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GENERATIVE ARTIFICIAL INTELLIGENCE CHATBOTS AND PRODUCTIVITY: ASSESSMENTS BY SMALL AND MEDIUM-SIZED ENTERPRISES IN FINLAND

OTTO EEMELI HEIKKILÄ

Work project carried out under the supervision of:

Paolo Leone

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ABSTRACT

Productivity and its benefits are increasingly important in today's modern world. This qualitative research aims to examine how small and medium-sized enterprises (SMEs) in Finland assess the impact of generative artificial intelligence chatbots (GAICs) on productivity. The data were collected through company interviews with a total of 16 SMEs in Finland and an expert interview with Professor Vili Lehdonvirta from the University of Oxford. This research and its findings are particularly relevant for SMEs considering the adoption and implementation of GAICs, not only to enhance productivity but also to ensure survival and competitiveness as competition intensifies and technology advances rapidly.

Keywords: Finland, GAICs, Productivity, SMEs

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INTRODUCTION

November 30, 2022. This date is regarded as the foundation of the widespread expansion of generative artificial intelligence chatbots (henceforth "GAICs"), when OpenAI ChatGPT (henceforth "ChatGPT") was released for public use (e.g., Al-Amin et al. 2024). Since then, the growth of generative artificial intelligence (henceforth "GAI") tools such as GAICs has been phenomenal, with competition among them continuing to intensify (e.g., Al Naqbi, Bahroun, and Ahmed 2024). In fact, one of the most significant areas of GAI implementation is GAICs (Aydin and Karaarslan 2023).

Since GAI tools such as GAICs are disruptive technologies, companies must realize their impact on business (Dwivedi et al. 2023; Leme Lopes 2023; Rajaram and Tinguely 2024). Particular attention should be given to the impacts of GAI on small and medium-sized enterprises (henceforth "SMEs"), as they are a critical part of any economy (Sharma et al. 2024). Moreover, it is crucial to consider the challenges SMEs face in keeping up with technological advancements, not only due to the fierce competition but also because of their inherent differences from large companies (Sharma et al. 2024). That is, unlike large companies, SMEs typically operate with limited resources, contributing to unequal opportunities to integrate GAI tools, such as GAICs, in the company (Kedi et al. 2024; Rajaram and Tinguely 2024; Sharma et al. 2024).

Research and publications related to GAI have increased, particularly since 2022 (Al Naqbi, Bahroun, and Ahmed 2024; Aydin and Karaarslan 2023). However, the majority of the literature focuses on large companies rather than SMEs (Rajaram and Tinguely 2024; Sharma et al. 2024). That is, there is limited research on the challenges of integrating GAI into SMEs (Rajaram and Tinguely 2024), as well as on factors influencing the adoption of artificial intelligence (henceforth "AI") chatbots in SMEs (Sharma et al. 2024). Moreover, the majority of the existing research on AI chatbots approaches the topic from a customer perspective rather

than a company perspective (Sharma et al. 2024). According to Al Naqbi, Bahroun, and Ahmed (2024), the majority of the literature of GAI falls within the category of "Chatbots and Conversational Agents". In contrast, less literature is available in the category of "AI Integration and Adoption of Conversational Agents". In addition, there is a need for research across different sectors, such as on the applicability of GAI, on the benefits and risks of GAI, and on the impact of GAI on employee productivity (Al Naqbi, Bahroun, and Ahmed 2024).

According to the researcher, limited research has been conducted on how SMEs assess the impact of GAICs on productivity, particularly in Finland. It is of relevance to choose productivity, given that the potential for enhanced productivity is one of the primary drivers behind companies integrating GAI (Al Naqbi, Bahroun, and Ahmed 2024). It is of importance to choose GAICs, given that they represent one of the most significant areas of GAI implementation (Aydin and Karaarslan 2023). It is of necessity to choose SMEs, given that they are considered to face challenges in integrating GAI tools, such as GAICs (Sharma et al. 2024). It is of interest to choose Finland, given that Finland has long been one of Europe's leading countries in digitalization (Finnish Government 2022), with the highest level of digital intensity among SMEs in Europe in 2023 (Eurostat 2024).

Thus, the aim of this research is to examine how SMEs in Finland assess the impact of GAICs on productivity. To achieve the research aim, the following research question is used: *How do SMEs in Finland assess the impact of GAICs on productivity?*

The data for this qualitative research were collected through an expert interview and company interviews. The expert interview was conducted with Vili Lehdonvirta, Professor of Economic Sociology and Digital Social Research at the Oxford Internet Institute, University of Oxford. The company interviews were conducted with a total of 16 interviewees and their companies from 4 different industries, with 4 companies representing each industry: Information Technology (henceforth "IT"), Administrative and Consulting Services (henceforth "ACS"),

Banking and Financial Services (henceforth “BFS”), and Retail and Wholesale (henceforth “RW”). The data from the interviews were analyzed using the Gioia Methodology (henceforth “Gioia Method”).

The purpose of this research is to increase awareness of how SMEs in Finland assess the impact of GAICs on productivity. By addressing other important themes beyond productivity, this research not only contributes to the limited existing literature on how SMEs in Finland assess the impact of GAICs on productivity but also expands on the limited existing literature previously mentioned by Al Naqbi, Bahroun, and Ahmed (2024), Rajaram and Tinguely (2024), and Sharma et al. (2024).

Henceforth, the structure of the research: Chapter 1 introduces the theoretical framework, which consists of GAICs and Productivity, and SMEs and AI in Finland. Chapter 2 explains the methodology, covering research methodology, data collection, and data analysis. Chapter 3 reviews the empirical findings. Chapter 4 includes the discussion, followed by the conclusion.

1. THEORETICAL FRAMEWORK

1.1. GAICs and Productivity

GAICs can be defined as robots, operating in a chat format, that simulate human language by generating unique and new content based on trained data (Al-Amin et al. 2024; Aydin and Karaarslan 2023). GAICs are based on GAI, with numerous tools available in the market (e.g., Aydin and Karaarslan 2023; Wong 2024). McGrath, Farazouli, and Cerratto-Pargman (2024), however, suggests that the concept of AI is somewhat ambiguous. Therefore, in this research, the category of GAICs includes, among others, ChatGPT and Microsoft Copilot (henceforth “Copilot”).

GAI is profoundly transforming companies across various industries (Kedi et al. 2024; Rajaram and Tinguely 2024). Recognizing the importance of adapting to this rapid technological advancement, many companies have begun integrating GAI tools, such as GAICs, to ensure

survival and competitiveness (Al Naqbi, Bahroun, and Ahmed 2024; Haase and Hanel 2023; Sharma et al. 2024). Especially for SMEs, GAI tools, such as GAICs, are considered to provide significant capabilities (Al-Amin et al. 2024; Kedi et al. 2024; Rajaram and Tinguely 2024). That is, GAI has enabled SMEs to access and utilize the same cutting-edge technology as large companies, which was largely impossible with previous technologies (Rajaram and Tinguely 2024).

One of the primary motivations for companies to adopt and implement GAI is the productivity benefits it offers (Al Naqbi, Bahroun, and Ahmed 2024). According to Dwivedi et al. (2023), productivity is measured in two ways: as efficiency, which refers to completing a task, and as effectiveness, which is based on the quality of the output. Noy and Zhang (2023), in turn, specifies productivity enhancement related to GAICs as follows: GAICs can either replace employee effort by producing quality output, thereby reducing the time spent on the task, or GAICs can complement employee skills by working collaboratively to produce more than either could individually. The potential of GAICs to enhance productivity is especially recognized in customer service (e.g., Al-Amin et al. 2024; Dwivedi et al. 2023). SMEs, in particular, are considered to benefit from GAICs in customer service by automating routine tasks such as customer support, inquiries, and requests (Al-Amin et al. 2024; Kedi et al. 2024; Sharma et al. 2024). As GAICs work continuously with customers, the need for human customer service representatives decreases, enabling cost savings. GAICs have even been observed to improve the quality of customer service and enhance customer experience and engagement (Kedi et al. 2024; Sharma et al. 2024). This is particularly significant for SMEs, as customer interaction is vital to them, and the importance of maintaining strong customer relationships is emphasized in fiercely competitive markets (Kedi et al. 2024). Another significant area of business that GAICs impact is marketing (e.g., Haleem, Javaid, and Singh 2022; Kedi et al. 2024). GAICs assist marketers especially in ideation, research, and content

creation (R. Gupta et al. 2024; Rajaram and Tinguely 2024). In addition, GAICs enable the segmentation of customers based on their preferences and behavior, with the aim of providing customized content (Al-Amin et al. 2024; R. Gupta et al. 2024; Kedi et al. 2024; Rajaram and Tinguely 2024). Especially for SMEs that may face challenges in marketing, GAICs serve as an invaluable tool for improving marketing effectiveness and tailoring marketing strategies (Al-Amin et al. 2024; Kedi et al. 2024).

Since internationalization and sustaining the growth of the customer base are vital for the survival of SMEs, the adoption and implementation of GAI present a considerable opportunity to resolve these challenges (Rajaram and Tinguely 2024). However, the success of integrating GAI tools, such as GAICs, varies among SMEs, depending on the sector or the nature of the business (Soni 2023). Moreover, according to Rajaram and Tinguely (2024), the challenges that GAI tools, such as GAICs, pose for SMEs can be categorized into adoption hurdles, reliance on third parties, accuracy of predictions, ethical issues, reputational and legal risks, and financial burden. Moreover, for GAI to enable productivity and thereby long-term competitiveness, it is essential for all stakeholders of SMEs to engage in mitigating the challenges (Rajaram and Tinguely 2024). This competitiveness is considered to result from accessing human knowledge, facilitating creativity and empowering innovation, transforming roles and boosting productivity, supporting decision-making, accelerating product development, and increasing differentiation of products and services (Rajaram and Tinguely 2024).

1.2. SMEs and AI in Finland

SMEs are vital to Finland's economy, representing 99.8 percent of all businesses, employing 62.1 percent of the workforce, and contributing 55.9 percent to the total value added (European Commission 2024a). SMEs in Finland are defined as enterprises with fewer than 250 employees and either a maximum annual turnover of EUR 50 million or a maximum balance sheet total of

EUR 43 million (Statistics Finland n.d.).

In Finland, 82 percent of the population possess basic digital skills, while approximately 85.6 percent of SMEs demonstrate basic digital intensity (European Commission 2024b). Despite 79.5 percent of companies in Finland utilizing AI, data analytics, or cloud (European Commission 2024b), the adoption of AI accounted for only 14 percent among SMEs in 2023 (Implement Consulting Group 2024). Furthermore, while 25 percent of the population had used GAI in 2023, its adoption in companies is still in the early stages (Implement Consulting Group 2024). Although only 14 percent of SMEs in Finland have adopted at least one type of AI technology, Finland nonetheless stands at the forefront in Europe regarding AI adoption by companies (Implement Consulting Group 2024). On the other hand, Finland lags behind in AI-related skills, innovation, and investment compared to global leaders (Implement Consulting Group 2024). In fact, there are challenges in applying AI technology, such as a lack of understanding of the opportunities AI can bring to business and the inability to make business logic and data sources transparent for AI experts to utilize (Jafarzadeh et al. 2024).

Nevertheless, GAI is expected to have a significant impact on Finland and its job market (Implement Consulting Group 2024). It is estimated that GAI will complement 63 percent of jobs, whereas 31 percent of jobs are anticipated to be unaffected by automation from GAI. The remaining 6 percent of jobs are expected to be partially or fully displaced by GAI (Implement Consulting Group 2024). Moreover, GAI is considered to have the potential to impact every sector in Finland and is projected to bring productivity improvements to 63 percent of workers, while 76 percent of workers themselves believe in productivity-enhancing effects of GAI (Implement Consulting Group 2024). However, only 24 percent of companies in Finland believe that GAI will significantly enhance productivity in their business by 2029 (Implement Consulting Group 2024).

2. METHODOLOGY

2.1. Research Methodology

When conducting research, the underlying assumptions and beliefs that guide how knowledge is developed are referred to as research philosophy (Saunders, Thornhill, and Lewis 2019). In this qualitative research, interpretivism was chosen as the research philosophy, as it aims to understand and interpret the subjective and complex realities within organizations while generating new insights, making it a highly appropriate philosophy for management and business research (Saunders, Thornhill, and Lewis 2019). In addition, since this research has a relatively small sample size of 16, yet is favorable for achieving saturation (Hennink and Kaiser 2022), and aims to understand in-depth how SMEs in Finland assess the impact of GAICs on productivity, interpretivism was considered an appropriate research philosophy.

Regarding theory development, an inductive approach was applied in this research, as it is an appropriate approach for the philosophy of interpretivism, and it enables developing theory based on the collected data (Saunders, Thornhill, and Lewis 2019). In addition, the inductive approach is considered suitable when the phenomenon is not well understood, as limited research has been conducted on how SMEs assess the impact of GAICs on productivity, particularly in Finland.

In order to achieve the desired outcome for the research, research design is the overall plan outlining the procedures for collecting, analyzing, and interpreting data to answer the research question (Boru 2018; Saunders, Thornhill, and Lewis 2019). Exploratory research design was considered appropriate for this research, as it enables a deeper understanding of the precise nature of the phenomenon with limited research, and it connects well with the philosophy of interpretivism and the inductive approach (Boru 2018; Saunders, Thornhill, and Lewis 2019). Moreover, the exploratory research design is inherently flexible and adaptable to changes in data and insights, as changes may occur during the research in the SMEs' assessments of the impact of GAICs on productivity.

2.2. Data Collection

The data for this research were collected through an expert interview and company interviews, as interviewing is an important qualitative research method for data collection (Boru 2018; Saunders, Thornhill, and Lewis 2019). Since expert interviewing supports the research with subject-related knowledge (Döringer 2021), the expert interview was conducted with Vili Lehdonvirta, Professor of Economic Sociology and Digital Social Research at the Oxford Internet Institute, University of Oxford. The company interviews, in turn, were conducted with a total of 16 interviewees and their companies from 4 different industries, with 4 companies representing each industry (see Appendix A). Furthermore, the combination of data from the expert interview and the company interviews contributes to the transferability of the research, enabling the data to be considered in other contexts (Korstjens and Moser 2018).

The researcher selected the four industries expected to be affected differently by GAICs, enabling a comparison of the accuracy of predictions. When selecting the companies, it was ensured that they fit the definition of an SME and the industries. The companies were selected according to the researcher's interest, with the intention of choosing significant companies in the industries. A purposeful sampling method was used in the selection of the interviewees. Since the intent was to gather information-rich responses from companies' leadership or other employees with relevant expertise, the purposeful sampling method was suitable, especially given the relatively small sample size of 16 used in this research (M. Gupta, Shaheen, and Reddy 2019). Moreover, as the data were gathered from individuals with relevant expertise and perspectives, this contributes to the credibility of the research (Korstjens and Moser 2018).

A semi-structured method was used in both the expert interview and the company interviews. The semi-structured method allows for the systematic and consistent identification of themes emerging from interviews, with predefined questions applied as needed to obtain more elaborate responses (Qu and Dumay 2011). Thus, the semi-structured method was considered

suitable, particularly given the potential industry-specific differences among the SMEs interviewed, as the quality of responses can vary due to limited knowledge of the research topic. Both the expert interview (see Appendix B) and the company interviews (see Appendix C) consisted of 10 open-ended questions, considered to be an appropriate amount for the research (Feyisa 2015). The questions in the company interviews were the same for each industry. However, some questions in the expert interview included an introduction to support the question, while each question in the company interviews was supported by two alternative sub-questions.

The interviewees were primarily contacted via email with interview requests. The interviews were conducted online via Microsoft Teams (henceforth "Teams"), although a few interviews were conducted face-to-face on-site due to the proximity of the interviewer and the interviewee. Otherwise, the interviews would have been impossible to conduct on-site due to the interviewees' locations and the time constraints. Teams is regarded as a convenient and widely known alternative to face-to-face interviews, especially due to the ease of sending interview links via email and the flexibility to join the interview from different devices (Wakelin, McAra-Couper, and Fleming 2024). However, challenges associated with online interviews, such as the lack of physical presence and its effects on responses, were considered in this research.

At the beginning of the interviews, the aim was to establish rapport with the interviewee through small talk and a brief introduction, fostering trust to encourage open responses, which is considered an important part of qualitative interviewing (Qu and Dumay 2011). In addition, Finnish was used in the interviews to prevent language barriers from restricting communication, and neutral manners were maintained to reduce bias (Saunders, Thornhill, and Lewis 2019; Zhang and Okazawa 2023).

All collected data were handled confidentially, ensuring the importance of anonymity in the company context (Polonsky 1998). The interviewees were properly informed regarding the

data, and permission to record audio was requested and granted.

2.3. Data Analysis

In this research, the data were analyzed using the Gioia Method. The objective of the Gioia Method is to provide the adequate rigor in qualitative research, consequently gaining popularity among researchers (Gioia 2021; Mees-Buss, Welch, and Piekkari 2022). Since the Gioia Method is supported particularly by the philosophy of interpretivism (Magnani and Gioia 2023) and is based on the inductive approach (Gioia, Corley, and Hamilton 2013), underscoring the importance of the semi-structured interviews (Gioia, Corley, and Hamilton 2013), choosing the Gioia Method was considered appropriate for this research.

Before applying the Gioia Method, the interviews and audio recordings were transcribed, which is an essential part of qualitative research (McMullin 2021). During the interviews, the automatic transcription function of Teams was utilized, when applicable, to streamline the initial transcription phase. However, since automatic transcription tools are prone to errors (Wollin-Giering et al. 2023), both the audio recordings and transcripts were manually reviewed multiple times to ensure consistency between them. After this, in the main transcription phase, the popular intelligent verbatim method used in qualitative research was applied, positively impacting the readability of the transcripts by minimizing repetitions and filler words (McMullin 2021). Once the interviews were transcribed and consistent with the audio recordings, they were translated from Finnish to English by the researcher, with attention to maintaining the quality of the translation when transitioning between languages (Birbili 2000). These steps contribute to the confirmability of the research by ensuring a systematic and transparent analysis process (Korstjens and Moser 2018).

The data were then ready to be analyzed using the Gioia Method, which involves three phases: first-order codes, second-order themes, and aggregate dimensions (Gioia, Corley, and Hamilton 2013). In the first phase, the transcripts were analyzed from an informant-centric perspective

(Gioia, Corley, and Hamilton 2013), where the interviewees' statements were captured and transformed into first-order codes, staying as close as possible to their original language and meaning. Analyzing each interview transcript individually resulted in several dozen first-order codes, which is typical for the Gioia Method (Gioia, Corley, and Hamilton 2013). The individual first-order codes from the company interview transcripts were grouped with similar ones within each industry, forming industry-specific first-order concepts in accordance with the Gioia Method. In the second phase, these first-order concepts were analyzed within each industry from a researcher-centric perspective (Gioia, Corley, and Hamilton 2013), where the first-order concepts were categorized into second-order themes, providing a more abstract and theoretical understanding of the data. In the third phase, the second-order themes were further analyzed and consolidated into aggregate dimensions, representing the highest level of abstraction and capturing the core theoretical concepts related to the phenomenon (Gioia, Corley, and Hamilton 2013). Once all the phases were analyzed, a data structure, aligned with the Gioia Method, was developed for each industry in the company interviews, with the aim of visualizing the developed theory and demonstrating the rigor of the research (Gioia, Corley, and Hamilton 2013). Moreover, this further contributes to the dependability of the research (Korstjens and Moser 2018).

3. EMPIRICAL FINDINGS

3.1. Company Interviews

The findings of this research are reviewed next. The following paragraphs summarize the key findings for each of the industries and their respective SMEs. The full data structures can be found in Appendix D.

3.1.1. Findings: IT Industry

One interviewee has a background in metaverse-related technology, while two other interviewees have experience in cybersecurity-related technology. Moreover, one interviewee

has outstanding engagement with AI, having worked for decades as a technology journalist. All the interviewees have learned to use GAICs informally through self-learning and hands-on experience. In addition, half of the interviewees explicitly state that they actively track technology related to GAICs. Three-fourths of the interviewees directly mention that they began using GAICs, such as ChatGPT, soon after their initial release, for both personal and professional use. Half of the companies have integrated GAICs into their core business, but only one company has integrated GAICs throughout the organization. That is, the software development, marketing, and sales teams at one company use GAICs, such as ChatGPT and Jasper AI. Three-fourths of the companies are more selective in implementing GAICs. That is, although one company uses GAICs for tasks such as patent analysis and contract drafting, its core business is based on report generation, which is automated through an algorithm based on GAI, and these data are ultimately analyzed, organized, and fact-checked using ChatGPT in a selective way. In contrast, one company has selectively implemented GAICs, specifically ChatGPT, more broadly across teams but is more cautious in integrating them into its core business. An exception is one company that has implemented GAICs selectively but minimally, in a way where practically a single employee personally uses GAICs, primarily Copilot and Google AI Gemini. All the interviewees recognize that GAICs have a positive impact on efficiency and productivity by automating repetitive and routine tasks, assisting in content creation, thereby saving time. A notable example of productivity benefits of GAICs is one company's achievement of leveraging ChatGPT's automation capabilities in its core business to generate thousands of articles based on its database, thereby driving traffic to the company's domain through effective search engine optimization. Other productivity benefits of GAICs, as identified by the interviewees, include the ease of information retrieval along with comprehensive analyses, as well as linguistic capabilities for producing high-quality text in different languages. Efficiency benefits, in turn, are especially observed in software

development, where GAICs simplify coding tasks by suggesting appropriate code and enabling non-developers to contribute to projects early. None of the companies have a formal employee training program for the use of GAICs. Only one company is potentially interested in an external training: *"[…] we constantly keep an eye on what […] training programs are offered in the market"*. Three-fourths of the interviewees justify the lack of need for employee training on GAICs due to the company's nature and size. For example, the interviewees state: *"[…] as a start-up and a young company, […] the employees know what they're doing and can find out if necessary, so […] we don't see the need to have training"* and *"[…] employee training isn't a major focus because we […] keep our team relatively small"*. All the companies, therefore, rely on their own expertise in using GAICs, suggesting informal development through self-learning and hands-on experience. However, in cases where expertise is insufficient, half of the interviewees mention turning to their networks. The interviewees' perspectives on the challenges and risks associated with GAICs are fragmented. One-fourth of the interviewees observe challenges and risks within their companies, while three-fourths perceive them as external to their companies. Only one interviewee explicitly states challenges and risks of GAICs, such as their poor quality in content creation: *"[…] we've self-made text material and articles on our website that perform better, […] making people read them much longer than those created directly by ChatGPT, because it's easy to notice […] that they repeat the same template […]"*. All the interviewees agree that the technology related to GAICs is advancing at a challenging pace, making it difficult to keep up. Moreover, all the interviewees state the importance of being continuously aware of how competitors leverage GAICs. The findings imply that three-fourths of the interviewees believe that GAICs can offer a competitive advantage in the industry. Half of the interviewees are convinced that their companies have achieved a competitive advantage and have strategies in place to sustain it. However, none of the interviewees suggest that their companies have a formal strategy solely dedicated to keeping

up with technological advancements related to GAICs. In addition, the findings suggest that while the interviewees perceive trends related particularly to GAI, their perceptions of trends specific to GAICs are limited.

3.1.2. Findings: ACS Industry

Three-fourths of the interviewees have used GAICs, primarily ChatGPT, and they have learned to use them informally through self-learning and hands-on experience. For example, one interviewee personally uses ChatGPT to prepare for discussions with reporters regarding recruitment work. Only one-fourth of the companies have adopted and implemented GAICs, although these companies are mainly utilizing large language models, such as OpenAI GPT-4, in support services and online training. The majority of the interviewees are able to express their perceptions primarily on efficiency and productivity benefits of GAI, but direct examples of these benefits in relation to GAICs are limited. Only one interviewee, despite never having used GAICs, states that the potential productivity benefits of GAICs result from their use in handling routine tasks: *"GAICs would certainly […]. […] increase productivity. On the other hand, […] we may not have many routine tasks that would need to be done by AI"*. Half of the interviewees consider that GAICs are unnecessary for their work. That is, one interviewee believes that the expertise is best applied within the interviewee's own specialized domain: *"[…] in an expert profession, it feels like my expertise is […] in my own head, so I haven't felt a great need to use ChatGPT, especially"*, while the other interviewee has not found a way to leverage GAICs due to the work being largely in-person: *"We haven't easily found ways to utilize this technology […], as the work […] involves face-to-face training sessions […]"*. The majority of the interviewees perceive confidentiality and data security as the primary challenges and risks associated with GAICs. For example, one interviewee states: *"[…] the challenge in our tax and legal consulting area is that all data and documents […] are usually highly confidential, so nothing should accidentally leak […]"*. In addition, many of the interviewees

perceive a lack of trust in the accuracy of GAICs. One interviewee also expresses hesitation and skepticism in technology related to GAICs: *"[…] when it comes to executive searches […] or other demanding headhunting […]. These processes remain highly personal […]. […] using AI might even be seen as diminishing the situation"*. Nonetheless, employee training on GAICs in the companies is limited, as only one-fourth of the companies that have adopted and implemented GAICs have formal AI-related training. However, one company plans to hire a freelance consultant to assist with the initiation of its training program. The other companies primarily encourage their employees to learn technology related to GAICs informally through self-learning and hands-on experience. Half of the interviewees directly state that they believe that GAI can offer a competitive advantage in the industry, but only one interviewee believes that GAICs specifically provide a competitive advantage for the company: *"We're very aware of how AI can benefit our industry, and our clients even expect us to be at the forefront of utilizing AI"*. Nonetheless, only one-fourth of the interviewees indicate that their companies have a formal strategy to keep up with technological advancements related to GAICs, while half of the interviewees state their companies as small, consequently suggesting that they lack such a strategy. Trends perceived by the interviewees mostly relate to how GAICs and GAI, in general, could be utilized in their professions. One interviewee, however, questions the significance of the technology related to GAICs: *"AI isn't a more revolutionary invention than previous technologies […]"*.

3.1.3. Findings: BFS Industry

All the interviewees have learned to use GAICs, mainly ChatGPT and Copilot, informally through self-learning and hands-on experience. The findings suggest that while all the companies use GAICs, their use is considered to remain at the individual level rather than being integrated company-wide, with half of the companies having adopted and implemented GAICs, such as ChatGPT and Copilot. The interviewees indicate that the reasons for not integrating

GAICs more widely include a lack of need and a risk-averse attitude: *"The situation is primarily that our company is currently so small and quiet that there's no need to aggressively develop our operations"* and *"[…] our compliance team has created internal policies […]. […] we always try to first observe […] how the industry is generally positioning itself […], and then proceed cautiously"*. One interviewee states that age demographics influence new technology adoption in the industry: *"The age demographic is often older, so new technologies take time to be adopted"*. The interviewees mention utilizing GAICs for company-related tasks, such as document drafting and presentation creation, and observe their benefits for supporting activities such as ideation and language and communication enhancement. Half of the interviewees directly state how GAICs enhance efficiency and productivity. They recognize that GAICs boost efficiency by increasing speed, leading to greater cost-effectiveness and client satisfaction, and by improving quality through error detection and correction, for example: *"[…] GAI, such as GAICs, also improves quality. […] can more quickly detect and correct errors, meaning that issues can often be identified and addressed before the customer even notices them"* and *"[…] allows more tasks to be completed faster and more cost-effectively"*. In terms of productivity, GAICs are considered to allow time to be reallocated to other tasks, for example: *"[…] I believe that with GAICs, we can focus more on truly important tasks and enhance our time management"*. All the interviewees express caution regarding GAICs, concerning data security and confidentiality. Shared concerns primarily relate to skepticism regarding the reliability of GAICs in data input. However, none of the companies have formal employee training on GAICs, although one company is developing formal AI-related training. One interviewee states that the board has not been fully informed of any training related to GAICs and emphasizes its need and importance: *"[…] I haven't received any […] training on AI as a board member […]. There's potential for a trainer to offer education to board members on using GAI. […] If the board doesn't understand GAI, it can't promote its adoption"*. Half

of the interviewees state that age poses a challenge to understanding and learning new technology in the industry, for example: *"[…] in this field, employees may be less technically savvy […]"*. The findings suggest that learning to use GAICs has occurred informally through self-learning and hands-on experience in all the companies. Half of the companies lack formal strategies to keep up with technological advancements, whereas the other half have them in place. However, the findings suggest that the strategies are not solely focused on GAICs. Three-fourths of the interviewees explicitly believe that GAICs can offer a competitive advantage in the industry, for example: *"[…] I believe that those who are among the first to effectively use GAICs will likely gain a competitive advantage, especially in terms of cost benefits"* and *"[…] there could be a competitive advantage if one identifies a really good use case"*. One interviewee, however, ponders whether the potential competitive advantage in the industry is a decisive factor: *"I see that in our industry, GAICs may not be a decisive factor for competitive advantage. They're more likely to improve internal efficiency rather than the efficiency of the product itself"*. Nonetheless, one interviewee suggests that the industry is compliance-driven: *"Our industry requires careful investigation, and the verification processes can be very burdensome and labor-intensive […]"*. Three-fourths of the interviewees perceive trends related to GAICs, primarily in the increased use of GAICs and their significant impact on the industry, for example: *"GAICs can significantly enhance the work of junior employees"*.

3.1.4. Findings: RW Industry

Three-fourths of the interviewees are aware of GAICs and have used them, primarily ChatGPT. Furthermore, the findings imply that the interviewees have learned to use GAICs informally through self-learning and hands-on experience. However, none of the companies have adopted and implemented GAICs permanently, while only one company has used them to a limited extent, primarily for content creation and data collection. One interviewee states that a hindering factor in integrating GAICs is operating in the B2B sector rather than in the B2C

sector: *"Since we operate in the B2B sector, we don't have the same level of inquiries and traffic as businesses focused on consumer sales"*. One interviewee, in turn, states that the company is independent but operates under the authority of a corporation: *"[...] we're independent businesses but belong to the corporation. System development choices are made within the corporation"*. Thus, according to the interviewees, integrating GAICs is not a priority and not practical, respectively. However, these interviewees have considered using GAICs: *"I've been considering GAICs' potential uses from a marketing perspective"* and *"[...] also considered whether [...] GAICs could be used more permanently in customer service"*. Only one-fourth of the interviewees elaborate on the impact of GAICs on efficiency and productivity related to work, recognizing ChatGPT's potential to reduce labor, save time, and contribute to cost efficiency: *"It frees up time for other tasks and allows a company to operate with fewer human resources. Every cost saving is beneficial for a company [...]"*. Half of the interviewees express their perceptions of the challenges and risks associated with GAICs, perceiving those related to labor markets and human interaction, ethics and security, usage and quality, as well as data integrity and confidentiality: *"GAICs can replace human interaction, which can be problematic, especially for older individuals who value personal customer service"*, *"GAICs can enable the creation of increasingly realistic [...] deceptions, making it harder to distinguish between truth and falsehood"*, *"[...] GAICs [...] might get caught in endless loops or provide generic responses"*, and *"The main concern is not to input information that could spread [...]. Another concern is to maintain your own critical judgment regarding the information [...]"*. Only one interviewee suggests that the company, which has used GAICs to a limited extent, has planned to conduct employee training on GAICs in a similar manner to other new technologies, where employees are initially encouraged to learn independently, with both internal and external training provided. One interviewee expresses interest in formal training but also justifies the lack of need for employee training due to the company's size:

"When relevant offerings start to appear […], training might be organized through those channels. […] in a small company, training often relies on self-study". None of the companies have their own formal strategies to keep up with technological advancements related to GAICs. One interviewee states that the company's size influences its strategies: *"[…] we don't have any specific strategies […]. In our small family business, overall strategies […] are primarily in the hands of the entrepreneurs"*. One interviewee, in turn, states that the industry influences the company's strategies: *"Our industry is a bit slower and more conservative, so we haven't been as proactive"*. Only half of the interviewees perceive trends surrounding GAICs. For example, GAICs' potential is perceived especially in e-commerce: *"[…] GAICs […] in e-commerce […] could analyze purchasing habits and suggest products based on a customer's previous purchases"*. Half of the interviewees believe in GAICs' potential to offer a competitive advantage. The interviewees state the potential in information retrieval and analysis, as well as cost savings by reduced human labor and enhanced operations through automation, without compromising the quality of customer service.

4. DISCUSSION

This discussion chapter is based on the empirical findings and the theoretical framework presented above as well as the company interviews summary (see Appendix E) and the expert interview summary (see Appendix F). The main findings related to SMEs, with a focus on productivity, are discussed next. To begin with, how the novelty of GAICs influences how SMEs assess the impact of GAICs on productivity is discussed, followed by a discussion of a paradox suggested by the findings.

The findings revealed that SMEs in Finland are highly aware of GAICs' potential to enhance productivity, likely driven by the recognition of its importance (Al Naqbi, Bahroun, and Ahmed 2024; Haase and Hanel 2023; Sharma et al. 2024). However, the novelty of GAICs is considered a significant factor influencing how SMEs in Finland assess the impact of GAICs on

productivity. That is, SMEs that have adopted and implemented GAICs are able to more concretely assess the impact of GAICs on productivity, as they can realize potential productivity benefits from them. As evident in the findings, a significant number of SMEs have not adopted and implemented GAICs and, therefore, assess the impact of GAICs on productivity more abstractly. This is supported by Lehdonvirta's statement that companies in Finland are not adopting enough new technology, thereby leaving its potential unrealized. However, according to Lehdonvirta and Soni (2023), the adoption of GAICs by SMEs varies across different sectors and can be complex (R. Gupta et al. 2024; Kedi et al. 2024). As the findings indicate, SMEs in the IT industry have adopted and implemented GAICs at the highest rate, evidently due to their predominantly favorable conditions for integration, supported by their modern, technology-focused infrastructure (Soni 2023) and expertise. Remarkably, SMEs in the BFS industry have adopted and implemented GAICs at a higher rate compared to SMEs in the ACS and RW industries, particularly given that the industry is founded on strong regulations, which GAI is seen to further strengthen (Aydin and Karaarslan 2023; Rajaram and Tinguely 2024). It may be that the BFS industry presumably possesses stable financial resources, facilitating the integration (Kedi et al. 2024; Sharma et al. 2024; Soni 2023). The ACS and RW industries, in turn, primarily value the human role in customer interactions over GAICs, conflicting with, e.g., Al-Amin et al. (2024), Kedi et al. (2024), and Sharma et al. (2024). Thus, the novelty of GAICs influences unequal opportunities for SMEs' readiness to integrate GAICs and assess their impact on productivity, not only in comparison to large companies (Rajaram and Tinguely 2024) but also among SMEs across different industries.

The paradox suggested by the findings is discussed next.

Firstly, SMEs are highly aware of the challenges and risks associated with GAICs, yet they primarily rely on training employees through self-learning and hands-on experience, an approach considered to contradict the fact that employers in Finland are legally obliged to create

training plans for their companies (OECD 2020). This may be due to the fact that SMEs operate with limited resources (Kedi et al. 2024; Rajaram and Tinguely 2024; Sharma et al. 2024) and, therefore, consider the informal training as a more cost-effective alternative to formal training programs on GAICs. It is also possible that, since the findings indicate that SMEs justify the lack of formal training based on the company's nature and size, the organizational environment of an SME, such as its culture and dynamics, contributes to the decision to rely on employees' independent training on GAICs. The finding may also reflect that SMEs believe training to be unnecessary due to the perception of GAICs as user-friendly (Al-Amin et al. 2024), considering the notably high level of basic digital skills possessed by the population in Finland (European Commission 2024b). On the other hand, the findings suggest that the novelty of GAICs impacts the availability and quality of formal training programs. Nevertheless, the lack of formal employee training reflects SMEs' focus on pursuing short-term productivity benefits from GAICs, as it enables the rapid utilization of these tools without requiring employees' commitment to training programs. However, this approach is perceived as leaving gaps in employees' competencies, thereby compromising the risk management emphasized by Lehdonvirta, which could potentially hinder the long-term productivity benefits of GAICs (Implement Consulting Group 2024; Rajaram and Tinguely 2024).

Secondly, the findings suggest that SMEs are largely convinced that GAICs provide a competitive advantage in their industries, yet not all SMEs have managed to achieve it. This indicates that SMEs encounter difficulties in applying and utilizing GAICs for long-term advantage, aligning with Jafarzadeh et al. (2024). It is possible that SMEs have not succeeded in differentiating themselves from competitors through the creativity highlighted by Lehdonvirta in their use of GAICs. Moreover, it may be that competitors of SMEs have also recognized the importance of GAICs to enhance productivity, resulting in short-term competitive advantage, as Lehdonvirta stated, due to challenges in sustaining it as other

companies adopt the technology (Soni 2023). Furthermore, as evident in the findings, there is awareness among SMEs that the technology related to GAICs is advancing at a challenging pace, making it difficult to keep up. In this regard, it is notable that many SMEs lack a formal strategy to keep up with technological advancements related to GAICs. Considering the high awareness among SMEs of trends, and challenges and risks associated with GAICs, it is highly possible that SMEs are curious and willing to pursue short-term productivity benefits from GAICs while remaining cautious regarding making long-term investments until the advantages and disadvantages of this relatively new and emerging technology (Al Naqbi, Bahroun, and Ahmed 2024; R. Gupta et al. 2024; Haleem, Javaid, and Singh 2022) have been proven. This is supported by Lehdonvirta's statement that reporting on negative cases involving new technologies has likely increased uncertainty and a risk-averse attitude among companies in Finland, slowing down adoption. On the other hand, as evident in the findings, it may be that SMEs perceive GAICs as less than fully critical to their business and, therefore, adopt a reactive stance toward them. That is, in addition to the justification among SMEs for the lack of a formal strategy due to the company's nature and size, many SMEs prefer personal contact with customers, affecting their decision to accept GAICs (Sharma et al. 2024) and formulate a strategy. On the other hand, it may be that customers desire human contact, and therefore, SMEs experience no pressure from customers (Sharma et al. 2024) to adopt and implement GAICs, influencing their strategies to keep up with technological advancements related to GAICs. Nevertheless, the recognition of competitive advantage offered by GAICs, without a formal strategy to keep up with technological advancements related to them, reflects that SMEs focus on pursuing short-term productivity benefits from GAICs by adopting a reactive approach to them. However, it is also possible that SMEs pursue to achieve long-term productivity benefits from GAICs, potentially driven by the belief in their capability based on short-term productivity gains. Nonetheless, without a formal strategy, achieving long-term productivity benefits is

considered unlikely due to potential stagnation, as competitors may adapt to technological advancements and leverage GAICs for productivity and competitive advantage.

The paradox suggested by the findings is thus that SMEs in Finland pursue short-term productivity benefits from GAICs, even though sustaining such benefits inherently requires long-term investment and time. That is, as Lehdonvirta emphasized, the full potential of productivity benefits from GAICs can only be achieved when SMEs invest in long-term innovation. Moreover, Lehdonvirta stated, supported by Dwivedi et al. (2023), R. Gupta et al. (2024), and Rajaram and Tinguely (2024), that the organizational structure of SMEs needs to be adapted, potentially through investment, to facilitate the adoption and implementation of GAICs. In addition, as Lehdonvirta underscored, the safe and secure adoption and implementation of GAICs is underpinned by investments in employee training and risk management, aligned with R. Gupta et al. (2024) and Soni (2023). In this regard, the engagement of all stakeholders to mitigate integration challenges is essential for SMEs to ensure productivity and long-term competitiveness (Rajaram and Tinguely 2024). However, as evident in the findings, the concept of adopting and implementing GAICs to potentially enhance productivity is multifaceted and varies among SMEs across different industries.

Finally, GAICs will inevitably have an impact on SMEs in Finland. SMEs must be prepared to adapt to this relatively new and emerging technology to ensure survival and competitiveness. Survival and competitiveness stem from the potential productivity benefits of GAICs in the long term, not the short term, and achieving the benefits requires both investment and time. There are, however, uncertainties associated with GAICs, which can be summarized in the words of Lehdonvirta: *"Since this is new technology, it remains unclear how significant the potential benefits might be and how extensive the possible applications could become"*.

CONCLUSION

This research examined how small and medium-sized enterprises (SMEs) in Finland assess the

impact of generative artificial intelligence chatbots (GAICs) on productivity. To achieve the research aim, the following research question was used: *"How do SMEs in Finland assess the impact of GAICs on productivity?"*

This research revealed that SMEs in Finland are highly aware of GAICs' potential to enhance productivity. However, a significant number of SMEs are unable to concretely assess the impact of GAICs on productivity due to the fact that they have not adopted and implemented them, thus preventing the realization of potential productivity benefits from GAICs. According to the research, the novelty of GAICs significantly influences SMEs' decisions to adopt and implement them. This research also suggests a paradoxical tendency among SMEs to pursue short-term productivity benefits from GAICs, even though sustaining such benefits inherently requires long-term investment and time.

This research has certain limitations. The sample included a total of 16 SMEs in Finland from 4 different industries, with 4 SMEs representing each industry. While this ensured some diversity, the relatively small sample size and the location may limit the generalizability of the findings. In addition, the term "GAICs" was likely often simplified by the interviewees to "GAI" or "AI", potentially introducing ambiguity and affecting the accuracy of the interpretations.

The insights provided by this research are particularly relevant for SMEs considering the adoption and implementation of GAICs, not only to enhance productivity but also to ensure survival and competitiveness as competition intensifies and technology advances rapidly.

Furthermore, this research in its current state serves as a comprehensive reference for researchers to further investigate this novel and emerging technology, facilitating the comparison of new perspectives with the findings presented in this research. In future research, it would be of particular interest to re-examine how SMEs in Finland assess the impact of GAICs on productivity as GAICs become more prevalent in SMEs.

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APPENDICES

Appendix A

Company Interviews *Participants*

Participants: A total of 16 interviewees and their companies from 4 different industries, with 4 companies representing each industry: IT, ACS, BFS, and RW.

Dates of the interviews: July 9, 2024 – September 9, 2024.

Durations of the interviews: Approximately 18 minutes (on average).

IT:

- Chief Technology Officer, Co-Founder
- Partner, Chairman of the Board
- Business Developer
- Member of the Board

ACS:

- Partner, Chairman of the Board
- Chief Executive Officer, Senior Partner
- Chief Operating Officer
- Chief Executive Officer, Chairman of the Board

BFS:

- Member of the Board
- Chief Executive Officer, Chairman of the Board
- Investment Manager
- Chief Information Officer

RW:

- Chief Executive Officer, Chairman of the Board
- Member of the Board
- Chairman of the Board
- Member of the Board

Note: For the anonymized participants, only the titles of the interviewees are presented.

Appendix B

Expert Interview *Questions*

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1. The use of GAI is increasing, especially in SMEs. What is generally required from SMEs to adopt and implement GAI tools, such as ChatGPT, into their daily business operations?

Theme: Prerequisites for SMEs to adopt and implement GAI tools (GAICs)

2. Do you see differences between various industries in how easily SMEs can adopt and implement GAI tools, such as GAICs? What factors influence this?

Theme: Industry-specific differences in GAI tools (GAICs) adoption and implementation

3. Finland is known as one of the leading countries in AI development, yet the application of AI in workplaces is considered insufficient. What do you think could be the reasons behind this, and what factors might influence it?

Theme: Barriers to AI application in workplaces in Finland

4. Regarding SMEs, what do you think are the most common advantages and disadvantages of

GAI tools, such as GAICs, in workplaces?

Theme: Advantages and disadvantages of GAI tools (GAICs) for SMEs

5. There have been cases where employees, whether unintentionally or intentionally, have entered sensitive company data into GAICs, thereby putting the company at risk. How important do you consider training employees in the use of GAICs, and how can a company effectively implement such training?

Theme: Importance of training employees in the use of GAICs and effective training methods

6. How do you see GAI tools, such as GAICs, impacting the productivity of SMEs? In what ways does productivity change after a company adopts and implements GAI in its business operations?

Theme: Impact of GAI tools (GAICs) on the productivity of SMEs

7. SMEs are generally more flexible and agile than large companies. Do you think SMEs could gain a competitive advantage from using GAI tools, such as GAICs, compared to large companies?

Theme: Competitive advantage for SMEs through GAI tools (GAICs)

8. How do you see SMEs' potential to differentiate themselves from competitors within the same industry if their competitors have adopted and implemented GAI tools, such as GAICs, in their business?

Theme: Differentiation potential for SMEs using GAI tools (GAICs)

9. In your book *Cloud Empires*, you discuss the growth of global tech giants to such a scale that controlling their operations becomes challenging, often negatively affecting user well-being. Do you see a similar possibility with AI companies' products, such as ChatGPT, growing so large that they could pose security risks to users?

Theme: Security risks of GAI tools (GAICs) growing too large

10. Do you anticipate that the use of GAI tools, such as GAICs, will increase further in the near future, particularly among SMEs in Finland?

Theme: Future trends in GAI tools (GAICs) adoption and implementation by SMEs in Finland

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Appendix C

Company Interviews *Questions*

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1. Are you familiar with GAICs, such as ChatGPT?

Theme: Familiarity with GAICs

- If positive: How did you first explore and learn about GAICs?

Theme: Exploration methods and learning channels for GAICs

- If negative: What do you think are the main reasons for your unfamiliarity with GAICs?

Theme: Reasons for unfamiliarity with GAICs

2. Has your company adopted and implemented GAICs?

Theme: Adoption and implementation of GAICs

- If positive: Can you describe what GAICs you are using and in what tasks or processes you utilize them?

Theme: Application and use cases of GAICs

- If negative: What barriers or reasons have prevented your company from adopting GAICs?

Theme: Barriers or reasons to adoption of GAICs

3. What potential advantages can you see GAICs could bring to your company?

Theme: Potential advantages of GAICs

- If positive: Can you share specific examples of these advantages?

Theme: Specific examples of GAICs' advantages

- If negative: What advantages have new technologies brought to your company so far?

Theme: Advantages of other new technologies

4. What potential disadvantages can you see GAICs could bring to your company?

Theme: Potential disadvantages of GAICs

- If positive: Can you share specific examples of these disadvantages?

Theme: Specific examples of GAICs' disadvantages

- If negative: What disadvantages have new technologies brought to your company so far?

Theme: Disadvantages of other new technologies

5. Have you observed changes in productivity since implementing new technologies (GAICs)?

Theme: Observed changes in productivity due to new technologies (GAICs)

- If positive: Can you provide specific examples or metrics whether the change has been positive or negative?

Theme: Specific examples or metrics of productivity changes from new technologies (GAICs)

- If negative: What methods would you consider using to measure the impact of new technologies on productivity?

Theme: Methods to measure productivity impact of new technologies (GAICs)

6. What is your approach to training employees on new technologies (GAICs)?

Theme: Approach to employee training in new technologies (GAICs)

- If positive: Have you implemented any specific training programs for employees to utilize AI technologies, such as GAICs?

Theme: Implementation of specific training programs for AI technologies (GAICs)

- If negative: What kind of training would be necessary for employees to effectively use new technologies now and in the future?

Theme: Required training for effective use of new technologies

7. Are you using other GAI tools to enhance productivity in your company?

Theme: Use of other GAI tools to enhance productivity

- If positive: Can you share what GAI tools you are using in your company?

Theme: Specific GAI tools in use

- If negative: What do you think are the reasons for not using (other) GAI tools in your company?

Theme: Reasons for not using (other) GAI tools

8. Have you observed industry trends regarding the adoption of AI (GAICs)?

Theme: Industry trends in AI adoption (GAICs)

- If positive: How do you think these trends will evolve in the next few years?

Theme: Future evolution of AI (GAICs) adoption trends

- If negative: What might be the barriers or reasons for the slow adoption of these AI technologies in your industry?

Theme: Barriers or reasons for AI adoption in the industry

9. Do you believe GAICs offer a competitive advantage in your industry?

Theme: Competitive advantage from GAICs

- If positive: How do you see your company's productivity in comparison to competitors that have adopted and implemented GAICs?

Theme: Comparison of productivity with competitors adopting and implementing GAICs

- If negative: What are the reasons that you believe GAICs do not offer a competitive advantage in your industry?

Theme: Reasons for not believing in GAICs' competitive advantage

10. Does your company have strategies in place to keep up with technological advancements?

Theme: Strategies for technological awareness

- If positive: How effective do you find these strategies in keeping your company competitive?

Theme: Effectiveness of strategies for competitiveness

- If negative: What improvements or changes do you think are necessary in your current strategies to sustain competitiveness in technological advancements?

Theme: Required improvements or changes in strategies for competitiveness

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Appendix D

Data Structures *Gioia Method*

Data Structure: IT Industry

First-Order Concepts	Second-Order Themes	Aggregate Dimension
• Experimenting with GAI tools since their initial release • High level of awareness and familiarity with AI tools such as ChatGPT and Copilot	Early adoption and experimentation	Technological pioneering

• Strong interest in exploring and utilizing cutting-edge technology		
• Using AI as a competitive advantage by optimizing workflows and increasing output • Actively monitoring AI trends and integrating advancements into business strategy • Viewing AI as a transformative megatrend across industries	Strategic positioning and competitiveness	Technological pioneering

First-Order Concepts	Second-Order Themes	Aggregate Dimension
• Incorporating GAI across departments (e.g., marketing, software development, and sales) • Leveraging AI for automation, productivity, and creativity • Using GAI for tasks such as coding, content creation, and legal drafting	Integration and diverse use cases	Operational efficiency and productivity
• Automating repetitive tasks to enhance		

efficiency • Using GAI to create reports, contracts, and analyses quickly and cost-effectively • Improving developer productivity and reducing barriers to project visibility	Productivity benefits through automation	Operational efficiency and productivity
First-Order Concepts	Second-Order Themes	Aggregate Dimension
• Concerns regarding security risks, data integrity, and disinformation • Emphasizing the need for	Challenges and ethical concerns	Ethical and secure implementation

human oversight and ethical use of GAI		
• Employees learning GAI tools through hands-on experience • Encouraging knowledge-sharing networks to enhance collective expertise	Self-learning and knowledge sharing	Ethical and secure implementation

Data Structure: ACS Industry

First-Order Concepts	Second-Order Themes	Aggregate Dimension
• Initial experimentation with GAICs but limited systematic		

adoption • Using AI tools for specific purposes such as document drafting and content creation	Selective adoption and use	Purpose-driven adoption
• Concerns regarding confidentiality and ethical implications in sensitive fields • Importance of controlled use and maintaining data privacy	Data sensitivity and ethical constraints	Purpose-driven adoption
First-Order Concepts	Second-Order Themes	Aggregate Dimension
• Enhancing customer support and efficiency in recruitment processes	Enhancing customer support through AI	Customer-centric operational enhancements

• Leveraging AI for online learning and training content development		
• Using AI for drafting contract templates and creating training materials efficiently • AI generating basic frameworks that experts can refine, saving time • Creating personalized training content to meet diverse client needs	Improving content and process efficiency	Customer-centric operational enhancements
First-Order Concepts	Second-Order	Aggregate Dimension

	Themes	
• Confidentiality challenges in handling sensitive data with AI tools • Ethical considerations when using AI for decision-making in recruitment or training • Avoiding direct use of AI outputs without human oversight to ensure accuracy	Concerns regarding confidentiality and ethical implications	Ethical awareness and data security
• Guidelines to restrict AI input of sensitive customer or company data • Using private		

cloud solutions for enhanced privacy and data security • Emphasizing transparency in how AI-generated content is used with clients	Controlled use of AI in sensitive areas	Ethical awareness and data security
First-Order Concepts	Second-Order Themes	Aggregate Dimension
• Internal and external training initiatives to build AI competence • Establishing task forces and appointing AI-focused roles to guide adoption	Knowledge development and organizational readiness	Readiness for AI integration
• Anticipating AI's role in		

transforming education and consulting • Viewing GAI as a potential source of competitive advantage in improving services	Future trends and competitive advantage	Readiness for AI integration

Data Structure: BFS Industry

First-Order Concepts	Second-Order Themes	Aggregate Dimension
• Limited use of GAI tools, primarily for personal productivity tasks • Gradual experimentation and cautious integration into business	Incremental implementation	Incremental innovation

processes		
• Encouraging employees to self-learn and experiment with GAI • Highlighting gaps in formal training and board-level understanding of AI	Evolving training and awareness	Incremental innovation
First-Order Concepts	Second-Order Themes	Aggregate Dimension
• Emphasizing AI's ability to accelerate processes and reduce costs • Using AI tools for analyses, presentations, and customer support improvements	Focus on speed and cost-effectiveness	Efficiency-driven application

• Using AI to reduce time spent on basic tasks without compromising work quality • Brainstorming and structuring ideas for presentations and reports with AI assistance	Enhancing workflow productivity	Efficiency-driven application
First-Order Concepts	Second-Order Themes	Aggregate Dimension
• Highlighting risks of unreliable outputs and confidentiality breaches • Need for thorough piloting and cautious adoption of	Concerns regarding reliability and security	Cautious implementation and risk management

GAI tools		
• Testing AI tools extensively to assess reliability and effectiveness • Adopting GAI incrementally to minimize risks and maximize learning	Pilot testing and controlled deployment	Cautious implementation and risk management
First-Order Concepts	Second-Order Themes	Aggregate Dimension
• Recognizing AI's potential to provide a competitive advantage through cost and efficiency gains • Awareness of the risks of falling behind	Competitive opportunities and risks	Strategic opportunity recognition

competitors without proactive adoption		
• Identifying AI applications that could transform investment and data analysis processes • Monitoring industry trends to uncover new opportunities for GAI adoption	Exploring emerging applications and benefits	Strategic opportunity recognition

Data Structure: RW Industry

First-Order Concepts	Second-Order Themes	Aggregate Dimension
• Low familiarity and sporadic use of GAICs • Limited	Limited adoption	Low-touch adoption

experimentation with GAI tools in niche or pilot projects	and awareness	
• Concerns regarding the practicality, usability, and relevance of GAI tools for SMEs • Ethical and security considerations in the context of customer data handling	Barriers to AI adoption	Low-touch adoption
First-Order Concepts	Second-Order Themes	Aggregate Dimension
• Using simpler automation tools such as Excel bots for logistics and data	Use of basic	Localized productivity enhancements

management • Bots assisting with proposal calculations, dispatch handling, and logistics optimization	automation tools (e.g., Excel bots)	
• Automating routine tasks overnight, saving considerable time and effort • Reducing costs by freeing up employee time for other activities • Potential for AI tools to streamline routine operations and reduce manual	Cost-reduction opportunities through AI	Localized productivity enhancements

workload		
First-Order Concepts	Second-Order Themes	Aggregate Dimension
• Customers value personal interactions and human contact in service • GAICs lack the warmth of human engagement, which some customers prefer	Preference for human-centric customer service	Balancing technology with personalization
• Personal interactions remains crucial, especially for older customers • Human interaction in customer service improves	Maintaining personal interaction in customer engagement	Balancing technology with personalization

satisfaction and retention		
First-Order Concepts	Second-Order Themes	Aggregate Dimension
• Recognizing the need to stay updated and gradually integrate beneficial technologies • Balancing technological adoption with maintaining personal customer connections	Proactive adaptation to trends	Strategic adaptation
• AI and data management decisions are made centrally within the corporation • Individual		

stores benefit from centrally developed solutions without needing specialized expertise • Centralized systems allow uniformity, efficiency, and resource optimization across multiple locations • For AI adoption, reliance on centralized solutions prevents resource duplication and inefficiency	Centralized system reliance	Strategic adaptation

Appendix E

Company Interviews *Summary*

The findings indicate that approximately 94 percent of all the interviewees are aware of GAICs, and approximately 88 percent have used them. All the interviewees that have used GAICs can be considered to have learned to use them informally through self-learning and hands-on experience. Only one interviewee stated participating in formal external training but gained very little new knowledge. In the RW industry, 25 percent of the interviewees are not aware of or have not used GAICs, whereas in the ACS industry, 25 percent of the interviewees have not used GAICs. Approximately 88 percent of all the interviewees perceive challenges and risks associated with GAICs, while the remaining 12 percent, from the RW industry, are unable to respond. Similarly, approximately 88 percent of all the interviewees perceive productivity benefits in technology related to GAICs, while the remaining 12 percent, from the RW industry, are unable to respond. Of all the interviewees, approximately 88 percent respond to trends in technology related to GAICs, from which approximately 36 percent perceive trends generally, 29 percent are uncertain about current trends, 21 percent recognize trends within their industries, and the remaining 14 percent are either unable to state trends explicitly or understand them solely from their company's perspective. Regarding competitive advantage, approximately 56 percent of all the interviewees directly state believing that GAICs can offer a competitive advantage in their industries. Of the interviewees, approximately 25 percent have not adopted and implemented GAICs in their companies.

The findings indicate that approximately 44 percent of all the companies, excluding those where GAICs are in personal use or not in permanent use, have adopted and implemented GAICs. Of these companies, approximately 57 percent, 29 percent, and 14 percent are from the IT, BFS, and ACS industries, respectively. All the interviewees that have adopted and implemented GAICs in their companies perceive productivity benefits in technology related to GAICs and

perceive challenges and risks associated with GAICs. However, of these interviewees' companies, only approximately 14 percent, from the ACS industry, have formal employee training on technology related to GAICs, while the majority of the companies rely on employees' self-learning and hands-on experience. The interviewees that have adopted and implemented GAICs in their companies, approximately 43 percent perceive trends in technology related to GAICs in general, while 29 percent recognize trends directly in their industries. The remaining 28 percent are unable to respond with certainty or more broadly to trends. Of the interviewees that have adopted and implemented GAICs in their companies, approximately 71 percent directly state that they believe that GAICs can offer a competitive advantage in their industries, while the remaining 29 percent believe GAICs can offer a competitive advantage generally or are unable to state directly. Approximately 43 percent of the interviewees that believe that GAICs can offer a competitive advantage in their industries suggest that they have achieved the advantage and aim to sustain their position at the forefront of the technology related to GAICs. These interviewees' companies are from the IT and ACS industries, and each of them can be considered to have a formal strategy to keep up with technological advancements related to GAICs. In contrast, approximately 14 percent of the interviewees that believe that GAICs can offer a competitive advantage in their industries lack a formal strategy in their companies to keep up with technological advancements related to GAICs. Considering the interviewees that believe that GAICs can offer a competitive advantage in general or are unable to state explicitly, approximately 43 percent of the interviewees' companies that have adopted and implemented GAICs lack a formal strategy to keep up with technological advancements related to GAICs.

Appendix F

Expert Interview *Summary*

Participant: Vili Lehdonvirta, Professor of Economic Sociology and Digital Social Research at the Oxford Internet Institute, University of Oxford.

Date of the interview: July 25, 2024.

Duration of the interview: Approximately 26 minutes.

Lehdonvirta emphasized that properly executed risk management for companies, especially for SMEs, is essential to ensure safe and secure adoption and implementation of GAICs across the entire workplace. Risk management particularly involves awareness of copyright and privacy risks, compliance issues, and errors and incorrect information generated by GAI. Lehdonvirta also stated that a risk with GAICs is the over-reliance of users on these tools: *"A potential paradox lies in the fact that the better a GAI chatbot is, the more easily people might end up over-relying on the data generated by these chatbots. In other words, once a chatbot is capable of producing 99 percent accurate data, people may stop checking for that 1 percent chance of error, which could lead to serious mistakes"*. Moreover, Lehdonvirta reminded that a general risk, particularly for SMEs, is the dependency on GAICs and their service providers. That is, although there are numerous companies offering GAI in various forms, such as Software as a Service, ultimately, they all rely on a handful of global tech giants that have the resources to train these large language models with their own technology and the power to monopolize other areas of the digital economy as well. Thus, risk management is crucial for a company's operational activities in relation to the diverse risks posed by GAICs. Since the risks related to GAICs are both unintentional and intentional, a company must manage these tools effectively, thoroughly understand the risks, and engage in operational planning based on mutually agreed-upon rules. Lehdonvirta mentioned that SMEs may not necessarily need extensive technological expertise in the sense that GAICs have already been widely productized. Nevertheless, there should be someone within the company who understands the risks of GAICs and has thought through strategies to mitigate these risks, Lehdonvirta stated. In fact,

Lehdonvirta highlighted that significant investment in training on GAICs is vital to ensure that employees can handle a company's sensitive data in a way that mitigates the risk of data leaking. On the other hand, the type and extent of training required depends on the company's specific context, such as its industry and objectives, Lehdonvirta stated.

For SMEs, the productivity benefits from GAICs are often initially quite modest, Lehdonvirta pondered. However, this does not apply solely to GAI tools but to new technology in general. The benefits in productivity from GAICs are particularly evident in customer-facing areas, such as improved customer service and support, where GAICs have replaced previous low-quality AI chatbots. Additionally, they enhance internal communication and streamline onboarding processes within the company. Lehdonvirta reminded that these benefits for SMEs usually become apparent over time. For these benefits to be realized, companies need to adjust their organizational structure to be favorable to GAI tools and invest in innovation. In fact, the full potential of GAICs can only be achieved when SMEs invest in long-term innovation. According to Lehdonvirta, the productivity benefits and their realization therefore require investment and time. On the other hand, Lehdonvirta emphasized the uncertainty regarding the benefits in productivity and use cases of GAICs: *"Since this is new technology, it remains unclear how significant the potential benefits might be and how extensive the possible applications could become"*.

Lehdonvirta stated that SMEs can gain a competitive advantage over large companies from GAICs especially when they adopt these tools early. That is, SMEs are inherently more flexible in adapting their business practices compared to large companies. Lehdonvirta mentioned that GAICs can offer a competitive advantage to SMEs, particularly in compliance and internal processes. SMEs typically acquire GAI tools as Software-as-a-Service solutions, whereas large companies are generally able to develop their own internal GAI tools through their technological architecture. Due to this, Lehdonvirta stated not finding it reasonable for SMEs

to invest in and manage their own technology. Lehdonvirta, however, pondered the likelihood and duration of SMEs gaining a competitive advantage over large companies: *"SMEs can gain at least a temporary competitive advantage, but once so-called winning practices are identified, they are quickly adopted by large companies as well"*. Lehdonvirta also reminded that even if every company has access to the same technology, it does not necessarily mean that there is no room to differentiate from competitors in some way. In fact, GAICs differ from other technologies in the sense that they can be applied in many ways for various purposes. In this regard, Lehdonvirta highlighted the importance of creativity for SMEs to differentiate themselves from competitors in the market by applying GAICs in a unique way. This creative differentiation for SMEs is necessary not only in competing with large companies but also in distinguishing themselves from other SMEs.

The adoption of GAICs by SMEs varies across different sectors. For SMEs to adopt and implement GAICs, they typically require a clear, ready use case, or they consider a potential new use case to invest in, Lehdonvirta pondered. Regarding need and demand, the greatest opportunities for GAICs are likely in consumer-oriented businesses and scale-driven volume businesses, whether in customer-facing interactions or internal processes, Lehdonvirta pondered. On the other hand, Lehdonvirta stated that SMEs are less likely to base their business on volume but rather on high-quality and customer service, which presents opportunities in customer-facing interactions. However, challenges in the adoption of GAICs exist in regulated industries, as the risks need to be well understood and considered in advance, especially when dealing with innovation and new technology, Lehdonvirta emphasized. On the other hand, GAICs present new opportunities in regulated industries, particularly in areas such as regulatory compliance and other potential use cases, Lehdonvirta pondered. Regarding Finland and the adoption of AI, Lehdonvirta agreed with the observation that companies are not investing enough in productivity and technology. Compared to, for example, companies in the U.S.,

companies in Finland tend to be slow in adoption of new technologies and exploring their potential. According to Lehdonvirta, this slow adoption of technologies, such as AI, may be due to uncertainty and a risk-averse attitude caused by widely reported cases where things have gone wrong. Nevertheless, Lehdonvirta stated not being entirely sure to what extent SMEs in Finland have currently adopted GAICs.
