

The travel guide for industrial digitalization

- A structured approach for companies that want to speed up their digitalization journey



Digitala Stambanan

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Introduction

Today, Sweden is one of the world's most competitive export countries, but industrial digitalization is changing the conditions for everyone globally. Therefore, the Swedish industry needs to quickly create an efficient digital infrastructure to compete in a new digital world market.

To help companies get started and find their way – their transition journey – [the Digitala Stambanan](#) project has produced a travel guide: a structured approach that results in an action plan for digitalization.

The travel guide does not describe where the journey should go but provides tools so that

each organization can find its way to successful digitalization. The travel guide is supporting the acceleration of digital transformation needed in the industry. Digital transformation, together with the unique Nordic cooperation culture, provides conditions for globally competitive companies also in the future.

The travel guide guides companies through five steps to create an action plan for digitalization:



Anchor

- ✓ Create commitment and anchor the work with digitalization in management.
- ✓ Assign a working group comprising the competences of manufacturing, business, and digitalization.



Current situation

- ✓ Map and describe the current situation, working methods, available systems, and data.



Opportunities and goals

- ✓ Identify opportunities with digitalization.
- ✓ Formulate an overarching vision that describes the desired situation.



Challenges

- ✓ Identify potential challenges and obstacles on the way to the desired situation.



Prioritize and create an action plan

- ✓ Weigh opportunities against challenges. Group the opportunities that require a solution to the same challenges.
- ✓ Identify and prioritize potential activities required to reach the desired position.
- ✓ Create an action plan for the digitalization.

The journey of digitalization

Technology is developing at a furious pace, and digitalization is affecting everyone and everything. As a result, many sectors have made great technological leaps in a short time. However, not all areas are developing at the same rapid pace, and the industry is an example of a sector that has lagged in the development.

The reason is that existing IT solutions and automation are not flexible enough to quickly and easily exchange data along a value chain. For several decades, the industry has optimized its production based on the requirements of mass production.

Now the industry is at the beginning of the next era, with digitalization as the driving force. With digitalization, the industry can meet as well new requirements for individually adapted products and services, as increased requirements for information exchange, and shorter delivery times, in a cost-effective way.

Digitalization enables increases in productivity, sustainability, flexibility, and speed to reach existing and new markets. But, for this to happen, organizations must integrate digitalization,

automation, and data analysis, and their processes and operations must be transformed. Digitalization is a transformative force that has the potential to influence and change everything in an organization. Industrial digitalization does not start from scratch. There is a lot to consider, such as equipment, systems, processes, organization, and culture. As every organization is unique, the digitalization journey becomes individual. This means that there are usually no complete ready-made solutions for digitalization to buy "off the shelf," but each organization needs to tailor its own journey.

Digitalization can be compared to the change that electrification brought about during the last century.

About the project Digitala Stambanan

Today, Sweden is one of the world's most competitive export countries, but industrial digitalization is changing the conditions for everyone globally. Therefore, the Swedish industry needs to quickly create an efficient digital infrastructure and a strong ability to compete in the new digital world market. Therefore, the industry needs a "digital stambana" for future competitiveness.

Digitala Stambanan is an exploratory innovation project in collaboration between the strategic innovation programs Produktion2030 and PiiA (ProcessIndustriell IT och automation) funded by Vinnova, the Swedish Energy Agency, and Formas. Together, they represent the manufacturing, raw materials, and process industries in Sweden. The project involves 29 organizations from the manufacturing industry, process industry, technology suppliers, research institutes, and academia.

The "stambana" is the name of Sweden's most

important railway lines, which were built in the 19th century and enabled efficient transport throughout the country. The railway system created conditions for trade and communication and connected Sweden with Europe. This allowed industrialism to spread throughout the country, not just along the coasts and to strategic ports. Labor and natural resources could be distributed throughout the country. In this way, "stambanan" laid the foundation for the welfare society Sweden has today.

In the digital age, data and information are becoming increasingly crucial for value creation. For Swedish industry to continue to be internationally competitive in the future, a Digital Stambana is needed; a digital infrastructure for creating efficient exchanges of data and information, enabling digital communication and new digital business models.

- RAILWAYS
- CONTROL FUNCTION
- SECURITY
- MAINTENANCE
- TRAFFIC PLANNING
- CRISIS MANAGEMENT
- RESCUE PREPAREDNESS
- INTERNATIONAL INTEGRATION
- CONTROL SYSTEM
- STANDARDS
- REGULATIONS
- PLAN FOR EXTENSION
- SERVICES
- TICKET SYSTEM
- WAY TO CONNECT (STATIONS, SWITCHES)
- MONITORING



THE PHYSICAL AND DIGITAL INFRASTRUCTURE FOR WELFARE

Just as “stambanan” for the railway not only required rails and trains to function, the Digitala Stambanan needs more than just fiber and connectivity. It is a system of systems with many necessary func-

tionalities that must work together, control systems, standards, security, and different services. A Digital Stambana enables new and efficient ways to organize value chains and bridge the functional silos that have emerged in the industry over the years.

- DIGITAL INFRASTRUCTURE
- CONTROL FUNCTION
- SECURITY
- MAINTENANCE
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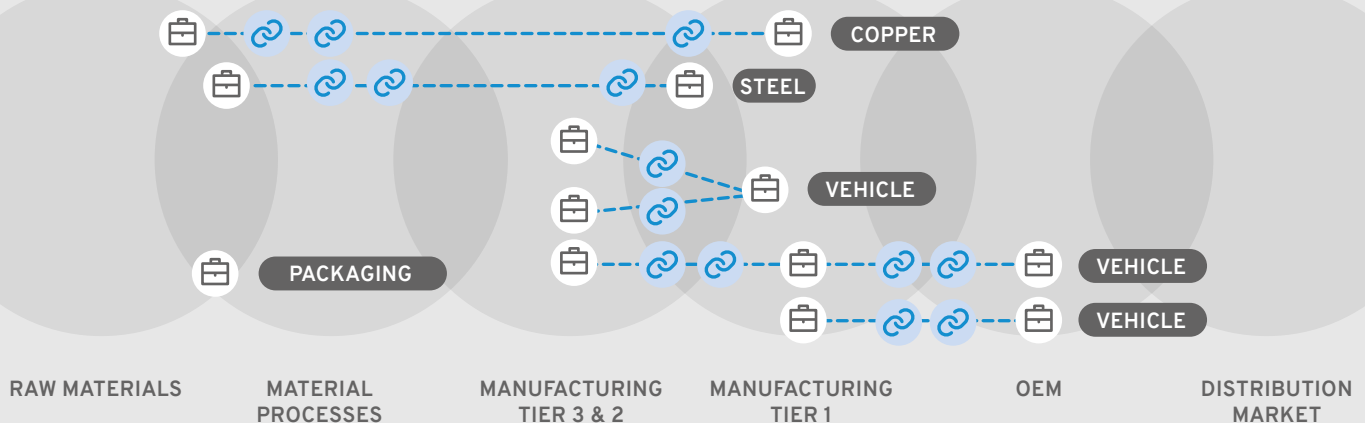
The goal of the project Digitala Stambanan

For the digitalization of industry to gain momentum and create value, good examples and knowledge are needed that can show the way forward. Therefore, the Digitala Stambanan project explores and builds knowledge about the digitalization of value chains and the requirements placed on digital platforms and digital markets. Furthermore, the project wants to present the opportunities with digitalized value chains, highlight challenges and obstacles and spread insights and experiences to companies and decision-makers in Sweden.

MAPPING OF SEVEN VALUE CHAINS

In the project, seven value chains were mapped to describe their current way of working. Based on these maps, increased value creation using digitalization was investigated. Together, the value chains

range from raw material extraction via tier suppliers to the final product manufacturers. With this approach, the project has identified several general and specific opportunities with associated challenges and obstacles.



About the Travel Guide

To help companies get started and define their digitalization journey, Digitala Stambanan has produced a travel guide. The travel guide does not describe where the journey should go but provides tools for each organization to find its way to successful digitalization.

The travel guide has been created through a synthesis of empirical results and experiences from the project's seven case studies of industrial value chains, meta-studies of other digitalization projects, and the competence of the participants in the Digitala Stambanan project.

Digitalization in the industry is an iterative journey of change. First, start mapping the current situation and way of working. Secondly,

based on the current situation, start drawing a picture of the desired future state. On the journey towards the desired state, companies need further development and implementation activities. Due to that, each organization is unique, an exploratory approach is advocated where knowledge of details breeds strategy and vice versa. Along the way, knowledge is built up to update the organization's strategy and navigate further towards new ways of creating new values. Which path an organization takes depends on existing conditions and the organization's history. Therefore, the most important thing is to start the journey and then work agile forward.



Anchor

Digitalization means a significant change, and just like with any change work, it is essential that the management is on-board and committed. With the management's support, the journey of change becomes much easier to handle. The initiators may need internal lobbying activities to convince the management if the ideas for change do not come from those in command.

When the ideas are anchored at the management level, a working group needs to be appointed

to plan and lead the implementation of the change. The working group members should be selected to reflect the business competence of the entire company or value chain. The group needs digitalization skills and perhaps also union representation. Also, think about creating a heterogeneous group based on, e.g., age, gender, and descent. Different perspectives and competencies provide a better overall view and also benefit creativity.



Current situation

When the work is anchored in the management and a working group has been appointed, it is time to map the current situation.

Start by mapping the organization's main processes – for example quotation -> order -> production -> delivery. What does the value stream look like, and what is done? Identify which transactions are performed, which data is exchanged, which way actors contribute, and which systems are used. Advantageously, this can be visualized on, e.g., whiteboards to show connections and need for improvements more clearly.

Complete the picture by mapping which systems exist and are used in the organization, what data is in each system, the system owner, the owner of the information, and in which processes they are used.

The mapping work should be carried out jointly in the working group, as the different perspec-

tives on the activities will be helpful. But also, because the mapping of the current situation is a learning opportunity, new knowledge makes it easier to see one's role in the larger context.

Different perspectives and competencies provide a better holistic view and promote creativity.

In addition, the working group members get to know each other, and gains an increased understanding of each other's perspectives and their impact on the organization. All this is the basis for a good and effective collaboration during the coming digitalization journey.

EXAMPLE

Mapping methods used in the project

Examples of mapping methods used in the Digitala Stambanan project.

Choose the method or methods that suit your situation.

Industry 4.0 Maturity Index is used to map the digital maturity level in a company. The method examines the digital level of maturity in four areas: resources, information systems, organizational structure, and corporate culture. The method assists manufacturing companies in developing a strategy to increase their ability to create value and approach Industry 4.0.

"**Rich Picture**" is a method for developing scenarios for digitalization of processes and for building digital competence. The work takes place in working groups and begins with mapping the current situation, followed by the desired state and then the generation of proposals for the transfer. The movement itself can be illustrated with cobweb diagrams in four dimensions:

1. Perspectives and attitudes
2. Process for data quality
3. Technology
4. Decision process

An ecosystem mapping can be used to see an organization's activities in a larger perspective. It involves mapping and visualization of the organization's ecosystem. The mapping process allows an organization to reflect on its current operations and explore how it is likely to change in a digital economy.



Opportunities and goals

Knowledge of both the business and digitalization is needed to identify opportunities with digitalization and formulate a target state. The industry has a deep domain competence in production, production techniques, and the organization's operations. However, those who have this competence do not always have insight into new technologies and the possibilities of digitalization.

Correspondingly, it is difficult for those who have specialist knowledge in different technologies to also have a complete understanding of the needs of other organizations. For an organization, it is therefore essential to involve the various competencies that exist. External help may be needed to gain more perspective and cover any competence gaps in the digital transformation planning and implementation. To facilitate the work of identifying opportunities, the Digitala Stambanan project has developed a workshop methodology.

A complementary way of identifying opportunities is to be inspired by what others have done. The shortest path to innovation is to embrace good things done in other industries or contexts and adapt them to your context. Here, digitalization opens to be inspired by completely different industries, since the common ground is handling and value creation from large volumes of data and information.

To realize the opportunities with digitalization, these need to be described concretely and in detail so that it becomes clear what is to be achieved and why. An effective way to do this is to formulate so-called "User Stories." User Stories describes what kind of data/information a specific user needs to have access to, to do something that creates a specific value. It is a fast way to manage requirements between users and developers without developing formal requirements specifications.

For the customer, it is excellent documentation

THE TRAVEL GUIDE

Workshop with a focus on opportunities

The Digitala Stambanan project has developed a workshop methodology to support organizations in identifying opportunities with digitalization. To create a clear picture of what benefit digitalization can achieve, competence about as well the business and its needs, as competence about what digitalization can offer, is required. The workshop provides a structured guide for discussions between these competencies to jointly identify relevant opportunities.

The goal is to identify a gross list with digitalization opportunities that can

then be evaluated and prioritized.

The workshop is divided into different main areas and sub-areas with associated discussion questions. The list is not complete but is intended to serve as a basis for discussion with increased width and different angles of approach.

Ökad bredd och olika infallsvinklar.





to clarify the needs and create an understanding among those who will implement the change.

Based on the identified opportunities using digitalization, it is time to formulate the vision for the digital change journey. With a clear vision, it is easier to develop specific goals and work out a strategy. A clear vision and strategy also help the organization to gather strength in a particular direction. The importance of the vision increases

Goals, plans, and strategies may need to be updated along the journey as new insights are gained.

the larger the organization is, as there are often parallel development activities in the organization that need to be coordinated to move in the desired direction.

User Stories – concretize opportunities

User Stories clarifies in detail what data is needed to create a specific benefit. Each User Story should preferably be formulated briefly enough to fit on a post-it note. User Stories start at an overall level and then break down into several more detailed sections.

Formulate a User Story

As a <Role> I need <Information> so that I can <Effect>

This wording clarifies what, why and what data is needed to reach the desired situation.

Examples of User Stories from Digitala Stambanan

"In my role as a supplier, I want to know the customer's requirements at an early stage in the sales process so that I can make recommendations of similar products with a better price and better delivery precision. Being able to be involved in the product selection creates the conditions for being involved and influencing the customer's product early in the development phase."

"In the role of customer / OEM, I want to be able to know my supplier's capacity at the moment, securing the correct delivery date and cost of products. This is to be able to negotiate correctly and provide sales with the right information. With a digital solution (information portal), it would be possible to share information with current and future suppliers/partners on a common platform."



Challenges

Once the vision has been formulated, it is time to identify the challenges that may arise along the journey. There are challenges in several areas that can jeopardize the work. Cooperation across organizational boundaries is often required to arrive at solutions, which can be a

challenge. Being aware at an early stage of the challenges that may arise increases the possibility of finding effective ways to deal with them. To facilitate the work of identifying challenges, the Digitala Stambanan project has developed a workshop methodology.

THE TRAVEL GUIDE

Workshop to identify challenges

In order to identify relevant challenges in a structured way, the Digitala Stambanan project has grouped them into different main areas. The list is not complete but forms the basis for a structured discussion. Together with

hypotheses and clarifying statements, this forms a workshop methodology for identifying challenges.





Prioritize and create an action plan

Now it is time to analyze the gap between the current situation and the target state, prioritize opportunities and create an action plan.

For every opportunity with digitalization that has been identified, there are different challenges that require different efforts. By analyzing challenges linked to each opportunity, a map is created indicating which opportunities that are relevant to move forward with, as some opportunities require excessive efforts.

The selected and taken forward opportunities need to be turned into activities that are

to be prioritized. It is wise to start the digital transformation with activities that have a high probability of giving significant positive effects with a relatively small effort. In this way, a positive image of the digital change is spread in the organization. In some situations, other things are more critical, and the activities are given a different order of priority. Here are some examples of methods to prioritize opportunities. The prioritized activities then constitute an action plan for approval and implementation of your digitalization journey.

EXAMPLE

Prioritization methods used in the project

Here are some of the prioritization methods used in the Digitala Stambanan project.

Effort versus effect

This workshop method is used to prioritize and organize areas where there is room for improvement that one or more companies in a supply chain want to focus on. The different areas

are organized based on the potential effect they can yield in relation to the effort required to implement the change and achieve the set goals. This is done using two axes, where one indicates the potential effect and the other the required effort.

SSG's priorities for collaboration

When development or collaboration is to be implemented across organizational boundaries, it is valuable to have a common understanding of content and priorities. This method provides a way to determine focus areas by assessing different areas based on challenge and openness to collaboration.

More material

To support the implementation, the Digitala Stambanan project has gathered and documented experiences of digitalization in practice.

In addition, the project Digitala Stambanan has produced some different demonstrators

to test and show how different solutions can be applied. The project has also created a scenario story concerning an active company's operations in 2030, with a backward-looking description of the company's development since 2020.



Digitala Stambanan

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