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WHITE PAPER

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# AI maturity web tool helps organisations proceed with AI

## Preface

Artificial intelligence (AI) is both revolutionising the ways in which societies functions and opening up new business opportunities. AI is expected to increase automation and boost productivity. It, therefore, is essential for all organisations to understand their readiness to take advantage of AI.

The AI maturity self-assessment web tool helps organisations gain a holistic view on their maturity level when planning, applying and developing new solutions based on AI. The tool was developed based on work by Finland's Artificial Intelligence Accelerator published in the Finnish Digibarometer 2018. The contents were reworked in close cooperation by the VTT Technical Research Centre of Finland Ltd. (VTT) and the University of Oulu, and in early 2019, VTT launched the tool as a free web tool for any organisation to assess its current AI maturity. It enables maturity comparison with other respondents of the tool and creating national and international AI maturity overview in the long run.

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# Introduction

Digitalisation has been identified as a major trend changing the society and business in the near and long-term future (Tihinen et al., 2016). Digital transformation is a key enabler of maintaining competitiveness and reacting to continuous changes and pressures. AI is revolutionising the ways in which societies function and opening up new business opportunities. In fact, AI is not a singular technology but includes several different methods, technologies, applications and research lines that can be considered to be one significant milestone in the broader digitalisation framework (Ailisto et al., 2018).

AI builds on the extensive data access facilitated by digitalisation and can boost transformation of the global economy into a digital economy. AI has been identified as one of the most important (sets of) technologies in our time. It can create new economic growth, thus promoting wellbeing. Access to more efficient, inexpensive computing capacity, the growth of big data available to AI and the development of algorithms have accelerated AI development and utilisation.

Recently, a growing number of countries (e.g. the United States, China and France) have recognised the opportunities provided by AI and prepared national AI strategies. The Finnish government launched a national AI programme in 2017 and formed an AI acceleration task force (Ministry of Economic Affairs and Employment of Finland 2017). The main motivation for the task force was to find ways to boost the AI leverage of Finnish industry. One concrete result from the task force was the development of the AI maturity index, later described in more detail (Pirttikangas et al., 2018, Ministry of Economic Affairs and Employment of Finland 2019).

## Maturity as a baseline for development

Maturity models have a long history and offer organisations a simple but effective way to measure their capabilities (Leino et al., 2017). In the literature, maturity models focusing at various topics can be found. Maturity has become a popular measure to evaluate the capabilities of an organisation within a certain discipline (or field of business) since the capability maturity model (CMM) was proposed in the early 1990s and has been proven in practice (Wendler, 2012). Maturity model research has been applied in more than 20 domains but is still heavily dominated by software development and software engineering disciplines.

Maturity models can contribute to organisational transformation and development of organisational competencies by initiating a change process (Mettler et al., 2010). These models are especially suitable for i) documenting the current maturity level; ii) developing a future vision and providing guidance on that development path; and iii) comparing the capabilities of organisations (e.g. Felch et al., 2018). Those three objectives were also considered in the development of the AI maturity model and self-assessment web tool. There are several viewpoints that should be taken into account when evaluating the possibilities for utilising AI. It is important that organisations first understand their own readiness for taking advantage of AI.

## AI maturity

The AI maturity model and tool were developed based on work done in Finland's Artificial Intelligence Accelerator (FAIA) whose AI maturity index was first published in the Finnish Digibarometer 2018 (Pirttikangas et al., 2018). The self-assessment tool was reworked in close co-operation by the Technical Research Centre of Finland Ltd. (VTT) and the University of Oulu. Published by VTT, the web tool is free for non-commercial use by any company or organisation to assess its current AI readiness and performance at <https://ai.digimaturity.vtt.fi/>. The tool gives answers to the following questions:

- How prepared is your organisation for the use of AI?
- Where is your organisation compared to other respondents of the tool?

## AI index as the starting point

FAIA<sup>1</sup> helps established Finnish organisations deploy AI by e.g. creating and sharing scalable ways of working together. To create awareness about AI viewpoints and capabilities, the AI maturity index was developed (Pirttikangas et al., 2018). The main six elements of the AI index are presented in Table 1: data, technology, internal processes, products and services, competences and AI as a resource. The maturity level in each dimension is described on four levels: i) awareness of AI; ii) initial AI; iii) integrated AI; and iv) AI as essential part of organisation's identity.

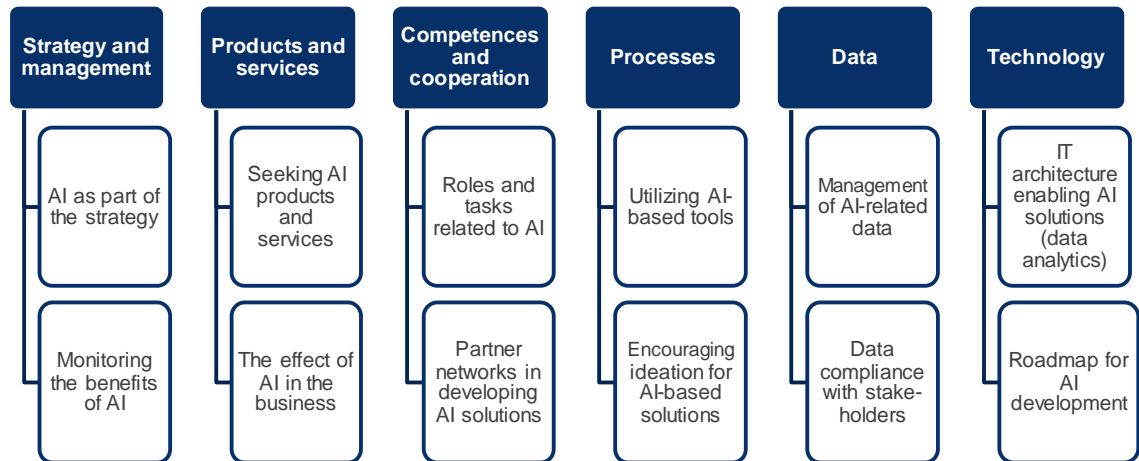
**Table 1: Dimensions and maturity levels of the AI index (Pirttikangas et al., 2018).**

	<b>Data</b>	<b>Technology</b>	<b>Internal processes</b>	<b>Products and services</b>	<b>Competences</b>	<b>AI as a resource</b>
<b>Awareness of AI</b>	Data is legally validated (e.g. privacy or usage rights) for use in AI models.	Traditional analytics and data management tools exist and are used.	AI opportunities are identified from internal processes.	Identified, clear needs for applying AI are surveyed and business potential estimated.	Discrete AI resources exist, or ecosystem partner strategy is created.	The role of AI as a resource in production is recognised.
<b>Initial AI</b>	Required share of data is in a structured format, enabling exploitation of AI in discrete areas.	Separate tools for AI (e.g. machine learning, categorisation and chat bots) are exploited in discrete use cases in batch mode.	Automation is enhanced with AI but only in discrete use cases.	A use case roadmap for AI is created, and discrete AI use case implementations are initiated.	AI experts are in a (centralised) team, and translators create bridges between the team and business areas.	AI works in simple tasks together with humans.
<b>Integrated AI</b>	Data and its management are built and designed for AI and integrated into business processes.	Real-time AI models are available for some discrete business activities.	AI is widespread within the internal processes of the company.	AI is part of products and services, some of which could not be produced without AI.	A networked AI team cooperates with other parties (e.g. colleagues, customers and partners) and reports to management.	AI technologies self-repair and self-teach.
<b>AI as part of identity</b>	A comprehensive data ecosystem including both external and internal information is updated in real time.	AI is used seamlessly as part of all businesses. AI is interactive and in real time.	Human-machine cooperation is planned. Machines help humans in everyday work.	AI is successfully scaled into businesses and creates value (e.g. sales, cost savings and new business areas).	Active development and contribution to AI science or applications for industry.	AI is part of the brand and has the same role as humans in the eyes of customers and partners.

<sup>1</sup> <https://faia.fi/>

## AI maturity model and tool

The AI model was modified from the AI index: i) there are five consistent maturity levels; ii) each previous maturity level is a prerequisite for the next level; and iii) each dimension has two questions with five response alternatives. In addition, the names of some dimensions have been renamed. The dimensions and categories are shown in Figure 1. Each category has a question with five optional prewritten responses reflecting the maturity level. Currently, the web tool has two optional languages: English and Finnish.



**Figure 1: The AI maturity tool has six dimensions. Each dimension has two categories with its own questions and optional prewritten responses reflecting the maturity level.**

As an example, Figure 2 presents the optional responses for the question 'Does your organisation have roles or tasks related to AI? (The role can be, for instance, data engineer, data analyst, data scientist, service designer or UX engineer)'.<sup>1</sup>

**Does your organisation have roles or tasks related to AI? (The role can be e.g. data engineer, data analyst, data scientist, service designer, UX engineer, etc.)**

- No roles or tasks related to AI have been specified or identified.
- Occasional tasks related to AI are managed in an improvised form and are performed alongside other tasks, depending on the expertise of the person doing them.
- The roles and tasks related to AI are clear for certain teams or departments.
- The roles and tasks related to AI have been defined in the organisation.
- The roles and tasks related to AI have been defined internally and with stakeholders related to the broader ecosystem.

**Figure 2: The prewritten response options reflect maturity levels. Here, as an example, is the first question about competences and cooperation.**

In the self-assessment tool, the respondent selects the response alternatives closest to the status reflecting his/her own organisation and receives a result graph (Figure 3) illustrating its responses (yellow) in comparison to those of all the respondents (red). When there are enough respondents, reference group comparisons (blue) can also be made. The results graph helps identify the most important areas for improvement. However, it is important to remember that the appropriate maturity level of an organisation always depends on the nature of its business and its position in the value network. Its goal, therefore, is not necessarily to achieve the highest level of maturity in all the dimensions.

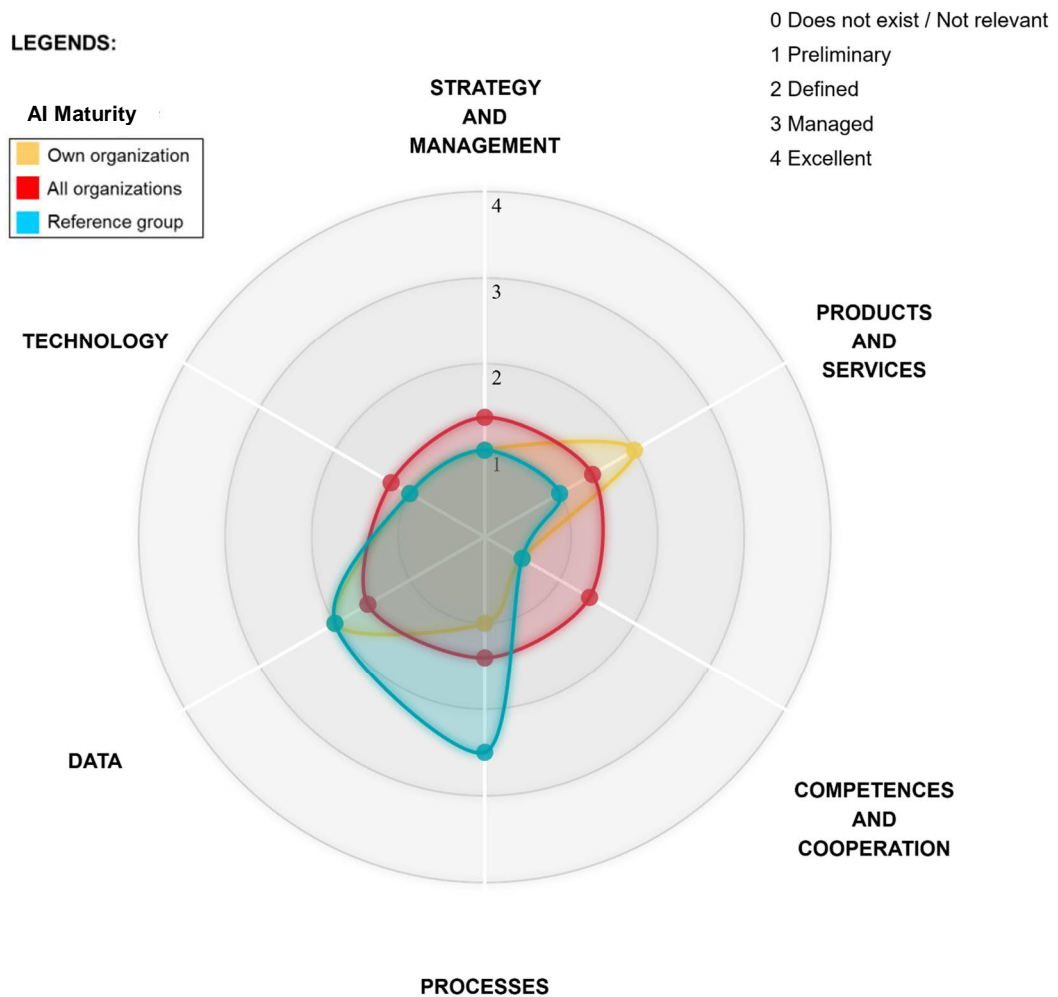


Figure 3: Example of the results graph displayed on the screen after all responses are given. When there are enough respondents, reference group comparisons (blue) can be drawn.

## Findings and conclusion

When considering the exploitation of AI, the first step is to understand an organisation's level of AI maturity. After that, selecting potential improvement steps becomes possible. VTT's AI maturity tool is a free-of-charge self-assessment web tool that produces a basic visualisation of AI maturity. It gives a baseline of current AI maturity in six dimensions, which can be used to recognise the most important and urgent development targets depending on the nature of the business and size of the organisation.

The AI maturity self-assessment web tool was published early 2019. In the end of October 2019, there were more than 80 responses, of which about 75% were from Finland. So far, the AI maturity average values in the different dimensions have ranged from 1.3 and 1.5 (on a scale of 0–4), showing that many organisations have only started on the path of exploiting AI in their operations.

The tool can be used to conceptualise viewpoints on AI, document the current state of AI, set a baseline for a future vision and provide guidance on a development path. The tool also offers possibilities to compare capabilities between organisations and within an organisation if there are respondents from different areas. Within the organisation the results enhance achieving a common understanding of the AI maturity levels in different parts of the organisation and potential development areas, which is especially important before starting any development projects. In the future, when there is enough data, also branch- and country-specific comparisons can be made.

A generic progress of exploiting the AI maturity tool is shown in Figure 4. It starts with the self-assessment, after which the results can be analysed as the result graph visualises also the average of all respondents and a potential reference group. During the analysis some preliminary development areas and ideas are usually identified. AI maturity workshop is especially beneficial before planning any development projects in order to get a joint understanding of the development targets. Development projects can then be prioritised and started. In case they are obvious, they can be started without the workshop.

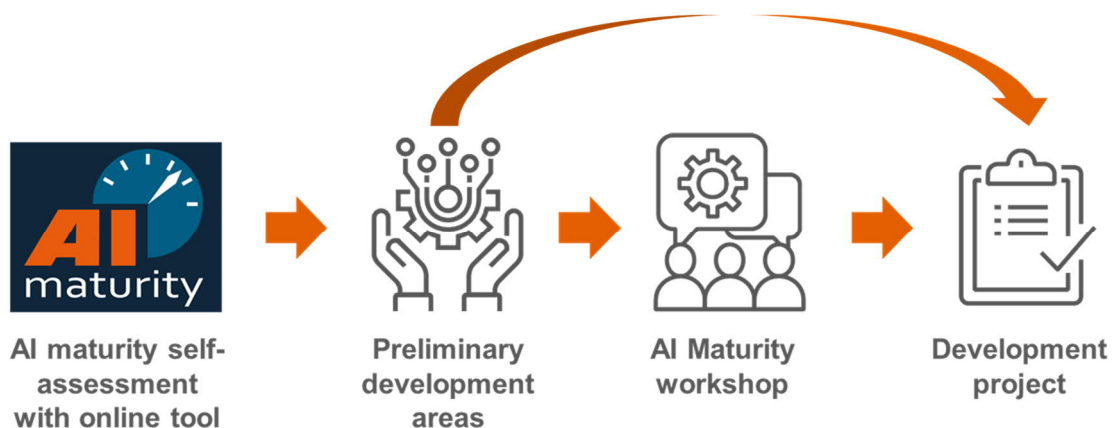


Figure 4: Generic progress of exploiting the AI maturity tool.

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