy to manage, minimize or eliminate the risk. Detailed elaboration of all options for addressing each risk and their evaluation. Assignment of risk solutions to responsible persons. Continuous monitoring or revision of the risk plan according to the current situation is essential. Factors influencing strategy development: project phase, size, priority, complexity, time and financial requirements.

*Continuous monitoring of the evolution of risk conditions* - During any project, additional risk events may occur and therefore risks must be continuously monitored. We can never identify and recognize all risks and the likelihood with which they may occur, so it is important that we continually identify new risks and reassess risks that have been previously recognized.

**New business plan**  [22]

A business plan is a document that describes your business activities. Whether you are just starting out in business or have years of trading under your belt, a good business plan is the foundation of your success.

Three reasons to update your business plan:

1. Get an idea of your longer-term plans or perhaps the profitability of the whole project.
2. you identify possible risks you may face
3. Increase your chances with investors (possibly crowdfunding) or the bank (when applying for a loan, etc.

A few tips for building a solid plan:

- Create a plan B for unexpected situations
- Focus on finances
- Include as much accurate data as possible in your plans, calculations...
- Plan should be simple and comprehensive at the same time
- Keep your plan up to date (at least once a year)

**Digital transformation**  [21]

Digital transformation is the process of using digital technologies to create new (or modify existing) business and corporate processes, corporate culture and customer experiences to meet modern and wildly changing trends, as well as business and market conditions. In short, it is about transforming traditional business into the digital age.

Digital transformation is changing the ways in which business is done, often (not so paradoxically) creating a whole new business.

But it is a thing that rises above traditional roles and elements such as stores, marketing, customer service. Rather, it's about moving as far as possible from traditional thinking (i.e. paper and spreadsheets) to smart apps, technology, etc. So the approach to the very essence of business is changing.

*How does "digital transformation" differ from "digitization" and "digitization"?*

- Digitisation - this is the transition from analogue to digital media (replacing paper and analogue tapes first with floppy disks and then with hard disks or, today, the cloud).
- Digitisation - the specific process of converting and transitioning to digital data.
- Digital transformation - digital transformation changes the ways in which business happens. With digital transformation, companies are re-examining all processes - from internal systems to customer interaction. In both modern forms (online and offline) they are asking questions like, "Can we change our process in a way that enables and delivers better decision making, incredible market-changing efficiencies, or a better customer experience with a greater emphasis on the personal touch?"

## Methodological indications

1. Discussion - what is risk management and who must control it?
2. Exercise - choose any example and demonstrate how to assess risks and opportunities
3. Task 1 - Create a simple business model for your company
4. Task 2 - Name how digitalisation could make your processes easier and how it could reduce costs

# M4 - Implementation of Industry 4.0

| Module n. | 4 | Duration | | 3-4 hours |
|---|---|---|---|---|
| Name of Module: | Implementation of I4.0 | | | |
| Aim: | The last module describes the process of implementing digitalization and offers auxiliary methods that lead to successful implementation. | | | |

## Themes

According to Gartner, there are five levels of supply chain maturity. These stages are reaction, anticipation, integration, collaboration and organisation. Maturity after connecting to Industry 4.0 depends on the integration and collaboration stages already mentioned. A longer term condition for a successful organisation is that it must have effective collaboration between people, technology and processes. Industry 4.0 enables organisations to manage the complexity caused by product customisation requirements, but also to respond more quickly to changes in the supply chain. This is one of the key benefits that serves to increase a company's competitiveness.

To implement an Industry 4.0 initiative, several steps should be followed:

1. *Understanding the starting point*
   Before a company proceeds to engage in an Industry 4.0 initiative, it needs to understand its starting position. This means checking the current state of the company and identifying areas where it can improve its maturity. This check will create a foundation for successful adoption throughout the organization and facilitate implementation.

2. *Focus on Industry 3.0 technologies*
   Adopting the principles of the 3rd Industrial Revolution is a good start for adopting other technologies. Most companies do not have the ability to implement Industry 4.0 because they do not have even the basic elements of Industry 3.0 in place, where processes are automated using logic processors and information technology. These processes operate largely without human intervention, but there is still a human aspect behind them. An example of the Industry 3.0 way is the CNC machine. Although it is largely automated, it still needs operator intervention directly in the production process. In Industry 4.0, the same CNC machine could monitor set programming parameters, but also use the data to make the machine more efficient manufacturing processes. If the manufacturing process was not manageable with the old CNC machine, implementing the new way would be very difficult.

3. *Creating a strategy*
   Creating a strategy is one of the critical parts of the process. Once the strategy is defined level of target maturity, it is essential to establish a detailed implementation plan that will help to achieve the goals. This serves several basic purposes, such as addressing potential barriers that may arise, but also facilitating the promotion of adoption and navigating the possible conditions that may arise among staff.

4. *Start small*

   Because some challenges are more complex than others, it is best to proceed incrementally. It is a good idea to define the steps, choose one step, solve it, and then present it to the entire department in the organization. Then, after successful acceptance, continue with the next defined goal. This approach is good for long-term success and providing the strong foundation needed to implement and sustain the initiative.

5. *Creating a friendly environment*

   If an organization is not ready for an initiative and its implementation, it will not adopt it. It is therefore desirable to create a production ecosystem in which the physical and digital elements of the business interact. This will create an environment suitable for Industry 4.0. Another bonus of creating this ecosystem is that it will expose cracks in the organization that may require attention and process changes.

6. *Focus on process optimization*

   The ultimate goal of Industry 4.0 is to streamline and improve existing processes. With this in mind, it is advisable to focus on process optimization. However, this may mean greater investment in training, support for automation and research. When examining processes in a company, errors may be found, which may again mean higher initial costs, but it's the only way to get to autonomous processes.

**Implementation tools and methods**

**SWOT analysis**

SWOT analysis is a compilation of strengths, weaknesses, opportunities and threats. It is used to evaluate the internal factors that affect the success of an organization or a specific company's objectives. The main objective of SWOT analysis is to help an organization develop a full understanding of all the factors involved in making business decisions. SWOT analysis is used when taking any action in a company, whether it is exploring a new initiative or reworking internal issues. By using this tool, new recommendations and strategies can be discovered, focusing on strengths and opportunities and overcoming weaknesses and threats. It is therefore a suitable tool for the implementation of Industry 4.0. A [9,10] SWOT analysis focuses on four basic acronyms, which allows a company to identify aspects that influence a strategy or initiative. Knowing these positive and negative elements can help to communicate more effectively which parts of the plan need to be developed. When designing a SWOT analysis, a table divided into four columns is created to list each important element side by side for comparison. Strengths and weaknesses do not usually correspond verbatim with the opportunities and threats listed, although they should correlate because they are ultimately tied together.

**DMADV**

We classify DMADV as a cycle of incremental improvement. It can be used for any kind of improvement and is therefore also suitable for implementations. This cycle is an optimized PDCA cycle. DMADV has the same principle as DMAIC, with the only difference that it can be applied to processes that have not yet been implemented.

The phases of DMADV are [8]:

- D (defining) - defining the objectives, describing the object and goal of the improvement
- M (measurement) - measurement of initial conditions
- A (analysis) - analysing the identified causes of deficiencies and facts

- D (design) - design of a new process
- V (verification) - the process meets or exceeds the requirements

**The future of the industry**

Industry 5.0 or Society 5.0 can certainly be considered the most anticipated trend. This initiative brings a major change in perspective, with Company 5.0 placing great emphasis on people as the foundation of the production process. There is a consensus among manufacturing and marketing that the focus of Industry 5.0 is Company 5.0. The products and services offered should be tailored to best meet customer requirements. The main intention is that the ongoing merger should be in line with technological progress and people, and that new technologies should help people and not replace them. Robots and cobots, which will make dangerous and repetitive work easier, are the most important help in this respect. At the same time, however, there will be a greater emphasis on the education of workers and their own contribution to society. One major contradiction with previous approaches is the people-centric model.

Process automation, the introduction of cobots and the development of technology allow people to develop new skills in the production process.

In this approach, it is assumed that to achieve a smart society, changes need to be made in traditional education and new tools, software, hardware need to be developed so that they can be well integrated into cobots. The fundamental difference between Industry 4.0 and Society 5.0 is that Industry 4.0 uses robotics and other technological elements as the basis of the revolution, while Society 5.0 only adds these elements or helps workers. It is important to note that as Industry 4.0 advances, there will be increased efficiency and thus increased productivity for Company 5.0. At the same time, by targeting customer needs and requirements, costs and consequent waste are reduced, as well as emissions, leading to environmental improvements.

The vision of Company 5.0 is a society where, for example, smart industries, autonomous cars or smart cities are integrated. In addition to a greater emphasis on the environment, there is also a focus on minimising all negative economic and management issues. In addition to measures against climate change, there is an effort to minimise all negative problems in the business sphere and management systems. The general expectation is for a more sustainable world where environmental, social and economic impact issues are interrelated and mutually addressed.

## Methodological indications

1. Discussion - how do you think the digitalisation of society should proceed?
2. Presentation - individual steps in the implementation of digitalization processes
3. Exercise - use of SWOT and DMADV methods on the example of our own company - how to introduce new technologies

# Sources

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