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# The complete “how-to” guide to your Digital Transformation with ERP for Manufacturers

# Forward

While many industries and business leaders are already experiencing the benefits of digitalization, a large number of organizations have yet to embark on their digital transformation journey. To remain relevant in the era of Industry 4.0, the time has come for the C-Suite to embrace and adopt emerging technologies that will allow them to thrive in the years to come.

Your ERP system can help digitalize your organization. The key is to ensure that it is future-fit; that it has the capacity to act as the heart of your organization; and that it can provide you with the critical information you will need during the transformation process.

**This document provides you with a practical guide on how to use your ERP solution to actively implement various processes that will enable your organization to reap the benefits of digital transformation.**

# Introduction

Just as a ship's captain would be reluctant to venture into uncharted waters, it is understandable that any decision maker would approach the journey of digital transformation with some trepidation. You are essentially charting a course that — if successful — will completely transform how your organization operates.

Every manufacturer's digital transformation journey will be different, and the challenges you will face will often require practical solutions specifically tailored to your organization. Taking those first steps can be daunting, but it will be worth it. Those leaders who embrace what Industry 4.0 has to offer will open the door to infinite possibilities and ensure the adaptability and longevity of their business.

Knowing where and how to start is often the biggest barrier to transformation. Lack of a clear strategy and a step-by-step plan of action can result in an organization's transformation journey stalling before it has gained traction.

**If well implemented to meet your objectives, an ERP solution will provide benefits that support your company's overall digital transformation strategy. A roadmap and checklist of what you need from your ERP solution will guide you through each phase of digitalization and help you to simplify the process as you take those all-important first steps.**

# What do you want digitalization to achieve for your organization?

Industry 4.0 — a subset of the Fourth Industrial Revolution — was publicly introduced in Germany in 2011. It was a government-led initiative to enhance German competitiveness in the manufacturing industry. Now a worldwide revolution, 4.0's focus is on automation and data exchange in manufacturing technologies and processes, and it is being achieved through the integration of future-fit technologies including:

- ERP systems that form the heart of the organization
- Cyber-physical systems (CPS)
- The Internet of Things (IoT), also referred to as the Industrial Internet of Things (IIoT)
- Cloud computing
- Cognitive computing (machine learning)
- Artificial intelligence (AI)

In the early stages, everyone was excited to implement Industry 4.0, and there were a number of early adopters of advanced technologies who were keen to embrace the opportunities it presented. Many saw it as a silver bullet that would fix everything overnight if you just threw some money at it.

**The reality is that while there have been some success stories, digitalization of the shop floor is not happening on the scale that many thought it would. Two of the main reasons for this slower uptake are that manufacturers are finding the costs and complexity of integration to be bigger challenges than anybody had foreseen.**

# How ready for digital transformation is your factory floor?

Before you even consider whether or not to digitalize your organization, you need a clear understanding of your current environment. This starts with knowing what's on your factory floor — Industry 4.0 is primarily about digitization of the shop floor. Many manufacturers and distributors are sitting with a number of analogue machines in their factories which still work perfectly well but, being analogue, have limited or no facility to connect digitally.

Another data collection challenge that has been identified with newer machines – which can digitally connect – is that most companies need to restrict access to their Programmable Logic Controllers (PLCs) to protect proprietary software as well as planning and other confidential information.

## *What you should consider*

- Appointing an automation specialist to:
  - Conduct an audit of your technology, processes, customer interactions and partner interactions
  - Identify gaps, bottlenecks and missing pieces in your operations
- An automation specialist will also help you to assess your total environment, tell you which machines can or cannot connect digitally and make recommendations on the best way forward for your organization. While it is possible in some instances to retrofit secondary sensors to enable the data collection process, it is a costly exercise.

> "Slapping cheap IoT sensors on everything isn't a cure-all, and it's entirely possible that more value gets created from a smaller number of more specialized, highly accurate IoT sensors."

**READ THE ARTICLE**

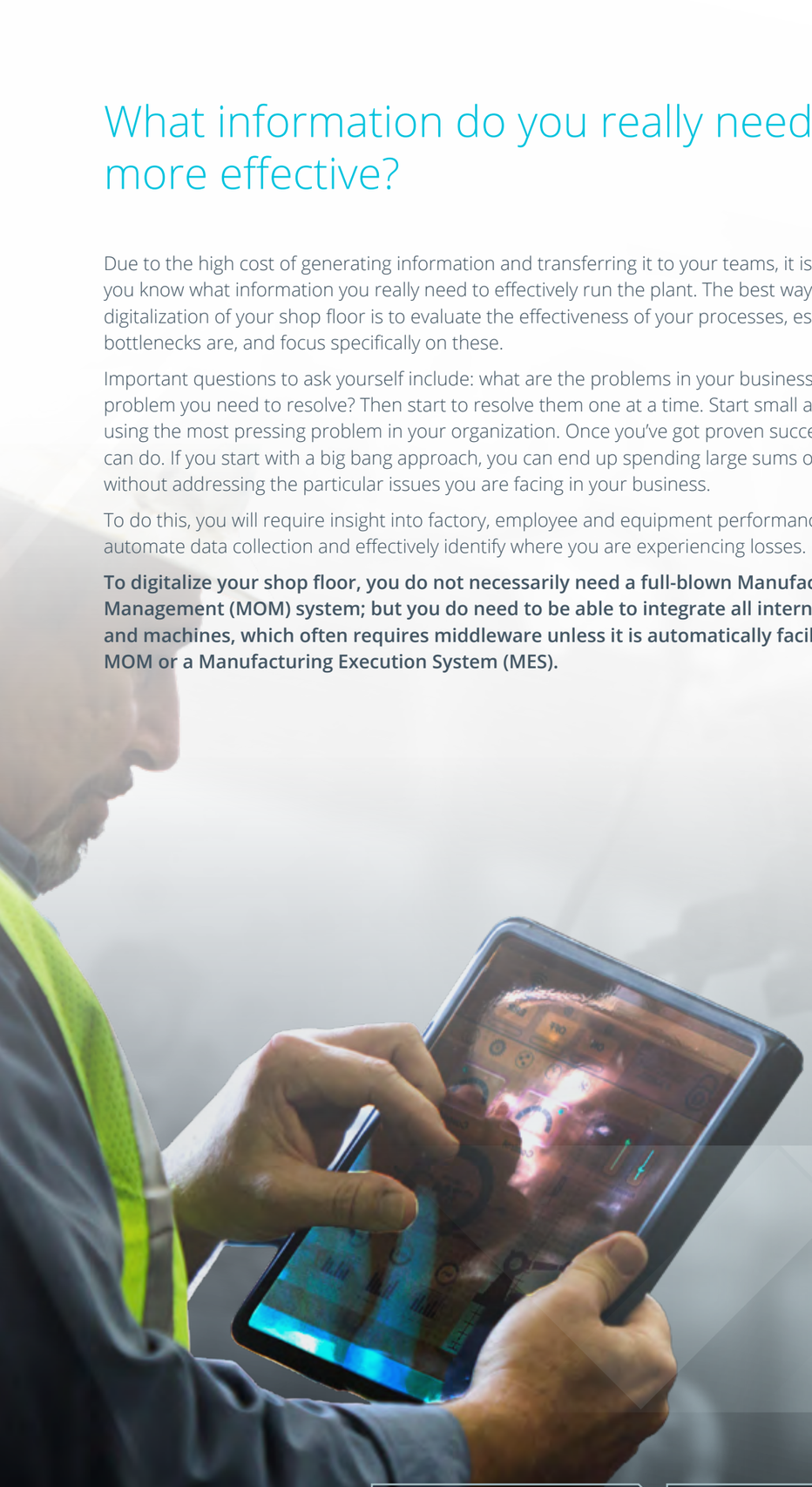
# What information do you really need to be more effective?

Due to the high cost of generating information and transferring it to your teams, it is imperative that you know what information you really need to effectively run the plant. The best way to approach the digitalization of your shop floor is to evaluate the effectiveness of your processes, establish where the bottlenecks are, and focus specifically on these.

Important questions to ask yourself include: what are the problems in your business, and what is the biggest problem you need to resolve? Then start to resolve them one at a time. Start small and create a test case using the most pressing problem in your organization. Once you've got proven success, ask what else you can do. If you start with a big bang approach, you can end up spending large sums of money, possibly without addressing the particular issues you are facing in your business.

To do this, you will require insight into factory, employee and equipment performance, using technology to automate data collection and effectively identify where you are experiencing losses.

**To digitalize your shop floor, you do not necessarily need a full-blown Manufacturing Operations Management (MOM) system; but you do need to be able to integrate all internal processes, people and machines, which often requires middleware unless it is automatically facilitated by either a MOM or a Manufacturing Execution System (MES).**



## *What you should consider*

- **Value-to-cost ratio:** The cost of gathering the information in a factory against the value of the information received.  Selecting an ERP that offers a plug-and-play solution to digitalize your factory floor, such as an integrated MOM or MES solution to automate data collection, can reduce the associated complexity and costs.
- **The type of middleware you require:** The data that is pulled from the machines is collected, collated and translated by middleware before it is integrated into your ERP solution. This is not something that is typically done by your ERP provider unless it is their core business. For starters, it's a highly specialized skill, and each company favors a particular type of architecture so they prefer to use their own approved suppliers.
- **Hardware and infrastructure costs:** You need the computing power to deal with all the information and turn it into something useful. Hard-wiring the network through the factory on a 'per meter' cost can quickly escalate the implementation costs.
- **Whether your ERP has the right interface to connect to the middleware:**

  ERP software does not automatically connect to machinery. An interface needs to be built between your ERP and the middleware. The middleware translates information in line with your requirements and sends it to your ERP system. Ask your ERP supplier whether they have the connection to receive information from the middleware.

  - To collect data from employees, crews and equipment, you would need an ERP that:
    - Provides a human-machine interface for manual start-stop data collection
    - Includes automatic data collection (IoT)
    - Combines both the above
    - Collects data from RFID/barcode entries
  - To connect to your equipment, you need to evaluate whether your machines have sensors and Programmable Logic Controllers (PLCs) as standard. If not, you can source middleware for your existing machinery. Either way, you will need an ERP that offers industrial connectivity to PLCs, which is typically done using native drivers.
- **Appointing a specialist:** to determine what kind of data you want to collect and how you're going to collect it. Once you have agreed on a way forward, that third-party automation specialist needs to potentially retrofit, but certainly complete the link-ups (e.g. getting 140 drivers to talk to 140 PLCs).

# Using Your ERP to go Digital

If you're considering implementing a new ERP solution or upgrading to the latest release of an existing one, you need to be looking for an ERP for tomorrow, not today. The question is, how do you know if the ERP solution is future-fit, or fit for retirement? The ERP solution you choose should include a few key features to help you through your digital transformation. These include: connected services; machine learning and AI; digital citizens; and event broadcast services.

## ERP Requirements for Digital Transformation

### IoT as an enabler of efficiencies and new revenue streams

The Internet of Things (IoT) refers to interconnected sensors, instruments and other devices networked together with computers' industrial applications, including manufacturing and energy management. This connectivity allows for data collection, exchange and analysis, potentially facilitating improvements in productivity and efficiency as well as other economic benefits (examples 1 and 2). IoT is an evolution of a Distributed Control System (DCS) which enables a higher degree of automation by using cloud computing to refine and optimize the process controls.

IoT is enabled by technologies such as cybersecurity, cloud computing, edge computing, mobile technologies, machine-to-machine, 3D printing, advanced robotics, big data, internet of things, RFID technology and cognitive computing.
*(**Ref.:** https://en.wikipedia.org/wiki/Industrial_internet_of_things)*

With the advent of the cloud and IoT, organizations are using collected data to derive new revenue streams, and achieve significant efficiencies, best described in the following scenarios:

**EXAMPLE 1**

An electronics manufacturer provides alarm tracking systems for motor vehicle fleets within the car hire industry. In the past, car hire companies would send cars to have alarms and trackers fitted and that would be the end of the job until the next car came along.

Now, the electronics manufacturer is able to collect data from the tracker equipment and sell it to the car rental company.

The rental company can use the data to:

- See how the drivers are treating the vehicles and adjust their quotes accordingly.
- See how fast the drivers accelerated and how harshly they braked.
- This information enables accurate decision-making regarding the rental company's negotiations with its clients.

***This technology opens up opportunities for electronics manufacturers to sell both the devices and the resulting data.***

**EXAMPLE 2**

Imagine that manufacturer industrial refrigerators for retail stores. One of the critical factors is up-time, ensuring the fridges maintain the correct temperature so that produce does not spoil before the given 'use-by' date.

The alternative is a long, drawn-out traceability, customer service and malfunctioning equipment issue. The customer buys a perishable food item which goes off before its use-by date, and reports to the retail outlet; the retail manager is notified and contacts the refrigerator supplier, who then sends a technician to assess what is wrong with the equipment. There could be long delays before the refrigerator is repaired.

How can you expedite this process and differentiate yourself from your competitors?

You could offer your customers 99.9% up-time:

- Place an IoT device inside the refrigerator to monitor temperature, humidity etc.
- As soon as any of these factors drop below a certain threshold, the device could send a message via the ERP system which could in turn create a ticket and notify a technician that they need to address the issue on that refrigerator.

***In the above refrigeration example, IoT outside of the organization offers the ability to create a new revenue stream.***

It allows the manufacturer to offer **predictive maintenance** on the products it manufactures and this in turn enables its customers to provide a better service to the end-customer.

It enables not only B2B but B2B2B2C. So while the manufacturer would originally have sold a particular product — the fridge — now they can offer their customers an additional service. In this instance, they would offer to collect, store and report on that data, sending out a technician as soon as they see it is necessary.

This approach means the customers don't have issues with spoilage and unhappy end-customers, and they don't have to manage the data themselves. The refrigeration vendor can charge a fee for that additional service, increasing not only goodwill through efficient after-sales service but also its increasing the organization's bottom line.

### *What you should consider*

- **IoT agnostic ERP:** To achieve these improved efficiencies and added revenue streams, your ERP should be IoT agnostic and not a proprietary system. It should be compatible with all the major IoT platforms, able to consume and 'play' well with them.
- **Cloud enabled:** You need to evaluate if your ERP is cloud compatible to be able to leverage cloud-enabled technologies used to collect data from IoT devices.

## An Open API

To use digital features, your ERP solution must have an open Application Programming Interface (API) at its core.

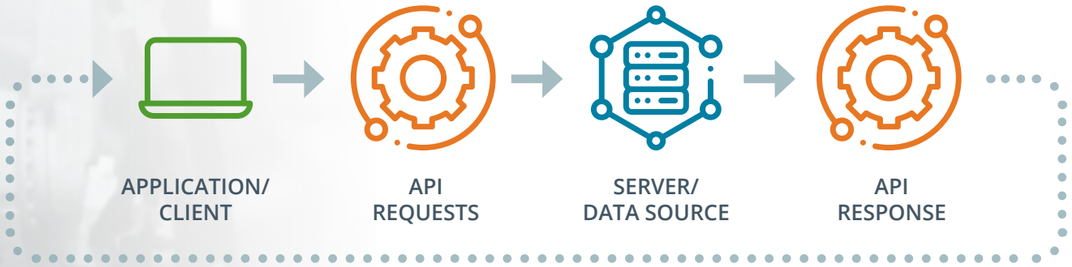
# API

Application Programming Interface

**API Definition**

An application programming interface provides a developer with programmatic access to proprietary software applications. It's a software intermediary that makes it possible for application programs to interact with each other and share data.

## HOW AN API WORKS




### *What you should consider*

- **Open API:** Ask your vendor if the ERP has an open API. If not, it won't be able to support Bot functionality, have connected services, or AI.
- **Cloud:** Your ERP should be cloud compatible or cloud aware to facilitate effective storage of the volumes of documents and data that will be generated when you digitally transform.

# Connected Services

The concept of having connected services is a necessity for any organization moving forward. A connected service allows you to subscribe to and consume services that have been provided in the world by other suppliers. These vendors don't have to be one of your ERP suppliers, it can be any vendor, anywhere. In the marketplace many organizations such as Amazon and Facebook already have connected services.

Connected services allow you to expand your supply chain outside your business by integrating offerings like Amazon, Facebook Marketplace and industry-specific platforms. By being able to integrate the connectors, you reap the benefits of other organizations' development because you don't have to put the time, effort and cost into developing them yourself.

You can now download a service, such as an Amazon connector, and integrate that into your ERP. This proves useful if you're wanting to find new ways to sell obsolete or surplus stock in non-traditional markets. You can push your products from your ledger to Amazon, and Amazon can consume it. It also helps you to get your product to market faster and to access non-traditional markets.

**EXAMPLE**

Imagine you are selling 10 books on Amazon. You have consumed the Amazon connector and have uploaded the books you want to sell. As you are processing a sales order for the books, you need to arrange a delivery quote. Let's say that you like to use ACME for deliveries.

In the past you would have had to contact ACME's call center, wait for a customer service agent to become available, give them the details of the package to be collected and wait while they calculated a quote for you. Once you accepted the quote the call center agent would notify the collections department to send someone to collect the package. You would have to follow up with them to check it was delivered, and they would need to send through an invoice, which might sit on your desk for a few days before being signed off and sent through to your accounts department for payment.

With connected services, you would be subscribed to ACME while processing the sales order on your system, and would be able to:

- Push information such as delivery address, weight and dimensions through to ACME's system for an instant quote.
- Once you've accepted the quote, the ACME delivery person is dispatched to collect the books and deliver them to the purchaser.
- Once the purchaser has signed for the books, an event is created on ACME's server.
- Because you are subscribed, you receive an emailed delivery note.
- The delivery note is pulled into your ERP system, and is available to mark for payment.

***By making use of ACME's connected services, you have sped up your sales process and thus increased your efficiency.***

One of the benefits of Industry 4.0 is the potential to generate new revenue streams. Connected services help you do that by opening up new potential business opportunities. Let's say you need a particular plastic part for use in your manufacturing process.

Previously you would have submitted a tender request to your three regular suppliers. With connected services, you have the ability to push the tender out to plastic and rubber suppliers that you haven't connected with before. They can all submit tender bids, potentially driving down costs and improving the rate of supply for you. Such opportunities also open new revenue streams for the suppliers as they are able to potentially tap into previously unexplored markets.

The ability to connect to the entire global market through connected services helps to move organizations from a linear supply chain to a circular supply chain. At the same time, it frees people up to focus on strategic initiatives and building relationships.

## *What you should consider*

**Can your ERP provider consume connected service applications?** It must be able to integrate an application without writing a single line of code. If it can't, it isn't future fit. Your ERP provider should also be keeping an eye on the connected services available worldwide, and be able to easily integrate with emerging newer connectors.

## Machine Learning and AI

Machine learning and AI tools in your ERP can help to identify trends, get predictions and identify anomalies. In essence, machine learning can help the business create efficiencies:

- **IN PROCUREMENT**

  AI can help your procurement teams be more efficient. Imagine you are creating a purchase order and you need to order 10 new laptops for 10 new staff members starting on 1 December. As you are capturing the order, the AI alerts you that the provider you have chosen won't provide laptops in December. It recommends that you select another supplier. If you had wanted that information previously, someone would have had to pull a report and do intense manual searching to see if that particular supplier had previously supplied laptops to the in December.

- **IN FINANCE**

  One of the most important aspects of any business is the ability to manage cash flow. What if you could predict when a customer would go into a 30, 60, 90-day age analysis? It would be more efficient if you received a warning that the customer was likely to go into a 60-day age analysis in the second quarter. As CFO, you can predict your organization's cash flow and prepare accordingly by managing your purchases so that you are able to pay your suppliers on time.

- **IN CUSTOMER ACCOUNT MANAGEMENT**

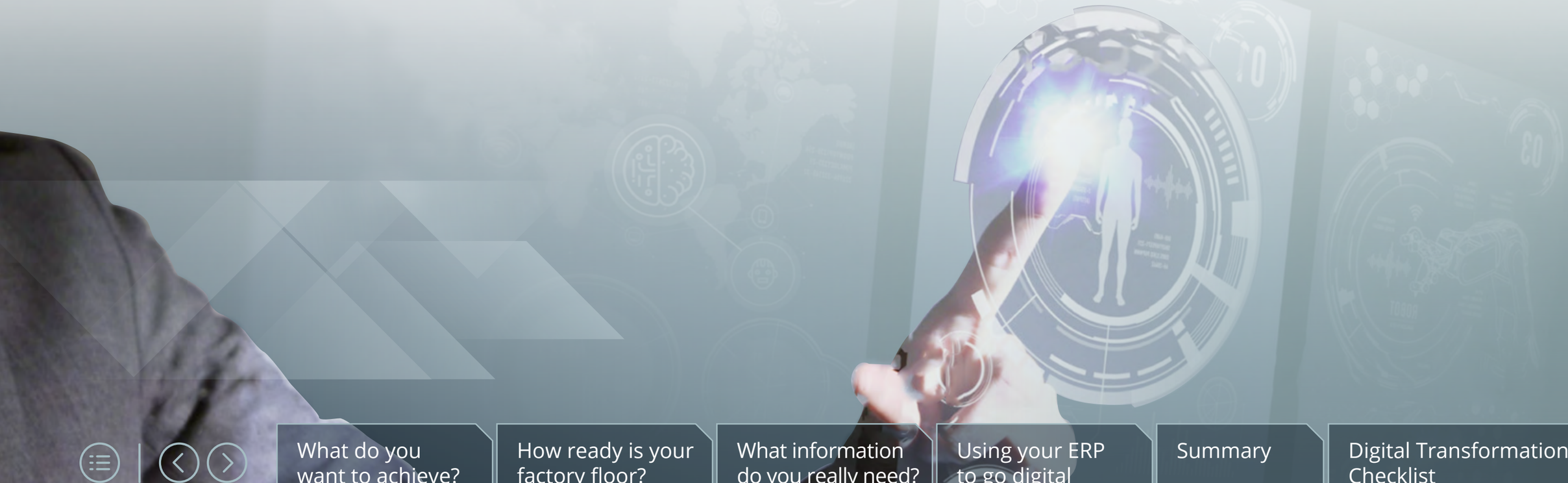
  AI can assist with trend and anomaly detection. As an account manager you need to keep a close eye on what's happening with your various accounts. In the past you would pull sales reports to see what a customer had purchased and a separate merchandise report to see what they had returned. You would pull a credit report to monitor their invoicing and credit levels, and to understand whether they had reached their threshold.

- **IN SALES**

  AI can help with clustering too. This means that when you are capturing a sales order, the AI will come up in the interface and say 'people who buy bikes also buy helmets'. The sales person can then make this suggestion to the customer, potentially creating an additional sale.

## *What you should consider*

- **AI capabilities in your ERP:** The key question you should ask your ERP vendor is if their system has AI. If they don't, then ask them if they are planning an AI solution, as it would be more efficient to upgrade your current system if it does everything else you need it to do. If they are not planning an AI solution that will be released in the near future, rather consider an ERP that already has AI capabilities.
- **AI as a first-class citizen of your ERP:** The AI should be a first-class citizen of your ERP, not a third-party 'tack-on'. If you are looking to incorporate AI into your organization you need to make sure your AI is a pre-existing, integral part of your ERP. It is possible to hire a consultant who can could build it for you, but it would be expensive, take time, be complicated, and you may end up with two separate operating systems.
- **Security risks:** Workarounds or add-ons become security risks. Your third party will be handling vast amounts of your data; consider who is going to manage the security of that data. The data will have to be moved off from somewhere else and security of the data is not guaranteed. It is better to have the two in one system, so that the data is not put at risk. By having the AI already integrated with your ERP, you also reduce your time to market.
- **A true future-fit ERP solution should be for everyone:** Your ERP should enable anyone to engage with AI, without them needing to be data scientists. Unless you understand the data you're being shown, there is no value in AI for you. You need to make sure your existing report writers can read the reports. Look for an ERP solution that has a tool similar to a report writing tool that will allow you to bring AI type functions to the user interface.
- **Upskilling your staff:** Understand that there will need to be some upskilling of staff as it is a new paradigm of thinking. Current reports tell you about the business as it is. AI will tell you what the business should be in order to be 'profitable. Typically, a lot of expensive resources are needed for people to start using AI. These include data scientists who will make sense of the volumes of information generated. Data scientists, who are usually statisticians or actuaries, are hard to find and, because of their advanced skill sets, they are an expensive resource to have on your team.



## Social ERP

Not the same as integrating ERP systems with external social-media sites, Social ERP mirrors the functionality of online social networking tools. The interface may act like WhatsApp or Facebook, but it is secured and maintained with your ERP solution. Social ERP tools can facilitate collaboration and communication among employees and departments by integrating a universally familiar and popular communication platform into ERP.

If your ERP contains a social element which enables you to 'follow' individual clients, you can obtain a comprehensive overview of activities on their accounts. So when the client orders something or makes a payment, or someone else from your team contacts them, it will pop up in your social ERP feed.

Your ERP of the future will push information to you, enabling you to use machine learning to detect trends. It's acceptable if a customer buys something one month and returns it the next. However, if a customer repeatedly buys and returns items, that is a trend – and a red flag for someone to find out why.

The system can even detect fraud. If a sales clerk captures an order for 100 items every Wednesday, and one particular Wednesday reflects an order for 1,000 items, it will immediately be flagged for verification. This also assists with inventory management.

## Bots – Self-Service Agents/Digital Citizens

Using self-service agents or digital citizens within your organization has a number of benefits.

According to an Aspect Consumer Experience Index research report, 71% of consumers want the ability to solve most customer service issues on their own. A growing and preferred means to conduct those self-directed interactions is through chatbots and automated interactions such as SMS and messaging.

There is a huge opportunity for organizations to differentiate themselves by making use of chatbots to service customers and facilitate staff self-service engagements.

Your self-service agents are exposed to the world 24/7, they never go to bed, and they are always there answering questions. They provide your customers with consistent service as they don't wake up grumpy in the morning, and they have the same attitude towards work every single day.

If you are looking for a digital citizen or Bot of the future, you should make sure that it has the ability to self-teach and self-learn. In the first few days your Bot will be quite immature – it won't know the lingo that your customers might use, or that you use in your oragnization. As the Bot starts to learn the lingo, the service they provide will improve.

### *What you should consider*

- **Whether your ERP has a digital citizen/Bot:** A good question to ask your ERP vendor is, do they have a digital citizen? If your current ERP does not have a bot and you want to digitalize your organization, you should check if your current supplier has a newer version that incorporates digital and has its own bot as a feature. If they don't, you will need to consider moving to a different ERP supplier that is future-fit.
- **A Bot with an in-built industry-specific understanding:** Your digital citizen should come with a solid understanding of industry specific terms such as bill of goods, vendor, debtor and service. It should be engineered to speak in generic business language.

# Digital Transformation Checklist

| Steps on your digital journey | Questions to ask yourself at each stage |
|---|---|
| Your first step on your digital journey is to contact a third-party automation specialist to come in and assess your specific situation. Start auditing your equipment, technology, processes and types of interactions with customers and partners. Identify gaps, bottlenecks and missing pieces in your operations. | ▪ What do you want to achieve by digitalizing your organization?<br>▪ How ready is your organization for digital transformation?<br>▪ What do you really need to know – What data do you need to answer pressing concerns?<br>▪ Have you weighed the cost of gathering information in a factory against the value of the information received?<br>▪ Have you evaluated the hardware and infrastructure costs? |
| Select an ERP system that can enable your digital transition.<br>*If you're considering implementing a new ERP solution, or upgrading to the latest release, you need to be looking for an ERP for tomorrow, not today.* | **Does your ERP have the following key features:**<br>▪ The connection to receive the information from the middleware<br>▪ An open API<br>▪ Connected services<br>▪ Machine learning and AI<br>▪ Digital citizens (Bots)<br>▪ Event broadcast services<br>▪ Cloud compatibility awareness |
| Connected services | ▪ Can your ERP provider consume connected service applications? The solution must be able to integrate an application without writing a single line of code. |
| Machine learning and AI can help your organization | ▪ Does your ERP solution contain some form of AI? If not, it is an application for today, not tomorrow.<br>▪ If your ERP doesn't have AI, ask your vendor if they are planning an AI solution.<br>▪ Ask if the AI is a first-class citizen of your ERP, or a third-party tack-on.<br>▪ Does your ERP solution have a tool similar to a report writing tool that will allow you to bring AI-type functions to the user interface? |
| Self-service agents/digital citizens | ▪ Ask your ERP vendor whether they have a digital citizen.<br>▪ If your current ERP does not have a Bot and you want to digitalize your organization, check whether there is a newer version which does incorporate digital and a Bot.<br>▪ If not, you will need to consider moving to a different ERP supplier that is future-fit. |

# Summary

While Industry 4.0 is underway, full digitalization may not be the answer for every organization. The best place to start is by understanding what you have and how you currently use it. Decide what you want to achieve from digital transformation and then decide whether the value derived from the data will outweigh the cost to get it.

Remember that the aim of 4.0 automation is to free people up to better focus on strategy and relationship building.

Start your journey by reaching out to your ERP provider to see how they can help guide you through the digital transformation process. Make sure your ERP provider has problem-solving experts who can identify the bottlenecks in your organization and address those specific issues for you. They must be able to prove value for your business. They must be able to prove ROI. They should only be selling the right technology to you at the right time, for the right reasons.

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