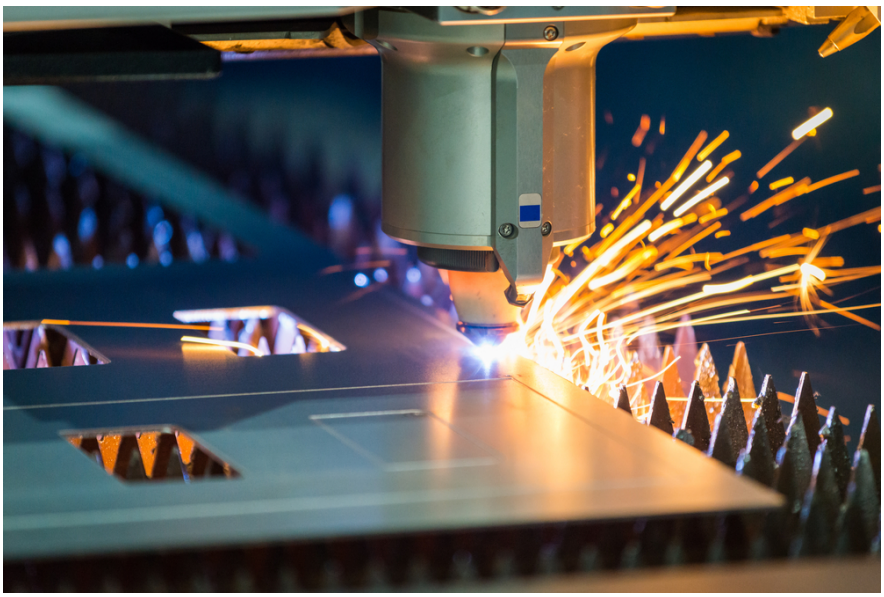
Why small suppliers are key to digitalising production chains

It's not the technology but rather the sluggish adoption and implementation that is slowing down the digitalisation of industrial production chains. Smaller manufacturing companies, in particular, need to scale up, collaborate and invest in ICT knowledge and skills to be competitive and more sustainable



This is part 2 of our analysis of the challenges and opportunities in digitalising industrial production chains. In this article, we explore the barriers and the ways that manufacturers can overcome them. Part 1 *deals with the current digital state of affairs, the productivity potential of digital chain technology and the advantages and disadvantages for manufacturing companies.*

Short-term productivity gains of digital production chains depend on the business case

In part 1 of this study, we found that many manufacturing companies could benefit from digitalising the production chain. In the short term, the individual business case is important:

- When several chain partners already exchange automated data or are willing to do so, the IT investments can be recouped in the short term.
- When there is a limited number of suppliers and a limited order flow consisting of more complex products, the revenue is lower due to the limited numbers and the many manual transactions that are then required. Order flows can be more autonomous for large serial orders of basic products without many changes.

Every manufacturing company benefits from automated digital data exchange in the long term...

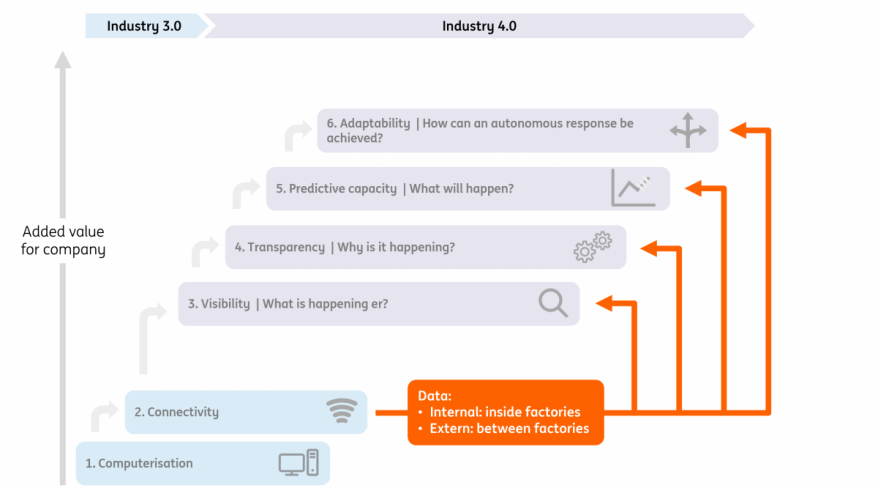
In the long term, digitally connecting companies that already work closely together through mutual ordering and delivery strengthens the competitive position. This is also true of smaller companies which make more complex products in smaller quantities. This process takes place in two ways:

- The more companies that have joined, the higher the revenues and the more often digital links will be a precondition for doing business.
- Data from suppliers and buyers is needed in order to have an up-to-date and accurate picture of the current market situation. Loss of demand and disruptions in the supply chain will become increasingly visible as more companies exchange automated data with each other.

...both at the beginning and end of the chain

A digitally-linked production chain will therefore not only become a precondition for doing business it will also offer competitive advantages for manufacturing companies. On the path towards a 'smart industry' (Industry 4.0), manufacturing processes will work more and more autonomously. Software links between IT systems inside and outside the factory are necessary to receive the necessary data for process optimisation. This forms the basis for data analysis and process management. For parties at the end of the production chain, timely chain information about supply disruptions is particularly important. The risk of disruption increases with each additional link. Conversely, it is mainly the changes in demand at end manufacturers that gradually trickle through and lead to great volatility among parties at the beginning of the chain via a so-called bullwhip effect. Automated information provision is therefore important for the entire chain in order to be able to anticipate unforeseen circumstances more quickly. Something that is valued even more than before due to the recent experience with long-term chain disruptions.

Internal and external data as inputs for Industry 4.0 process optimisation



Source: Source: ING Research based on Acatech

End producers are enforcing digitalisation more often

More and more end producers (Original Equipment Manufacturers or OEMs for short) and other clients in the chain want real-time insight into the order status. At the same time, OEMs themselves often find it difficult to adapt and open up to the chain in order to achieve efficient data exchange. Larger OEMs and suppliers are often more advanced with digitalisation than smaller suppliers. The pressure they exert from their leading role can accelerate the movement towards digitalisation of the chain.

Data standards enable efficient data exchange...

To exchange data with each other, digital solutions are available that translate data formats of the sending company into data formats that the receiving company can process. However, one-to-one links cost a lot of time and money and are no longer usable when a system is changed. There are many IT systems in circulation, each with their own data formats. In order to efficiently exchange data with each other in a network of many suppliers and customers, it is therefore important to use a standardised data format to which the various systems are adapted.

...which increases the productivity potential

This increases the productivity potential for the entire chain because digital communication no longer only takes place between companies and large buyers who enforce one-to-one links with suppliers. It also allows a large group of smaller companies the opportunity to join a network of digitally-communicating companies without a major investment.

Hundreds of Dutch manufacturing companies exchange data smoothly and securely via a data standard

Internationally, various industrial data networks or data spaces are under development. For example, the NTT network in Japan and in Germany, the Catena-X network for the

automotive industry and Manufacturing-X for various industries. The Dutch manufacturing industry has been gaining experience with the Smart Connected Suppliers Network (SCSN) for some time now. This is an independent data standard and technical infrastructure with which companies can securely exchange automated information. There are currently about 300 companies connected to SCSN and the ambition is to reach 1,200 connections by the end of the year.

Digital production chain requires four preparatory steps from companies

Companies that want to automate the data flow in the production chain benefit from a solid digital foundation. They must take into account a number of preparatory steps:

1. **Data management: structuring and digitalising data flows**

   Organise first, then digitalise and automate...

   Data entering and leaving the company must be digitally accessed and managed in a structured manner in order to be able to automate data exchange in the chain. The following applies: first organise and then digitalise and automate. It starts with visualising and structuring data flows. This makes it clear which actions can be omitted from now on because, for example, there may be some duplicate administration or unnecessary information exchange taking place. Only essential data remains. When this is then correctly entered into software programs for Computer-Aided Design (CAD) and Product Data Management (PDM), much less administrative work is ultimately required, and finding the right data becomes easier.

   ...to reduce administrative burden and prevent failure

   It also becomes clear which data and which links are still missing in order to compile and disclose an integral picture of the business processes in a digital 'shell' in which all of the data comes together. The way of recording is important to be able to exchange. Separate administration of purchased parts can, for example, lead to incorrect orders.

2. **IT systems: getting automation and security in order**

   The right software links business processes and systems of chain partners

   A company that goes digital preferably has a well-functioning ERP software (Enterprise Resource Planning). This software integrates the automation of administrative, financial, commercial and logistics processes into one company-wide package. When this data management is in order, the various business processes can be connected to each other via ERP. From there, connections that are necessary for automatic information exchange can be made with multiple parties simultaneously via EDI (Electronic Data Interchange) 1-on-1 or via a standardised data network.

   Security is a precondition that requires constant attention

Well-secured IT systems are a precondition for the safe exchange of data. Additional safeguards for shielding and securing data can be built in by making explicit who receives and is allowed to view what information. Digital exchange in the chain does not mean that companies can just look into each other's systems. Producers can call in ICT suppliers to guarantee security when making links between companies so that they do not shut each other down if something goes wrong at one company.

3. **Exploration: technical linking and agreements with one party**

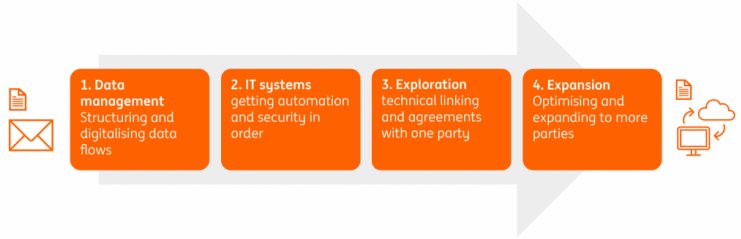
   Not having ERPs communicate with each other is the biggest challenge, but the organisation around it. This requires clear agreements with chain partners about what to expect from each other. What is the term of the contract, the maximum delivery period and the order size or the error tolerance in terms of quality, for example, with digital processing of the order flow? When can orders be changed? To gain experience with this, it is necessary to explore with a trusted party how and under what conditions automatic exchange can take place.

4. **Expansion: Optimising and expanding to more parties**

   By evaluating after the first link, subsequent links will be established more quickly through learning effects. The digital linking of more chain partners provides increasing benefits, for example in the form of lower overhead costs and higher revenues due to the faster and more extensive information provision. After the first experience, more and more data flows can gradually take place automatically. Ultimately, for example, due to the early receipt of the current quality status of ordered semi-finished products and materials, own production processes can be adjusted in time to the product characteristics of the inputs.

Digital production chain requires four preparatory steps from companies

Four preparatory steps for companies to take to fully realise the benefits of automated data exchange*



Source: Source: ING Research * depending on the company's starting position

Adoption and implementation of digital technology are stumbling blocks

Internal barriers for companies

- **Lack of IT knowledge and skills**

  Digital applications require different knowledge and skills from personnel. Experienced professionals also have to learn skills for this. The ageing of the workforce often makes this a challenging process. The number of digital natives among employees is limited and it takes time and money to educate older people. Moreover, technical operations are increasingly driven by software, which means that staff are further removed from the core processes. This produces resistance. Recent research by Panasonic Connect Europe also shows that while companies expect to be able to increase their productivity with technology, they are confronted with major knowledge and skills barriers, especially when it comes to digital transformation projects.

- **Cold feet: unknown makes unloved**

  The manufacturing industry is still too hesitant about digitalisation. A lack of digital experience reinforces that attitude. The added value of digitalisation is still relatively unknown to producers and the theme is often seen as complex. Questions such as: What can I do with it? Where do I start? Do I have the right people? What will it cost me and what will it yield? In practice, digital opportunities are increasing, but it is also becoming increasingly difficult for companies that are lagging behind to get involved. In addition, ERP implementation sometimes turns out to be quite difficult. That can be daunting. Furthermore, general caution for fear of disrupting the production flow or inadequate cybersecurity plays a role, as does uncertainty about the payback period. With digital applications, this is often less easy to quantify than with the purchase of a machine or robot.

- **Lack of resources and time**

  In order to increase productivity through digital applications, an investment in people and resources is first required before work can be done more productively. Separate chain links with partners or a data network such as SCSN are affordable, but all together entail relatively high costs for smaller companies (modifications and updates of) software packages and hired or own IT personnel. Among existing staff, in addition to insufficient knowledge, there is often insufficient time to get started.

External barriers to business

Getting suppliers and customers on board can also be an obstacle to chain digitalisation. Suppliers are sometimes too small or too hesitant and customers, such as OEMs, for example, are too large to adapt to digital industry standards. Large companies often have their own portals and systems that are simply not adapted to external systems due to various internal interests.

Collaborate, scale up, invest and just get started

Within successful technological ecosystems, collaboration and knowledge sharing are central. Innovative companies do not reinvent the wheel but learn from each other and create new techniques and products together. It is also easier for them to realise a digital production chain. Given the increasing complexity of products and manufacturing processes and the demanding environment in which companies operate, economies of scale quickly pay off. A certain size is necessary to pay sufficient attention internally to (chain) digitalisation. While a long-term plan and digitalisation strategy are preferable, taking small steps as quickly as possible to gain digital experience is better than waiting.

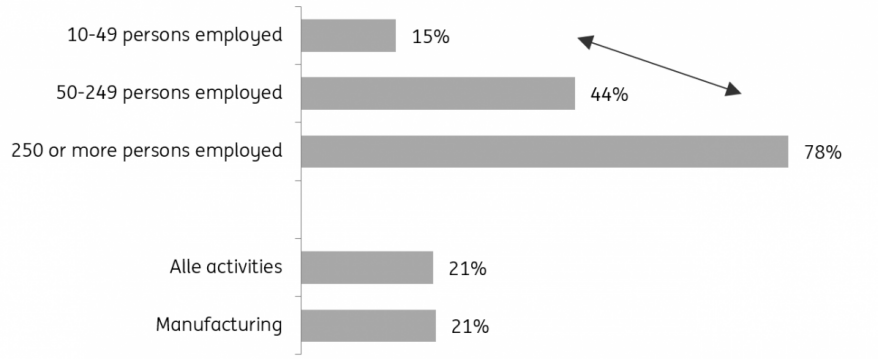
Industry ambassadors are needed who take chain digitalisation to the next level

Trade organisations, purchasing organisations, policymakers and larger buyers can actively support smaller companies with knowledge and approach them to participate in knowledge sessions, field labs, campuses or other partnerships aimed at increasing the competitiveness of the entire chain. Smaller businesses often struggle to find the outside specialist support they need to carry out their plans. Ambassadors from the sector can help them with this.

Invest in a willingness to change and digital knowledge and skills

It is preferable to employ ICT specialists. An ICT view offers a different perspective on the necessary adjustment of business processes to implement real changes. A good alternative is to hire external ICT specialists with experience in industrial automation and digitalisation. Ultimately, it is not the technology that determines the added value for the company, but the way in which it is applied.

Smaller companies employ ICT specialists less often



Source: ING Research based on Eurostat

Enterprise employed ICT/IT specialists, % of EU-companies, 2022

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