Anna Lahtinen | Iris Humala

Empowering SMEs with Artificial Intelligence

Guide to harnessing the potential of AI for small and medium-sized enterprises

AI TIE

Haaga-Helia

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Join us to build your knowledge of AI and create your own AI success story

This guide was edited by:

Dr. Anna Lahtinen, DBA, Senior Researcher, Haaga-Helia University of Applied Sciences. Anna's work focuses on research, development and innovations in AI, entrepreneurship and business renewal. The projects she has led include Tapping the potential of AI through co-design (in Finnish) financed by the Finnish Work Environment Fund, and its predecessor, AI is here – support, skills and cooperation are the way forward! as well as AI Technology Innovation Ecosystems for Competitiveness of SMEs (AI-TIE) and its expanded spin-off project, AI-TIE Southern Finland, which were supported by the European Regional Development Fund, Helsinki-Uusimaa and Kymenlaakso Regional Councils. Anna's 20 years of international work experience covers project management and partnership development in business, higher education and innovation ecosystems. The topic of her dissertation (2010) was women entrepreneurs in the Nordic countries. A work based on her dissertation received a prize for practical input in enterprising by the U.S. Association for Small Business and Entrepreneurship.

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In cooperation with:

Foreword

While chairing the steering committee for the project *AI-TIE – AI Technology Innovation Ecosystems for Competitiveness of SMEs*, I had an interesting opportunity to follow and focus on the rapid development and potential of AI applications.

The processes of developing different new business operations in SMEs, finding new solutions and commercialisation have taken up a great deal of time and resources during my career. In order to achieve end results in the right place and at the right time, it would often have been helpful to resolve issues and make connections much faster and using the best available information.

While there is plenty of potential for using AI in SMEs' business, large companies have so far been the main beneficiaries of these technologies. The purpose of this guide and the AI-TIE project on which it is based is to encourage SMEs to make use of digitalisation by enabling and visualising different ways of improving resource efficiency and competitiveness and generating new business and success through AI.

Accessible and up-to-date data plays a very important role, especially in problem-solving situations. When solving problems or considering new services and products for your customers, a great deal of information about backgrounds, causes, possible solutions and their impacts is often needed. The fact that this information may be fragmented and stored in many different locations may make finding and using it a challenge. Product and service life cycles are becoming shorter and time windows for new opportunities may be smaller, which may make it difficult to achieve sufficient cash flows quickly enough. As a result, quick and efficient access to information are crucial factors in business. The faster you can access information and find effective solutions, the faster you will find the right path forward. This is why using efficient information acquisition methods as well as various databases and digitalisation can be highly rewarding.

I hope this guide will spark your interest and help you understand and be inspired by the potential of artificial intelligence.

Porvoo, 9 March 2023

Fredrik Pressler

CEO, East Uusimaa Development Company Posintra
Chair of steering committee for AI-TIE and AI-TIE Southern Finland projects, 2021–2023

How did this guide come about?

The *Empowering SMEs with Artificial Intelligence* guide is based on the information and results of a project called AI-TIE – AI Technology Innovation Ecosystems for Competitiveness of SMEs as well as the artificial intelligence journeys we have shared with more than one hundred Finnish companies.

AI-TIE – AI Technology Innovation Ecosystems for Competitiveness of SMEs was a project coordinated by Haaga-Helia University of Applied Sciences and implemented in cooperation with Laurea University of Applied Sciences in 2021–2023. Its objective was to support the development of small- and medium-sized enterprises (SMEs) in Uusimaa region of Finland by means of artificial intelligence solutions. SMEs have been identified as playing a significant role both in Finland and throughout the EU. They account for approximately 98% of all companies.

The main objective of AI-TIE was to support SMEs in developing and growing their business by using AI solutions to improve their internal processes, boost innovation and promote product and service development. **Investments in technological advancement and AI deployment in SMEs support Finland's competitiveness in international markets.**

AI-TIE was launched in June 2021 and concluded in August 2023. It was funded by the European Regional Development Fund (REACT-EU) and Helsinki-Uusimaa Regional Council. The project also gave impetus to the AI-TIE Southern Finland project (2022–2023) in which the project model was implemented across all industry sectors, in Uusimaa and also in Kymenlaakso regions of Finland. These projects supported a larger number of Finnish SMEs in deploying artificial intelligence. The Regional Council of Kymenlaakso provided funding to support the spin-off project.

AI-TIE IN NUMBERS

- AI accelerators **3**
- Companies in AI accelerators **65**
- Companies in research and development institutions' RDI projects **100+**
- SME representatives who benefited from AI-TIE tools **200+**
- Companies that received COVID-19 support **80+**
- New piloted products or services and 3 new jobs created **8**
- AI stories of Finnish companies www.aistories.fi **60+**
- AI at Work webinars **15**
- Business advisors in Train-The-Trainer coaching **20**
- Communication and cooperation partners **22**

Online course
"AI in Business"
ai-in-business.fi

Guide
"Empowering SMEs with Artificial Intelligence"
haaga-helia.fi/ai-tie

Interview series
"AI in Finland"
aistories.fi/suomi

Information updated on May 23, 2023.

AI-TIE has led SMEs to a path of AI development and inspired them to consider and brainstorm concrete possibilities for AI deployment and suitable use cases for their business. This work has been supported in various ways, including:

- organising Finland's first **sector-specific AI accelerators** aimed at companies in the cleantech as well as health and med tech sectors
- implementing a light-weight, cross-sectoral **AI micro accelerator** for SMEs in Uusimaa and Kymenlaakso regions of Finland
- providing **Train-The-Trainer coaching** for business advisors and development companies to support their capabilities to inform companies in their networks about the potential of AI
- activating work on AI ecosystem building
- **creating the open online course** AI in Business **in English and Finnish** (www.ai-in-business.fi)
- producing
  - **a series of interviews on AI in Finland**, in which public figures and societal influencers share their views on artificial intelligence
  - **a series of webinars** on AI at Work
  - **AI stories from companies**, which present Finnish AI projects and solutions www.aistories.fi in **Finnish and English**
  - **Empowering SMEs with Artificial Intelligence guide** in **Finnish and English**, www.haaga-helia.fi/ai-tie.

The *Empowering SMEs with Artificial Intelligence* guide was co-written by several members of the implementation team at Haaga-Helia University of Applied Sciences, a number of SMEs, members of the AI-TIE steering committee, our colleagues at Laurea University of Applied Sciences and project partners. We would like to extend our warmest thanks to all of you for your valuable contributions!

The Empowering SMEs with Artificial Intelligence guide was produced in cooperation with the steering group for the AI-TIE project package and with the support of its members and the organisations they represent:

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Who is this guide for and how can it be used?

For SME representatives – Build your knowledge and understanding of artificial intelligence, gain insights into AI applications, and read about solutions used by other companies and stories of AI experiences that have meaning and provide inspiration. Concrete tools for SMEs will support your work organisation in its first steps on the AI journey.

For managers and supervisors – Receive support for mapping the current situation at your company or business unit and understanding the big picture in AI application development. The guide highlights the importance of data as the foundation for AI solutions and sheds light on the development of IT and tech capabilities and the importance of company and management commitment in terms of developing well-functioning AI solutions.

For entrepreneurs – Read about other SMEs' experiences and expert views concerning artificial intelligence. You will also learn about the potential of AI technologies in SMEs and AI applications in your business.

For business advisors – Learn about solutions for promoting digitalisation and AI deployment in SMEs, which will allow you to pass the information on to entrepreneurs and SMEs. The contents of this guide will help you encourage companies in move in new directions, using practical AI-TIE tools that will support them in deploying AI.

For experts in networks and expert organisations – The guide will increase your understanding of AI deployment in Finnish SMEs, and you can share information on the potential of AI with companies in your network. You will gain new insights into your organisation's role in the ecosystem and how you can support companies in AI deployment.

For researchers – The guide will stimulate your interest in information based on applied research, in which AI deployment in SMEs has been promoted by means of systematic surveys as well as subsequent AI accelerator experiments and collaboration with companies.

For everyone interested in deploying AI as part of their work and their organisation's development and competitiveness.

Join us and start your own AI story!

You can either focus on sections of the guide that interest you or read the contents more thoroughly!

Artificial intelligence doesn't have to be particularly demanding or complex. In practice, it can be deployed with a low threshold. Even small benefits from AI will give you access to refined information and improve your work efficiency. SMEs – take a bold step into this area! Experimentation and daring do not cost anything. If you do end up developing AI solutions and projects, you will have a good understanding of artificial intelligence, which will improve your chances of achieving good results. We recommend starting with a small idea while keeping the big picture in mind. You will get there.

Ari Maaninen, Senior Project Manager, Mediq Finland

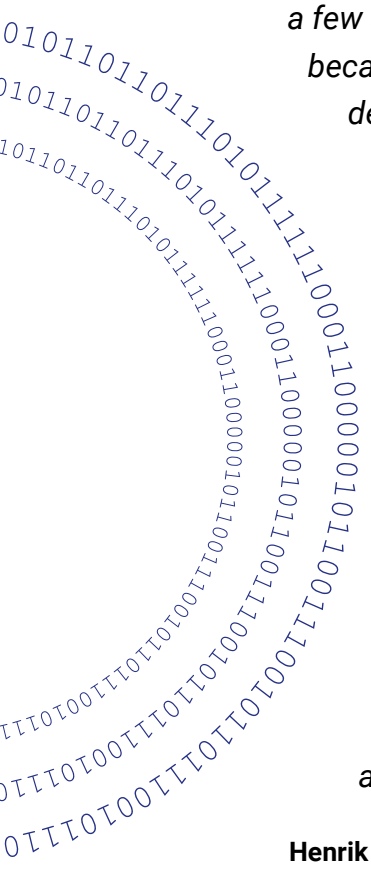
This guide focuses on the potential of AI for SMEs

The fact that large companies reap the greatest benefits from AI, while small- and medium-sized enterprises are the ones with great potential for deploying them in business has been recognised at the European level. Estimates indicate that approximately 24 million SMEs operate in the European Union, accounting for 99% of all companies. The corresponding figure in Finland is 98%, or some 350,000 SMEs. This is a very significant group in terms of Finnish society and the national economy. By definition, SMEs have fewer than 250 employees and an annual turnover of no more than EUR 50 million. As a result, they comprise a wide range of micro, small and medium-sized enterprises. We recommend that you apply the contents of this guide to your company's situation, adapting them as required based on your resources and your vision.

We encourage all SMEs to take an active interest in artificial intelligence and build their related expertise and understanding of it. Companies of the following types are in the best position to deploy and use artificial intelligence:

1. SMEs **which have already utilised digitalisation** in their operations but could further enhance their innovativeness, competitiveness and job creation potential by improving their competence in AI and the digital transformation.
2. SMEs **that are planning to deploy AI** to develop their internal processes or innovate new products and services.

Supporting AI deployment in SMEs can promote their flexibility with regard to the digital transformation, competitiveness, economic and social well-being.



In the early days, mobile phones, computers and the Internet were used by a few select business executives. However, these technologies quickly became mainstream, forcing companies to take an interest in them and develop their capabilities for their use. AI solutions like ChatGPT are significant technologies, as they are having a greater impact than the Internet and can consequently even be compared to the birth of enlightenment in the late 1700s. **An increasing number of companies see artificial intelligence and its potential as strategically important. This also applies to any organisation – not only tech companies – operating at the customer interface.** *The majority of Finnish companies are SMEs, and they should take a particularly active interest in artificial intelligence and develop their understanding of it. AI will have, and is already having, a much wider impact than what was generally expected. In that sense, the 1960s phrase coined by Roy Amara, a computer scientist at Stanford University, may be more valid than ever today: "We tend to overestimate the effect of a technology in the short run and underestimate the effect in the long run.*

Henrik Keinonen, D.Sc. (Econ.), Partnerships, Venture Capital, Business Helsinki Accelerator, Business Helsinki

Artificial intelligence in today's SMEs

Studies have shown that around 70% of Finnish SMEs are not using artificial intelligence in their business. However, in contrast to a few years ago, SMEs are increasingly interested in the potential of AI and are more willing to commit to developing AI-based solutions and experiments associated with them.

At the beginning of the AI journey, it is important for a company to understand its starting points and capabilities for deploying AI-based solutions, analysing them in terms of the company's specific goals and other companies in the operating environment. The next section illustrates what artificial intelligence in SMEs is today and how you can utilise this technology to meet the needs of your business.

An SME's digitalisation level affects its readiness to deploy AI

While most Finnish SMEs use at least some digital tools or off-the-shelf IT solutions in their daily work, the majority of these companies represent a level of digitalisation that involves little or no tailoring of technical solutions to the company's business processes (Figure 1). As technology deployment requires competence and ties up resources, slightly more advanced digital tool users often end up working with an external IT service provider to develop customised solutions. However, some SMEs have successfully given digitalisation a role in enhancing their competitiveness or made conscious efforts to turn it into a competitive advantage over their competitors.

Artificial intelligence (AI) refers to the ability of a machine to imitate and use skills traditionally associated with human intelligence, such as reasoning, learning, planning, designing or creating. In practice, AI is advanced analytics based on machine learning combined with automation.

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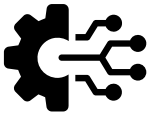

DIGITALISATION IS PART OF CORE ACTIVITIES

- In addition to basic IT capabilities, we actively deploy new technologies. Digitalisation is business as usual for us, and we are prepared for its accelerating pace.
- The company utilises digitalisation to gain a competitive edge over its competitors.

- We use in-house resources to develop our own IT solutions.
- Digitalisation has a role in the company's competitiveness

Most SMEs are here

- We engage in collaboration and development work with an external IT service provider.
- Digitalisation is part of the company's interaction with partners and customers.

- We buy off-the-shelf IT solutions and software. We use digital tools, including a website or an electronic booking system.
- We actively explore and use the potential of digitalisation.

TAKING THE FIRST STEPS TOWARDS DIGITALISATION

- We mainly use paper, binders, and Excel and/or Word files. We have some digital tools, including Teams.
- Basic digital tools are part of daily work.

Figure 1. Digitalisation capabilities of Finnish SMEs.

In a wider sense, this warrants the following conclusions from the perspective of AI deployment:

- AI-based solutions can be developed to improve the company's internal processes or create new and improved products and services, especially in those SMEs where digitalisation is already a natural part of business processes.
- SMEs mainly rely on external partnerships and work together with external IT service providers for technical implementation of AI solutions.
- Many off-the-shelf solutions for AI deployment are already on the market, and more are being released all the time. These solutions can also be used by companies with a modest level of digitalisation to exploit the potential of AI in their business with reasonable resource inputs.
- Artificial intelligence is rapidly becoming ubiquitous and is already an inconspicuous part of our daily lives in many cases. Good examples of this include the automatic transcription function in MS Teams, Facebook Newsfeed, Google search engine, Netflix recommendation algorithm, built-in synonym search in MS Word, and the latest ChatGPT chatbot, which is based on artificial intelligence.
- Tools that have already been integrated into our daily work or are otherwise openly used give us increasing access to AI. This makes it easy for SMEs, also those at a low level of digitalisation, to familiarise themselves with the potential of artificial intelligence in practice. A better understanding paves the way to tailored solutions and more advanced artificial intelligences.

SMEs have a basic understanding of the potential of AI

Many Finnish SMEs already have a basic understanding of the potential offered by AI technologies for developing business processes, even if the company has not applied them or consciously used them yet. Some companies have mapped the possibilities of artificial intelligence for their business needs but have not moved on to deployment. However, there are also many companies that have no idea or knowledge of how artificial intelligence could be used in their business. These

companies accounted for up to 25% of the 23 participants in the AI accelerator for the cleantech industry, even among those with a fundamental interest in AI.

Only a few SMEs have carried out AI experiments and pilots or launched new AI-based products and/or services in the market, but their number is growing rapidly. The starting points for AI deployment reported by the companies participating in the cleantech AI accelerator provide a good example of this (Figure 2):

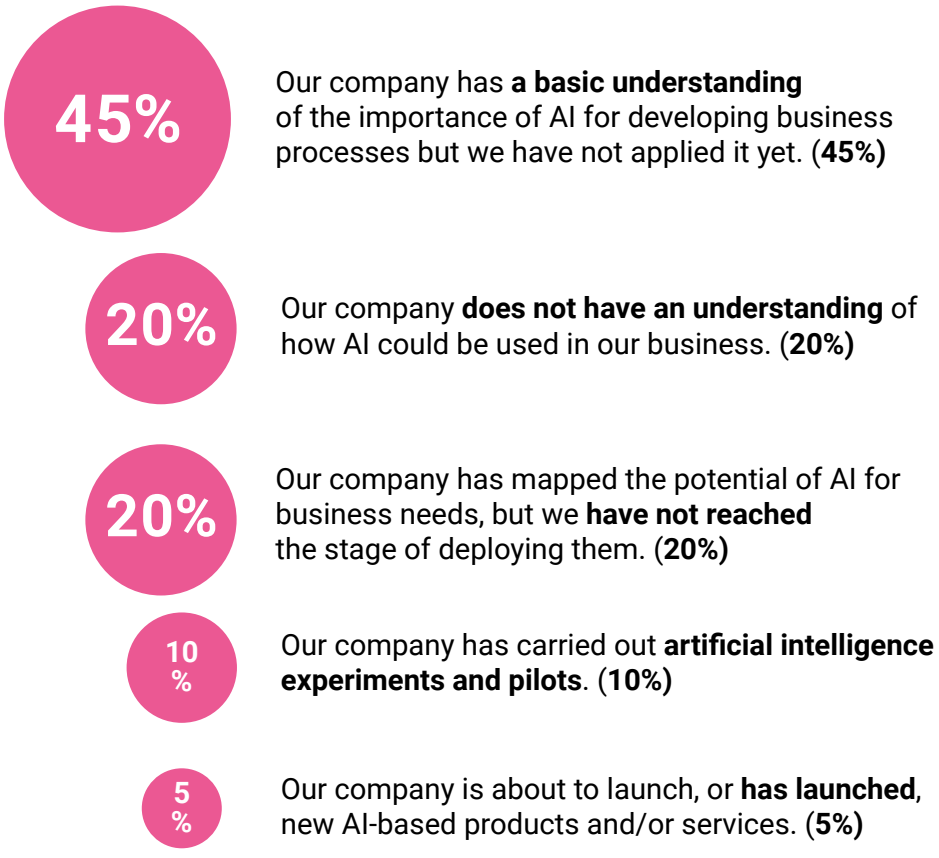

Figure 2. Use of AI in SMEs participating in the cleantech accelerator, percentages rounded up (Ruohonen 2021).

It was interesting to see how many companies participating in the AI-TIE accelerator, when considering their use cases and possibilities, seemed to question whether their ideas measured up – as if AI applications should be something more, or at least more ambitious, than any other tech-based step forward planned by the company. This is not how it works. ***AI-based applications can be very simple. In many cases, the most challenging stage in their deployment is identifying the essential data found in companies – which often exists in different formats and locations – and converting it into a processable format and using it in the right location.*** *From the deployment perspective, the requirements of AI applications are quite similar to other applications that companies have had to deal with for years, rather than being outlandish new problems.*

Hannu Vahtera, D.Sc. (Econ.), Research Area Director,
Haaga-Helia University of Applied Sciences

Our observations in AI accelerators and interviews with companies (Ruohonen 2021, 2022) indicate that the accountable managers in Finnish SMEs deploying AI are given free rein and the authority to promote AI initiatives with their peers in different business units and functions. In general, AI-based experiments and solutions in these SMEs are also in line with the company's broader business strategy. Some SMEs also report that the senior management is committed to the organisation's AI strategy, which is likely to accelerate development work and facilitate strategy implementation within the company. We believe that these starting points contribute to a company's commitment to AI deployment across a broader front.

SMEs see diverse potential in artificial intelligence. Product and service development and production, quality control, maintenance and remote diagnostics, sales and marketing, customer service, finance, IT functions and, to a lesser extent, HR management are areas in which SMEs see the greatest potential for AI.

Data, or machine-readable information, is at the core of AI solutions and a must for producing solutions that work as expected. Data that is available, of adequate quality, and in a format that enables reliable processing is a precondition for

deploying AI solutions. In this equation, data availability is generally not an obstacle in SMEs; studies indicate that they **have versatile data sources**, including numeric, text, image, video and audio data. Most companies can identify at least three different data sources, although numeric data and text are the most common types.

Special attention must be paid to the company's data architecture and master data management (MDM) to ensure successful deployment of AI solutions and to also enable (further) development of business processes in the future. Master data refers to relatively permanent data at the core of the company's business that is used to meet multiple needs. It affects operations throughout the company and, consequently, its stakeholders. Master data management refers in general to best practices of data management in companies associated with developing and also monitoring the data and data warehouses in the company.

SMEs take a pragmatic view and aim for reliability

Compared to other actors in the sector, most SMEs aim for robustness, security and, above all, reliability when deploying AI. References are particularly important when they select partners. The number of such 'hesitant' companies may be up to three times higher than that of companies which see themselves as pioneers and are among the first in their fields to boldly experiment with new technologies (Figure 3). Companies that see themselves as visionaries, in which new technological solutions are an established part of their business, are a clear minority in Finland.

Just like any other technological change, designing and deploying AI solutions require investments. A pragmatic approach is often necessary in SMEs, taking into account the realities of most SMEs when it comes to the investments required by this change. To quote a company representative: “Our resources are limited, and this determines our path forward to a large extent.” While AI deployment is seen as an opportunity to enhance the company’s competitiveness and solidify its position compared to other operators in the field, **time, money and competence** emerge as key challenges. An SME representative we interviewed described their company’s attitude towards artificial intelligence by saying, “**When it comes to AI, we intend to be pioneers compared to other operators in our sector**.”

Figure 3. AI deployment in SMEs in relation to other operators in the sector.

SMEs' strength lies in networks. Considering that most companies' resources are limited, partnerships help promote the deployment of AI. Partnerships also enable companies to save time, build and supplement the competence they are lacking, and find funding. Almost all SMEs that are implementing an AI-based technical solution are potentially or certainly planning to collaborate with IT service providers or other companies to develop the solution over the short term. Examples of the type of collaboration they look for include developing the company's own software robotics product, various automation solutions, and solutions that improve existing systems and the customer experience.

Companies identify risks in AI deployment but make little or no input into managing them

The key risks related to AI use are seen as compliance with statutes and regulation, information and cyber security, privacy and explainability – which refers to knowing how AI models draw their conclusions. To a minor extent, identified risk factors are also associated with the organisation's reputation, realisation of equality and fairness, and the replacement of labour with automation, which can cause reputational damage as well as social problems.

While SMEs recognise the risks associated with AI diversely and consider them relevant to their business, they rarely resort to active risk mitigation. The range of risks is wide, and their impacts are often industry-specific. In the health and med tech industry, for example, compliance with laws and regulation as well as privacy protection are seen as the key area of AI-related risks. As a result, addressing them actively is essential when developing AI solutions.

> **Partnerships enable companies to save time, build competence, and find funding.**

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The discussion of Finnish SMEs' IT and technology capabilities in this chapter is based on initial surveys of SMEs participating in the three AI accelerators organised in the AI-TIE project (2021–2022) and the results of individual and pair interviews with 14 business advisors conducted in three development companies in summer 2022. Industry-specific AI accelerators were organised for the cleantech (19 companies) and health & med tech (16 companies) sectors. A total of over 30 SMEs from different sectors participated in the third accelerator (micro accelerator).

The initial survey of the SMEs participating in the AI accelerators examined the companies' relationship with artificial intelligence, AI use, the potential of AI, their intentions to recruit AI experts in the following year, the risks associated with AI and their management, and the companies' data sources. The companies were also asked about their capabilities for using artificial intelligence in comparison with other operators in their sectors.

The business environment is changing at an accelerating pace, and it is more difficult than ever for entrepreneurs to identify and anticipate future challenges. Fortunately, entrepreneurs' capabilities for deploying new methods are also improving, as is their ability to utilise AI-based solutions. Consequently, AI offers great potential for solving SMEs' challenges feasibly, and smaller companies are often more flexible when it comes to participating in experiments. Improving companies' knowledge of AI is important in terms of boosting Finland's overall competitiveness.

Petri Ovaska, Regional Director, Uudenmaan yrittäjät

Li Andersson

Finnish politician, known for her role as chairman of the Left Alliance, as a member of parliament and as Minister of Education of Finland.

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It is important for companies to think about AI from the perspective of their own industry - what it means, what new possibilities it opens up and what ethical principles are involved – so that they can incorporate them into their own operations from the outset, because these issues will be a part of a larger discussion in the future. It is also important to anticipate skills needs. The better you can do that, the better you can respond to those needs. Finland’s main challenge is the shortage of skilled labour, but as a small country compared to many others, we have the potential here to work really closely together and to work, plan and implement solutions to these challenges together.

AI SWOT for SMEs

The SWOT analysis (Strengths, Weaknesses, Opportunities & Threats) related to artificial intelligence for Finnish SMEs sums up companies' strengths and weaknesses as well as opportunities and threats arising from the business environment (Figure 4).

The SWOT analysis enables the company to understand and analyse factors affecting its operations. You can use it to examine your company's operations and highlight its strengths or address any weaknesses you identify in the next development phase of the company. The strengths and weaknesses recorded in the SWOT analysis are matters that the company can influence and make decisions on. While not all weaknesses can be eliminated, their impact should be minimised. Upper-level ways of turning weaknesses into opportunities include:

- **Investing in AI competence in SMEs and strengthening the skills base**, for example, through various artificial intelligence projects and partnerships. Pilot projects produce information on the practical possibilities of applying artificial intelligence and acquiring reliable data in addition to dispelling uncertainty about AI experiments.
- **Building sector-specific knowledge of the potential of AI** helps map the need for and level of AI expertise in SMEs. This promotes their investment readiness and opportunities for engaging in network cooperation and developing AI-based solutions also for international markets.

In certain areas, SMEs' possibilities of influencing the opportunities and threats in their business environment are limited. For example, companies must comply with EU-level legislative reforms relevant to artificial intelligence. However, good planning helps to prepare for the threats, ensuring that unfavourable developments do not take the company by surprise. Some threat factors can even be turned into new opportunities if AI can help solve tricky problems and further improve the company's competitiveness.

STRENGTHS

- We recognise the **versatile potential** of AI, and its use has been considered by the management and personnel
- Our approach is based on needs and added value: **AI is expected to produce concrete benefits** in daily work (e.g., customer service, maintenance and remote diagnostics, IT functions, quality control, sales and marketing, product and service development, supply chains, production or finances)
- **Understanding of AI is being developed actively** (e.g., competence development and various experiments)
- Our company identifies **diverse opportunities for AI application**
- Our company is recruiting more **AI experts** or developing partnerships to make up for lack of competence
- Our company has **different data sources for developing AI solutions** (e.g., numeric, text and image data)
- Our company identifies and manages risks associated with AI

WEAKNESSES

- Uneven levels **of competence slow development of AI use cases**
- **Our company lacks expertise for mapping the needs or promoting the project**
- **Assessing feasibility and ensuring investment readiness is a challenge**
- **Availability and reliability of data vary** and require additional work, such as a master data management strategy, protocols and quality assurance
- **Legal requirements associated with using personal data require special expertise** and risk management
- **Keeping pace with technological development requires continuous investments**, such as ensuring the reliability and explainability of AI models as well as selection of applications and further development
- **Resource constraints in SMEs slow the deployment of AI-based solutions** (e.g., labour, competence, technology, financial resources and time)

OPPORTUNITIES

- The company identifies new **business opportunities and competitive advantages in customer-oriented and specialised AI solutions**
- **Investing in AI uses** that interest a wide range of companies, including financial management optimisation, sales and marketing, will improve the company's efficiency
- **Networking enables the company** to develop AI-based solutions for domestic and international markets
- Vendors and **technical implementers of AI solutions are easy to find**
- **Developing AI-related cooperation between business advisors and SMEs** provides broader support for AI deployment

THREATS

- **Legislative** constraints and changes must be identified and addressed in the company's operations
- **The company must invest in information security and cyber security**
- **Service providers' abilities** to meet the needs for maintaining and updating the service vary
- **Systemic risks must be identified**, including how artificial intelligence works as part of other systems and together with humans
- **Ethical issues** associated with AI
- **Controllability** and predictability **of AI systems**
- **Quality of data used to train AI**

Figure 4. SWOT analysis of AI in Finnish SMEs (modified from Nikina-Ruohonen et al. 2021).

See below for examples of how threats can be converted into opportunities:

- By developing their expertise in managing AI-related risks, companies can prepare for unexpected situations affecting their business and also secure their operations in exceptional circumstances.
- New AI solutions can help companies suffering from labour shortages find ways to make their operations more efficient and cope with a smaller workforce.

Looking beyond the generative AI hype, across industries, AI is the unifying factor for the products that will next conquer their markets and the world. While we are still in the early days of AI, it is not only a promise of the future, but it is already surrounding us in both digital and physical products. AI is the revolution of our generation and will change our lives even more than computers or air travel ever have.

Niko Vuokko, CTO, Silo AI

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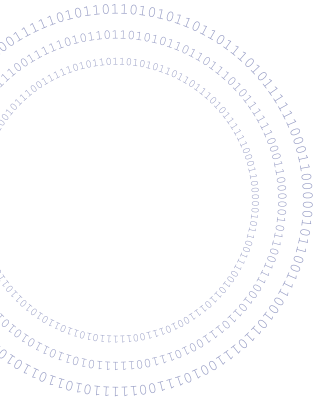
SOURCE:

Nikina-Ruohonen, A., SanMiguel, E., Kauttonen, J. (2021). Cleantech AI: suomalaisten PK-yritysten matka kohti tekoälykypsyyttä [Finnish SMEs' journey towards AI maturity; in Finnish]. Blog in Uusiouutiset journal. Published on 7 December 2021, link

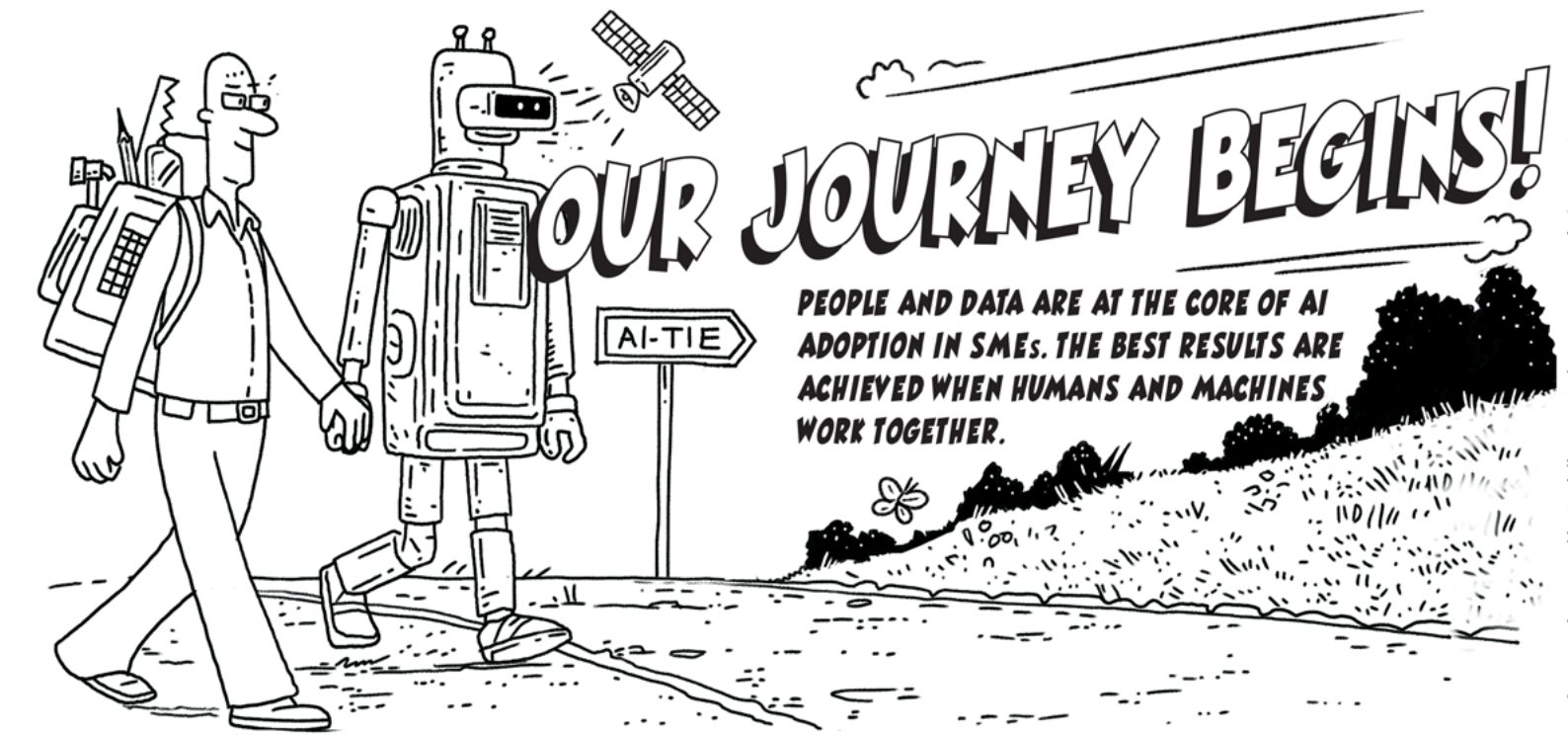
Your AI story starts here: AI-TIE leads you to the benefits of AI

Each company embarks on its individual AI journey. However, there are certain regularities we have observed in the course of the AI-TIE project and crystallised after more than two years of working with AI and the pilot projects of dozens of Finnish SMEs. The steps SMEs can take towards the benefits of AI described below were formulated on the basis of this work. The steps leading to the benefits are built on **key drivers of change that influence decision-making and choices within the company**, which must be present in order for AI to be deployed successfully. **Networks** and practical **tools for SMEs** boost the company on the way to its success story with AI. The following chapters of this guide illustrate the different steps on the artificial intelligence journey, and they can also be used to write your own AI story.



Before AI-TIE, the amount of information about AI was zero, now it is already a step ahead and awareness in the company has increased. The bravest of employees are already embracing the potential of AI and consider it in the work challenges they face and in seeking solutions to those challenges. Coffee table discussions show that people are more daring in thinking about AI. That's probably how it was when humanity shifted from horse-drawn carts to cars.

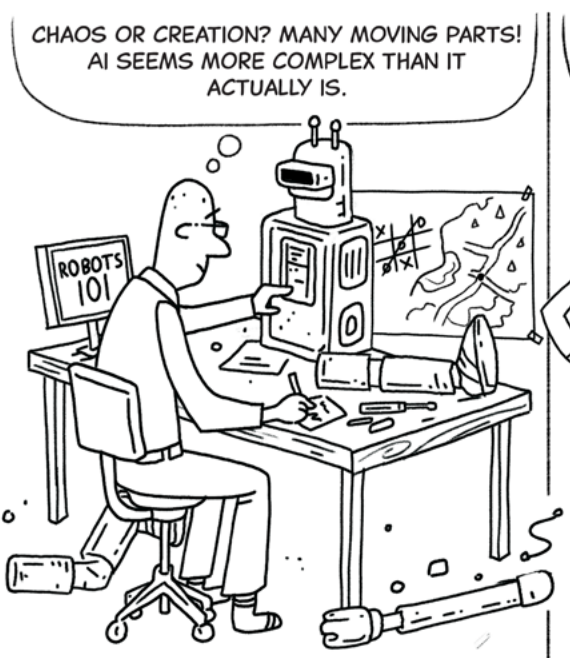
Georg Savolainen, Systems Specialist, SGN Group



OUR JOURNEY BEGINS!

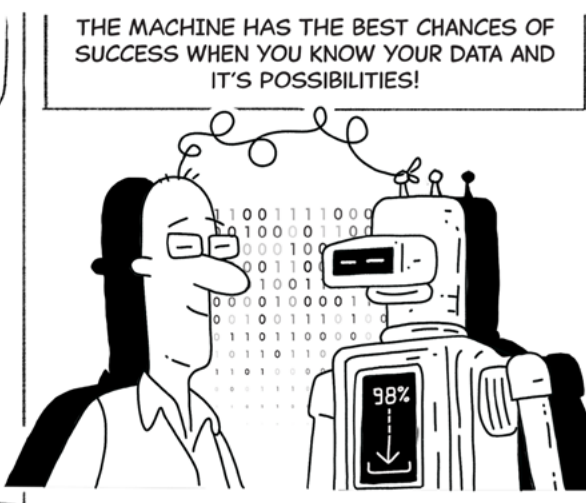
PEOPLE AND DATA ARE AT THE CORE OF AI ADOPTION IN SMEs. THE BEST RESULTS ARE ACHIEVED WHEN HUMANS AND MACHINES WORK TOGETHER.

START – AI ADOPTION IS A JOURNEY WITH MULTIPLE STEPS AND PHASES. DIGITALISATION AND AI ARE SHAPING THE WORLD. RACE TO THE AI ADVENTURE!

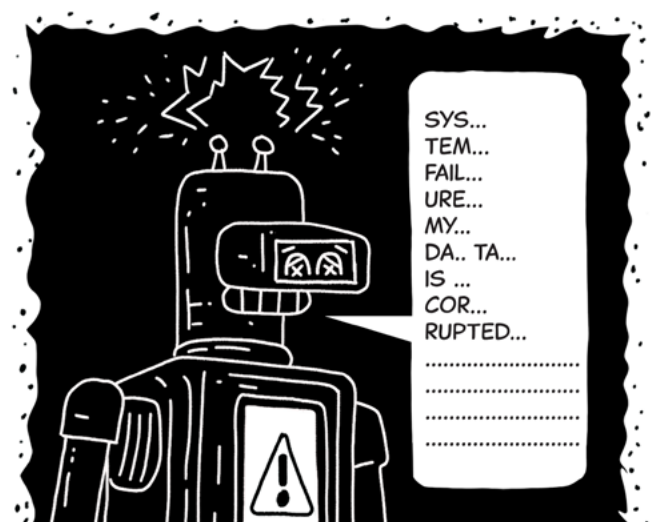


STAGE 1 – HOW TO AVOID GETTING LOST? DEVELOP YOUR AI SKILLS BASED ON YOUR OWN AND YOUR COMPANY'S PREMISES AND GOALS. BASIC KNOWLEDGE IS ENOUGH TO GET STARTED, NO IN-DEPTH TECHNICAL AI COMPETENCE IS REQUIRED.

STAGE 2 – IS THE ROUTE CLEAR? SOMETIMES IT IS EASIER TO FIND A TECHNICAL SOLUTION THAN TO IDENTIFY BUSINESS NEEDS. SUCCESS STARTS WITH IDENTIFYING CONCRETE BUSINESS NEEDS!

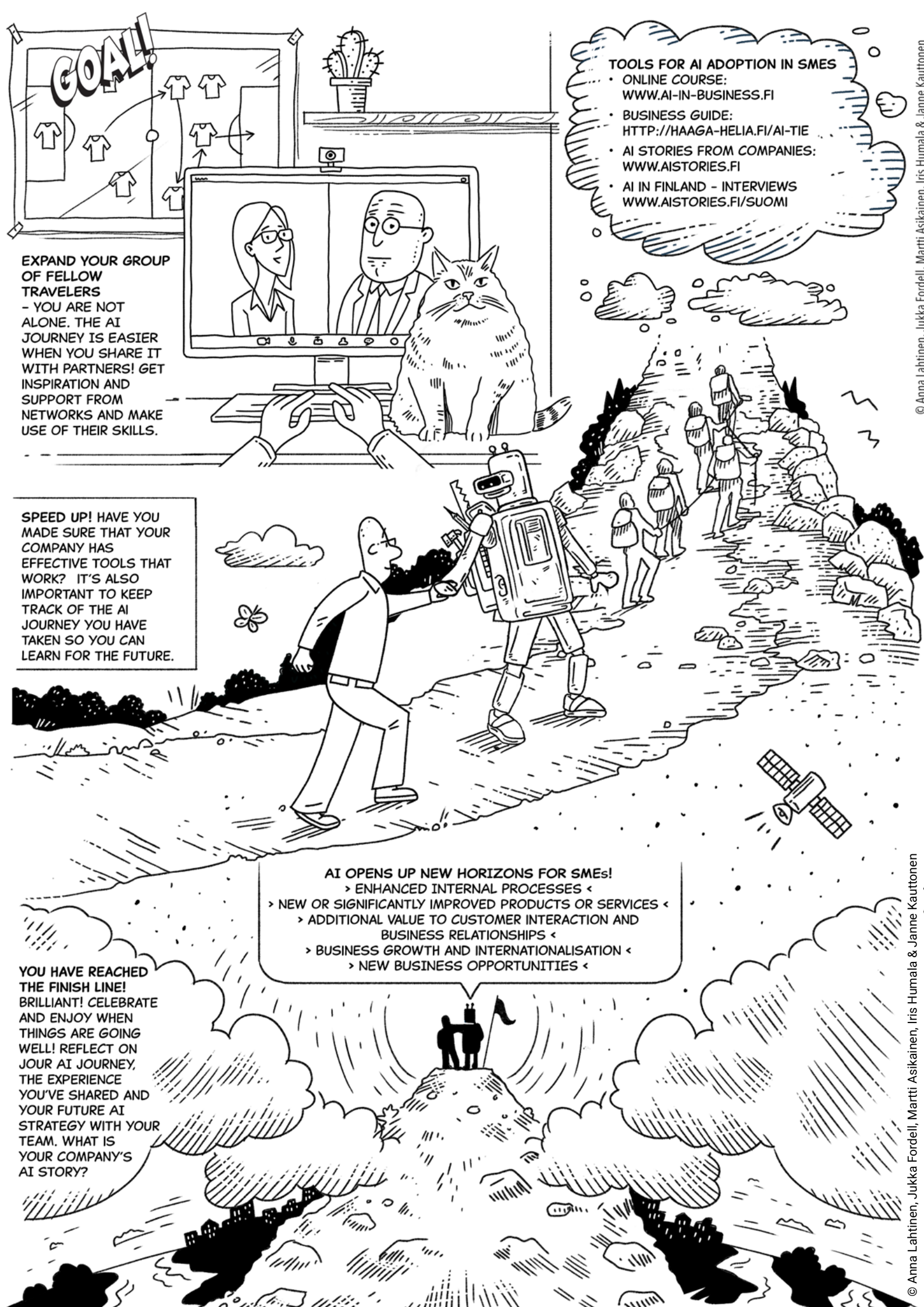


STAGE 3 – IS YOUR DATA DECEPTIVE? TO REACH THE NEXT STAGES AND THE FINISH LINE, COLLECT HIGH-QUALITY DATA SYSTEMATICALLY BUT DON'T TRY TO COMPENSATE A LACK OF QUALITY WITH QUANTITY.



PAUSE FOR THOUGHT – IS IT A MISS? DO YOU HAVE ENOUGH TECHNICAL SKILLS? THERE'S LOTS OF TECHNICAL AI COMPETENCE IN THE MARKET! YOU SHOULD MAKE SURE THAT YOU HAVE THE REQUIRED IT AND TECHNOLOGY CAPABILITIES.

GET EVERYONE INVOLVED IN THE SHARED AI DEVELOPMENT JOURNEY. MAKE SURE THAT BOTH IT AND BUSINESS FUNCTIONS ARE REPRESENTED.



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Explore the benefits of AI for SMEs and build your competence and understanding

Minna Hiillos

Minna Hiillos, PhD, Director of the University and Higher Education Sector, President and CEO, Haaga-Helia University of Applied Sciences

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You cannot drop out of the race, because all companies are certainly trying to use AI to improve the efficiency of their business. **This is not the time to say that AI does not affect me, because it affects everyone involved in business**. Close monitoring of AI and the discussion about it is also needed and, in particular, an understanding of what it means for your business.

Benefits of AI for SMEs

AI solutions enable companies to improve their competitiveness and develop their competitive advantage over their competitors. Many companies start their AI journey with small-scale AI experiments aimed at improving the efficiency of the company's internal operations. As expertise and experience in AI accumulate, the deployment of AI will be expanded and utilised as a part of new or significantly improved products or services. However, SMEs have plenty of leeway when it comes to deciding where to start with AI deployment and whether to begin with a more lightweight AI solution or focus on developing a strategically important solution.

At the start of your AI journey, you should understand the benefits that AI deployment can bring to your business and clarify them from your company's perspective (Figure 5).

How could AI benefit your work, or what could it offer to the company you represent? What is currently working well and how can it be further strengthened? What could be better? How could AI solutions help you better respond to your customers' requests and needs? What would make your work easier and free up time from work routines? How can new technological solutions support achievement of the company's key objectives?

AUTHORS:

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> **What could be improved with AI in your everyday work life?**

AI USE CASES IN SMES

AI solutions for improving the efficiency of the company's operations.

Companies often start AI deployment and experiments to improve the efficiency of their internal processes.

AI as part of a new or significantly improved product or service.

The solution meets Customer needs and creates added value.

BENEFITS OF AI IN SMES

Developing business processes.

Thanks to their size, SMEs are agile. They have a limited number of core processes and a low level of bureaucracy. AI-based development provides an opportunity to critically review processes and clarify key business objectives.

Changes and improvements visible in customer work.

The operations of SMEs are often more business- than development-oriented, which puts the customer at the core of both. The limited resources of SMEs encourage them to focus their AI experiments effectively.

Supporting business growth.

New solutions allow SMEs to create competitive ability and advantage in the local market, allowing them to look for channels to enter the international market. At best, AI-based development provides opportunities for creating new jobs and increasing turnover.

Enabling the green transition through digitalisation.

AI solutions can contribute to the digitalisation and automation of a company's business processes and to reducing its carbon footprint.

A brand-new opening for new business.

Once you have clearly determined your business objectives, AI solutions can have significant strategic value – due to their size and agility, the pre-conditions for this are good in SMEs.

Figure 5. Benefits of AI in SMEs.

The opportunities of AI in the med tech sector

Artificial intelligence (AI) will have a revolutionary impact on many areas of societal importance – and med tech and health care are the first to come to mind. At best, AI is a kind of invisible intelligence. Something that works like the engine under the bonnet, speeding up processes and removing barriers and bottlenecks to the work of professionals. There are plenty of bottlenecks in healthcare as the population is ageing and there may be a shortage of competent workforce. People are no longer concerned that AI will somehow replace people and render us irrelevant. At this point, we have little choice but to rethink health care and medical care, and the smart introduction of technology plays a major role in this context.

After all, it is a well-known fact that those who are able to help their customers solve problems are most successful in competition. The customers of med tech companies and service providers are facing such enormous challenges that this competitive advantage is now available on a massive scale. I see AI taking its first steps in areas such as planning the treatment of surgical patients with the help of software robotics, tools for interpreting imaging results and using remote monitoring methods to monitor patients' long-term condition.

But who is going to develop care processes through AI-assisted analysis? What could enable us to identify the areas where patients fall between the cracks of the system and run into a dead end? I believe this is an area where proper analysis and a brand-new service business would be needed in Finland. We are already being praised as a model country for data, so there should be no barriers to continuing this development.

AI is a tricky business when it comes to regulatory control. I am sure that not all ideas can be turned into medical devices. In any case, product developers should be prepared for a long process. However, anyone who can manage the challenges posed by regulatory control will take a big leap forward in competition in a new, growing market. Meanwhile, there are many problems that can be solved merely by upgrading existing methods, which does not necessarily even require a product development process under the Medical Device Directive.

This is easy to say from a theoretical point of view, but there is still a lot of work to be done in practical implementation. The scale of this challenge is so massive that no individual industry player can deal with it alone. Instead, we need a new

kind of ecosystem mindset that enables public and private actors to solve one problem at a time in an atmosphere of trust. While I see that some visions already exist, we still need a strategic approach and leadership in order to put them to practice. We also need a great deal of business knowledge to turn smart and (artificially) intelligent health care into business and future export products for Finland.

AUTHOR:
Kaisu Sutinen, Senior Business Advisor, Health Capital Helsinki

As a welfare nation, Finland needs to capitalise on all its strengths now and in the coming years. Technology and artificial intelligence play a key role in this equation, enabling us to alleviate the shortage of resources in social services and health care while renewing services towards the unavoidable and major systemic change. SMEs play an important role in building this change.

Minna Saranpää, CEO, Wilhelmiina Palvelut

Society produces an immense amount of data. AI can help us get more out of it. We talk about data-driven management. The emphasis is on patient safety when supporting decision-making in health and social services. This means we must pay attention to CE markings. If you need help with regulatory issues, just ask.

Saara Hassinen, Managing Director, Healthtech Finland

Today, AI is widely utilised in health care and its use is regulated. Click here to read more (in Finnish) about how the development of artificial intelligence is regulated in Healthtech Finland's blog.

AI is an important tool for solving societally significant challenges. One of these challenges is the increasing share of older people in the population. During this so-called silver transition, we must be able to proactively support the functional capacity of older people. AI is likely to be increasingly utilised in the social welfare and health care sector – to a much greater extent than we can currently anticipate. The widespread introduction of AI will have a significant societal impact on the realities of people, companies and different sectors. I believe that in 2030, AI will be used diversely and as a natural part of Foibekartano's operations.

Ulla Broms, Managing Director, CEO, Foibe Foundation, Foibekartano

Significance of AI in customer work

Customers and business benefits play a key role in SMEs' operations, and this should be kept in mind as you make progress on your AI journey. It makes sense to focus your development efforts on measures that increase the added value for businesses and customers and which customers are also willing to pay for.

Consideration of the benefits of AI starts with thinking about **what the added value generated by AI can offer to the customer and the user in practice and how the company can communicate this in its marketing**. The focal point can be using AI to develop a product, service or customer experience, such as a personalised service. In this example, AI can serve as a chatbot assistant that submits personalised and tailored messages to customers, assists them by providing information or guiding them forward in the business process. AI can be helpful to customers through a chat feature in the early stages of the customer process, after which the discussion can be continued in person. Chatbots have even been used when selling power plants!

Learning from others

Examining the best practices in different industries can help unveil the benefits of AI for customers. For example, exploring online shops representing different industries or AI solutions developed for remote monitoring can provide you with good tips for creating solutions of your own.

SMEs need to make use of the most effective targeted marketing methods, and AI can be one of them. We have come a long way from the traditional 4Ps of marketing (product, price, place, promotion). Instead, marketing takes place online and on various platforms where your customer may or may not notice and pay attention to your advertisement. For example, an AI application can be asked to create a short video of a product or service for targeted marketing. It is essential to specifically target the video to your customers.

> **What added value could AI bring to the customers of the company you represent?**

Plenty of development prospects

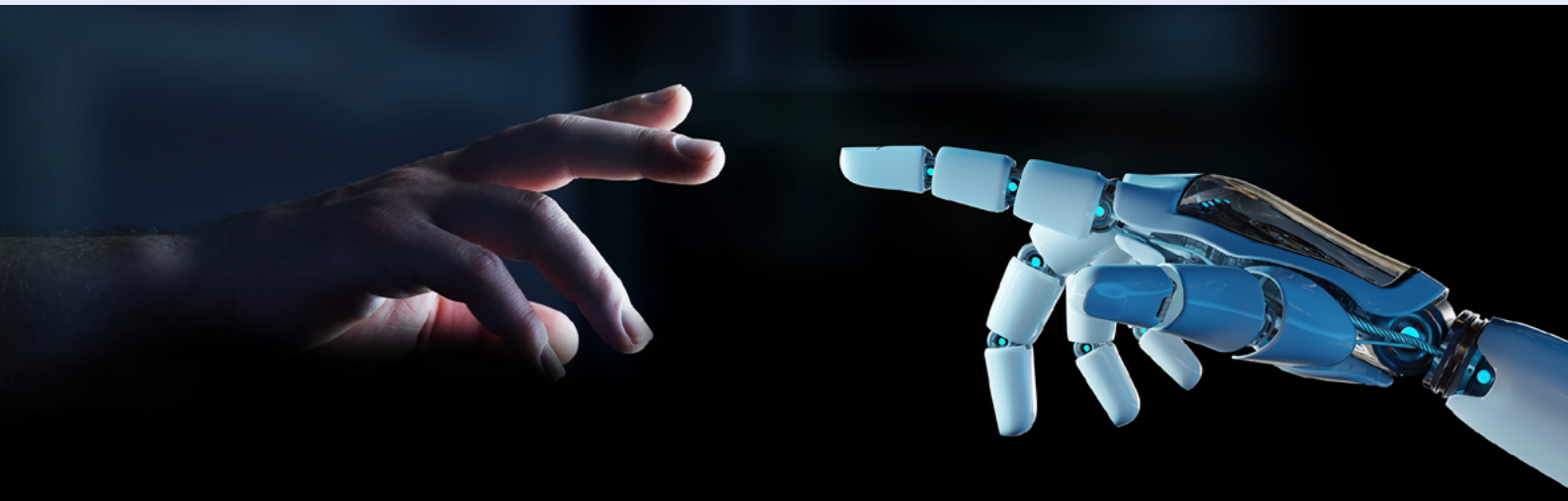
Solutions that utilise AI can free up a lot of time for customer work. In general, there is a need for both AI solution providers and customers. For example, AI could be used to develop inventory management and optimise logistics in the health sector, which is experiencing labour shortages. This would free up nursing staff resources for customer work. Industry-specific software can also facilitate and accelerate the work of many specialists who utilise a specific type of expertise in their tasks.

AI has great potential. For instance, its utilisation in developing new circular economy solutions is only just getting started. Meanwhile, the use of machine vision has the potential to reduce waste and produce added value for customers. The utilisation of large amounts of data also enables more efficient optimisation, reduces routine work and produces more consistent and predictable quality. AI also offers SMEs plenty of opportunities for predicting the future, which has been a stumbling block for them. SMEs draw up budgets but do not refer back to them, even though companies should always anticipate what is going on in the world and keep track of their forecasts.

One of the key questions that SMEs must solve is **whether a challenge that involves producing added value for the customer is one your company wants to solve**. There is good reason to address this challenge – and AI could provide a solution.

AUTHORS:

Tommi Knaapinen, CEO, Western Uusimaa Chamber of Commerce; Iris Humala, Project Specialist, Researcher; Anna Lahtinen, Project Manager of AI-TIE, Senior Researcher, Haaga-Helia University of Applied Sciences



Examples of AI solutions used in customer work

- **Chatbots**: an algorithm that imitates human discussions and can support customer service on the company's website by answering questions, helping customers find information and guiding them forward.
- **Self-service software**: enables people to navigate smoothly on websites, recommends products and services, produces purchase suggestions based on historical data, and helps customers make purchases.
- **Text analytics and natural language processing**: can be used to analyse large data masses, for example, when structuring customer feedback and implementing key measures based on feedback.
- **Optimising the content and time use of sales work**: using AI in sales development, such as targeting sales and optimising time use in sales, optimising pricing, assessing the likelihood of a purchase, customer segmentation, and sales forecasts.
- **Personalised marketing**: AI creates targeted marketing campaigns based on customer data, increasing commitment and conversions through purchases, appointments or contact requests
- **Maintaining customer relationships**: AI can identify early signs of customer loss and enable companies to react rapidly to this.
- **Multilingual support**: AI-assisted translation tools provide support in multiple languages to ensure a seamless global customer experience.
- **Emotion recognition in customer encounters**: AI can help recognise customers' emotional responses in customer encounters (face-to-face and virtually), for example, by detecting customers' reactions when they are browsing websites. You can test emotional reactions in laboratory environments, see the Sales & eComm Lab at Haaga-Helia University of Applied Sciences.

Ilkka Haahtela

Director General, Finnish Immigration Service

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I strongly believe that we will be able to use data as the basis for developing public sector operations quite a lot. We have a huge number of customers. We have accumulated a massive amount of data on all our customers, and the data is the oil we need to lubricate the wheels of the public sector. We need to oil the machinery to make it more flexible so that we can draw a lot of different conclusions, gain an even better understanding of our clients, and provide them with better customer services. We need artificial intelligence to support our own human intelligence.

AI improves the efficiency of a company's operations

AI can be utilised diversely in customer work and when developing new services. In SMEs, the utilisation of AI often begins with developing and enhancing the company's operations. It is important to start this process by examining the company's operations from a sufficient number of perspectives and collecting as many different ideas as possible (Figure 6). While developing your company's activities, you may end up forming a service process offered to your customers. Similarly, a product development process may provide insight into the development of customer work.

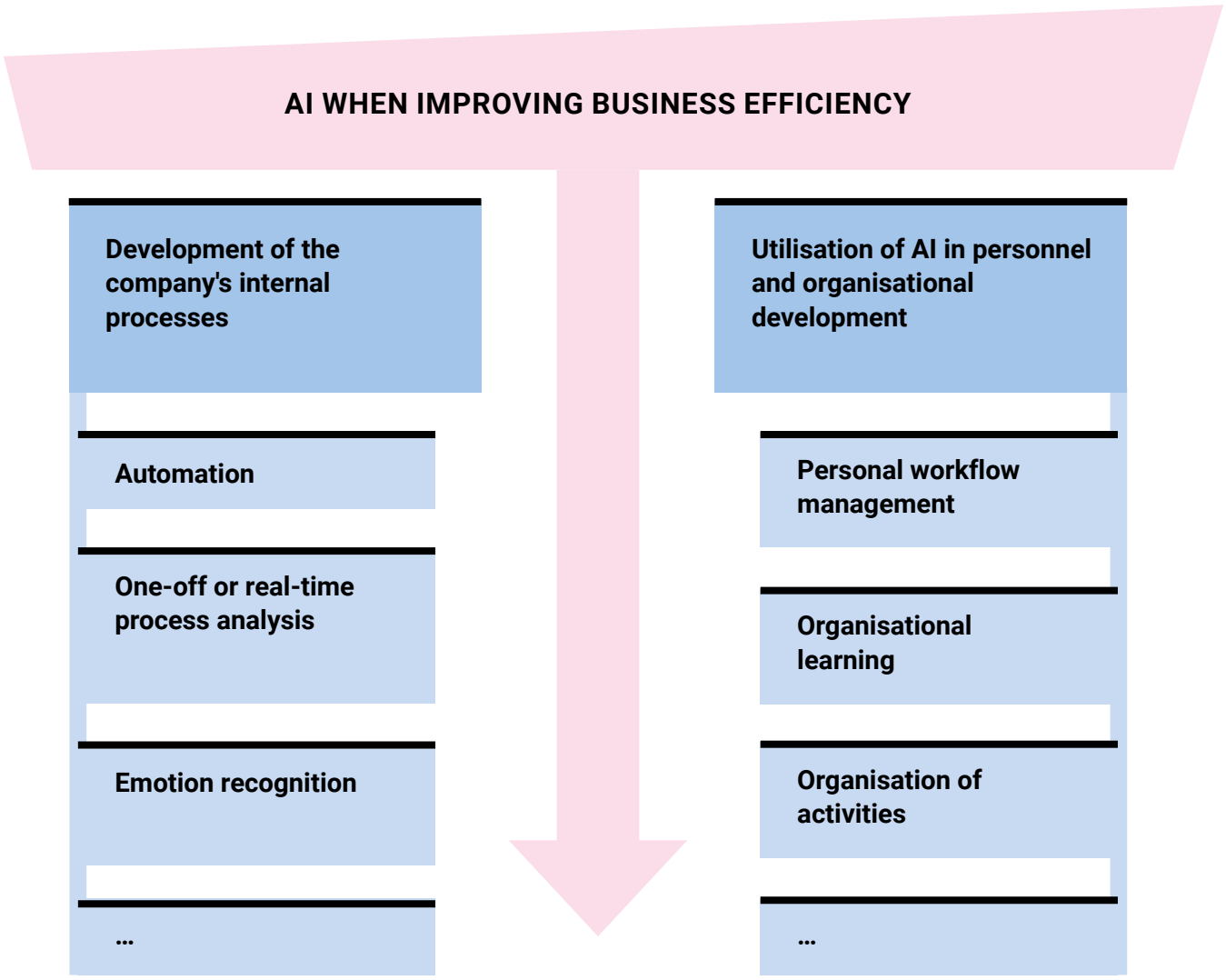

Figure 6. Examples AI when improving business efficiency.

> **Analysing the data accumulated in a company is a natural first step towards applying AI.**

AI can be used to **improve the efficiency of a company's business** in various ways: for example, things can be done faster, with fewer resources and even with better quality. If the company has already accumulated data on its processes, analysis of this data is a natural first step in the application of AI. The aim is usually to find bottlenecks or additional delays in the processes, detect deviations, find possible cause-and-effect relationships relating to problems, and classify and forecast different situations.

The progress of AI utilisation in an SME can be described as a two-step process:

1. A one-off analysis of the company's current situation based on the available data and consideration of how the processes could be made more efficient. The analysis identifies key development areas, prioritises the most useful alternatives and implements development measures.
2. After improving the efficiency of the processes, you should perform a real-time AI-based analysis and track how the process works, focusing on any deviations etc. In the first phase, you should pay attention to the types of data you will need in the second phase by, for example, considering which monitoring indicators you are going to need in the future.

When identifying development needs in the process during the first phase, you should focus on bottlenecks and unnecessary work phases and also on the opportunities provided by automation. For instance, some work stages can be replaced by software robotics, in which case self-learning AI solutions open up new opportunities. Machine vision and the related AI solutions can also offer solutions for developing process quality. From a monitoring perspective, you should remember that process-related data may accumulate into systems based on entries made by people, through various application log files, such as transactions in applications and their causes, entries recorded in chronological order, and from sensors and various devices connected to the Internet.

Compared to traditional feedback templates, emotion recognition – which involves using AI to identify people's presumed emotional reactions – can help obtain more direct and clearer information about the customer experience or the functionality of instructions. As this involves collecting personal data, the rules laid down in legislation and the General Data Protection Regulation (GDPR) must be observed when collecting and analysing data (see e.g. the General Data Protection Regulation (GDPR), the Data Protection Act (5.122018/1050) and the Act on the Protection of Privacy in Working Life (759/2004).

Making use of AI when developing personnel and organisation

AI solutions can also be utilised in personnel development. AI can be used to analyse issues such as different work styles, provide employees with personal support and guidance by reducing the amount of information they have to memorise and their mental burden, and by guiding them towards more effective working methods. As a result, artificial intelligence can make employees' daily lives easier at the individual level and enable their professional development. This approach can also be extended to the entire organisation.

A company's development efforts typically target people and the corporate culture directly. In addition to technical success, it is important to acknowledge how the project and its results are perceived and how it will affect the corporate culture in the long term. For this reason, it is essential to ensure that the data used by AI when developing the company's activities is comprehensive and sufficient, and that the company does not try to extract something from the data that is not there. It is often a good idea to proceed in small steps, because initially there is not enough data available to implement a more comprehensive change. In fact, using poor data to change the company's activities may lead to an anti-AI business culture that prevents success in later AI projects.

AUTHOR:
Altti Lagstedt, Principal Lecturer, Haaga-Helia University of Applied Sciences

AI in service and product development

Key factors for competitiveness in a constantly changing operating environment include business renewal and rapid and proactive responses for introducing new or significantly improved products and services to the market. **AI is not the solution to all challenges – on the contrary, many problems are solved without it**. However, in the best-case scenario, AI can help improve existing products and services and develop new ones. New technological solutions help the company stay competitive and respond to changing customer needs.

Studies show that when AI solutions are correctly integrated, they speed up the product development process, reduce costs and improve product quality (Latvakoski 2021). An international study by McKinzey (2019) found that 65% of companies using artificial intelligence in product and service development reported an increase in turnover of more than 5 per cent. In terms of different areas of AI application, Finnish SMEs see the development and manufacturing of products and services as having the greatest potential (Ruohonen 2021).

How can an SME move forward on a practical level with regard to identifying AI use cases in service and product development? Those with an interest in product and service development should familiarise themselves with product development and innovation processes and methods that can also be applied to AI development. Service design is a good example of this. You can also use the available tools to create ideas for AI use cases, see e.g. the AI in Business online course. This free online course aimed at SMEs uses design tools to help you perceive and select the most promising AI use cases for your organisation.

AUTHOR:

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SOURCES:

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Find out more about the potential of AI, because they can transform the way your company operates. Start by learning about different AI applications. You don't have to do everything yourself, you can also buy expertise from partners. Be curious about new things, it's a smart move to utilise artificial intelligence!

Elina Pekkarinen, CEO, Central Uusimaa Business Development Centre – Keuke

Where can I learn about AI?

In the previous sections, you learned about the benefits and opportunities of AI in SMEs, which we will explore in more detail later in this guide. However, at this point, we will discuss how you can familiarise yourself with AI and make it a natural part of your daily life and work (Figure 7).

Sustainable practical measures for learning about AI

Creating new products, services and solutions requires new and open thinking and major changes in thinking patterns. AI provides a gateway to new kinds of operating models. This is why SMEs should also monitor the development of AI. There is a way for everyone to get involved at some level. One way to get started is by reflecting on the original term for AI, *artificial intelligence*. What does *artificial* really mean? And what about *intelligence*?

When new technologies or operating methods enter the market, the first implementations are typically clumsy, and AI is no exception in this regard. For example, at some point at the dawn of the Internet in early 1990, people were unsatisfied with how it was working. Nevertheless, the Internet revolutionised the world. The development of AI shares many characteristics with the development of the Internet. As a result, people and organisations find that it contains a world of endless opportunities and are investing in increasing resources in it. However, quick conclusions based on the first visible AI applications hamper the ability of people and organisations to harness AI and integrate it into their everyday lives.

New phenomena such as artificial intelligence are challenging for SMEs, as learning about new things and investigating them requires resources. Fortunately, there are many quick, inexpensive and – above all – tangible ways of monitoring the development of AI and understanding it better. Rather than taking a shot in the dark, you should first make sure you understand the possibilities and limitations of AI before considering how to utilise it in your business. There are many ways to understand AI better. We have listed a few examples below:

Participating in networks with one of more partners that are interested in AI allows you to observe how others see AI and make use of it. Desires and requirements for developing and applying AI in the company's business may also emerge from partnerships and customer relationships. Companies should have partners that spur them on, providing them with a partner in discussions and experience-based information. The fact that Finnish companies value networks, have networking skills and are able to communicate fluently in English is a positive trend. AI solutions will not become prevalent in small language areas first, which is why English plays an important role in this context.

SMEs should also acknowledge **the value of one-on-one contacts** as a tool for understanding AI better. If you have little knowledge of AI, one-on-one discussions provide opportunities to ask questions confidentially, even 'stupid' ones. You may also find AI enthusiasts in your organisations or even your recreational activities. For example, a Christmas letter that your friend has created using ChatGPT may prove to be an eye-opener.

Consciously taking minor risks by participating in activities or collaboration that involve AI is a good way to explore AI-related solutions. This also provides the company with an opportunity to identify and test the level of its organisation culture – whether it rewards personal initiative and opportunities for experimentation and risk-taking without guaranteed success. New issues such as artificial intelligence reinforce an open-minded corporate culture, casual exploration and enthusiasm for experimentation. Companies should identify experimentation targets specific to their industry, in which they can take sufficiently small risks in genuine real-life situations.

Networking may be a good alternative for SMEs if risk-taking is not possible in the company for reasons such as restrictions imposed by the sector. This makes it possible to share the risk related to the new issue with network partners, thus placing less burden on individual companies.

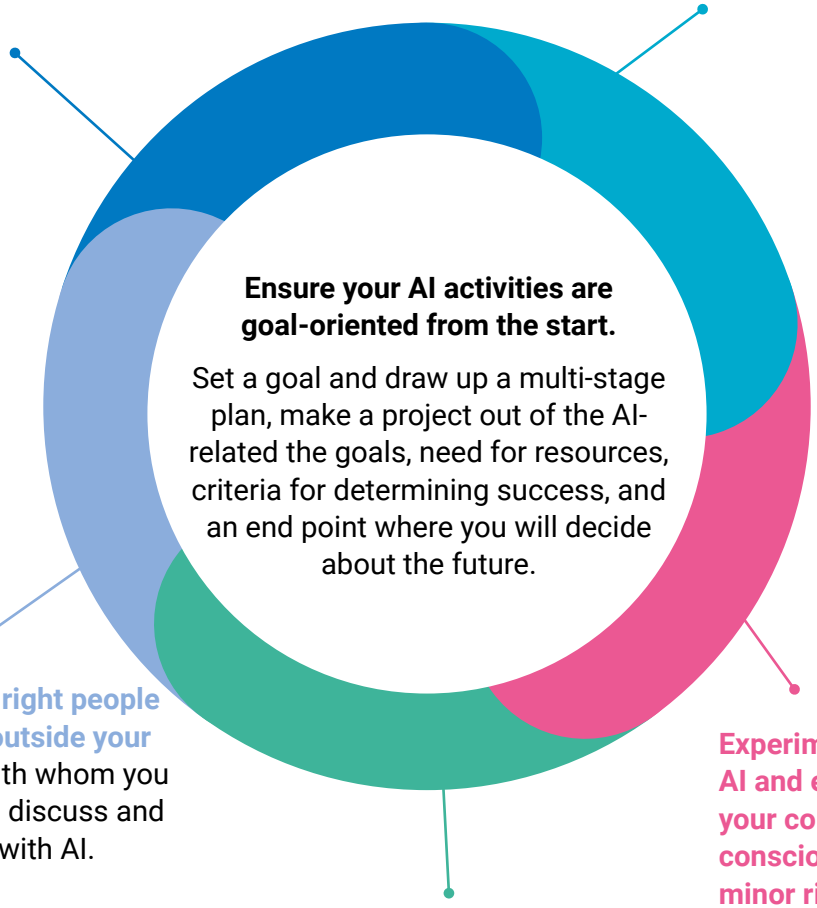
The truth is that identifying the right people is crucial when a company starts to explore, consider and experiment with artificial intelligence. Finding the right people can be very challenging, especially in larger organisations. SMEs have close-knit teams and low hierarchies, so it may be a good idea if a larger group of employees can participate and familiarise themselves with AI together, especially in the early stages. As examining AI and its utilisation from many different perspectives is absolutely vital, participants in this process should be attracted from both ICT and other company operations.

You can also outsource AI competence and utilise other professionals, such as consultants, or obtain it through cooperation with start-up companies or by employing higher education students. If the assignments are correctly timed, they can sometimes be very useful and even recommended. Student projects such as Master's theses in technology and other fields provide a means for SMEs to explore new phenomena and acquire information about them. Students also provide companies with an external perspective and new insights. Research, development and innovation cooperation (RDI cooperation) requires advance contributions from the company with regard to defining and outlining the topic and recruiting and guiding students. After the assignment, the organisation's management is responsible for identifying any areas that the company should invest in to ensure that no identified potential is left unused.

PRACTICAL MEASURES FOR LEARNING ABOUT AI

Participate in networks where one or more network partners are interested in AI. Desires and re-quirements for developing and applying AI in the company's business may emerge from them.

Develop one-on-one contacts to get to know AI; no question is too "stupid" to ask your contact.



Identify the right people inside and outside your company with whom you can explore, discuss and experiment with AI.

Experiment with AI and encourage your company to consciously take minor risks; gather experience through independent studies and AI experiments.

Learn by benchmarking. Get to know the AI solutions of other companies, collect good ideas from them and compare them with what you are doing.

Figure 7. How to learn about AI?

Goal-oriented operations right from the start

When you are harnessing a new phenomenon, simply wandering aimlessly around a new topic rarely leads to any concrete results. Instead, it is important to turn whatever you are doing into a project: set a goal, draw up a multi-stage plan and determine the need for resources, duration and criteria for assessing the success of the project. It is also useful to define the endpoint where the company will decide whether or not to continue the project and how to proceed in the future.

The level of goal orientation related to AI should be carefully considered in the changing operating environment. The company has to decide where to set the bar and also how to communicate the goals clearly to internal and external stakeholders. Ambition serves as a yardstick in this context. At the same time, you should keep in mind that new phenomena enable the company to raise its bar even higher and achieve ambitious but realistic goals. Of course, things are different if the company is only aiming to learn about AI instead of seeking to achieve a genuine competitive advantage through AI, reduce its costs or acquire a certain number of new customers. There is also a major difference between the company inviting its employees to familiarise themselves with AI in general and setting clear goals for the activities.

We should also consider the potential of AI in solving societal problems such as labour shortages. A survey conducted in 2021 among the member companies of the Finnish Chambers of Commerce showed that nearly 75% had experienced a shortage or a major shortage of skilled labour. When there are not enough people to do all the work, it is time to consider how new solutions like artificial intelligence can help. An experience of scarcity is often a trigger for doing things in a new way. In fact, at the level of an individual organisation, we might ask the following question: Could we manage with ten new employees instead of thirty? What measures would this require?

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AI stories from SMEs

Anna Lahtinen, Project Manager of AI-TIE, Senior Researcher and
Iris Humala, Project Specialist, Researcher, Haaga-Helia University of Applied Sciences

Finnish SMEs have hundreds of successful AI stories that you can learn a lot from when embarking on your AI journey. The following section presents a few AI solutions and ideas created by companies that participated in the AI-TIE AI accelerators. **More articles, blogs, videos and audio podcasts on AI stories are available at www.aistories.fi**

Assistor-Uuttera: AI solution for the entry logistics of new cars

LINK Design and Development: Analytics to help increase sales and sales margins

Saalasti: AI-based condition management service anticipates the need to maintain the machines in client companies

Premix: Machine vision-based AI solution promotes the plastic manufacturing process

Talokaivo: Character and image recognition solution for automating the ordering process

Medfiles: Utilising AI in taking steps toward digital transformation

Foibekartano: Automation of shift planning with artificial intelligence

Mediq: Automated tender reading

Kiitosimeon: Automating purchase invoices with a semi-finished solution “off the shelf”

Finland's Found Property Service: AI speeds up the recovery of lost goods

SA-TU Logistics: Forecasting customs clearance time

Hurrikaanit Ympäristöhuolto: Sewer network condition assessment with the help of machine vision

AI solution for the entry logistics of new cars

Assistor-Uuttera is Finland's leading operator in vehicle logistics. In May 2022, the company developed an automated AI solution with the help from Azure Data Factory and Machine Learning Workspace tools. More than 50% of all new cars sold in Finland pass through Assistor-Uuttera to car dealerships and customers. The company uses the AI solution to assess the date that cars arrive in the country and the possible number of cars per day.

"This data is utilised when planning the company's production and optimising its resources. The new solution mainly serves the company's internal needs," says *Aki Karppinen*, Head of ICT & Development at Assistor-Uuttera. He believes that the pilot project has increased Assistor-Uuttera's expertise and understanding of using AI in business development.

Analytics to help increase sales and sales margins

LINK Design and Development is an expert company in product and service development that operates in Espoo and Salo, Finland. When participating in the AI-TIE artificial intelligence accelerator, the company utilised AI to visualise the necessary investments in sales and the types of customer projects it should favour. Using a data-based breakdown, the company was able to demonstrate the functionality of sales projects carried out in the previous four years from several different perspectives. Their raw data consisted of data stored in the company's ERP system database during the 2018–2021.

"AI could make it easier to optimise the content of and time used in sales. Customer lifecycle modelling also has a lot of potential", says *Laura Kurra,* Senior Software Developer at LINK Design.

According to Kurra, AI could be utilised to optimise the content of sales, for example, when preparing bid content and analysing campaigns. In the context of time-use optimisation, AI could help determine what types of projects should be sold and how much time should be spent on sales. She believes that good AI applications could also include functions that monitor the behaviour of the most profitable customers in addition to detecting deviations and managing customer risks during the customer lifecycle.

Laura Kurra believes that the compiling data is the most laborious task in this process, which is why it is important to prioritise which data will be collected next.

"You should expand your data base with factors that describe the quality of customer projects, including meaningfulness, future potential and factors that motivate your employees," she says.

SAALASTI

AI-based condition management service anticipates the need to maintain the machines in client companies

Based on the lessons learned from the AI-TIE artificial intelligence accelerator, CrossWrap – a member of the Saalasti Group – developed a proactive condition management service for its customer cooperation that can be used to improve machine operation and prevent interruptions in use. Among other things, the service makes it possible anticipate customers' needs for spare parts and maintenance, which aims to prevent possible machine failures. Cross Wrap designs and manufactures wrapping and bale opening and unwrapping equipment for the waste, waste-to-energy, recycling and wood industries.

"Our greatest challenge was that we did not have the base data needed to build an artificial intelligence model. Instead, we had to start from scratch by collecting

suitable data that allowed us to learn more about how the machines are used," says *Laura Leskinen*, Business Development Director at CrossWrap.

CrossWrap has also started to promote machine vision-based services to identify material quality. The company ended up using ready-made AI solutions that already contained data on the different materials used by the company's machines. Laura Leskinen recommends that companies also extensively explore which AI solutions and collaboration opportunities are already available.

Machine vision-based AI solution facilitates the plastic manufacturing process

Premix, which participated in the AI-TIE artificial intelligence accelerator, develops electrically conductive plastics and other functional plastic materials. It also provides tailored material solutions on a global basis for the automotive and electronics industry, diagnostics, and the health and well-being sector.

Raw materials play an important role in plastic manufacturing. As there is always a natural variation in the raw materials, suppliers e-mail the company a PDF document describing the properties of each raw material pallet. Variation in the raw materials affects the plastics manufacturing process.

"In order to utilise the raw material data in the production process, we created a machine vision-based solution in which a software robot reads the contents of the attachments and places them in a raw material database," explains *Jan Järveläinen*, Service Development Director at Premix Group

The AI solution demo was completed at the beginning of 2023, and development work will continue in the company.

Character and image recognition solution for automating the ordering process

Talokaivo is a Finnish company that manufactures plastic products. It was established in 1988 and is part of Pipelife Finland. Talokaivo introduced an AI-based character recognition solution to automate its ordering process. The new form identification application makes it easier to run orders through the sales process in the company's ERP system. The company will also continue its development work with a pricing robot.

The AI-TIE artificial intelligence accelerator had a significant impact on the development of the data strategy for Talokaivo and its parent company Pipelife Finland, and the company has also continued to invest in digitalisation and AI development after the accelerator. "We will strengthen our expertise by appointing a new person to take charge of our process and digitalisation development team in early 2023," says *Marko Heikkinen,* Head of New Business Development at Pipelife Finland.

Utilising AI in taking steps toward digital transformation

Medfiles provides healthcare product development and lifecycle management solutions.

> *"During the AI-TIE cooperation, Medfiles developed about 30 business ideas. AI can be utilised in a large share of them. Approximately 50 per cent of them were completely new, while the other half were improvements to existing*

processes and services. We looked at our work processes with brand new eyes and in light of new information. Based on this experience, the company has established a Digital Transformation unit and hired a new employee for it. Artificial intelligence has huge potential for new business.

Jesse Salonen, Head of Digital Transformation, Medfiles

"Even today, the basic assumption is that companies in the sector have adopted artificial intelligence. This trend will only gather momentum, and companies will have to deploy AI to keep up with their competitors".

Minna Meritähti, Safety Systems and Data Management Manager, Medfiles

foibe kartano

Automation of shift planning with artificial intelligence

Traditional work shift planning in a care home environment involves cooperation between many people and coordination of plans drawn up by different employees. Foibekartano developed and introduced an AI-based solution to automate the process.

"The introduction of this solution in one of our homes has taught us that you learn to use AI by doing! Its effective deployment requires cooperation between people and machines and support from the work community when implementing the change in work processes. Deploying an AI solution that was developed in-house for the first time may not be a straightforward process – effective implementation requires discussion, cooperation and regulation before you can adopt the solution more extensively in your company".

Salla Seppänen, Director, Foibekartano

Automated reading of tenders

Mediq Finland provides services to Finnish healthcare and laboratory professionals. The company offers devices, supplies and services to improve patients' quality of life. Mediq's AI-based solutions have really taken off as a result of AI-TIE.

> *"We have added machine-readable elements to our tendering service to streamline the process. In practice, this means automated reading of tenders and automation of customer decisions. Automating tasks that are currently performed manually has been a part of enhancing our internal processes. In addition, our second AI-based solution involved increasing the level of automation in our Aitta service. This helps our customers save resources, time, money and space. Automation produces direct value for our customers. The new features utilise enriched data. The features improve the product availability, making it easier for our customers to carry out their core tasks in busy healthcare settings, day in and day out."*
>
> *"Based on our experience of AI-TIE, a wide range of experts from different company areas must take part in the development of AI-based solutions. A diverse group of our employees with different backgrounds, skills and ideas participated in the development process. A shared language allowed us to create an organisational policy and a can-do mindset. There are plenty of tools available and their number is constantly increasing, but better development and results depend on your vision, perception and mindset. The threshold for launching new AI-based innovations is now low at Mediq."*
>
> **Heidi Liikkanen, Managing Director, Mediq Finland**

Automating purchase invoices with a semi-finished solution “off the shelf”

“Our company has a very high number of recurring invoices every month. We wanted to use artificial intelligence to automate our purchase invoices, and a semi-finished solution was already available on the market. Of course, we needed to customise the solution to suit our company’s environment, integrate it into our financial systems and do some further processing before implementation. But we expect the result to also be highly rewarding – in the best case, it will reduce manual labour by up to 80% and free up a corresponding amount of human resources for new tasks. A successful AI experiment lays a good foundation for further development. We are already working on our next AI-based solution, an image recognition system for waybills that we plan to enhance with machine vision.

Smaller companies like ours do not have a large IT department or in-house resources at their disposal. It is not always necessary to develop custom tools, as you can make use of what is already available on the market instead. You can also purchase AI-based solutions as an outsourced service, but even in that case, you must be able to look for the right things and present the right questions to external partners. AI-TIE has provided significant support in this regard. This cooperation has provided us with new information and support and made it possible to develop the competence of our existing staff. It has also allowed us to review and challenge our practices and approaches.”

Lauri Honkaharju, System Administrator, Kiitosimeon

SUOMEN
Löytötavarapalvelu

Artificial intelligence speeds up the process of finding lost goods

When a person loses their belongings, one option is to fill in a form on the website of Finland's Found Property Service (*in Finnish* – Suomen Löytötavarapalvelu). An AI algorithm has been created to match the information filled in with the goods already found and on the register, and to make suggestions to customer service staff to find and secure the right pairs. The solution was developed and improved based on the knowledge, insights and expertise gained at the AI-TIE AI accelerator. The solution is now in production with good results. The next step is to further modify the form to include drop-down menus and to limit the amount of data that the AI can process. The solution is already working well, but will be further improved.

> *"The AI-TIE gave us an understanding of what was possible – we knew how to ask our technical partner to do things to create a solution that would work for us. We modified the partner's proposal, which our partner originally built from our perspective. Now we also have a person who is passionate about AI within our team and is profiling the work more on the deployment side of AI and focusing on the opportunities it brings."*
>
> **Jukka Ylirautia, Managing Director, Finland's Found Property Service**

See below for a few more AI use case ideas developed by companies participating in AI accelerators.

Forecasting customs clearance time

SA-TU Logistics provides logistics services at the national level. The company is part of the Customs Support Group which operates in 11 European countries. In Finland, the company produces approximately 150,000 customs declarations each year.

In the AI accelerator, SA-TU Logistics developed its idea for forecasting the completion of the customs clearance procedure. It is important to provide customers with a reliable forecast of the time spent in the customs clearance process so that further transport of the customs cleared goods from the customs warehouse can be accurately timed. This helps avoid driving unnecessary kilometres, unnecessary waiting times, and the resulting extra emissions and costs.

The forecast feature allows customers to monitor the duration of the customs clearance process and its estimated completion time and make transport capacity arrangements accordingly. At the same time, the system produces information for the internal use of SA-TU Logistics and enables increasingly accurate planning of personnel resources and time use.

According to *Jyrki Messo*, the company's Director of Information Technology, it was clear which AI use case idea the company would select, as the forecast provided methods for optimising several processes and calculating emissions from the activities. SA-TU Logistics also had access to a sufficient amount of reliable data. The idea can be implemented as an AI solution, but also using traditional methods if necessary.

SOURCE:

Lagstedt, A. & SanMiguel, E. (2022). Tekoälyn avulla aikataulu-, resurssi- ja hiilidioksidisäästöjä [Saving time, resources and carbon dioxide with AI]. eSignals. Published on 16 March 2022.

Sewer network condition assessment with the help of machine vision

Hurrikaanit Environmental Maintenance is a company whose main activities include drain clearance, well emptying, pumping station cleaning and sewer inspection services. The inspections are performed by inserting a video camera inside the pipe that is being examined, after which an expert from the company carefully reviews the video material. Video data analysis provides great opportunities for AI application. Over the years, Hurrikaanit has accumulated large amounts of sewer scanning data, which can be utilised when training AI. The company eventually selected the Swiss HadesAI AI system, which was already available in the market.

In the HadesAI system, the sewer pipe is first washed and then filmed with a camera designed for this process. The video material and details about the pipe are then uploaded to the application, and the AI system uses them as the basis for analysing the data and identifying any damage and potential problems visible in the pipes. The system has been trained using millions of images collected from hundreds of different locations around the world. It can detect more than 300 different types of damage. An expert still has to review the results carefully, but they can focus on the problem areas identified by AI rather than examining the entire video material in detail and marking each problem area manually.

After the first contact, Hurrikaanit decided to test the system with their own data. At this stage, it worked together with Mindcom, an AI company from Kuopio, Finland. Based on preliminary data analysis, the system was capable of independently identifying the most typical problems occurring in sewer pipes.

SOURCE:

Kauttonen, J., Ruohonen, A. & Heino, K. (2022). Tekoäly kilpailuetuna ympäristöhuollossa [Artificial intelligence as a competitive advantage in environmental services.]. eSignals Pro.

Start with your business needs

2

Henri Alén

Chef, restaurateur and Master Chef judge

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If we think about making use of digital opportunities, quite a radical change can be expected there. Logistics as part of wholesale operations, stockpile management systems, digitalisation in agriculture – digitalisation applies to all the different parts of the food chain. We cannot only think about the doors, walls, cooks and waiters in our restaurants. Instead, we must talk about the food chain as a whole and artificial intelligence and digitalisation as a part of it.

Identifying external business needs

While artificial intelligence is a buzzword at this time, companies should not perceive it as an end in itself. As in any other development project, the development of AI should generate business benefits. Identifying both internal and external business needs is an important step on the AI journey and in AI deployment, also for SMEs. Only then will it make sense to start considering development areas and how to apply AI in them.

As the world changes, needs for business changes are emerging from several different sources and directions. This development is continuous, which is why identifying an SME's business needs should also be a continuous activity. If a company remains stagnant, it may find itself in a situation similar to typewriter plants in the 1990s: the technical development of computers overtook the industry, and only a few manufacturers managed to switch to printer manufacturing or otherwise adapt to the new situation. The majority of manufacturers gradually fell into oblivion and disappeared into the history books.

Consequently, it is essential to identify external and internal development needs.

> **First, identify your internal and external business needs. Only then does it make sense to think about how to apply AI.**

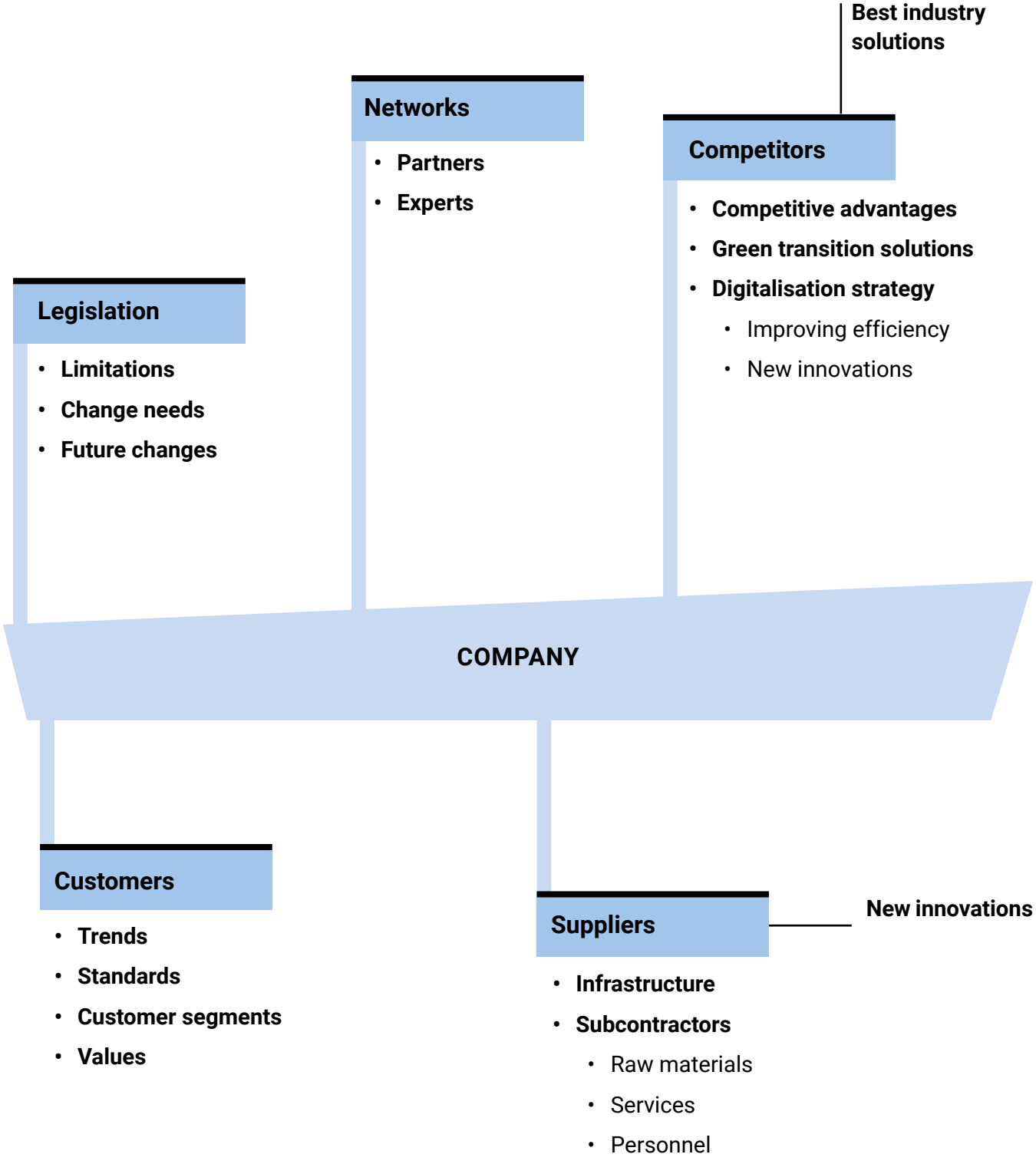

Figure 8. Examples of the sources of external needs for change.

In terms of a company's external change needs (Figure 8), the requirements laid down in legislation and regulations typically take precedence. They are clear and inflexible requirements with a strict deadline. Even though regulations based on legislation and decrees appear to be quite straightforward and a necessary evil, it is useful for SMEs to consider their impact more extensively. Companies should find out whether other business objectives could also be achieved when they are implemented, as each necessity also represents an opportunity.

Companies are rarely able to ignore their competitors. For this reason, SMEs in particular should invest in regular benchmarking of their competitors – not only based on hearsay but also by systematically exploring the competitors in their field. Each company has a slightly different business model, and it is good to understand where competitors find or think they can find competitive advantages: whether their logistics are highly refined, they rely on cheap labour, compromise on raw material, have achieved digital breakthroughs, have decreased loss by improving efficiency, have a story-driven approach based on mental images, or use some other strategy.

You can also find good incentives in various networks: industry associations, various publicly funded development projects, your own expert networks or other close contacts. Similarly, subcontractors and suppliers may have good knowledge of the latest innovations, new raw materials, tools and future disruptions in the sector, in other words, market disruptions caused by new innovations.

You should summarise the business development needs originating from various sources, perform risk analyses and prioritise your measures based on the available resources and achievable business benefits. When analysing development needs, you should focus on the internal development needs of the SME. This means determining whether a single investment in development could solve more than one problem.

AUTHOR:
Altti Lagstedt, Principal Lecturer, Haaga-Helia University of Applied Sciences

Identifying internal business needs

Internal development needs may arise either at the initiative of the management (e.g. strategies) or from among the SME's employees (e.g. suggestions for improving practical work). Information does not automatically flow in either direction. In the worst-case scenario, strategies are not linked to the operative activities, while challenges in operative activities are never brought to the attention of senior management. SMEs also need an effective information channel in both directions.

Internal development needs may be identified or unidentified; even if no one is complaining, it does not necessarily mean that things are going well. In many cases, things may not be going well but people have grown accustomed to it or never experienced a better situation, and are unaware that things could be better. SMEs should analyse their activities systematically, rather than making decisions based only on a gut feeling.

In addition to strategies and identified challenges, you should consider the following aspects when analysing your activities:

- How well your processes work or whether the processes have even been identified. A process map and process charts will help you understand the situation.
- The quality of your operations: the quality of the final product, quality of processes, quality of competence, quality of tools. What quality indicators are you using?
- Does the SME manage data systematically, and is this made visible (data architecture)? Which deficiencies have been identified? What can you do with the existing data?
- How do you manage your information systems (system architecture)? Have you identified any shortcomings or integration needs? Is information security/ data protection handled appropriately in your company?
- Your organisation's capacity for change, future needs for competence, how well are they aligned with your strategies?

Potential internal assessment tools include an enterprise architecture model as well as various tools for generating ideas, such as brainstorming sessions or similar methods. Risk analyses are also useful tools when the aim is to systematically assess your activities.

Assessment of internal needs often includes looking for solutions and capabilities to deal with change needs that originate externally. As a result, it also makes sense for SMEs to combine the processing and solutions of business needs that come from external and internal sources.

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Selecting a development area

Based on Hume's guillotine, the way things are does not determine how things should be. Applying this principle freely, we could say that the need for development does not automatically dictate how that development should be carried out. The need describes the identified problem, but it does not directly determine an optimal solution. There are several ways to achieve the same business objective. For example, if the aim is to improve the margin of a product sold by the company, it can be achieved by adding new features with a good margin to the product or by reducing expensive but insignificant features. Or, instead of changing the company's products, we can find cheaper subcontractors or optimise our own processes. There is no single right way to choose a development area, even if the need for development is obvious.

Business development can be roughly divided into elements that focus on the company's operations (processes) or products. Of course, especially in the service business, you may not be able to fully separate the product from the core process. However, in principle, the service is everything the customer sees, and the process also includes those parts that the customer cannot directly see.

In comparison to traditional development methods, AI has created new dimensions for development that SMEs should take into account when identifying and assessing their development targets. If you have access to sufficient amounts of high-quality data, you may even be able to use AI to automate your entire data analysis process. AI can be used to both look at the data and determine what has happened as well as to help you understand why something happened and what might happen in the future. It may even suggest what should be done about the matter. AI is a tool for management decision-making, but it also offers many other development opportunities in areas such as quality management and process control. The utilisation of artificial intelligence also makes it possible to achieve development targets that, only a few years ago, might have been considered too expensive or otherwise unfeasible. When assessing development targets, it is important to consider how artificial intelligence could change the prevailing situation in each area under review (Figure 9).

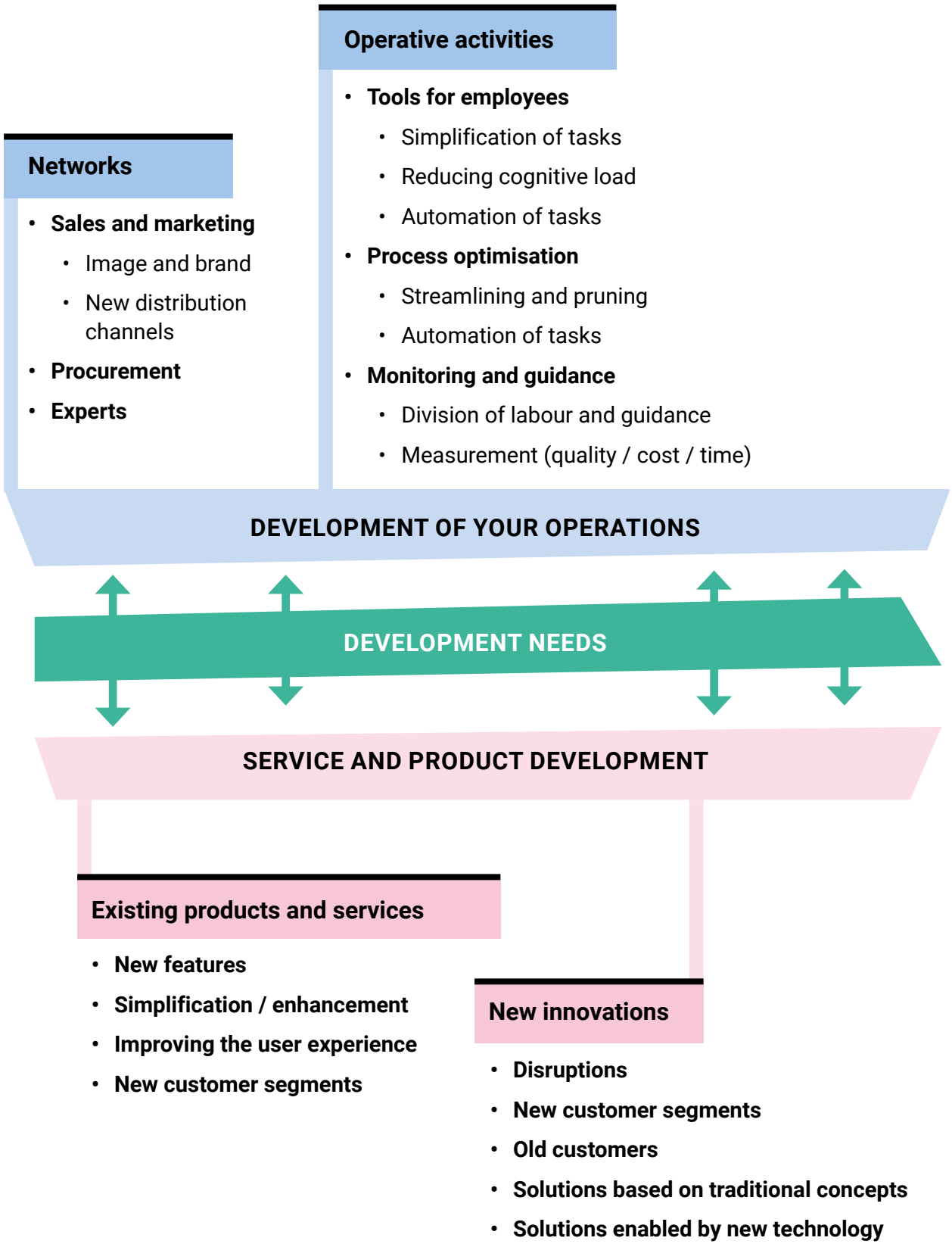

Figure 9. To support the identification of development areas: business development focuses on the company's operations (processes) or products/services.

As is the case with development needs, there are often many development areas that you cannot pursue immediately. This makes it important for SMEs, especially those struggling with limited resources, to prioritise their development areas (Figure 10). You should start by tackling areas that help you achieve significant benefits with a reasonable investment. Meanwhile, you should discard any areas that produce questionable benefits but require major investments.

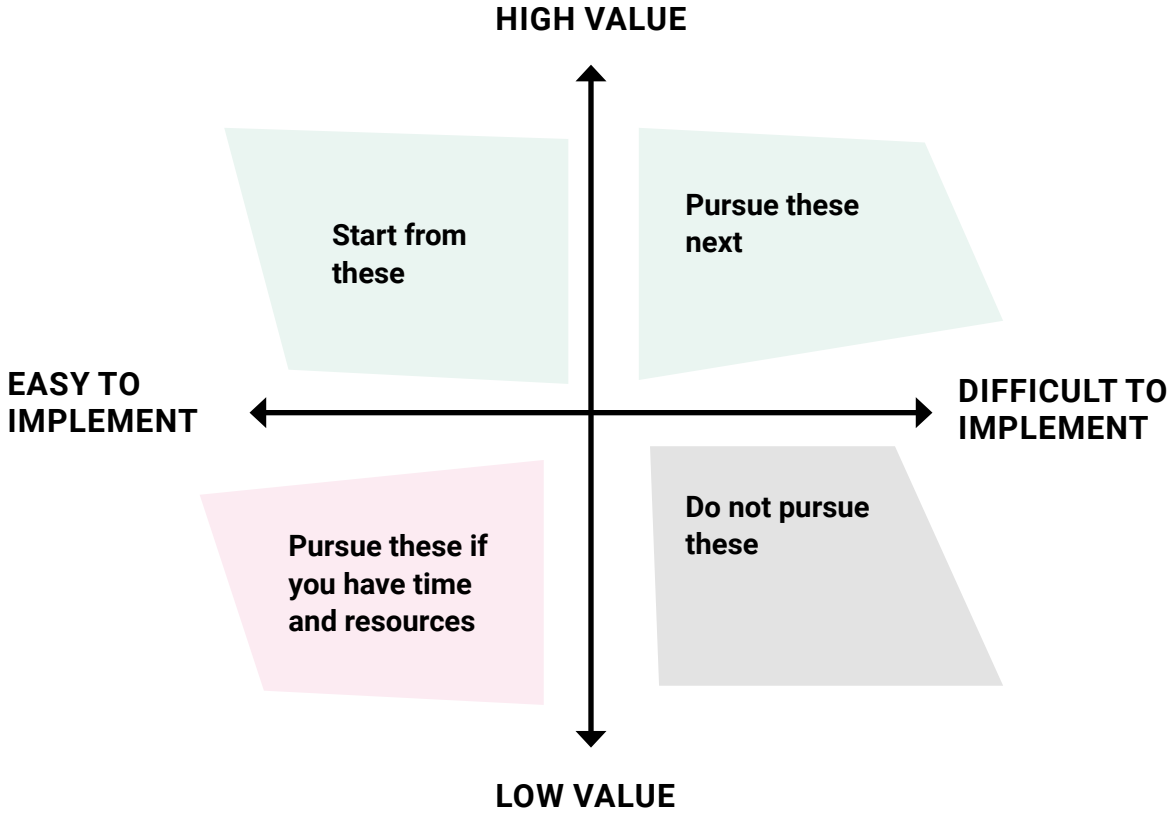

Figure 10. Prioritization matrix for business development targets.

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Developing an AI use case

AI projects utilise AI from a business-driven perspective – not with a technology-first approach.

The development of an AI use case starts with **brainstorming**. The brainstorming can focus on identified challenges that you want to solve and new opportunities available in the market that you can use to renew your business. The easiest thing is to start with problems that require a solution. You can also start brainstorming use cases through 'horizontal' cooperation and joint planning involving different units in your organisation. It is advisable to include people who are closely involved in your support and business processes in the development work as well as external representatives of the value and supply chain if necessary.

Identifying **data challenges** is a critical step. This focuses on the quantity and quality of the data and access, in other words access rights, and addressing issues arising from data protection legislation. If there is not enough data for the AI solution or its quality is inadequate, you must determine how to collect the required amount of high-quality data.

Careful **prioritisation** of the use case from the perspectives of business impact and ease of implementation is a key success factor in an AI project. A use case that is beneficial to your business and feasible is identified as a sum of various factors. A use case must have a **clear business need** and **the support of the management**. You must be able to **predict the benefits** it produces based on both quantitative and qualitative criteria. These may include decreasing production costs, new innovative products or services or, for example, improved well-being at work.

You must also be able to **limit** the use case to a project that is **as clear-cut as possible** so that you can determine the personnel and working hours, investments and data warehouses needed for it. It is important to appoint a clear owner and development team to the development project as early as possible. You should harness the organisation's internal communications to support implementation of the use case and the change that AI deployment will cause in the organisation.

For guidance on developing a use case at an SME, see the free AI in Business online course.

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Iris Humala, Project Specialist, Researcher, Haaga-Helia University of Applied Sciences

Ethical issues related to developing an AI use case

In recent years, AI and its impacts have become important topics of discussion among professionals in various industries, researchers and the general public. These discussions have focused on highly-visible failures of AI solutions and ground-breaking achievements. **While people increasingly recognise the potential that AI has for revolutionising everyday life and different areas of business, they have also realised that there can be problems and risks associated with AI.**

Teemu Laajasalo

Bishop, Diocese of Helsinki, Master of Theology,
Doctor of Education

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Humanity is the most important principle in AI development. Instead of thinking that AI should become humane, I see it as a tool that learns, imitates, develops and utilises the vast amount of human-produced information in the world – restructuring and building it. The idea of humanity relates to its potential applications. Artificial intelligence must be used humanely and for the benefit of human beings. Rather than segregating or dividing us, it must be used in a way that unites us.

AI is a tool created with mathematical algorithms that can be used not only well or poorly, but also for both good and evil. In Europe, legislators have started drafting AI laws and regulations, but the challenge is a lack of consensus on what is and is not acceptable. As a result, we should take a more detailed look at how AI should be used and for which purposes it should not be applied.

Ethics is an academic field that deals with questions about what is good and evil and how we can assess moral right and wrong. Ethics has identified three principles that enable us to argue for and against things. These are consequential ethics, deontological (duty-based) ethics and virtue ethics. All people and also companies apply the three different thinking patterns when reflecting on their operations and aims. The management of a company that is developing its business activities must be able to answer questions such as those presented in the figure below when investing in the implementation of AI solutions (Figure 11).

The functioning and objectives of artificial intelligence can be assessed from three different perspectives: consequences, duties and virtues. The management of an SME that is developing its business activities must also be able to answer these kinds of questions when investing in the implementation of AI solutions.

In practice, there are major differences between people and companies in terms of how they analyse and value these different perspectives and their details. In an extreme case, some companies focus merely on maximising their financial profits, i.e., the consequences, and are consciously or unconsciously taking major legislative risks. Meanwhile, others strive to stand out from the rest with their principles of virtue, which supports their competitive advantage and brand and is used to justify higher margins and profits on the market. In general, however, we may argue that all companies should make their choices consciously and systematically, taking their strategic objectives into consideration.

When directing the development of AI, it is important to balance different ethical perspectives: consequential, duty-based and virtue ethics. The challenge is that there is not always a single or even correct answer to an ethical question. An organisation that is developing and introducing AI must make choices between conflicting requirements, vague uncertainties and changing priorities. Taking different perspectives into account requires both multidisciplinary and detailed competence in many different fields of expertise. To be successful, the company needs a systematic AI management model. Guiding the model involves combining

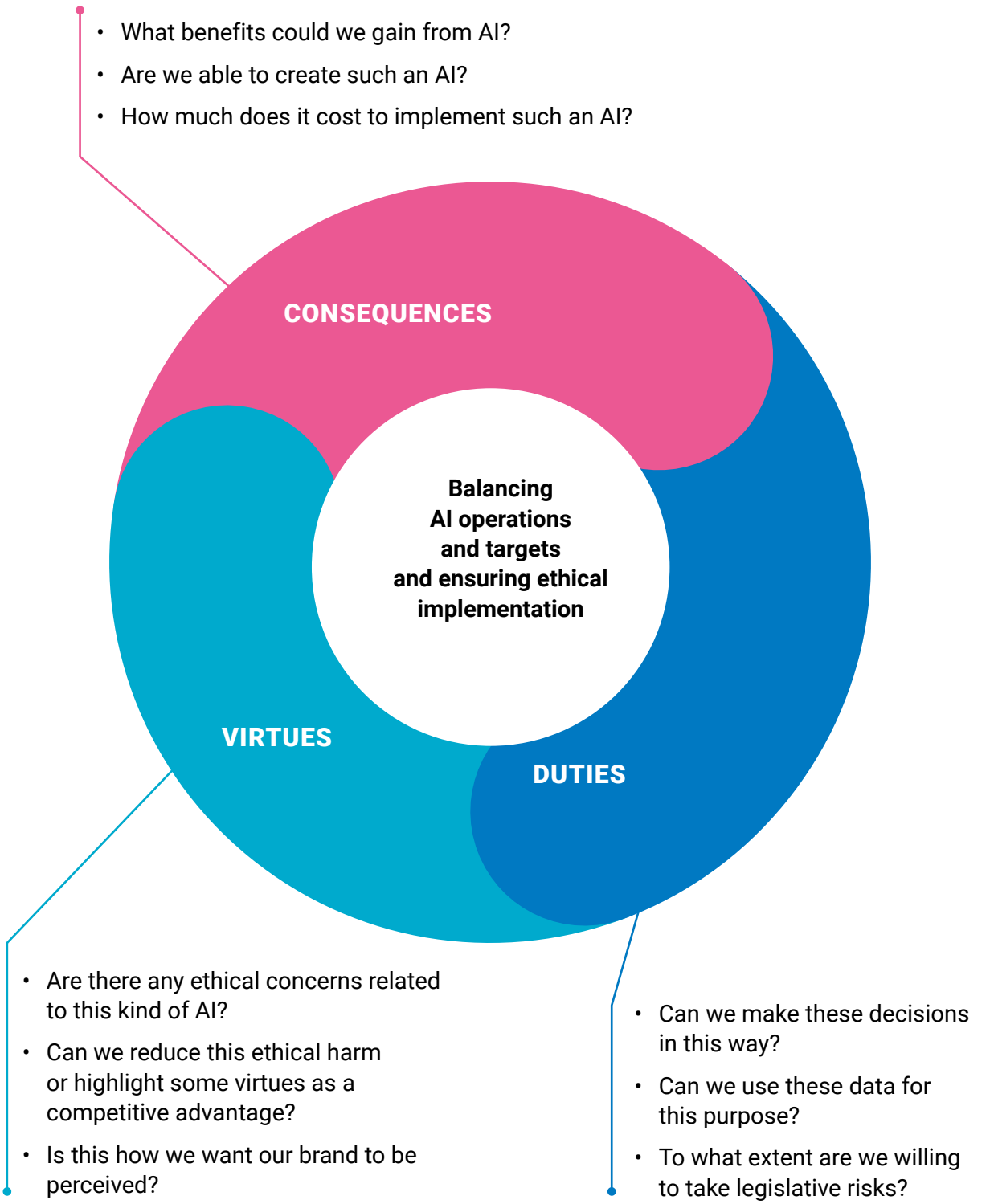

Figure 11. The three pillars of assessing the functioning and objectives of AI: consequences, duties and virtues.

the perspectives of various experts in different fields and making decisions while paying sufficiently broad attention to viewpoints ranging from technical and economic aspects to legal issues, the company's brand and competitive advantages.

You should not build an AI management model that operates separately from the company's other activities. Instead, any studies and decisions related to AI should be integrated into established business development practices. When deploying AI, it is particularly important to start by planning the business objectives and use cases. This is because it is often not possible to fix something that should not have been built in the first place. When you have clearly determined a solution that benefits your business, it will also be easier for you to identify more complete solutions that may serve the specific interests of your company. Ready-made solutions available in the market can often help you achieve major savings compared to custom solutions you have created from scratch. On the other hand, those seeking a special competitive advantage in AI can invest a significant part of their turnover in their solutions.

AI solutions that work well in optimal conditions may not be as well-suited to all environments and could fail to meet the requirements of local laws or pose a risk to your reputation among your customer base. When you are in the process of acquiring an AI, you should therefore perform independent assessments of the true benefits, challenges or risks of the AI solution for your business. This also provides you with a better understanding of how extensively or systematically you should consider legislative aspects or virtue ethics in, for example, your use case. As you progress, it is important to build a monitoring system alongside the AI solution that measures the quality of decisions produced by the AI from those perspectives that are important to your company.

The direction of business development must also address other topics related to the development of AI, such as business objectives and the requirements of information processing and software technologies. In this way, SMEs can also direct the development of AI – considering the entire life cycle of business change – from a business idea involving AI to the final decommissioning and ensuring the usefulness, legality and virtue of AI solutions.

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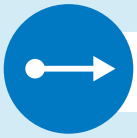
Examples of ethical solutions related to AI when developing an AI use case

Duty-based ethics

Deliveroo, a company that provides food courier services, was using an algorithm to score its delivery drivers to prioritise orders to the desired delivery drivers. However, an Italian court sentenced the company to pay fines, stating that the algorithm was in breach of labour law. The court argued that the algorithm may have given lower scores to delivery drivers whose activity level was lower during holidays, sick leaves, strikes or similar breaks protected by law.

While Deliveroo was facing problems due to its opaque and discriminatory scoring algorithm, one of its competitors, Wolt, decided to develop and publish a report on its algorithmic transparency and ethical perspectives. This is a way for companies to make conscious choices between making their resources compete against each other and empowering them, or between pursuing opaque efficiency and a culture of transparency.



Consequence ethics

Scientific publications have found that the AI solutions used in the Epic patient record system have caused significant additional work due to false alarms and have proven to have very poor accuracy. Some AI solutions may be less effective in certain environments and in practice than they might have been under previous, limited optimal conditions.

However, it is important to note that AI has also provided major business benefits. For example, Zalando has successfully used AI to provide outfit recommendations, which has increased the size of users' shopping carts – and therefore also the volume of sales – by up to 40% compared to shopping without the recommendations feature. These examples illustrate why it is important for a company utilising AI to assess and measure the actual performance of AI in their business using the data currently available to the company.

Virtue ethics

The US Department of Defence was looking to develop methods for identifying people and objects with the support of Google for the purpose of analysing images collected by drones. However, Google discontinued the controversial cooperation after a negative response from its employees who did not want to participate in supporting the military industry.

An ethical operator can question the prevailing operating models and end up with a completely different solution. Pedigree is a great example because, instead of collecting and profiling people's personal data, they decided to use cameras embedded in their billboards to observe dogs so that they could target ads based on the dogs' characteristics. The targeted advertisements in the billboards also reached owners who were spending time in shopping centres with their dogs – ethically and more inexpensively and profitably. Pedigree's advertising campaign was a huge success. It lowered advertising costs by a massive 34.4% per viewed advertisement and generated up to 29% regional growth in sales.

Maria Pettersson

Journalist and non-fiction writer, chief editor of Journalisti magazine

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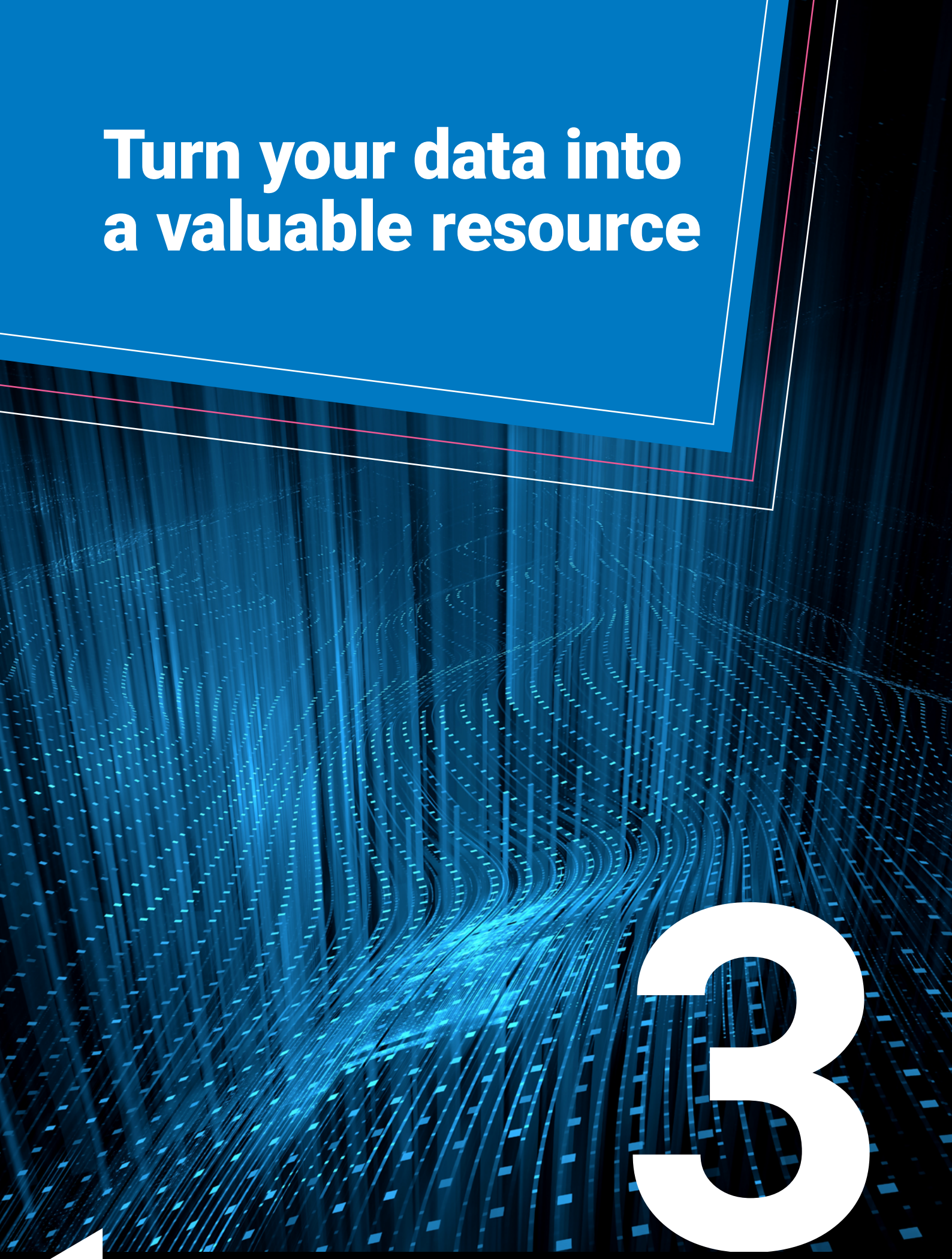
I hope that journalists will make increasing use of AI as a good tool, an assistant, or even a background reporter to a certain extent, as long as journalistic decisions continue to be made by people. What we write about, make reports about, talk about – all that would still be up to people, because it is not something you can really outsource. Humans are left with the responsibility. Ultimately, the final form and content is at least approved, and preferably also created, by humans.

Turn your data into a valuable resource



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After you have developed an AI use case, the next step involves the examining the data. When AI is applied to a specific use case, data is always the starting point. Data is valuable corporate capital and a prerequisite for adopting AI, also in SMEs. **When considering AI, you should first ask whether the company has good-quality, systematically collected data.** Data is usually found in digital files and databases, but unfortunately it is also often stored in physical folders. Utilising data in an AI solution requires its conversion into numbers, text, images and videos that can be used to train the AI model. Resources are typically needed for defining, collecting, cleaning and integrating data and other work. The first thing many companies notice is the fact that off-the-shelf, turnkey solutions are rarely available for the problem at hand. The work required to compile data is often strongly dependent on the company.

In many cases, the available data cannot be used as such to train a machine learning model. Instead, data annotation, i.e., the manual labelling of data elements, is often required. Annotation involves supplementing the data with information that you want to train the AI model to use and which the data does not already contain. Data annotation is often a laborious process that increases the price of an AI project. In some cases, annotation can be outsourced, but interpreting data often requires expertise in the field, which makes it a challenging task. Despite this, high-quality data possessed by a company can be very valuable capital that no one else has access to. As a result, despite its costs, annotation can be a highly profitable solution in the long term.

Data quality is key

One thing SMEs should keep in mind is the fact that AI solutions can only be as good as the data used to develop them.

Although the collection, processing and refinement of data as well as possible annotation is the most time-consuming stage of an AI project, it may also be the most important one. Once you have recognised the business needs for the AI use case, the actual work will start by investigating the company's data resources. The key questions at this stage are:

- What are the company's data warehouses related to the use case?
- Where is the data stored and who owns it?
- Is there enough data and which data is missing?
- How high is the quality of the data?
- How do you collect the missing data?

It is a good idea to draw up a systematic plan for collecting data, i.e. a data strategy. The quality of data previously collected by the company can be improved before implementing the AI solution at the SME. The quality of data is adequate if it suits its purpose and contains the necessary information. You can apply various quality criteria to evaluate the data. Below is a list of the eight most important criteria:

- **Quantity**. The development of AI solutions and models requires a large amount of data, especially when you start from scratch (as opposed to fine-tuning a model). However, quality always takes precedence over quantity.
- **Relevance**. This indicates whether the data can be used to measure the phenomenon you want to measure and answer the questions that you want to answer.
- **Accuracy**. The data corresponds to what you want it to describe. Precise data contains no random errors and accurate data contains no systematic errors.
- **Integrity**. The data must contain all the information necessary for serving its purpose. The data must not contain too many gaps, i.e., missing data.
- **Compatibility**. The data must be compatible, i.e., collected based on the same principles and the same methods and in the same format. The data must not change too much over time (compare with timeliness).
- **Accessibility**. Access to the data and sufficient user rights are required for the lawful processing of data. In the case of personal data, you must pay particular attention to the requirements set by the General Data Protection Regulation (GDPR).
- **Reliability**. The data may not contain significant deficiencies and errors. For example, data anomalies, sources of interference and background noise make the analysis more difficult.

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Matti Heikkinen

Director, High Performance Unit at Finnish Olympic Committee,
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The national strategy for elite sports is one of the key strategic spearheads of the National Olympic Committee. When it comes to the data strategy, this is a marathon rather than a sprint. We are currently talking about data pools, data collection and data utilisation. We are taking small but determined steps forward, aiming to collect data created in sports and thinking about how to make use of this technological development in individual, team, summer and winter sports, and parasports.

Data volume depends on the application

Assessing the amount of data required is usually difficult and there is no clear answer regarding how much data you will need. A sufficient amount is highly dependent on the application and the type of data. **From the perspective of a data scientist, you can never have too much data, because smaller, representative samples of the large data mass can always be extracted if you do not want to use all the data. From a business perspective, SMEs should also know that it is not worth collecting more data than necessary, as this often results in additional costs.**

The amount of data is particularly dependent on how you intend to apply AI and whether you are training the AI model from the start or acquiring an off-the-shelf model. However, even when using a ready-made model, you may have to modify or pre-process the data so that it can be fed into the AI model. The table below (Table 1) lists three different ways of implementing the AI model.

Table 1. Three ways of implementing the AI model.

MODEL IMPLEMENTATION METHOD	Applicable problem	Data volume requirements	Points to consider
1. The model is trained fully by the company	The problem or data is unique, no ready-made model can be applied	A high volume of training data is required (at least thousands of samples)	Training the model requires expertise and resources
2. The company's data is used to augment a ready-made model	The problem is common to a certain extent, but your data has special characteristics	Even a small amount of training data may suffice (hundreds of samples)	You must ensure that the model matches your problem
3. The company uses a ready-made model	The problem and data are common with no special characteristics	No training data is required	The ready-made model must fully match your problem and data

The AI model type is particularly crucial when training the model. For example, all the simplest linear models have poor accuracy, but you can make them work with just hundreds of training data samples. On the other hand, deep neural network models are accurate but can easily require thousands or even millions of samples. In practice, you must always find a balance between the desired performance and data requirements.

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The most common pitfalls: data siloing and quality problems

The most common challenges with data are related to data silos and quality. These can be a problem regardless of whether you are training a model from scratch or introducing a ready-made model.

Data silos are a significant challenge to the utilisation of business data – also in SMEs. This refers to the fragmentation of data as a whole, because data is collected in different ways by different functions or units. Such silos typically arise from financial, production, marketing and sales activities. As a solution to this problem, different Enterprise Resource Planning (ERP) systems are used to collect data in a structured format with an integrated approach.

This helps produce a common set of concepts and an operating model that all the company's employees understand in the same way. It allows utilisation of the collected data both horizontally throughout the operations and units as well as vertically in the strategic and operational planning of the company or group.

Poor data quality can prevent implementation of your AI solution. For example, there is a large volume of data, but its quality is poor because it has not been systematically collected. As a result, it may have gaps (it lacks integrity), bias (does not accurately describe reality) and errors (not accurate/faultless). **You cannot compensate for poor quality with a high volume of data because errors in poor-quality data may accumulate as the quantity increases.** Data compatibility

is a problem, especially in the biggest organisations, as data has been collected in different units using various systems and/or different format(s). It is also possible that no data has been collected on important processes.

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Data sources

The data used in an AI solution is usually produced by the company itself as part of its daily business operations, but it is also very common to use other data sources (Figure 12).

Internal data: Data produced and stored by the company. The primary data source, which usually contains customer data, sales data and different types of data generated in production, such as text, images, videos, sensor signals and tables. These types of data are typically stored in databases and repositories.

External non-open data: Data obtained from other companies, public actors, organisations and Internet databases. The data may be subject to a fee or at least require registration. The use and storage of such data are often subject to restrictions, as it may also contain sensitive data.

External open data: A special case of external data that is free and available for everyone. In many cases, you may also use the data commercially and without restrictions, but this should be verified separately. Open data is usually available from public sector actors and various open data websites. In Finland, they include https://www.avoindata.fi/en and https://www.stat.fi/index_en.html and the Google service https://datasetsearch.research.google.com.

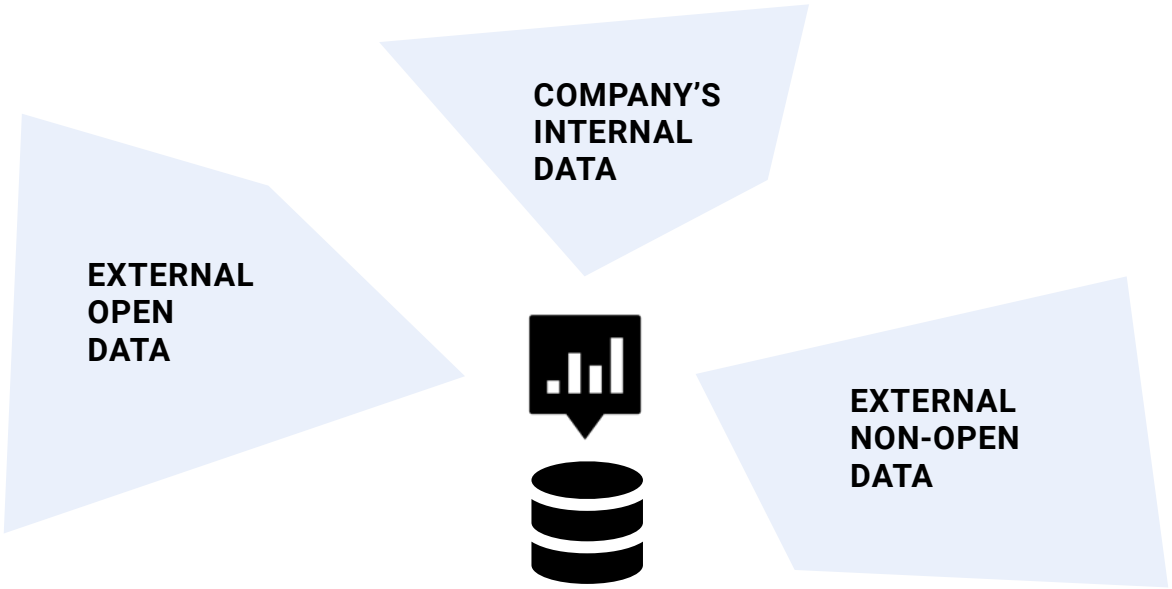

Figure 12. Data sources for developing AI-based solutions.

Enrich your data with external data. This can be useful if, for example, you want to train an artificial AI model that requires a huge amount of data (e.g., a deep neural network) and/or ensure that your model functions on a wider scale than only for your own data.

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Data ownership and potential obstacles to its use

Does your SME collect personal data or sensitive data? Is the data owned by the company or by the customer? The legislation requires compliance with the GDPR (General Data Protection Regulation) when processing personal data. Any data that contains personal data is subject to GDPR and must be protected particularly well. Personal data includes all data concerning an identified or identifiable person. Data can be used to identify a person directly or indirectly, for example, by combining an individual piece of data with some other data that enables identification.

In particular, data anonymisation and pseudonymisation are methods used in processing sensitive data and data that contains personal data. **Anonymisation** refers to the processing of data and personal data in a manner that makes it impossible to identify individuals from the data. **Pseudonymisation** means the processing of personal data in a way that the personal data can no longer be linked to a specific person without additional information (e.g., a code key). Unlike anonymised data, pseudonymised data remains subject to the GDPR.

In practice, all personal data and its processing require a legal and carefully predefined purpose of use. For more up-to-date information, see the website of the Office of the Data Protection Ombudsman at www.tietosuoja.fi.

Making data a valuable resource – tips for practical implementation at SMEs

- **Find out which data your company has and which data you will need to implement your AI use case.**
- **Ask your current IT service provider about which AI solutions it could offer to your company.**
- **Determine whether a ready-made application or product for the use case is available on the market.**
- **Consult a supplier/service provider of AI solutions that has experience in your company's sector or the implementation of AI solutions using similar data.**

Cloud services make it easy to get started with AI deployment. However, it should be noted that these services may cause problems related to the location, ownership and mobility of data. Many cloud services do not allow users to choose where their data is stored or analysed. If the data is subject to the GDPR, for example, transferring it outside Europe may pose a risk. You must already investigate such aspects when designing your AI solution and, if necessary, select your service provider accordingly.

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SOURCE:

FAIA First Artificial Intelligence Accelerator (2020). AI PLAYBOOK v1.4 - Liikkeelle tekoälyn hyödyntämisessä [Getting started with AI utilisation].

Understand your company's IT and technology capabilities

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A precondition for implementing AI or other advanced data analytics solutions is that the company's IT infrastructure and practices are at an adequate level. The next step on the SME's AI journey involves starting to consider the issues that should be considered from the perspective of digitalising business processes.

Digitalisation of business processes

The level of digitalisation of business processes varies in SMEs. There are also many different sources of development needs as well as development areas where AI could be utilised. This section discusses the development of business processes and the starting points related to digitalisation, adopting AI and the data required for this purpose.

A company's processes can be roughly divided into three groups: steering and monitoring processes, core processes and support processes (Figure 13). Core processes are those that bring money in, such as manufacturing products for sale or the producing services that your company sells. All other processes are simply there to ensure that the core process is working smoothly.

There is a fine line between the service you sell and the company's core process, especially in a service business. As a result, the impact of the development work on the service you are selling must also be taken into account when developing the process. This makes it very natural to develop both areas at the same time.

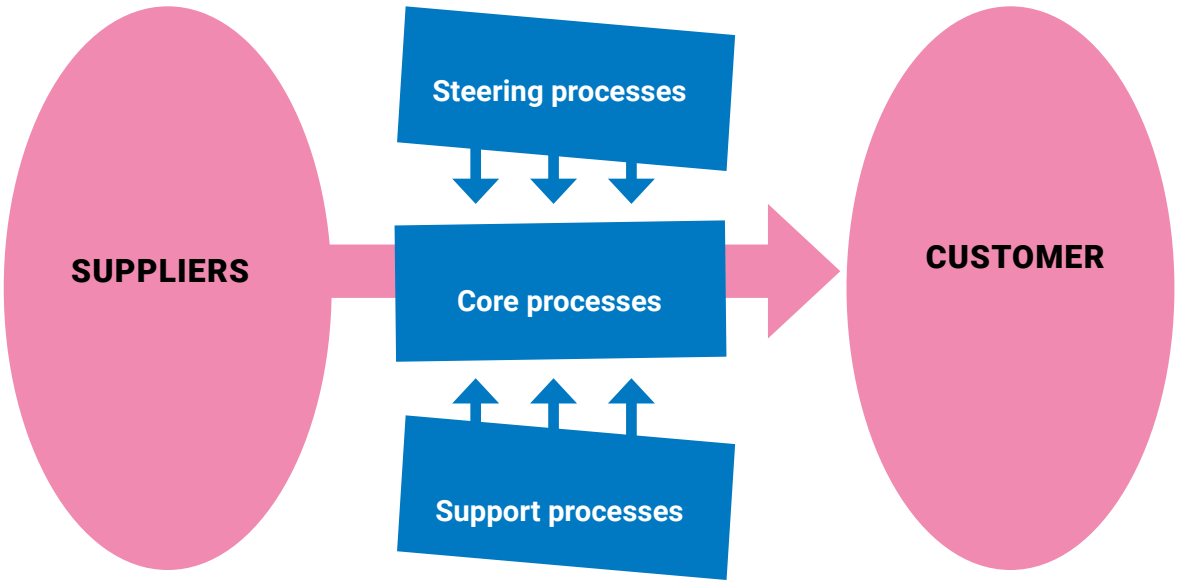

Figure 13. A company's processes can be divided into three groups: steering and monitoring processes, core processes and support processes.

Business process development involves a risk of sub-optimisation: a small advantage in one area may cause a major problem in another. When digitalising business processes, you should understand the priorities of your company's operations, the types of processes you are developing, and the impact of the development on other processes and the implemented service or product. For example, rather than prioritising support and steering processes over the core process, you should make the smooth running of the core process your primary goal.

When considering the utilisation of AI in business, there is also a risk that the digitalisation of processes is only perceived as a tool for producing data for AI and treating the change merely as an IT project. In practice, the digitalisation of business processes is always a change project in which you must also take people and corporate culture into account.

In order to succeed, the digitalisation of business processes must:

- **make people's lives easier:** for example, by providing tools that make work easier and services that make life easier (and enrich it)
  - information systems must be useful tools that reduce rather than increase the mental stress caused to users
  - information systems must be easy to use and fit the process naturally, they must not cause additional work stages
- **streamline processes:** digitalisation must pay for itself: compared to the initial situation, the final result should be
  - more economical
  - higher quality
  - more efficient, and
  - more beneficial
- **produce data to support decision-making:**
  - sufficient data (coverage). You cannot make up for any missing parts of the analysis process by guesswork, which makes it essential to consider the analysis when planning digitalisation: which data will actually be needed.
  - data of sufficiently high quality. You should preferably collect first-hand data that directly concerns the phenomenon rather than indirect data about the effects of the phenomenon (for example, you should measure quality deviations in the production line rather than the number of complaints).
  - only include data that you actually need. All data has its price, there is no point in collecting data that you do not need. The first data filtering must be carried out during the data collection phase, at which point you must know what your aim is.

In the worst case, the focus is only on one of the above, such as producing data, and the resulting new systems end up making people's lives more difficult rather than easier. An information system that is considered poor has a direct negative impact on the quality of the data collected by it. If the system is not seen as making work or the process easier in any way, it is used as little as possible and employees will preferably avoid using it altogether.

SMEs should also remember that the digitalising business processes is not only about developing information systems but also a logical set of operations that brings together suitable methods, business needs, people and the development environment.

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Basic requirements for deploying an AI solution

While AI deployment in an SME does not require in-depth expertise in AI or data sciences, IT managers and the company's management should be familiar with the basics of AI to successfully acquire and deploy AI. At the very least, you must be able to engage in discussions with suppliers of AI services to avoid creating a solution that does not work for you. Understanding the capabilities required for AI deployment is a good start (Table 2).

Parts 1 and 2 are the elements that set an AI solution apart from other software solutions. AI deployment is based on large data masses. Creating AI models requires special skills, especially in data science, which combines skills in statistics, mathematics, algorithms and programming. If you are using ready-made models, basic IT competence is usually sufficient as long as the models are integrated into a user interface that works.

Table 2. Capabilities required for the adoption of AI or other advanced data analytics.

Data availability and usability	Technical skills	IT infrastructure and software	Resources for IT
Does the data exist? Is it available? How much of it is there and in which format?	Does your company have anyone who knows how to process data, program or use suitable software and perform data analysis?	Does your company have hardware and software that can run AI models and enable their smooth use?	Does your company have sufficient resources and the will to make sure that the IT infrastructure and developed solutions are always up to date?

Hardware requirements

While off-the-shelf AI models can usually be run on your computer in a similar manner to other software, in practice you should store the models on a server or cloud service where you can manage them centrally and the models are scaled for a sufficiently large number of users. You can run most AI models on a laptop or even a mobile phone. A high-quality graphics processing unit (e.g., 8GB or more memory) is recommended. If the model uses an Application Programming Interface (API) and the network, the actual computing takes places online, meaning that the terminal device is used to supply data and display the result. In practice, almost all AI production solutions are currently implemented using various cloud services, such as Google Cloud, Amazon Web Services or Microsoft Azure. This makes the development, management and security of AI models considerably easier. If necessary, you can bring the computing from the cloud closer to the place of use. This is called edge computing.

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How to get started when making technology procurements?

Very few SMEs have managers who focus solely on IT – IT is often only one area of their job description. On the other hand, the implementation of AI solutions requires specialised data science expertise and experience in adapting AI solutions to business. However, this is not an obstacle to utilising artificial intelligence, and the company does not need to hire a designated “AI team”. Today, AI solutions can also be found in many off-the-shelf applications and cloud services, and IT service providers also have solutions that allow SMEs to make full use of AI at a low threshold.

Whenever possible, you should familiarise yourself with and make use of existing solutions. Check to see if your current applications and IT solutions already contain AI features (such as MS Office 365, Google Workspace, SAP Business One, and Oracle NetSuite). If necessary, ask your current IT supplier for advice. It is usually not profitable to fully develop your own model from scratch, because this requires a great deal of special competence and resources. It is much easier to automate or increase intelligence in an existing IT solution rather than build a brand-new IT solution on top of AI. Do not directly copy AI solutions from other companies. Your business is unique and other solutions are very rarely fully compatible with your business.

Companies have different starting situations and levels

What is your company’s current situation? See below for a list of typical starting situations that represent different levels of technology and data application. Each example describes the first steps that you should take in that situation.

- **LEVEL 1:**
  The company mainly uses paper, binders, and Excel and/or Word files.
  The data is scattered in different locations and some of it is only available in a non-digital format. First, the data must be digitalised and stored in a centralised manner, for example, using a cloud service. The data format must be harmonised and data collected systematically. The company must invest in basic IT expertise and infrastructure, either through training or recruitment.

- **LEVEL 2:**
  The company purchases off-the-shelf IT solutions and software.
  This represents a low threshold for deploying AI features as long as data management and collection are appropriately ensured in the company. Ready-made software and the related AI models may not be well-suited for the company's operations. The company should consider more advanced cooperation with the IT solution provider, for example, in the form of custom software and start developing its own competence in IT and AI.

- **LEVEL 3:**
  The company engages in cooperation and implements development measures with the help of an external IT service provider.
  This allows the company to introduce AI features with a low threshold and, to a limited extent, create custom software for its operations. The company should work with its IT service provider to find out what types of AI solutions are available and how they could be developed together. If necessary, you should consider changing your IT service provider. The company should invest in increasing its competence in both IT and AI.

- **LEVEL 4:**
  The company develops its IT solutions using in-house resources.
  The company has strong competence in IT, which also lays a good foundation for developing AI solutions. The company should invest in increasing its competence in AI, either through training or by recruiting IT experts. Cooperation with suppliers of AI solutions should also be considered.

- **LEVEL 5:**
  In addition to basic IT capabilities, the company is actively adopting new technology.
  The company has reached a level that provides excellent starting points for the development of AI solutions. The company has good capabilities for carrying out rapid AI experiments. At this stage, the company can invest in developing AI competence by either providing further training to in-house IT experts, hiring a data scientist, and/or cooperating with external AI solutions suppliers.

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What AI solutions are available?

AI solutions suitable for SMEs are available in a variety of forms, ranging from fully developed in-house solutions to ready-made services purchased by the company. AI solutions purchased as a service are often referred to as Machine Learning as Service (MLaaS). This category also includes APIs (Application Programming Interface) and various plug-in-type solutions that make it easy to deploy AI services as a part of existing programs/applications. The table below (Table 3) summarises the advantages and drawbacks of these three solutions. In this context, an application refers to either a cloud service installed on your computer or a virtual cloud service.

Table 3. Assessment and summary of AI solutions: off-the-shelf application, MLaaS / API / Plug-in, the company's own application.

	Off-the-shelf application	MLaaS / API / Plug-in	Company's own application
Positive	• Very easy to adopt in production. • Solves a specific, well-defined problem. • Usually affordable.	• Easy to adopt in production. • Allows some customisation (e.g., API calls). • Affordable with small volumes. • Good scalability.	• The best solution when a custom model is needed. • Large volumes. • Affordable because there are no separate charges for use. • Fully under your control.
Negative	• A generic solution, not suitable for a rare problem. • Integration with other IT environments can be challenging.	• Expensive with large volumes, you may not be able to control how/where data moves and computing takes place. Not fully customisable for customer needs.	• Expensive to develop and maintain. Expertise required.
When appropriate	• The problem and data are common with no special characteristics or need to customise. The optimal solution if sufficient for the company's needs.	• The problem is somewhat common and off-the-shelf components can be used.	• The problem or data is unique, no suitable off-the-shelf model is available. No part of the service can be outsourced e.g., for information security reasons.

AI deployment while addressing IT and technology capabilities – tips for practical implementation in SMEs:

- **Ask your current IT service provider what AI solutions it could offer to your company. Is there a ready-made application or product available for your AI use case?**
- **Make sure that your IT infrastructure enables seamless integration of the AI solution, e.g. in terms of computing power, data storage and processing.**
- **Consult a supplier/service provider of AI solutions that has experience in your company's sector or the implementation of AI solutions using similar data.**
- **If no ready-made solution is available and the company decides to train its own AI model, ensure that you have access to the required data sciences competence either inside the company, through recruitment or from external service providers.**

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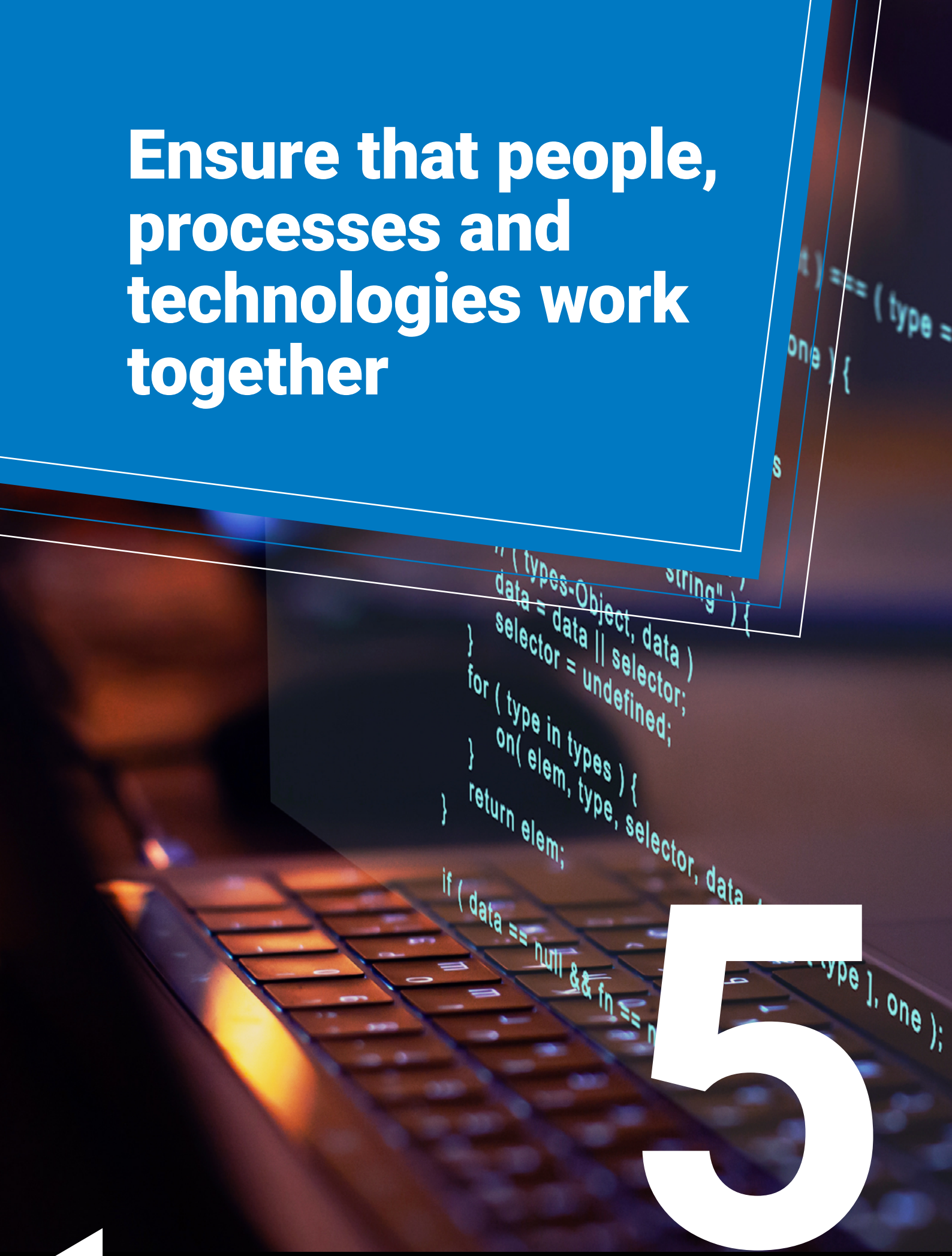
SOURCE:

Klemetti, A. & Kauttonen, J. (2022). Älyä pilvessä ja reunalla – tekoälyn hyödyntäminen reunalaskennassa [Intelligence on the cloud and the edge – AI utilisation in edge computing], *eSignals Pro*, published 7 September 2022, link

Ensure that people, processes and technologies work together



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AI deployment is also linked to a wider change in the company's business operations and management. The following section discusses these issues in relation to the SME's AI journey.

Commitment by the company and its management is important for successful AI deployment

At this stage, there are already many technical solutions for AI and parties that offer them. **This means that the successful implementation of AI no longer depends on the technology**. It is important for SMEs to boldly develop their understanding of AI and experiment with it. Individual experiments and the analyses performed based on them may have business value and help you gather experience in AI. However, producing continuous value means more investments and ensuring that your foundations are solid. The deployment of AI can only create a competitive advantage when your company evolves from Proof-of-Concept and one-off experiment stages to production solutions. This, in turn, requires the creation of AI experiments and conditions that support them at the very beginning of the AI development process.

Even if a technically good result is produced at the Proof-of-Concept stage and the data used by the company has explanatory power, the company's ability to obtain a permanent competitive advantage may still be at risk if the impacts of the implemented solution on people and processes have not been assessed and anticipated (Figure 14). There is a particular risk for this in SMEs, where resources are limited and activities aimed at achieving immediate business results take precedence over long-term development work. **SMEs and their management commit to AI deployment when you start by considering synergies between people, processes and technologies.**

An AI experiment that produces good results builds trust in the potential of AI and bolsters willingness to allocate resources to development work. Commitment on the part of people's and the management is reinforced when they see that the AI deployment can create solutions that generate value for customers or internal use. When the processes are sound, people understand the impact of new

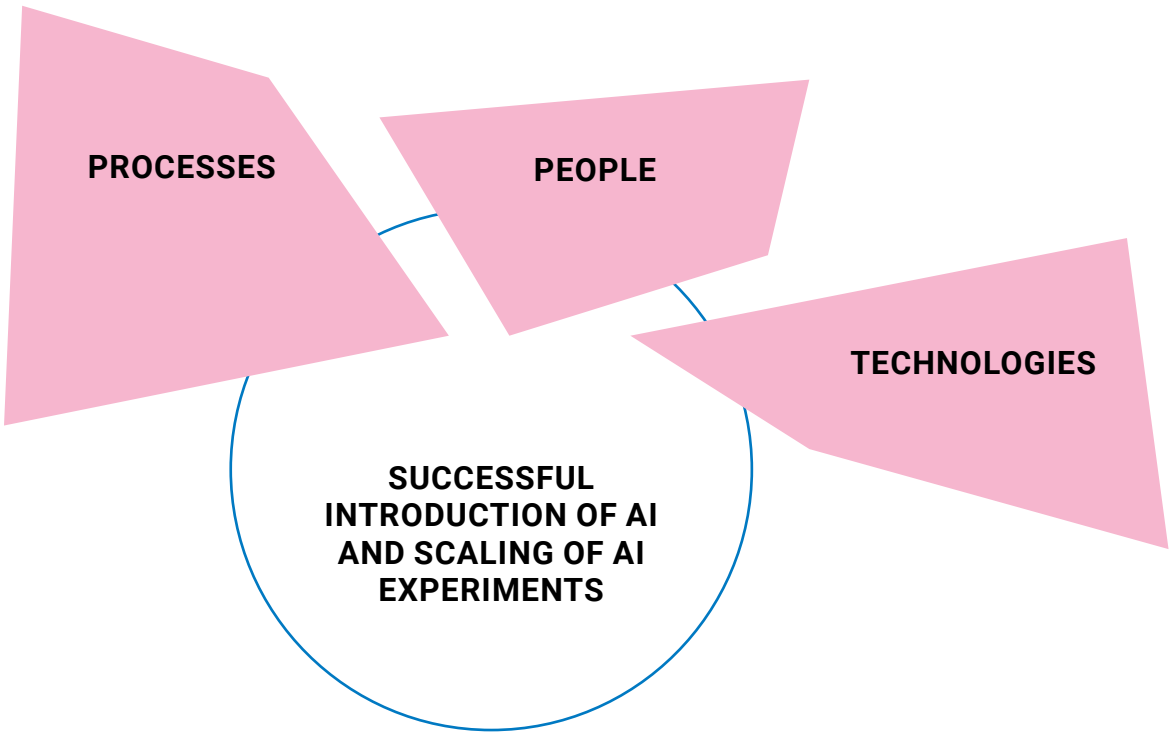

Figure 14. Successful deployment of AI and scaling of AI experiments: people, processes and technologies (Figure adapted from J. Kostamo 2023).

solutions on their own work and see its value. The introduction of each new solution represents a change in the company's current state, and it is absolutely crucial to already consider this in the planning stage.

- **SMEs are well placed to engage people, management and partners in implementing AI solutions.** The organisational hierarchies of SMEs are low and information flows quickly. They have fewer key business processes than larger companies and organisations. As a result, it is easier to clarify and work on these processes as new solutions are introduced. **The challenge is not the technology itself, but the skills required to utilise new opportunities.** You can support company and management commitment to the adoption of AI with the following measures:

- **Incorporate AI deployment into your business vision.** Achieving long-term business impacts is difficult without an appropriate business vision and support from the management.
- **Improve your company's capabilities for renewing its business and processes.** Benefits are only realised once you have changed your business models and processes, and they are powered by data and anticipatory insights based on data.
- **Identify, acquire and/or develop the necessary technical skills for AI deployment.** The transition from AI experiments to the scaling of solutions and their introduction into production requires many technical skills that may not be part of the company's DNA.
- **Include the AI solution in the surrounding IT infrastructure.** A precondition for full utilisation of AI is its integration with the surrounding IT infrastructure and, if necessary, adaptation of the IT environment to support the specific business context of the AI solution.

AUTHORS:

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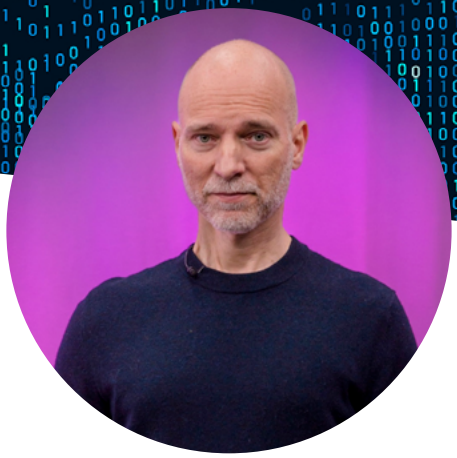
SOURCE:

Kostamo, J. (2023). Taking AI into use is not a "walk in the park". Presentation, AI-TIE participation intelligence micro accelerator, Kotka, Finland, 18 January 2023.



Aku Louhimies

Award-winning film director and screenwriter

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The film industry is rather conservative and certain changes only take place very slowly. Especially in Hollywood, which is known as the capital of commercial film production, many things progress slowly. Certain innovations have been introduced, such as various 3D goggles and smell-o-vision, but then the industry returns to the status quo. However, a major change is likely to mostly be about how digitalisation or machine learning can be utilised gradually and better and to an increasing extent. The tools are quite simple. There's not that much to them, they are not chemistry nor rocket science and are actually available to almost anyone.

Implementation of an AI development project

A change related to digitalisation or AI deployment is usually implemented as a project with a schedule, objective and development resources. The desired project implementation method has a direct impact on project management. If an SME starts with an agile approach and makes progress with small, iterative rounds, the idea of change will become clear along the way. More comprehensive planning right from the start makes progress more straightforward. In this context, we often refer to the waterfall model.

The traditional project management model is strongly dependent on comprehensive planning in the early stages and monitoring to ensure implementation of the project proceeds as planned. This so-called waterfall model is an effective development tool when the initial situation is clear, the objectives are well known and the SME is able to plan the development steps from the initial state to the target state in detail. **However, if the initial situation and objective are somewhat unclear, preparing an exact plan begins to resemble making predictions and the risk of problems emerging during the project becomes unreasonable. In this case, it is better to start with a more agile change-driven method.** Figure 15 below provides instructions on selecting a suitable method for your development project.

Change-driven development does not usually involve project management in the traditional sense, where a project manager takes responsibility for the progress of the project following the project plan and the steering committee approves the project results at the agreed points (in accordance with the Stage-Gate process model). In agile development, such as the Scrum method, the product owner is responsible for ensuring that the results meet the business needs and the Scrum master responsible for the Scrum method is responsible for ensuring that the development work is carried out according to the chosen method. Product owners play a major role in agile development: they act as gatekeepers to ensure that the project actually achieves its business objectives. The product owner must have a good view of the company's current business situation and a clear vision of what lies at the core of the development goals. Ultimately, the product owner decides what is - and is not - developed in the project.

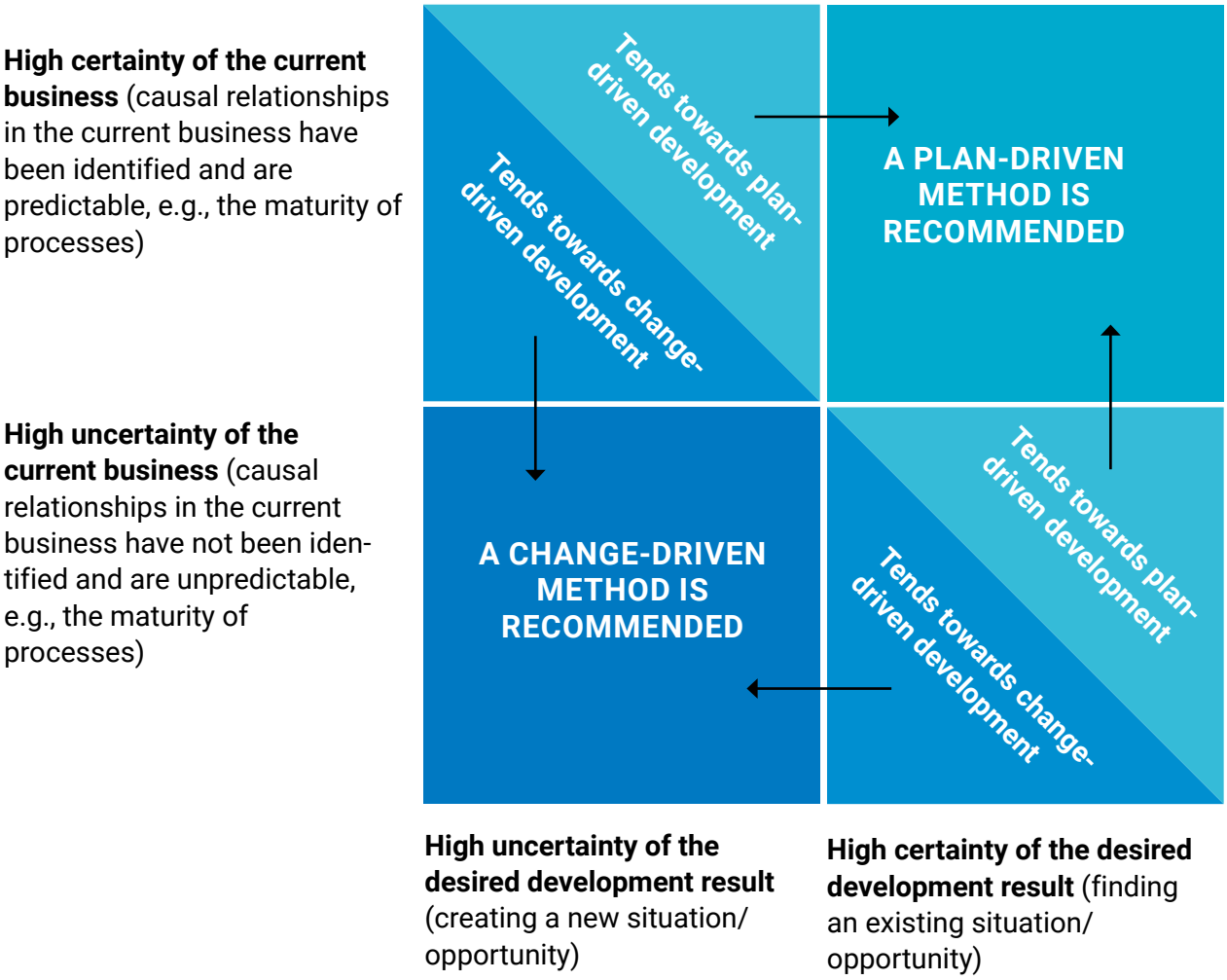

Figure 15. Selecting the method for your development project

The different methods require different roles as well as varying levels of business commitment and timing. In the waterfall model, business experts must make a strong commitment to the definition work carried out at the initial stage and finalisation of all the definition documents. In agile development, in addition to the product owners, business experts must also be closely involved throughout the development process in addition to commenting on interim versions and answering questions from developers. It is important to engage key actors to ensure that the work performed in the project will actually be beneficial and achieve the business objectives, and also because committed key actors reduce resistance to change.

Whatever the development method used in an SME, it is important to ensure the commitment of relevant employees and understand your role during the development process. In particular, you should carefully examine the roles and responsibilities of experts and ensure that key persons have time to participate in the project. Once again, you should remember that the ultimate goal is to generate business benefits, not to deploy the software.

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Resources for AI deployment in an SME

Questions related to the resourcing of development work are key to AI deployment, and the process requires a variety of resources. In general, it is useful to consider at least the following resourcing-related issues:

Investment in AI and its deployment involve various cost items, such as personnel and training costs, costs related to development, hardware, data processing and technical implementation.

Building the AI competence of personnel helps develop the required competence within the company, making it easier to adopt AI-based solutions. This is important for every organisation, but especially for SMEs with more limited technical resources, which have a clearer need for staff training and consulting services.

Examining and possibly utilising **ready-made technical solutions** instead of developing your own AI solution can help keep the costs related to technical implementation at a moderate level.

The utilisation of networks supports AI deployment in SMEs. Cooperation with RDI institutions, business development companies and other businesses offers new perspectives on the development of AI-based solutions and helps share expertise and reduce costs.

Funding opportunities for experimentation and implementation of AI-based solutions are available in many ways, and SMEs can apply for various government subsidies and participate in publicly funded RDI projects.

Strategic planning, which precedes AI deployment, enables the identification of key business needs and the technology solutions to be harnessed to support them. This will also help SMEs identify the resources needed to adopt AI.

How much will it currently cost for your company to adopt AI? How do companies fund AI pilots and development work? For answers to these questions, see the "FAQs about AI for SMEs" section in this guide.

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AI deployment is based on teamwork between IT and business

The adoption of AI requires close collaboration between IT and business. This also refers to the commitment of both departments to AI-based development efforts. AI deployment is a technical challenge that also requires you to understand business and focus your goals. IT is usually responsible for the technical aspects, such as developing AI applications, data processing and integration, while the business side is responsible for the uses, objectives, and customer and user needs.

AI deployment requires collaboration between IT and business at several levels. For example, your IT department must understand business needs and goals in order to develop AI applications that correspond to these needs. Meanwhile, the company's business operations must understand the potential and limitations that AI includes in order to define uses and objectives that are realistic and achievable.

AI deployment also requires continuous collaboration and cooperation between IT and business. For example, IT needs to report to business concerning the progress of AI application development and, if necessary, adapt the plans to match your business needs and goals. In turn, business needs to provide feedback on the use and impact of AI applications so that your IT department can further develop applications and improve their impact on business.

Cooperation between IT and business is therefore central to the adoption of AI in order to ensure that AI applications meet business needs and goals and deliver the desired benefits. This collaboration already plays a key role when you are brainstorming AI use cases, making it possible to analyse the ideas from the perspectives of both business and IT.

The text above is an example of writing using ChatGPT. ChatGPT uses an AI-based language model, and the text has been edited by Anna Lahtinen, Project Manager of AI-TIE, Senior Researcher, Haaga-Helia University of Applied Sciences.

Heikki Malinen

President and CEO, Outokumpu,
Member of the Board of Directors, Neste

”

I have spent a lot of time learning how to use Chat GPT 4. I've even tested whether I could code using the application myself - I'm not a coder, but for a start, the raw Python code was surprisingly easy to write using AI. This is new and even a bit mysterious territory for me. I believe that AI will change the way we work and we will see completely new openings that we could not have imagined only a moment ago. The way the world is changing with AI is both exciting and interesting.

Participative leadership from start to finish

Development projects aiming at the utilisation of AI must progress smoothly and achieve the targets set for them within a planned schedule. The characteristics of a well-managed project include a development idea based on the SME's needs, financial and competence resources, a concise project plan and a participative leadership style. Expert organisations, in particular, should involve their personnel extensively to efficiently identify and draw on the competence needed in the project.

Benefits of participative leadership

A good team of developers, often supported by external specialists, is always at the core of the development project. Esa Saarinen emphasises well-functioning teamwork and chemistry between people by saying, "*We can only succeed together with others*". People are what makes a project.

Participative leadership provides a way to create a good community of developers and a shared intent. It creates a development ethos and activities that support the project from the beginning to the end and carries over to the next project. A project management approach that engages personnel begins with an invitation to participate in brainstorming and get involved in a joint development arc.
It creates tension that engages, motivates and energises actors across the organisation's internal borders. The work progresses with the support of genuinely appreciative dialogue. This makes it possible to refine the best ideas and build mutual trust in your own and others' competence and work as the project makes headway.

Development project arc

It is important to already engage experts in brainstorming stage of the project, ensuring that the views of experts representing different functions can be comprehensively taken into account from the very beginning of the project. This ensures that the project is planned extensively, taking the needs and processes of all parties concerned into consideration.

The working methods used in the development project must be selected in a resource-wise manner. Light working methods, such as Lean and Scrum methods and a design mindset, are widely used approaches when planning and implementing projects. They are all based on a cyclical and communal continuous development approach and are divided into systematic planning, activities and evaluation phases.

Once you have set objectives for your project, you should discuss the special competencies supporting the project with the project team. At the same time, team members should consider how they could develop their own competence during the project. This allows projects to serve as development platforms for personnel competence, resulting in tasks that activate, give direction to and energise employees. Such participative discussions support well-being at work and job satisfaction. Everyone will have a clear idea of what they get out of the project, in other words, an answer to the question: *What is in it for me*?

A problem commonly faced by SMEs is the fact that the development project is just another task among many others. It is a good idea to provide the project team with regular coaching. The aim is to clarify and maintain the energy of the work from one step to another. Protecting work efficiency is also important for the progress of the project.

Working on a project also involves a variety of uncertainty factors and surprises that may end up confusing the plans. Schedules are delayed, assignments pile up, and external experts may also have differing views on the direction you should be taking. Collaborative working methods should be used to resolve these situations. They help share, acknowledge, structure and deal with difficult situations and support the process of finding solutions. It is also advisable to discuss the emotions and experiences related to the project together, as they affect the project team's motivation, well-being, commitment and competence development. It is also important to manage uncertainty.

All is well that ends well (enough)

At the end of the development project, you should invite all team members to an evaluation and final session to analyse your successes and development areas. It is important for the project team members to jointly consider how you succeeded in identifying needs, objectives and tasks in the project, how well the objectives guided the activities, and how well the working methods and team members' competence supported the progress of the project at different stages. It is also a good idea to share the lessons learned in the project with each other and openly discuss what you could learn from any failures and surprises encountered in the project during the next project round. If you also used the project as a method of developing staff competence, you should discuss the achievement of personal development goals.

Many companies have a seemingly never-ending continuum of projects, which is why every project that ends should also be celebrated and concluded in a meaningful way. You can bring attention to the success achieved in projects in your internal communication throughout the company. At the same time, you can learn important lessons from failures that can also benefit the entire organisation. For example, you can organise a festive closing event for your team, and reward people who participated in the project – perhaps in a humorous way. SMEs can also use the project story and results in their marketing and social media.

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A successful journey towards change and its implementation

AI deployment in a company is a situation of change that brings new elements to established processes and practices. This is often particularly pronounced in SMEs; in a smaller work community, the impacts of what you are doing affect many employees and their work. The adoption of AI may require changes to existing business processes. This may include defining new roles and responsibilities, introducing new workflows and processes, and promoting information sharing and cooperation at the interfaces of the company's internal and external stakeholders.

With regard to work, SMEs are no exception. The nature of work in SMEs is becoming increasingly complex, which is why work requires an increasing amount of social and intellectual skills from the company's management and its employees. Large and small business changes must be in line with the SME's existing working approaches, processes and the organisation's business model in order to enable a change that occurs naturally and ensure that it becomes a genuine part of everyday activities.

Managing a change related to AI deployment helps reduce the negative impacts of the change and ensures that the change meets its objectives. **A successful transition to AI consists of a baseline survey, preparation of a plan for the journey, plan implementation, assessment of impacts, and incorporating the achieved results into everyday business activities.**

The work done to clarify the objectives of the AI development project at the beginning of this journey and communicating them and their underlying reasons to all the SME's employees will be worth the effort. Defining the vision for change and summarising it in a way that is easy for everyone to understand is another important success factor. A good vision is clear and practice-oriented and inspire positive feelings. The energy for change in the vision will catch on throughout the work community when your management also strongly believes in it. A clear goal makes the development work feel like a meaningful joint effort.

Trust between different actors in the organisation is also a cornerstone of a change related to AI deployment. In an SME, a climate of trust is created and advanced when the discussion is open, respectful and safely constructive. If trust begins to crumble, it is time to take a break and start an open debate before continuing the journey towards change. You should also pay attention to and acknowledge any resistance to the change, because denying it will not make it go away. In any case, you can prevent or at least reduce resistance with good planning.

Monitoring the change – including documentation, interim and final assessment points, and evaluating the activities – will make it easier to understand what has worked in the AI adoption process and what has not. It is also important to anchor any changes achieved in the daily life of the SME to prevent the operations from gradually returning to the previous state. Clear monitoring practices will help the management quickly respond to any errors in judgement and utilise the lessons learned in future AI development projects.

AI affects people, and individuals are the most challenging subjects to manage. Therefore, managing emotions is also a key part of leadership. Emotions have a major impact on the work environment and employee performance. An open and safe corporate culture also encourages employees to express their negative and positive feelings.

> **Communicate about change in a holistic way!**

As different individuals perceive changes in varying ways, they also make progress at their own paces when it comes to changes involving the adoption of AI. As a result, changes rarely occur in a straightforward manner. The precondition for the full implementation of a change at the company level is a sufficient group of employees that has internalised the change and started using the new operating methods.

Successful implementation of AI in an SME means that both management and employees are genuinely committed to the AI development project and modify their own thinking and activities according to the objectives set for the change. The precondition for this is to involve both management and employees in planning the change in a constructive way.

John P. Kotter's Eight-Step Change Model (2012) points the way towards a successful change, one step at a time. The change model places particular emphasis on people's commitment and communication, which play a key role in implementing a successful change in the organisation:

1. **Creating a sense of urgency:** it is important to start by identifying a clear need for change and determining the goals of the change.
2. **Forming a multidisciplinary coalition:** key management and IT experts form a multidisciplinary team with expertise in change management.
3. **Creating a vision and strategy**: the vision and strategy of the change help the organisation understand where it is going and what the goal of the change is.
4. **Comprehensively communicating the change:** it is important to clearly communicate about the need for the change and the goals set for it in the organisation. Communication must be timely and continuous, targeting all employees throughout the company so that everyone understands the significance of the change.
5. **Empowering employees:** you should engage your entire company personnel in planning and implementing the change and make sure everyone is committed in order to ensure sufficient support for the change inside the company.
6. **Taking measures and ensuring short-term wins:** the company implements operational and practical changes required by the vision. Ensuring that the core process runs smoothly is crucial to the change.
7. **Consolidating gains:** systematic monitoring ensures that the change is ongoing and the company continues to make determined progress towards the objectives set for the change.
8. **Anchoring change in the corporate culture:** the change is rooted in the corporate culture, which ensures that the new operating methods continue to be visible in the company's everyday life and daily operations.

As change projects are always complex and challenging, SMEs should carefully plan how to proceed based on the company's specific needs.

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SOURCE:

Kotter, J. P. (2012). *Leading change*. Boston: Harvard Business Press.

Creativity and artistic-style communal working methods support the change brought about by AI deployment

> ”Creativity is about seeing what is there in a new ”
>
> **Helene Schjerfbeck**

Creativity and artistic-style working methods can help managers and employees commit to new solutions in the AI-related change process. In an everyday context, creativity can also manifest itself as flexibility in coping with challenges, inventiveness in finding new solutions or an ability to look at things from a new perspective. Creative methods can also be used to visualise internal experiences, emotions and thoughts that could otherwise easily remain hidden.

A joint visual SWOT workshop in the work community is an example of using artistic-style creative working methods. A visual SWOT analysis is an approach developed based on image analysis and a ‘conventional’ SWOT matrix with four components (strengths, weaknesses, opportunities and threats). A key feature of this approach involves encountering yourself and others and a joint discussion based on images. The image material used in visual SWOT work stirs discussions among the participants and inspires joint discussion, thus creating mental images and new, insightful views and development ideas among the participants. A visual SWOT analysis is closely linked to the stages of individual and communal work. The participants start their individual work by choosing images from a selection of art images that evoke emotions or speak to them and adding them to the matrix component that is meaningful to them. The joint work also engages participants in putting the jointly achieved solutions and decisions into practice.

From the perspective of HR management in an SME, the key objectives of a communal workshop are to create shared knowledge, build commonly agreed meanings for matters, and dispel prejudices and beliefs. A further aim is to dismantle power hierarchies and highlight the diverse tacit knowledge found in the work community.

From the perspective of creativity, the workshop focuses on an individual and collegial situation related to experiencing art during which perception and experience expand individual and shared thinking and knowledge. Rather than being based on mastering a tool or possessing the exact right skills, the artistic output in the workshop is all about communication and a way to see aesthetic experiences differently.

Images make communication easier and faster

The power of visuality is clear in the communal work stage. Images activate the participants' imagination and facilitate and accelerate joint communication. The discussion easily shifts from the abstract to the concrete – and vice versa – depending on the topic being examined. Images make it easy for participants to put their emotions to work, exclude ideas that do not fit the theme, and bring up solutions supported by the group. Images also help perceive and process more complex entities. Visuality makes the invisible visible and almost tangible. It also creates shared humour and joy of doing things. Communal work can captivate even the quietest participants and build bridges between different worlds of thought and experience. This subsequently engages participants in joint creation and a goal they have created together.

If your SME has the willingness and competence to guide its staff through a change that utilises its competence, you can use the above visual SWOT analysis. Look for images for the analysis in free stock photo websites. If your company does not have the in-house competence needed for such a process, you should commission the workshop from a facilitator with expertise in creative working methods.

Using creative approaches originating in the world of arts in the business world may also spark some resistance and even conflicting and opposing opinions among the personnel. You should acknowledge that this is precisely where the power of creative work lies – in conflicts and tolerating them. At best, you may end up creating something completely different and brand new. At the same time, exposure to this conflict exposes something real about people, ideas and goals. In a way, it makes things clearer – creating a new level, opening up new perspectives and opportunities, and providing a positive boost to the activities.

AUTHORS:

Authors: Teija Fontell, Art Pedagogy Specialist, Senior Lecturer and Marjo Ruuti, Work Counsellor and Senior Lecturer, Laurea University of Applied Sciences

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Deploying AI: Empowering SMEs with Artificial Intelligence implementation model

The implementation model for **Empowering SMEs with Artificial Intelligence** (Figure 16) supports the deployment of AI in SMEs and shows how you can get started on the journey towards implementing them. The model visualises the steps in an SME's artificial intelligence journey and is based on the experiences of AI that SMEs gained in AI-TIE projects. The **Empowering SMEs with Artificial Intelligence** model is adapted from the IDEAL software development process model and the standard CRISP-DM Data Mining process.

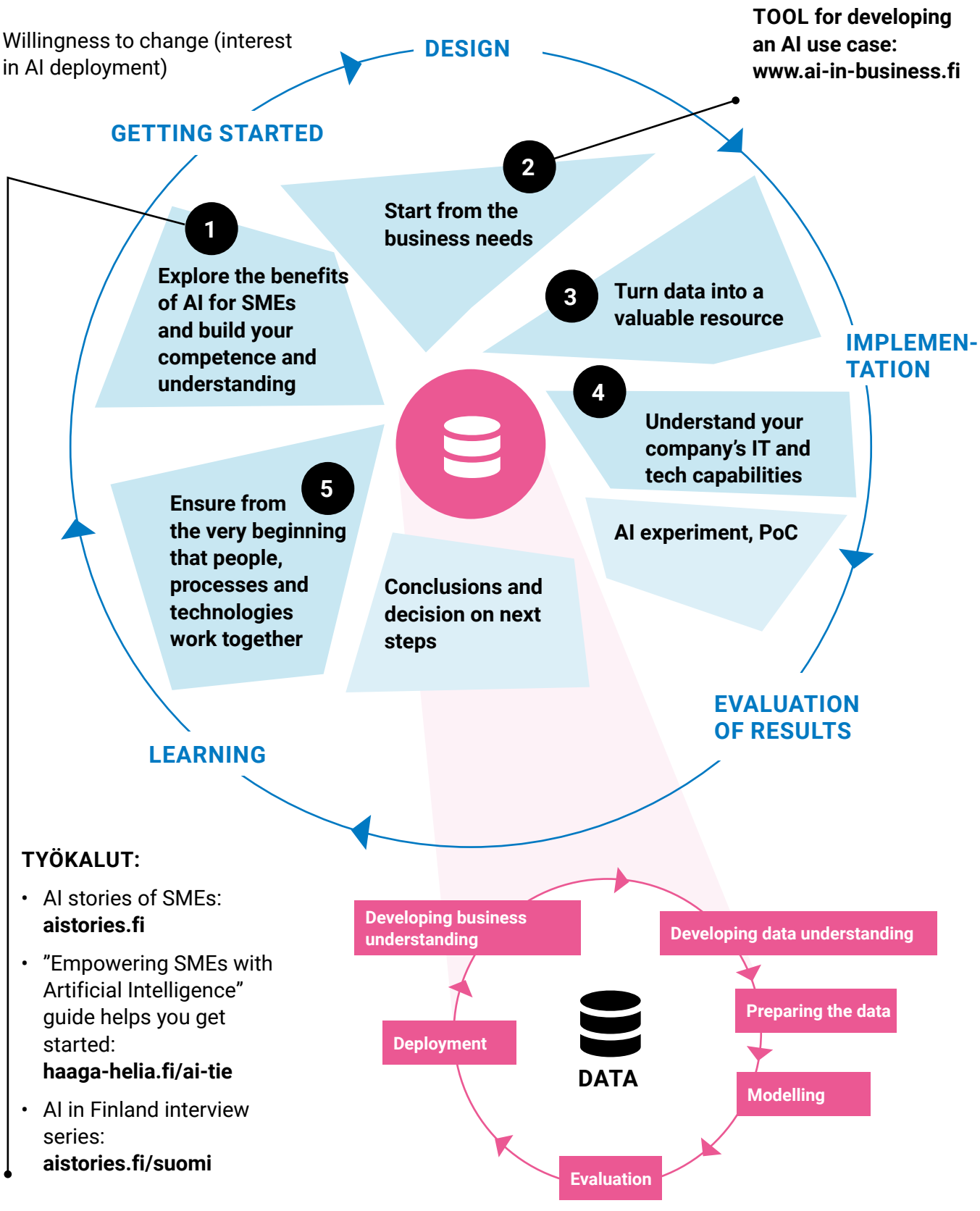
The AI journey begins with willingness to change, charting the benefits of AI, and building an understanding of it (1). Ensuring that people, processes and technologies work together (5) is one of the first steps, and the different stages of the process always come back to this. The actual AI deployment takes place in the diagnosis stage, which identifies business needs (2) and develops data understanding (3). The design stage involves analysing and taking the company's IT and tech capabilities into account (4).

Stages 1 to 5 sum up the contents of this guide. Each stage is discussed in detail in the preceding chapters, and the model can consequently also be used to understand the contents of the guide.

After designing the AI deployment, the final steps of the process are implementation and evaluation of the results. This means putting the Proof-of-Concept (PoC) into practice and, based on this, making a decision on the next steps and the possibility of implementing the AI solution in the SME. These steps are not discussed further in this guide. Once the conclusions have been made and results evaluated, learning outcomes can also be examined. They are manifest as increased understanding and experience of artificial intelligence and offer opportunities to improve compatibility between people, technologies and processes.

Data is at the centre of the AI deployment process, and the stages of data preparation form a development curve.

The "**Empowering SMEs with Artificial Intelligence**" implementation model is an iterative process in which the work phases are repeated. In this way, AI deployment and the development work associated with it can provide long-term benefits and competitive advantage in an optimal manner.



THE STRENGTH OF SMES LIES IN NETWORKS

Figure 16. The implementation model for **Empowering SMEs with Artificial Intelligence** was adapted from the IDEAL software development process model and the standard CRISP-DM Data Mining process.

From the SME perspective, the model highlights the following observations:

- Personnel competence is particularly valuable for SMEs. Building AI competence enables more efficient digitalisation of business processes and AI deployment.
- Their size and low hierarchies mean that SMEs are well placed to ensure that people, processes and technologies are working together when promoting experiments with AI and its wider deployment.
- Good and tested tools for launching the AI deployment process that specifically target SMEs are openly available and free of charge. Examples include an online course on identifying AI use cases www.ai-in-business.fi, companies' AI stories www.aistories.fi, and the "**Empowering SMEs with Artificial Intelligence**" guide www.haaga-helia.fi/ai-tie.
- SMEs tend to be agile, which enables an efficient AI deployment process as illustrated in the model.
- To ensure successful AI deployment, the model emphasises the need for collaboration between IT and business teams. If an SME does not have in-house IT resources, it must be prepared to engage existing or new external partners in AI development.
- The strength of SMEs lies in networks, which can provide versatile support for the different stages of AI deployment. Valuable partnerships may be forged with actors such as RDI institutions, business development companies, and other businesses.

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Artificial intelligence is a good servant but a bad master. It can be no better than what it is trained to be. It is worth learning about it if you need to maximise the benefits of your data. Help is also available if you are prepared to ask for it. Practice makes perfect.

Saara Hassinen, Managing Director, Healthtech Finland

Tools to support AI deployment

An SME's AI journey is often completed in multiple steps, and tools are also needed along the way. This section deals with tools developed and tested in AI-TIE that are particularly suitable for SMEs. These tools will help you get started if you are considering the benefits of artificial intelligence technologies, their suitability for your company and AI deployment. You can use them to improve your internal business processes and to develop, sell and deliver your products and services. The AI-TIE tools will help you build your company's AI competence step by step and with the goal clearly in mind.

The tools are grouped into three categories:

- **BE INSPIRED,**
- **LEARN AND APPLY,**
- **IMPLEMENT AND NETWORK.**

Explore the tools and utilise the most suitable ones to learn more about the potential of AI and find out about other companies' experiences. Start using the tools in your organisation – **discussions and insights** are a great start!

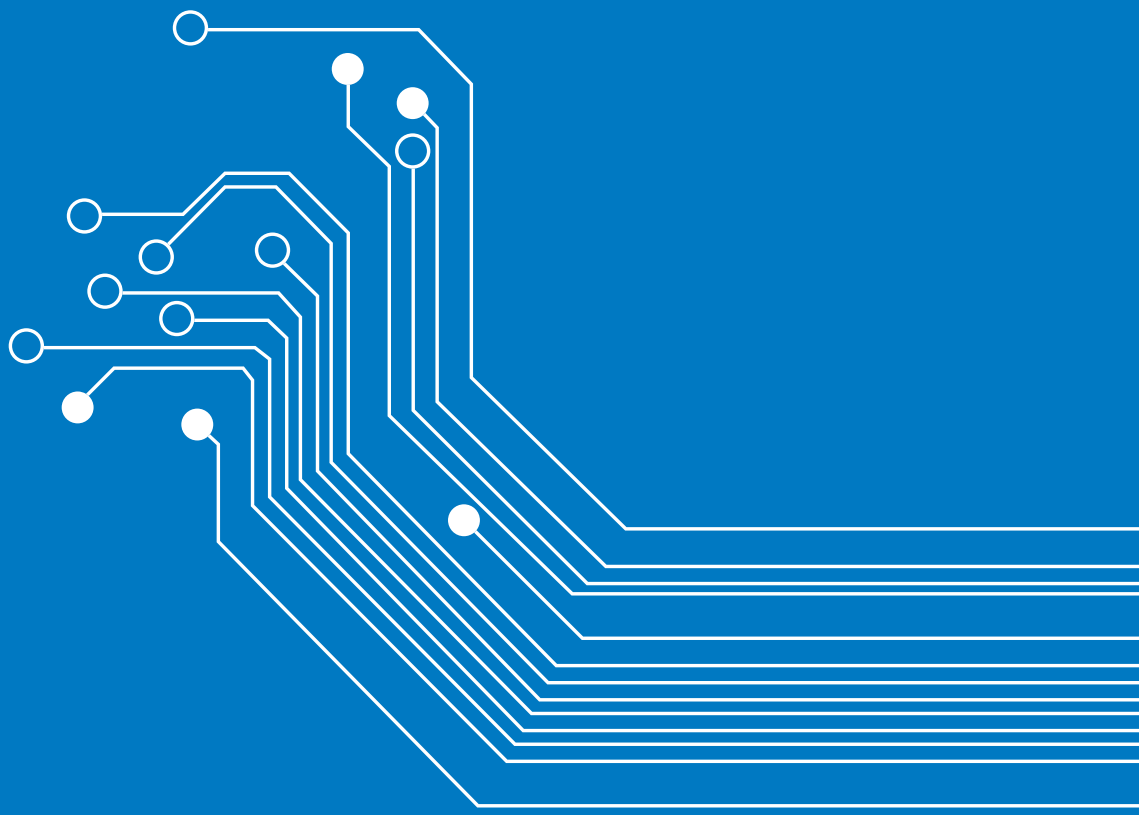
Life in an SME is busy and demanding, leaving little or no time for development. However, artificial intelligence is a topic you should stop to consider and consciously start improving your knowledge of it. The tools offered by AI-TIE have been an eye-opener. They have given us fascinating and useful insights into artificial intelligence technologies and their practical possibilities.

Maarit Källman, CFO, Evantia

DISCUSSIONS AND INSIGHTS: AI canvas

This easy-to-use and clear summary for SMEs will guide discussions about the potential of AI in your company and your capabilities of deploying it in your business.

The discussion canvas contains a number of questions designed to help understand where your company is right now in relation to AI, what you can focus on next, and what kind of tools you can use in your work. The questions concern AI expertise and the use of AI, identification of business needs, data-related issues, the company's IT and tech capabilities, and its ability to start exploring the potential of AI and promote its use.



AI Canvas is intended for SMEs to be used as a tool to guide discussions on the potential of artificial intelligence (AI) and the company's capabilities for deploying AI technologies in its business.

These guiding questions help you understand where you stand right now as you embark on your AI journey, what you can focus on next, and what kind of tools are available to support you on the way.

1. AI COMPETENCE AND USE OF AI

- ☐ Our company does not yet have an understanding of how AI could be used in our business.
- ☐ Our company has a basic understanding of the importance of AI technologies in developing business processes but we have not yet applied them.
- ☐ We have charted the potential of AI for meeting our business needs, but we have not yet taken steps to deploy it.
- ☐ Our company has conducted AI experiments and piloted AI solutions.
- ☐ Our company has launched, or is about to launch, new AI-based products and/or services.

2. IDENTIFYING BUSINESS NEEDS

We have identified our company's business needs which could be resolved by using AI

☐ Poorly ☐ Adequately ☐ Satisfactorily ☐ Well ☐ Excellently

The starting point for a good AI solution is business needs. They may include improving efficiency or developing new services and products.

- What kinds of challenges is the company facing, and could AI offer a solution to them?
- What new business opportunities is your company planning to seize?
- What types of needs for AI solutions does your company have, and is the need clearly defined and delimited?

3. DATA

The availability of systematically collected data of a high quality in our company is

☐ Poorly ☐ Adequately ☐ Satisfactorily ☐ Well ☐ Excellently

AI is powered by data, which is a prerequisite for deploying AI in a company. Typical data formats are numbers, text, images and videos.

- What type of data does the company have, and what are its volume and quality like?
- Is the data well-organised and easily accessible? Can more data be collected if necessary?
- Who owns the data, and does the ownership restrict its use?

4. IT AND TECH CAPABILITIES

Our company's situation is best described by the following:

- ☐ We mainly use paper, box files, and Excel and/or Word files.
- ☐ We buy off-the-shelf IT solutions and software.
- ☐ We engage in collaboration and development work with an external IT service provider.
- ☐ We develop our own IT solutions, drawing on internal resources.
- ☐ In addition to basic IT capabilities, we actively deploy new technologies.

5. COMPANY'S COMMITMENT

The readiness of our company to advance AI deployment is

☐ Poorly ☐ Adequately ☐ Satisfactorily ☐ Well ☐ Excellently

- The dialogue between company's IT and business expert are required to brainstorm and implement AI use cases.
- The management needs to support the development and offer sufficient resources for creating new AI solutions.
- The company needs to foster an encouraging culture of innovation.
- An AI project requires a clear division of responsibilities and ownership within the company.

"Your company's business culture must have an element of courage to get on with things and invest in something which will not necessarily bring immediate profit but which, through a learning process, will benefit the company in the future."

Timur Uzbjakov
Sales Manager, Dewaco Oy

"In my opinion, it is better to go ahead and experiment with AI than keep mulling over it. So don't hesitate and grab the bull by the horns."

Jani Leppänen
Chief Technology Officer,
Pharmac Finland Oy

Bringing the potential of AI to SMEs

AI-TIE tools to support AI deployment in companies

BE INSPIRED

AI stories
aistories.fi

Get to know Finnish companies' AI stories, examples and case studies as articles, audio and video podcasts.

LEARN AND APPLY

Online course
AI in Business
ai-in-business.fi

Complete a free online course that helps to identify and prioritise AI use cases.

IMPLEMENT AND NETWORK

Empowering SMEs with Artificial Intelligence guide

Get ready to deploy AI and use the guide in AI application development.
haaga-helia.fi/ai-tie

AI-TIE – AI Technology Innovation Ecosystems for Competitiveness of SMEs project supports SMEs in developing and growing their business. They can use AI solutions to improve their internal business processes and promote innovation in the product and service development phase, or to support the sales and delivery of products and services to customers. It is funded by the European Regional Development Fund and Helsinki-Uusimaa Regional Council as part of European Union's actions responding to the COVID-19 pandemic.

EUROPEAN UNION
European Regional Development Fund

Leverage from the EU 2014–2020

Helsinki-Uusimaa Regional Council

Discover open access tools

Now that you have a better understanding of your company's situation, we recommend that you next take a look at the tools we have produced to help you make headway when considering potential uses for AI in your company. A summary of the tools is given below, after which each tool is discussed in detail based on user experiences.

BE INSPIRED	
AI stories www.aistories.fi	Discover Finnish companies' inspiring AI stories in blog posts, business videos and video podcasts. The stories will introduce new ideas and give you tips based on other companies' artificial intelligence projects and solutions.
AI in Finland interview series, www.aistories.fi/suomi	Watch to interviews with Finnish public figures and social influencers, in which they describe their experiences of artificial intelligence and the potential it brings to Finnish businesses.

LEARN AND APPLY	
Online course ”AI in Business”, www.ai-in-business.fi	Take a study trip! A free online course for SMEs provides basic information on using AI in business. The course will help you brainstorm, analyse, plan and prioritise AI use cases.
AI accelerators, www.aistories.fi/suomi	Follow and participate in AI trainings and AI accelerators. Read about SMEs’ experiences of learning together! The AI-TIE project’s Clean Tech, Med Tech and micro accelerators improved companies’ AI competence, offered tools and expertise and encouraged networking.

IMPLEMENT AND NETWORK	
“Empowering SMEs with Artificial Intelligence” guide www.haaga-helia.fi/ai-tie	You can use this guide to map your current situation, build a big picture of artificial intelligence and support the development of AI applications. The guide is based on information and results produced in the AI-TIE project.
Business advisors	Take advantage of the expertise and networks of business advisors in your area! They will also help you find funding sources for developing AI-based solutions.

BE INSPIRED

AI stories www.aistories.fi

- **Company blogs**

Find inspiration in Finnish companies' motivating AI stories, experiences and examples in blogs and articles. The AI stories will help you understand the potential of artificial intelligence and reflect on possible future scenarios for your company.

The AI stories present different AI projects and solutions developed by Finnish SMEs to improve their operations and innovate new products and services. In addition to the stories of SMEs that participated in the cleantech and med tech accelerators, they offer other interesting case studies.

In my opinion, it is better to move ahead with an AI experiment than keep mulling over it. So stop hesitating and grab the bull by the horns.

Jani Leppänen, Chief Technology Officer, Pharmac Finland

EXAMPLES OF AI STORIES:

From experiments to production and towards game changer AI products, Rolan (in Finnish)

Carbon neutrality: AI application for financial management helps reach a global goal, Snowfox.AI (in Finnish)

Company videos and video podcasts

Company videos and video podcasts are interviews with companies that participated in the AI-TIE accelerators in which they describe their AI journeys and share their experiences of AI. Company videos and video podcasts introduce you to the AI experiences of other SMEs, helping you understand the potential of AI in terms of business development and supporting the creation of AI solutions in your company.

Lasting for a few minutes each, the company videos describe the AI journey from the perspective of companies and other actors. The video and audio podcasts collated from interviews with company representatives offer you more experiences, ideas and insights related to AI use.

Your business culture must have an element of courage to progress with things and invest in something which will not necessarily pay off immediately but which, through a learning process, will benefit the company in the future.

Timur Uzbjakov, Sales Manager, Dewaco

EXAMPLES OF COMPANY VIDEOS:

Medfiles AI journey

Prevett AI journey

Workpower AI journey

EXAMPLES OF VIDEO PODCASTS:

AI contributes to the mobility evolution, Rolan

Developing AI solutions in SMEs, Link Design

Making manufacturing more efficient with AI, Picosun

Join us, watch and listen!

- **AI in Finland videos and podcasts**

www.aistories.fi/suomi

Watch and listen to interviews with Finnish social influencers describing their experiences of artificial intelligence and the potential it brings to Finnish businesses. The interviewees are President Tarja Halonen; Ilkka Haahtela, Director General, Finnish Immigration Service; Peter Vesterbacka, entrepreneur; Henri Alén, restaurateur; Teemu Laajasalo, Bishop, Diocese of Helsinki; Maria Pettersson, journalist; Aku Louhimies, film director; Matti Heikkinen, Director, High Performance Unit at Finnish Olympic Committee; Minna Hiillos, President and CEO of Haaga-Helia University of Applied Sciences; Li Andersson, known for her role as Minister of Education of Finland, and Heikki Malinen, President and CEO, Outokumpu.

President Tarja Halonen

It is essential for companies to learn about sustainable development and the opportunities and challenges it creates, as well as about artificial intelligence. For the duration of the present millennium, I have been involved in setting the goals for the UN's 2030 Agenda for Sustainable Development. The idea that we could develop a system based on humans and human understanding of nature, human rights, equality and democracy while also being capable of national and international development was considered quite utopian at the beginning. The number of unknown factors it involved was extremely large, and my personal interest has focused on whether these gaps can be filled by means of artificial intelligence and other new technologies.

LEARN AND APPLY

- **Online course** www.ai-in-business.fi

Learn about using artificial intelligence in business at your own pace! A free online course that introduces you to AI use in business is an excellent way for SMEs to quickly grasp the business benefits and concrete design of AI. The online course was produced in cooperation with IT, AI and business experts and researchers who participated in the AI-TIE project.

The course consists of approximately four hours of the basics of AI and case descriptions, plus four to ten hours of work on your business case. During this time, you will go through the basics of artificial intelligence and apply what you have learned to brainstorming and analysing your company's AI use cases. The course also provides a step-by-step design toolkit to help your company brainstorm, analyse, plan and prioritise AI use cases.

At the end of the course, you will have identified and prioritised use cases and found the best and most suitable ones for you. After the course, why not continue with Design Sprint and the PoC (Proof-of-Concept) steps, either with support from your in-house IT resources or by seeking a company that offers AI services as your partner? You will also receive a certificate for completing the course.

SME representatives who completed the course described its value as follows:

Helps you recall the teaching situations and think about the company's use cases in concrete terms.

The videos were good. You really had to think hard about the multiple choice questions.

The online course promoted in-depth learning. There was a lot of the new terminology had to learn.

- **AI accelerators**

The AI-TIE project organised a total of three AI accelerators. Two of these were industry-specific accelerators that targeted at SMEs from Uusimaa operating in the cleantech as well as health and medtech industries, while the third one was a micro accelerator – a lighter and shorter implementation for SMEs from Uusimaa and Kymenlaakso in all sectors. The micro accelerator consisted of workshops, some of which were remote while others were based on physical presence.

The Clean Tech accelerator attracted 19 and the Health & Med Tech accelerator 17 SMEs or organisations from Uusimaa that were planning to use AI or expand their AI competence. A total of 32 SMEs from Uusimaa and Kymenlaakso participated in the Micro accelerator.

The knowledge base, tools and business sparring offered by the accelerators created a competence base that would enable the participants to further apply their learning and learn by piloting the AI use case selected in the accelerator at the AI Design Sprint stage.

The project's partners when implementing the sector-specific accelerators wash the Finnish AI accelerator FAIA, which operates under Silo.ai, and Siili Solutions for the micro accelerator.

READ MORE ABOUT THE ACCELERATORS: :

Artificial intelligence capabilities of Finnish cleantech SMEs improved by acceleration (14 January 2022)

High-tech solutions at the centre of Finnish AI expertise (23 May 2022; in Finnish) (23 May 2022

Introduction to AI for the social and welfare sector (12 May 2022; in Finnish)

Foibekartano's AI journey (company video), https://www.aistories.fi/tekoaly-tarinat/

This is how companies participating in the accelerators described the lessons they learned:

The AI-TIE accelerator gave us insights into the world of artificial intelligence and the potential for its application.

The accelerator gave us concrete ideas for AI applications and uses.

An interesting overview, the specific tasks were good. Getting a chance to talk to others was great.

SMEs may find it difficult to grasp the possibilities of using data and artificial intelligence. The accelerator offers these companies an opportunity to learn about value creation through data and the principles of artificial intelligence while giving them a chance to design and develop their own, tailored AI-based use cases.

Mika Aho, Leading AI Solution Strategist, Data Design

IMPLEMENT AND NETWORK

Join networks and learn about the prerequisites for developing AI applications and boosting cooperation.

- **Empowering SMEs with Artificial Intelligence guide**
  www.haaga-helia.fi/ai-tie

The guide for SMEs provides step-by-step guidance on how to use AI solutions to develop and grow business, such as improving internal processes, innovation, product and service development.

The guide provides:

- examples of AI solutions and company experiences
- knowledge and understanding of AI
- tools to support companies' adoption of AI.

- **Business advisors**

SMEs have limited resources. They often need to focus their time, money and expertise on the core business, with few resources left over for acquiring and developing AI competence. Studies indicate that European SMEs' AI competence is often inadequate, meaning that they are unable optimally harness the potential of AI.

Regional development companies have business advisors whose experience and networks can support SMEs in AI use (Figure 17). These business development companies can offer training to support AI deployment and help companies find funding opportunities for AI-based development.

We recommend that you contact a business advisor in your area and discuss these topics with them in order to turn your plans to apply AI into reality, allowing you to reap the business benefits of AI as quickly as possible. The more you know, the easier these discussions will be. This is why it is worth using the AI discussion canvas and the Empowering SMEs with Artificial Intelligence guide to prepare for them.

Business advisors and development companies help SMEs deploy artificial intelligence and find partners.

Watch the video: AI from the perspective of business advisors

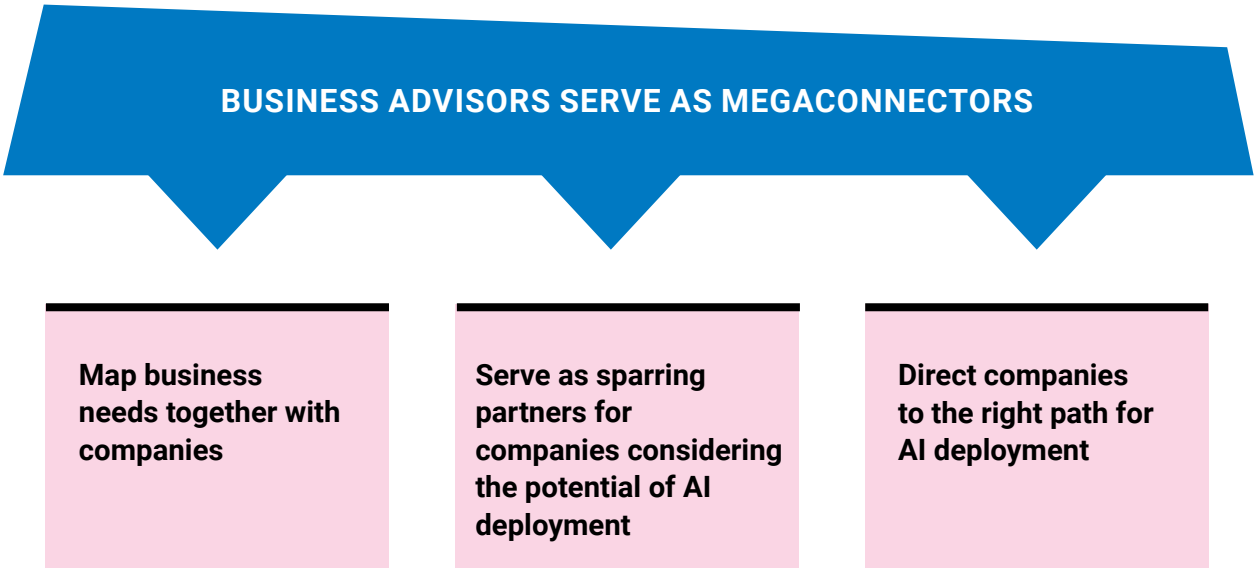


Figure 17. Business advisors' roles in discussions about AI with SMEs (Ruohonen et al. 2022).

AUTHORS:

Iris Humala, Project Specialist, Researcher, and Anna Lahtinen, Project Manager of AI-TIE, Senior Researcher, Haaga-Helia University of Applied Sciences

SOURCE:

Ruohonen, A., Ruuti, M., Saloranta, P., Asikainen, M. (2022). Yritysneuvojat megakonnektoreina tekoälykeskustelussa pk-yritysten kanssa [Business advisors as megaconnectors in AI discussions with SMEs]. Helsinki Region Chamber of Commerce, published on 13 December 2022, link.

Leverage the experiences of the business development company and advisors in your area for AI deployment

Digital solutions and artificial intelligence open up new opportunities for SMEs to serve their customers. Even small operators can use these technologies to rapidly increase their customer base, market share and profitability.

Support from experts working in regional development companies and other business advisory organisations is easily accessible when an SME is exploring the potential of AI in its business, seeking partners for an AI project, or mapping funding sources for launching development efforts. Help is also available if you are considering ways of developing your company's operations in order to respond to existing and future customer needs.

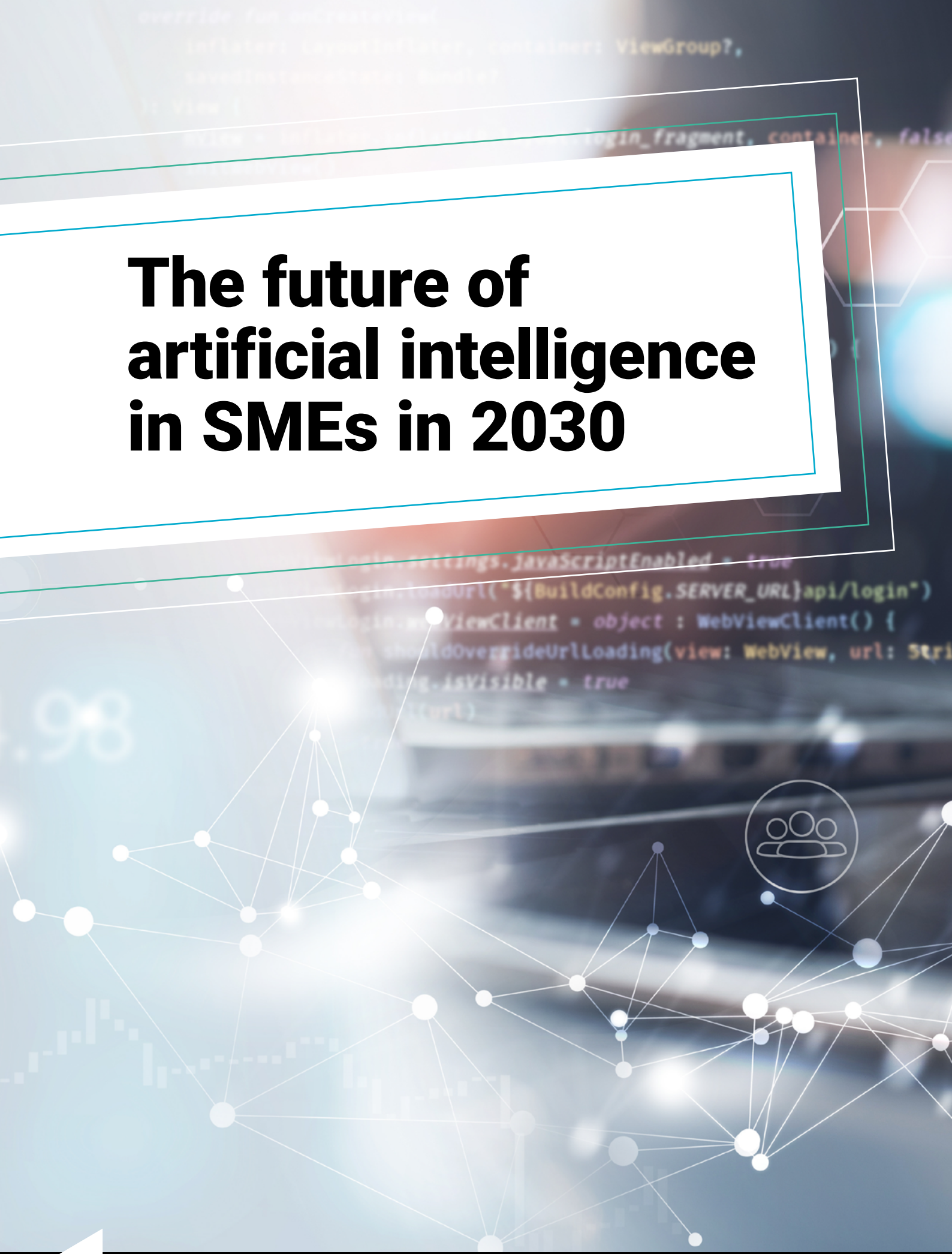
Support for partnerships and funding

Business development companies provide SMEs with information on funding and networking opportunities for developing their operations, products and services. SMEs can tap funding from regional, national and EU sources. In addition, development projects with significant growth potential and scalability may also attract private financiers, such as banks, venture capitalists and business support foundations.

Business advisors know the companies in their area well. You can rely on their help when seeking a partner for developing AI solutions or building a network to boost your company's digital capabilities to a new level. When you need to expand the network outside your area or country, a business advisor may have a suitable contact in a development company in your target area, Team Finland or another useful organisation. Get in touch!

AUTHOR:
Tuula Metsälä, Business Advisor, Kotka-Hamina Regional Development Company Cursor

The future of artificial intelligence in SMEs in 2030



Peter Vesterbacka

Game designer and business guru

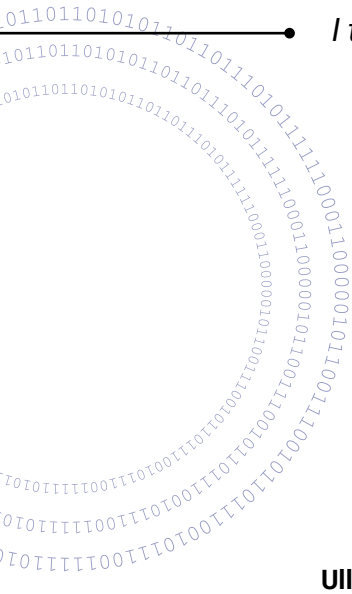
> We always must consider our limitations in whatever we do. Therefore, **we must prepare for a future in which we have unlimited computing resources**, as this is where the world is inevitably heading.

The rapid development of artificial intelligence makes long-term visualisation a challenging task that requires a vivid imagination. In a few years' time, the situation regarding artificial intelligence in society and SMEs may be very different from what it is today. In practice, any **attempts to anticipate what will happen after 2030 are mere estimates at this stage.**

However, some key trends related to artificial intelligence in SMEs are likely.

Artificial intelligence will be business as usual in SMEs

Even today, **SMEs have plenty of imagination and identified needs for brainstorming and developing AI use cases.** Companies' interest in artificial intelligence and their readiness to commit to AI experiments have also grown significantly in recent years, and the pace of this change seems to be accelerating. At the very least, this can be considered an indicator of future trends and the pace of development.



I thought that artificial intelligence was something quite outlandish and utopian. AI-TIE showed me that it is not actually that difficult. It is enough to have an interest, a willingness to develop things and an ability to network. If you want to be successful as an employee, manager and company in the future, you must be involved in developing and using artificial intelligence – and preferably at the forefront or your course will be determined by others. Every SME should invest in developing its personnel's AI competence and use suitable tools for this. We will certainly continue to do so here at Foibekartano. I want to thank AI-TIE for a well-managed entity, high-quality content and tools that work.

Ulla Broms, CEO, Foibe Foundation, Foibekartano

On the other hand, SMEs lack the in-house AI competence and expertise, which tends to be easily outsourced even when digitalisation, AI and the deployment of new technologies have helped improve an SME's overall competitiveness. By 2030, SMEs will already have more understanding and experience of artificial intelligence. At that stage, many SMEs will have realised that artificial intelligence and an ability to use it are key factors for their survival and competitiveness. At that point, I believe that many companies will have hired at least one AI expert.

At the same time, AI will deepen the gap in competitiveness between companies that deploy AI and those that have not invested in AI development. **Business models will rapidly become outdated, and many companies will fall by the wayside, leave the market, and be replaced by new companies at the forefront of digitalisation and artificial intelligence.** The Internet revolutionised retail trade, the book and music sectors and changed our attitudes towards cable TV and landline phones. Artificial intelligence will reform, destroy and create industries in a similar way. By 2030, AI-based solutions will broadly support continuous innovation in SMEs. Many SMEs will have also managed to create disruptive niche products and services that have brought them new business.

AI will affect SMEs more extensively and be relevant to a larger group than previously thought

Until recently, it was believed that AI competence development and support for AI experiments should be targeted especially at SMEs with a higher level of digitalisation and better preconditions for AI deployment. However, the trends and rapidly expanding availability of artificial intelligence show that its impacts will be greater than expected. For SMEs, this means that **all types of companies – those of all sizes and ages, located in different geographical areas and operating in different sectors – should be interested in AI**. Prioritising AI development and expertise as a strategic goal as early as possible will help companies secure their competitiveness and success in 2030.

SMEs that have already launched new AI-based products and/or services in the market (innovators) are currently a clear minority (Figure 18). The number of SMEs

that have carried out AI experiments and pilots (early adopters) is slightly higher. This growing group consists of SMEs which have mapped the potential of AI for responding to the company's business needs but which have not yet deployed AI (early majority). Roughly the same number of companies have no idea of how AI could be used in business, even if they might be interested in the topic (laggards). Many SMEs have a basic understanding of the importance of AI for developing business processes but have not applied these technologies (late majority). (Ruohonen 2021.)

However, the outlook for 2030 is different:

- An increasing number of SMEs will realise that AI plays a key role in competitiveness and survival in a changing market situation and creates a potential competitive advantage over other operators in their industries. Innovators of AI-based products and services as well as early adopters of AI solutions will
  increase in numbers.
- SMEs currently representing a late majority will move from building their understanding and knowledge of AI towards concrete experiments and AI application and target early markets.
- The number of laggards will decrease – they will either leave the market or start improving their AI competence and make progress in its strategic use.

By 2030, there will be countless off-the-shelf AI solutions on the market. At that stage, AI development will not be led by academia and research, as new AI models and applications will primarily be created in the business sector. This will be reflected as a reduced demand side gap: smart and usable AI-based solutions and pioneering products will quickly and easily cross the demand gap as they move from early markets to mainstream markets and are integrated into a larger number of SMEs.

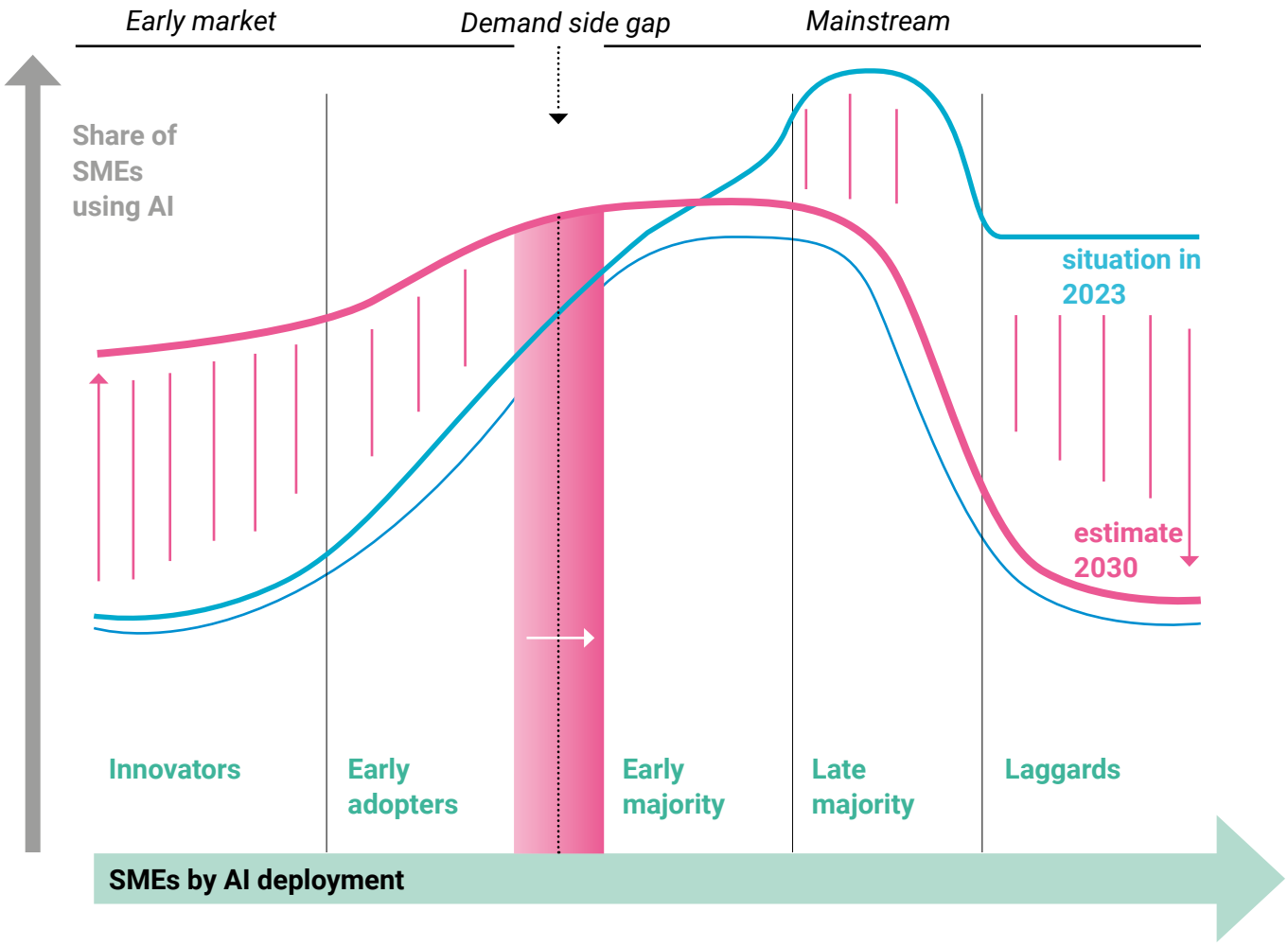
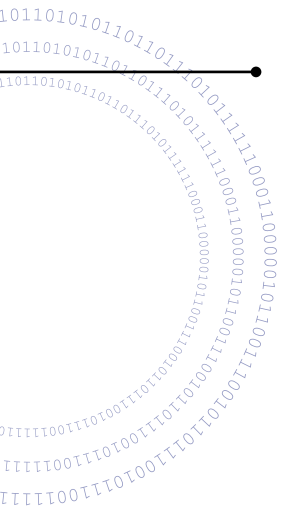


Figure 18. AI deployment in SMEs (modified and adapted here from Everett Rogers' diffusion of innovations curve)

An exponential increase in SMEs' AI success stories

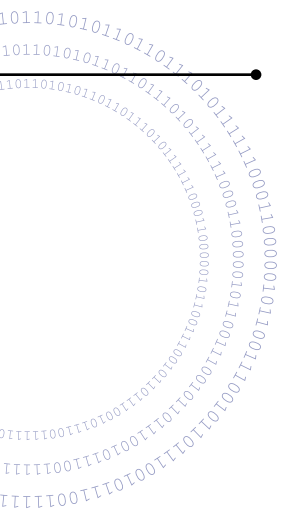
In 2030, SMEs will have learned to recognise and tap the concrete benefits of artificial intelligence. AI solutions will largely have been deployed based on needs and added value. **SMEs will expect and receive concrete benefits from AI** for their practical daily work and business. SMEs will have learned to identify and prioritise AI applications across a broad front in their operations and target AI deployment at the company's needs: product and service development, production, supply chains, quality control, IT functions, maintenance/remote diagnostics, sales and marketing, customer service, finances.

Within a few years, SMEs will have extensively seized the **opportunities of customer-oriented, tailored AI solutions** in which they face no competition from large tech companies. In today's business life, SMEs have a growing number of customers who are looking for and requesting new, innovative solutions.



While collaborating with the AI-TIE project, we found that we have a huge volume of data that could be utilised with AI. I believe that **by 2030, we will have created a convincing AI-based product and be using it at the customer interface.** *I also believe that we will have an in-house AI expert at that time; special expertise is needed, as simply understanding IT and technology is not enough for AI deployment. In 2030, artificial intelligence will be more widely used in Pharmac's operations and society at large.*

Karoliina Kaijasilta-Järvenpää, CEO, Pharmac Finland



Artificial intelligence today still raises the hackles of many people. **In 2030, artificial intelligence will be a tool that will diversify rather than reduce work. A precondition for this is a change in the professional mindsets of today, enabling AI to become a key competitiveness factor for the company by 2030.** *For our company, this has meant readiness to innovate and the courage to deploy artificial intelligence. We are currently putting the finishing touches on the deployment of our first AI solution with support from AI-TIE. This has given us an excellent starting point for learning and building a path towards new AI-based products and services.*

Sanna Kukkonen, Service Manager, Evantia

What comes after AI?

It will be too late to ask this question in 2030 – companies must seek answers to it now, while developing their business through AI and creating longer-term strategic visions.

Artificial intelligence sparks a lot of emotions and discussions but listening to all voices helps us to understand a new phenomenon. In a few years, a more solid framework will be in place for societal debate, which will shift to organised networks built around specific themes. As the discussion on AI gathers momentum and becomes more structured, it will be easier for SMEs to seize interesting opportunities and pursue them with support from networks. By 2030, we will have moved **from multi-voiced discussions to network cooperation**.

What comes after AI is defined by what we are investing in now and which trends in AI solution development are supported. AI offers diverse potential to influence climate change management, medicine, energy production, health care, education, logistics, next-generation customer experience with highly tailored solutions at its core, and many other areas.

However, hopefully the human face of AI will remain at the heart of visions for the future of artificial intelligence and companies' development work. Artificial intelligence will inevitably affect our working methods and interaction between people – **it is up to the people and companies developing AI solutions to build the type of cooperation between people and machines that will serve humanity over the longer term.**

After artificial intelligence, we will live in a society of the future. If AI could boost your work performance to the extent that you would have significantly more free time, what would you use it for? Would you prefer to ask Chat GPT or a friend for advice? Will you appreciate art created by AI and consider it equal to the works of human artists? What will man's best friend be in the future: a book, a dog or a machine? How would you like your life to look in the post-AI world?

Helsinki, 23 April 2023

Anna Lahtinen
Project Manager of AI-TIE, Senior Researcher,
Haaga-Helia University of Applied Sciences

SOURCE:

Ruohonen, A. (2021). Puhtaan teollisuuden kiihdyttämön yritysten alkukartoitus [Initial survey of companies in the cleantech accelerator]. Presentation at the AI-TIE accelerator kick-off event on 4 November 2021).

Artificial intelligence plays an essential role in boosting our company's competitiveness. Our competitors are quickly making use of the same types of AI applications we are working on. By 2030, we will know how to use AI to shape our business in a way that allows us to stand out among our competitors. At this point it remains a challenge. **At work, the bar is being raised all the time. It is no longer enough to have basic vocational knowledge and expertise; you must be assisted by technology and artificial intelligence.** *As the baseline requirements of work increase rapidly, the journey to standing out among competitors through AI is longer.*

Jesse Salonen, Head of Digital Transformation, Medfiles

The logistics sector is undergoing a transformation. What kind of fuels will we be using in 2030? *How will we manage to digitalise our document management processes by then? What means could we use to calculate emissions across the supply chain and even for individual orders? The volume of new requirements and related legislation is large. Software is being developed to resolve these challenges, and AI is an inevitable part of this development.*

Åke Lindfelt, Project Manager, Kiitosimeon

FAQs about AI for SMEs

SMEs have many questions about AI, and some of them come up more frequently than others. See below for FAQs and answers to them. These questions and answers are based on the experiences of more than 100 companies that embarked on an AI-TIE journey between 2021 and 2023.

1. **Do I and my company really need artificial intelligence?**
2. **To what extent do I need in-depth knowledge of how artificial intelligence works?**
3. **Which factors affect data quality?**
4. **How much data is enough?**
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1 Do I and my company really need artificial intelligence?

When considering your personal needs for using AI, you should understand that AI is already being deployed in many contexts and applications, even if we are not always aware of it. Examples of this include recognising spam messages, customer service chatbots, targeting of online ads and other content at social media users based on their preferences and online behaviour, and machine translations from one language to another.

You will need knowledge of AI in your work in the future, at least to some extent. This is why you should familiarise yourself with AI as you do with all new things, learn about it, update your knowledge and experiment with it. For example, you can start your learning path independently by taking the AI-TIE - Artificial Intelligence in Business online course at: www.ai-in-business.fi.

A company should always examine the need for artificial intelligence from the perspective of the business opportunities it can potentially create. You should

apply AI if you really need them, not only for the sake of doing so or because others do. First you must determine if the company has a significant business problem that can be solved by AI; the problem must be well defined and the required data must be available, or collecting it must be possible.

Many issues and business challenges can also be solved without artificial intelligence. If AI is not needed in the company's product or service, or if the data required to build and use models is not available, using AI is probably not worthwhile.

2 To what extent do I need in-depth knowledge of how artificial intelligence works?

You do not need to have in-depth knowledge about the operating principles of artificial intelligence or be familiar with the mathematics behind it. However, you must understand its operating principles and interface with your business well enough to be able to discuss the topic and its potential within the company and when ordering services and selecting partners. It is important to understand that an AI solution consists of a use case that responds to business needs, data, machine learning as well as software and hardware. Therefore, it is advisable to grasp its key concepts, including machine learning and algorithm, at an early stage.

In short, machine learning refers to the ability of a machine to learn based on repeated data presented to it and an algorithm without manual programming of rules. In practice, an algorithm is a list of instructions that describe how a task or process is performed. All computer programs and AI solutions consist of several different algorithms implemented in a programming language.

You should also know about key AI application types: supervised learning, unsupervised learning and reinforcement learning. The supervised learning method is useful when the application is expected to produce predictions. Typical business uses of supervised learning include customer segmentation based on purchasing behaviour and profiles and finding deviations in sensor signals in industrial applications. The aim of reinforcement learning is finding the best strategy and optimal decision-making to achieve the desired outcome.

3 Which factors affect data quality?

Data and its quality play a crucial role in AI deployment. You cannot develop AI solutions and the machine learning models they require without high-quality data, including text, images, tables, and numeric data. In general, data quality is adequate if the data is fit for the purpose and contains the necessary information, and its volume is sufficient for the use case. (Description/instruction: Data quality can be improved, and you can invest in it when planning business processes). It is advisable for a company to create a data strategy that defines which data is valuable for business and how it is collected, developed, and used. Various quality criteria can be used to evaluate data quality. The eight most important criteria areas:

- **Relevance.** Can the data be used to measure the phenomenon you want to measure and answer the questions you want to answer?
- **Timeliness.** An updated version of the data is available, and the data is not outdated in its use context.
- **Accuracy.** The data corresponds to what you want it to describe. Precise data contains no random errors and accurate data contains no systematic errors.
- **Integrity.** The data must contain all the necessary information needed in order for it to serve its purpose. The data must not contain too many gaps, i.e., missing data.
- **Compatibility.** The data must be compatible, i.e., collected based on the same principles and the same methods and in the same format. The data must not change too much over time (compare with timeliness).
- **Accessibility.** Access to the data and sufficient user rights are required in order to process the data lawfully.
- **Reliability.** The data may not contain significant deficiencies and errors. For example, data anomalies, sources of interference and background noise make it more difficult to analyse.

Poor quality data usually has gaps (it lacks integrity), bias (it does not describe reality accurately) and errors (inaccurate/noisy). You cannot compensate for poor quality with a high volume of data, as errors in poor-quality data may accumulate when the volume increases. Data compatibility is a problem, especially in large organisations, as the data has been collected in different units using various systems and/or in different format(s).

4 How much data is enough?

There is no straightforward answer to this question, as a sufficient volume of data depends heavily on the application and data type in question. From the data scientist's point of view, there can never be too much data. You can always take smaller, representative samples of big data if you do not wish to use all of it. From a business perspective, however, collecting more data than is necessary is not worthwhile. The more complex the model to be trained is (the more parameters it contains), the higher the volume of data you need. However, quantity never makes up for quality in the case of data.

The required volume of data is particularly dependent on the following three factors:

- **Machine learning algorithm:** the more complex the model (number of degrees of freedom), the more data is required to train it.
- **Data quality:** the poorer the data quality, and the lower the proportion of desired information compared to undesired information (low signal-to-noise ratio), the more data you will need to train the model to pick up the desired signal and act on it.
- **Type and severity of the problem:** the more difficult the problem, the more data is needed to train a sufficiently accurate model.

An old rule of thumb is that the number of data samples should be at least ten times the number of free parameters in the model. A simple linear model for regression analysis typically has dozens of parameters, whereas a neural network model for classifying images can easily have millions.

A large volume of data is required to develop AI solutions and models, especially when you start from a scratch. On the other hand, using pretrained AI models, which are necessary especially when working with audio, text and image data, means that a small volume of the company's own training data will suffice (tens or hundreds of samples). The company can artificially increase the data volume by creating synthetic data. While it can never fully replace authentic data, it usually helps significantly in training the AI model.

SOURCE AND READ MORE:

Kauttonen, J. (2023). How much data is enough for developing an AI solution?. eSignals (in Finnish).

5 How much does AI deployment cost for the company today? (2023)

The required level of AI competence and the price of the AI solution may vary significantly, because a company might use several AI programs or technologies simultaneously. Costs are incurred from the design, piloting and production use of AI solutions, maintenance and any further development needs. You should also be aware that AI coding is being productised, APIs (Application Programming Interfaces) provide more results with less work, and new software packages increasingly contain AI-based functionalities.

Resources and resource allocation are an important issue for SMEs. In addition to money, resources are needed in the areas of person-hours, development and integration of business and IT competence, data, software, technology procurements and outsourced services. The costs may also be affected by the technological solutions used by customers and stakeholders. The rate of return (ROI) on a company's AI-related investments often determines how its AI costs are allocated – and this also applies to customers if the AI service targets them.

The price of a basic experiment for testing an AI idea carried out by a data scientist is typically around EUR 7,000–10,000. In particular, costs come from converting the data into a processable format. Developing and productising an actual AI solution will cost tens of thousands of euros. However, SMEs can also produce time- and cost-effective solutions, for example, for improving internal processes or creating an improved/new product or service.

6 How do companies fund their AI pilots and development work?

AI pilots and development will take up an SME's funds and personnel resources. External funding sources include various national and EU schemes. For more information about these sources and to apply for funding, it is advisable to enlist the help of a local business development company or actors specialising in financing. AI-related funding can also be discussed in clusters of several SMEs that support joint development and the achievement of a common goal.

SMEs can benefit from participating in AI development work together with RDI institutions, including universities of applied sciences and universities, and draw on their resources and networks. RDI institutions can offer a broad range of expertise as well as services intended for companies, including AI accelerators, sparring, education that supports continuous learning, and research competence.

7 Where can you find partners for the technical implementation of an AI solution?

Finding partner companies that offer technical AI solutions is easy in Finland today. Actors such as Business Finland and the Finnish AI Accelerator FAIA maintain lists of companies operating nationally. You can also find partners for AI development in the same way as other IT partners – through recommendations and on the Internet or meet potential partners by participating in accelerators and training.

Agile and resource-efficient local actors may prove suitable partners for SMEs starting out with small-scale pilots and experiments. Local business development companies can also give you tips about other partners and will be happy to tell you more about their work. An external IT partner with expertise in IT solutions for SMEs may be able to implement AI solutions and is familiar with the local field of actors.

Approaching larger IT actors may be a smart move in the case of larger projects and consortia formed by a number of SMEs in which several companies have similar AI deployment needs.

8 What should you take into account when purchasing AI-related services?

A key problem that often arises when purchasing AI services is so-called information asymmetry, which means that the vendor knows much more about the subject than the buyer. This involves the risk of buying the wrong kind of service. Consequently, the buyer should be familiar with the basic concepts of AI and understand how it differs from conventional software. AI competence is not only exclusively technical (e.g. coding) but also strongly methodological, which is why it requires more extensive knowledge of fields like statistics, mathematics, data science and software production. You cannot always know in advance whether or not an AI service will work well for your business, because this can often only be verified in the pilot phase of the project. In any case, the AI service must be a seamless part of the company's IT environment rather than a separate application.

Some key points to consider include the following:

- Do not copy ideas directly from other IT projects or competitors as this can easily lead you down the wrong path.
- Note the partner's (vendor's) key competence areas related to artificial intelligence. Companies often have specific focus areas, including machine vision, text analysis, speech recognition or process optimisation. Make sure the vendor has experience in a field relevant to your solution.
- The range of optional solutions is wide. It is essential to understand the type of solution that your company needs.
- Explore the market to see if you can find an off-the-shelf solution to your AI problem. Applying an existing and tested AI model is cheaper than building a completely new one.
- You need to consider information security and data processing. For example, if the service provider is American and the company European, any personal data processing will be subject to requirements under EU legislation (GDPR).

9 How should an SME proceed in AI deployment?

An SME should *share information and develop understanding* before deploying AI. Sector-specific knowledge supports new openings, helping to find the correct direction and recognise opportunities. A broad understanding within the company of why artificial intelligence is being introduced, what benefits it provides and what it aims to achieve is also important. Are you striving for short-term benefits or aiming for long-term strategic objectives? Getting a good start is vital when deploying AI. In addition, you must find the right use case to ensure that the AI application will meet the need, provide the desired results and create a competitive advantage in the changing field of business.

Engaging the work organisation and management is a critical step when striving to further a new project within the company. A team that works well together, raising awareness throughout the organisation structures and work that is transparent for the organisation will support the progress of the project and joint planning. It is also worth focusing on the company's resources and ensuring that AI implementation receives enough attention, rather than being launched alongside other work. *Leadership* is often required in projects, and it also plays a key role in this case. In addition, attention should be paid to ensuring the relevant competence and the management's participation and support.

Even if launched with smaller inputs, AI implementation and experiments can have practical value for the company. Utilising the lessons learned and understanding gained in this way will make it easier to expand the deployment, develop the operations and scale up the solution. The challenge that needs to be solved may be right at the heart of the strategy, and you may be one step closer if you already have some good experiences of an excellent AI implementation.

You should keep the possibility of finding *an external partner and outside support* in mind if the company's IT resources and AI competence are limited. Many AI pilots, experiments and successful projects have been completed in the market. You can learn from them and draw on this expertise. Remember that companies operating in your field are also an option in terms of providing information and support when considering AI solutions.

10 What kind of tools could SMEs try?

Various demos are available for trying out artificial intelligence applications. These can be downloaded or used online. See below for a list of some examples that were tested in February 2023.

Online services:

- Chatbot: https://chat.openai.com
- Text-guided image generation and editing: https://openai.com/dall-e-2 , https://replicate.com/stability-ai/stable-diffusion
- Several machine vision and text analysis models: https://teachablemachine.withgoogle.com/, https://experiments.withgoogle.com/collection/ai, https://huggingface.co/spaces
- Several machine vision models: https://www.nvidia.com/en-us/research/ai-demos/
- A wide range of AI and data analytics products: https://mad.firstmarkcap.com

Downloadable programs for training your small-scale AI models:

- Weka (https://www.cs.waikato.ac.nz/ml/weka)
- KNIME (https://www.knime.com)
- Orange (https://orangedatamining.com)

Programming libraries (e.g. Python)

- https://scikit-learn.org/ (general machine learning and data analysis)
- https://keras.io/ (deep neural networks)
- https://opencv.org/ (machine vision)
- https://huggingface.co/models (NLP and machine vision)
- https://h2o.ai (general machine learning, scalable)

It is important for companies to understand that free services and trial versions of commercial programs are only intended for small-scale experiments. They are not suitable as production solutions for the company's day-to-day operations. Free versions usually contain no data protection functionality for data processing. Consequently, processing and analysing confidential data in these services is not recommended under any circumstances.

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Publications relevant to the theme

20 March 2023 From Relatable Stories Towards AI Ecosystems – The European Business Review

10 October 2022 AI and medtech ecosystem in Finland – opportunities for SMEs – MedTech Insights

22 May 2022 Innovation Ecosystems as a Source of Renewal for Innovative Enterprises – "Innovation", Routledge Series on Ideas in Business and Management

20 October 2021 Artificial Intelligence Empowers the Competitiveness of Cleantech and Healthtech SMEs — Helsinki Smart Region

31 August 2021 Finnish project to boost adoption of AI at SMEs — Good News from Finland

20 August 2021 Finnish project aims to boost adoption of AI-based solutions — Health Care IT News

18 August 2021 Artificial Intelligence driving competitiveness in SMEs. The new RDI project develops collaboration to support the Finnish AI Innovation System — Health Capital Helsinki

11 August 2021 AI-TIE – AI Technology Innovation Ecosystems for Competitiveness of SMEs. The new RDI project develops collaboration to support the Finnish AI Innovation System — Haaga-Helia University of Applied Sciences

AI stories of companies participating in the AI-TIE accelerators in blogs, video podcasts and company videos: https://www.aistories.fi