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Utilization of generative AI among industrial management engineers

Effects on productivity through the lens of Extended TAM

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TIIVISTELMÄ:
Generatiivisen tekoälyn käyttö on kasvanut viime vuosina räjähdysmäisesti. Tutkimusta generatiivisesta tekoälystä tulee tehdä mahdollisimman paljon, jotta tutkimus pysyy ajan tasalla tekoälyn kehityksessä.

Nykytutkimus on rajallista ja keskittyy pää asiassa kvantitatiivisiin menetelmiin millä ei saada yhtä monipuolisia vastauksia kuin kvalitatiivisilla haastatteluilla. Tällä tutkimuksella pyritään vastaamaan tähän puutteeseen ja tuomaan nykytutkimukseen syvällisempiä näkemyksiä generatiivisen tekoälyn nykytilasta ja millainen kehitys lisäisi sen käyttöä.

Tutkimus on tehty tuotantotalouden insinööreillä, joilla on 1–4 vuotta täysipäiväistä työkokemusta. Insinööri ovat valmistuneet Turun Ammattikorkeakoulusta. Nykytutkimus keskittyy pitkälti opiskelijoihin ja korkeakoulukontekstiin. Siksi on tärkeää keskittää tutkimusta myös työelämään siirtyneille yksilöillä.

Tämä tutkimus keskittyy kohderyhmän kokonaisvaltaiseen generatiivisen tekoälyn käyttöön ja siihen millaisia vaikutuksia generatiivisella tekoälyllä on tuottavuuteen. Nykytutkimus on löytänyt laajasti erilaisia käyttökohteita. Tämä tutkimus vahvistaa näiden käyttökohteiden relevanttiuden ja tarjoaa yksityiskohtaisempia selityksiä, miksi nämä käyttökohteet on koettu hyödyllisiksi.

Tutkimuksen löydöksistä huomaa miten positiivisesti vastaajat näkevät generatiivisen tekoälyn mahdollisuudet. Tällä hetkellä generatiivisen tekoälyn laajempaa käyttöä estää konkreettisten käyttökohteiden puute. Suuremmalla osalla kohderyhmästä ei ollut syvällisempää osaamista generatiivisesta ja kokivat tarvitsevansa lisää koulutusta omilta organisaatioiltaan.

Vastaajien päämotivaatio generatiivisen tekoälyn käyttöön on sen tuoma aikasäästö. Kohderyhmä koki myös, että tekoäly parantaa heidän työnsä laatua. Aikasäästöjen avulla kohderyhmä on saanut huomattavia parannuksia heidän tuottavuuteensa. Vastaajat kuitenkin kokevat, että eivät käytä generatiivista tekoälyä niin paljon kuin mahdollista, joten generatiivisen tekoälyn käytöllä on kasvuvaraa

Suurimmat riskit generatiivisen tekoälyn käytössä kohderyhmässä keskittyvät sen tuottaman datan oikeellisuuteen. Toiseksi suureksi riskiksi on tunnistettu organisaatioiden sisäisen datan turvallisuus. Kohderyhmä ei ollut niin huolissaan henkilökohtaisen datansa turvallisuudesta.

Kokonaisuudessaan tekoälyn nähtiin erittäin positiivisesti ja suurena mahdollisuutena. Kehityskohteita löytyi myös huomattavasti, ja näiden kehittyessä käyttö myös lisääntyy.

KEYWORDS: Artificial intelligence, generative, productivity, technology acceptance, AI

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ABSTRACT:
Usage of generative AI has increased exponentially in the past few years. Research on generative AI should be conducted as much as possible due to keep up with the latest developments of generative AI.

Current research is limited, and it mostly conducted with quantitative methods, which cannot provide as comprehensive responses as qualitative methods. This research aims to strengthen this aspect by bringing in deeper perspectives on the status of generative AI currently and what kinds of developments would increase its usage.

This research is conducted on industrial management engineers, who have between 1 and 4 years of experience. Current literature is focused on educational context; therefore, it is important to focus the research also on individuals who are already working full-time.

This research focuses on the overall usage of generative AI within the target group and on what kind of effects it has on productivity. Current research has found numerous use cases and this research confirms their relevancy and offers detailed explanations on why these uses cases have been seen as useful.

From the findings of this research, it can be seen how positively the respondents view the possibilities which generative AI can provide. At this moment the lack of more concrete use cases is hindering wider adoption. Most of the respondents did not have deep knowledge of generative AI and they felt the need for more training to be provided by their organization.

Primary motivation for the usage of generative AI was the time savings it can bring. The target group felt also that AI improves the quality of their work. Time savings have improved productivity noticeably within the target group. Respondents felt that they do not use generative AI as much as possible and therefore there is room for wider adoption.

Biggest risks in the usage of generative AI in the target group are focused on the data accuracy. The second biggest risk was found out to be the security of internal organizational data. The target group was not as worried about their personal data as they were about their organizational data.

Overall, AI was seen very positively and as a big opportunity. Points for development were also found and improvement in these will further increase the usage.

KEYWORDS: Artificial intelligence, generative, productivity, technology acceptance, AI

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AI Artificial Intelligence

1 Introduction

Usage of generative artificial intelligence (AI) has increased monumentally in the past few years. Because of this doing research on generative AI is extremely relevant. Generative AI is being implemented to new and old processes all the time with an increasing trend. The producers of artificial intelligence services promote their services as time savers and productiveness enhancers. Companies feel increased pressure on exploring on how they can utilize artificial intelligence to obtain competitive advantage within their fields.

Entry level professionals can have impact in accelerating artificial intelligence adoption. Generally younger Finnish individuals utilize more artificial intelligence than older generations. (Statistics Finland, 2024a) Because of this it is important to research how entry level professionals view their usage of generative AI. This gives a wider perspective on what is generative AI used for and what capabilities are needed for it to become more widely used. AI has also been seen as a possible reducer of entry level jobs (Alavi et al., 2024).

This research will focus on generative AI using the Technology Acceptance Model (TAM) as the theory to assess the acceptance levels of generative AI. TAM has been recognized as a viable tool in assessing the AI adoption on multiple studies (Dahri et al., 2024; Setälä, et al., 2025; Lai, Cheung, and Chan, 2023; Bourouni et al., 2024) The popularity of generative AI has increased exponentially in the past years. Generative AI creates outputs from inputs. The form may differ and usually text or pictures are used as inputs, and they are also popular outputs. (Chakraborty et al., 2023) The purpose of this thesis is to research on how the focus group utilizes this technology on their respective work and what kind features would increase the usage.

1.1 Background

News are published on artificial intelligence every day on all possible news outlets. There are a lot of different perspectives on artificial intelligence (Su et al., 2024). This is also shown in the academic research done on artificial intelligence There has also been research on the dangers and negative aspects of AI. Alkaissi and McFarlane (2023), showed that ChatGPT can fill its responses with disinformation if it cannot formulate a correct answer.

There is also research done on how AI can be beneficial to individuals. Yılmaz et al. (2023) researched they validity and reliability of generative AI software. Their research indicated that withing students the reliability and acceptance of generative AI software is on a high level. Within students the attitudes and perceptions of generative AI software were researched by Chan and Hu (2023) and the results showed positive attitudes towards generative AI. Overall, the reception of generative AI among students is positive and it is widely used.

The productivity gains generative AI can create has been research before. Noy and Zhang (2023), found significant productivity gains on midlevel professional in their quantitative research. In Finnish context Hajikhani and Cole (2023), indicated also productivity boosts. Productivity has also been researched in the context on how generative AI can automize work related tasks and the effects it might have on labor markets. (Eloundou et al., 2024) One of the biggest concerns regarding generative AI software is the possible effect on job markets. (European Parliament, 2025; Chan and Hu, 2023; Joshi, 2025)

Most of the current research on generative AI is done with quantitative methods or with mixed methods. Most of the current research is done on students which is understandable due to the high usage levels of generative AI among students (Statistics Finland, 2024a). In Finnish context the available research on generative AI is really limited.

TAM has been used to research generative AI adoption. Bourouni, et al. (2024) utilized TAM in their research on university educators and discovered six factors which affected adoption. Ma et al. (2024) used TAM in their quantitative research also. Most of their participants had a bachelor's degree and were under 25 years old. They discovered correlations between different TAM factors in their research.

1.2 Research Gap

Noy and Zhang (2023) grasped productivity with their research on mid-level professionals. Generative AI has had promising results in enhancing productivity (Bick et al., 2025; Noy & Zhang, 2023; Aromaa et al., 2025). Prior research the effects generative AI has been focused on educational context (Noy & Zhang, 2023; Dahri et al. 2024; Yılmaz et al., 2023; Bourouni et al., 2024; Setälä et al., 2025; Chan & Hu, 2023). A deeper understanding of how the productivity gains translate from education to entry level workers has not been evaluated and therefore needs to be researched further.

From the perspective of engineering some research has been conducted but not on industrial management engineers (Joskowicz & Slomovitz, 2023; Koponen, 2024). According to Statistics Finland (2024a) over half of the Finnish generative AI users are students which gives some explanations on the emphasis in educational context on a Finnish level.

Lai, Cheung, and Chan (2023), furthermore emphasized the need for qualitative studies to gain more in-depth data. Current research is prominently done with quantitative questionnaires (Dahri et al., 2024; Setälä et al., 2025; Yılmaz et al., 2023). With these methods it is hard to gain the same amount of depth as qualitative methods can offer with interviews. Qualitative methods are not absent from the current literature. Aromaa et al. (2025), introduced them in Finnish industrial perspective and Joskowicz and Slomovitz (2023), from an engineers perspective.

To obtain the possible competitive and financial benefits generative AI can produce for organizations. It is crucial to conduct research also on people who are already working fulltime. This aspect has been widely neglected in current research. Especially deeper dives on users wants and needs on generative AI software need to have more emphasis to understand the current situation better and to make better AI related strategies for the future.

Entry level industrial management students are chosen as the target group for this study. Industrial management was chosen as the academic background for the participants due to the structure of the education which is a mixture of technological and economical subjects. On Finnish landscape academical research on generative AI there is not enough research. Therefore, it is important to understand the perspectives Finnish professionals have on artificial intelligence.

1.3 Research questions and limitations

This research is conducted on recent graduates of industrial management. The respondents need to have a Bachelor of Engineering degree from Turku University of Applied Sciences. Respondents may also have a master's degree on, or they can be currently completing one. The respondents need to have 1-4 years of work experience to be qualified for the study.

The purpose of the study is to assess how does the target group utilize generative artificial intelligence in their daily work. Technology acceptance model is used as the main theoretical framework. Technology acceptance has been validated as reliable tool within generative AI in Finnish context also. (Lai, Cheung, & Chan, 2023; Setälä et al., 2025; Koponen, 2024). Data is collected through interviews and technology acceptance model is used as a tool to create the questions to the interviews and to evaluate the acceptance level.

Research questions:

- How can generative AI improve productiveness of entry level industrial management graduates?
- What are the developments needed for increase in generative AI acceptance?

1.4 Structure of the thesis

The first chapter of the thesis is the introduction. In this chapter contains the background of the research which provides needs for this research. This part includes background of the research accompanied with the purpose of the study. Research questions and the target group are also presented in the introduction.

The second section of the research is the literature review. The first part of the literature review focuses generative AI. This divided to several sections including usage in different context and risks and concerns. The usage rates of generative AI are also broken down in this section. TAM is used as the main theory to assess the acceptance, and the theory and adaptations are thoroughly explained in this section.

After this comes the empirical section of the research. The empirical section is divided into chapters on methodology which elaborates the choosing of qualitative methods among the other methods chosen for the research. After this chapter the results and findings of the research are presented.

In the last chapter the results of the study are concluded with discussion on the results. Limitations and further research points are also discussed in this section.

2 Literature Review

The theoretical background is presented in this section. In this section the different concepts of generative AI are explained. This section provides the backbone for the research. Current research is evaluated to find out the different perspectives on which research has focused on. The status of Finnish AI usage is also presented and the development trends associated to this. Because AI is developing so rapidly, focus is on the most recent studies. (Zhou et al., 2022) In this research the sources related to generative AI are required to be published after 2020. This limitation was chosen due to developments in generative AI after 2020.

According to Nyst (2024) ChatGPT was released at the end of 2022. This led to the popularity of generative AI software. Therefore, some of the research done between 2020 and 2022 can already be outdated and are not included in the thesis. Some of the literature for the Technology Acceptance Model and other theories are published before 2020. They are included in the thesis because they are still relevant. A lot of research has been conducted and financed by the producers of generative AI software. These articles have been left out of literature review since there is a high possibility of bias towards the benefits of generative AI software and their own products.

2.1 Artificial Intelligence

There are a lot of different definitions on AI. The complexity of AI makes it impossible to be defined in one way. Rosenthal-von der Pütten (2020) describes AI as machine which has been created to mimic human intelligence. United Nations (2024) describes it as machines which can successfully execute assignments which are traditionally require human intelligence to be completed. AI is a wide term which includes a lot of different entities (Banh & Strobel, 2023). AI systems solve problems based on the information they have. They have a set goal which they will try to achieve. (European Parliament, 2023) AI is already present in the lives of most people. AI is used for example to create personalized advertisements in online stores, language translations, self-driving cars, cybersecurity among many other use cases. (European Parliament, 2023)

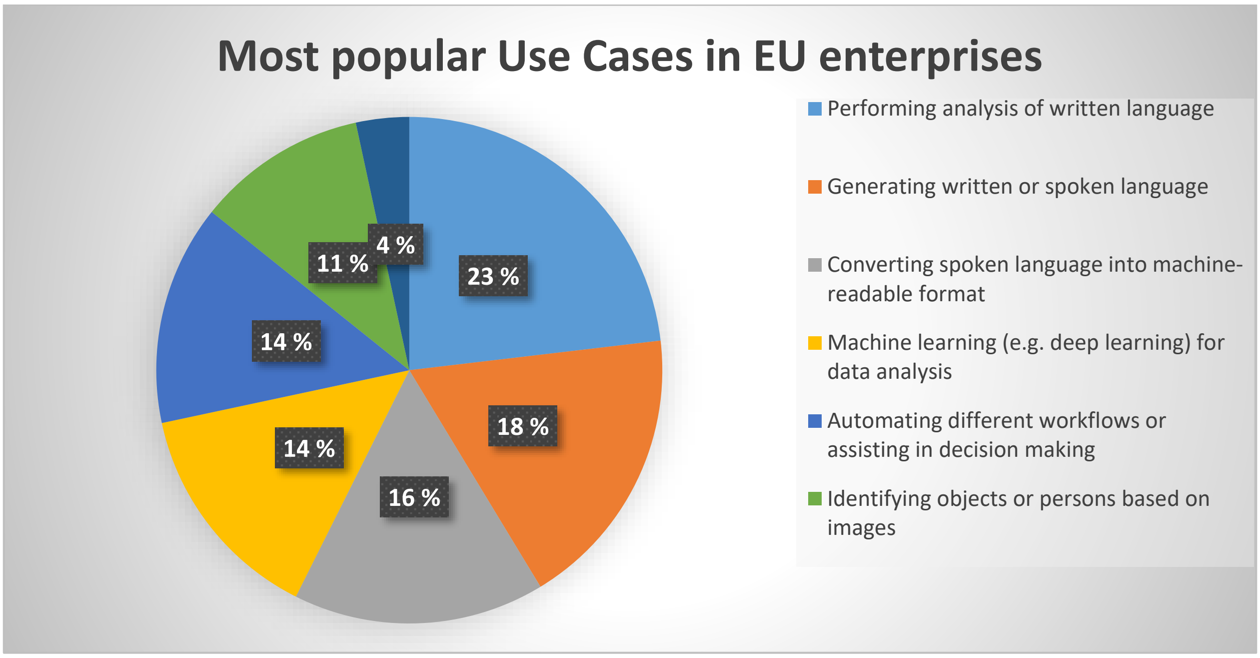

Figure 1. EU AI software usage on an enterprise level (Eurostat, 2025)

As seen from Figure 1. of the most popular AI software are Performing analysis of written language and generating written or spoken language. Figure 1. also highlights the wide range different kinds of usage enterprises have for different kinds of AI software. Analyzing and generating written language can be done with generative AI software. This already take 41% of the total popularity. This emphasizes the level of importance of generative AI software on EU level.

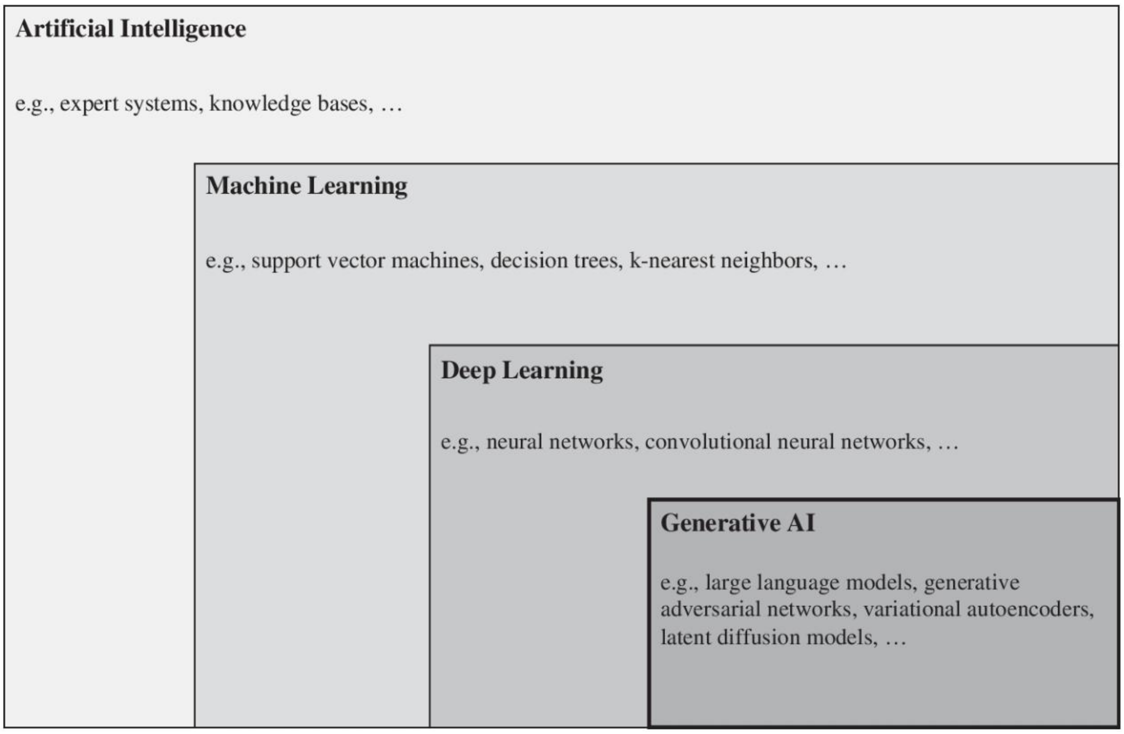

Figure 2. Artificial intelligence (Banh & Strobel, 2023)

Some might falsely review generative AI as the only form of AI. As seen from Figure 2. Generative AI is only one part of AI. AI is used as a term is widely used and can be falsely used for generative AI also. This thesis will focus on generative AI instead of AI as an entity. Some of the prior research has not specified if it is focusing on generative AI. Therefore, research which is not narrowed to generative AI is used in the literature review if it applicable for this thesis.

2.2 Generative Artificial Intelligence

Generative AI is used to create objects. Generative AI requires inputs which are usually prompts but can vary and be in a lot of different forms. The technologies behind generative AI are called deep learning and neural networks. (Chakraborty et al., 2023)
The outputs of generative AI can be in many kinds of formats. Some examples of the possible output formats include text, picture, video, and audio. The first research of

generative AI was introduced already in the 1950s. (Chakraborty et al., 2023) The popularity of generative AI has increased exponentially after the launch of OpenAI's ChatGPT. First version of ChatGPT was released in the end of 2022 to the public. (Marr, 2023)

Generative AI software is evolving rapidly. After ChatGPT's release a lot of the technology organizations started to develop their own solutions. Dale (2024) describes the rapid developments in generative AI within a year. Within the year after ChatGPT's release the market already had multiple competing solutions available. This emphasizes the exponential development generative AI has had in the past few years. Therefore, new research needs to be constantly done on the latest advancements and changes to stay relevant.

2.2.1 Most popular generative AI software

All the biggest technology companies are developing their own generative AI software. According to Marr (2024) the most ChatGPT is the most popular generative AI tool. One reasons for the popularity of ChatGPT include the fact that it was the first to launch a generative AI software which gained interest due to its phenomenal performance at the time. It was also free to use and gained popularity rapidly. (Marr, 2024)

Solution	Developer	Market share
ChatGPT	OpenAI	61 %
Copilot	Microsoft	14 %
Gemini	Google	14 %
Perplexity	Perplexity	6 %
Claude AI	Anthropic	3 %

Table 1. The most popular generative AI software (First Page Sage, 2025)

As seen from Table 1. ChatGPT has over half of the overall market share. Google and Microsoft are their biggest competitors currently with other upcoming competitors rising. When observing from the perspective of market share, Google and Microsoft are quite even when compared to each other, but OpenAI still has a substantial lead compared to all the other solutions. Dropoff after Microsoft and Google is also significant as the market share levels drop to below ten percent. It should be noted that the market is immature since all the solutions are recent. Joskowicz and Slomovitz, (2023), indicated that ChatGPT is the most popular solution among people with engineering backgrounds also.

2.2.2 Generative AI, what is it used for?

This chapter will examine what generative AI used for. As previously stated, generative AI is used to create objects based on inputs. Prior research indicates a wide range of different use cases generative AI has. Users utilize generative AI differently and have different tasks and needs. The definitions of different use cases are vague, and different authors define them differently. Between the use cases, a lot of overlap can be found. Next, the most popular use cases found in the literature are presented.

Drafting and creating text has risen as the one of the most popular use cases for generative AI in prior research. (Noy & Zhang, 2023; Bick & Blandin, 2025; Aromaa et al., 2025; Bourouni et al., 2024). The contexts in these studies vary a lot, yet this factor is discussed in all of them. Generative AI is also used to create art and pictures (Chan & Hu, 2023; Joskowicz & Slomovitz, 2023). Generative AI is also widely used to create and draft code (Eloundou et al., 2024; Bick & Blandin, 2025; Joskowicz & Slomovitz, 2023). Prior research indicates that drafting and creating is widely used within administrative tasks (Bick & Blandin, 2025; Bourouni et al., 2024; Aromaa et al., 2025)

Generative AI is also used prominently as learning support tool (Bick et al., 2025; Setälä et al., 2025; Yilmaz et al., 2024). A lot of the research is on an educational context therefore it could be the factor behind popularity. In an organizational context generative AI also was brought up as a tool for learning support by Salmo (2024). One of the benefits of generative AI in learning identified, has been the capabilities it has in summarizing text (Chan & Hu, 2023). Chan and Hu (2023) also highlighted it as a useful research assistant.

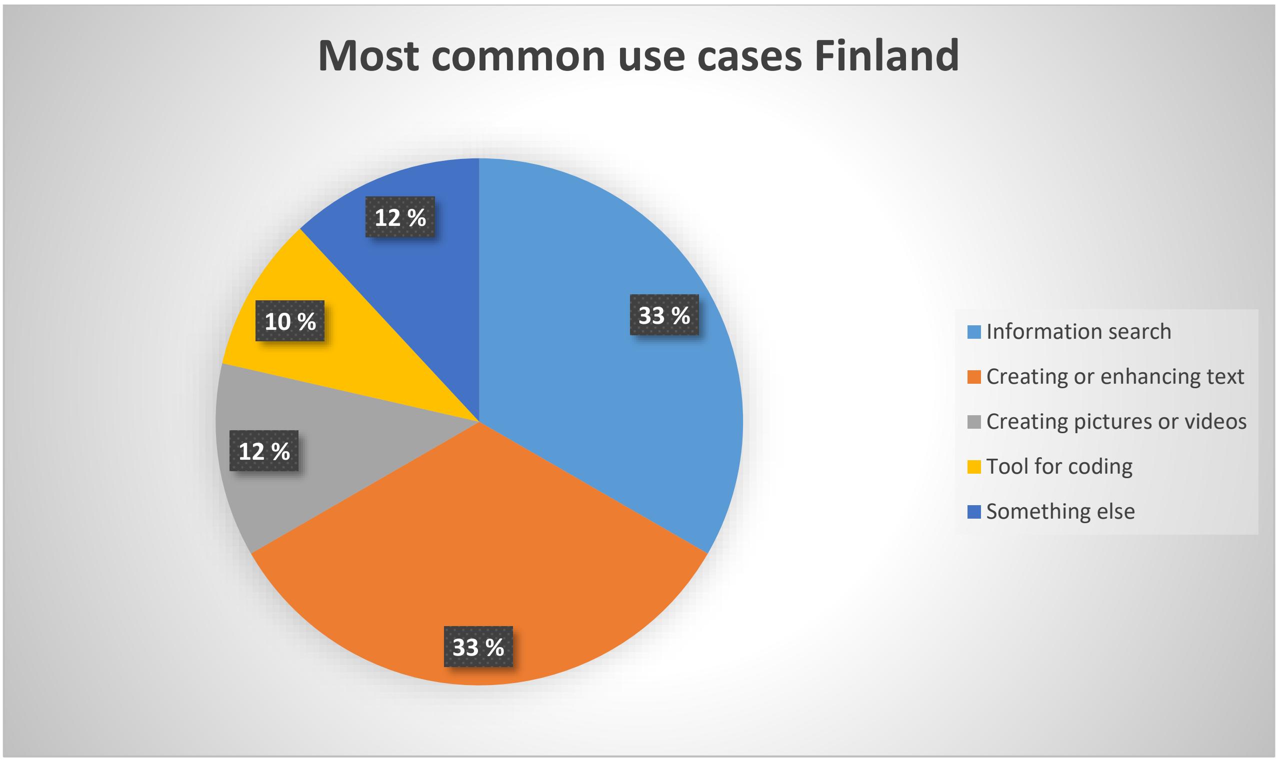

Figure 3. Most common use cases (Statistics Finland, 2024a).

As seen from Figure 3. information search and text editing/creating are the most important use cases for generative AI software. These two take over half of the use cases. The next most common use cases for generative AI are using it to create pictures and videos and as tool for coding. As explained above, prior literature has different focus points compared to Figure 3. In prior literature information search has not been recognized as important factor as in this graph. This could be explained by the different contexts since Figure 3. displays only the Finnish usage.

Information search generative AI software has started to compete against traditional search engines like Google. Perplexity and ChatGPT have openly discussed on the capabilities of generative AI software in information search. (Koetsier, 2024) In prior research this perspective does not appear frequently. Information search is not totally absent from prior literature. Joskowicz and Slomovitz (2023), indicated it as one of the most popular use cases as well as Koponen (2024).

As presented in Figure 3. creating or enhancing text is the other most common use case for generative AI in Finland. Creating text means that the generative AI software are asked to create text based on the inputs. Enhancing the text means that the text is given as input and the generative AI software is asked to modify it to appeal in wanted format. (Chakraborty et al., 2023) For example, the text can be asked to be modifier to be more formal or academic.

The generative AI software are constantly developing in text creation. (Statistics Finland, 2024a). Else (2023) did research on AI generated text. This research indicated that even scientist could not tell the difference between AI generated text when being compared to text created by human authors. Because the quality of text can be this good, it is easy to see why text creating is one the most popular use cases for generative AI software in Finland as seen above in the literature review and in Figure 3. The accuracy of AI generated text needs to be constantly evaluated. There are also a lot of risks and concerns regarding usage of generative AI and its outputs, and they will be further evaluated in chapter 2.2.4.

2.2.3 AI usage in Finland

Finland is doing adequately on a global level on AI usage. Although the current trajectory is indicating a decline in the future. (AI Finland & Business Finland, 2025) This is concerning even from the perspective of Finnish government. The Finnish government has invested in AI adoption. An example of this is the Artificial Intelligence 4.0 program conducted by the Ministry of Economics Affairs (2023). The current investments will not be enough if the current trajectory cannot be turned around.

Ilonen (2025) indicated that most the organization in Finland are encouraging to use generative AI. 24 percentage of the companies utilized AI in their daily activities in 2024. This is a significant increase compared to the year 2023 when the adoption rate was only 15 percent. (Statistics Finland, 2024b) The average adoption rate around the whole EU is 13,48 percent with a 5,5 percent growth rate from 2023 (Eurostat, 2025). Finland is well above average in the adoption rate when compared to EU and the growth rate is 1,6 times faster than the average.

23 % of Finnish people used generative AI in 2024. Men tend to use more generative AI tools with 28 % use rate. The corresponding use for women is 18 %. 57 % of the generative AI users were fulltime students and 29 % had fulltime jobs. (Statistics Finland, 2024a)

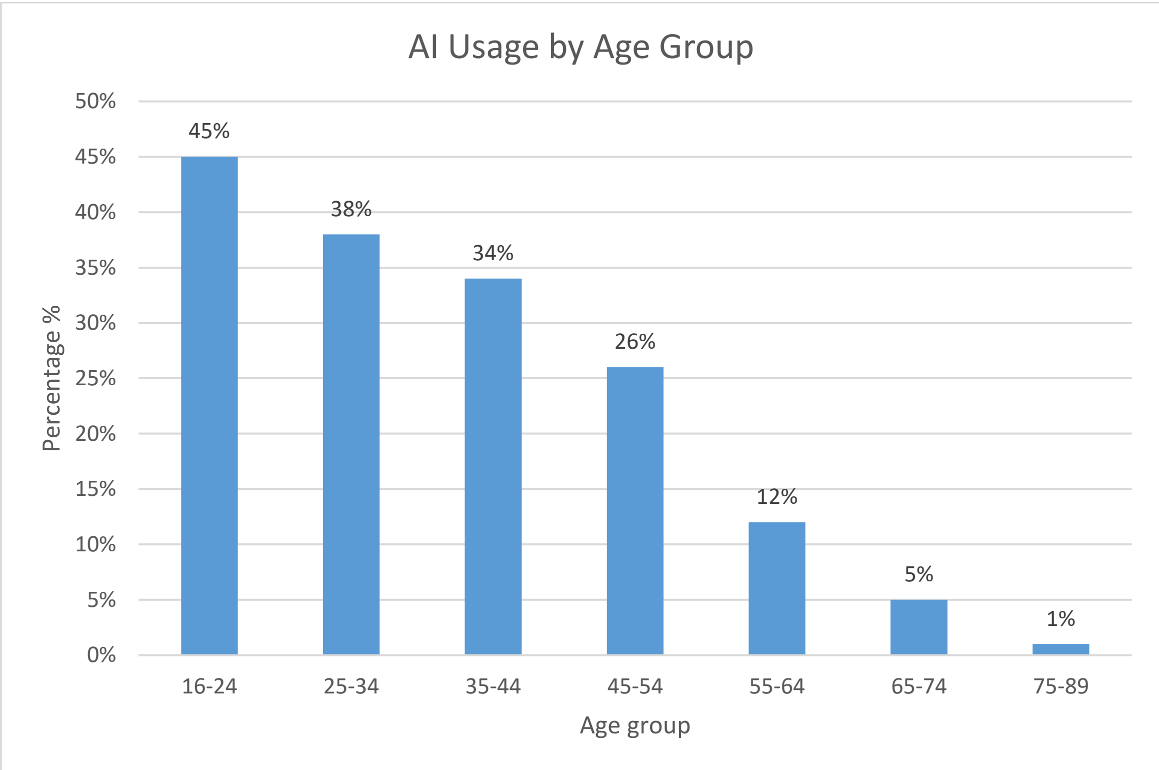

Figure 4. AI usage by age group. (Statistics Finland, 2024a)

As seen from Figure 4. The adoption of generative AI software is a lot broader with the younger generations. This phenomenon is not unusual when discussing technology adoption. This phenomenon has been researched multiple times. For example, Choudhary et al. (2024), collected relevant research for their literature review, which proved that younger generations are exceptionally interested in high technology solutions to be used in their work and are more interested in exploring how they can improve their daily work.

2.2.4 Risks and concerns of generative AI

There are also risks associated with Generative AI. One of the major concerns about generative AI is accuracy (Su et al., 2024). A lot of the research is focused on the risks associated with generative AI software. These risks and concerns ought not to be neglected, and they are acknowledged also in this thesis.

Other important risks and limitations to consider when utilizing generative AI software are ethical concerns and bias. LLMs are trained with data. This data will usually have at least some sort of bias. (Joshi, 2025) This factor needs to be considered when evaluating outputs generated by generative AI software. Other major concerns on generative AI are ethical. One of the biggest ethical concerns is plagiarism which AI can conduct on the outputs it creates (Joshi, 2025). Ilonen (2025) highlighted the lack of guidelines for generative AI within the target group as negative aspect. Lack of guidelines within an organization can create confusion on AI utilization.

European Parliament (2025) addressed the there is concern on the possibility that AI could reduce a significant number of jobs. This concern has also been addressed in modern research of generative AI. Chan and Hu (2023) and Joshi (2025) indicated that the research proved the concerns on AI affecting the job market in the future are relevant. Concerns on how generative AI will impact future job markets were also assessed more quantitatively in research conducted by Eloundou et al. (2024). They indicated that generative AI could influence 10% of daily tasks for 80% of the whole US workforce. In the long term this could possibly affect the job market. In Finnish context Ilonen (2025), implied in his research that there was no fear of effect on job security within his target group. This research was done on a small target group, and this perspective should be researched more to gain a wider perspective.

Misinformation that generative AI can create when does not have the right answers are called hallucinations (Su et al., 2024). The generative AI is hallucinating when it is creating an answer based on false information and because of this creating an output which is incorrect. If you read the output without any critical evaluation, you will not notice the disinformation in the text. (Alkaissi & McFarlane, 2023) There are different kinds of methods for hallucination detection (Su et al., 2024).

Using generative AI may increase inequality. This is because everyone does not have access to generative AI tools or even if they have, they might not use them for various reasons. (Chan and Hu, 2023). On the other hand, Noy and Zhang (2023) found an equality perspective. Their research indicates that usage of generative AI narrowed the gap between an established writer and with a writer with lesser abilities. Although in this research everyone had access to generative AI tools.

Alavi et al. (2024) stated concerns on organizational shifts towards heavy AI reliance which could possibly affect the entry level workers. Therefore, the perspective on the possible concerns the entry-level employees need to be addressed. Alavi et al. (2024) also emphasizes the need for balance with usage of generative AI and learning with traditional methods.

2.2.5 Regulations

In the European Union (EU) the usage of AI is regulated (European Parliament, 2023). EU regulates AI to ensure that the AI used within EU follows the values of the EU. These values include safety, transparency, environmental friendliness among others. The EU has also banned the usage of certain AI software. For generative AI software transparency is key. (European Parliament, 2023). According to the European Parliament (2023) generative AI software needs to inform the user that the output is AI generated. In addition to this the model cannot produce illegal content, and copyrighted data cannot be used for training purposes. Ilonen (2025) showed regulation of AI like the EU AI Act can be harmful to AI adoption.

On company level the guidelines and regulations vary between organizations. Ilonen (2025) found a need for clearer guidelines to the usage of generative AI in his research. The target group pointed out the lack of guidelines to be a negative aspect since they did not know what was allowed and what was not.

2.2.6 Generative AI research in Finland

Academic generative AI research in Finland is currently limited since it is such a new phenomenon. The amount of research is going increase a lot in the coming years. Therefore, conducting this research is important and further research on different aspects need to be conducted.

Salmo (2024), indicated in her research that the most popular use cases for generative AI was information search, text creation and summarizing. These results are in line with Statistics Finland (2024a), since it indicates information search and text creation as the most important use cases. Other findings in this research were enhancements in work quality. The quality of the work was enhanced with the usage of generative AI tools (Salmo, 2024). The findings were backed up by Ilonen (2025). In his research generative AI was used as tool to edit and brainstorm instead of creating content from zero. Salmo (2024) indicated that the case company in their research lacked the time to further study and explore generative AI software with the concerns on the potential risks hindered the adoption and acceptance rate. Another factor was the uncertainty among users on what generative AI software to use.

Aromaa et al. (2025), did research on the context of manufacturing industry. This offered valuable insights into this research since it is expected that at least some parts of the target group work in the manufacturing industry due to their educational background. They highlighted possibilities in improving efficiency with generative AI, but not actual gains received yet. Hajikhani and Cole (2023), confirmed the productivity gains in Finnish context.

Aromaa et al. (2025), found in their research positive attitudes towards generative AI, and a lot of potential, but they also recognized a lot of risks. Most of the risks acknowledged have been also recognized in another research (Su et al., 2024). Attitude was recognized as the most prominent factor in enhancing AI adoption in the research conducted by Koponen (2024).

2.3 Productivity

In this thesis the effect of generative AI on productivity is studied. Cambridge University Press defines productivity as the "*rate at which a company or country makes goods, usually judged in connection with the number of people and the amount of materials necessary to produce the goods".* In other words, it can describe the quality of the output based on the input. In the context of generative AI this is exploring productivity is relevant.

Generative AI software are often viewed as productivity enhancers. Some of the reasons for this are that the organizations which produce the solutions often advertise their solution capabilities on productivity enhancing. Microsoft and Google both advertise their respective generative AI software Copilot and Gemini as productivity enhancers (Google n.d.; Microsoft n.d.). As seen from **Table 1.** these are the second largest generative AI software after ChatGPT.

The increase in productivity generative AI can create has been researched on multiple occasions. Hajikhani and Cole (2023) and Noy and Zhang (2023) research indicates that the usage of generative AI increased productivity immensely. Noy and Zhang (2023) that using generative AI decreased the time the tasks took but also improved the quality of the output. Eloundou et al. (2024), showed that there are a lot of other factors which will affect productivity enhancements. Regulatory and economic factors among others will also have an impact on generative AI usage.

Noy and Zhang (2023) found significant improvements in productivity. Their research indicates that generative was not enhancing the abilities of the use but instead it worked as a relief for effort needed to create text. The research was conducted on mid-level professionals with a university degree. Bick et al. (2025) also found an increase in productivity when using generative AI software. Their work indicates a correlation between the amount of generative AI used and the increase in productivity percentage.

2.4 Technology Acceptance Model (TAM)

Created by Fred Davis in 1989, the TAM is a theory created to help understand the process of technology adoption. TAM has been created from the Theory Reasoned Action (TRA). (Davis & Granić, 2024) The purpose of TAM is to help understand how individuals adopt new tools and technologies (Davis & Granić, 2024). TAM has been chosen as the main theory for this thesis because of its advantages when analyzing individuals and the capabilities of analyzing acceptance from multiple different perspectives.

The main purpose of TAM is to assess the likeliness of the future adoption and acceptance of the technology in question. TAM can also provide an explanation on why technology is being accepted or rejected. (Davis & Granić, 2024) This feedback can then be used to improve the technologies further to meet the users’ wants and needs in a more effective way.

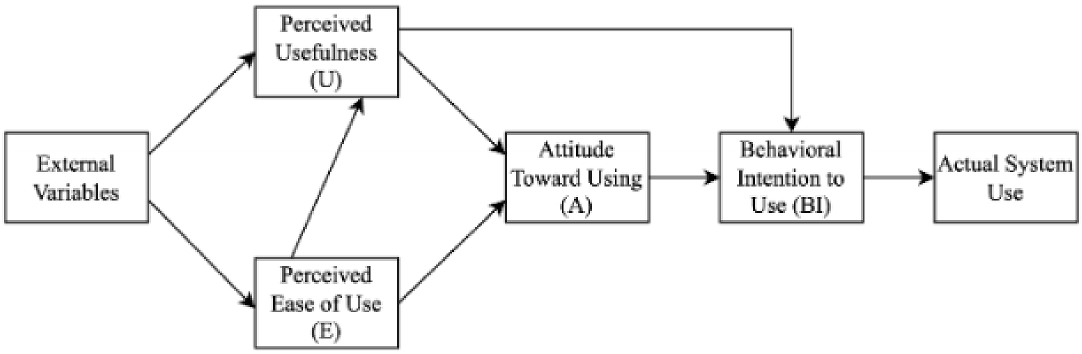

Figure 5. Technology Acceptance Model (Davis & Granić, 2024).

The most important aspects of TAM are presented in Figure 5. There are five main pillars in TAM. The first two of these are considered as external variables and these are the most important factors when the possible user makes decision on starting to use the particular technology. These are summarized below according to Davis and Granić (2024) :

Perceived Usefulness (U) : This means how does how does the possible user view the benefits of the product. Perceived usefulness is the most important factor in the user's acceptance process. (Davis & Granić, 2024) The technology needs to bring some benefit for the user to start using them. For example expected improvements from AI could be time savings, increase in productiviness or better quality in writings (Noy & Zhang, 2023).

Perceived Ease of Use (E) : Every technology has has a learning curve. The easier the use of the technology is viewed, more likely is the adoption of the technology. Users always want the maximal benefits with minimal effort and because of this the design in technologies needs to be as userfriendly as possible. In TAM Perceived Ease of Use is the second most important factor in the acceptance process(Davis & Granić, 2024). This is because there are complex technologies used for complex tasks. In these situations the benefits the funtionalities bring outweight the Ease of Use. (Davis & Granić, 2024)

Attitude Toward Using (A) : People always develop feelings towards the technologies. These feelings can be positive or negative (Davis & Granić, 2024). Neverthelesee these feeling usually affect the acceptance and the user can rarely make an objective decision. Even the smallest details can effect on how does the user feel about the technology. The user might choose the technology based on just how are the users feelings. These feelings might be towards the technology or the company which is producing the technology or just towards the invidual who is pithcing them the technology.

Actual System Use : The user needs to have a usecase for the technology. After all no matter how functional or trendy the technology might feel like, if there user find no use case for the product then the user does not start to use it. (Davis & Granić, 2024)

In this thesis TAM will be used to assess the tools the respondents currently have used and to discover what kind of tools would help them in their future work. Perceived Ease of Use will change radically once the user has had hands on testing with the new technology (Davis & Granić, 2024). This way more perspectives on different stages of adoption of the AI tools can be researched.

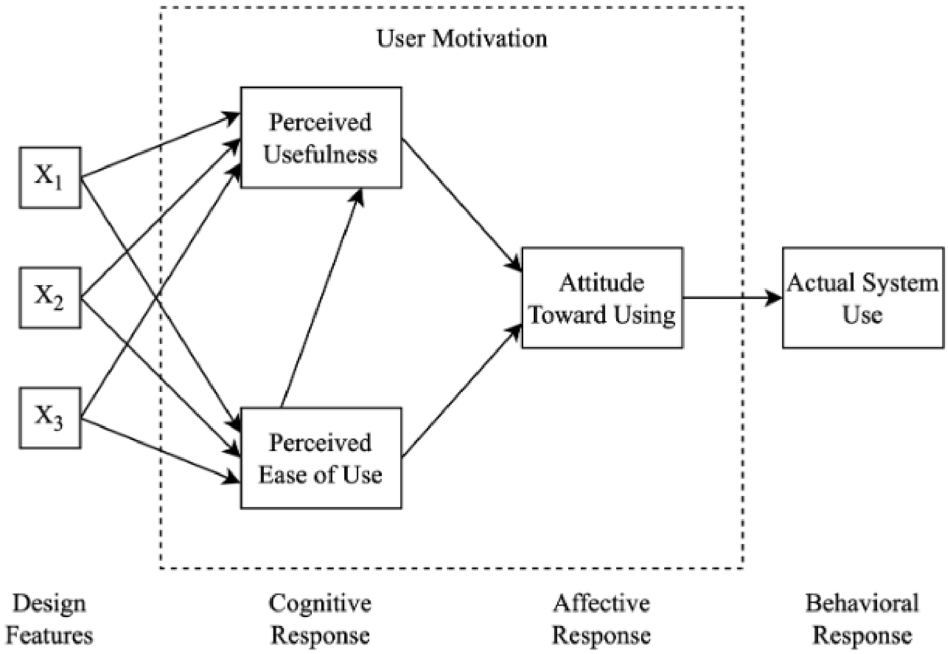

Figure 6. Adopted from Davis et al. (1986) TAM with user motivation and different responses

As seen from Figure 6. the acceptance process can also be divided to a linear progresess. Here the Design features represent the external variables. As Figure 6. presents, three factors are included in User motivation. These are cognitive and affective responses. Positive effect on these can lead to Actual System Use which is a change in behavior.

2.4.1 Extended TAM or TAM2

Venkatesh and Davis (2000) introduced additional factors to TAM. This model is known as Extended TAM or as TAM2. This theory will further be referred to as TAM2 in this thesis. TAM2 introduces three social factors to the original which widen the perspective of the original TAM. In addition, the TAM2 introduces new cognitive instrumental factors. (Davis & Granić, 2024)

The social factors in TAM2 are an important addition to the original theory especially in AI research. Because of the exponential popularity of on generative AI tools and the benefits they promise, social factors are crucial for AI research.

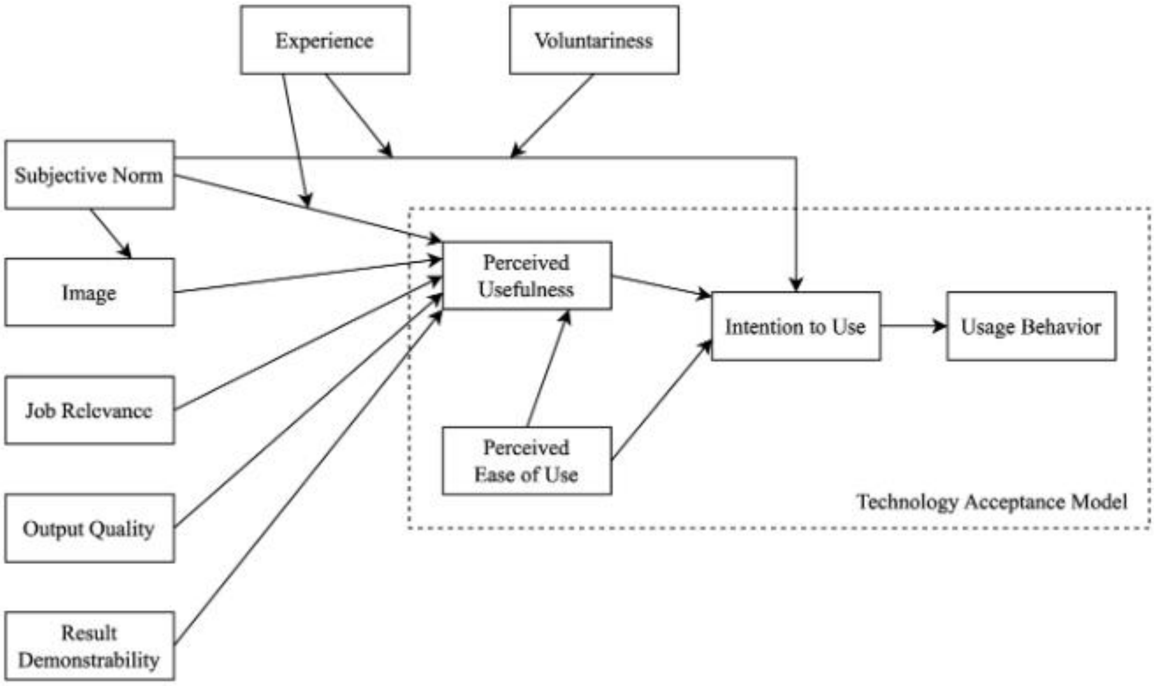

Figure 7. Extended TAM (Venkatesh & Davis, 2000)

Venkatesh and Davis (2000) presented new factors to original TAM, and they are presented in above in Figure 7. Below each of the new factors will be explained:

Subjective norm means how do important stakeholders the technology. If they view it as important or beneficial for the work, then there can be pressure to use the technologies. (Venkatesh and Davis, 2000) The subjective norm can also be against the technology for example, other organizations might restrict usage of generative AI software and other might embrace it.

Image utilization of modern technologies might boost your image in some organizations. If you are effectively utilizing AI, it might boost your Image within your peers and management. If the technology is viewed as a subjective norm in the organization, can this have significant positive effect on the image of technology (Venkatesh and Davis, 2000).

Voluntariness of the technology. According to Venkatesh and Davis (2000), voluntariness influences acceptance. It is important to discover in the research if the technologies are mandatory or voluntary within the organization. Different roles use different technologies. For example, some organizations might force their employees to use generative AI and for some organizations it might be voluntary.

Job relevance of the technology is another aspect to consider when assessing the possible acceptance of the technology. The technology needs to bring direct benefits to the actual job the person is performing. The relevance of the technology is determined on how it performs on the tasks it is performing and on how well it achieves its goals. (Venkatesh and Davis, 2000) In the case of generative AI, no matter how great the technology might be even then if it does not help in the main duties the possible user has, then the usage becomes non-existent.

Output quality defines how well does the technology perform in the tasks it is meant to do (Venkatesh and Davis, 2000). For the technology to be accepted the outputs need to be on an adequate level. Is this especially meaningful when considering generative AI software. A major part of the credibility concerns generative AI has been caused by the hallucinations it can create which are an extreme example of inadequate output quality (Su et al., 2024).

Result demonstrability the new technology needs to be of a high level. The more evident the results are more likely acceptance is. (Venkatesh and Davis, 2000) For example in the context of productivity and generative AI this could be a clear presentation of hours saved by week. Result demonstrability is especially important for this research since one of the aspects researched is the effect of generative AI has on productivity. For the user of generative AI should present demonstrable results for the user to notice the possible gains in productivity.

2.4.2 Benefits and limitations of TAM

TAM as theory has been proved to be useful on multiple occasions and it is widely known and accepted as a great theory to assess technological acceptance. According to Davis and Granić (2023) flexibility, reliability and wide usage are biggest benefits TAM can provide to research.

Limitations of TAM include the inconsistency of the data it produces. This is since it does not have that much standardization. (Davis & Granić, 2024) For this research the lack of standardization is fitting because the exploratory nature of this thesis. This gives the respondents the ability to answer the questions more openly. This also leads to the other limitation of TAM which is the fact that it relies on subjective data. (Davis & Granić, 2024) It is impossible for the respondents to report their wants and need on generative AI objectively and this needs to be considered when analyzing the data.

TAM was chosen for this thesis due to its simplicity for the respondents. The goal for the interview was to keep the questions easy to understand for the respondents to sustain a high level on the answers for each of the questions.

2.5 TAM in generative AI

Extended TAM was chosen as the theory for this because it is very suitable for generative AI on multiple aspects. In this chapter the prior academic research is discussed, and the different factors of TAM are explored in the context of generative AI.

2.5.1 Current Research

Setälä et al. (2025), introduced Extended TAM to Finnish generative AI research. Their study indicated that the usage of Extended TAM in generative AI research is valid and that the additional factors introduced in Extended TAM are extremely suitable for research conducted on generative AI. This research was done in an educational context. Similar research was conducted by Lai, Cheung, and Chan (2023), in different contexts further validating Extended TAM.

Dahri et al. (2024) researched pre-service teachers with the utilization of extended TAM. This research was also done in an educational context. Dahri et al. (2024) generative AI was highly accepted among the teachers as a tool to improve teaching. Many different factors affected the acceptance of generative AI software. The most important factors were found out to be social influence and individual competencies. (Dahri, 2024)

More research on educational context was done by Bourouni et al., (2024), their research further cements the usage of TAM in AI adoption as a viable tool. This was backed up in Finnish context with and adapted version of extended TAM by Setälä et al. (2025). Bourouni et al. (2024), in their research raised the common concerns generative AI has on plagiarism and misinformation among other ethical matters. According to their research the keys for successful adoption of generative AI software are minimizing risks, making them as easy to use as possible and arranging proper training and support for the solutions. (Bourouni et al., 2024)

Noy and Zhang (2023) researched TAM on generative AI from a Behavioral context. The target group of their study was students within their final year. The target group of this research is close to the target group of this thesis since this target group was in the final year of their studies and the target group for this thesis recently graduated. Because this research is two years old, the framework of this study could be utilized to the same target group as a follow up study since it can be assumed that they have now 1-2 years of full-time work experience.

Noy and Zhang (2023), stress and anxiety were identified as accelerating factors in generative AI software. These factors and incoming deadlines drove towards adoption of AI. From this can be interpreted that the students were starting to use generative AI software to gain productivity enhancement and this study shows that generative AI software provided that. Research also indicated that after getting used generative AI it became more likely that they will use it in their jobs. (Noy and Zhang 2023)

There has been also research been done in Chinese context. This research found a correlation between use behavior and perceived usefulness. Another correlation was found with use behavior and perceived ease of use. (Ma et al., 2024) This research also indicated that the educational background has an effect between the factors. The study implies that people with higher educational backgrounds are more likely to utilize generative AI software in their work, and they are more likely to view the technology as more useful if they also view it as easy to use. (Ma et al., 2024) The target group of this thesis must have at least a bachelor's degree and because of this it will be compared to the results of this research.

2.5.2 Linking TAM to the research gaps

As explained above user motivation consists of Perceived Usefulness, Perceived Ease of Use and Attitude Towards Using. Perceived Usefulness and Perceived Ease of Use can be affected by a lot of different factors. Setälä et al. (2025), highlighted Perceived Usefulness as the most important factor in the acceptance. They also indicated practicality was an important factor in Finnish context. This is disputed by Koponen (2024), because attitude was found to be the most important factor in her research, but otherwise the findings were similar. Lai et al. (2023), did not find practicality as notable factor in the context of students of Hong Kong. Perceived usefulness was highlighted as the most important factor in this research also.

Lai et al. (2023), and Setälä et al. (2025), implied that Perceived Ease of Use was not notable factor when evaluating acceptance yet opposing results can also be found on current research (Koponen, 2024; Lim et al., 2025). Therefore, deeper research on the matter ought to be conducted.

Dahri et al., (2024) included a lot of different aspects related to perception in their mixed method research. This research indicates a lot of possibilities generative AI can create with their promising results. Noy and Zhang (2023), indicated that stress and anxiety were accelerating factors in user acceptance. This field needs more research. To evaluate the acceptance in a more efficient manner drivers behind user motivation need to be evaluated due to the lack of extensive research on the matter. In the terms of TAM the external variables related behind the accceptance need to researched.

Extended TAM gives depth to the aspect of user motivation in the research. Extended TAM will be used as a backup to gain depth on the participants answers. From the factors introduced in Extended TAM some are researched. Output quality is a major concern when using generative AI (Alkaissi & McFarlane, 2023). Job relevance was one of the factors Noy and Zhang (2023), discovered to be important to acceptance.

Actual System Use: all the participants use generative AI. For this research it is important to backtrack from this to find out what factors have led to the actual use of the current solutions. If the participants reflect on their past acceptance process, it might be easier to reflect on what could lead to acceptance of more generative AI usage. In this context also the abandoned generative AI software needs to be researched. Noy and Zhang (2023) reported that some of the participants in their research stopped using the ChatGPT after their research for various reasons. When researching generative AI, the failures need to be discovered. In this context the generative AI software which the users have tried but have abandoned during the way.

2.6 Synthesis of the literature

Factors and motivation behind the usage of generative AI require deeper research. Research on the Finnish context needs to be further improved. The attitudes towards adoption need to be researched on a deeper level to find the motivational drivers behind the possible adoption.

The focus of the current research is within an educational context. It is important to research on how does the acceptance transfer to entry-level professionals. The amount of qualitative research is marginal compared to the amounts of quantitative research conducted. The prior research indicates that various aspects of generative AI need to be evaluated due to the complexity of the matter.

Productivity is the focus and there is already prior research conducted on it. The research has indicated positive effects which generative AI has generated on productivity. Productivity cannot be researched without considering the risks generative AI can have. Therefore, multiple perspectives need to be considered in the empirical section. Qualitatively the perception of productivity gains can be discovered. Positive possibilities AI can bring is brought up in almost all the prior research. The risks are also researched thoroughly, and the identified risks tend to be similar in each of the studies. Lai, Cheung, and Chan (2023), highlighted the need for qualitative studies with interviews to obtain results which dive deeper.

TAM has been proven as an excellent tool and with Extended TAM wider perspectives can be evaluated. Perceived Ease of Use is a significant part of TAM. Still there is research which indicates that in the context of generative AI it might not be an important factor. This factor ought to be researched further.

3 Methodologies

In this chapter the research methods used in this research are presented. This chapter describes also the data collection and analysis of the collected data. Qualitative methods were used for this research and will be introduced in this chapter. Semi-structured interviews were conducted to collect the data used in the research. The data was analyzed using thematical approach. Nine interviews were conducted on the target group for this research.

3.1 Qualitative Methods

Qualitative research methods were chosen as the method for this research. Quantitative research focuses on measuring factors numerically quantitative methods give a more nuanced understanding of the researched matter by letting the participants respond with more freedom to achieve more depth and details in the response (Silverman, 2019).

Qualitative methods require deep analysis because of the depth that the answers have with a linkage to an existing theoretical framework (Silverman, 2019). In this research Extended TAM is used as the main theoretical background with prior Generative AI research. Need for more qualitative research has been noted in prior research by Lai, Cheung, and Chan (2023).

Majority of the prior research has been conducted with quantitative methods therefore a qualitative approach is needed for a broader view of the subject. According to Silverman (2019) research done with qualitative methods is aimed at answering questions about how and what. How and what are included in both main research questions of this research and they are also used a lot in the interviews to obtain answers which are open ended.

3.2 Target Group

The target group was chosen to be industrial management engineering graduates with a bachelor's degree from Turku University of Applied Sciences. The participants have graduated between 2023 – 2025. Some rejected the opportunity to participate in the research. The goal was to receive participants from various different roles and environments. This background research was done through LinkedIn. The participants were approached with text messages.

This target group was chosen because industrial management blends commercial and technical aspects (Turku University of Applied Sciences). Joskowicz and Slomovitz (2023), indicated that AI knowledge among individuals with technical engineering backgrounds is very limited. For this research, the participants do not need to have a deep understanding of AI. This research is aimed at individuals who do not in fact have a deep knowledge of AI.

To be eligible for the research the participants need to have used at least some kind of a generative AI software with their work-related tasks. To be eligible for the research the participants also need to have relevant full-time work experience. Minimum work experience needed to be eligible for the study is one year. This was chosen because after one year of work it can be assumed the person has onboarded to the position properly and started to contribute. Most of the respondents had already worked fulltime while writing their bachelor’s thesis and this experience was also accounted for.

The maximum allowed work experience is four years. This limitation is done to focus on professionals who already have relevant work experience but are still early in their career.

A lot of past research was focused on students. Noy and Zhang (2023) focused their research on mid-level professionals. This is why focus shifted towards entry level professionals or to be more specific bachelor’s graduates who already have jobs and some relevant work experience. The experience was capped to 4 years. This decision was made to avoid the participants to be too accustomed to their jobs and for them to still be relatively close to their graduation. This segmentation was done also because, according to Statistics Finland (2024a) the rate of AI usage drops rapidly when moving to older working people and to be eligible for this research, the participant needs to have used at least some kind of a generative AI software. The focus is towards younger individuals since they have a higher AI adoption rate (Joskowicz & Slomovitz, 2023). And from the older generations it would be harder to find participants.

3.3 Data collection methods

Qualitative methods were chosen to be used in this research. Interviews were chosen as the method for data collection. The interviews were conducted online. Online interviews were chosen over face-to-face interviews. This decision was done to make the interview process more efficient. Efficiency was improved by eliminating the possible traveling and This decision eliminated any locational restrictions participants could have had.

The data was collected using semi-structured interviews. According to Silverman (2019), semi-structured interviews an ideal form of data collection when the number of interviews is in the range between 6 and 20. In semi-structured interviews there are set questions to be asked from all the participants, but the questions are open ended to receive answers with more depth (Silverman, 2019). During the interview interviewee might have to ask some questions for more elaboration or to confirm the meaning of the answer (Silverman, 2019).

The interviews were conducted online. Nine interviews were held for this thesis. The interviews were recorded and transcribed. The interviews were held in Finnish since the respondents, and the interviewer were Finnish. The interview questions can be found in **Appendix 1.** in English. The questions were only translated to Finnish for the interviews.

Experience (years)	Role	Organization size in Finland
1,5	Technical Specialist	500
2,5	Category Manager	400
2,5	Supervisor	2 000
3	Interior design manager	14
3	Materials Specialist	800
2,5	Buyer	50
2,5	Head of Maintenance	18
3,5	System Responsible	2 000
3	Procurement Engineer	50

Table 2. Experience, roles and the organization size in Finland.

The industries among the participants varied from shipyards to information technology. The organizational sizes presented in Table 2. are not accurate. Instead, they are approximate to give perspective on the sizes of the organizations. After six interviews it became clear that a lot of the themes very already discovered. Three more interviews were conducted after this point to confirm the matter. The participants had a lot of similar views on the topics, and the three interviews did not provide a lot of new insights. Of course, minor details were discovered from these interviews.

3.4 Data analysis

The data collected by the interviews is analysed using a thematic analysis. The literature review is used as the background for the questions used in the interviews. Thematic analysis was used for this thesis due to its versatile capabilities in the analysis of qualitative data. Thematic analysis is recognized as one of the most popular ways to analyse qualitative data. (Braun & Clarke, 2013)

Thematic analysis is used to recognize patterns and themes in the data and then analysing them. Thematic analysis is an iterative process where the data is gone through multiple times to find the themes in the data. (Braun & Clarke, 2013) The data in this research is the transcriptions of the interviews.

Coding was done based on in the data provided in the interviews. The literature review was used as the basis for the coding. All the linkages to the literature review were coded among other details worth exploring. In the data analysis process, more focus was assigned to the codes which appeared more often in the interviews. Singular codes are also brought up if they had relevant insights which were considered to further improve the research.

After the coding process had been completed, was the process of recognizing broader themes started. Large part of the themes was created based on the literature review. The research questions and the theoretical background provided a large part of the themes. These themes are presented in the research findings chapter.

The interviews were conducted in Finnish. The in this chapter quotations from these interviews are used for this thesis to give context. The interviews were done with the use of Microsoft Teams and they were recorded and transcriptions were made. The interviews were held in Finnish and translated to English by the researcher. The quotations are translations to English and therefore might differ a bit from the original quotations.

3.5 Validity and reliability

Assessing the reliability and validity of qualitative data is a delicate matter. According to Lincoln and Guba (1985) four main criteria should be assessed when evaluating qualitative data. These criteria are credibility, transferability, dependability and confirmability. These criteria are used to assess the trustworthiness.

Credibility is the aspect of which assesses how the responses of the participants describe their experiences (Ahmed, 2024). In this research the respondents were given open questions to ensure that they can answer in their own words. Very little help or guidance was given by the interviewer. The experiences were positive even though there was not much generative AI usage. This contradiction needs to be taken to account when analysing the data.

Transferability is the factor used to assess how the data can be used in other contexts (Ahmed, 2024). The methodology of this research was created in a way which can be replicated and used in a lot of different contexts. These methods were general and are easily replicated among other target groups. More research on other target groups is needed to extend the knowledge on Finnish acceptance levels, and the results of this research cannot be generalized to other target groups.

Dependability is needed to determine how consistent are the findings (Ahmed, 2024). The findings in this research where consistent among the respondents. Although critic is needed also in this aspect because the research was done by only one researcher. Generative AI also has a lot of hype behind it, and it could influence the responses the participants might feel that they should be hyped about it even though they do not use it that much.

Confirmability is the aspect where amount of effect of the researcher’s bias affects the research (Ahmed, 2024). The researcher views generative AI as a monumental tool which has risks attached to it. Even though measures were taken to minimize this factor by trying to include a lot of different aspects, were the results generally positive but risks are also acknowledged.

Overall, the data quality gathered in the research is adequate. From validity perspective data gave perspectives to the researched matter and conclusions can be made from this. Reliability is also on a high level. There was a lot of similar findings among prior research which embraces a high level of reliability in this research.

4 Research findings

In this chapter, the findings of this research are presented. The data is from the interviews conducted for this research. Quotations from the interviews are also presented to give wider perspective on the responses on the generative AI. This section is divided into themes which rose from the interviews.

4.1 On what do industrial management engineers use generative AI?

The interviews a long list of different use cases were found. The most popular use cases in Finland presented in **Figure 1.** Where all found within the interviews. In **Figure 1.** the creating pictures and videos were the 3rd most common use case, but the participants had only tested the using generative AI in this. This could be explained with the job relevance factor and explained by the fact that the sample might not these kinds of tasks in their daily work.

Information search was highlighted as the most popular use case for generative AI, and this is much in line with **Figure 1.** According to the participants information search generative AI is competing against traditional search engines mainly Google. Among the participants the perspectives on which is better varied a lot. Some consensus was found on the fact that in certain types of searches generative AI performed better than Google. Still the concern on the outputs of generative AI often led to double checking the data generated by generative AI from another source searched with Google.

"I think it is faster and can answer to anything whereas Google might not be able to give a straight answer." 3

"I can for example first ask differences in steel qualities and based on the results start conducting more research on the matter."

"I need to crosscheck from Google." 8

Creating and enhancing text was another use case noted in **Figure 1.** as one of the two most popular use cases. This use case was also popular among the participants. Text was enhanced and created for example for more formal email and as a help when creating requests for quotations. One of the participants organizations also had AI generated customer service answers embedded in their customer service processes.

"I can modify my writing tone to be more professional." 2

As depicted in the literature review some of the prior research highlighted using generative AI as a learning assistant as one of the most prominent use cases for generative AI. This research further strengthens the use case since it is widely used as a learning assistant within the participants in work and study contexts. It was used for learning in a lot of different ways.

"It is at least personal assistant" 3
"I inputted the materials to generative AI and asked it to explain the data in a better and more precise way."

Below are some examples of other use cases the participants had for generative AI:

- Brainstorming
- Coding
- Math
- Simplifying data
- Translation
- Gathering data

The participants had numerous use cases for generative AI and a strong believe that more use cases are to be found for them indicating strong belief in the positive effects of generative AI.

4.2 Why industrial management engineers use generative AI

This chapter will examine why do the industrial management engineers use, and which factors accelerate the usage. The usage levels varied a lot in the sample. One of the participants had stopped using of generative AI almost completely on the other end of the spectrum one of the respondents was heavily invested in different generative AI models and had very deep knowledge on the matter.

All the participants saw possible benefits in utilizing generative AI. The participants also saw a lot of different risks related to the usage of generative AI. Over half of the participants worked in an organization which where generative AI was widely used. Although most of participants felt that their organizations did not utilize generative AI to its full capacity.

4.2.1 Possibilities on productivity

In this chapter the effect on productivity is examined with the insight provided by the interviews. The participants view on productivity were in line with each other and none of the respondents had a different opinion on the overall effects generative AI can have on productivity. All the participants indicated that generative AI has a positive effect on productivity, and it was the main reason generative AI was used. Some even considered the benefits as major. There was still room for improvement since the participants indicated that there are still problems in the current generative AI software which hinder the possibilities on maximal productivity gains.

“Pretty much all I do with generative AI is related to improving my productivity.”
“If I get stuck on something then I get the help quite easily from there”

There was a strong consensus between the participants that generative AI has a very strong positive effect on productivity. In fact, when the when the interviewees were asked *"Why do you use generative AI?"*, most of them answered that the main reason for the usage of generative AI was productivity increase. Three of the respondents also used the word Convenience as another word to describe why they were asked about the causes which lead to the usage of generative AI.

"It makes things easier. Everything is much faster in case have so called harder question, it gives me the answer straight away."

The interview also included a direct question on *"How does generative AI effect productivity?"* this question was asked later in the interview. Because all the respondents considered productivity as one of the root causes of generative AI usage, were the answers quite narrow for this question. Time savings was regarded as the main benefit when asked about this by most of the respondents. Time savings were created by the productivity enhancements. Other direct benefit created by generative AI was improvement in work quality.

"It makes it possible to create software which would be otherwise too hard or too slow to make"

None of the respondents have measured the benefits which the generative AI has created for them. Even though the organizations varied from small Finnish companies to large multinational organization, had none of them measured the benefits of generative AI at least in a way the participants had any knowledge. Although the benefits were clear to the to the respondents and some of them considered the improvements significant, had none of them any numerical data to back this up. One interview highlighted importance to embedding generative AI to current tools to further improve productivity.

(The benefits in productivity) *"Are clearly visible but how well can they be measured is another thing."*

4.2.2 Perceived Usefulness

Among the participants the usefulness of generative AI software was undeniable. All the respondents viewed them as very useful. Even the participants which did not utilize generative AI very much saw the usefulness it can provide but still their adoption had stalled due to the lack of use cases.

"It (generative AI) makes my life easier."
"It saves time."

The participants had a lot of different use cases for the generative AI. There was a lot of variances on the amount of use cases between the participants. The participants who saw more use cases in generative AI did use it more. Most of the respondents indicated that training could increase their usage. This indicates that there could be even more use cases for the participants. This also indicates that on an organizational level generative AI is not seen as very useful since it is not already widely used among some of the organizations. In a couple of the organizations, it was promoted on an organizational level, but actual use was not that common.

"Even though a lot of individuals use generative AI in their daily tasks has generative AI has not been mentioned to me even once by my organization."
"On an organization level the benefits of generative AI are constantly promoted to all but in our daily tasks within the team there has not been a lot of public talk about it."

Most of the participants also indicated a willingness to invest time in learning to use alternative generative AI software with steeper learning curve. They were willing to invest the time if they knew that the investment would be beneficial in terms of increased time savings or other.

4.2.3 Perceived Ease of Use

The importance of Perceived Ease of Use has been debated in the prior research as conducted with TAM as a method as shown in the literature review. The participants viewed it as a major factor in their generative AI usage. In fact, one participant highlighted it as the reason why generative AI was used by him. One of the participants highlighted that their organization had already embedded generative AI into their processes. This participant implied that this has significantly increased the usage of generative AI.

(Generative AI) "Is easy to use and therefore used."
"The software and the user interface need to be easy to understand."
"I like to cut corners therefore if it is to use, then I would like to use it. It is ridiculously easy to use." (ChatGPT)

Most of the organizations in which the participants were employed by, had not widely adopted generative AI to their processes. Only five of the participants had licences provided by their organisations to utilize generative AI tools which were not freely available. The rest of the participants used the free versions. ChatGPT was used by all the participants. If the participants were not provided with another tool or a license, they used the free version of ChatGPT. Four of the participants had a Copilot license provided by the organization. Still these participants utilized the ChatGPT to some use cases since it had better performance in these tasks.

"AI is not officially embedded in any of the processes where it would be used. It is just a voluntary support tool."

4.2.4 Job Relevance

Job Relevance was highlighted as one of the most important aspects of the adoption process of generative AI. When asked about *"What would increase the usage generative*

AI?" participants highlighted the lack of concrete use cases. The amounts of generative AI usage varied a lot among participants. Yet even the participants who did not use generative AI much, did see the benefits of utilizing it. Especially the ones who did not use it as much indicated the lack of use cases.

A lot of the participants indicated that in their daily work they did not have any more use cases to expand on. This being a subjective perspective, it is impossible to verify if they could utilize generative AI more in their work in this research. This conflicts with the fact that most of the participants indicated that training could increase their generative AI usage. Based on the interviews and prior research, there should be more use cases for all the participants to expand on. These tasks might not be in high importance during their daily work, and they might not have thought about utilizing generative AI in these kinds of use cases.

"I don't have a lot of needs to use AI, but in the moments, I need it, it saves a lot of time."
"AI could be forced to some processes to make you have to use it"

Around half of the participants highlighted training on generative AI could increase their usage. This indicates that there in fact could be more use cases for generative AI. With successful training the participants could be able to widen their perspective on the possibility of more use cases for generative AI.

"I have not had the need to use it and have not thought about what I could use it for. Nowadays it can be used to almost anything."

The effect of training to increase acceptance of generative AI is not in line with other matters brought up in the interview. The participants indicated that they do not have more use cases for generative AI within their work but on the other hand believed that more training could be influential in increasing their usage.

"If someone gave me some kind of a training to it because I am not interested so much in technological matters and do not want educate myself on the matter."

4.2.5 Intention to use and actual use

Almost all the participants used generative AI, but the frequency and amount of use cases varied a lot. Actual use was found outside working hours since some participants used generative AI for information search and as learning assistant in case, they had some studies going on alongside work. Only one of the participants did not use generative AI now. He had used it before and strongly believed that he will start using it again once a suitable use case is found.

"I have not had the need to use it and have not thought about what I could use it for. Nowadays it can be used to almost anything."

All the participants had the intention to use but stated that lack of use cases hindered to the actual usage. Since the intention was very strong among the participants it can be presumed that their use will likely increase in the future if the generative AI tools develop further. Other factors increasing the actual use and accelerating the adoption process could be training provided by their organizations and their own research in generative AI.

"Our personnel are stubborn; therefore, a strong message needed from the leadership team with a concrete use case."

4.3 Aspects hindering acceptance

There was multiple hindering aspects recognized which hinder the acceptance of generative AI. In this chapter, these aspects will be presented. To maximize the acceptance of generative AI and to maximize the productivity possibilities, these aspects need to be taken to account to minimize their possible negative effects.

4.3.1 Productivity limiting factors

According to some of the interviews, generative AI can also have negative effect on productivity in some cases. Some of the interviews highlighted the importance of embedding generative AI to current processes and software. These factors also limit the acceptance of the technology due to the poor performance.

Weak output quality was highlighted as one of the biggest limiting factors on productivity enhancements. Some of the interviewees also stated that they need to always double check the data provided by generative AI. The double checking is a time-consuming process and can diminish the positive effects created by generative AI in the first place.

The organizations restrict on what data can be inserted into generative AI. This can limit the use cases because it cannot be used with internal documentation to its full potential. Even though most of the organizations did not have clear policies on generative AI usage, knew the respondents not to insert sensitive data into them. This remained unclear that where the instructions on not to put sensitive data came since there were no official policies in most of the organizations. Some of the participants stated common sense as the factor on why they did not put sensitive data into generative AI.

"We have sensitive information which not hoped to be inserted into any generative AI software."

4.3.2 Output quality

From the perspective of the participants own output was output quality was highlighted as one of the most important factors in increasing the adoption of generative AI. Along with time savings the biggest benefits the respondents utilized generative AI in text creation and enhancing. Majority of the respondents used generative AI to draft or modify official emails.

"If someone likes to use a bit "dumber" tone in writing, can be modified one to become more professional."

From the perspective of the generative AI software was the output quality of different generative AI software were heavily scrutinised by the participants. When asked about the risks the participants had regarding the usage of generative AI, was weak output quality highlighted as the biggest risk in the usage of generative AI. To tackle this risk the users are currently double checking the data created by generative AI. For the checking process Googling was highlighted as the most popular way to check the data and to find alternative sources for the data. There was variance between the respondents because some of them considered ChatGPT as much better tool for information search compared to Google.

"I might have a perception on the matter, but I want to search for assurance for it. It is kind of like calling a coworker but faster."
"I would be ready to wait for 5 minutes for an answer if the answer would actually be correct."
"Google is faster and easier."

Weak output quality was highlighted as one the main causes in switching between generative AI software and on switching from generative AI to traditional search engines. All the participants who had Copilot licenses, still used other generative AI software in additionally. Usually, the solution used alongside Copilot was ChatGPT. These participants implied that ChatGPT was more suitable for certain use cases.

"The prices of the software is constantly going down and the quality of the answers is generally getting better. Therefore, I constantly evaluate different generative AI software options."

In conclusion, according to this research, the importance of output quality is undeniable in the acceptance of generative AI. Currently weak output quality is hindering generative AI usage. It could be argued that if the output quality of generative AI improves with the same rate that it has improved in the recent years, might the improvements in this factor further increase the adoption of generative AI.

4.3.3 Risks

The usage of generative AI does not come without risks, and this is acknowledged among the participants. A lot of different risks were brought up in the interviews. All the participants were concerned on what information from their organization could be inserted into generative AI. Some of the participants were not concerned on their personal data being inserted into generative AI and considered the data "not as important".

"I would not put our organizations internal matters in there (generative AI)"
"I would not use it for sensitive personal information"

One of the biggest risks identified in the research was regarding the output quality. The participants were concerned about the information generated by generative AI. Some of the participants highlighted the need to crosscheck always the data generated by generative AI. On the other hand, cross checking data and source validation is always highly recommended when acquiring data from anywhere.

"It gathers and saves data from about me."

A couple of participants highlighted the fact that generative AI could have a negative effect on their critical thinking. The participants implied that in the worst-case scenario people could start over relying on generative AI over time and using just the outputs it creates without any kind of critical assessments. One of the participants already indicated that he possibly has coworkers who only use the straight outputs from generative AI. This could be only an anomaly but since the concern was raised by more than one participant, it could develop to a wider issue.

"My critical thinking could weaken if I start overly relying on ChatGPT."

Even though plagiarism and copyright issues was highlighted as a major risk in prior research, was this aspect absent from the respondents' answers. It was specifically asked about but none of participants brought it up when asking about risks or in any other context.

4.4 Other factors brought up in the research

In this chapter, rest of the findings regarding the Extended TAM methodology are presented. Also, other smaller matters brought up within the interviews are discussed in this section.

4.4.1 Result demonstrability

None of the participants had measured the benefits which generative AI had created for them. None of the participants had any knowledge of their organisation measuring the benefits at any level. Yet, all the participants saw clear benefits especially time savings in using generative AI. None of the participants worked in their organizations IT departments therefore there could be some measurements done within their organizations without them knowing.

On a personal level this research proves that the participants strongly believe in the benefits of utilizing generative AI. None of them had any numerical data to back this up but still benefits in time savings and increase in productivity was clear for the participants. Generative AI also excelled in a lot of different uses cases further strengthening its position as useful tool.

(The benefits) *"Are clearly visible but how well can they be measured is another thing."*

4.4.2 Voluntariness

Most of the organisations in which the participants worked in did not enforce their employees towards generative AI usage. Only one of the participants noted that generative AI was embedded in their daily processes heavily and was therefore forced to use it. Only around half of the participants even had a license to some generative AI software indicating low investments from the organizations towards generative AI adoption.

"It is just a voluntary support tool."

Those who did not have a licence provided by their organizations used free versions different generative AI tool. ChatGPT was clearly the most popular and all the participants had used it to some extent. Only one of the respondents had a ChatGPT license provided by their organization. This indicates that most of the respondent's sook out of generative AI voluntarily and not from the organizational push. This furthermore validates the fact that the participants saw a lot of possible benefits in using generative AI in their work.

Some of the participants highlighted a stronger push needed from their leadership to indicate among their organizations. Lack of organizational motivation towards usage was highlighted by many of the respondents. Some of the respondents implied that if their organizations would bring up generative AI with trainings and advertisements, would they likely use it more.

(To increase generative AI usage) "A strong message needed from the leadership team with a concrete use case." 6

4.4.3 Experience

The experience levels on generative AI varied a lot in among the participants. Most of the participants implied that training could increase their generative AI usage and that they would be willing to invest time to learn using better generative AI tools. This implies that the participants think that more experience would increase their usage. The participants acknowledged their knowledge is limited and it could be a limiting factor in their generative AI usage.

"I necessary do not have the experience since a not utilized it enough there I have not become familiar with it."

When looking at the small sample in this research, the individuals with more experience had more use cases for generative AI and therefore likely used more generative AI. The amount of experience with generative AI did not have a major effect on their opinions regarding generative AI. Only correlation found was a difference when asking about the effects generative AI can have on the job market. Two of participants which had the least experience on generative AI indicated that generative AI will likely reduce jobs in the future whereas the rest indicated that it would influence the job market but will not decrease the overall number of jobs.

4.4.4 Subjective norm and image

Using generative AI was not the norm in all the organizations. Most of the participants felt like they were the using more generative AI than their peers. There was no pressure to use generative AI and some of the participants felt like the generative AI users were a minority in their organization. A couple of the participants indicated that older coworkers used less generative AI and hindered organizational acceptance of generative AI by opposing all organizational changes.

"I probably belong to a minority" (Because generative AI usage)

A clear difference was found between smaller and bigger organizations. Smaller organizations did not invest in generative AI licences whereas the larger organizations did provide some license. Yet this did not seem to affect the acceptance of the organizations or individuals because there were similar remarks from smaller and bigger organizations participants. These included the lack of organizational push and lower acceptance levels on the older employees.

“No one from my organization has ever mention AI for me”

None of the participants highlighted that the usage of generative AI could had any effects on how they are viewed in their organization or if it could have any effect on their image. Yet all the respondents implied that the importance of generative AI will only increase in the coming years.

4.4.5 The effect of generative AI to the job market.

There was a strong consensus to that AI will have a major impact on the job market. Majority of the participants indicated that generative AI will strongly modify the job market, but the number of jobs would likely stay the same. The participants indicated that the need for many of the current jobs could be replaced by AI in the future, but they strongly believed that other jobs would emerge the replace these jobs. Couple of the respondents had a different perspective. They indicated that the total number of jobs could decrease, and the increasing usage of AI could even lead to higher unemployment rates.

“Customer service personnel might not be needed as much in the future.”
“Some of our customer service responses are already AI generated”
“AI might create inequality in the job market”
“Some industries are going to disappear, and some are going to increase”

4.5 Current acceptance among industrial management engineers and the future

The acceptance level of generative AI was very high among the participants. According to the interviews the most important factors in Extended TAM were job relevance and output quality. Both factors directly affected on the usage of generative AI. Experience was the third most important factor. Experience and job relevance had some correlation since increase in job relevance would increase the usage and therefore increase experience levels in the future. This works the other way also since a lot of the respondents indicated that they do not have a lot of experience with generative AI and believe that that more training and experience would help them find new use cases and therefore increase usage. Output quality was scrutinised a lot by the respondents and the respondents did not have a lot of trust to the outputs. Developments in output quality could increase the usage in the future.

Using generative AI was normal in the organisations yet it was not widely used. None of the respondents indicated that generative AI could affect their image in a positive or a negative way, yet they implied that the importance would increase in the future. They implied that generative AI would become an essential skill in a lot of different jobs. Therefore, this factors importance could change in the future. Voluntariness was neither an important factor in this research since the acceptance was already on such a high level that the participants used them voluntarily.

Result demonstrability turned out to be an interesting factor in this research. None of the respondents had data gathered from themselves or by their organisations on the possible benefits of generative AI. Yet, all the participants were convinced on the benefits which generative AI has created for them. Some of the respondents even clearly indicated that they would not use generative AI unless the positive results were this clear.

4.5.1 What would increase the usage of generative AI?

Most of the respondents indicated that there was room for increase in generative AI usage. Generative AI related training was the most highlighted mean to increase the usage. The respondents who indicated a need for training implied that providing the training should be the responsibility of their organisation. Only one of the respondents indicated a strong willingness to learn more about generative AI on their own. This conflicts with the fact that most of the respondents indicated willingness to invest to better generative AI tools. From this can be interpreted that the organizations should find and present more suitable tools, if possible, for the respondents instead of the participants doing the research themselves. Yet this interpretation is disputed since the respondents used other generative AI software along the ones the organisations provided indicating some research done outside their company policies.

“I would require a clear need.”
“I do not have currently a clear need for it and therefore I am not actively looking for use cases. But if the software would offer me use cases, I would use it more.”

Most of the participants did not have features they were longing for. Instead, when asked about features which could increase the usage of generative AI the participants answered none and some of them just highlighted the need for better output quality within current solutions. A lot of different current features were brought out within this question, further indicating that improving the output quality also could increase the acceptance of generative AI.

4.5.2 Productivity

The participants had a strong consensus that generative AI has major benefits to productivity. Possible time savings created by generative AI can be major. Generative AI still has room for development, and it can improve productivity even more once participants learn how to utilize it better and would find more job-related use cases. The research already showed that that there are a lot of use cases but none of the respondents utilized generative AI in all of them. Of course, not all the use cases are relevant for all the roles but there is room for improvement.

On an organisational level there is a lot of room to improve. Most of the organizations have not successfully embedded generative AI to their processes. In these organisations AI does not seem to be a focus point now. Lack of clear policies also hinder the usage to some extent. The participants did have some unique use cases for generative AI where it could be utilized to gain competitive advantage. Some of the of respondents wanted a push from the leadership team to adopt generative AI on a wider scale.

5 Discussion and conclusions

In this chapter the results of this research are compared to existing literature and the answers to the two research questions are presented. First the results to the research questions are presented and this will be followed by managerial implications of thesis, and then the limitations and suggestions for further research are presented.

5.1 Conclusions

In this chapter, the conclusions of this research are presented. The conclusion section is divided into two sections according to the research questions.

RQ1 How can generative AI improve productiveness of entry level industrial management graduates?

The positive effects for productivity were undisputed in this research. Hajikhani and Cole (2023) and Noy and Zhang (2023) implied productivity increases in their respective research, and this research further embraces the effects and time savings which the productivity enhance can provide. Noy and Zhang (2023) also indicated improvements in work quality. This was also proven to be the case for the respondents of this research. Noy and Zhang (2023), also indicated that if students get used to generative AI, they are more likely to implement it to their work. This was the case also within this target group since all the respondents had utilized generative AI already in their studies. Noy and Zhang (2023), also highlighted stress and anxiety as drivers for adoption of AI but this aspect was absent in this research as with prior research.

Perceived usefulness has proven to be one of the major drivers of generative AI usage. In prior research in Finnish context there was a dispute between Koponen (2024), and Setälä et al. (2025), on the most important factor. Perceived usefulness was the most important factor in this research as it was in Setälä et al. (2025). Practicality was also important because the participants required concrete use cases. This research showed that generative AI is perceived as highly useful among the participants, but that they require more concrete use cases within their work.

In conclusion, the respondents viewed generative AI mainly as a productivity enhancing tool and perceive it as useful. The benefits gained from generative AI usage in the best-case scenario are time savings and improved quality of work. To further improve productivity two main factors raised as points of improvement. Output quality was highlighted as the biggest factor hindering generative AI usage and therefore limiting the productivity benefits. The second most important factor limiting was the lack of concrete use cases for generative AI.

RQ2 What are the developments needed for increase in generative AI acceptance?

As mentioned above the output quality is currently hindering the acceptance of generative AI and the lack of use cases. Training was brought up as a mean to help with increasing acceptance. Though this aspect needs further research to measure the effects. This was brought up also by Bourouni et al. (2024). They highlighted the need for training provided from the organizations. This matter was further emphasized by this research. Some of the respondents indicated no interest towards technical matters there an interesting perspective for new research would be to research if the trainings would increase the usage.

Alkaissi and McFarlane, 2023 indicated output quality as the biggest factor, and Noy and Zhang (2023) the job relevance. These factors were the most important also in this research. The job relevance is associated directly with the lack of use cases. If more use cases are found, then the usage will increase. The rapid development of generative AI could indicate that the output quality could improve in the future. This is also needed to increase acceptance of generative AI.

Eloundou et al. (2024), indicated regulatory as a factor in the usage of generative AI. The effects were negative in this research since the respondents could not use generative AI to its full capabilities because their organizations regulated on which data can be inputted to generative AI. This limiting factor in acceptance can’t be removed unless organizations find generative AI software which they can fully trust. On another perspective, Ilonen (2025), highlighted the lack of company policies hindering the usage. This factor was also brought up by the respondents, indicating that organizational regulation could in fact influence positively the generative AI usage to some extent.

In conclusion the acceptance level of generative AI among industrial management engineers was on a high level but there is a lot of room for improvement further improvement in the future. Productivity can be improved also a lot further in the future.

5.2 Contributions to existing literature

This research provides a needed deep dive to the usage of generative AI among industrial management engineers. This research adds more perspective to working professionals which is needed due to the current focus on educational context. Risks in prior research were also further proven to be the same except for plagiarism which was not identified as risk in this research (Su et al., 2024).

Need for training is in line with Bourouni et al. (2024). Although the actual effects of training should be researched more. This research found now new use cases for generative AI even though the respondents had quite a long list of different use cases. From this it can be interpreted that current literature has already presented a large part of the most common generative AI use cases.

Alavi et al. (2024), raised concerns on the effects generative AI has on entry-level workers. This research was done on entry-level workers but none of them noticed any effects generated by generative AI directly affecting the entry-level workers. Setälä et al. (2025), already introduced Extended TAM to Finnish generative AI context and this research further confirms Extended TAM as viable tool for evaluating generative AI usage due to its compatibility with this kind research.

5.3 Managerial implications

The findings of this research implies that the individual contributors are pushing responsibility of learning more about generative AI towards the organization. Also, they indicate that training could possibly increase their usage and that there could be use cases which they are not aware of. The research indicates that there is room for improvement in terms of productivity among the teams.

Managers should take initiative and have an open conversation with their team to share current best practices to make sure the team at least utilizes it to the best of the teams' capabilities. After this serious discussion should be held on the possible need of training provided by a professional of generative AI usage. Instead of general training team specific training with a professional consult could be effective to find more team specific use cases for individuals.

The participants were entry level professionals. All the participants strongly believed in the capabilities generated by generative AI. But most of the participants longed for more organizational push towards the usage. The managers should discuss amongst the leadership team if generative AI is currently positioned in their strategy in a correct way and if it is something they should invest more on. Although, in this case also concrete use cases need to be discovered to get return on investment.

5.4 Limitations of the study and further research

There were numerous limitations for this study and even though the current acceptance levels among the industrial management engineers were researched quite thoroughly. This research was conducted by only one individual therefore the perspective is limited. The target group was also small and therefore the results should not be generalised. The results give realistic view to Finnish entry level industrial management engineers, but it cannot be blindly generalised to individuals with different academic backgrounds or with longer careers.

This thesis focuses only on generative AI. This limits the research to a minor part of AI. In the research, the lack of knowledge on the full capabilities of AI from the researcher and the respondents limits the research. To fully understand the capabilities of AI, case studies among the organizations should be conducted to further seek out the possibilities in which AI can improve their processes.

Further research should be focused on how does training affects generative AI usage. This search implied the need for training but organizational training, but the effectiveness of training needs to be validated. The need for organizational commitment has already been discussed in the managerial implications chapter. More research should be done also on organizational context to validate their perspective on generative AI since the results currently show low commitment in large parts of the organizations.

Another point of weakness in current research is productivity gains. The gains are difficult to measure numerically, but more research should be done than backing up the data. All the respondents were sure subjectively about the gains, but none have numerical data to back up.

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Appendices

Appendix 1. Questionnaire

- What do you use generative AI for?
- Why do you use generative AI?
- Which generative AI applications do you use?
- What benefits do you gain from using AI? And are they measured or measurable?
- How does generative AI improve productivity?
- How do your company and co-workers view generative AI?
- What kind of organizational policies do you have and is it normal to use?
- Have you tried alternative AI? What were those?
- What made you stop using them?
- What risks do you see with generative AI, and how does it affect your use?
- How will generative AI affect the job market?
- How can AI differentiate your company from competition?
- What would make you use more generative AI?
- What would increase AI usage in your company?
- What features would increase your generative AI usage?
- How does the ease-of-use and effect the decision on using generative AI?
- How does the reliability of generative AI affect your usage?