



CHALMERS
UNIVERSITY OF TECHNOLOGY



Facilitating AI Implementation

A Framework for Implementing Generative AI and AI Agents at Manufacturing Small and Medium-sized Enterprises in the Gothenburg Region

Master's Thesis in Learning and Leadership

FELICIA ANDERSSON
ELIAS PALM

DEPARTMENT OF COMMUNICATION AND LEARNING IN SCIENCE

CHALMERS UNIVERSITY OF TECHNOLOGY
Gothenburg, Sweden 2026
www.chalmers.se

MASTER'S THESIS 2026

Facilitating AI Implementation

A Framework for Implementing Generative AI and AI Agents at
Manufacturing Small and Medium-sized Enterprises in the
Gothenburg Region

FELICIA ANDERSSON & ELIAS PALM



CHALMERS
UNIVERSITY OF TECHNOLOGY

Department of Communication and Learning in Science
CHALMERS UNIVERSITY OF TECHNOLOGY
Gothenburg, Sweden 2026

Facilitating AI Implementation
*A Framework for Implementing Generative AI and AI Agents at Manufacturing
Small and Medium-sized Enterprises in the Gothenburg Region*

© Felicia Andersson and Elias Palm, 2026.

Supervisors: Johan Bengtsson,
Gothenburg Technical College
Matilda Hurtig,
Gothenburg Technical College
Christian Stöhr,
Department of Communication and Learning in Science,
Chalmers University of Technology

Examiner: Philip Gerlee,
Department of Mathematical Sciences,
Chalmers University of Technology

Master's Thesis 2026
Department of Communication and Learning in Science
Chalmers University of Technology
SE-412 96 Gothenburg
Sweden
Telephone +46 31 772 1000

Cover: Image representation of the AKSEA Framework developed in this thesis, symbolising the five Priority Areas it contains: *Ansvar* (Responsibility), *Kompetens* (Competence), *Strategi* (Strategy), *Engagemang* (Engagement), and *AI-policy* (AI Policy).

Typeset in L^AT_EX
Gothenburg, Sweden 2026

Facilitating AI Implementation

A Framework for Implementing Generative AI and AI Agents at Manufacturing Small and Medium-sized Enterprises in the Gothenburg Region

Felicia Andersson & Elias Palm

Department of Communication and Learning in Science

Chalmers University of Technology

Abstract

The rapid advancement of generative AI (GenAI) and AI agents presents significant strategic opportunities within the industrial sector, yet small and medium-sized enterprises (SMEs) frequently struggle to navigate the socio-technical complexities of technology implementation. This study aims to develop a conceptual framework tailored to management teams within manufacturing SMEs in the Gothenburg region, facilitating their transition from traditional workflows to AI-augmented operations. Utilising a qualitative multi-method research design, a systematic literature review of 15 academic papers was conducted to examine the drivers and barriers of SME technology adoption, complemented by local empirical insights gathered from eight semi-structured interviews involving 14 participants across various operational roles. Through an iterative development process, the theoretical and empirical findings were synthesised inductively through thematic analysis and subsequently deductively mapped using the Technology-Organisation-Environment-Individual (TOEI) framework.

The study identifies 15 distinct Influencing Factors shaping implementation, culminating in the development of the AKSEA Framework. To facilitate local utilisation, the framework was created in Swedish and is structured around five core Priority Areas: *Ansvar* (Responsibility), *Kompetens* (Competence), *Strategi* (Strategy), *Engagemang* (Engagement), and *AI-policy* (AI Policy). The empirical findings reveal that local SMEs exhibit significant variations in digital maturity, necessitating a non-sequential, flexible architecture for the AKSEA Framework. Rather than enforcing a rigid roadmap, it functions as a dynamic decision-support tool. Ultimately, this study concludes that successful GenAI and AI agent implementation within manufacturing SMEs requires a shift from general models toward context-specific, adaptable guidance, thereby enabling management to formulate tailored strategies aligned with their unique organisational readiness.

Keywords: Generative AI, AI Agents, Manufacturing SMEs, Technology Implementation, Change Management, Organisational Learning, Framework, TOEI, Gothenburg.

Acknowledgements

First and foremost, we would like to express our sincere gratitude to Johan Bengtsson and Matilda Hurtig at Gothenburg Technical College (GTC) for making this Master's thesis possible, and for their continuous support and assistance in driving this work forward. We are also deeply grateful to our academic supervisor Christian Stöhr at the Department of Communication and Learning in Science at Chalmers University of Technology, for his invaluable academic support, wisdom, and guidance throughout the course of this thesis.

Furthermore, we extend our appreciation to Noomi Bergström and Christian Lundeflo at GTC. Their crucial assistance in establishing contact with enterprises throughout the Gothenburg area was instrumental to the success of our empirical data collection. Additionally, we would like to thank Conny Svensson at AI Sweden for sharing his expertise and providing valuable guidance during the formative stages of this project.

Our sincere thanks also go to all the participating companies. The valuable insights, time, and feedback provided by the respondents were essential for successfully carrying out this research. Furthermore, we would like to express our gratitude to our examiner, Philip Gerlee, for his guidance and support, alongside our classmates, for the sense of community and shared laughter that enriched our time throughout this process.

Finally, as this thesis marks the culmination of our Master's programme in Learning and Leadership at Chalmers University of Technology, we would like to thank our families and friends. Their unwavering support, patience, and encouragement during our years of study have been indispensable in reaching this significant milestone in our lives.

Felicia Andersson & Elias Palm, Gothenburg, June 2026

Declaration on the Use of Generative AI

This thesis was partially supported by generative AI tools, primarily Google Gemini, for language polishing, text refinement, and structural feedback. Additionally, a dedicated AI transcribing tool provided by Chalmers University of Technology (2026) was utilised to transcribe the semi-structured interviews. However, all resulting transcripts were subsequently listened through and verified for accuracy by the authors. Furthermore, Scopus AI was employed during the initial, exploratory phases of the literature search, though it was not used within the formal systematic literature review itself.

These technologies were leveraged exclusively to enhance the clarity, search efficiency, and academic tone of the authors' own phrasing and research process. No part of the core conceptual framework, data synthesis, or final arguments was generated by AI. All final content was thoroughly validated, verified, and written by the authors, who retain full responsibility for the integrity of the research.

Contents

List of Figures	ix
List of Tables	x
1 Introduction	1
1.1 Research Gap	2
1.2 Purpose and Goals	2
1.2.1 Research Questions	3
2 Theoretical Background	4
2.1 Generative AI and AI Agents	4
2.1.1 Technological Foundations of AI	4
2.1.2 AI Agents and Increased Autonomy	6
2.1.3 Regulating AI	6
2.2 Theories on Change Management and Organisational Learning	7
2.2.1 Kotter’s Eight Accelerators	7
2.2.2 SMART Goals	10
2.2.3 SECI Model	10
2.2.4 Self-Determination Theory	11
2.3 Existing AI Implementation Frameworks	12
2.3.1 Sarkar	12
2.3.2 Amarasuriya and Abston	13
2.3.3 Sánchez, Calderón and Herrera	13
2.4 Conceptual Framework	14
2.4.1 TOEI Framework	14
3 Method	16
3.1 Data Collection	16
3.1.1 Literature Review	16
3.1.2 Semi-Structured Interviews	18
3.2 Data Analysis	19
3.2.1 Inductive Thematic Analysis	19
3.2.2 Deductive TOEI Categorisation	20
3.3 Framework Development	20
4 Results	22

Contents

4.1	Influencing Factors	22
4.2	Literature Review	24
4.2.1	Factors in the Technology Dimension	25
4.2.2	Factors in the Organisation Dimension	26
4.2.3	Factors in the Environment Dimension	28
4.2.4	Factors in the Individual Dimension	30
4.3	Interviews	30
4.3.1	Current Usage	31
4.3.2	Local Influencing Factors	32
4.3.2.1	Factors in the Technology Dimension	33
4.3.2.2	Factors in the Organisation Dimension	33
4.3.2.3	Factors in the Environment Dimension	37
4.3.2.4	Factors in the Individual Dimension	38
4.4	The AKSEA Framework	38
4.4.1	Responsibility	39
4.4.2	Competence	39
4.4.3	Strategy	40
4.4.4	Engagement	41
4.4.5	AI Policy	41
5	Discussion	42
5.1	Socio-Cultural Variations in Leadership and Change Management Competence	42
5.2	Variation of GenAI Competence and Usage Among SMEs	43
5.3	The AKSEA Framework Fills a Gap within the SME Context	44
5.4	Limitations	45
5.5	Future Research	46
6	Conclusion	48
6.1	Research Question 1	48
6.2	Research Question 2	49
6.3	Research Question 3	49
6.4	Concluding Remarks	50
	Bibliography	51
A	Interview Questions	I
B	Original quotes	IV
C	AKSEA Framework Iterations	XI
C.1	Version 1.0	XI
C.2	Version 2.0	XII
C.3	Version 2.1	XII
C.4	Version 3.0	XIII
D	Feedback on AKSEA Framework Version 3.0	XX

E AKSEA Framework Final Version

XXII

List of Figures

2.1	The SECI process. Adapted from Nonaka (1994).	11
3.1	PRISMA flowchart of the screening process.	17
C.1	Framework Version 1.0	XI
C.2	Framework Version 2.0	XII
C.3	Framework Version 2.1	XII
D.1	Quantitative feedback.	XX

List of Tables

3.1	Overview of interviewees and their respective roles.	18
4.1	Overview of Influencing Factors and Abbreviations.	23
4.2	Literature review summary of barriers (B) and drivers (D) regarding implementation.	24
B.1	Summary of Interview Quotes	IV

1

Introduction

Within only a few years, the field of Artificial Intelligence (AI), specifically the domain of Generative Artificial Intelligence (GenAI), has undergone significant expansion and rapid evolution. On November 30, 2022, OpenAI released ChatGPT to the public, an online GenAI chatbot that immediately gained attention for its state-of-the-art ability to generate human-like text (Roumeliotis & Tselikas, 2023). In just one week, ChatGPT had over one million sign-ups, and by January, 2023, there were 100 million monthly active users (Taulli, 2023). This development sparked a competitive response among other technology companies, leading to the emergence of other chatbots such as Microsoft Copilot, Google Gemini, and Anthropic's Claude (McClelland & Reisinger, 2023). Now, a little over three years later, these tools are becoming integrated into daily life (Statistics Sweden, 2025b). GenAI is projected to transform society in a manner similar to, if not more profound than, previous technological milestones such as the internet and mobile phones (Taulli, 2023).

An even more recent and likewise disruptive technological development is the emergence of AI agents. An AI agent is an autonomous system capable of interacting with its environment, facilitating independent decision-making, and executing complex tasks without continuous human intervention (RISE, n.d.). By leveraging GenAI as a cognitive foundation, these agents can orchestrate diverse tools and process heterogeneous data types, including text, imagery, and code, thereby enabling proactive and sophisticated problem-solving within digital environments (RISE, n.d.). These capabilities of GenAI allow for an extensive range of applications within an organisation (Taulli, 2023). However, such versatility does not guarantee that every application is strategically viable or yields significant organisational value.

While significant opportunities to utilise GenAI and AI agents exist, organisations are still identifying how to implement these technologies in meaningful, value-creating ways (Tillväxtverket, 2025). At the national level, Statistics Sweden (2025a) reports that many Swedish enterprises lack an explicit purpose for their use of AI. Their study highlights a significant disparity based on organisational scale: while 71.9% of large enterprises have adopted AI to some extent, adoption rates drop to 49.6% for medium-sized firms and 30.8% for small enterprises. This trend is mirrored on a global scale regarding GenAI, where OECD (2025) documents a similar correlation between company size and the adoption of GenAI as a specific technology.

Together, small and medium-sized enterprises (SMEs) in Sweden employ 2.1 million

people, excluding single-person firms, compared to 1.2 million employed by large enterprises (Ekonomifakta, 2024). The European Commission (2003) defines SMEs as “enterprises which employ fewer than 250 persons and which have an annual turnover not exceeding EUR 50 million, and/or an annual balance sheet total not exceeding EUR 43 million” (Annex, Art. 2.1). Given their role as the primary employer alongside their currently limited implementation of GenAI and AI agents, SMEs are the focus of this study.

1.1 Research Gap

Swedish SMEs currently possess limited knowledge regarding the utilisation of AI to generate business value and consequently require competency-building measures tailored to their specific operations and digital maturity (Tillväxtverket, 2025). This challenge is further compounded by the fact that many SMEs perceive existing educational initiatives as overly general or excessively academic (Tillväxtverket, 2025). Parallel to these practical barriers, a survey of extant literature conducted within this study regarding frameworks and roadmaps for GenAI and AI agent implementation within SMEs reveals a significant research gap. Few comprehensive frameworks exist for organisational AI implementation, and even fewer address GenAI and AI agents specifically or the unique constraints of SMEs.

While research in the field is emerging, three primary frameworks identified demonstrate clear limitations in this context. The models proposed by Sarkar (2026), Amarasuriya and Abston (2026), and Sánchez et al. (2025) either target AI technology in general within an SME context or focus on GenAI without distinguishing between different organisational sizes. A more comprehensive analysis of these models is provided in Section 2.3, where their lack of specificity further underscores the necessity for the more focused approach adopted in this research.

To address this gap, the empirical focus of this study is directed specifically toward manufacturing SMEs. This decision is informed by global data indicating that manufacturing firms are among the least likely to have integrated AI into their operations (Alex et al., 2025). Consequently, by examining a sector where adoption rates are historically low, yet the potential for value creation through GenAI and AI agents is high (Arregi et al., 2026), this research aims to provide a more targeted and actionable framework than the general models currently available in the literature.

1.2 Purpose and Goals

This study aims to facilitate the implementation of GenAI and AI agents within manufacturing SMEs. Drawing inspiration from a previous master thesis by Hurtig and Moradi (2022), who developed a roadmap for enhancing sustainability in SMEs, this research aims to develop a framework to serve as a decision-support tool, enabling manufacturing SMEs to design their own tailored implementation plans for GenAI and AI agents.

To ensure the framework is grounded in both the operational and human-centric needs of these organisations, the research adopts an educational perspective. This approach applies theories of learning and change management as a foundation for the development process. Furthermore, the construction of this framework builds upon existing knowledge of technology implementation by synthesising established drivers and barriers identified in previous research.

By combining these theoretical insights with an empirical investigation of how manufacturing SMEs currently perceive and utilise these technologies, the study provides an overview of the current landscape. To ensure practical utility, the framework addresses the specific organisational barriers that currently hinder implementation. Ultimately, this approach ensures that the resulting framework provides actionable components tailored to support SME management in navigating the complexities of emerging AI technologies.

1.2.1 Research Questions

To achieve the primary objective of facilitating GenAI and AI agent implementation through the development of a framework, the following research questions have been formulated:

- RQ1:** What key barriers and drivers can be synthesised from existing literature on digital transformation and change management regarding the implementation of emerging technologies in SMEs?
- RQ2:** How do manufacturing SMEs in the Gothenburg area currently perceive and utilise GenAI and AI agents, and what are the primary barriers and drivers for further implementation?
- RQ3:** What components should a framework include to support SME management in navigating the strategic implementation of GenAI and AI agents?

2

Theoretical Background

This chapter establishes the theoretical foundation necessary to analyse the implementation of GenAI and AI agents within SMEs. As technological adoption is a complex phenomenon involving both organisational and individual shifts, this chapter synthesises perspectives from various disciplines to provide a comprehensive analytical lens.

The theoretical background is structured around three main pillars: the technological context, the organisational change process, and a combined conceptual model. First, the core technologies of GenAI and AI agents are defined to provide a baseline for understanding their capabilities and limitations in an operational context. Subsequently, the chapter explores the implementation process through theories of change management and organisational learning: Kotter’s Eight Accelerators are employed to frame the overarching change process, while SMART goals, the SECI model and Self-Determination Theory are utilised to specifically address goal setting, knowledge sharing and individual motivation.

Furthermore, to provide a broader comparative context, the chapter concludes with a review of existing AI implementation frameworks. Serving as a benchmark, this inclusion allows a critical comparison between established academic roadmaps and the conceptual framework developed within this study. Additionally, the Technology-Organisation-Environment-Individual (TOEI) framework is introduced as the primary conceptual model, providing the structural dimensions necessary to categorise and analyse the results of the conducted literature review and interviews.

2.1 Generative AI and AI Agents

This section provides a conceptual overview of AI, GenAI, and AI agents. By establishing a clear definition of these technologies, as well as their inherent possibilities and limitations, this section serves as a theoretical foundation for understanding the practical requirements of their implementation.

2.1.1 Technological Foundations of AI

Multiple definitions of the term Artificial Intelligence exist, but many are similar in alluding to “making machines behave with ‘intelligence’ as humans do”, as stated by Kalota (2024, p. 2). What is meant by the term “intelligence” is also debated, but

some critical attributes of intelligence are “(a) the ability to learn from experience, (b) adapting to new situations, (c) understanding and handling abstract concepts, and (d) using knowledge to manipulate one’s environment” (Kalota, 2024, p. 2).

To achieve this artificial intelligence, most of the current computer models and programs are using statistical-based techniques, as is the case for GenAI models (Kalota, 2024). GenAI belongs to the field of deep learning, which utilises Artificial Neural Networks (ANNs) to learn directly from unstructured data without the need for pre-processing it. Inspired by the human brain, an ANN consists of so-called neurons structured into layers, where each layer of neurons has a connection to the next with specific “weights” (Kalota, 2024). When training to find patterns in the data, the ANN updates these weights that determine the connection strength between the layers, essentially updating what output is generated from a specific input.

This architecture forms the basis of current GenAI models, which have since expanded into networks with billions of neurons while utilising the pivotal Transformer architecture (Zhang et al., 2023). Introduced by Vaswani et al. (2017), this architecture features a self-attention mechanism that enables the system to process a sequence simultaneously. This allows the model to evaluate the significance of different elements such as words in a sentence relative to one another, regardless of the distance between them. By leveraging this architecture alongside extensive training on vast datasets, GenAI models learn the underlying probability distribution of the data, allowing them to generate novel content that remains statistically consistent with their training inputs.

However, as a consequence of these probability-based algorithms, GenAI possesses inherent limitations, such as the tendency to hallucinate and exhibit bias (Zhang et al., 2023). Hallucinations occur when a model produces content that is linguistically or grammatically sound yet factually incorrect (Boretti, 2026). This phenomenon stems from the fact that the models do not possess a fundamental understanding of truth. Rather, they predict the most probable subsequent token based on statistical patterns, which can lead to the generation of plausible-sounding but entirely fabricated information.

Relatedly, algorithmic bias manifests when a model produces skewed outputs that favour specific viewpoints or reinforce stereotypes (Zhang et al., 2023). This is often a direct reflection of the quality and composition of the training data. If the underlying datasets lack nuance or contain historical prejudices, the model will inevitably replicate and potentially amplify these biases.

At the core of text-based GenAI models are Large Language Models (LLMs), which are specialised ANNs designed for the analysis and generation of natural language. Given that contemporary LLMs can comprise trillions of parameters, the specific logic behind an individual output is often impossible to trace (Zhang et al., 2023). Consequently, the technology is frequently criticised for being a “black box”, where the lack of interpretability poses a significant challenge for ensuring accountability and reliability in professional applications.

A prominent class of these LLMs is the Generative Pre-trained Transformer (GPT), originally conceptualised by Radford et al. (2018). As the nomenclature implies, a GPT model is generative in its ability to produce novel text, pre-trained on massive data sets to learn language patterns prior to fine-tuning, and structurally reliant on the Transformer architecture (Yenduri et al., 2024). By leveraging this combination, GPT models can maintain contextual awareness across long dialogues, making them the primary engine behind contemporary conversational AI tools widely adopted in commercial settings.

2.1.2 AI Agents and Increased Autonomy

AI agents represent a new paradigm in AI (Dwivedi et al., 2026). Moving beyond the traditional “input-to-output” pattern of standard GenAI models, these agents operate through multi-step processes, setting incremental goals to complete complex real-world tasks within specific domains, such as customer support or email management. These agents utilise an LLM, such as a GPT model, to serve as a core reasoning engine. By integrating this engine with memory and specialised tools, AI agents can interact autonomously with their environment in real time (Dwivedi et al., 2026). This kind of architecture allows them to execute workflows with minimal human intervention.

However, despite their autonomous nature, individual agents are often constrained by limited memory capacity and the inherent complexity of the tasks they can resolve independently (Dwivedi et al., 2026). To overcome these limitations, agents can be integrated into larger multi-agent systems. Within such frameworks, agents can collaborate and access shared memory banks, thereby enhancing their collective problem-solving capabilities and operational scope. This enables them to solve intricate tasks and automate complex workflows by exhibiting greater autonomy and interacting with dynamic environments more effectively than stand-alone AI agents (Dwivedi et al., 2026). Consequently, unlocking significant potential for enterprise use cases.

2.1.3 Regulating AI

While the autonomous capabilities of AI agents and the generative power of LLMs offer significant opportunities, their inherent limitations and data-intensive mechanics present considerable ethical and legal challenges. To govern the ethical development and deployment of artificial intelligence, the European Union (EU) introduced the AI Act (EU, 2025). This regulation aims to establish a comprehensive definition of AI systems in general, extending beyond GenAI and AI agents. The regulation details prohibited and high-risk uses, constraining the deployment of AI that could potentially harm individuals. A key measure of the Act stipulates that AI operations require human oversight to mitigate the risks of full automation. Additionally, the regulation specifically mandates that GenAI systems must comply with EU copyright laws.

Concurrently, organisations must adhere to the General Data Protection Regula-

tion (GDPR) when utilising GenAI (IMY, 2025). Given the absence of a universal standard for the secure processing of personal data in these contexts, enterprises are required to perform comprehensive risk assessments for any AI applications handling sensitive information. Furthermore, IMY (2025) states that because data inputted into publicly available GenAI services may be retained to train future iterations of the models, businesses must implement precautions to avoid sharing sensitive data. These measures must ensure both the protection of trade secrets and full compliance with GDPR regulations.

2.2 Theories on Change Management and Organisational Learning

Beyond a technical understanding of GenAI and AI agents, understanding organisational processes and human behaviour is also fundamental for a successful implementation. To capture this competence, this study integrates four established theoretical models on change management and organisational learning, ensuring a holistic perspective on the transition from traditional workflows to AI-augmented operations.

Kotter's Eight Accelerators serve as a backbone of the framework, providing the necessary structure to facilitate organisational change, from the initial establishment of urgency to the final anchoring of new practices within the corporate culture. This is complemented by the integration of SMART goals, which serve to operationalise the implementation by ensuring that AI initiatives remain purposeful, measurable, and evaluable against organisational benchmarks.

Furthermore, to ensure the continuous evolution of internal expertise, the framework incorporates principles from the SECI model, facilitating the transformation of individual insights into collective organisational knowledge. Finally, Self-Determination Theory is utilised as an analytical lens to foster the motivation required for sustained employee adoption. By aligning these theories, the developed framework addresses both the structural requirements of the firm and the psychological needs of the individual, ensuring a comprehensive approach to GenAI and AI agent implementation.

2.2.1 Kotter's Eight Accelerators

To facilitate change in organisations, John P. Kotter presents eight steps called 'accelerators' (Kotter, 2014). They are tailored around common challenges that enterprises may face during a change attempt and are as follows:

1. **Create a sense of urgency**

For change to even be possible there needs to be an argument for why change is needed among as many people at the organisation as possible (Kotter, 2014). This can be done by highlighting an opportunity for the organisation to increase production or to become more stable in the future. In earlier work,

Kotter (2012) also mentions how a crisis or the potential threat of one can be used to create a sense of urgency.

2. Build and evolve a guiding coalition

The second accelerator requires forming a group of people that lead the change (Kotter, 2014). This group needs to possess both leadership capabilities while also having management knowledge and feeling a strong sense of urgency for change. Kotter defines leadership as being the ability to create change and influence other people. Management knowledge refers to the ability to make sure that daily operations are well run. The core group must contain the following criteria in some way (Kotter, 2012):

- i) *Position of power*, to be able to execute their decisions.
- ii) *Expertise*, to ground decisions in established knowledge, where both technical proficiency and diverse professional, organisational, and cultural viewpoints are included.
- iii) *Credibility*, so other employees will take their work seriously.
- iv) *Leadership*, to be able to implement the change.

3. Form a change vision and strategic initiatives

The third accelerator emphasises the necessity of establishing a formal vision and strategy (Kotter, 2014). This vision must be long-term, incorporating initiatives that propel the organisation toward its ultimate objectives. To avoid the constraints of executive-level biases or priorities, the guiding coalition should formulate these initiatives and the overarching vision. Furthermore, this process should not be rushed, as an insufficient vision can be more detrimental to an organisation than the absence of one (Kotter, 2012).

4. Enlist a volunteer army

In the fourth step, the guiding coalition disseminates the vision and strategy to the workforce. Emphasis is placed on communication to ensure employees understand the intended vision and the specific initiatives to be implemented (Kotter, 2012). It is essential to utilise diverse communication channels, repeating the message consistently over time while facilitating inquiries and employing various mediums, such as written text and oral presentations. This multifaceted approach is necessary to mitigate misunderstandings and alleviate the anxiety typically associated with organisational change.

5. Enable action by removing barriers

To enable employees to implement change, organisational barriers must be eliminated. This process, defined in earlier publications as employee empowerment, requires the following actions (Kotter, 2012):

- i) Communicate a coherent vision to employees so they have a shared sense of purpose, serving as a catalyst for action.
- ii) Align organisational structures, information systems and personnel systems with the vision to facilitate the implementation of the desired changes.
- iii) Provide training to equip employees with the right skills and attitude needed to implement the change.
- iv) Confront supervisors and personnel who obstruct progress or fail to contribute to the implementation process.

6. **Generate (and celebrate) short-term wins**

Short-term wins are not something that groundlessly occurs, they need to be planned for (Kotter, 2012). By visualising that the change is leading towards improvement to the entire organisation and celebrating them, it sustains the change progress (Kotter, 2014). Not only does it foster motivation for employees already taking part in the change, but it can also motivate employees to join the change process.

7. **Sustain acceleration**

Once change is integrated within the organisation, the seventh step involves preventing the workforce from abandoning the change process (Kotter, 2014). It is essential to continuously recruit employees to the initiative, generate further short-term wins, and decentralise the change efforts as necessary (Kotter, 2012). As the guiding coalition cannot manage all sub-initiatives simultaneously, responsibility must be distributed to other managers or department heads who have committed to the change effort. Sustaining acceleration requires reinforcing previous accelerators to ensure the change process maintains its momentum. This involves monitoring the process to ensure the organisation does not experience fatigue or lose focus due to emerging resistance or complacency.

8. **Institute change**

The final step involves institutionalising the change by embedding it within the organisational culture (Kotter, 2014). This encompasses the redefinition of processes, hierarchies, procedures, and behaviours throughout the organisation. For this transition to occur, the previous cultural norms must cease to exist (Kotter, 2012). The following actions are instrumental in facilitating the establishment of this new culture:

- i) Show improved results from the new practice.
- ii) Stress how the old culture or practice that has served the organisation well until now, is no longer useful.
- iii) Get rid of seniors not embracing change by offering them an attractive early retirement program but embracing those who choose to adapt and stay.

- iv) Make sure new hires are screened based on the new practices and not the old ones.
- v) Do not promote people that do not adopt the change or viscerally appreciate it.
- vi) Ensure new CEOs full-heartedly believe in the new practice and will not go back to the old one.

2.2.2 SMART Goals

The SMART Goals model developed by Doran (1981) provides a guideline for effective goal setting. Doran (1981) states that when formulating a goal, one should strive to make the goal *Specific, Measurable, Assignable, Realistic, and Time-related* (SMART):

- *Specific*: Target a particular area for improvement.
- *Measurable*: Quantify, or at least suggest, an indicator of progress.
- *Assignable*: Define responsibility clearly.
- *Realistic*: Outline results that can realistically be achieved with the available resources.
- *Time-related*: Include a timeline for when the results can be achieved.

Doran (1981) acknowledges that not all goals will fulfil all five criteria. Principally the *Measurable* criteria, since more abstract goals that could be beneficial cannot always be quantified but should not be overlooked. The SMART criteria should be seen as a guideline and tool, not rigid rules, for developing effective goals (Doran, 1981).

2.2.3 SECI Model

The SECI model by Nonaka (1994) is a model for knowledge creation and organisational learning. It builds on the assumption that knowledge is created through conversion between *tacit* and *explicit* knowledge. Explicit knowledge refers to knowledge that can be communicated in formal, systemic language, whereas tacit knowledge refers to a type of knowledge with cognitive and technical elements that are difficult to formalise and communicate. Nonaka (1994) describes four processes of knowledge conversion, detailed below and visualised in Figure 2.1:

- *Socialisation*: Tacit knowledge sharing directly between individuals.
- *Externalisation*: Transforming tacit knowledge into explicit knowledge.
- *Combination*: Combining different types of explicit knowledge into new wholes.
- *Internalisation*: Transforming explicit knowledge into tacit knowledge.

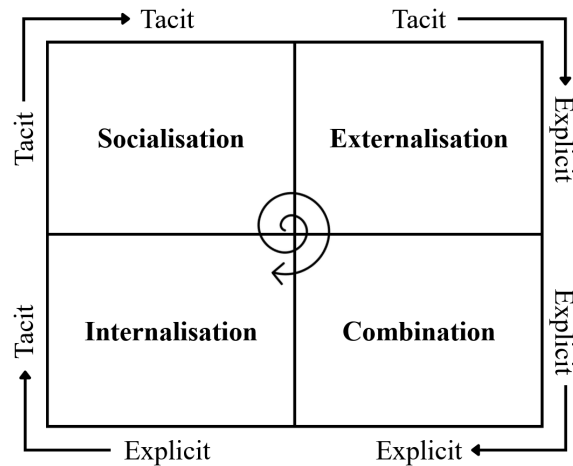


Figure 2.1: The SECI process. Adapted from Nonaka (1994).

Referencing Nonaka, Jacobsen and Thorsvik (2021) describes a framework with six central characteristics of a well-functioning knowledge creating system:

1. *Overlapping meeting places:* Forums where employees meet both vertically and horizontally to share information.
2. *Collaboration with mentors:* Teams where new and experienced employees are integrated to transfer tacit knowledge.
3. *Decentralisation:* Encouraging horizontal communication to promote rapid knowledge dissemination.
4. *Electronic databases:* Systems for storing and sharing explicit knowledge.
5. *Systematic training and instruction:* Structured processes for competency development.
6. *Culture of trust:* An organisational culture characterised by care and trust, which facilitates the transmission of information.

2.2.4 Self-Determination Theory

Self-Determination Theory is a comprehensive framework developed by Ryan and Deci to explain the drivers of human motivation (Ryan & Deci, 2000). Motivation is broadly categorised into *extrinsic* motivation, performing a task to achieve a separable outcome or external reward, and *intrinsic* motivation, the inherent satisfaction derived from the activity itself (Ryan & Deci, 2000).

Within this framework, Ryan and Deci (2000) suggest that the development of intrinsic drive depends on the fulfilment of three mutually reinforcing psychological needs: competence, autonomy, and relatedness.

- *Competence:* An environment where skills can be practised and recognised is required. Conversely, settings that hinder or ignore a sense of mastery tend to diminish motivation.

- *Autonomy*: Tasks need to be perceived as voluntary and self-endorsed. External factors, such as threats or rewards, can undermine intrinsic motivation by shifting the individual’s focus toward external demands and pressures.
- *Relatedness*: This social dimension involves feeling supported by one’s environment and collaborating toward common goals. While a strong sense of relatedness significantly bolsters intrinsic motivation, a lack of social connection does not necessarily inhibit it, provided the other needs are met.

In comparison to extrinsic motivation, intrinsic motivation tends to result in enhanced performance, persistence, and creativity, as well as heightened vitality, self-esteem, and general well-being. Consequently, this is of significant interest to managers seeking to facilitate employee motivation and commitment within the workplace (Ryan & Deci, 2000).

2.3 Existing AI Implementation Frameworks

This section evaluates a selection of AI implementation frameworks identified within contemporary literature to establish a benchmark for the framework developed in this study. The three frameworks briefly outlined hereafter represent diverse approaches, tailored to varying technologies, organisational scales, and business functions.

Although these frameworks offer valuable strategic guidance, they generally adopt a “one-size-fits-all” philosophy, aiming for broad applicability across different sectors without geographical or industry-specific constraints. By detailing the components and operational logic of each framework, this review establishes the necessary context to contrast existing academic roadmaps with the framework developed in this study.

2.3.1 Sarkar

The framework proposed by Sarkar (2026) targets all types of companies, regardless of size or industry, and GenAI as a specific technology. It consists of four phases; *Explore*, *Codify*, *Integrate*, and *Elevate*. The Explore phase initiates low-stakes experimentation to identify role-specific, high-value use cases, which are subsequently institutionalised during the Codify phase through the standardisation of prompt libraries and documented best practices. The Integrate phase involves a systemic redesign of workflows to embed AI as a seamless, non-optional component of recurring business processes, while the final Elevate phase ensures long-term sustainability by fostering AI literacy and robust governance.

To further illustrate application of the framework, Sarkar (2026) also describes various organisational use cases, balancing these opportunities against a critical review of potential risks and their corresponding mitigation strategies.

2.3.2 Amarasuriya and Abston

Focusing on the procurement function within SMEs, Amarasuriya and Abston (2026) proposes a framework for the adoption of diverse AI technologies, which is structured around three interconnected pillars, namely *Intelligent Automation and Decision Augmentation*, *Ethical Procurement Ecosystems*, and *Dynamic Regulatory Adaptation*. Each of these pillars is supported by a three-step implementation roadmap designed to facilitate an efficient and ethical transition.

The first pillar, Intelligent Automation and Decision Augmentation, commences with the introduction of low-risk automation to foster organisational familiarity, transitions towards the scaling of specialised applications such as predictive analytics, and concludes by ensuring that strategic planning remains a human responsibility.

This is followed by the second pillar, Ethical Procurement Ecosystems, which addresses the mitigation of bias and the promotion of supplier diversity through a roadmap that includes the application of World Economic Forum guidelines, participation in advocacy networks for enhanced diversity, and the integration of Explainable AI to ensure transparent decision-making.

Finally, the third pillar, Dynamic Regulatory Adaptation, focuses on maintaining compliance within a volatile legal landscape by utilising Regulatory Technology for continuous legislative monitoring, joining industry consortia for early regulatory insights, and designing modular AI systems that can be rapidly updated as data privacy and sustainability mandates evolve.

2.3.3 Sánchez, Calderón and Herrera

Based on a broad analysis, Sánchez et al. (2025) introduces a six-phase roadmap to facilitate AI implementation in SMEs, alongside a comprehensive review of challenges, opportunities, and use-case examples. The implementation process is structured as follows:

The roadmap commences with a *Current State Assessment*, in which the organisation evaluates its technological infrastructure, workforce competencies, and digital maturity. This phase is essential for establishing a realistic baseline for adoption.

Following this, the second phase involves defining *Strategic Objectives*. This stage ensures that AI initiatives are tied to measurable business goals, such as operational efficiency or improved customer experience, that align with overarching business priorities.

Next, the organisation moves into *AI Solution Selection*. Here, the firm chooses between custom, off-the-shelf, or cloud-based deployment models based on their specific resource constraints and scalability requirements.

The fourth phase is *Pilot Project Implementation*, which allows the firm to validate the feasibility of the AI solution in a controlled, small-scale environment. This serves to build internal trust and capacity before proceeding to a wider rollout.

The fifth phase integrates *Training and Change Management*, focusing on continuous upskilling to close knowledge gaps. It also addresses cultural resistance by clarifying how AI functions to augment, rather than replace, human roles.

The final step, *Measurement and Scaling*, involves using established Key Performance Indicators (KPIs) to evaluate the impact of the pilot. This provides the insights necessary to refine the strategy and scale successful AI applications across broader organisational functions.

2.4 Conceptual Framework

To establish a robust analytical framework for interpreting the findings of this study, the TOEI framework is employed. As an extension of the Technology-Organisation-Environment (TOE) framework, the TOEI framework incorporates an additional Individual dimension to better capture the influence of individual actors on the implementation process. The following section provides further explanation of the TOEI framework, outlining its core components.

2.4.1 TOEI Framework

When studying technology adoption and implementation among organisations, a number of different models targeted at both the organisational and individual level are frequently utilised (Li, 2020). One of the organisational level models is the TOE framework developed by Tornatzky et al. (1990). While, according to Li (2020), no unified organisational-individual theory is commonly used, studies by Khayer et al. (2020) and Kumar et al. (2025), among others, have added an individual dimension to the TOE framework. This section further describes this adapted TOEI framework.

As originally described by Tornatzky et al. (1990), the technological dimension of the TOE framework generally pertains to aspects such as the *Availability* and *Characteristics* of the studied technology. The organisational dimension broadly encompasses firm *Size*, available *Slack resources*, internal *Communication processes*, and both *Formal and informal linking structures*. Lastly, the environmental dimension incorporates external factors, including *Industry characteristics and market structure*, *Technology support infrastructure*, and *Government regulation* (Tornatzky et al., 1990).

The individual dimension lacks standard components. One of the well-known individual level models is the Technology Acceptance Model (TAM) (Li, 2020), where Khayer et al. (2020) has drawn inspiration. The original TAM, developed by Davis et al. (1989), contains *Perceived usefulness* and *Perceived ease of use* as factors for predicting adoption. Khayer et al. (2020), specifically studying cloud computing adoption, instead uses three components in their model: *Computer Self-efficacy*, *Social Influence* and *Resistance to Change*. Kumar et al. (2025), analysing Human-AI collaboration, incorporates *Favourable attitude*, *Self-efficacy*, *Hedonic motivation* and *Personal innovativeness* as components of the individual dimension within the

2. Theoretical Background

TOEI framework. While a universal standard is lacking, the individual dimension is thus defined in this study through the human factors that constitute the individual's role during technology implementation and adoption.

3

Method

This chapter outlines the research design and the systematic process used to identify and categorise the factors influencing implementation of both technology in general and GenAI and AI agents in particular. A qualitative multi-method approach was adopted, where a literature review and semi-structured interviews were conducted in parallel to allow for iterative insight development. By synthesising the findings from these methods, a framework was developed to facilitate technology implementation within SMEs in Gothenburg, the design process for which is also detailed in this chapter.

3.1 Data Collection

To gain understanding of the implementation landscape for GenAI and AI agents within SMEs, this study utilised a combination of secondary and primary data sources. The literature review provided a theoretical foundation, while the semi-structured interviews offered real-world empirical insights from practitioners in the field. By integrating these two sources, the study achieves methodological triangulation, ensuring that the final framework is not only theoretically grounded but also reflective of the practical realities and challenges faced by SMEs in the Gothenburg region.

3.1.1 Literature Review

To ensure a transparent and replicable review of existing research, the literature search adopted a systematic approach based on the methodology described by Säfsten and Gustavsson (2020). This process involved distinct stages of identification, screening, eligibility, and inclusion. While not a full-scale systematic literature review, the review exceeded the scope of a traditional narrative review by serving as a primary data source for the thematic synthesis. It primarily targeted the first research question regarding technology implementation in general.

To maintain academic rigour, Scopus was utilised as the sole database to ensure the inclusion of peer-reviewed literature. The scope was restricted to journal articles, books, book chapters, and systematic reviews published in either English or Swedish. Iterative keyword testing resulted in the following search string:

3. Method

(“change management” OR “technology implementation”) AND (“technology” OR “digitalisation” OR “digital transformation” OR “industry 4.0”) AND (“SME” OR “small and medium sized enterprise*”)

The search and subsequent evaluation followed the PRISMA (Preferred Reporting Items for Systematic reviews and Meta-Analyses) guideline (Haddaway et al., 2022). The search, performed February 23, 2026, yielded 141 records. During the identification phase, one duplicate was removed, three were excluded due to language constraints, and 42 were excluded due to their publication format, specifically conference papers and conference reviews. Following a preliminary screening of titles, keywords, and abstracts, a further 64 articles were removed. Of the remaining 31 articles, seven were unavailable for retrieval in full text. After a comprehensive full-text review of the 24 eligible articles, nine were excluded and 15 were ultimately included for data extraction and analysis. This process is illustrated in the PRISMA flowchart in Figure 3.1. To minimize potential inter-reviewer bias, both the preliminary screening and full-text review were conducted independently by each researcher. This was achieved using the ‘blind mode’ feature on the Rayyan.ai platform (Ouzzani et al., 2016), prior to reconciling any discrepancies regarding inclusion and exclusion criteria.

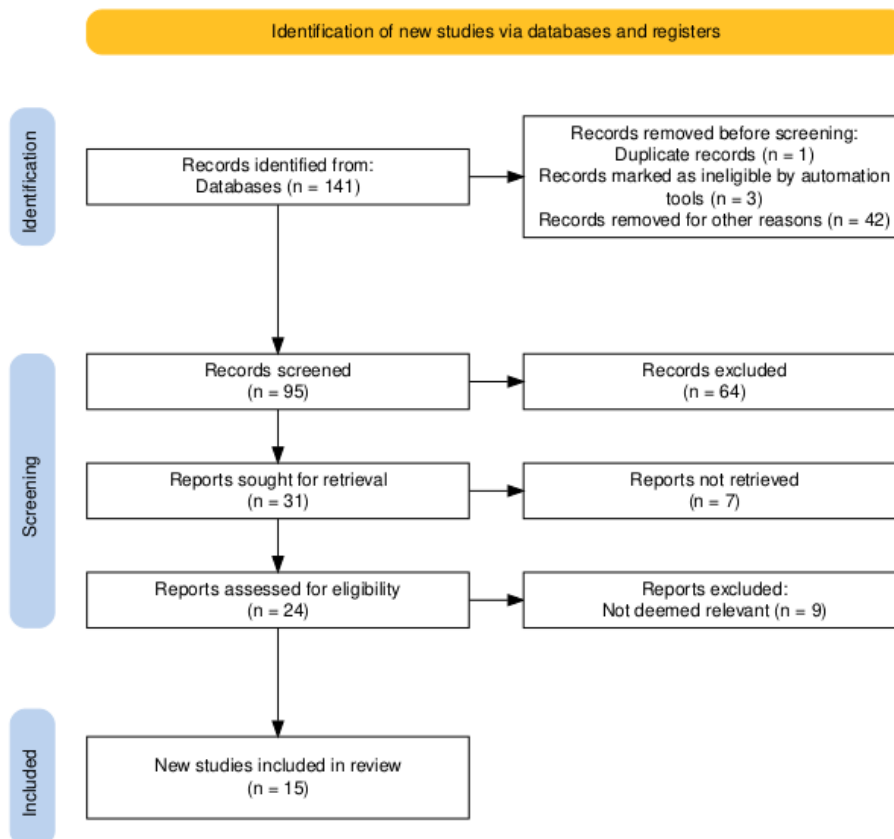


Figure 3.1: PRISMA flowchart of the screening process.

3.1.2 Semi-Structured Interviews

Parallel to the literature review, primary data were collected through semi-structured interviews involving 14 participants across eight SMEs. A purposive sampling strategy was employed to recruit manufacturing firms regardless of their current level of AI implementation, ensuring a comprehensive overview of the sector. The identification and selection of these companies were conducted in collaboration with Gothenburg Technical College (GTC). By leveraging GTC’s industrial network, the study gained access to a wide spectrum of organisations. An overview of the participating organisations and the interviewees’ professional roles is provided in Table 3.1.

Table 3.1: Overview of interviewees and their respective roles.

Company	Role(s)
A	1. CEO 2. IT Manager
B	1. Production Engineering Manager
C	1. CEO
D	1. Co-Owner, Sales & Operations
E	1. Sales & Procurement
F	1. Vice CEO 2. Supply Chain Coordinator 3. IT and Business Development
G	1. Engineering & Procurement Manager
H	1. CFO 2. Sales 3. Accounting 4. Production Manager

To ensure the ethical and lawful processing of interview data, the study followed Chalmers University of Technology’s guidelines for student work (Chalmers University of Technology, 2024). All participants provided informed consent, and both the individuals and their respective organisations have been anonymised to reduce traceability and protect sensitive information. In accordance with data protection protocols, all primary personal data were permanently deleted by June 5, 2026, while the subsequent anonymised findings were retained within the study.

While the primary focus was to address the second research question, the interview guide was informed by all three research questions and developed in accordance with established methodological guidelines by Esaiasson et al. (2024) (see Appendix A). To ensure relevance and clarity, the interview questions were refined through pre-testing with the supervisors from GTC. The semi-structured approach facilitated impromptu follow-up questions, allowing for deeper insights into the current state

of GenAI and AI agent implementation. All interviews were recorded and transcribed verbatim in Swedish, utilising the transcription service of the Chalmers AI Portal (Chalmers University of Technology, 2026). Subsequently, the automated transcriptions were manually proofread and verified against live notes taken during the sessions. To ensure clarity for the international reader while preserving the participants' original intent, quotes were translated into formal English only after the initial results were drafted. For added transparency, the original Swedish versions of the cited quotes are available in Appendix B.

3.2 Data Analysis

The analysis of both literature and interview transcripts began as an inductive thematic approach, developing into a deductive approach using the TOEI framework.

3.2.1 Inductive Thematic Analysis

To analyse the qualitative data from both the literature review and interviews, a thematic analysis was conducted following the six-phase framework established by Braun and Clarke (2006). The process began with a familiarisation phase, involving thorough reading of the interview transcripts and literature sources to gain a comprehensive overview of the data. Following this, literature and transcriptions were systematically highlighted and coloured based on initially developed themes. At this preliminary stage, the literature review generated five core themes, and the interviews yielded eight themes reflecting empirical practice. The themes were as follows:

Literature review

- Best practices and recommendations
- Pitfalls and suboptimal approaches
- Barriers to implementation
- Benefits of implementation
- General observations and uncategorised findings

Interviews

- Current applications
- Future applications
- Barriers and obstacles
- Implementation drivers
- Organisational culture
- Attitudes and perceptions
- Education and learning
- Digital maturity

After the initial coding, a hybrid thematic approach was adopted, balancing inductive discovery with the deductive structure provided by the TOEI framework. As the analysis progressed, the initial codes were reviewed and refined, emerging into barriers and drivers of technological implementation together with a current state analysis. Iterative refining and unification of the drivers and barriers across both literature and interviews continued, allowing for a structured comparison between theoretical findings and empirical observations. This culminated in the defining and naming of the barriers and drivers as *Influencing Factors*, mapped onto the four pillars of the TOEI framework, and a current state analysis of GenAI implementation at manufacturing SMEs.

3.2.2 Deductive TOEI Categorisation

While the traditional TOE framework developed by Tornatzky et al. (1990) focuses on firm-level adoption, this study extends the model to include the Individual dimension to account for human agency and personal attitudes observed in the data. This framework served as the primary structural lens for data analysis. The identified barriers and drivers were systematically organised into the four pillars of the TOEI framework:

- **Technology:** Factors related to the infrastructure and technical characteristics of GenAI and AI agents.
- **Organisation:** Internal organisation attributes, culture, and resources.
- **Environment:** External market pressures, competition, and legislation.
- **Individual:** Personal attitudes and cognitive factors of the users.

The TOEI framework was applied as a system of interdependent dimensions rather than isolated categories. Within the SME context, these dimensions frequently overlap. For example, limited organisational resources directly influence an individual's capacity to engage with new AI technologies. Adopting this systemic perspective allows the analysis to capture the complex interplay between organisational internal and external factors and individual employee characteristics.

3.3 Framework Development

The final stage of the research involved a synthesis of the identified Influencing Factors into a strategic framework designed for SME practitioners. This process moved beyond simple categorisation to the development of five distinct *Priority Areas* for the implementation of GenAI and AI agents.

Grounded in synthesised findings from the literature and interviews, the framework's iterative development was guided by the theories of change management and organisational learning. Central to this process was the integration of Kotter's Eight Accelerators, which served as a structural foundation, while the SECI model, SDT, and SMART goals along with information on AI-related concepts were embedded as practical implementation instruments. Finally, to ensure practical usability for the target audience, the framework was authored in Swedish.

The initial version was conceptualised during a brainstorming session on a physical whiteboard. The second iteration transitioned to the digital platform Mural, where the focus shifted to formulating key questions and inquiries to address the identified barriers and drivers. This resulted in version 2.0, which was further refined into a version 2.1 by categorising the inquiries, leading to the emergence of the aforementioned Priority Areas. Version 3.0 focused on enhancing interpretability and usability. Consequently, the framework was adapted into a PowerPoint presentation, and incorporated supporting informational pages to improve practitioner comprehension.

To ensure the framework's validity and practical relevance, five workshops were

held with a subset of the interviewed companies. Each workshop concluded with a structured feedback session, incorporating both verbal discourse and an anonymous online survey to capture quantitative and qualitative insights. A summary of the feedback can be found in Appendix D. Following this, minor refinements were made to produce the final iteration of the framework, resulting in the *AKSEA* Framework, which is presented in Section 4.4. Documentation of previous iterations is provided in Appendix C.

4

Results

This chapter presents the findings derived from the data collection and analysis, culminating in the presentation of a strategic implementation framework for GenAI and AI agents. To provide a comprehensive understanding of the current adoption landscape, the chapter is structured into four sequential sections.

First, an overview of the 15 key Influencing Factors identified across both the literature review and the empirical data is presented. Structured according to the Technology-Organisation-Environment-Individual (TOEI) framework, these factors serve as the analytical foundation for the study and are summarised in Table 4.1.

Secondly, the specific findings from the literature review are detailed, outlining the theoretical trends of technology implementation. Third, the results from the semi-structured interviews are presented, offering a localised empirical perspective from manufacturing SMEs within the Gothenburg region.

Finally, by synthesising these theoretical and empirical insights, the chapter concludes with the introduction and explanation of the AKSEA Framework. This strategic decision-support tool operationalises the identified Influencing Factors into actionable Priority Areas, providing SMEs with the structural guidance necessary to facilitate successful technology integration.

4.1 Influencing Factors

Before detailing the findings from each data source, it is essential to provide a description of the identified Influencing Factors that emerged from the literature review and interviews. A notable characteristic of these 15 Influencing Factors is their dual nature; depending on an SME's specific context, a single factor can manifest as either a barrier or a driver for implementation. For instance, while a supportive organisational culture acts as a driver, its absence constitutes a barrier.

To aid information presented in subsequent sections, each factor is assigned an alphanumeric identifier where the initial letter corresponds to its respective TOEI dimension: Technology, Organisation, Environment, or Individual. It should be noted that the numerical component serves solely as a unique identifier for referencing purposes and does not denote the relative importance or priority of the factor.

Table 4.1: Overview of Influencing Factors and Abbreviations.

Abbreviation	Influencing Factor
T1	Data Security
T2	Digital Infrastructure
O1	Resources
O2	Top Management Support
O3	Change Management Competence
O4	Culture of Communication and Collaboration
O5	Strategy
O6	Digital Competence
E1	Competitive Pressure
E2	Customer Pressure
E3	Government Support
E4	Laws and Regulations
E5	Collaborative Networks and Partnerships
I1	Attitude
I2	Perceived Usefulness

Within the Technology dimension, two factors were identified. The first, *Data Security*, concerns the tools and routines utilised by an enterprise to manage and store data in a secure manner. The second factor, *Digital Infrastructure*, denotes the existing digital tools within an organisation and their compatibility with the technology intended for implementation.

The Organisation dimension consists of six factors. Resources are defined as the financial capital and time available to the SME. *Change Management Competence* comprises the strategies employed during transitions to support personnel throughout the process. *Top Management Support* encompasses the involvement of senior leadership and its subsequent impact on implementation efforts. *Culture of Communication and Collaboration* refers to group-level social factors and their effect on the adoption of innovations. *Strategy* involves the goals and vision for implementation, including the structure and execution of these objectives. Finally, *Digital Competence* is defined as the collective ability to utilise new technology effectively, encompassing both foundational proficiency among staff and the presence of specialised expertise required for advanced application.

Five factors were identified within the Environment dimension. *Competitive Pressure* refers to the influence exerted by competitors and the labour market on technology implementation. *Customer Pressure* encompasses the necessity of meeting evolving customer demands and the resulting impact on organisational change. *Government Support* is defined as external assistance, such as financial funding and educational resources, provided by various governmental bodies to enhance implementation capabilities. *Laws and Regulations* include formal legal requirements, governmental mandates, and regulatory documents governing industry standards. Lastly, *Collaborative Networks and Partnerships* involves strategic alliances and pro-

fessional relationships that facilitate knowledge sharing and resource exchange.

Finally, the Individual dimension consists of two factors. *Attitude* includes the emotional and motivational aspects regarding the use of new technology. *Perceived Usefulness* refers to the specific value and benefits individuals anticipate or experience when interacting with the technology.

4.2 Literature Review

The results in this section primarily address the first research question, which examines the key barriers and drivers for implementing emerging technologies in SMEs. These findings are derived from a thematic analysis of the 15 articles selected during the screening process. By drawing on existing literature within digital transformation and change management, this section explores findings from previous technological implementations to extract actionable insights. Table 4.2 provides a comprehensive overview of the identified factors, classifying them as barriers, drivers, or both, based on the perspectives presented in the literature.

Table 4.2: Literature review summary of barriers (B) and drivers (D) regarding implementation.

Artikel	T1	T2	O1	O2	O3	O4	O5	O6	E1	E2	E3	E4	E5	I1	I2
Arayici et al. (2011)				D	D	B	D	D/B						D/B	B
Brodeur et al. (2023)			B		D/B	D	D/B	D/B						D/B	
Cheng et al. (2024)		D		D	D	D	D	D	D						
Cimini et al. (2021)		D/B	D/B		D	D	D	D							
Ghobakhloo and Iranmanesh (2021)	B	D/B	B		D/B	D	D/B	D/B	B		D	D	D/B	D	
Ghobakhloo et al. (2022)	B	B	D/B	B	D/B	D/B	D/B	D/B		D	D/B	D	D/B	D/B	D
Haber and Carmeli (2023)			B	B	D/B	B		D/B						B	
Qureshi et al. (2025)					D	D									
Rawat et al. (2024)	B	B	B		D			B		D	D/B				B
Soomro et al. (2026)			D	D	D/B	D/B	D/B							B	
Thomas et al. (2008)		B	D/B	D/B	B		B	B							B
Thuan et al. (2025)			D/B	D/B			B		D	D/B	D				
ul Haq and Suki (2024)			D/B	D	D		D			D/B			D	D/B	
Vilma and Booshnam (2025)	B	B	B	B			D/B	B							
Yu and Schweisfurth (2020)			D					B				D			

Applying the abbreviations established in Table 4.1, Table 4.2 delineates the position

of each reviewed article concerning the identified Influencing Factors. The notation “D/B” signifies instances where an article addresses a factor as both a barrier (B) and a driver (D), while empty cells indicate that the factor was not mentioned. The factors of the Technology dimension include Data Security (T1) and Digital Infrastructure (T2), while the Organisation dimension consists of Resources (O1), Top Management Support (O2), Change Management Competence (O3), Culture of Communication and Collaboration (O4), Strategy (O5), and Digital Competence (O6). Factors in the Environment dimension are Competitive Pressure (E1), Customer Pressure (E2), Government Support (E3), Laws and Regulations (E4), and Collaborative Networks and Partnerships (E5). Finally, the factors of the Individual dimension include Attitude (I1) and Perceived Usefulness (I2).

4.2.1 Factors in the Technology Dimension

The literature review analysis begins with the Technology dimension, which addresses concerns associated with the emerging tools and technology. As described in Section 4.1 above, this dimension consists of two primary Influencing Factors: Data Security (T1) and Digital Infrastructure (T2).

Data Security

According to Vilma and Booshnam (2025), when SMEs lack the ability to handle data security risks, it inhibits technical development and makes it difficult for firms to strike a balance between operational resilience and technological evolution. The high costs and specialised knowledge required for handling data in a secure manner create significant barriers, complicating their broader digital transformation efforts (Ghobakhloo & Iranmanesh, 2021). In the context of implementation of industry 4.0 technologies at manufacturing SMEs, Ghobakhloo and Iranmanesh (2021) highlights how knowledge on data security is a central component of successful digital transformation. Beyond internal constraints, Rawat et al. (2024) notes that organisations may have reservations with sharing sensitive data with a third party due to the potential risk of security breaches.

Digital Infrastructure

Once again within the context of Industry 4.0 implementation in manufacturing SMEs, Ghobakhloo and Iranmanesh (2021) identifies pre-existing digital infrastructure as a critical success determinant for supporting new technologies. Correspondingly, Vilma and Booshnam (2025) concludes that a lack of such infrastructure specifically impedes AI implementation in SMEs.

Furthermore, Ghobakhloo et al. (2022) observe that insufficient interoperability between legacy systems and new innovations prevents these enterprises from successfully adopting further advancements. To ensure the availability of necessary infrastructure, both Ghobakhloo et al. (2022) and Cimini et al. (2021) emphasise the importance of conducting digital maturity assessments. This concept is further elaborated in the section regarding Strategy as an Influencing Factor.

4.2.2 Factors in the Organisation Dimension

Transitioning from the technical requirements, the Organisation dimension focuses on the internal structural and strategic readiness of the firm. This dimension encompasses the largest set of Influencing Factors: Resources (O1), Top Management Support (O2), Change Management Competence (O3), Culture of Communication and Collaboration (O4), Strategy (O5), and Digital Competence (O6).

Resources

According to Yu and Schweisfurth (2020), the primary motivator for implementing digital innovations, such as Industry 4.0, is cost reduction. Paradoxically, the costs associated with such innovations also represent the principal barrier for manufacturing SMEs (Brodeur et al., 2023). In the context of AI implementation, Vilma and Booshnam (2025) identifies “perceived cost” as a significant obstacle, noting that a lack of knowledge often impairs the ability of SMEs to accurately value a new innovation, thereby delaying the adoption process.

Another barrier is the substantial time required for implementation (Cimini et al., 2021). SMEs may be reluctant to initiate new projects if previous implementations exceeded planned budgets and time-frames (Haber & Carmeli, 2023). This suggests that time and cost serve as significant impeding factors for digital implementation in SMEs, particularly when compounded by insufficient knowledge regarding the innovation.

Top Management Support

Top management, particularly the CEO within SMEs, occupies a unique position by possessing both insight into company operations and the authority to enact changes (Haber & Carmeli, 2023). This leadership level maintains the power to allocate necessary resources for implementation (Soomro et al., 2026; ul Haq & Suki, 2024). Consequently, their involvement in the digital transformation process is considered a critical success factor (Arayici et al., 2011; Soomro et al., 2026).

Cheng et al. (2024) highlight a positive correlation between the implementation of innovation and transformational leadership. In their investigation of success factors for knowledge management, the authors emphasise that senior management involvement is essential for successful outcomes. Similarly, Vilma and Booshnam (2025) notes that a lack of top management support inhibits technology adoption. Haber and Carmeli (2023) further elaborate that leadership must be directly involved in or supportive of the implementation, as increased involvement correlates with higher success rates.

Change Management Competence

Effective change management is identified as a primary catalyst for technological implementation, showing a strong positive correlation for successful AI implementation (ul Haq & Suki, 2024). This competence allows organisations to overcome employee resistance, noted by Soomro et al. (2026) as the most critical barrier to AI

implementation, by fostering a culture that actively embraces innovation. According to Soomro et al. (2026), the hallmarks of effective change management include the strategic allocation of resources toward employee training and the clear communication of both the benefits of the technology and its role in the long-term corporate strategy.

However, the method by which this competence is acquired is crucial for long-term success. While SMEs may bridge gaps in expertise by employing temporary consultants, Thomas et al. (2008) cautions that this carries the risk of losing knowledge and skills once the implementation phase concludes.

Culture of Communication and Collaboration

According to Arayici et al. (2011), a culture that promotes collaboration, interoperability, and integration between departments facilitates the implementation of innovation. A key success factor is the shared understanding of new processes, ensuring that all stakeholders remain aware of both pending and completed changes.

Furthermore, Cimini et al. (2021) identifies communication as a vital component of implementing change, as it allows organisations to convey the timing, methods, and rationale behind transitions, thereby mitigating employee resistance. This perspective is further supported by Brodeur et al. (2023), who acknowledge that a culture fostering communication and collaboration ensures that relevant information reaches the appropriate individuals at the optimal time, increasing efficiency.

Strategy

According to Cimini et al. (2021), some managers assume that the mere adoption of new technology inevitably leads to successful long-term implementation. However, empirical evidence suggests otherwise. Furthermore, Cheng et al. (2024) observe that SMEs often focus on the immediate benefits of innovation. Consequently, Cheng et al. (2024) emphasise the necessity of developing short, medium, and long-term transformation roadmaps that include specific goals and measurable parameters to verify successful outcomes.

In pursuit of immediate success, SMEs often focus on technological aspects during strategy formulation, thereby overlooking the influence of organisational and human factors on the implementation process (Cimini et al., 2021). To address this, while considering resource constraints of SMEs, Cimini et al. (2021) advocate for an incremental implementation approach co-designed within the organisation. Supporting this collaborative strategy, Arayici et al. (2011) highlight a bottom-up approach that prioritises the users of the innovation to mitigate potential resistance.

Regarding incremental progress, Brodeur et al. (2023) recommends executing multiple smaller projects but cautions that this approach does not resolve fundamental challenges, such as establishing a robust strategy or securing change management competence. Ghobakhloo and Iranmanesh (2021) extends this argument by noting that change management expertise is essential for effective strategy formulation, yet SMEs typically lack such internal knowledge. Additionally, as previously noted

under the Change Management Competence factor, relying on consultants for this expertise poses a risk of knowledge loss upon their departure (Thomas et al., 2008).

As previously noted under the Digital Infrastructure factor, conducting a digital maturity assessment is a vital component of a robust strategy (Cimini et al., 2021; Ghobakhloo et al., 2022). However, Cimini et al. (2021) also caution that organisations may become excessively focused on preparation, which can stall the transition to actual implementation. Additionally, Rawat et al. (2024) find that SMEs frequently struggle with these self-evaluations due to limited resources.

To summarise, successfully implementing innovation in SMEs requires moving beyond a purely technological focus toward structured, long-term roadmaps that integrate organisational and human factors. To overcome resource constraints and internal resistance, firms should adopt an incremental, bottom-up approach while ensuring they develop change management competence and conduct digital maturity assessments, balancing preparation with momentum toward implementation.

Digital Competence

According to Haber and Carmeli (2023), investing in employee competence is a vital step for enterprises aiming to implement new technology. Arayici et al. (2011) identify two key factors regarding digital competence in the context of building information modelling (BIM) and 2D-drafting implementation. First, they emphasise the importance of involving employees through a user-centric approach during the implementation of innovations. Second, they note that employees must receive targeted education to acquire the skills necessary to utilise the new technology.

This is supported by Cheng et al. (2024), who argues that the rate of skill acquisition directly influences the speed of implementation. Relatedly, Haber and Carmeli (2023) observes that organisations may perceive educational efforts as a significant hurdle, which can lead to the abandonment of projects even after other resources have been committed.

Furthermore, technical expertise is essential for the successful execution of digital transformation (Brodeur et al., 2023; Ghobakhloo et al., 2022). This underscores the necessity for both a foundational baseline of competence and staff with domain-specific mastery.

4.2.3 Factors in the Environment Dimension

Beyond the internal organisational boundaries, the Environment dimension examines the external pressures and support systems that shape an SME's strategic choices. This dimension consists of five factors: Competitive Pressure (E1), Customer Pressure (E2), Government Support (E3), Laws and Regulations (E4), and Collaborative Networks and Partnerships (E5).

Competitive Pressure

SMEs tend to be the more vulnerable links in industrial value chains and, consequently, may be compelled to implement innovations that are disruptive to their operations (Ghobakhloo et al., 2022). Furthermore, ul Haq and Suki (2024) theorise that competitive pressure should be viewed as an indirect factor regarding AI implementation, rather than a direct force acting in isolation. Instead, it influences other barriers and drivers, although it is worth noting that ul Haq and Suki (2024) could not prove this correlation empirically.

Customer Pressure

Thuan et al. (2025) identify pressure from customers as a driver of technology implementation, noting that it compels SMEs to adapt to evolving customer requirements to remain competitive. Furthermore, customers may exert pressure on SMEs to adopt disruptive technologies and invest in advanced systems (Ghobakhloo et al., 2022). Consequently, customer demand serves as a determinant of the technology implementation rate.

Government Support

Manufacturing SMEs in countries with accessible government support are more likely to implement new technologies (Ghobakhloo & Iranmanesh, 2021). Studying Industry 4.0 implementation, Ghobakhloo et al. (2022) and Rawat et al. (2024) argue that government support serves as a driver of implementation by compensating for SMEs' resource constraints. However, a lack of awareness regarding available funding can indirectly impede the implementation process (Ghobakhloo et al., 2022).

Laws and Regulations

Government regulations mandate the implementation of new technologies through formal legal requirements (Yu & Schweisfurth, 2020). While Rawat et al. (2024) maintains that such regulations can have a facilitating effect, they underscore that inadequate regulatory frameworks may inhibit the implementation of Industry 4.0 technologies. As highlighted by Ghobakhloo and Iranmanesh (2021), SMEs must also be aware of supporting policies and regulations to benefit from them effectively.

Collaborative Networks and Partnerships

Ghobakhloo et al. (2022) emphasise that communication extending to external stakeholders facilitates the implementation of Industry 4.0 technologies. They highlight the significance of partnerships in enabling this transition, noting that a lack of collaboration with the external value chain can inhibit further progress. Supporting this, ul Haq and Suki (2024) maintains that collaborative networks facilitate technological implementation, specifically regarding AI, by ensuring that SMEs remain informed about global trends. Furthermore, partnerships with academia can provide the necessary training and assistance required for the implementation process (Ghobakhloo et al., 2022).

4.2.4 Factors in the Individual Dimension

Lastly, the Individual dimension shifts the analysis toward the human element, focusing on the psychological aspects of technology adoption. As described in Section 4.1, this dimension consists of two factors: Attitude (I1), and Perceived Usefulness (I2).

Attitude

Employee attitudes toward digital transformation significantly impact the success of technology implementation (Ghobakhloo et al., 2022). Haber and Carmeli (2023) observe that a fear of new technology often hinders this process. This apprehension originates from several factors, including resistance to change, the complexity of the technology, concerns regarding diminished privacy, or a perceived loss of status. Regarding AI adoption, Soomro et al. (2026) identifies the phenomenon of “AI anxiety”, noting that such distress reduces motivation and job satisfaction while increasing employee strain, potentially resulting in lower implementation rates.

To mitigate these effects, SMEs must ensure employees remain informed about upcoming transitions (Ghobakhloo & Iranmanesh, 2021), as previously noted regarding the Culture of Communication and Collaboration factor. Furthermore, Brodeur et al. (2023) suggests addressing negative attitudes through two complementary measures: establishing forums for dialogue and providing technical training, the latter of which aligns with the factor of Digital Competence.

Perceived Usefulness

Ghobakhloo et al. (2022) identifies perceived usefulness as a primary driver of technology implementation. According to Rawat et al. (2024), a lack of awareness regarding benefits often discourages investment, primarily due to the difficulty of estimating the economic return on advanced technologies. Furthermore, many organisations view technological innovation as a universal solution to all problems, leading to dissatisfaction when the technology fails to meet unrealistic expectations (Thomas et al., 2008). These challenges, combined with inadequate change management, make it difficult to foster a corporate culture conducive to implementation. As noted by Arayici et al. (2011), a significant barrier to the implementation of BIM and 2D-drafting technologies is the employees’ lack of perceived value, a factor closely linked to their resistance to change.

4.3 Interviews

This section presents an analysis of the current perception and usage of GenAI and AI agent technologies within manufacturing SMEs in the Gothenburg region. In addressing the second research question, the section specifically highlights how the previously identified Influencing Factors act as primary barriers and drivers for further implementation from a local perspective. These findings derive from interviews with 14 individuals across eight SMEs (see Table 3.1 for participant details). All quotes featured in this analysis have been translated from Swedish, and, to ensure

transparency, both the original statements and their translations are documented in Appendix B.

4.3.1 Current Usage

All interviewed SMEs have experimented with GenAI, with some also engaging with lower-autonomy AI agents. Online chatbots, specifically ChatGPT and Microsoft Copilot, serve as the primary interfaces for these technologies. Common applications include text generation and information retrieval. Additionally, some companies utilise these tools for image and code generation, as well as for summarising and reviewing extensive documentation or large datasets. For example, Company A uses Microsoft’s Copilot integrated into SharePoint to summarise long e-mail threads:

When it is integrated with SharePoint, with the email inbox, with everything, it makes it very easy to access information by simply talking to the AI and asking things like, ‘what was the situation with this?’ and ‘how was it with that?’, ‘Can you summarise what we are talking about’ or ‘can you summarise this email conversation?’

Company F identifies numerous applications for the technology, ranging from market research to more routine daily tasks, such as translation and information retrieval, noting the impact these tools have on improving daily operational efficiency:

We asked Claude to scout how our brand stands on the entire global market, and how our customers and suppliers and such perceive us, to see the market situation. We can do that as well. Then ChatGPT is likely the best friend when it comes to many small questions that arise, anything from labor law to our certificates to, ‘explain this in another language’ or such. So, it is like a colleague who answers questions. I am a simple user, but it is an enabler in everyday life.

One form of usage that Company G has implemented, and that three companies name as desired but have not yet implemented, is an extended version of information search in the form of an “expert-chatbot”. The sought-after function is that the chatbot has access to internal company knowledge and not only general information from training data and internet searches. Company G explains both how and why they are utilising this functionality, also highlighting the enhancement of summarising and reviewing information:

We purchased a few business accounts and started building some GPTs, primarily based on the information we have, that is, technical information. We have the expertise for calculations and such, so we have fed that into the GPT (...). We have managed to get rid of all the running around to ask questions. When someone new joins, they keep asking, and I, as a design engineer, end up answering the same question over and over again. We have eliminated those minor issues since we implemented it, because now they just use their phones when they have a query, ask it there, and find the information in a much easier way. We also use it

when reviewing contracts or trying to summarise texts. For things like that, ChatGPT is very straightforward and useful.

Another desired implementation that only Company G has managed to integrate in some ways is the optimisation of different processes and workflows. Although the purpose of all usage is to optimise a workflow in some way, this paragraph refers to more specific processes that can be optimised in different ways, such as file conversion and material purchasing implemented by Company G. The processes that the other companies mention as desirable to optimise are, for example, route planning of field service, optimising material flows, or automating paperwork. With how GenAI and AI agents work from a technical standpoint, other forms of algorithms and AI technology may be necessary to fulfil these desires, but GenAI and AI agents can be a helpful tool in setting up the new workflows, as described by Company G that uses Lovable, a GenAI tool for app creation:

We design in a programme called [Program X] (...). Then we have machines down here that need to be connected. We extract parameters and similar data from it, and then we need to input that into another programme called [Program Y] (...). They cannot sync with each other unless we convert those files. (...) We are actually using Lovable and doing a bit of vibe-coding. So now, he has built an app where we just drag in the files we get from [Program X], and it takes a fraction of a second (...). So we have continued with Lovable and also use it for a few apps to help optimise our purchases.

In summary, current usage levels vary considerably among the interviewed SMEs. Although all participants experiment with GenAI, and to a lesser extent AI agents, there is a significant disparity in application, both between companies and among employees within the same organisation. While most usage is concentrated on text generation and information retrieval, utilisation varies across the firm. The following list details the current applications of GenAI and AI agents identified during the study:

- Text generation
- Image generation
- Code generation
- Process optimisation
- Retrieving information
- Summarising information
- Analysing information
- Expert/wiki-bot

4.3.2 Local Influencing Factors

The thematic analysis of the interviews also resulted in the identification of multiple Influencing Factors of GenAI and AI agent implementation. The factors were subsequently categorised into the TOEI framework, maintaining consistency with the Influencing Factors from the literature review.

4.3.2.1 Factors in the Technology Dimension

Data security is mentioned by several companies as one of the main risks regarding GenAI and AI agents. Six out of eight companies mention some kind of perceived risk with how to securely handle data when using AI tools. As Company A puts it:

My greatest concern is data storage, that is to say, data sovereignty. Who has control over it? (...) And it is like this: when this starts to leak, will AI be able to help leak everything? That is where my concern lies.

To mitigate this risk, several companies exercise caution regarding the data accessed and uploaded to AI tools. However, as underscored by Company H, the Perceived Usefulness, another Influencing Factor, is negatively affected:

One has to be careful with using AI so as not to give away all the information and everything. And if you do not give away information, then you cannot use AI very effectively in many cases.

Digital Infrastructure is mentioned explicitly by three companies as an issue connected to the implementation of GenAI and AI agent technology. The AI tools having access to relevant company information is essential for optimising utility, and integration between other digital systems and sound data management is central to this objective. To illustrate the issue, Company A expresses frustration with data storage:

Another major issue that always arises is: is the data where it should be? It never is.

Legacy systems and inefficient workflows due to those systems are brought up by Company C as issues on this topic, also connected to the factor Digital Competence in the Organisation dimension. A change in digital infrastructure often require changes in organisational workflows and competence building, which might lead to an avoidance in implementing new technology.

4.3.2.2 Factors in the Organisation Dimension

Resources, specifically in terms of time and financial capital, were cited as barriers to implementation by all interviewed SMEs, with the exception of Company G, which has already achieved a high level of implementation. Both Company A and H mention the cost of licenses for “off-the-shelf” GenAI tools. For Company H, it is still a current barrier, while Company A no longer sees that price as a barrier. For them, the resources saved or generated from use of GenAI has justified the investment:

Initially, there was a lot of talk about the price, as people felt the costs were high because the Copilot subscription is around 300 SEK a month. However, once you realise the value it provides, it pays for itself quite quickly. That licence fee is really nothing compared to what we get back. But for those who do not know how to utilise AI, it is a significant cost and a major barrier to adoption.

Related to the competence of how to utilise the technology, several companies also mention not having enough time as an issue. Employees are not given or cannot find the time to learn how to use GenAI and AI agents, making monetary investment in the technology ineffective and, as Company A stated, the technology is therefore seen as expensive. This finding correlates with the Digital Competence factor, as well as the factors Attitude and Perceived Usefulness in the Individual dimension. As stated by Company B, commenting on the need to believe in the usefulness of the technology in order to invest time:

[Time] is likely the deficiency. But sometimes you have to make the time if... What matters is how much you believe in it.

The findings suggest that perception of the technologies and investment of time are inextricably linked, as a perceived usefulness is needed to be willing to invest time, while investing time is a prerequisite for increased competence and consequently perceiving the technology as useful.

Regarding the financial trade-offs between developing proprietary AI agents and awaiting the native integration of these technologies into existing systems, Company F deliberated:

I am somewhat restrictive about spending too much money on a proprietary agent and the like, because I believe that this will be the kind of thing that, well, it will just be integrated into our system. You just have to wait a little. It will be included.

Although the need for significant investment is recognised, determining when to invest and which specific GenAI and AI agent technologies to prioritise are cited as complex strategic dilemmas.

Top Management Support is not explicitly named by any company as either a driver or barrier, but Company B touches upon the importance of a process of change having support from both top management and frontline staff:

I believe [the change process] needs to come from both directions, that it should meet in the middle somewhere for it to be as good as possible. It is clear that I can say, 'yes, now we are going to do this and that.' But then they might not agree, and that usually leads to some friction and issues and it does not turn out very well. Instead, it should come from both directions so that everyone understands how it can help.

Rather than emphasising support from management, the interviewees underscore the importance of having support from all parts of the organisation.

Change Management Competence is touched upon in different ways by several companies. Notably, five out of eight companies name enabling employees to recognise the need for change as central to a successful implementation, similar to the statement from Company B regarding support from frontline staff. As stated by Company C, when asked about earlier successful change initiatives:

I believe that was a success factor, the team got to understand the need

and shape [the change process] together.

Some of the companies experience a barrier in the difficulty to update routines and disrupting ingrained habits and workflows. There is a desire to convince all employees of the necessity of the change, yet acknowledging that this is not always feasible. As Company F describes, sometimes it is necessary to ‘rip off the Band-Aid’:

I think you also need to be a bit firm and just rip off the Band-Aid. For example, by being forced into it. Because if you are not forced, it's very easy to follow that natural instinct of being a bit lazy by nature.

Balancing the voluntary engagement of employees with clear strategic direction presents a persistent challenge for SME management.

A **Culture of Communication and Collaboration** is something that several companies highlight as important to have for handling change processes and harnessing employees’ ideas. In general, each company describes its own organisational culture as open and close-knit. At the same time, all companies except Company C lack a more structural approach to catch these ideas and leverage collaboration. As Company B answers on the inquiry around space for testing new ideas and structure for gathering employee input:

We have quite a bit of freedom here, so if you want to test something, it is okay. Just say what you are thinking and we will see if it... So there is no direct routine for that.

Communication is also mentioned as a solution to the issue of getting employees to understand the need for implementation, as previously stated under the Change Management Competence factor. As Company F postulates on how to facilitate the change process and ensure buy-in from the entire workforce, particularly those who may be impacted without direct personal benefit:

I actually believe it is about communication, talking about [the change process]. Explaining that someone else might benefit from it, too. It is partly about this ‘storytelling’. ‘Why are we doing this?’, ‘What is our journey?’. Because then you get people on board along the way as well, I think.

Strategy is also viewed as important in managing technology implementation by the SMEs that mention the topic. At the same time, none of the interviewed companies had any long-term strategy for their implementation of GenAI and AI agents. Only two of them had an AI policy in place, mostly governing usage and mitigating risky behaviour. Company G is one of them, and they resonated the following :

It was not as if we had a clear strategy that AI should be used in this specific way here. We have not had that. Instead, it became ad hoc. But we are a small company and we saw the opportunity where we could get some help from [GenAI], and so we started with it. In the long term, we will likely have to look at where we are going, where it should be

implemented, why it should exist, and so on. So, I believe that strategy will simply become clearer the further we go.

Being a smaller company, strategy and policy documents are not a priority. At the same time, several SMEs do express a wish to be more strategic in their business. Company F specifically highlights the importance of a strategy in order to provide employees with a sense of security during the transition:

It is about having a transition that feels controlled. So, when you have it, you have to account for that as well, so you are not just floating at cloud-nine altitude. Because then you feel there is no control, and that is very daunting.

Some companies also mention pilot projects as a specific strategy contributing to a successful implementation. Focusing on small wins is seen as essential for building momentum and securing employee buy-in during the transformation. Company C has a history of using pilot projects as part of their strategy and intends to follow this approach for its AI implementation:

Then run a pilot, not everything at once. What we have said is that we should limit the scope to where we see the greatest value, but also where we have the highest degree of maturity regarding the use of these types of tools. (...) If [the pilot project] works well, then we also have a critical mass of competence in the organisation, and then it is easier to spread it further.

Digital Competence is another stepping stone seen as essential for the implementation of GenAI and AI agent technology. The interviews indicated substantial variations not only between the companies but also within them. As Company A states:

We use [AI tools] very much. Then we have a group of people who like to google or use AI to google. And then we have people down there who have barely asked about it.

Most interviewees were among those that had experimented the most with GenAI at their respective company. Even then, none of the interviewed saw themselves as an expert, even if they did use GenAI tools in their daily workflows.

When using GenAI tools, Company A finds people might place too high trust in the results. As mentioned in Section 2.1, GenAI operates on the mathematical probability of patterns, and so-called ‘hallucinations’ is still an issue inherent to the technology. The primary skill required is therefore no longer just technical operation, but evaluative judgment. And as Company F puts it, verifying generated information might be difficult:

How do I know if I am getting a sensible answer or not? Especially when you input, ‘Here, read these three PDFs of 400 pages each and give me a summary.’ How do I know that it is getting it right? In that case, I would actually need to read the PDFs.

It is a balancing act of staying critical without being overly sceptic, to be able to reap the rewards while avoiding the risk of acting upon incorrect information. To mitigate the risk of technical errors or unintended outputs, tool providers also intentionally impose limitations, as noted by Company A:

Microsoft is not allowed to create or write in the same way as the user in emails or in the calendar and things like that. It is allowed to create Word and Excel files, which are, so to speak, 'dead files'. But it is not allowed to create 'communication material'.

For Company A, the GenAI tool provider restricts certain desired functionalities. Notably, the interview revealed no internal attempts to develop proprietary solutions, which may indicate a knowledge gap regarding the creation of autonomous AI agents capable of performing tasks beyond the constraints of existing third-party tools.

Interviews also indicate that a dedicated IT manager role is generally absent among the companies studied, with the exception of Companies A and F. Notably, these two companies were also among those that used AI tools most extensively.

As for the variation in digital competence between companies, findings suggest large discrepancies. Some companies were still without an enterprise license of any GenAI tool, only two companies had set an AI policy and no company had any long-term strategy set. Company G and H explicitly mentioned participating in a workshop on GenAI, but no systematic or recurring learning sessions were identified. Hands-on experience with the tools is the most common approach to improving AI tool competence, and finding practical use cases is seen as essential for both skill development and perceived usefulness of the technology. As Company C describes it, connecting the issue to both Strategy and Attitude as Influencing Factors:

I would like [to acquire a licence], but then you need to have use cases and you need to have people, either a strategy, I suppose, or at least individuals who are interested enough to be self-driven in it.

These findings suggest a general lack of investment in developing employees digital competence and the digital maturity of the organisation.

4.3.2.3 Factors in the Environment Dimension

There is a general absence of external environmental dimensions such as regulatory pressures or government influence in the interview data. This is likely attributable to the scope of the interview guide, which focused primarily on internal organisational and individual challenges. Consequently, while broader environmental factors are recognised in the literature, they were less prioritised by the participants. Nevertheless, some findings related to the environmental Influencing Factors did emerge.

Regarding the Influencing Factor **Collaborative Networks and Partnerships**, Companies C, E, and F noted that they had either engaged or were considering engaging consultants to facilitate the implementation process. In relation to **Customer Pressure**, some SMEs emphasised the importance of maintaining strong

customer relationships. This priority makes Company E hesitant regarding the use of AI tools, as they prefer to maintain a personal approach in their customer interactions. Regarding **Competitive Pressure**, some companies expressed an interest in the implementation progress of their peers, suggesting an awareness of technological advancements within the industry.

4.3.2.4 Factors in the Individual Dimension

Attitudes toward these technologies are identified by the interviewed SMEs as an influence on the implementation process. As previously noted, digital competence levels vary across firms. However, most interviewees, with the exception of Company E, express a positive attitude toward GenAI and AI agent technology. Nevertheless, internal discrepancies and concerns persist. Some respondents identified negative attitudes among employees stemming from a fear of displacement. Additionally, Company B noted that while some employees value the technology, others fear a potential atrophy of their own skills:

I know that there are some operators who, when they encounter a problem, stand there with ChatGPT and ask questions, and they think it works perfectly fine. But there are many who are a bit afraid and want to distance themselves... They feel that, 'this is not fun. This is something that will take over. I will not have to think for myself'.

The most common concern among interviewees themselves, previously mentioned under the Data Security factor, is not knowing how and where data is stored, and whether it is used in training the AI tools or not.

Perceived Usefulness is also important for successful implementation, but compared to attitude, perceiving the technology as useful is more closely connected to each company's digital competence. Even with a positive attitude, many of the companies lack knowledge of how to use the technology, and subsequently find difficulty perceiving it as useful. As previously mentioned under the Digital Competence factor, finding practical use cases is seen as essential by several companies. Herein lies a large barrier and a gridlock in needing some competence on GenAI and AI agents to be able to find the use cases, but not wanting to invest resources into building the competence unless practical use cases are found. As illustrated by a quote from Company C:

It often becomes very vague when analysing the potential of AI in our company. That is to say, how would one be able to get started?

4.4 The AKSEA Framework

This concluding section of the Results chapter presents the final iteration of the framework developed within this study, synthesising empirical findings from the interviews with theoretical insights from the literature review. The framework is hereafter designated as the AKSEA Framework. This acronym is derived from the Swedish nomenclature of the five core Priority Areas that emerged from the iterative

development process: *Ansvar* (Responsibility), *Kompetens* (Competence), *Strategi* (Strategy), *Engagemang* (Engagement), and *AI-policy* (AI Policy).

By addressing the identified Influencing Factors, the AKSEA Framework serves as a strategic guide for management, offering a comprehensive overview alongside practical recommendations and tools to facilitate the implementation process. In its entirety, the framework comprises 60 PowerPoint slides, provided in Appendix E. Each of the five Priority Areas contains an introductory description, guiding questions, and selected insights into GenAI and AI agents, change management principles, and organisational learning theories.

While the subsequent sections describe each Priority Area and its respective connection to the Influencing Factors, an important distinction is that the AKSEA Framework is non-sequential. Although organised in a logical flow, organisations are not required to initiate the process within the Responsibility area, nor must they exhaust the contents of one area before advancing to the next. Rather, the AKSEA Framework is designed to function as a dynamic decision-support tool, providing the structural foundation and depth of knowledge necessary for management to formulate a tailored, firm-specific implementation strategy.

4.4.1 Responsibility

The first priority area, Responsibility, defines three primary actors in the change process. These roles consist of the *Change Management Group*, which is tasked with overseeing the implementation, alongside *Decision-makers* holding formal authority within the SME, and the *Employees* who are directly affected by the transition.

This area aligns with the Influencing Factors of Top Management Support, Change Management Competence, and a Culture of Communication and Collaboration, and Government Support. It draws upon the work of Kotter (2012), specifically regarding the necessity of delegating responsibility and establishing a “guiding coalition”. Consequently, the objective of this area is to clarify the distribution of responsibilities connected to the implementation process while addressing the distinct requirements of each stakeholder group. Furthermore, it incorporates the identification of external support to facilitate the initiation of the change process.

4.4.2 Competence

The second priority area, Competence, connects to three of the Influencing Factors: Digital Competence, Change Management Competence, and Collaborative Networks and Partnerships. It addresses the need for two different types of competence for a successful implementation, namely *User Competence* and *Coordination Expertise*. A basic user competence is needed for all employees, covering a foundational understanding of GenAI and AI agent abilities and limitations, knowledge of the specific tools chosen by the SME, and a basic understanding of relevant laws as described in their AI policy.

The Change Management Group also needs the coordination expertise to facilitate

three functions: support, project management, and strategic oversight. Firstly, the supportive dimension focuses on fostering AI competence through guidance and the exchange of best practices among employees. Secondly, the project leadership dimension ensures that AI initiatives are driven effectively from conception to implementation, with a focus on resource optimisation and evaluation. Finally, the strategic dimension provides the necessary direction by developing and communicating a cohesive AI strategy that aligns with the company's overarching goals. It is not required for every individual member of the Change Management Group to possess all three types of expertise. Rather, these competencies should be represented collectively across the team.

Furthermore, this area provides a conceptual overview of GenAI and AI agents, distinguishing them from the broader field of AI, whilst offering practical guidelines on technological application and experimental learning. To facilitate deeper knowledge acquisition, external networks and educational programmes are also highlighted as useful channels for building expertise and exchanging best practices. Additionally, Nonaka (1994) is included to provide the Change Management Group with a structured model for organisational learning. By utilising the SECI model, the group is equipped with a tool to facilitate and manage the internal dissemination of knowledge across the SME.

4.4.3 Strategy

Strategy, the third priority area, addresses the Influencing Factors of Strategy, Resources, Digital Infrastructure, and Attitude. This area focuses on formulating both short- and long-term strategic goals. To facilitate the establishment of realistic objectives based on the current state, the AKSEA Framework incorporates an assessment of processes, workflows, digital infrastructure, customer demands, and employee attitudes.

Furthermore, Strategy serves as the domain where external Influencing Factors are addressed. Given that enterprises can rarely alter their external environment, the AKSEA Framework focuses on accounting for these factors through the aforementioned current state assessment. This ensures organisational alignment with external pressures such as Laws and Regulations, Customer Pressure, and Competitive Pressure. This priority area also emphasises the importance of external monitoring to identify potential Government Support and Collaborative Networks and Partnerships.

To support goal-setting, the SMART goals model (Doran, 1981) is integrated into this area. The importance of small-scale pilot projects and celebrating short-term wins is also underscored, aligning with the sixth accelerator proposed by Kotter (2014). Additionally, the Strategy area includes a toolbox of diverse GenAI and AI agent use cases to inspire enterprises by demonstrating practical technological applications.

4.4.4 Engagement

The fourth priority area, Engagement, addresses employee receptivity and participation throughout the implementation process. This area is linked to the following Influencing Factors: Culture of Communication and Collaboration, Attitude, and Perceived Usefulness. It focuses on strategies for managing internal communication, motivation, and attitudes, while seeking to anchor the implementation of GenAI and AI agents within the organisational culture.

To support these objectives, the AKSEA Framework incorporates established theoretical models. Motivation is addressed through Self-Determination Theory (Ryan & Deci, 2000), while strategies for cultural change, communication management, and attitude shifts are based on the theories of Kotter (2012).

4.4.5 AI Policy

The fifth priority area, AI Policy, addresses the Influencing Factors of Laws and Regulations and Data Security. Establishing such a policy is essential for enabling employees to utilise GenAI and AI agent tools safely, ensuring alignment with both organisational objectives and governmental regulations. Given the prevalence of local variations, the literature lacks universal theories for AI policy formulation. However, for companies in the Gothenburg region, the EU AI Act and GDPR constitute the primary regulatory frameworks.

While this study identifies specific core components for inclusion in an AI policy, providing a comprehensive guide to legal compliance remains beyond its scope. Consequently, readers are directed to external authorities for detailed regulatory guidance and practical inspiration. Specifically, the AKSEA Framework references the Agency for Digital Government (DIGG, 2026), the Swedish Authority for Privacy Protection (IMY, 2026), and Norstedts Juridik (n.d.) as resources to assist in the policy-making process.

5

Discussion

This chapter synthesises the theoretical findings from the literature review with the empirical insights gathered from the interviews to critically evaluate the implementation of GenAI and AI agents within manufacturing SMEs.

To provide a structured evaluation, the subsequent discussion first contrasts general academic trends with the practical, socio-cultural realities of local SMEs in Gothenburg, specifically regarding leadership styles and change management practices. This is followed by an examination of the internal variations in AI maturity and the usage disparities observed among these firms. Furthermore, the AKSEA Framework is situated within the wider academic landscape to demonstrate the strategic advantages of a non-sequential, flexible implementation guide. Finally, the chapter concludes with a critical reflection on methodological limitations and outlines recommendations for future research within this rapidly evolving technological domain.

5.1 Socio-Cultural Variations in Leadership and Change Management Competence

By integrating theoretical findings from the literature review with empirical insights from interviews, this section examines the alignment or divergence between general technology implementation trends and the specific implementation of GenAI and AI agents within manufacturing SMEs in Gothenburg.

Although these datasets originate from distinct sources, with the literature providing a broad academic perspective and the interviews offering an internal view, the results demonstrated significant thematic alignment. This synergy justified a unified analytical approach and the categorisation of both sets of findings within the TOEI framework. However, despite this structural consistency, the application of the TOEI framework also illuminated two specific areas where the operational experiences of Gothenburg's SMEs diverge from the existing literature.

The first is the role of management. While the literature emphasises Top Management Support as a critical hierarchical driver where the CEO dictates resource allocation (Soomro et al., 2026), this was largely absent in the interviews. Instead, the local SMEs underscored a more collaborative approach, suggesting that successful implementation requires support from all levels of the organisation rather than a

mandate from the top-down. This divergence may stem from cultural differences in management styles, reflecting a flatter Swedish organisational structure compared to more hierarchical international contexts, or it may suggest that the interviewees prioritised collective engagement over formal executive approval.

Secondly, a discrepancy emerges regarding the Influencing Factor of Change Management Competence. While the literature review highlights established methods of effective change management, such as coordinating educational measures and communicating both the necessity and the execution of change (Soomro et al., 2026; Thomas et al., 2008; ul Haq & Suki, 2024), the interview results present a contrast. Specifically, the interviews indicate that although organisations expected employees to understand the need for change, they did not elaborate on the strategic methods required to achieve this understanding. Although Company F highlights communication through ‘storytelling’ as a means to convey the necessity of change, a general absence of formal methodologies and reflection regarding change management remains apparent. This lack of critical reflection indicates that such analytical processes are not fully integrated into the operations of local SMEs, and the limited occurrence of reflection may be attributed to resource scarcity, particularly time constraints. Time constraints are identified as a primary barrier to implementation by multiple firms, while remaining closely interconnected with several other Influencing Factors.

Ultimately, while cultural nuances may account for minor discrepancies between the literature and interview data, both sources offer complementary perspectives within a broader context. Due to these fundamental similarities, established insights from literature regarding the implementation of other technologies were successfully transferred to the domain of GenAI and AI agent technology.

5.2 Variation of GenAI Competence and Usage Among SMEs

This section examines the current status of local SMEs in relation to broader statistics concerning AI implementation. While the interview results confirm that most participating companies exhibit low adoption levels, consistent with the statistics presented in the Introduction, a distinct nuance emerges from the empirical data.

Specifically, the interviews reveal significant discrepancies in GenAI and AI agent competence and usage, both across and within individual SMEs. As noted in Section 4.3.1, Company G is the sole participant to have implemented an “Expert chatbot”, an application that three other SMEs identify as a desired use case. Furthermore, as synthesised and exemplified by a quote from Company A in Section 4.3.2.2 regarding the Digital Competence factor, substantial variation also exists internally within each company.

The variation observed across SMEs is unsurprising and was deliberately accounted for during the development of the AKSEA Framework. However, the internal variation within these organisations is of greater analytical interest, suggesting that the

implementation of GenAI and AI agents is currently driven by individual agency rather than formal organisational strategy. This reliance on individual initiative and competence creates a fragmented internal landscape, wherein a minority of employees develop expertise while the broader workforce remains unengaged.

From an educational perspective, this ad hoc approach is problematic. Without formalised learning paths, the disparity between high-performing individuals and the rest of the organisation is likely to widen, potentially resulting in inconsistent data handling practices and associated security risks. Consequently, these findings indicate that the low utilisation rates reported in general statistics may conceal a more complex internal inequality. This discrepancy underscores the necessity of a strategic focus on collective digital literacy, an objective that is explicitly addressed by the AKSEA Framework.

5.3 The AKSEA Framework Fills a Gap within the SME Context

This section examines the contrasting elements between existing frameworks and the AKSEA Framework. These distinctions are significant as they illustrate how the AKSEA Framework addresses the research gap identified in the Introduction. While existing frameworks offer valuable general guidance, the information presented in Chapter 1.1 suggest that they frequently fail to meet the specific practical requirements of manufacturing SMEs. Consequently, the following paragraphs analyse how the AKSEA Framework bridges this gap through its unique scope and structure.

First, a primary distinction lies in the intended target group. The framework proposed by Sarkar (2026) encompasses companies of all sizes and sectors. Similarly, while Sánchez et al. (2025) addresses all sectors, their focus is specifically on SMEs. Although Amarasuriya and Abston (2026) also examines SMEs, their model is restricted to the procurement function. Notably, none of these frameworks incorporate geographical limitations. This stands in contrast to the AKSEA Framework, which is specifically scoped to manufacturing SMEs within the Gothenburg region. Although this geographic focus limits generalisability, it enabled the development of industry-specific use cases and material tailored to local implementation levels. This approach directly addresses the criticism, noted in the introduction, that existing initiatives are frequently too general.

Secondly, a defining characteristic of the AKSEA Framework is its dual focus on facilitating the implementation of both GenAI and AI agents. This represents a unique contribution, as contemporary frameworks seldom address AI agents. While Sarkar (2026) examines GenAI, it excludes agents, categorising them instead as an emerging development that will present future organisational and managerial challenges. Furthermore, although Sánchez et al. (2025) and Amarasuriya and Abston (2026) adopt a broader scope by covering various forms of AI, their approaches lack specificity for these particular technologies. Consequently, the AKSEA Framework offers a more specialised application for integrating GenAI and AI agents, addressing a gap where existing models remain either overly broad or insufficiently focused.

Lastly, the AKSEA Framework differentiates itself from existing models by avoiding a rigid, sequential roadmap in favour of the flexible structure of the five Priority Areas. Although Amarasuriya and Abston (2026) employs a hybrid format with three pillars, roadmaps for each pillar are still included. Conversely, the AKSEA Framework is designed to allow organisations to engage with any of the five areas according to their digital maturity and current needs. Serving as a decision-support tool, the AKSEA Framework provides management with targeted recommendations to facilitate the design of a tailored implementation strategy. This approach fosters a sense of ownership by aligning the strategy with the firm's unique context. By prioritising practical application, the AKSEA Framework addresses the criticism that existing initiatives are frequently too theoretical.

In summary, while existing models lay a valuable theoretical foundation, the AKSEA Framework addresses the practical gap by offering a specialised and non-sequential approach. By prioritising flexibility over rigid roadmaps and focusing specifically on GenAI and AI agents, the AKSEA Framework transitions from general AI theory to a tailored decision-support tool for manufacturing SMEs.

5.4 Limitations

This section provides a critical reflection on the inherent limitations of the selected research design and evaluates the constraints associated with the data collection and framework development processes. To ensure transparency and academic rigour, the subsequent discussion addresses the temporal trade-offs of the parallel qualitative approach, the inevitable subjectivity in designing the framework, and the generalisability of the interviews. Furthermore, it examines how the scope of the semi-structured interviews intentionally prioritised internal organisational readiness over environmental and regulatory influences, assessing the subsequent implications these boundaries have for the comprehensiveness of the final results.

To begin with, the combination of two parallel qualitative methods presents both advantages and limitations. The primary strength lies in the rigorous literature review, which would not be achievable through a stepwise design due to time limitations, and simultaneously conducting interviews facilitated an iterative approach. However, a more exhaustive literature analysis prior to formulating interview questions might have yielded a more deeply grounded study. Conversely, results from a preliminary literature review could have narrowed the scope of the questions, potentially obscuring a more comprehensive perspective of the current state of the field.

Secondly, the methodology employed to develop the AKSEA Framework may also be subject to scrutiny, specifically regarding its objectivity and academic rigour. However, the process involved multiple iterations to strengthen the alignment with identified Influencing Factors and enhance usability for SMEs. As detailed in the Methods chapter, established theories on learning and change management guided the development, providing further theoretical foundation. Consequently, although the result possesses an inherent degree of subjectivity, both the design process and

the AKSEA Framework itself are well-supported.

Moreover, additional limitations involve the selection of participating companies and the specific roles of the interviewees. While the sample size of 14 participants across eight companies may be considered insufficient for broad generalisation, the perceptions, usage, barriers, and drivers identified were remarkably consistent across all SMEs. The primary variation concerned their GenAI and AI agent competence and usage, as already discussed in Section 5.2. Furthermore, the SMEs that chose to participate may have possessed a pre-existing interest in these technologies, potentially skewing the findings towards a more positive perspective. Regarding the interviewee roles, while including more non-managerial staff might have provided a broader range of individual perspectives, it may not have significantly enhanced the organisational insights. Managers were prioritised because they typically possess the most comprehensive overview of company-wide processes.

Lastly, regarding Influencing Factors in the Environment dimension, the interviews yielded no generalisable outcomes. Although the literature review highlights these factors as critical external drivers, they were scarcely articulated by the interviewees. This divergence stems primarily from a methodological constraint, as these external environmental dimensions were not explicitly integrated into the semi-structured interview guide. Consequently, because the inquiries predominantly focused on internal technological and organisational readiness, the participants did not spontaneously address environmental influences.

This omission carries implications for the comprehensiveness of the AKSEA Framework. While the framework provides robust internal decision support, its guidance on navigating external pressures, such as upcoming AI legislation or regional funding opportunities, remains limited. Nevertheless, the scarcity of spontaneous remarks on these factors may also indicate that for manufacturing SMEs within the Gothenburg region, immediate internal barriers, including resource constraints and competence deficits, are perceived as significantly more pressing than external institutional drivers.

5.5 Future Research

Building upon the findings and reflections presented in this chapter, this final section outlines three key recommendations for future research to further advance the field of GenAI and AI agent implementation in SMEs.

Firstly, although the AKSEA Framework is theoretically grounded in established models and a foundation of 15 identified Influencing Factors, it has not yet undergone a comprehensive empirical evaluation. The feedback collected during the iterative development of the AKSEA Framework provided valuable pointers for improvement during the iteration process, but further research is required to validate its long-term efficacy. Consequently, a primary recommendation for future study is the conduct of multiple-case longitudinal studies. By monitoring the application of the AKSEA Framework across several SMEs over an extended period, researchers could

determine whether the AKSEA Framework is truly self-sufficient and to what extent it facilitates a successful, sustained implementation of GenAI and AI agents.

Secondly, the rapid evolution of AI tools presents a significant temporal challenge. There is an inherent risk that the AKSEA Framework may become obsolete as technological paradigms shift towards more advanced systems that surpass current generative models and AI agents. Consequently, the regulatory landscape is also frequently updated, adding a layer of legal complexity that manufacturing SMEs must navigate. Future research should, therefore, focus on the continuous evolution of this tool, potentially leading to the development of a “version 4.0”. Such research is highly recommended to investigate how emerging laws, regulations and other environmental factors alter the landscape for SMEs, and whether the 15 identified factors remain relevant or if their relative importance shifts as AI becomes more deeply integrated into industrial operations and society at large.

Finally, while this study was contextualised within manufacturing SMEs in the Gothenburg region, the diverse nature of the sampled companies raises the question of whether the industrial sector presents a more significant constraint than geographical location. To enhance the generalisability of the results, future research should investigate the AKSEA Framework’s applicability to SMEs across the whole of Sweden. Comparative studies between different regions or different industrial sectors would be instrumental in testing this hypothesis and validating the broader utility of the AKSEA Framework across various organisational and regional contexts.

6

Conclusion

The purpose of this study was to develop a framework that can facilitate the implementation of GenAI and AI agents within manufacturing SMEs in the Gothenburg area. By identifying the necessary components and developing the AKSEA Framework, the overarching purpose of this study has been achieved. Furthermore, by comparing the AKSEA Framework with established frameworks, this study illustrates how the developed model is uniquely positioned to address the distinct research gap identified in the introduction.

To achieve this objective, three research questions were formulated. The following sections demonstrate how the findings from each question provide a clear answer, contributing to a detailed synthesis of the study's conclusions.

6.1 Research Question 1

What key barriers and drivers can be synthesised from existing literature on digital transformation and change management regarding the implementation of emerging technologies in SMEs?

Based on a systematic literature review and a subsequent thematic analysis, 15 distinct Influencing Factors were identified. These factors are categorised across the four TOEI dimensions: the Technology dimension includes the factors Data Security and Digital Infrastructure. The Organisation dimension consists of Resources, Top Management Support, Change Management Competence, Culture of Communication and Collaboration, Strategy, and Digital Competence. The Environment dimension includes Competitive Pressure, Customer Pressure, Government Support, Laws and Regulations, and Collaborative Networks and Partnerships. Finally, the Individual dimension consists of the factors Attitude and Perceived Usefulness.

In answering RQ1, the synthesis of these Influencing Factors through the TOEI framework reveals that the primary challenges of digital transformation in SMEs are not inherently technological. Instead, the majority of the identified barriers and drivers fall within the Organisation dimension. Consequently, this study concludes that facilitating the implementation of emerging technologies fundamentally requires digital transformation strategies that actively address and adapt existing organisational structures, culture, and leadership styles.

6.2 Research Question 2

How do manufacturing SMEs in the Gothenburg area currently perceive and utilise GenAI and AI agents, and what are the primary barriers and drivers for further implementation?

To answer RQ2, qualitative data was gathered from 14 semi-structured interviewees across eight manufacturing SMEs in the Gothenburg area. The empirical findings reveal a highly fragmented landscape regarding how these companies currently perceive and utilise GenAI and AI agents, with both current usage patterns and internal attitudes varying significantly.

Crucially, the primary barriers and drivers influencing further implementation within the Gothenburg region are the 15 key Influencing Factors identified across this study's theoretical and empirical phases. However, while certain factors may inherently exert more influence than others in specific operational contexts, the objective of this research was not to rank them. Ultimately, the findings underline that while these fundamental drivers and barriers are universally shared, the perceived urgency and capacity to address them depend heavily on each individual firm's organisational readiness.

6.3 Research Question 3

What components should a framework include to support SME management in navigating the strategic implementation of GenAI and AI agents?

In answering RQ3, this study concludes that to effectively support SME management in navigating a fragmented technological landscape, a framework must include components that offer a high degree of operational adaptability alongside structured change management guidelines. Drawing upon the Influencing Factors identified across both the literature and the interviews, the AKSEA Framework was synthesised to incorporate these exact properties. By directly addressing the company-specific needs and varied AI usage patterns of manufacturing SMEs, the AKSEA Framework provides components structured to support organisations regardless of their initial readiness. Consequently, these adaptive components equip management with the necessary tools to not only initiate the implementation process but to successfully advance and sustain the strategic integration of GenAI and AI agents over time.

To operationalise this strategy, the AKSEA Framework comprises five distinct Priority Areas designed to guide management through the transition. First, **Responsibility** focuses on establishing clear roles, ensuring that designated individuals drive the implementation process with the mandate to make influential enterprise decisions. Second, **Competence** enables management to identify and foster the specific knowledge required by both the workforce and the leadership team itself. Third, **Strategy** provides a structured approach to formulating a sustainable, long-term strategic direction as well as short-term pilot projects, while **Engagement**

ensures that all employees are actively involved and invested in the process. Finally, an **AI Policy** establishes formal organisational rules to guarantee the ethical and lawful use of GenAI and AI agents.

6.4 Concluding Remarks

Ultimately, by anchoring the Influencing Factors found in the literature (RQ1) within the diverse, company-specific realities of local manufacturers (RQ2), this study bridges the gap between abstract organisational theory and practical execution. The AKSEA Framework fulfils the study's purpose by providing a theoretically grounded yet highly actionable decision-support tool (RQ3), successfully facilitating the strategic journey of GenAI and AI agent implementation within manufacturing SMEs.

Bibliography

Alex, S., Alexander, S., Bryce, H., Lareina, Y., Michael, C., & Balakrishnan, T. (2025, November 5). *The state of AI in 2025: Agents, innovation, and transformation* (tech. rep.). McKinsey & Company. <https://www.mckinsey.com/capabilities/quantumblack/our-insights/the-state-of-ai#/>

Amarasuriya, S., & Abston, K. A. (2026). Procurement 4.0: A Three-Pillar Framework for Ethical AI Adoption in Small Businesses. *Journal of Small Business Strategy*, *36*, 27–37. <https://doi.org/10.53703/001C.157792>

Arayici, Y., Coates, P., Koskela, L., Kagioglou, M., Usher, C., & O'Reilly, K. (2011). Technology adoption in the bim implementation for lean architectural practice. *Automation in Construction*, *20*, 189–195. <https://doi.org/10.1016/j.autcon.2010.09.016>

Arregi, A., Retegi, J., Igartua, J. I., & Ibarra, D. (2026). Exploring the impact of generative artificial intelligence in manufacturing: Applications and implications. In E. Barbadilla-Martín, A. Robles-Velasco, M. Rodríguez-Palero, & P. Cortés (Eds.), *Data science, challenges and applications for industrial innovation and sustainability* (pp. 72–77). Springer Nature Switzerland.

Boretti, A. (2026). Hallucinations in generative AI: A threat to scholarly integrity and the urgent need for publisher-led academically supervised verification. *Energy Research & Social Science*, *136*, 104720. <https://doi.org/10.1016/j.erss.2026.104720>

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101. <https://doi.org/10.1191/1478088706QP063OA>

Brodeur, J., Deschamps, I., & Pellerin, R. (2023). Organizational changes approaches to facilitate the management of industry 4.0 transformation in manufacturing smes. *Journal of Manufacturing Technology Management*, *34*, 1098–1119. <https://doi.org/10.1108/JMTM-10-2022-0359>

Chalmers University of Technology. (2024, March 28). *Behandling av personuppgifter i studentarbeten*. Retrieved February 5, 2026, from <https://www.chalmers.se/utbildning/dina-studier/kandidat-och-examensarbete/behandling-av-personuppgifter/>

Chalmers University of Technology. (2026). *Chalmers AI Portal - Transcriptions*. Retrieved May 18, 2026, from <https://ai.portal.chalmers.se/transcriptions>

- Cheng, C.-H., Li, M.-H., Tang, B.-J., & Cheng, Y.-R. (2024). The impact of knowledge management and organizational learning promotion in small and medium enterprises on the implementation of industry 4.0 and competitiveness. *Administrative Sciences, 14*, 161. <https://doi.org/10.3390/admsci14080161>
- Cimini, C., Boffelli, A., Lagorio, A., Kalchschmidt, M., & Pinto, R. (2021). How do industry 4.0 technologies influence organisational change? An empirical analysis of Italian SMEs. *Journal of Manufacturing Technology Management, 32*, 695–721. <https://doi.org/10.1108/JMTM-04-2019-0135>
- Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science, 35*(8), 982–1003. <https://doi.org/10.1287/mnsc.35.8.982>
- DIGG. (2026, February). *Inför en AI-policy*. Retrieved May 6, 2026, from <https://www.digg.se/ai-for-offentlig-forvaltning/riktlinjer-for-generativ-ai/infor-en-ai-policy>
- Doran, G. T. (1981). There's a S.M.A.R.T. way to write managements's goals and objectives. *Management Review, 70*, 35–36. <https://openurl.ebsco.com/contentitem/bsu:6043491?sid=ebsco:plink:crawler&id=ebsco:bsu:6043491&crl=c>
- Dwivedi, Y. K., Helal, M. Y., Elgendy, I. A., Alahmad, R., Walton, P., Suh, A., Singh, V., & Jeon, I. (2026). Agentic AI Systems: What It Is and Isn't. *Global Business and Organizational Excellence, 45*, 253–263. <https://doi.org/10.1002/JOE.70018>
- Ekonomifakta. (2024). *Företagens storlek*. Retrieved January 30, 2026, from https://www.ekonomifakta.se/sakomraden/foretagande/naringslivet/foretagens-storlek_1212719.html
- Esaiasson, P., Gilljam, M., Oscarsson, H., Sundell, A., Towns, A., & Wängnerud, L. (2024). *Metodpraktikan*. Norstedts Juridik.
- EU. (2025, February 19). *EU AI Act: first regulation on artificial intelligence*. Retrieved May 13, 2026, from <https://www.europarl.europa.eu/topics/en/article/20230601STO93804/eu-ai-act-first-regulation-on-artificial-intelligence>
- European Commission. (2003). Commission Recommendation of 6 May 2003 concerning the definition of micro, small and medium-sized enterprises. *Official Journal of the European Union, (L 124/36)*. <https://eur-lex.europa.eu/eli/reco/2003/361/oj>
- Ghobakhloo, M., & Iranmanesh, M. (2021). Digital transformation success under Industry 4.0: a strategic guideline for manufacturing SMEs. *Journal of Manufacturing Technology Management, 32*, 1533–1556. <https://doi.org/10.1108/JMTM-11-2020-0455>
- Ghobakhloo, M., Iranmanesh, M., Vilkas, M., Grybauskas, A., & Amran, A. (2022). Drivers and barriers of Industry 4.0 technology adoption among manufacturing SMEs: a systematic review and transformation roadmap. *Journal of Manufacturing Technology Management, 33*, 1029–1058. <https://doi.org/10.1108/JMTM-12-2021-0505>

- Haber, L., & Carmeli, A. (2023). Leading the challenges of implementing new technologies in organizations. *Technology in Society*, *74*. <https://doi.org/10.1016/j.techsoc.2023.102300>
- Haddaway, N. R., Page, M. J., Pritchard, C. C., & McGuinness, L. A. (2022). PRISMA2020: An R package and Shiny app for producing PRISMA 2020-compliant flow diagrams, with interactivity for optimised digital transparency and Open Synthesis. *Campbell Systematic Reviews*, *18*(2), e1230. <https://doi.org/10.1002/cl2.1230>
- Hurtig, M., & Moradi, T. (2022). *Roadmap for Sustainable Development: A Guide for Small and Medium-sized Enterprises in the Gothenburg Region* [Master's thesis]. Chalmers University of Technology. Retrieved January 30, 2026, from <https://hdl.handle.net/20.500.12380/304776>
- IMY. (2025, February 5). *GDPR vid användning av generativ AI* (tech. rep.). https://www.imy.se/globalassets/dokument/rapporter/gdpr-vid-anvandning-av-generativ-ai_imy-2024-9162.pdf
- IMY. (2026, March). *AI och tillämpning av GDPR – Vägledning om GDPR och AI*. Retrieved May 6, 2026, from <https://www.imy.se/verksamhet/dataskydd/innovationsportalen/vagledning-om-gdpr-och-ai/gdpr-och-ai/ai-och-tillampning-av-gdpr/>
- Jacobsen, D. I., & Thorsvik, J. (2021). *Hur moderna organisationer fungerar* (5th ed.). Studentlitteratur.
- Kalota, F. (2024). A Primer on Generative Artificial Intelligence. *Education Sciences*, *14*, 172. <https://doi.org/10.3390/EDUCSCI14020172>
- Khayer, A., Talukder, M. S., Bao, Y., & Hossain, M. N. (2020). Cloud computing adoption and its impact on SMEs' performance for cloud supported operations: A dual-stage analytical approach. *Technology in Society*, *60*, 101225. <https://doi.org/10.1016/J.TECHSOC.2019.101225>
- Kotter, J. P. (2012). *Leading change, with a new preface by the author*. Harvard Business Review Press. <https://ebookcentral.proquest.com/lib/chalmers/reader.action?docID=5182145&ppg=35&c=RVBVQg>
- Kotter, J. P. (2014). *Accelerate*. Harvard business review press.
- Kumar, N., Kumar, R. R., & Raj, A. (2025). Establishing Antecedents and Outcomes of Human-AI Collaboration: Meta-Analysis. *Journal of Computer Information Systems*. <https://doi.org/10.1080/08874417.2025.2492885>
- Li, J. C. (2020). Roles of Individual Perception in Technology Adoption at Organization Level: Behavioral Model versus TOE Framework. *Journal of System and Management Sciences*, *10*, 97–118. <https://doi.org/10.33168/JSMS.2020.0308>
- McClelland, C. S., & Reisinger, D. (2023). The Best AI Chatbots for 2023. *PCMag UK*. Retrieved January 28, 2026, from <https://uk.pcmag.com/ai/148205/the-best-ai-chatbots-for-2023>

- Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. *Organization Science*, 5, 14–37.
- Norstedts Juridik. (n.d.). *AI-policy för kommunal verksamhet*. Retrieved May 6, 2026, from <https://www.nj.se/juno/kommun/ai-policy>
- OECD. (2025). *Generative AI and the SME Workforce: New Survey Evidence* (tech. rep.). OECD Publishing. Paris. <https://doi.org/10.1787/2d08b99d-en>
- Ouzzani, M., Hammady, H., Fedorowicz, Z., & Elmagarmid, A. (2016). Rayyan – a web and mobile app for systematic reviews. *Systematic Reviews*, 5(1), 210. <https://doi.org/10.1186/s13643-016-0384-4>
- Qureshi, K. M., Mewada, B. G., Yadav, A., Almakayeel, N., Alghamdi, S. Y., & Qureshi, M. R. N. M. (2025). Analysing lean 4.0 adoption factors towards manufacturing sustainability in SMEs: A hybrid ANN-Fuzzy ISM framework. *Scientific Reports*, 15. <https://doi.org/10.1038/s41598-025-01076-1>
- Radford, A., Narasimhan, K., Salimans, T., & Sutskever, I. (2018). *Improving Language Understanding by Generative Pre-Training* (tech. rep.). OpenAI. https://cdn.openai.com/research-covers/language-unsupervised/language_understanding_paper.pdf
- Rawat, P., Yashpal, & Purohit, J. K. (2024). Evaluating and prioritizing the barriers of industry 4.0 implementation in indian SMEs: An ISM approach. *Journal of The Institution of Engineers (India): Series C*, 105, 543–560. <https://doi.org/10.1007/s40032-024-01042-2>
- RISE. (n.d.). *Möjligheterna och fallgroparna med AI-agenter*. Retrieved February 5, 2026, from <https://www.ri.se/sv/artificiell-intelligens/berattelse/mojligheterna-och-fallgroparna-med-ai-agenter>
- Roumeliotis, K. I., & Tselikas, N. D. (2023). ChatGPT and Open-AI Models: A Preliminary Review. *Future Internet*, 15(6). <https://doi.org/10.3390/fi15060192>
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55, 68–78. <https://doi.org/10.1037/0003-066X.55.1.68>
- Säfstén, K., & Gustavsson, M. (2020). *Research methodology: For engineers and other problem-solvers*. Studentlitteratur. <http://urn.kb.se/resolve?urn=urn:nbn:se:hj:diva-47077>
- Sánchez, E., Calderón, R., & Herrera, F. (2025). Artificial Intelligence Adoption in SMEs: Survey Based on TOE–DOI Framework, Primary Methodology and Challenges. *Applied Sciences 2025, Vol. 15*, 15. <https://doi.org/10.3390/app15126465>
- Sarkar, A. (2026). From AI Hype to Workflow Reality: A Strategic Framework for Integrating Generative AI Across Organizational Functions. *Organizational Dynamics*, 55, 101202. <https://doi.org/10.1016/J.ORGDYN.2025.101202>
- Soomro, S., Fan, M., Sohu, J. M., Soomro, S., & Shaikh, S. N. (2026). AI adoption: a bridge or a barrier? The moderating role of organizational support in the path

toward employee well-being. *Kybernetes*, 55, 1059–1085. <https://doi.org/10.1108/K-07-2024-1889>

Statistics Sweden. (2025a). *AI use in enterprises 2025*. Retrieved February 5, 2026, from https://www.scb.se/contentassets/13819b76125e4a43b496ffc3b22d36ec/fd9901_2025a01_br_nvftbr2501eng.pdf

Statistics Sweden. (2025b, October 17). *Befolkningens IT-användning 2025*. Retrieved February 3, 2026, from <https://www.scb.se/hitta-statistik/statistik-efter-amne/forskning-och-det-digitala-samhallet/det-digitala-samhallet/befolkningens-it-anvandning/pong/statistiknyhet/befolkningens-it-anvandning-2025/>

Taulli, T. (2023). *Generative AI: How ChatGPT and other AI tools will revolutionize business*. Apress. <https://doi.org/10.1007/978-1-4842-9367-6>

Thomas, A. J., Barton, R., & John, E. G. (2008). Advanced manufacturing technology implementation: A review of benefits and a model for change. *International Journal of Productivity and Performance Management*, 57, 156–176. <https://doi.org/10.1108/17410400810847410>

Thuan, L. T., Tam, N. T., Trang, N. T. N., Trang, L. T. T., Huyen, K. N., & Huong, N. T. (2025). Digital transformation and sustainable business growth: Evidence from SMEs in Vietnam's Mekong Delta. *International Journal of Advanced and Applied Sciences*, 12, 223–233. <https://doi.org/10.21833/ijaas.2025.06.022>

Tillväxtverket. (2025). *Svenska små och medelstora företags AI-kompetens: En kartläggning av ekosystemet med fallstudier* (Report No. 0508). Retrieved January 30, 2026, from <https://tillvaxtverket.se/download/18.19d85e0e1961e0c5e2e28ca/1744272027800/Svenska-SMFs-AI-kompetens.pdf>

Tornatzky, L., Fleischer, M., & Chakrabarti, A. (1990). *The Processes of Technological Innovation*. Lexington Books. <https://books.google.se/books?id=EotRAAAAMAAJ>

ul Haq, F., & Suki, N. M. (2024). Mediating role of AI adoption between the relationship of leadership vision, change management capability, competitive pressure, trading partnerships, and SME performance. *Pakistan Journal of Commerce and Social Sciences*, 18, 872–892.

Vaswani, A., Shazeer, N., Parmar, N., Uszkoreit, J., Jones, L., Gomez, A. N., Kaiser, Ł., & Polosukhin, I. (2017). Attention is all you need. In I. Guyon, U. V. Luxburg, S. Bengio, H. Wallach, R. Fergus, S. Vishwanathan, & R. Garnett (Eds.), *Advances in neural information processing systems* (Vol. 30). Curran Associates, Inc. https://proceedings.neurips.cc/paper_files/paper/2017/file/3f5ee243547dee91fbd053c1c4a845aa-Paper.pdf

Vilma, A., & Booshnam, D. (2025). Agility Toward the HRIS Advancement at the Organization and Its Impact on Performance in SMEs. *Journal of Small Business Strategy*, 35, 58–75. <https://doi.org/10.53703/001c.142296>

Yenduri, G., Ramalingam, M., Selvi, G. C., Supriya, Y., Srivastava, G., Maddikunta, P. K. R., Raj, G. D., Jhaveri, R. H., Prabadevi, B., Wang, W., Vasilakos, A. V., & Gadekallu, T. R. (2024). GPT (Generative Pre-Trained Transformer) – A compre-

hensive review on enabling technologies, potential applications, emerging challenges, and future directions. *IEEE Access*, 12, 54608–54649. <https://doi.org/10.1109/ACCESS.2024.3389497>

Yu, F., & Schweisfurth, T. (2020). Industry 4.0 technology implementation in SMEs – A survey in the Danish-German border region. *International Journal of Innovation Studies*, 4, 76–84. <https://doi.org/10.1016/j.ijis.2020.05.001>

Zhang, E. Y., Cheok, A. D., Pan, Z., Cai, J., & Yan, Y. (2023). From Turing to Transformers: A Comprehensive Review and Tutorial on the Evolution and Applications of Generative Transformer Models. *Sci*, 5, 46. <https://doi.org/10.3390/SCI5040046>

A

Interview Questions

The interviews were conducted in Swedish. The following questions are presented in their original Swedish form, followed by the English translation in parentheses.

Uppvärmningsfrågor (Warm-up questions)

- Hur ser din bakgrund ut och vad är din roll på företaget?
(*What is your background and what is your role at the company?*)
- Hur länge har du jobbat här?
(*How long have you been working here?*)
- Utbildningsnivå
(*Level of education*)
- Dagliga arbetsuppgifter
(*Daily work tasks*)

Tematiska frågor (Thematic questions)

- Vad är din inställning till generativ AI och AI-agenter?
(*What is your attitude towards generative AI and AI agents?*)
- Hur ofta använder du generativ AI och eventuella AI-agenter eller agentisk AI?
(*How often do you use generative AI and any AI agents or agentic AI?*)
 - Säkerställ om det är på jobbet eller privat. (*Ensure whether it is for work or personal use.*)
- Till vad använder du det (generativ AI, AI agenter och agentisk AI)?
(*What do you use it for [generative AI, AI agents, and agentic AI]?*)
 - Till vilka typer av arbetsuppgifter? (*For what types of tasks?*)

A. Interview Questions

- Hur ser din användning ut jämfört med andra kollegors?
(*How does your usage compare to that of your colleagues?*)
- Vilka AI-modeller använder du?
(*Which AI models do you use?*)
 - Licens via företaget eller privatkonto? (*Company license or private account?*)
- Hur har du lärt dig att använda AI-teknikerna?
(*How did you learn to use these AI technologies?*)
 - Finns det någon utbildning på företaget? (*Is there any training provided by the company?*)
- Finns det någon AI-policy på företaget?
(*Is there an AI policy at the company?*)
 - Om ja: Hur hjälper den dig veta hur du ska / inte ska använda AI?
(*If yes: How does it help you know how you should or should not use AI?*)
- Var känner du att du saknar kompetens / kunskap i din användning av AI?
(*Where do you feel you lack competence or knowledge in your use of AI?*)
- Vad hade du velat lära dig använda AI till?
(*What would you like to learn to use AI for?*)
- Vilka utmaningar och hinder ser du för att du själv ska börja använda AI / använda AI mer?
(*What challenges and barriers do you see for yourself to start using AI / using AI more?*)
 - För att hela företaget ska öka användning? (*For the company as a whole to increase its usage?*)
- Vad hade DU behövt för att använda AI mer?
(*What would YOU need in order to use AI more?*)
- Om du får tänka fritt och struntar i exakt hur AI funkar, vilka arbetsuppgifter eller typer av dem hade du velat få hjälp med eller slippa göra?
(*Thinking freely and disregarding exactly how AI works, what tasks or types of tasks would you like help with or prefer to avoid doing?*)
- Finns det generellt något utrymme för att testa nya idéer och någon struktur för att fånga upp dem?
(*In general, is there any room for testing new ideas and is there a structure for capturing them?*)

A. Interview Questions

- Har du något exempel på ett tidigare införande av ett nytt verktyg/system/rutin/arbetssätt?
(Do you have an example of a previous implementation of a new tool/system/routine/way of working?)
 - Vad gick bra/dåligt? Några lärdomar tog du med dig från det?
(What went well/poorly? What lessons did you take away from that?)
- Har du några idéer på hur man kan få med alla på företaget “på tåget” att använda AI?
(Do you have any ideas on how to get everyone at the company “on board” with using AI?)
- Kan du se några risker med implementeringen / att öka företagets användning av AI?
(Can you see any risks with the implementation / increasing the company’s use of AI?)
- Något mer du tycker är extra viktigt att tänka på kring ett införande av AI?
(Is there anything else you think is especially important to consider regarding an implementation of AI?)

B

Original quotes

Table B.1 contains the original Swedish versions of the interview excerpts cited in the main body of this thesis. These entries are limited to data specifically referenced in the results. Full transcripts are excluded to ensure participant anonymity and maintain focus on the research themes.

Table B.1: Summary of Interview Quotes

Company	English Translation	Swedish Original
A	When it is integrated with Share-Point, with the email inbox, with everything, it makes it very easy to access information by simply talking to the AI and asking things like, 'what was the situation with this?' and 'how was it with that?', 'Can you summarise what we are talking about' or 'can you summarise this email conversation?'	när den är integrerad med med sin Sharepoint, med sin e-postlåda, med allting, gör att det är väldigt lätt att kunna komma åt information genom att just prata med AI:n och säga att liksom 'hur var det med det här?' Och 'hur var det med det?', 'Kan du sammanfatta vad vi pratar' eller 'kan du sammanfatta den här mejlkonversationen'
F	We asked Claude to scout how our brand stands on the entire global market, and how our customers and suppliers and such perceive us, to see the market situation. We can do that as well. Then ChatGPT is likely the best friend when it comes to many small questions that arise, anything from labor law to our certificates to, 'explain this in another language' or such. So, it is like a colleague who answers questions. I am a simple user, but it is an enabler in everyday life.	Vi bad Claude scouta runt hur vårt varumärke står sig på hela världsmarknaden, och hur våra kunder och leverantörer och sånt, så att lite så för att, eh, se marknadsläget. Det kan vi också göra. Sen ChatGPT är väl den bästa kompisen när det kommer till, till många småfrågor som dyker upp alltifrån arbetsrätt till våra certifikat till, eh, 'förklara det här på ett annat språk' eller så, så att, eh, som en en kollega som svarar på frågor. Så att, jag är en enkel användare, men det är en möjliggörare i vardagen.

Continued on next page

Table B.1 – Continued from previous page

Company	English Translation	Swedish Original
G	<p>We purchased a few business accounts and started building some GPTs, primarily based on the information we have, that is, technical information. We have the expertise for calculations and such, so we have fed that into the GPT (...). We have managed to get rid of all the running around to ask questions. When someone new joins, they keep asking, and I, as a design engineer, end up answering the same question over and over again. We have eliminated those minor issues since we implemented it, because now they just use their phones when they have a query, ask it there, and find the information in a much easier way. We also use it when reviewing contracts or trying to summarise texts. For things like that, ChatGPT is very straightforward and useful.</p>	<p>Vi köpte några business konton och så började vi bygga lite GPter här på, framförallt, information som vi har, alltså teknisk information. Beräkningar och sånt det kan ju vi, så det har ju vi matat in i GPT (...). Vi vi har blivit av med det här springandet och fråga och så är man en ny så springer man och frågar igen och så kan jag som konstruktör sitta och svara på samma fråga om och om och om igen. De smågrejerna har vi blivit av med sen vi implementerade det, för nu sitter de med telefonen när de har en fråga och ställer den där och hittar informationen på ett mycket lättare sätt. Vi kan ju använda det också när vi granskar avtal, när vi försöker summera texter och sånt, så är ju ChatGPT väldigt enkelt och bra.</p>
G	<p>We design in a programme called [Program X] (...). Then we have machines down here that need to be connected. We extract parameters and similar data from it, and then we need to input that into another programme called [Program Y] (...). They cannot sync with each other unless we convert those files. (...) We are actually using Lovable and doing a bit of vibecoding. So now, he has built an app where we just drag in the files we get from [Program X], and it takes a fraction of a second (...). So we have continued with Lovable and also use it for a few apps to help optimise our purchases.</p>	<p>vi ritar i ett program som heter [program X] (...). Och sen har vi maskiner här nere som vi skall koppla, vi tar ut parametrar och sånt ur det och sen ska vi in i ett annat program som heter [program Y] (...). De kan inte synka med varandra utan att man gör om de filerna. (...) vi använder faktiskt lovable och vibe-kodar lite grann. Så nu har han gjort en app så vi bara drar in de filerna vi får från [program X] och så tar det ju bråkdelen av en sekund (...). Så vi har även fortsatt med Lovable och använder lite appar för att kunna optimera våra inköp, använder vi det också till.</p>
<p><i>Continued on next page</i></p>		

Table B.1 – Continued from previous page

Company	English Translation	Swedish Original
A	My greatest concern is data storage, that is to say, data sovereignty. Who has control over it? (...) And it is like this: when this starts to leak, will AI be able to help leak everything? That is where my concern lies.	Största oron för mig är datalagringsen, alltså datasuveräniteten. Vem, vem har koll på den? (...) Och då är det såhär, när det här börjar läcka, kommer AI kunna hjälpa till att läcka allt? Det är väl där min oro sitter.
H	One has to be careful with using AI so as not to give away all the information and everything. And if you do not give away information, then you cannot use AI very effectively in many cases.	Man får vara försiktig med att använda AI för att inte lämna ut all information och allting då. Och om man inte lämnar ut information uh då kan man inte använda AI riktigt många gånger på ett smidigt sätt.
A	Another major issue that always arises is: is the data where it should be? It never is.	En annan stor femma som alltid är liksom är datan där den borde vara? Det är den ju aldrig.
A	Initially, there was a lot of talk about the price, as people felt the costs were high because the Copilot subscription is around 300 SEK a month. However, once you realise the value it provides, it pays for itself quite quickly. That licence fee is really nothing compared to what we get back. But for those who do not know how to utilise AI, it is a significant cost and a major barrier to adoption.	I början så har det varit väldigt mycket snack också kring pris, att AI kostar och så tycker folk att det är dyra kostnader för att copiloten ligger på 300 kr eller någonting i månaden, men när man sitter med värdet i den så det räknar hem sig ganska snabbt. Den licenskostnaden är ju liksom ingenting jämfört med vad vi får tillbaka. Men för dem som inte vet hur dem ska använda AI så är det en dyr kostnad och en ett stort motstånd till det.
B	[Time] is likely the deficiency. But sometimes you have to make the time if... What matters is how much you believe in it.	Det är väl [tiden] som är bristen. Men ibland får man ta sig tiden om man... Det [som] gäller [är] hur mycket man tror på det.
<i>Continued on next page</i>		

Table B.1 – Continued from previous page

Company	English Translation	Swedish Original
F	I am somewhat restrictive about spending too much money on a proprietary agent and the like, because I believe that this will be the kind of thing that, well, it will just be integrated into our system. You just have to wait a little. It will be included.	Jag är lite restriktiv med att lägga alldeles för mycket pengar på en egen agent och liknande, för jag tror att det här kommer vara sånt som ja, det ska bara integreras i vårt system. Det är bara att vänta lite. Det kommer ingå.
B	I believe [the change process] needs to come from both directions, that it should meet in the middle somewhere for it to be as good as possible. It is clear that I can say, 'yes, now we are going to do this and that.' But then they might not agree, and that usually leads to some friction and issues and it does not turn out very well. Instead, it should come from both directions so that everyone understands how it can help.	Jag tror [förändringsprocessen] behöver komma från båda hållen, att det, mötas på mitten någonstans för att det ska bli, eh, så bra som möjligt. Eh, Det är ju klart att jag kan säga till att 'ja, nu ska vi göra så här och så här'. Men eh, då kanske inte dom tycker att ja, men nej, det, då blir det ju oftast lite tjafs och lite grejer och inte så bra, utan om man, eh, det kommer från båda hållen och att alla förstår vad det kan hjälpa med.
C	I believe that was a success factor, the team got to understand the need and shape [the change process] together	Så där tror jag en framgångsfaktor var liksom, teamet fick förstå behovet och utforma [förändringsprocessen] uh tillsammans.
F	I think you also need to be a bit firm and just rip off the Band-Aid. For example, by being forced into it. Because if you are not forced, it's very easy to follow that natural instinct of being a bit lazy by nature.	Jag tror att man måste också vara lite hård och rycka plåstret till exempel tvingas in i det. För att om du inte tvingas in i det så är det väldigt lätt att gå på den här naturliga instinkten att vara lite lat av sin natur.
B	We have quite a bit of freedom here, so if you want to test something, it is okay. Just say what you are thinking and we will see if it... So there is no direct routine for that.	Vi har det ganska fritt här, så vill man testa en sak så är det okej. Eh, Säg bara vad det är du har tänkt och så får vi se om det, eh... Så det finns ingen direkt, eh, rutin på, på det.
<i>Continued on next page</i>		

Table B.1 – Continued from previous page

Company	English Translation	Swedish Original
F	I actually believe it is about communication, talking about [the change process]. Explaining that someone else might benefit from it, too. It is partly about this 'story-telling'. 'Why are we doing this?', 'What is our journey?'. Because then you get people on board along the way as well, I think.	Jag tror faktiskt kommunikation, prata om [förändringsprocessen]. Förklara att det är någon annan som kanske kommer vinna på det också. Så att det handlar ju lite grann om det här 'storytelling'. 'Varför gör vi det?' 'Vad är vår resa?', eh. För då får du med dig människorna på vägen också tror jag.
G	It was not as if we had a clear strategy that AI should be used in this specific way here. We have not had that. Instead, it became ad hoc. But we are a small company and we saw the opportunity where we could get some help from [GenAI], and so we started with it. In the long term, we will likely have to look at where we are going, where it should be implemented, why it should exist, and so on. So, I believe that strategy will simply become clearer the further we go.	Det var inte så att vi hade en tydlig strategi att nu ska AI användas på det här sättet hos oss. Det har vi inte haft utan det blev ad hoc liksom. Men vi är ju ett litet företag och vi såg möjligheten där vi kunde få lite hjälp av [GenAI] och då börjar vi med det. På längre sikt så blir det väl lite grann så att man kanske får titta - Vart ska vi, var ska det finnas och varför ska det finnas och så vidare. Så att, jag tror den strategin kommer bli tydligare ju längre vi går helt enkelt.
F	It is about having a transition that feels controlled. So, when you have it, you have to account for that as well, so you are not just floating at cloud-nine altitude. Because then you feel there is no control, and that is very daunting.	Att man har en övergång som känns kontrollerad. Så när du när du har den så måste man nog tillgodose det också så man inte bara är ute på molnfri höjd. Och så känner man att det finns ingen kontroll och då är det ju väldigt läskigt.
<i>Continued on next page</i>		

Table B.1 – Continued from previous page

Company	English Translation	Swedish Original
C	Then run a pilot, not everything at once. What we have said is that we should limit the scope to where we see the greatest value, but also where we have the highest degree of maturity regarding the use of these types of tools. (...) If [the pilot project] works well, then we also have a critical mass of competence in the organisation, and then it is easier to spread it further.	sen köra en pilot, inte allt på en gång, utan uh det vi har sagt det är att vi ska avgränsa scopet, att där vi ser störst värde, men också där vi har uh högst mognadsgrad kring uh använda den här typen av verktyg (...) Eh, och fungerar [pilotprojektet] bra, då har vi också en kritisk massa kompetens i verksamheten och då är det lättare att sprida vidare.
A	We use [AI tools] very much. Then we have a group of people who like to google or use AI to google. And then we have people down there who have barely asked about it.	Vi använder [AI-verktyg] väldigt mycket. Och. Sen så har vi ett gäng som tycker om att googla eller använda AI för att Googla. Eh, Och. Sen så har vi folk där nere som knappt har frågat.
F	How do I know if I am getting a sensible answer or not? Especially when you input, 'Here, read these three PDFs of 400 pages each and give me a summary.' How do I know that it is getting it right? In that case, I would actually need to read the PDFs.	Hur vet jag om jag får ett vetligt svar eller ej, liksom? När, framförallt när man då matar in, "Här, Läs dom här 3 PDF:erna på 400 sidor var och ge mig en sammanställning." Hur vet jag att den hittar på rätt? Då behöver jag ju läsa PDF:erna.
A	Microsoft is not allowed to create or write in the same way as the user in emails or in the calendar and things like that. It is allowed to create Word and Excel files, which are, so to speak, 'dead files'. But it is not allowed to create 'communication material'.	Microsoft får inte skapa får inte skriva på det sättet som som användaren i mejlen eller i kalendern och sådana grejer då. Så den får ju skapa Word filer och Excel filer får den skapa som är liksom 'döda filer' om man får säga. Men dom får inte skapa 'Kommunikationsgrejer.'
<i>Continued on next page</i>		

Table B.1 – Continued from previous page

Company	English Translation	Swedish Original
C	I would like [to acquire a licence], but then you need to have use cases and you need to have people, either a strategy, I suppose, or at least individuals who are interested enough to be self-driven in it.	jag skulle vilja [skaffa en licens], men då behöver man ha användningsområden och man behöver ha personer, antingen en strategi tänker jag, eller, eh, åtminstone personer som är så pass intresserade att dom är liksom självdrivna i det.
B	I know that there are some operators who, when they encounter a problem, stand there with ChatGPT and ask questions, and they think it works perfectly fine. But there are many who are a bit afraid and want to distance themselves... They feel that, 'this is not fun. This is something that will take over. I will not have to think for myself'.	jag vet att det är några operatörer som, när dom stöter på ett problem så står dom med chatGPT och frågar, och dom tycker ju att det funkar alldeles utmärkt. Men det är ju många som är lite rädda, vill ta avstånd, det... känner att ja, nej, 'det här är inte kul. Det här är nånting som kommer ta över. Jag kommer inte behöva tänka själv'.
C	It often becomes very vague when analysing the potential of AI in our company. That is to say, how would one be able to get started?	Det blir ofta väldigt fluffigt om man ska analysera AIs potential i vårt företag. Alltså hur skulle man kunna komma igång?

C

AKSEA Framework Iterations

This appendix details the four primary iterations developed prior to the final version of the AKSEA Framework.

C.1 Version 1.0

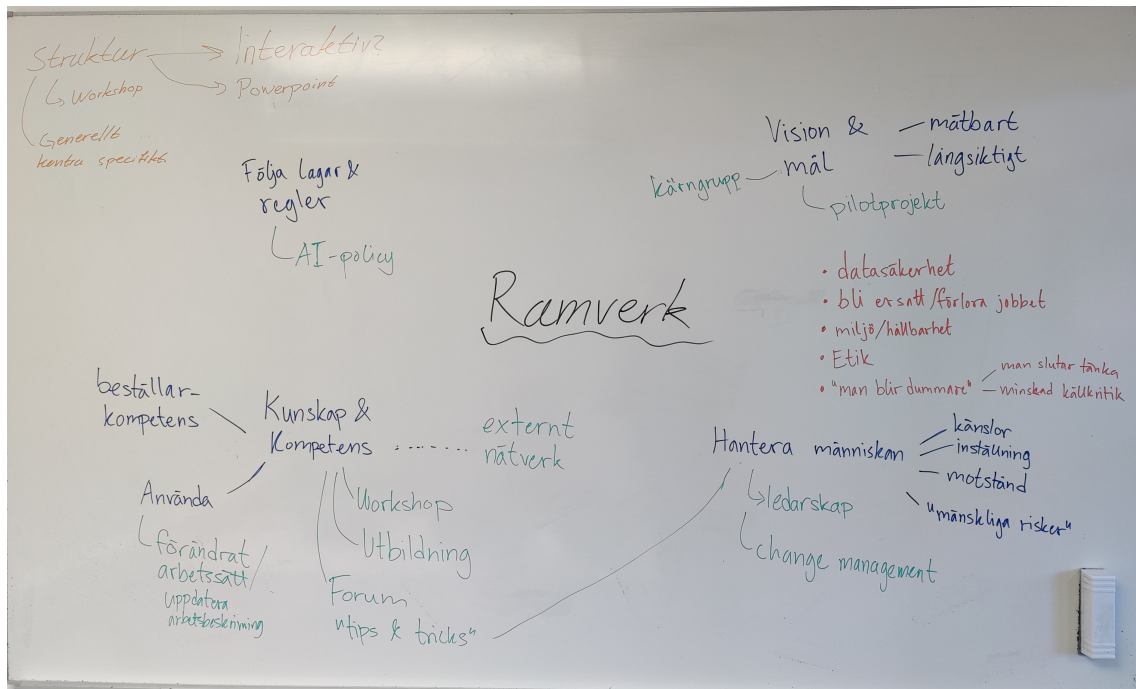


Figure C.1: Framework Version 1.0

C.2 Version 2.0

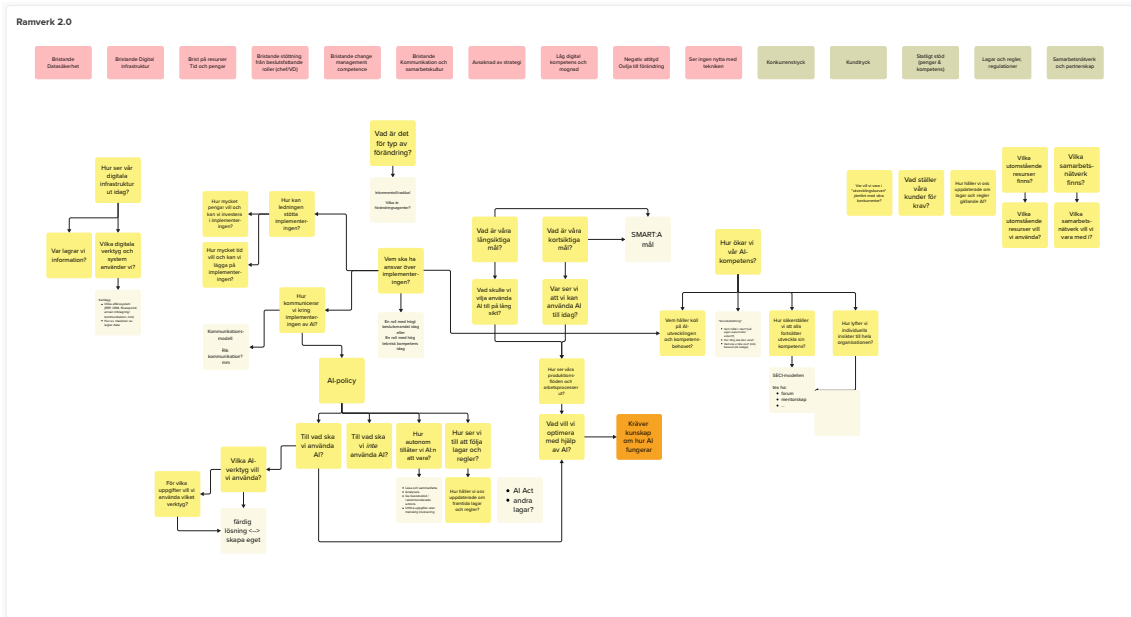


Figure C.2: Framework Version 2.0

C.3 Version 2.1

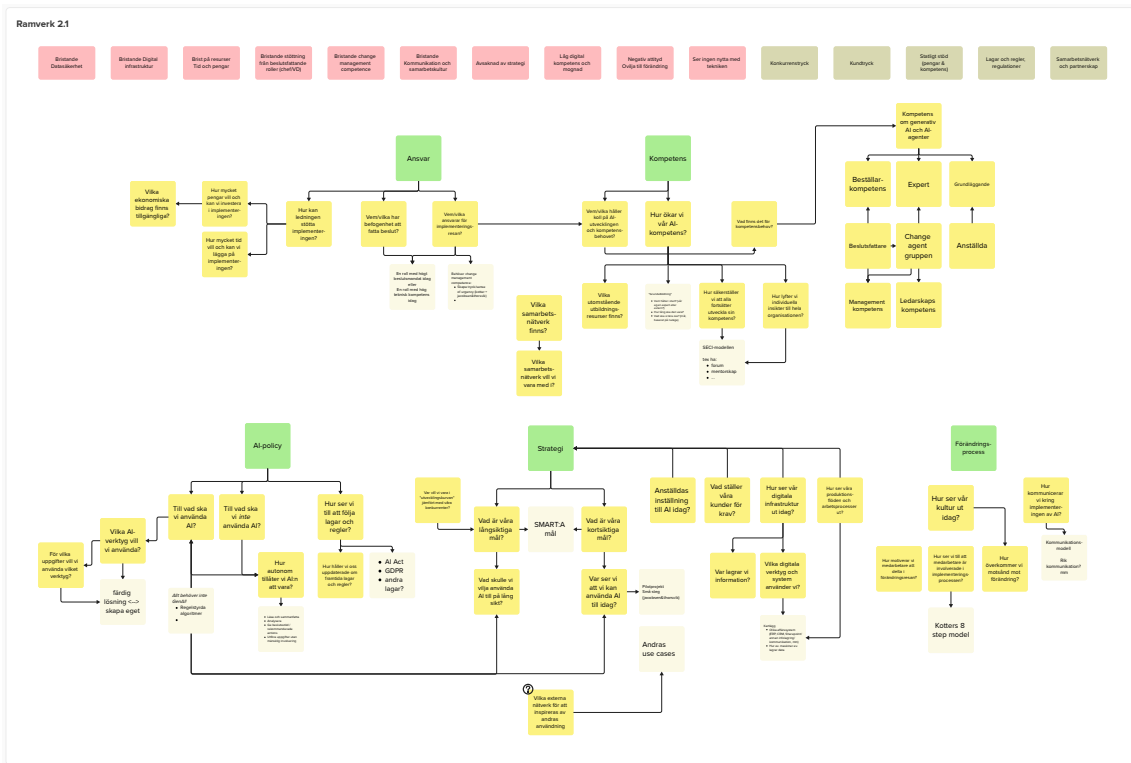
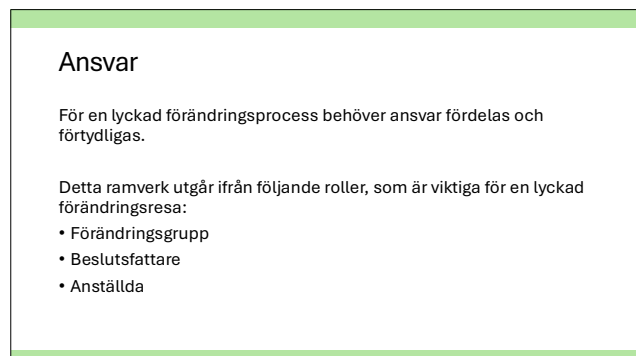
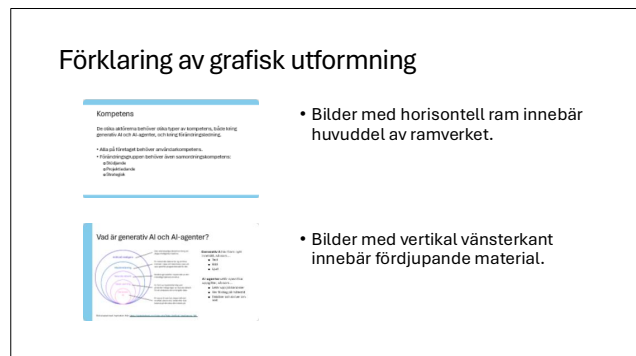
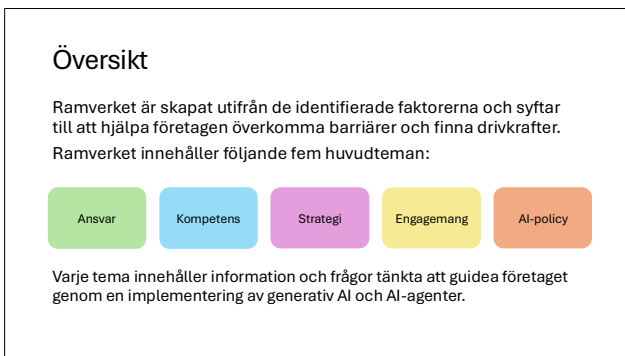
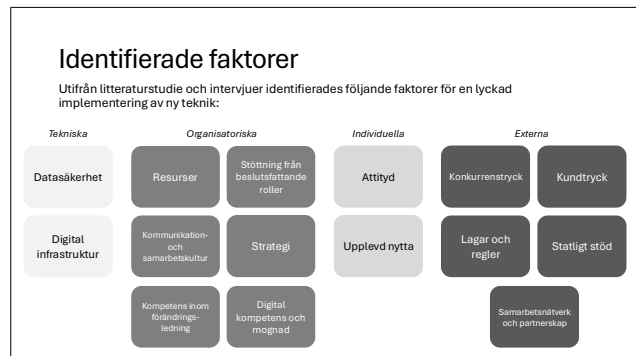
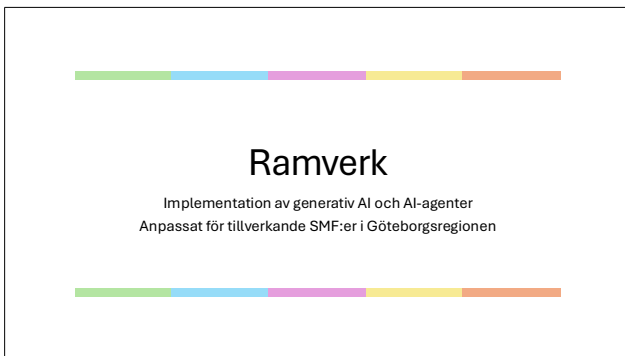


Figure C.3: Framework Version 2.1

C.4 Version 3.0

Please note that the pages are ordered row by row: starting from the top-left, moving to the top-right, and then continuing downward in the same pattern. Due to technical limitations in the PDF rendering, certain hyperlinks may not be interactive.



Förändringsgrupp

- Kärngruppen ansvariga för att leda förändringen.
- Behöver bestå av minst 2 personer som tillsammans har kompetens för...
 - Ledarskap: Inspirera, motivera och leda människor mot gemensamma mål.
 - Management: Planera, organisera och styra verksamhetsresurser effektivt.
 - IT: Förstå, använda och utveckla tekniska lösningar och system
- Gruppen behöver perspektiv från flera olika roller, och kan med fördel inkludera olika positioner i hierarkin.
- Övriga anställda behöver ha tilltro till förändringsgruppen.
 - Inhyrda konsulter kan täcka brist på kompetens men behöver då kunna vara på plats för att anställda ska känna just tilltro.

Beslutsfattare

- Den/de personer som har mandat att ta beslut kring investeringar, resursprioritering och bindande beslut.
 - Ofta ledningsgruppen.
- Minst en beslutsfattare behöver ingå i Förändringsgruppen.

Anställda

- De anställda på företaget som inte ingår i Förändringsgruppen, men påverkas av förändringsprocessen.
 - Alla anställda kommer antagligen i någon mån påverkas av förändringen.
- Behöver få en grundläggande kompetens kring generativ AI och AI-agenter.
 - Mer om detta i steget [Kompetens](#).
- Anställdas inställning till förändringen är också viktig att hantera.
 - Mer om detta i steget [Engagemang](#).

Frågor att besvara:

- Vem/vilka har idag befogenhet att fatta vilka beslut?
- Vilka ska ingå i Förändringsgruppen?
- Hur kan ledningen stötta Förändringsgruppen?
 - Spelregler kring beslutsfattande, resursfördelning, etc.
- Hur mycket resurser kan Förändringsgruppen använda?
 - Arbetstid, pengar att investera i kompetensutveckling och teknik, etc.
- Finns det några ekonomiska bidrag att söka utifrån?

Kompetens

Kompetens

De olika aktörerna behöver olika typer av kompetens, både kring generativ AI och AI-agenter, och kring förändringsledning.

- Alla på företaget behöver *användarkompetens*.
- Förändringsgruppen behöver även *samordningskompetens*:
 - Stödjande
 - Projektledande
 - Strategisk

Användarkompetens

Alla anställda bör ha en grundläggande förståelse för tekniken, i och med dess allt snabbare integrering och inverkan på människors vardag.

Innebär:

- Grundläggande förståelse för vad AI är och dess möjligheter/begränsningar.
 - Se [nästkommande slides](#).
- Kunskap om de AI-verktyg som företaget använder.
 - Se [Strategi](#).
- Grundläggande förståelse för GDPR och andra relevanta lagar.
 - Se [AI-policy](#).

Grundläggande förståelse

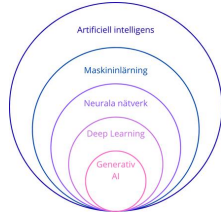
Följande slides är en konkretisering av den grundläggande förståelse som är del av användarkompetensen.

De beskriver kort vad generativ AI och AI-agenter är, samt dess möjligheter och begränsningar.

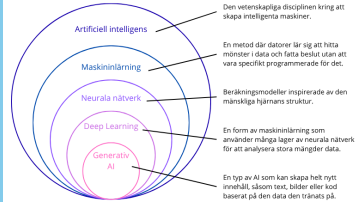
Vad är generativ AI och AI-agenter?

Generativ AI ≠ AI
Generativ AI ⊆ AI

Viktigt att veta är att AI är mycket mer än bara generativ AI.



Vad är generativ AI och AI-agenter?



Generativ AI tar fram nytt innehåll, så som...

- Text
- Bild
- Ljud

AI-agenter utför specifika uppgifter, så som...

- Letar upp jobbanonser
- Ger förslag på mötestid
- Felsöker och skriver om kod

Bild skapad med inspiration från https://sictplaybook.org/index.php?title=Artificial_Intelligence_101

Vad är generativ AI och AI-agenter?

Kategori	Maskininläring (ML)	Generativ AI (GenAI)	AI-agenter
Beskrivning	Använder data för att skapa prediktiva modeller eller klassificeringar.	Använder storskaliga språkmodeller (LLM) för att skapa nytt innehåll.	Fungerar som en autonom aktör som utför komplexa uppgifter självständigt.
Exempel	<ul style="list-style-type: none"> Försäkningsprognoser Prediktivt underhåll 	<ul style="list-style-type: none"> Sammanfatta text Bildgenerering 	<ul style="list-style-type: none"> Schemaläggare Fakturahandläggning

- Generativ AI är en underkategori till maskininläring (se föregående bild).
- AI-agenter använder generativ AI, men även andra verktyg (t.ex. webbsökning, mejl, kalender) för att utföra sina uppgifter.

Se *The Digital Playbook – AI 101* för fördjupad men ändå komprimerad information.

Möjligheter och begränsningar

Generativ AI är en sannolikhetsmaskin, inte en sanningsmaskin.

• Kända problem:

- **Hallucinerar:** Även om dagens modeller ofta genererar korrekta svar, finns risk för fel, särskilt kring information som är väldigt komplex eller nischad. Svaren presenteras oavsett väldigt självsäkert, vilket gör felaktig information svåridentifierad.
- **Bias:** AI:n tränas genom feedback från människor (RLHF), vilket återskapar fördomar. Det gör även vissa chatbottar mer benägna att hålla med användaren, även när användaren har fel.

Som användare är det viktigt att granska det resultat en AI genererar.

Möjligheter och begränsningar

Generativ AI kan användas för att lösa många olika problem som kräver generering, sammanställning eller analys av innehåll, men det är också viktigt att fundera över om det verkligen är generativ AI som ska lösa problemet.

- **Regelstyrd algoritm:** Fasta, förutsägbara uppgifter.
- **Maskininläring:** Identifiera mönster, göra förutsägelser.
- **Generativ AI:** Skapa nytt innehåll.

- *Generativ AI kan dock användas för att skapa algoritm/ML-lösningar.*

Samordningskompetens

Roll	Vad innebär det?	Kompetensbehov	Exempel på uppgifter
Stödjdande	Stödjer och vägleder medarbetare i användningen av AI-verktyg. Ansvarar för intern utbildning och erfarenhetsutbyte.	Djupare kunskap om AI-verktyg, förmåga att lära ut, kommunikationsförmåga.	Hålla workshops, skapa guider, svara på frågor om AI-användning, samla in feedback från medarbetare.
Projektledande	Leder och driver AI-projekt från idé till implementering. Samordnar resurser och utvärderar.	Projektledning, affärsanalys, kravspecifikation, riskhantering, kunskap om AI-leverantörer.	Identifiera affärsmöjligheter, formulera krav, välja verktyg, utvärdera resultat.
Strategisk	Utvecklar och kommunicerar företagets AI-strategi.	Affärsstrategi, marknadsanalys, långsiktig planering, kommunikationsförmåga, kunskap om lagstiftning.	Utveckla en AI-strategi, prioritera bland AI-projekt.

Tips för kompetensutveckling

- Alla personer i Förändringsgruppen behöver inte ha alla delar av samordningskompetensen, men delarna behöver finnas eller utvecklas inom gruppen.
- Förbättra organisatoriskt lärande mha SECI-modellen.
 - Se nästkommande slides.
- Förändringsgruppen bör...
 - >> Utforska tillgängliga utbildningsresurser.
 - >> Undersöka och gå med i externa nätverk.

SECI-modellen

- Modell för organisatoriskt lärande
- *Lärandespiral* som visar övergångarna mellan tyst och explicit kunskap

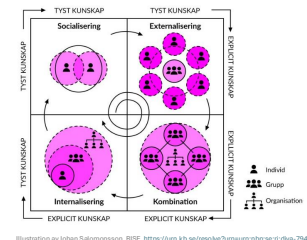
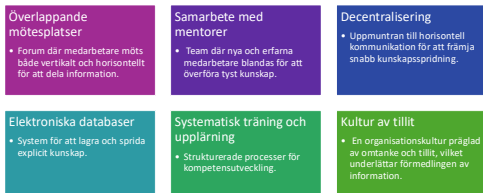


Illustration av John Seamonson, RISE. https://www.kb.se/hexo/ke?utm_medium=webcam&id=686-75485

Källa: Nonaka, I. (1994). A Dynamic Theory of Organizational Knowledge Creation. *Organization Science*, 5(1), 14–37.

SECI-modellen

- 6 punkter för att förbättra organisationens *lärandespiral*



Källa: Nonaka, I. (1994). A Dynamic Theory of Organizational Knowledge Creation. *Organization Science*, 5(1), 14-37.

Frågor att besvara:

- Var är vår kompetens just nu?
- Hur lyfts individuella insikter till resten av organisationen idag?
- Vad finns det för tillgängliga utbildningsresurser?
- Vilka externa nätverk finns? Vilka vill vi vara med i?

Strategi

Strategi

För att kunna utforma en strategi för förändringsresan behövs en kartläggning kring:

- Digital infrastruktur
- Produktionsflöden och arbetsprocesser
- Kundkrav
- Anställdas inställning till AI

Utifrån detta kan Förändringsgruppen sedan ta fram visioner och mål på både kort och lång sikt.

Frågor att besvara – Utgångsläge

- Vilka digitala verktyg och system använder vi?
- Finns generativ AI och/eller AI-agenter redan integrerat i några av systemen?
- Var och hur lagras vår information?
- Hur ser våra produktionsflöden och arbetsprocesser ut?
- Vad ställer våra kunder för krav kring AI-användning?
- Hur ser våra anställdas inställning till generativ AI och AI-agenter ut?

Långsiktiga mål

Långsiktiga mål är en utmaning att ta fram, men kan med fördel vara idealistiska och visionära.

Målen bör formas av Förändringsgruppen, men behöver förankras i hela företaget och dess övergripande vision, och med de anställda.

- *Mer om förankringen hos anställda i avsnittet [Engagemang](#).*

Kortsiktiga mål

Mål på kort sikt behöver vara mer konkreta än de långsiktiga visionerna.

- Använd SMART-modellen för att utforma kortsiktiga mål.
 - *Se nästa slide.*
- Fira och uppmärksamma de små vinsterna.

SMART: Modell för att konstruera mål

SMART:a mål, kriterier man bör beakta vid måluppsättning.

- **Specific:**
 - Det ska vara tydligt och precist, och inte gå att missförstå.
- **Measurable:**
 - Det ska finnas något sätt att mäta framgång inom målet.
- **Assignable:**
 - Det ska vara tydligt vem eller vilka som ansvarar för att nå målet.
- **Realistic:**
 - Det ska gå att uppnå utifrån tillgängliga resurser.
- **Time-related:**
 - Det ska finnas en tidpunkt på när målet ska vara uppnått.

QBS: Alla kriterier behöver inte innefattas för att målet ska vara bra, exempelvis mer långsiktiga.

Källa: Doran, G. T. (1981). There's a S.M.A.R.T. way to write management's goals and objectives. *Management Review*, 70(11), 35-36.
<http://openurl.ebsco.com/contentitem/bsu:6043491?sid=ebco-plink:crwle&id=ebco:bsu:6043491&cid=crwle>

Tips för strategiskapande:

- >> Börja med grundläggande utbildningar för AI-användning.
- >> Se över vilka verktyg som finns tillgängliga - integrerade i nuvarande system, färdiga lösningar att köpa in, eller bygga något eget.
- >> Hitta 1-2 pilotprojekt att genomföra med valda verktyg.
- >> När ni har några projekt igång, kan ni fördjupa strategiarbetet och utöka verktygslådan.

Stöd:

Som hjälp finns översikt av dagens verktyg, samt två olika användningsfall, beskrivna på nästkommande slides.

Dagens verktygslåda - Urval av chattbotar

Modell	Företag	Fördelar	Nackdelar
ChatGPT	OpenAI	<ul style="list-style-type: none"> • Konversera på svenska 	<ul style="list-style-type: none"> • Delvis kontroversiellt företag (politiskt kopplat)
Gemini	Google	<ul style="list-style-type: none"> • Integrerat i Googles produkter • Konversera på svenska 	
Copilot	Microsoft	<ul style="list-style-type: none"> • Integrerat i Microsofts produkter 	<ul style="list-style-type: none"> • Upplever lite sämre svarskvalitet
Le Chat	Mistral	<ul style="list-style-type: none"> • Utvecklas inom EU (Frankrike) -> Data lagras inom EU 	<ul style="list-style-type: none"> • Upplever lite sämre svarskvalitet • Klarar ej svenskt tal
Claude (obs, ej detsamma som Claude Code)	Anthropic		<ul style="list-style-type: none"> • Delvis kontroversiellt företag (politiskt kopplat) • Klarar ej svenskt tal
DeepSeek	DeepSeek AI		<ul style="list-style-type: none"> • Kontroversiellt företag (koppling till kinesiska staten)

Dagens verktygslåda - egna lösningar eller färdiga verktyg

- Det går också skapa egna lokala lösningar
 - Kräver lite mer kunskap
 - Kan ha en hög initial kostnad (Se mer under [AI-policy](#))
- Även hemsidor som är mer nischade, tex
 - Lovable eller bolt.new: Skapa hemsidor
 - Google Veo 3 eller Luma dream machine: Skapar rörlig bild från text.
 - Gamma: Skapar Powepoints åt dig
 - NotebookLM: Låter dig chatta, prata och lyssna på uppladdade dokument

Användningsfall 1: Transkribering av möten

- Skapa en specialiserad AI-agent (kallas customGPT, Gem el. dyl. beroende på verktyg).
 - Skriv in instruktioner på format för svaret, t.ex. "Skapa en sammanfattning av mötet på 4-5 meningar, samt viktiga nästa steg som punktlista".
 - Tips: Använd en chattbot för att skapa instruktionen.
- Spela in mötet.
- Ladda upp ljudfilen till AI-agenten.
- **OBS: Tänk på att gratisversioner av vissa verktyg inte lagrar data på ett säkert sätt. Mer om detta under [AI-policy](#).**

Användningsfall 2: Supermanual för operatörer

- Skapa digital databas.
 - Se till att alla manualer finns i pdf, word eller annat filformat och att texten är sökbar.
 - Ta bort förlegad information så att AI:n inte läser av fel.
 - Sammanställ alla dokument i en stor fil eller mapp.
- Ge AI:n tillgång till databasen.
 - Detta kallas RAG.
- Ge AI:n instruktioner kring att den endast ska hämta fakta från databasen, språk och hur den ska presentera information.

Några fler användningsområden

- Mötesantecknare.
- Skapa innehåll till sociala medier eller hemsida.
- Agent som övervakar lager och ger tips på vad som behöver beställas utifrån inskickade ordrar.
- Fler användningsfall (för alla typer av AI, inte bara generativ): <https://my.ai.se/anvandningsfall>
- AI Use Case Canvas – Mall för att hitta användningsfall: <https://my.ai.se/resurser/ai-use-case-canvas-svenska>

Frågor att besvara:

- Vad ser vi att vi kan använda AI till idag? (Kortsiktiga mål)
- Vilka verktyg eller system vill vi använda?
- Vad har vi för vision med implementeringen? (Långsiktiga mål)

Engagemang

Engagemang

Medarbetarnas inställning till och delaktighet i förändringen är avgörande för dess framgång och kräver aktiv hantering.

- Ramverket fokuserar på hantering av:
 - Kommunikation
 - Motivation
 - Attityd

Förändring

Människor gillar inte förändring...

- Man behöver motivera anställda till förändringen.
- Göra det möjligt att bidra till förändringen.
- Förankra förändringen i kulturen så att den "sitter i väggarna".

Källor:

Kotter, J. P. (2012). *Leading change*, with a new preface by the author. Harvard Business Review Press.
Kotter, J. P. (2014). *Accelerate*. Harvard business review press.

Self determination theory:

En motivationsmodell – 3 faktorer bakom motivation

Autonomi:

Anställda behöver uppleva att de frivilligt börjar använda AI mer, tvång har motsatt effekt på motivation.

Relatedness:

Anställda behöver uppleva att de arbetar för något större, långsiktiga mål kan bidra till detta.

Competence:

Anställda behöver uppleva att de lär sig, kan utöva sin nyvunna kompetens och visa upp den.

Källa: Ryan, R. M., & Deci, E. L. (1985). *Self-Determination Theory and the Facilitation of Intrinsic Motivation, Social Development, and Well-Being*. *Self-Determination Theory*.

Kommunikation

- Förmedla nödvändighet av förändringen.
- Tydliggör vision, strategi och initiativ.
- Använd flera informationskanaler.
 - Ha möjlighet att förmedla rik information, exempelvis via möten.
- Repetera informationen för att befästa den.

Att få med anställda i förändringsresan

- Belys potential (uppmärksamma lyckade initiativ)
 - Ger inspiration
 - Ger möjlighet att visa upp kompetens
- Tillgodose upplärning inom AI-användning

Källor:

Kotter, J. P. (2012). *Leading change*, with a new preface by the author. Harvard Business Review Press.
Kotter, J. P. (2014). *Accelerate*. Harvard business review press.

Att förankra förändring i företagskulturen

- Ta bort gamla system som konkurrerar med det nya.
- Uppmuntra och uppmärksamma personer som bidrar till förändring.
- Nyanställda "screenas" så deras attityd till AI ligger i linje med företagets vision.
- Investera i infrastruktur som möjliggör utveckling.
- Motverkande aktörer med inflytande behöver konfronteras.
 - Exempelvis: Mellanchefer, handledare eller dylikt.
- Befordra inte personer som motsätter sig AI.

Källor:

Kotter, J. P. (2012). *Leading change*, with a new preface by the author. Harvard Business Review Press.
Kotter, J. P. (2014). *Accelerate*. Harvard business review press.

Frågor att besvara

- Hur ser vår företagskultur ut idag?
- Hur ser vi till att medarbetare är involverade i implementeringsprocessen?
- Hur kommunicerar vi kring implementeringen av AI?
- Hur motiverar vi medarbetare att delta i förändringsresan?
- Hur överkommer vi motstånd mot förändring?

AI-policy

AI-policy

För att anställda ska använda AI på ett säkert sätt och känna trygghet i hur det används behövs en AI-policy, utformad av Förändringsgruppen.

Policyn ska vara ett levande dokument med beslut kring hur AI används på just det egna företaget.

Policyn behöver även ligga i linje med gällande lagar.

- Förändringsgruppen som utformar AI-policyn behöver känna till dessa lagar.
- För andra anställda ska AI-policyn räcka som styrdokument för säker användning.

Exempel på punkter i en AI policy

- Syfte
- Tillämplighet
- Etiska aspekter
- Dataskydd och säkerhet
- Användning och begränsningar
- Ansvar
- Utbildning

(Hämtat från DIGG.se)

Lagar och styrdokument att beakta

GDPR: Lagar om hur persondata får lagras.

- Se på [IMY](#) vad man behöver tänka på kring GDPR kopplat till AI.

EU's AI-act: EU-regulation om om AI användning.

- Myndigheten [DIGG](#) sammanfattar med fokus på generativ AI.
- Framför allt [Article 5](#) är relevant.

Crash course i datasäkerhet och AI-modeller

Typ av AI	Företagskostnad	Datasäkerhet	Kapacitet
Privatkonto Gratis	Gratis	Data sparas och AI tränas på uppladdad data. (Låg säkerhet)	Begränsad: Oftast bara tillgänglig till enst språkmodell
Privatkonto Betal	Stående månadskostnad	Valbart att stänga av att AI tränas på din data. Saknar central kontroll om vilket data som lagras.	Fler verktyg, har hög gräns
Företagslicens	Stående månadskostnad	Central kontroll: Admintillgång till vilken data som lagras externt. Sätter juridiska krav på extern part.	O begränsad och med prioritet till externa servrar
På egen server	Hög initial kostnad	Ingen data lämnar företaget.	Server begränsar. Kräver mer expertis för att uppnå

Mer inspiration till utformningen av en AI-policy

- [DIGG.se](#)
- [Nordstedts juridik](#)
- [IMY](#)

Frågor att besvara

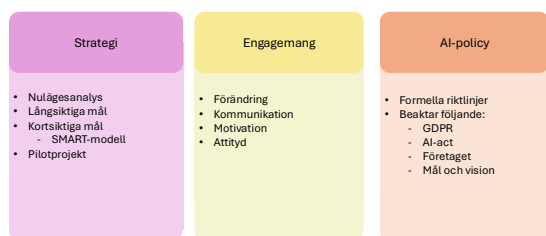
- Till vad ska vi använda AI?
- Till vad ska vi *inte* använda AI?
- Hur ser vi till att följa lagar och andra styrdokument?
- Hur håller vi oss uppdaterade om framtida lagar och regler?
- Hur autonom tillåter vi en AI-agent att vara?



Sammanfattning



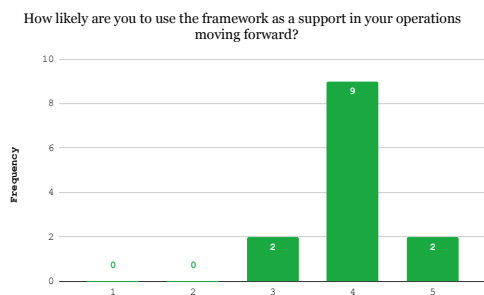
Sammanfattning



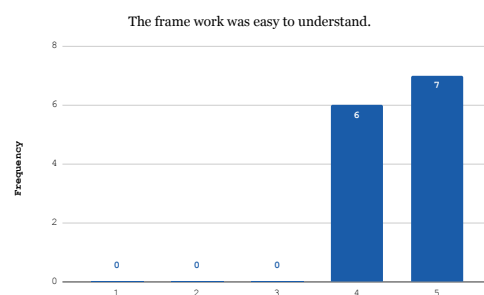
D

Feedback on AKSEA Framework Version 3.0

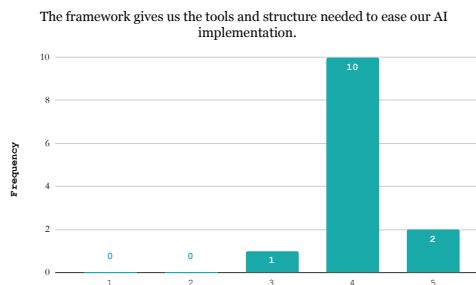
Prior to the finalisation of Version 3.1, primary feedback was gathered on the preceding iteration, Version 3.0, from a subset of the participating companies. This evaluative phase utilised a mixed-methods approach, comprising both quantitative metrics and qualitative insights. Although the limited sample size precludes formal statistical significance, the quantitative data indicates a broadly positive reception among respondents, as illustrated in Figure D.1. The ratings are based on a 5-point Likert scale as defined in each subfigure.



(a) Likelihood of future use.
(1: Very unlikely – 5: Very likely)



(b) Ease of understanding
(1: Strongly disagree – 5: Strongly agree)



(c) Utility for AI implementation.
(1: Strongly disagree – 5: Strongly agree)

Figure D.1: Quantitative feedback.

The qualitative feedback provided critical pointers for the final refinement of the framework. Analysis of the free-text responses suggested a demand for increased emphasis on AI agents, supplemented by practical use cases and illustrative examples. In response, more comprehensive information regarding AI agents, specific tools, and actionable implementation strategies was integrated into the final version.

One respondent specifically noted that the linguistic tone of the framework appeared overly academic. This feedback suggested that such a tone might inadvertently alienate SMEs seeking a pragmatic, ‘hands-on’ approach, thereby hindering the framework’s adoption. Consequently, efforts were made to balance academic rigour with practical accessibility.

As the feedback was collected during a workshop, a significant proportion of respondents (5/18) highlighted the practical assignments as particularly valuable, specifically the testing of AI tools and the development of AI agents. These insights directly informed the transition to the final iteration, Framework 3.1 (presented in Appendix E). This version incorporates expanded sections on autonomous agents and pilot projects, alongside structured activities specifically designed to foster practical AI proficiency and user competence.

E

AKSEA Framework Final Version

Please note that the pages are ordered row by row: starting from the top-left, moving to the top-right, and then continuing downward in the same pattern. Due to technical limitations in the PDF rendering, certain hyperlinks may not be interactive.



Ramverk

Implementation av generativ AI och AI agenter
Anpassat för tillverkande SMF i Göteborgsregionen



Ramverkets syfte

Fokuserar på implementationen av generativ AI och AI-agenter.

- Ska underlätta designen av företagets egna implementeringsstrategi.

Riktat sig primärt mot företagsledningen.

- Behöver en helhetsbild av verksamheten för att kunna skapa en skräddarsydd strategi.

Uppmanas att användas som en omfattande guide.

- Behöver inte följas kronologiskt.




Identifierade faktorer

Utifrån litteraturstudie och intervjuer identifierades följande faktorer för en lyckad implementering av ny teknik:


Tekniska	Organisatoriska	Individuella	Externa
Datasäkerhet	Resurser	Stötning från beslutsfattande roller	Attityd
Digital infrastruktur	Kommunikation- och samarbetskultur	Strategi	Konkurrenstryck
	Kompetens inom förändringsledning	Upplevd nytta	Kundtryck
	Digital kompetens och mognad		Lagar och regler
			Statligt stöd
			Samarbetsnätverk och partnerskap

Översikt

Ramverket är skapat utifrån de identifierade faktorerna och syftar till att hjälpa företagen överkomma barriärer och finna drivkrafter. Ramverket innehåller följande fem huvudteman:

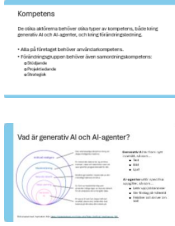


Varje tema innehåller information och frågor tänkta att guida företaget genom en implementering av generativ AI och AI agenter.



- Ansvar**
 - Förändringsgrupp
 - Beslutsfattare
 - Anställda
- Kompetens**
 - Användarkompetens
 - Samordningskompetens
 - Kompetensutveckling
- Strategi**
 - Nulägesanalys
 - Långsiktiga mål
 - Kortsiktiga mål
 - SMART-modell
 - Pilotprojekt
- Engagemang**
 - Förändring
 - Kommunikation
 - Motivation
 - Attityd
- AI-policy**
 - Formella riktlinjer
 - Beaktar följande:
 - GDPR
 - AI-act
 - Företaget
 - Mål och vision

Förklaring av grafisk utformning



- Bilder med horisontell ram innebär huvuddel av ramverket.
- Bilder med vertikal vänsterkant innebär fördjupande material.

Ansvar

Ansvar

För en lyckad förändringsprocess behöver ansvar fördelas och förtydligas.

Detta ramverk utgår ifrån följande roller, som är viktiga för en lyckad förändringsresa:

- Förändringsgrupp
- Beslutsfattare
- Anställda

Förändringsgrupp

- Kärngruppen ansvariga för att leda förändringen.
- Behöver bestå av minst 2 personer som tillsammans har kompetens för...
 - Ledarskap: Inspirera, motivera och leda människor mot gemensamma mål.
 - Management: Planera, organisera och styra verksamhetsresurser effektivt.
 - IT: Förstå, använda och utveckla tekniska lösningar och system.
- Gruppen behöver perspektiv från flera olika roller, och kan med fördel inkludera olika positioner i hierarkin.
- Övriga anställda behöver ha tilltro till förändringsgruppen.
 - Inhyrda konsulter kan täcka brist på kompetens men behöver då kunna vara på plats för att anställda ska känna just tilltro.

Beslutsfattare

- Den/de personer som har mandat att ta beslut kring investeringar, resursprioritering och bindande beslut.
 - Ofta ledningsgruppen.
- Minst en beslutsfattare behöver ingå i Förändringsgruppen.

Anställda

- De anställda på företaget som inte ingår i Förändringsgruppen, men påverkas av förändringsprocessen.
 - Alla anställda kommer antagligen i någon mån påverkas av förändringen.
- Behöver få en grundläggande kompetens kring generativ AI och AI-agenter.
 - Mer om detta i under [Kompetens](#).
- Anställdas inställning till förändringen är också viktig att hantera.
 - Mer om detta i under [Engagemang](#).

Frågor att besvara:

- Vem/vilka har idag befogenhet att fatta vilka beslut?
- Vilka ska ingå i Förändringsgruppen?
- Hur kan ledningen stötta Förändringsgruppen?
 - Spelregler kring beslutsfattande, resursfördelning, etc.
- Hur mycket resurser kan Förändringsgruppen använda?
 - Arbetstid, pengar att investera i kompetensutveckling och teknik, etc.
- Finns det några ekonomiska bidrag att söka utifrån?

Kompetens

Kompetens

De olika aktörerna behöver olika typer av kompetens, både kring generativ AI och AI-agenter, och kring förändringsledning.

- Anställda behöver *användarkompetens*.
- Förändringsgruppen behöver även *samordningskompetens*:
 - Stödjande
 - Projektledande
 - Strategisk

Användarkompetens

Alla anställda bör ha en grundläggande förståelse för tekniken, i och med dess allt snabbare integrering och inverkan på människors vardag.

Innebär:

- Grundläggande förståelse för vad AI är och dess möjligheter/begränsningar.
 - Se *nästkommande slides*.
- Kunskap om de AI-verktyg som företaget använder.
 - Se *Strategi*.
- Grundläggande förståelse för GDPR och andra relevanta lagar.
 - Se *AI-policy*.

Grundläggande förståelse

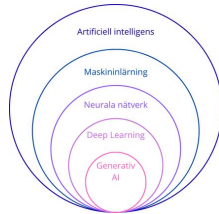
Följande slides är en konkretisering av den grundläggande förståelse som är del av användarkompetensen.

De beskriver kort vad generativ AI och AI agenter är, samt dess möjligheter och begränsningar.

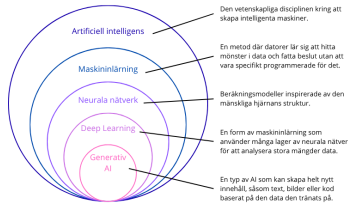
Vad är generativ AI och AI agenter?

Generativ AI \neq AI
Generativ AI \subseteq AI

Viktigt att veta är att AI är mycket mer än bara generativ AI.



Vad är generativ AI och AI agenter?



Generativ AI tar fram nytt innehåll, så som...

- Text
- Bild
- Ljud

AI agenter utför specifika uppgifter, så som...

- Letar upp jobbanonser
- Ger förslag på mötestid
- Felsöker och skriver om kod

Bild skapad med inspiration från https://aiotpplaybook.org/index.php?title=Artificial_Intelligence_101

Vad är generativ AI och AI agenter?

Kategori	Maskininlärning (ML)	Generativ AI (GenAI)	AI agenter
Beskrivning	Använder data för att skapa prediktiva modeller eller klassificeringar.	Använder storskaliga språkmodeller (LLM) för att skapa nytt innehåll.	Fungerar som en autonom aktör som utför komplexa uppgifter självständigt.
Exempel	<ul style="list-style-type: none"> • Försäljningsprognoser • Prediktivt underhåll 	<ul style="list-style-type: none"> • Sammanfatta text • Bildgenerering 	<ul style="list-style-type: none"> • Schemaläggare • Fakturahandläggning

- Generativ AI är en underkategori till maskininlärning (se föregående bild).
- AI-agenter använder generativ AI, men även andra verktyg (t.ex. webbsökning, mejl, kalender) för att utföra sina uppgifter.

Se *The Digital Playbook – AI 101* för fördjupad men ändå komprimerad information.

Möjligheter och begränsningar

Generativ AI är en *sannolikhetsmaskin*, inte en *sanningsmaskin*.

• Kända problem:

- *Hallucinerings*: Även om dagens modeller ofta genererar korrekta svar, finns risk för fel, särskilt kring information som är väldigt komplex eller nischad. Svaren presenteras oavsett väldigt självsäkert, vilket gör felaktig information svåridentifierad.
- *Bias*: AI:n tränas genom feedback från människor (s.k. "RLHF"), vilket återskapar fördomar. Det gör även vissa chatbotter mer benägna att hålla med användaren, även när användaren har fel.

Som användare är det viktigt att granska det resultat en AI genererar.

Möjligheter och begränsningar

Generativ AI kan användas för att lösa många olika problem som kräver generering, sammanställning eller analys av innehåll, men det är också viktigt att fundera över om det verkligen är generativ AI som ska lösa problemet.

- **Regelstyrd algoritm**: Fasta, förutsägbara uppgifter.
- **Maskininlärning**: Identifiera mönster, göra förutsägelser.
- **Generativ AI**: Skapa nytt innehåll.

- *Generativ AI kan dock användas för att skapa algoritm/ML-lösningar.*

Två övningar för att komma igång

Få AI:n att hallucinera




1. Dela upp er i par eller små lag. Uppdraget är att få AI:n att hitta på ett helt eget, trovärdigt faktfel.
2. Testa lite olika strategier för att lura AI:n, t.ex.
 - Nischad info (lokal historia eller detaljer om ert eget företag).
 - Långa trådar (prata länge om ett ämne, byt spår och be den sedan minnas detaljer från början).
 - Logiska följder (kluriga gåtor eller att räkna tecken i ord).
3. Samtals och visa upp era bästa exempel.
4. Diskutera efteråt: Hur lätt/svårt var det? Hur låt AI:n när den hittade på (osäker eller tvärsäker)? Vad innebär detta för hur vi dubbelkollar vårt arbete i vardagen?

Effektivisera med AI

1. Skriv ner 3-5 administrativa, tråkiga eller tidskrävande uppgifter ni gör varje vecka (t.ex. sammanfatta mötesanteckningar, skriva veckobrev, leta efter information i långa PDF-filer).
2. Sätt upp lapparna på väggen och gruppera dem.
3. Välj ut 2-3 vanliga uppgifter och öppna ett AI-verktyg.
4. Testa hur AI:n kan hjälpa till att lösa eller snabba på dessa uppgifter. Diskutera vad som funkade bra/dåligt.

Några exempel på AI-lösningar och användningsfall finns i avsnittet [Sammanfatta](#) - men fundera först själva!

Förändringsgruppens samordningskompetens

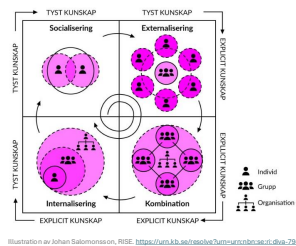
Roll	Vad innebär det?	Kompetensbehov	Exempel på uppgifter
 Stödande	Stödjer och vägleder medarbetare i användningen av AI-verktyg. Ansvarar för intern utbildning och erfarenhetsutbyte.	Djupare kunskap om AI-verktyg, förmåga att lära ut, kommunikationsförmåga.	Hålla workshops, skapa guider, svara på frågor om AI-användning, samta in feedback från medarbetare.
 Projektledande	Leder och driver AI-projekt från idé till implementering. Samordnar resurser och utvärderar.	Projektleddning, affärsanalys, kravspecifikation, riskhantering, kunskap om AI-leverantörer.	Identifiera affärsmöjligheter, formulera krav, välja verktyg, utvärdera resultat.
 Strategisk	Utvecklar och kommunicerar företagets AI-strategi.	Affärsstrategi, marknadsanalys, långsiktig planering, kommunikationsförmåga, kunskap om lagstiftning.	Utveckla en AI-strategi, prioritera bland AI-projekt.

Tips för kompetensutveckling

- Varje individ i Förändringsgruppen behöver inte besitta alla delar av samordningskompetensen, men delarna behöver finnas eller utvecklas inom gruppen.
- Förbättra organisatoriskt lärande mha SECI-modellen.
 - Se *nästkommande slides*.
- Förändringsgruppen bör...
 - >> Utforska tillgängliga utbildningsresurser (se *Användbara länkar*).
 - >> Undersöka och gå med i externa nätverk.

SECI-modellen

- Modell för organisatoriskt lärande
- *Lärandespiral* som visar övergångarna mellan tyst och explicit kunskap



Källa: Nonaka, I. (1994). A Dynamic Theory of Organizational Knowledge Creation. *Organization Science*, 5(1), 14-37.

SECI-modellen

- 6 punkter för att förbättra organisationens *lärandespiral*:

Överlappande mötesplatser • Skapa forum där medarbetare möts både vertikalt och horisontellt för att dela information.	Samarbete med mentorer • Skapa team där nya och erfarna medarbetare blandas för att överföra tyst kunskap.	Decentralisering • Uppmuntra till horisontell kommunikation för att främja snabb kunskapspridning.
Elektroniska databaser • Skapa system för att lagra och sprida explicit kunskap.	Systematisk träning och upplärning • Utveckla strukturerade processer för kompetensutveckling.	Kultur av tillit • Skapa en organisationskultur präglad av omtanke och tillit, vilket underlättar förmedlingen av information.

Källa: Nonaka, I. (1994). A Dynamic Theory of Organizational Knowledge Creation. *Organization Science*, 5(1), 14-37.

Frågor att besvara:

- Var är vår kompetens just nu?
- Hur lyfts individuella insikter till resten av organisationen idag?
- Vad finns det för tillgängliga utbildningsresurser?
- Vilka externa nätverk finns? Vilka vill vi vara med i?

Strategi

Strategi

För att kunna utforma en strategi för förändringsresan behövs en kartläggning kring:

- Digital infrastruktur
- Produktionsflöden och arbetsprocesser
- Kundkrav
- Anställdas inställning till AI

Utifrån detta kan Förändringsgruppen sedan ta fram visioner och mål på både kort och lång sikt.

Frågor att besvara – Utgångsläge

- Vilka digitala verktyg och system använder vi?
- Finns generativ AI och/eller AI agenter redan integrerat i några av systemen?
- Var och hur lagras vår information?
- Hur ser våra produktionsflöden och arbetsprocesser ut?
- Vad ställer våra kunder för krav kring AI-användning?
- Hur ser våra anställdas inställning till generativ AI och AI-agenter ut?

Långsiktiga mål

Långsiktiga mål är en utmaning att ta fram, men kan med fördel vara idealistiska och visionära.

Målen bör formas av Förändringsgruppen, men behöver förankras i hela företaget och dess övergripande vision, och med de anställda.
 - Mer om förankringen hos anställda i avsnittet [Engagemang](#).

Kortsiktiga mål

Mål på kort sikt behöver vara mer konkreta än de långsiktiga visionerna.

- Använd SMART-modellen för att utforma kortsiktiga mål.
 - Se nästa slide.
- Fira och uppmärksamma de små vinsterna.

SMART: Modell för att konstruera mål

Använd akronymen SMART för att göra mål så tydliga och konkreta som möjligt:

Specific	Det ska vara tydligt och precist, och inte gå att missförstå.
Measurable	Det ska finnas något sätt att mäta framgång inom målet.
Assignable	Det ska vara tydligt vem eller vilka som ansvarar för att nå målet.
Realistic	Det ska gå att uppnå utifrån tillgängliga resurser.
Time-related	Det ska finnas en tidsram för när målet ska vara uppnått.

OBS: Alla fem kriterier behöver inte uppfyllas för att målet ska vara bra! Speciellt Measurable, då vissa saker i en organisation är svårt att kvantifiera.

Källa: Doran, G. T. (1981). There's a S.M.A.R.T. way to write management's goals and objectives. Management Review, 70(11), 35-36. <https://openurl.ebsco.com/contentItem/bsu:6043491?aid=ebsco:plink.ccrwiler&id=ebsco:bsu:6043491&cr=c>

Tips för strategiskapande:

- >> Börja med grundläggande utbildningar för AI-användning.
- >> Se över vilka verktyg som finns tillgängliga - integrerade i nuvarande system, färdiga lösningar att köpa in, eller bygga något eget.
- >> Hitta 1-2 pilotprojekt att genomföra med valda verktyg.
- >> När ni har några projekt igång, kan ni fördjupa strategiarbetet och utöka verktygslådan.

Stöd:

Som hjälp finns översikt av några av dagens verktyg, samt tre olika användningsfall, beskrivna på nästkommande slides.

Urval av chattbotar

Modell	Företag	Fördelar	Nackdelar
ChatGPT	OpenAI	<ul style="list-style-type: none"> • Konversera på svenska • Företagslicenser 	<ul style="list-style-type: none"> • USA-baserat (GDPR och datahantering)
Gemini	Google	<ul style="list-style-type: none"> • Konversera på svenska • Integrerat i Googles produkter 	<ul style="list-style-type: none"> • USA-baserat
Copilot	Microsoft	<ul style="list-style-type: none"> • Integrerat i Microsofts produkter • USA-baserat, men uppfyller GDPR 	<ul style="list-style-type: none"> • Upplever lite sämre svars kvalitet
Le Chat	Mistral	<ul style="list-style-type: none"> • EU-baserat (Frankrike) • Fler gratisfunktioner 	<ul style="list-style-type: none"> • Upplever lite sämre svars kvalitet • Klarar ej svenskt tal
Claude (obs, ej detsamma som Claude Code)	Anthropic	<ul style="list-style-type: none"> • Mycket bra på text och kod-skrivande 	<ul style="list-style-type: none"> • USA-baserat • Klarar ej svenskt tal
DeepSeek	DeepSeek AI		<ul style="list-style-type: none"> • Kina-baserat • Sämre på svensk text

Fler verktyg

- **Lovable** eller **bolt.new**: Skapa hemsidor eller egna appar.
 - T.ex. egen hemsida som konverterar filer.
- **Google Veo 3** eller **Luma dream machine**: Skapar rörlig bild från text.
- **Gamma**: Skapar Powepoints.
- **NotebookLM**: Låter dig chatta, prata och lyssna på uppladdade dokument.

Nischade verktyg är ofta bättre på sin uppgift.
 - Men! Se upp för fejk-sidor.

Skapa specialiserade chattbotar (AI-agenter)

- De flesta AI-chatt-verktyg erbjuder idag möjlighet att skapa specialiserade chattbotar.
 - Kallas customGPT, Gem, Agent eller liknande beroende på verktyg.
 - Kan dock behövas betalversion.
- Dessa ger man väldigt specifika instruktioner och information som gör dem bättre än en "standard-chatt".
- Se exempel på användningsfall i följande tre slides.
 - Ännu fler exempel finns också i [Användbara länkar](#).

Användningsfall 1: Mötessammanfattare

- Skapa en specialiserad chattbot och definiera önskat svarformat.
 - Ex: "Du är en expert på att transkribera och sammanfatta möten. Skapa en sammanfattning av inspelningen på 4-5 meningar, samt viktiga nästa steg som punktlista med saklig ton".
- Spela in mötet.
- Ladda upp ljudfilen till chattbotten.
- **OBS: Tänk på att gratisversioner av vissa verktyg inte lagrar data på ett säkert sätt. Mer om detta under [AI-policy](#).**

Användningsfall 2: Supermanual för operatörer

- Skapa en digital databas.
 - Säkerställ sökbara filformat, rensa förlagad information och sammanställ materialet.
- Skapa en specialiserad chattbot och ge specifika instruktioner om att endast hämta fakta från databasen samt definiera språkstil och presentationsform.
 - Tips: Ge instruktioner på hur den ska leta i den bifogade databasen.
- Ge chattbotten tillgång till databasen.
 - Gör på lite olika sätt beroende på verktyg.

Användningsfall 3: Översättare med nischad terminologi

- Skapa en specialiserad chattbot och definiera önskat svarformat.
 - Ex: "Översätt orden jag lägger in så att det är anpassat för följande språkstil (...). Svara i en tabellform med upp till 3 synonymer på engelska".
- Skriv in i instruktioner eller ladda upp dokument med önskad terminologi.
- Skriv in ord eller text som ska översättas.

Tips för specialiserade chattbottar

- **Ladda upp kunskap:** Du kan ladda upp filer (PDF, Word, Excel) direkt i agenten. Gör det med era egna manualer eller policys så blir svaren "ni" och inte bara "allmän AI".
 - Ibland kan AI ha svårt att läsa av eller skapa PDF då filerna kan skapas på flera olika sätt. Testa kopiera texten till annat format om det inte fungerar.
- **Ge den en roll:** Börja alltid instruktionen med "Du är en..." (t.ex. "Du är en erfaren produktionstekniker"). Det styr AI:ns tonläge och fokus.
 - Använd AI:n själv för att skriva en bra instruktion.
- **Iterera:** Om agenten svarar lite fel, ändra i dess instruktioner. Liknar att lära upp en nyanställd, det tar några försök innan det funkar.

Skapa AI agenter med högre autonomi

I dagsläget är de flesta stora chattbottar begränsade till att användaren måste ge en prompt, och kan inte göra uppgifter självständigt. Högre autonomi börjar dock införas och det finns andra verktyg med större möjligheter.

- Finns low-code betaltjänster för att skapa egna agenter.
 - Ex: Zapier, n8n, LangChain.
 - Även ChatGPT har nyligen (april 2026) lagt till Agenter för användare med Business- eller Enterprise-konton.
- Finns även gratisprogram för att skapa egna AI-agenter, men kräver mer kunskap och innebär högre risk.
 - Ex: OpenClaw.
- Se [AI-policy](#) kring autonomi.
- OBS: Troligtvis kommer Google, Mistral m.fl. att utveckla egna liknande tjänster för detta.

Frågor att besvara:

- Vad ser vi att vi kan använda AI till idag? (Kortsiktiga mål)
- Vilka verktyg eller system vill vi använda?
- Vad har vi för vision med implementeringen? (Långsiktiga mål)

Engagemang

Engagemang

Medarbetarnas inställning till och delaktighet i förändringen är avgörande för dess framgång och kräver aktiv hantering.

- Ramverket fokuserar på hantering av:
 - Kommunikation
 - Motivation
 - Attityd

Förändring

Människor gillar inte förändring...

- Man behöver motivera anställda till förändringen.
- Göra det möjligt att bidra till förändringen.
- Förankra förändringen i kulturen så att den "sitter i väggarna".

Källor:
Kotter, J. P. (2012). Leading change, with a new preface by the author. Harvard Business Review Press.
Kotter, J. P. (2014). Acceleste. Harvard business review press.

Self determination theory:

En motivationsmodell – 3 faktorer bakom motivation

Autonomi:

Anställda behöver uppleva att de frivilligt börjar använda AI mer, tvång har motsatt effekt på motivation.

Relatedness:

Anställda behöver uppleva att de arbetar för något större, långsiktiga mål kan bidra till detta.

Competence:

Anställda behöver uppleva att de lär sig, kan utöva sin nyvunna kompetens och visa upp den.

Källa: Ryan, R. M., & Deci, E. L. (1985). *Self-Determination Theory and the Facilitation of Intrinsic Motivation, Social Development, and Well-Being*. *Self-Determination Theory*.

Kommunikation

- Förmedla nödvändighet av förändringen.
- Tydliggör vision, strategi och initiativ.
- Använd flera informationskanaler.
 - Ha möjlighet att förmedla rik information, exempelvis via möten.
- Repetera informationen för att befästa den.

Att få med anställda i förändringsresan

- Belys potential (uppmärksamma lyckade initiativ)
 - Ger inspiration.
 - Ger möjlighet att visa upp kompetens.
- Tillgodose upplärning inom AI-användning
 - Se [Användarkompetens](#).

Källor:

Kotter, J. P. (2012). *Leading change, with a new preface by the author*. Harvard Business Review Press.

Kotter, J. P. (2014). *Accelerate*. Harvard business review press.

Att förankra förändring i företagskulturen

- Ta bort gamla system som konkurrerar med det nya.
- Uppmuntra och uppmärksamma personer som bidrar till förändring.
- Nyanställda "screenas" så deras attityd till AI ligger i linje med företagets vision.
- Investera i infrastruktur som möjliggör utveckling.
- Motverkande aktörer med inflytande behöver konfronteras.
 - Exempelvis: Mellancheff, handledare eller dylikt.
- Befordra inte personer som aktivt motsätter sig AI.

Källor:

Kotter, J. P. (2012). *Leading change, with a new preface by the author*. Harvard Business Review Press.

Kotter, J. P. (2014). *Accelerate*. Harvard business review press.

Frågor att besvara

- Hur ser vår företagskultur ut idag?
- Hur ser vi till att medarbetare är involverade i implementeringsprocessen?
- Hur kommunicerar vi kring implementeringen av AI?
- Hur motiverar vi medarbetare att delta i förändringsresan?
- Hur överkommer vi motstånd mot förändring?

AI-policy

AI-policy

För att anställda ska använda AI på ett säkert sätt och känna trygghet i hur det används behövs en AI-policy, utformad av Förändringsgruppen.

Policyn ska vara ett levande dokument med beslut kring hur AI används på just det egna företaget.

Policyn behöver även ligga i linje med gällande lagar.

- Förändringsgruppen som utformar AI-policyn behöver känna till dessa lagar.
- För andra anställda ska AI-policyn räcka som styrdokument för säker användning.

Lagar och styrdokument att beakta

GDPR: Lagar om hur persondata får lagras.

- Se på [IMY](#) vad man behöver tänka på kring GDPR kopplat till AI.

EU AI Act: EU-regulation om AI överlag.

- Myndigheten [DIGG](#) sammanfattar med fokus på generativ AI.

- Framför allt är article 5 och 6 relevanta:

- [Article 5](#) (prohibited use)
- [Article 6](#) (high-risk use)

(Hela AI Act hittas under [Användsbara länkar](#))

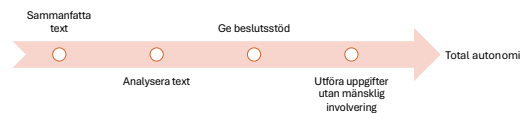
Crash course i datasäkerhet och AI-modeller

Typ av AI	Företagskostnad	Datasäkerhet	Kapacitet
Privatkonto Gratis	Gratis	Data sparas och AI tränas på uppladdad data. (Låg säkerhet)	Begränsad: Oftast bara tillgång till enkel språkmodell
Privatkonto Betal	Stående månadskostnad	Velbart att stänga av att AI tränas på din data. Saknar central kontroll om vilket data som lagras.	Fler verktyg, har hög gräns
Företagslicens	Stående månadskostnad	Central kontroll: Admintillgång till vilken data som lagras externt. Sätter juridiska krav på extern part.	Obegränsad och med prioritet till externa servrar
På egen server	Hög initial kostnad	Ingen data lämnar företaget.	Server begränsar. Kräver mer expertis för att uppnå

OBS! Olika leverantörer hanterar data på lite olika sätt. Ovanstående är baserat på OpenAI:s riktlinjer från 2026.

Autonomi

- AI-agenter kan skapas med olika nivåer av autonomi.
 - Formalisera därför var företaget drar gränsen för agenter autonomi.
- Nyheter som visar på AI-agenters autonomi:
 - AI-agent driver eget kafé i Stockholm (SVT).
 - AI-agent raderade företagets databas på 9 sekunder (OMNI).



Exempel på punkter i en AI policy

- Syfte
- Tillämplighet
- Etiska aspekter
- Dataskydd och säkerhet
- Användning och begränsningar
- Ansvar
- Utbildning

Hämtat från [DIGG.se](#). För mer information och exempel, se [Användbara länkar](#).

Frågor att besvara

- Till vad ska vi använda AI?
- Till vad ska vi *inte* använda AI?
- Hur ser vi till att följa lagar och andra styrdokument?
- Hur håller vi oss uppdaterade om framtida lagar och regler?
- Hur autonom tillåter vi AI-agenter att vara?

Användbara länkar

- Djupgående förklaring av generativ AI och AI-agenter:
 - https://kickpajbook.org/index.php?title=Artificial_Intelligence_101
- Gratis vidareutbildning på Chalmers:
 - <https://www.chalmers.se/ko/education/open-and-courses/continuing-professional-development/open-online-courses/working-and-learning-with-generative-ai>
- Fler exempel på användningsfall (för alla typer av AI, inte bara generativ):
 - <https://www.ai.se/ai-utbildning>
- AI Use Case Canvas – Mall för att hitta sina egna användningsfall:
 - <https://www.ai.se/ai-utbildning/ai-utbildning-och-stod/>
- Inspiration till utformningen av en AI-policy:
 - <https://www.dig.se/ai-for-offentlig-forvaltning/riktlinjer-for-generativ-ai/for-en-ai-policy>
 - <https://www.ai.se/ai-utbildning/ai-utbildning-och-stod/>
 - <https://www.ai.se/ai-utbildning/ai-utbildning-och-stod/>
 - <https://artificialintelligence.eu/ai-acc-explorer/> (hela EU:s AI Act)

Avslutande ord

Detta ramverk har tagits fram av Felicia Andersson och Elias Palm som en del av ett examensarbete vid masterprogrammet Lärande och ledarskap på Chalmers tekniska högskola. Innehållet bygger på en omfattande litteraturstudie kombinerat med intervjuer och workshops tillsammans med tillverkande små och medelstora företag i Göteborgsregionen.

Som avslut vill vi rikta ett stort tack till alla deltagande företag, samt:

- ♦ **Johan Bengtsson & Matilda Hurlig** på Göteborgs Tekniska College (GTC) och Production for Future för överdierlig stöttning i att driva projektet framåt.
- ♦ **Christian Stöhr** på Chalmers för vägledning och värdefull akademisk feedback.
- ♦ **Noomi Bergström & Christian Lundeflo** på GTC för hjälpen med nätverkande och företagskontakter. Utan ert engagemang och stöd hade examensarbetet och detta ramverk aldrig kunnat skapas!

Slutligen vill vi även tacka dig som läser, och hoppas att detta ramverk ger dig inspiration och kunskap nog för att ta nästa steg i din och organisationens AI-resa.

Tack!

Felicia Andersson & Elias Palm, maj 2026

DEPARTMENT OF COMMUNICATION AND LEARNING IN SCIENCE

CHALMERS UNIVERSITY OF TECHNOLOGY

Gothenburg, Sweden

www.chalmers.se



CHALMERS
UNIVERSITY OF TECHNOLOGY