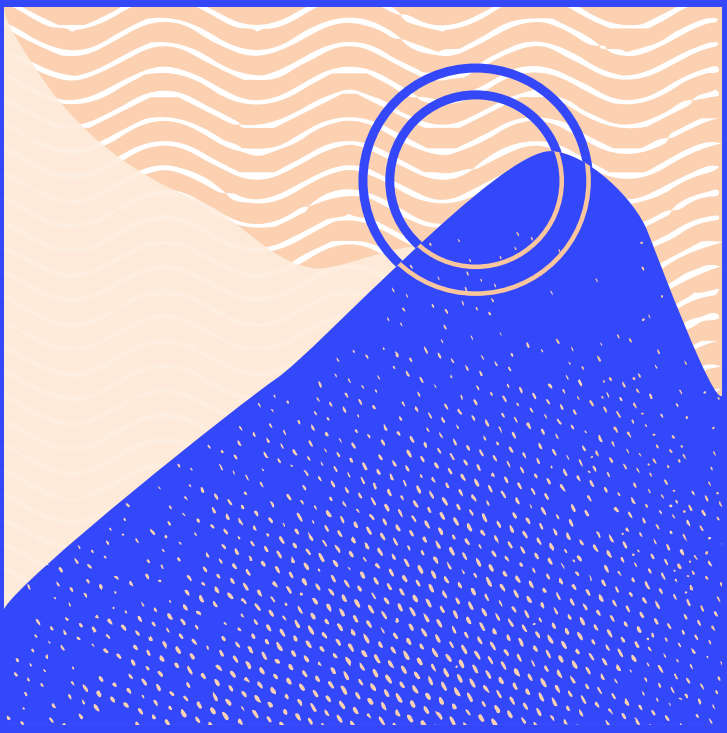
Finland's Artificial Intelligence Accelerator

FAIA

AI PLAYBOOK



HOW TO GET STARTED WITH AI - AN ORGANIZATIONAL GUIDE

FINLAND'S AI ACCELERATOR FINLAND'S AI ACCELERATOR

This guide is based on the activities of Finland's Artificial Intelligence Accelerator, FAIA. The guide would not exist without the open-minded attitude of KIRAHub, Silo.AI, the Building Information Group, Granlund, the AINS Group and BST-Arkkitehdit towards sharing information and learning together.

Finland's Artificial Intelligence Accelerator

FAIA

Getting started with AI - An organizational guide, published on 30th of June 2020

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FINLAND'S ARTIFICIAL INTELLIGENCE ACCELERATOR

FAIA helps organizations utilize artificial intelligence by facilitating accelerator batches based on common themes.

A common theme can be a general-purpose technology that can be utilized by many organizations, such as speech recognition (for which you can download a guide here), a certain specific focus area, such as predictive maintenance, or the similar maturity level to utilize AI, as is the case with the Basics of AI accelerator batch this guide is based on.

All batches are private and the work is conducted in groups, relying on peer support and knowledge sharing.

OUR PROMISES:

1. Your organization's ability to learn accelerates
2. You will understand what operational deployment of AI requires
3. You will avoid common mistakes, be able to share your successes and learn in a group
4. You can trust that the service providers are approved by a neutral party and represent the most prominent AI companies in Finland.

Interested in working with us? Service providers, academia, as well as organizations deploying AI are all welcome. >> Contact.

[1]FAIA, short for FInland's AI Accelerator

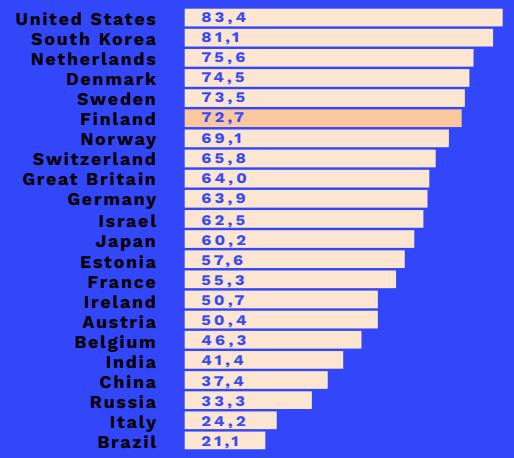
FAIA is established and run in cooperation with the Ministry of Economic Affairs, Technology Industries of Finland and Silo AI.

ARTIFICIAL INTELLIGENCE IN FINLAND

According to a study commissioned by Finland's Artificial Intelligence Accelerator, in 2019 there were slightly over one thousand companies in Finland developing and utilizing artificial intelligence. It is around 2.4 percent of all companies with more than five employees. The number grows if you include all companies that have conducted small-scale AI experiments, but all in all, the sluggishness of Finnish companies in the utilization of AI is **worrisome and surprising**.

Why should we be worried? The sluggishness in getting started does not only impact AI – it is a much wider problem extending to companies' overall (un)desire to reform operations through digitalization. Surveys of the digitalization of companies and the society show similar trends – Finland has good prerequisites (infrastructure, educational level, etc.), but poor results. For example, the results of the Digibarometer 2019 by Etla Economic Research show that the effects of digitalization on Finland's economic growth are falling behind the reference countries. Sitra's corporate survey found that the attitudes of Finnish companies towards digitalization are more negative than in other European countries. This is reflected by the absence of investment in digitalization.

The digital divide, meaning the gap between those with skills and those who have been marginalized from everything digital, is often mentioned in discussions of the citizens' everyday IT skills. **This same digital divide can be seen in companies.** According to a study by the Suomen Yrittäjät, the companies that have already invested in digitalization are



Digibarometer. Effects (all sectors).

When it comes to the overal effect of digitalization, Finland is only sixth after the United States, South Korea, the Netherlands, Denmark and Sweden. Brazil, Italy and Russia are srewards.

Figure 1: **The effects of digitalization in Finland do not correspond to the good prerequisites we have. (Digibarometer 2019)**

more likely to invest more compared to those still considering making their initial investment. The companies that have already invested are continuously learning, whereas those who wait for the hype to calm down remain stagnant in their learning, fall further behind, and may never reach their international and domestic competitors who got into the swing of things in time.

This is why the deployment of AI in companies should be thought of more as a continuous learning process rather than point investments. When evaluating the profitability of AI projects, one must also take into consideration the increase in understanding, learning, and their impact on the company's competitiveness – Return on Learning (ROL). ROL is indeed a better, or at least important, complementary metric next to the traditional Return on Investment (ROI).

Why is the sluggishness of Finnish companies in the use of AI so surprising? Finns are interested in AI. The ambitious objective of the internationally recognized Elements of AI course implemented by the University of Helsinki and Reaktor was to get one percent of Finns to become familiar with the basics of AI. The free online course was launched in May 2018 and already exceeded its objective at four months. Now, more than 100,000 Finns have already become familiar with the basics of Artificial Intelligence by taking the course.

Thus, it is certain that the number of people who are interested in AI or have taken the Elements of AI course goes beyond the thousand companies that already utilize AI. Companies need these kinds of skilled people who are able to ramp up AI activities. You, reading this guide, could be this person. **Where Elements of AI has successfully spread the basics of AI amongst individuals, this guide aims to share the basics of AI from the perspective of organizations.** The guide is intended to support those who are among the first enthusiasts within their organization.

THIS GUIDE AIMS TO SHARE THE BASICS OF AI FROM THE PERSPECTIVE OF ORGANIZATIONS. THE GUIDE IS INTENDED TO SUPPORT THOSE WHO ARE AMONG THE FIRST ENTHUSIASTS WITHIN THEIR ORGANIZATION.

ONE INDUSTRY IN TRANSITION

The contents of this guide heavily focus on the learning and observations identified during FAIA's accelerator batch designed for the Real Estate and Construction Sector (RECS). As a sector, RECS is interesting: gigantic in size and impact, but low in productivity and (almost) stagnant in R&D investments. To the eye of an outsider, this seems like a challenging spiral: rapid renewal would be needed, but easy and cheap means are not necessarily available.

In the summer of 2019, FAIA and KIRAHub investigated the current state of AI application in the Finnish Real Estate and Construction Sector. Forty plus companies shared their view of the state of AI in the sector. The capabilities of the companies in the sector to utilize AI are significantly divergent from each other. The forerunners have been collecting and developing their own data resources, with functional AI solutions already intact. However, a majority of the companies in the sector are only now taking the first steps on their AI journey.
During its activities, FAIA has already noticed that organizations - not limited to just the RECS - generally have two clear thresholds regarding the utilization of AI:

(1) understanding the business opportunities of AI, and
(2) deploying AI solutions from experiments to wider use.

According to the survey a majority of RECS companies are still mainly wrestling with the first challenge instead of the second. This is why FAIA assembled a Basics of AI accelerator batch for actors in the RECS.

The observations found during the batch are presented in this guide and serve all organizations still in the early stages of AI development regardless of their sector. The initial challenges are very similar: accumulating basic understanding, collecting and evaluating ideas, handling expectation management, internal sales work, and finding a common language.

THERE ARE TWO CLEAR THRESHOLDS REGARDING THE UTILIZATION OF AI:

1) understanding the business opportunities of AI, and

2) deploying AI solutions from experiments to wider use

AI IN ORGANIZATIONS

In everyday use, analytics, machine learning and artificial intelligence mean roughly the same thing. This has led to a situation where a significant portion of an individual's time is wasted on arguing whether something is “AI” or not. The definitions do not really matter when viewing the phenomenon with a wider perspective: **AI is basically data utilization (and part digitalization)**. AI is currently the talk of the town, but as more and more solutions become mundane, the discussion volume dies down.

When taking the first steps with AI, it is common to view it through “AI goggles”, easily overemphasizing technology, data, algorithms and machine learning models. In reality, only a fraction of time in the development work is spent on developing the actual machine learning model or code, with the majority of time spent on everything around it: collecting, cleaning and processing data, building integrations, etc.

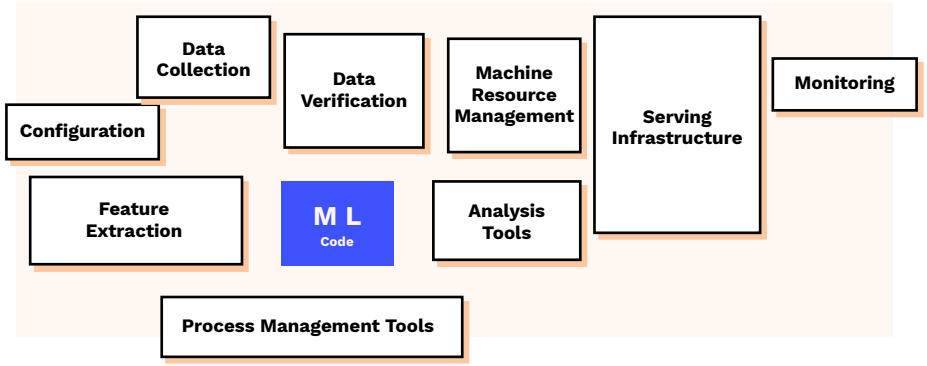


Figure 2: **Only a small portion of AI solutions consist of actual machine learning code and models (the small black box in the middle of the picture), while the surrounding infrastructure is extensive and complex. Source: Sculley et al. 2015., Hidden Technical Debt in Machine Learning Systems.**

Indeed, it is the first realization of many organizations that there are rarely ready-to-use off-the-shelf solutions for the problem at hand.

Machine learning is therefore only a small part of practical AI solutions and at the organizational level, AI should be viewed from an even larger perspective. AI solutions tend to require legal and contractual expertise, they tend to change some processes and thus the way of working, which means that a lot of energy is usually put on getting people on board and familiarized with the new. In some cases, AI can even impact the overall business models (usually leaning towards services). Putting all this together gives you the overall picture of AI which is so much more than just technology, data or computing power. The best end result can be achieved when AI is not viewed as a separate phenomenon but as **part of the organization’s core processes and normal product development.**

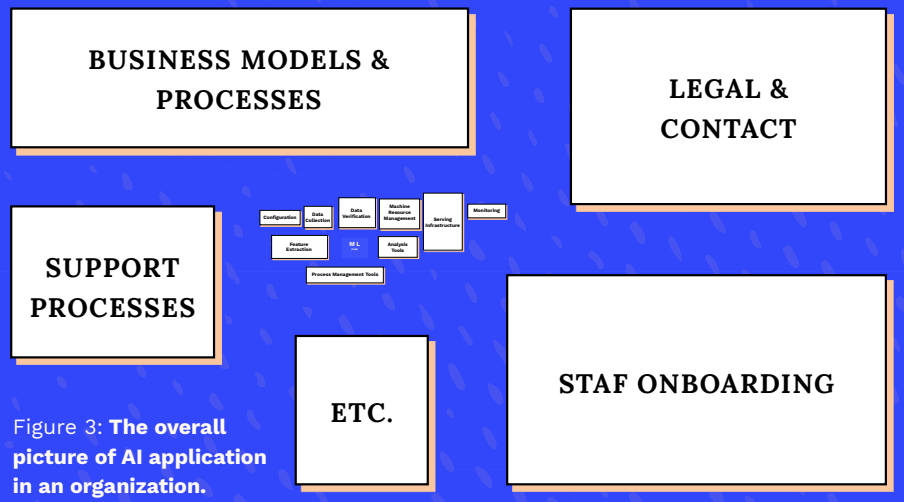


Figure 3: **The overall picture of AI application in an organization.**

AI AS PART OF THE NORMAL PRODUCT DEVELOPMENT

You should have great reservations about AI sales pitches promising a huge improvement in efficiency with just a few weeks of development work. According to statistics published by the business magazine Forbes, in the US only one in ten machine learning projects go past the pilot phase. There is no reason to believe that the situation in Finland would be significantly better. The reason for the experiments dying out is that too often, AI is thought of as an external phenomenon instead of being a part of daily product development and core processes.

From the perspective of AI, the core activities of the organization are the most interesting. The reason is simple: **it is much easier to automate or increase intelligence to something that exists rather than the other way around.** As a result, gradual, managed improvements such as more efficient inventory management or more accurate quality control processes are good development targets.

The implementation of AI solutions requires special expertise, such as expertise in natural language processing, which is rarely possessed by organizations. The lack of expertise gives an easy excuse to not start utilizing AI. This is a common misconception: a bakery does not need to have the best oven builder on its payroll, it needs the best baker. If the oven breaks down, a repairman is called. Only after the bakery has enough ovens should they consider hiring their own repairman. The same rule also applies to AI solutions: you may need external expertise for a while, but you must permanently understand for what purposes data, analytics, AI and automation can be utilized in your business. This understanding cannot be outsourced.

The biggest driver of successfully deployed AI solutions is not an AI expert or data scientist, but a good product owner. The product owner (regardless of the title) is a person in the company whose role is to know the business, the product and the customers. They do not think of AI as a separate opportunity, but as part of daily product development and processes. In order to succeed, the product owner must understand the basics of AI.

THE BIGGEST DRIVER OF SUCCESSFULLY DEPLOYED AI SOLUTIONS IS NOT AN AI EXPERT OR DATA SCIENTIST, BUT A GOOD PRODUCT OWNER.

GETTING THE BASICS IN ORDER

The three largest challenges slowing down the utilization of AI in organizations are: (1) deficiencies in staff competence, (2) imperfect understanding of the benefits of AI, and (3) problems related to the quantity and quality of data. Plenty of high-quality material has been written about all of these issues. The following links provide help in meeting these challenges.

STAFF COMPETENCE

Managing the basics of AI at a level that does not require a deep understanding of the technology should be part of common knowledge in companies. Knowledge of general-use AI technologies helps to understand where AI could be useful and what the limitations of the technologies are.

Do you know the basics of AI? The free Elements of AI online course developed in Finland provides a good basic understanding of how AI works. Discussions within the organization are much easier if the participants have at least Elements of AI or equivalent knowledge as their starting level.

What does AI look like and feel in practice? This visualized and explained example of a simple classification algorithm helps you understand how AI models work. You can try out creating an AI model without any coding skills using Google's Teachable Machine tool.

Do you recognize the ethical issues related to AI? The ethical and responsible utilization of AI has been a widely debated topic. You can familiarize yourself with the subject by reading the materials listed on the Ethics Challenge page of the AI Finland project as well as ethical principles published by companies.

UNDERSTANDING THE BENEFITS OF AI

Machine learning can be used very diversely in different applications but it needs a clearly framed problem in order to work. In the application of AI, particular attention must be paid to the clear definition of the problems that need to be resolved.

Do you understand the benefits of AI for business? You can get started by familiarizing yourself with The Executive's AI Playbook by McKinsey as well as articles on the real-life benefits of AI and AI utilization strategies.

Do you know examples in your industry? Doing a Web search for "AI use cases" + the name of your sector is a good start. You can find examples of the utilization of AI in different industries in, for example, the database published by Emerj and McKinsey's Discussion Paper (in particular, see p. 23 Exhibit 6 and p. 42 from Appendix A).

Can you frame problems so that they are solvable by a machine? Google's course on framing the problems to be solved is a good starting point.

Do you know the Finnish AI field? FAIA's AI landscape updated biannually lists the best companies in Finland that are particularly focusing on AI.

QUANTITY AND QUALITY OF DATA

The sufficient quantity and quality of the available data will allow problem solving with the help of AI, while shortcomings in these limit the possibilities. Often, more than half the time in an AI project is spent on data. Knowing your own data capabilities is key for all organizations planning to utilize AI.

Do you know what data your organization collects and how? Is the data structured or unstructured? Does your organization have a data strategy? Here is a good article on the journey of data from collection to utilization by AI.

ARTIFICIAL INTELLIGENCE AND DATA

With current methods, AI needs data to function. The quality and quantity of data are emphasized because AI learns from the data entered into the models. It is this learning aspect that distinguishes machine learning from traditional programming. In traditional programming, the rules are created by programming: data is entered into the software, which it processes on the basis of the pre-programmed rules, and a result is produced. A monthly sales report works as an example: the sales data is entered, the software processes the data according to the programmed rules, and generates a report on sales transactions as a result. Editing these rules or processes always requires action by the software developer, i.e., a human.

Machine learning, on the other hand, means a machine's ability to learn from data, without explicit programming. A machine learning algorithm is trained by feeding it large amounts of training data, which also indicate the desired result. For example, the training data for an image recognition algorithm could comprise X-rays taken during a cancer screening, where the X-rays have been analyzed by an expert and classified according to whether or not tumors are detectable in them. The algorithm adapts based on the teaching data, finding the rules based on which it can later work with new data as well. These rules do not therefore need to be pre-programmed like in traditional programming. In the case of the cancer screening example: once the algorithm has seen enough sample X-rays from both healthy and sick patients during the teaching phase, it has learned to identify features of the images that indicate tumors and will, in the future, be able to analyze corresponding X-rays and classify them on behalf of a human.

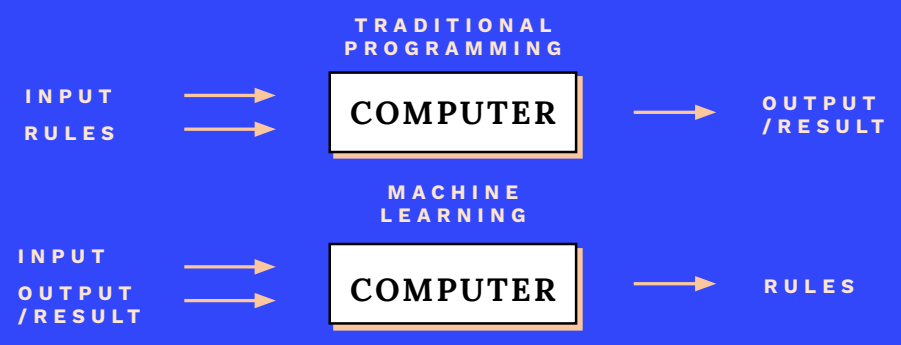
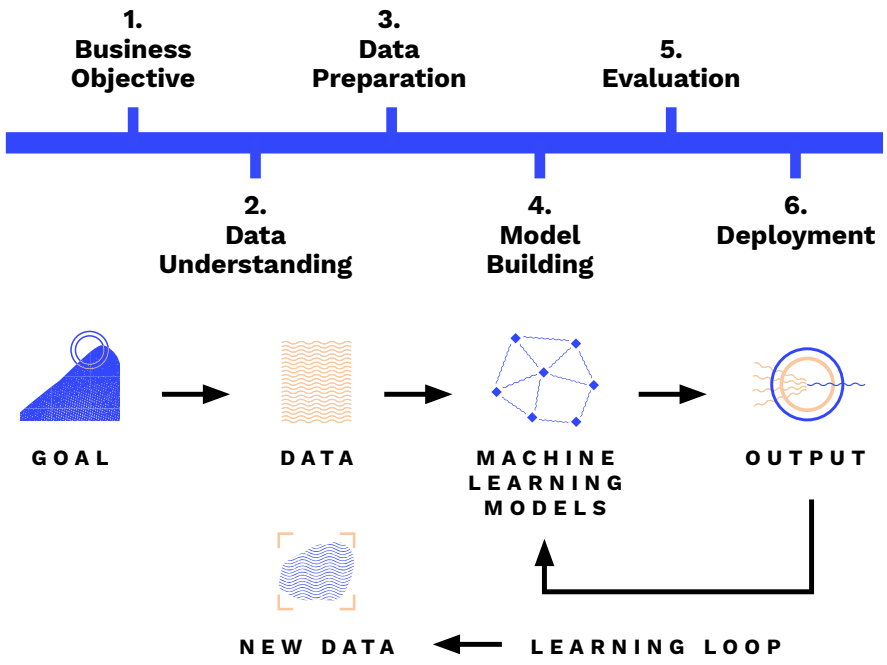


Figure 4: **An illustration of traditional programming and a machine learning algorithm. The difference between traditional programming and machine learning.**

The available data is often not suitable as such for machine learning models. In the above-mentioned cancer screening example, the X-rays do not in themselves help the model to identify tumors; this requires images classified by experts, indicating whether or not they contain tumors. This type of data is called labeled data. Data labelling is often a laborious process that increases the price of the machine learning project as labelling needs to be done by specific domain experts. In some cases, the labeling can be outsourced, but seldom completely. Producing labeled data is easier if a so-called learning loop is built into the AI solutions, which means that people can label data in the user interface during the use of the application, allowing the interpretation ability of the machine learning model to gradually improve in time.



Because of the importance of data and data quality in the implementation of machine learning systems, it is commonly also the first stumbling block. It is good to be aware of data-related needs when starting to think about the possibilities your organization has for utilizing AI. The implementation of the first AI applications often involves the need to implement organizational practices for the collection, storage and management of data (so-called data infrastructure). When an organization has a good understanding of its own data reserves and their usability, it will be much easier to move on to the next step in implementing AI: identifying a good AI use case.

Figure 5: **An AI solution from a data perspective. Data preparation and classification is often a laborious process, for which reason a learning loop should be built into the solution, allowing data labelling also during use.**
Source: **Silo.AI.**

THREE DATA POINTERS WHEN STARTING WITH AI:

1) Identify your data reserves and understand what kind of data is valuable

2) Start collecting needed data

3) Don't be too fancy, sometimes a simple non-AI solution can offer a way to collect data.

IDENTIFYING USE CASES FOR AI

WHAT MAKES A GOOD USE CASE

Finding the most suitable use cases for AI usually requires two types of expertise – that of the product owner and that of the data scientist – because the organization's processes, products and customer knowledge must be in line with technical understanding of what is achievable with AI.

You should always start with the problem instead of the solution. Evaluate various ways of solving the identified problems and **treat AI as one possible solution**. If the identified problems meet the following criteria, you are on the right path in utilizing AI:

- ☐ The problem is business-oriented
- ☐ It is valuable enough (Note: learning is also valuable!)
- ☐ The problem can be solved with AI – it is well framed, and the necessary data is available or collectable
- ☐ The solution has a clear product owner (see page 15)

The selection and success of the first AI use cases are of great importance. Even if the technical implementation is successful, if the first experiment does not generate added value, it will fail to inspire the organization to further investments and may even lead to increased skepticism towards AI. For this reason, it is wise to choose a use case that generates immediate value when deployed. When looking at the possible problems to solve there are different levels within the organization's operations that tends to be easier to start with:

IDENTIFYING USE CASES AT DIFFERENT LEVELS IN THE ORGANIZATION

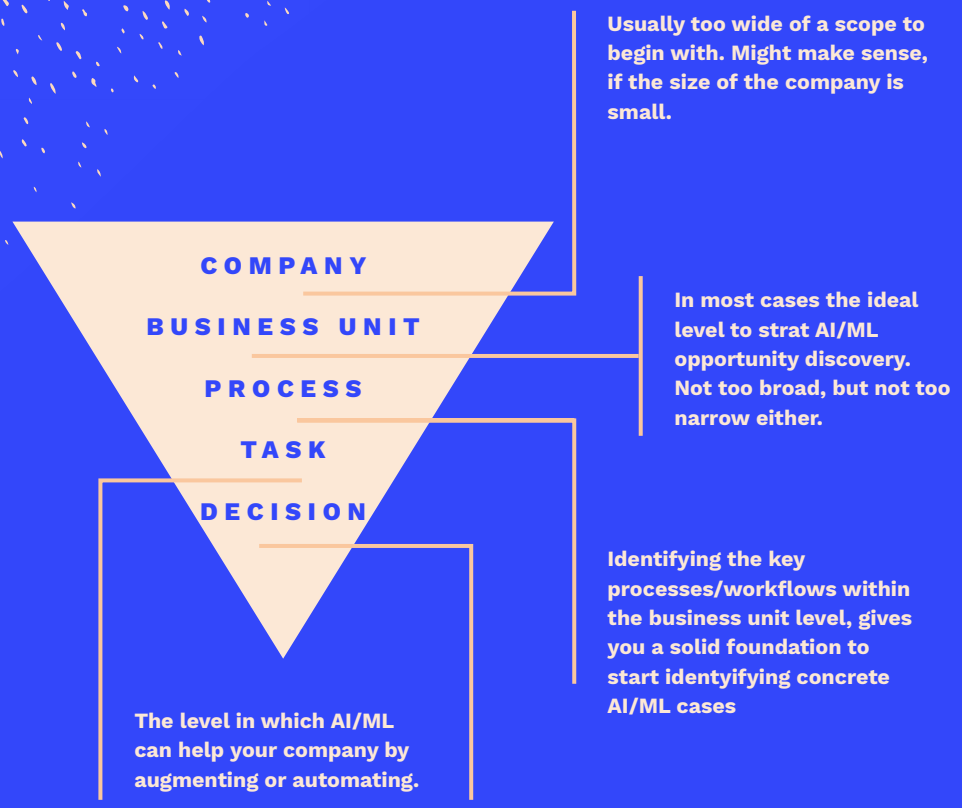


Figure 6: **At what level in the organization's operations most benefits can be obtained with machine learning.**

Once you have found a good use case, describe how the (AI) solution should work and what the ideal outcome would look like. What is the added value of the solution and how will the customer or end user benefit from it? Next, you should develop metrics that define the criteria for success. Evaluate the type of data you have available to train the AI model. Can data be utilized as such, how and at what cost? Which parties form the key stakeholders? Who is the end user? What kind of interfaces and integrations are required? As you can see, there are a lot of open questions. You can use the "AI Solution Canvas" (pictured below) for this purpose. When you use the same canvas for each use case, you can quickly see what will work and what will not.

AI SOLUTION CANVAS

Figure 7: **AI Solution Canvas. You should start filling in the canvas from the middle and then move from left to right.** Source: **Silo.AI**

HOW

Data
What data is going to be used here?

Value Proposition
What are we trying to do for the customer/end user?

Stakeholders & End users
Who are the key people for the project?

Processes
What processes do we have? Are we able to automate them?

Metrics
How do we measure the performance of the solution?

Interfaces
How do end users interact with the solutiion?

WHAT

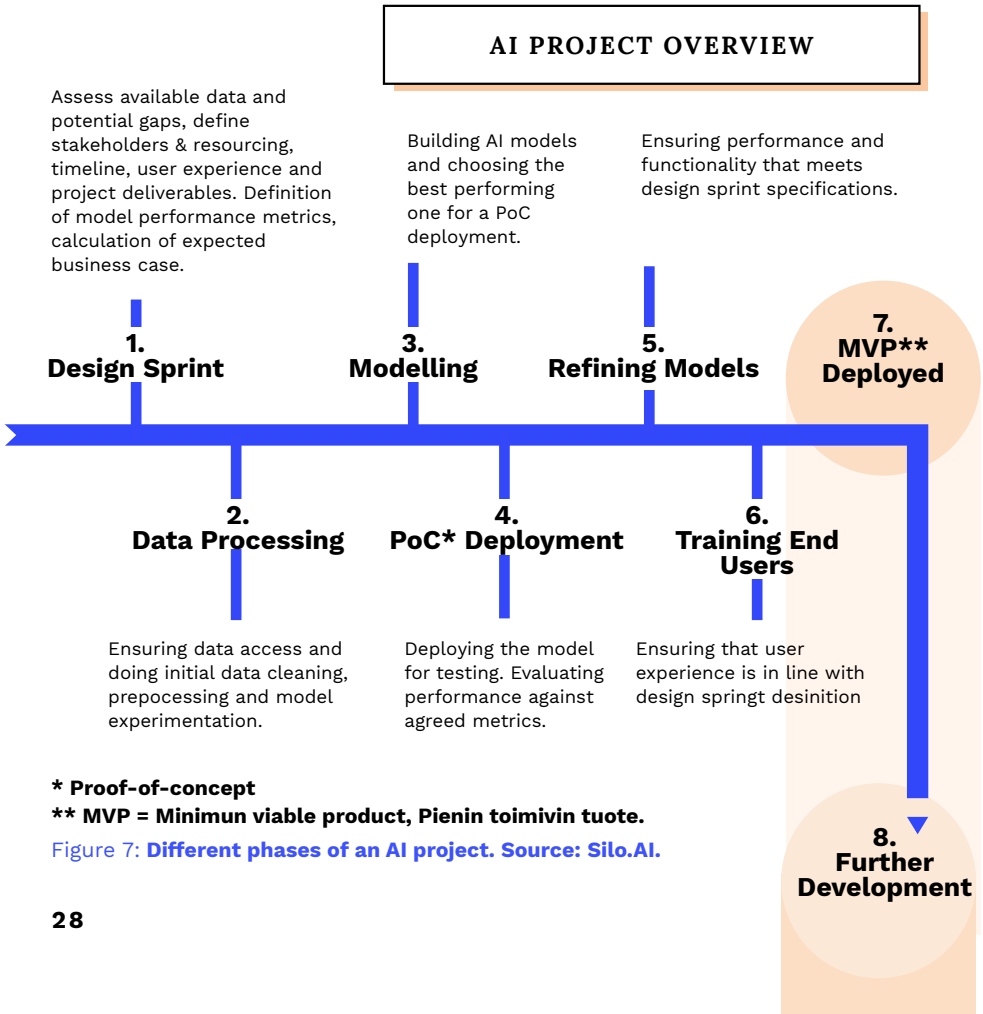
Points
What obstacles are there for the solution to be implemented?

Gains
What will we get, if the solution is implemented?

WHY

LAUNCHING AN AI PROJECT

An AI project includes many phases: from the design sprint to testing and deployment (*see Figure 7 Different phases of an AI project*). The previously introduced AI Solution Canvas serves as a good basis. AI Projects are typically iterative, going back and forth between different phases. As a whole, projects comprise of data, machine learning models, code and people.



*** Proof-of-concept**
**** MVP = Minimun viable product, Pienin toimivin tuote.**

Figure 7: **Different phases of an AI project. Source: Silo.AI.**

PEOPLE ARE AT THE HEART OF EVERY AI PROJECT.

Data processing

In its current form, machine learning is mainly supervised learning, which means that the model learns from examples. In order for the model to be able to distinguish the correct examples from the wrong ones, the training data must contain different examples, both positive and negative. If you want to train a computer vision model to detect product defects, you need to have enough examples of different defects in products and, correspondingly, examples of flawless products.

Loads of data collected within a short period of time will not, in some cases, do the trick either. This is emphasized in cases where, for example, there are seasonal differences, such as temperature changes or differences in consumer behavior. In such a case, you should have enough data from several years to enable the model to take seasonal variations into account.

It takes time to collect and process data. As explained in the previous chapters of this guide, the labeling of data may be laborious and costly if the processing requires the input of several experts (such as a radiologist). Therefore, it makes sense to map the organization's data reserves at the early stages of the project.

Testing the AI models

Testing is one of the most important project phases, as it gives a realistic idea of what can be achieved with current AI models. This often leads to a more detailed scoping of the use case or a re-examination of the problem.

Preliminary training data can be used to perform quick tests on the performance of different machine learning models, but when making a final assessment, it is always advisable to use genuine historical data for testing. The accuracy requirements for the model vary, depending on the use case and the available tools. In some cases, 60% accuracy may be sufficient. Such a case could be, for example, anticipating whether a parcel will be delayed. In other cases, however, the 60% probability is totally inadequate, such as in the reviewing of legal contracts.

The development of a machine learning model can be an iterative process, because identifying the model's flaws helps understand the additional features that need to be introduced into the solution. You will also obtain information on what you should exclude. As a result of the testing, you will be able to define suitable metrics for assessing the success of the (rest of the) project.
Additionally, it is good to keep in mind that the model introduced is never a static solution; in order to become smarter and able to adapt to possible changes in the process, the model should constantly learn from all new data. Feedback loops are valuable as they allow the continuous development of the model.

People define, build and use AI

People are at the heart of every project. In addition to a good product owner, technical expertise is needed, but not necessarily always found within the organization. Fortunately, that is not mandatory. Using external experts may be easier, especially if the need is temporary. The technical experts should have expertise in IT capabilities and machine learning modeling, as well as an understanding of the implementation of an AI solution. See below what type of expertise you should have at which phase of the project:

It is important for technical experts to understand the use case in detail, and it would be beneficial if they have experience of different kinds of AI models in order to choose the most appropriate model for the case in question. In addition, the AI project team must have access to domain-specific data related to the final solution in order to ensure that the model is learning the right things.

A successful AI project often requires cooperation and communication between many people. The responsibility of the product owner and the roles of the end users are emphasized. The end users should be involved already in the design phase of the solution. The user experience must be intuitive and pleasant. End users are often the party ultimately responsible for the further development of the solution; they must be able to trust the solution and understand the added value the solution brings.

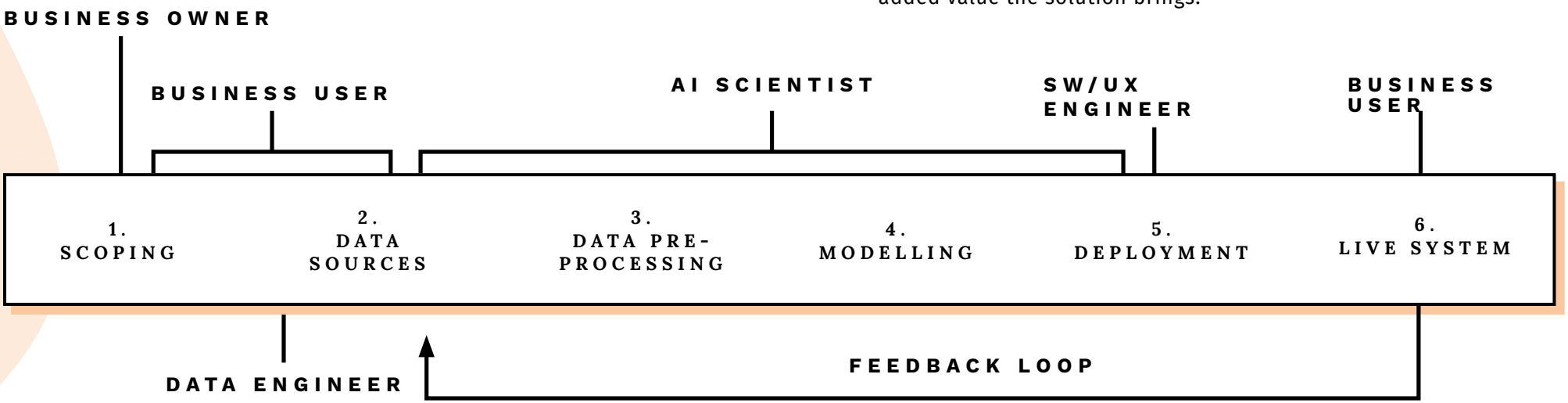


Figure 9: **Expertise during an AI project. Many kinds of expertise and cooperation between different experts are required during the project. The image above attempts to depict the need for expertise at different phases of an AI project.** Source: **Silo.AI.**

RESULTS AND LEARNINGS FROM THE ACCELERATOR BATCH

Below is a short description of the projects and observations from the organizations who participated in the accelerator batch. Although the organizations in the batch are from a single sector, the observations presented in this guide serve organizations regardless of their sector.

BST-ARKKITEHDIT: A TOOL FOR DATA MODEL STANDARDIZATION

BST-Arkkitehdit designs high-quality architecture based on customer needs.

The contents of data models produced during building design are not standardized, and the requirements on the data contents vary depending on the partner and the project. This causes compatibility issues, and converting data to different needs is difficult or even impossible.

As a solution for the problem, BST-Arkkitehdit is building a nomenclature for building components. Based on the common nomenclature and characteristics of the building component, such as its material, dimensions and location, the components can be automatically identified and classified in different systems with the help of machine learning. For example, a door used in a plan is classified automatically as a hatch because of its size and mode of use. The automatic classification allows each project party to use its own practices, but the data model can still be modified to serve budgeting, construction or maintenance, to name a few examples.

OBSERVATIONS

1 AI is not currently suitable for visual problem solving - design work will continue to be human work.

2 Teaching AI requires a large quantity of standardized and machine-readable data. There are a lot of building floor plans available, but training the solution to understand different types of building plans fragments the materials into small sets. As a result, an insufficient amount of data is available for teaching purposes.

3 AI can free up resources from repetitive routine work for more useful and meaningful work. The AI classification eliminates the need for manual data entry. This is helpful as classification data entered manually is prone to errors. The data contents of models can be harmonized on the national level which will remove barriers to data transfer and improve the efficiency of the real estate and construction sector in all aspects.

AI is suitable for repetitive and laborious tasks that do not require the special expertise and experience of a designe" *– Sergej von Bagh, CEO, BST-Arkkitehdit Oy*

BUILDING INFORMATION: CUSTOMER INTELLIGENCE BEFORE ARTIFICIAL INTELLIGENCE

RAKENNUSTIETO

Building Information Ltd and its parent company, the Building Information Foundation RTS sr, is a value-based public utility institution that promotes construction practices through guidelines, digital information and services.

During the accelerator batch, Building Information prepared a first version of a roadmap to AI utilization in order to understand how the opportunities of machine learning should be approached as an organization, and what would be the most suitable first applications for them. At the same time, the staff was brought up to the required basic-level competence in order to be able to proceed in the implementation of the roadmap.

Building Information Ltd is a data producer and data distributor, and their key AI-related possibilities lie in the structuralization of textual data. Perhaps the most well-known service of Building Information is the comprehensive RT Building Information file. Converting the contents into a structured, digital format presents a huge opportunity for the entire construction industry.

OBSERVATIONS

1 **Customer intelligence first.** Projects where AI could be utilized should be framed through customer needs. The outputs must be useful – people want to do useful things.

2 **Technology is not the determining factor.** Modern technology offers good solutions, but you can start with just a pen and paper. What's important is that you start doing things with other players.

3 **Eyes on the horizon.** A lone pilot project easily withers after it has ended and its benefits may not necessarily be realized. A successful project proceeds from a pilot to the production phase.

4 **Understand your data capital.** AI is a compilation of algorithms that feeds on data. It is important to see how AI can be fed and understand what needs to be done with the data so that it can be utilized as the basis for machine learning.

"Utilizing automation in the built environment is intriguing; there is a lot of data, and even small acts have the potential to bring about a major process change. However, we learned that the development race is not won with artificial but customer intelligence. Start with the customer needs and involve the solutions and technology only after the needs are crystal clear." *– Tommi Arola, Research Director, The Building Information Foundation RTS sr*

THE AINS GROUP: AI FOR THE EVERYDAY LIFE OF ENGINEERS

A-INSINÖÖRIT

The AINS Group is one of the largest construction engineering and consulting houses in the Nordic countries.

During the accelerator batch, the AINS Group developed a model to better predict costs, resources and resourcing of engineering projects. The idea is to estimate costs, resources and schedules in different phases of projects, starting with tendering and proceeding to both engineering and implementation phases. The chosen application for AI is directly linked to the company's main business and processes.

The key data comprises building models and architectural plan views from which the complexity of the site can be inferred. In addition to these, data related to the location and the purpose of the building are needed. The data has been accumulated from the previous projects of the AINS Group.

As a first step, a light-weight data analysis was built to show if there are major deviations between previous implemented plans and the project plans at hand, showing in concrete terms whether a project can be implemented as such or whether it should be returned to the engineer's table.

OBSERVATIONS

1 Obtain information on the basic AI technologies and their application, also outside your industry.

2 Identify which data is valuable. Are you collecting it systematically?

3 Have open discussions about AI within your work community with people in various positions. The similarity of their challenges and wishes may surprise you.

In the real estate and construction sector, AI tools provide means to aim for higher goals. The most important of these is the smoother everyday life of people" *– Pieti Marjavaara, AINS Group*

GRANLUND: AI ASSISTED CONTRACT COST CALCULATIONS

Granlund is a strongly growing group of companies that specialize in the construction and real estate sector.

Granlund aims to improve contract cost calculations by estimating the numbers of various building technology machineries, materials and space requirements already at the tender stage, before any site specific implementation-level planning or data modeling has been done.

Granlund has extensive data resources comprising both architectural models and machineries as well as materials data models from previously completed projects from a period of over ten years. By analyzing and combining this data, a statistical calculation model was created that allows the engineer to easily estimate quantity data for a new site (e.g. metrical amounts of ventilation ducts) in order to support costing already during the first steps of the project. Hospital buildings were selected as the building type in the first project.

OBSERVATIONS

1 The consistency, comprehensibility and standardized presentation of the data is of the utmost importance.

2 Data from building technology models alone is not enough: the data must be combined with, for example, room type data obtained from the architectural model of the site. The challenges included the inconsistent naming of rooms in the architectural models of different sites.

3 At the first stage, it was not necessary to utilize machine learning, as traditional statistical modeling produced a sufficient result. As time goes on, it will be possible to supplement the model by connecting other data sources such as records of hours worked and project financials.

The project showed that AI cannot be purchased off the shelf. You must have your own, clear vision of what you are aiming for. The fact that you have a lot of data - even in a semantic form - is not yet a sufficient starting point for the development of AI applications. I started the project with somewhat of a lackadaisical attitude. In the end, I was much more humble" *– Tero Järvinen, Granlund Group*

THE SHOW MUST GO ON - JOIN US

In the foreword of the guide, we wrote that the deployment of AI should be thought of more as a continuous learning process rather than point investments. We hope that this guide will serve as good support material for those who are among the first enthusiasts in their own company, i.e., in the starting blocks of the learning process.

But you don't have to be alone. We are organizing Basics of AI accelerator batches with Finland's Artificial Intelligence Accelerator.

An accelerator batch lasts for six months, during which the organization learns to:

- Identify the application possibilities of AI in their own core processes.
- Understand their own data resources and their possible shortcomings.
- Work with data.
- Work on their first AI project.

Interested in working with us? >>Get in touch.

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