Identifying and Exploiting Strategic AI Opportunities to Strengthen Innovation and Competitiveness

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Abstract. This paper presents a strategy method that enables organisations to identify and exploit strategic opportunities arising from AI in the context of the emerging fifth industrial revolution and society 5.0. Building on multiple pilot projects and validation workshops with Swiss small businesses, the study develops and refines a practical, three-phase AI strategy method consisting of design, build and run phases. The core contribution lies in the structured design phase, which guides organisations through company, process and task-level analyses to uncover AI-relevant products, services and knowledge-intensive activities and processes. The resulting validated AI strategy method provides a practical pathway to enhance innovation capabilities and readiness for AI-driven digital transformation, fostering sustainable advancements for organisations and society.

Keywords: AI Strategy · AI Framework · Human-AI Collaboration · AI and Society · AI Opportunities · Innovation · Competitiveness · Digital Strategy

1 Introduction

Over the past 300 years, numerous industrial revolutions alongside societal changes drove organisations to adapt to new technologies, develop new processes and skills, while also developing new business strategies to successfully compete and innovate in the market [3,48].

The transition to digitalisation and digital transformation was preceded by three industrial revolutions (mechanisation since the 1750s, mass production

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since the 1870s and automation since the 1960s). Since the early 2000s, we have been part of the fourth industrial revolution – the digital transformation. This revolution is characterised by the 'interconnection of everything with everything' (i.e., Internet of Things (IoT)). Since the 2020s, continuous advances in technology (especially computing power and artificial intelligence (AI)), alongside with social change (including the sustainability notion), have sparked the idea of an emerging fifth industrial revolution that promotes the symbiosis between humans and machines/robots [40]. This symbiosis, with AI at its core, aims to further leverage the advances of the fourth industrial revolution, promoting interoperability, delegating intellectual tasks to AI (which in turn triggered legal and ethical considerations), and focusing on sustainable action [14,43].

Prior research has provided potential use cases (e.g., [5,13,23,37]), checklists/propositions (e.g., [12,30,16]), or readiness frameworks (e.g., [22,26]) on how organisations can adapt AI, but not a strategy framework to help them unlock strategic AI opportunities in digital transformation. A project team from various research institutions was tasked with investigating how organisations – particularly small businesses, i.e. small and medium-sized enterprises (SMEs) – can respond to this emerging fifth industrial revolution at a strategic level, and how a process (method) can be designed to support organisations in identifying and exploiting AI opportunities within their business strategies and dealing with implications of allocating intellectual tasks to humans.

2 Literature Review

2.1 Digital Transformation, AI and Strategy Development

The exploitation of AI is of great importance for innovation and competitiveness capabilities and thus the economic success of organisations and societies alike. Through the targeted use of AI, the value of products and services can be increased, processes can be made more efficient, decisions can be improved, tasks can be automated, enhanced or enabled for the first time, and new business opportunities can be captured [18,39].

For a common understanding of AI, we refer to the AI map of Reichenberger et al. [45], which describes AI as the simulation of intelligent behaviour with a computer in line with assumptions of the 1955 Dartmouth workshop proposal [35]. Cognitive abilities [45] are described as knowledge, learning, thinking, perception, communication and action, and have their counterparts in subfields of AI: language processing, computer vision, robotics, knowledge representation and reasoning, and machine learning (ML). Segessenmann et al. [49] argue that these AI enabled cognitive abilities increasingly reshape human self-understanding by blurring distinctions between human and machine, thereby necessitating a re-examination of what is distinctively human in an age of opaque, powerful computational systems (referred to as "extended intelligence" embedded in human–technology relations), challenging metaphysical, moral, social, and legal categories traditionally used to distinguish humans from technological entities [17].

The two main families of AI methods are described as data-based AI (the foundation of ML), in which correlations in data are automatically recognised and applied [21]. A widely used method are neural networks, which also form the basis for large language models (LLMs). In data-based AI, intelligence is primarily a question of data. The more data is available for training, the more 'intelligent' a system can be. On the other hand, in knowledge-based AI, intelligence is primarily a question of knowledge. In knowledge-based systems, knowledge is represented using symbols in the form of rules and is used to derive logical conclusions. Although AI is often equated with ML these days, there are many applications that require knowledge-based AI or a combination of both approaches [21].

In a business context, to maintain an organisation's competitiveness, the breakthrough of generative AI marks an important turning point in digital transformation. Almost all organisations are now engaged with the central technology of the fifth industrial revolution in some form – either to integrate it or to question why they are not doing so [15,25,55]. As such, AI – both data- and knowledge-based – is not regarded as just one of many new technologies, but as a so-called 'booster technology'. This means that it has the potential to drive and accelerate progress in many other areas as well. Due to its disruptive nature, it is often described as a transformative element [31].

Therefore, AI not only changes individual processes or products, but entire industries and markets, and therefore requires organisations to adapt their business strategies in order to remain competitive. At the same time, it is recognised that the use of AI could bring profound changes in the labour market – especially in knowledge-intensive professions [8,54]. Small businesses, in particular, must address both opportunities and challenges [47]; and organisations that do not actively engage with AI run the risk of falling behind. For traditional small businesses, adapting to these developments is crucial in order to remain competitive in an increasingly dynamic market environment [8,46].

2.2 AI and Society

AI has also become a structuring force in contemporary society, reshaping economic, social, cultural, and political domains. Malja and Afrasiabi [34] emphasize that AI does not develop in isolation; rather, it co-evolves with societal actors (residents and consumers, firms and employees, non-profit organisations (NPOs), and public institutions) to form a dynamic system in which technological and social transformations mutually reinforce one another. One central mechanism linking AI and societal advancement lies in AI's capacity to reshape socioeconomic structures. Generative and analytical AI systems influence productivity, job design, and economic (in)equality, providing opportunities for social progress while also posing risks that require collective governance. Literature explains that AI has the potential to enhance prosperity by improving productivity, expanding access to information, and enabling new forms of education and healthcare. At the same time, these benefits are unevenly distributed, with possible increases in social inequality unless guided by effective policies and institutions [9,28,36].

Organisations serve as key mediators through which AI impacts society. As firms adopt AI to optimise logistics, personalize consumer services, and enhance decision-making, the boundaries between technological systems and human actors increasingly blur [34]. With AI integrating into industry, and in the public sector, AI influencing broader cultural, ethical, and governance structures, thereby reshaping expectations about transparency, accountability, and human–machine collaboration.

At a more holistic level, AI enables new models of societal development through social innovation. According to sustainable development research, AI-powered tools can strengthen social inclusion, environmental stewardship, and community resilience by generating solutions that optimise resource allocation, support decision-makers, and enable participatory governance [36], encouraging societies to adopt new norms, governance models, and ethical frameworks also in light of commercial activities of corporations [6]. These relationships underscore that the future of AI is inherently a social project, contingent on interdisciplinary collaboration and ethical frameworks, while also fostering innovation and competitiveness across many societal actors in the fifth industrial revolution.

3 Methodology

In order to support small businesses to respond to AI-driven opportunities and challenges in a business context, the aim of the research project was to develop a practical method based on Design Science Research (DSR) according to Hevner et al. [20] and Winter [51]. The method set included a literature review [41] and the development of multiple artefacts via pilot projects and workshops.

Through the pilot projects, we gained a deeper understanding of the SMEs' needs (i.e., awareness of the problem); in the suggestion phase, we proposed a new methodology (including techniques and templates); in the development phase, we instantiated the methodology for each of the two SMEs; and for the evaluation phase, we tested the methodology in various validation workshops. Table 1 provides an overview of the projects and workshops which, through various iterations, have supported the development of the AI strategy method.

The overall approach is a specialisation of three building blocks of enterprise architecture management (following [1]) for AI and in line with the principles of human-centred design as defined by BMGF [4] and IDEO [24]: strategic planning (design), project life cycle (build), and operation and monitoring (run). Enterprise architecture extends the technical perspective on AI systems and sets them into the context of strategic planning and business design.

The three phases following BMGF [4] and IDEO [24] include:

Phase 1: Design (Strategic Planning) – together with stakeholders from the organisations, strategic opportunities and potential AI-linked challenges are identified and possible projects or solution ideas/use cases are developed. The first two pilot projects (with SME1 and SME2 between March and May 2024) were conducted in this first phase using process reviews, storyboards and per-

Table 1. DSR pilot and validation workshops.

Step	SME	Duration	Industry
Pilot projects	SME1	Mar 2024 (to 2025)	IT provider
	SME2	May 2024 (to 2025)	Risk and governance
Initial validation	(12 participants)	Jun 2024	Consulting, commercial, academia
Validation workshops	SME3	Oct/Nov 2024	Electrician
	SME4	Jan 2025	Pharma distributor
	SME5	Dec 2024	Telco provider
	SME6	Oct 2024	Electrical engineering
	SME7	Nov 2024	Promotion agency
Roundtable validation	(5 SMEs)	Nov 2025	Consulting, energy, engineering, retail

sonas. The initially proposed method mix was further developed over several iterations in the subsequent validation workshops.

Phase 2: Build (Project Life Cycle) – AI projects are planned, documented and developed based on a process model. This includes data collection, model development and training – primarily using machine learning (ML) – and the creation of a knowledge base. At the same time, training materials and instructions for AI implementation shall be created.

Phase 3: Run (Operation and Monitoring) – together with technology partners, AI projects are developed and implemented, alongside IT infrastructure decisions, governance frameworks, training of employees, marketing of the AI solution and ongoing optimisation.

The focus of the developed AI strategy method was on the design phase, which was planned in three iterations or levels following Amin [2]:

Iteration 1 – Company level: identifying products and services (existing or new) for which the use of AI is suitable.

Iteration 2 – Process level: identifying knowledge and data-intensive tasks (processes) and defining overarching goals across the processes (use-cases).

Iteration 3 – Task level: using design thinking to generate solution ideas, specifying the required measures, roles and data.

Thus, the first iteration/level deals with the strategic dimension of the organisation, the second with the business process level and the third with the operational perspective/tasks, leading to a documented and prototyped AI solution.

Subsequently, the proposed method was tested, further developed and validated with a total of seven small businesses in Switzerland from various industries between March 2024 and January 2025 (the two pilot organisations through additional workshop iterations, and five additional organisations through validation workshops), in addition to a final validation workshop in November 2025. Please see Table 2 for a full description of the design phase.

Table 2. Method steps and tools to identify and exploit strategic AI opportunities for strengthening innovation and competitiveness (design phase) (following [42]).

Step	Tool method	Description / workshop questions (examples)
1 Company level – *Identification of products and services for which AI is suitable.*		
1.1	Open strategy questions [53]	What will change in the market/organisation in the future and what are the challenges/pain points?
1.2	BCG portfolio matrix [19]	Can AI help turn a question mark into a star? How do we defend cash cows against AI-enabled competitors?
1.3	Capability map [38]	Where do we struggle with low capabilities? What capabilities are missing for high-potential products/services (from 1.2)?
1.4	2×2 matrix [33]	Identify products/services and capabilities in which AI provides value. Assess impact on future success and feasibility.
2 Process level – *Identification of knowledge/data-intensive tasks and definition of key goals.*		
2.1	Enterpr. knowledge graphs [21]	Processes with tasks that primarily use or process knowledge (data).
2.2	Balanced Scorecard [29]	Where do you see AI market opportunities that could benefit the customer long term?
2.3	Balanced Scorecard [29]	Where do you see AI process optimisation opportunities benefiting the organisation long term?
2.4	Balanced Scorecard [29]	Define overarching objectives for the use of AI across identified processes.
3 Task level – *Generation of AI solution ideas; definition of measures and documentation.*		
3.1	Storyboarding, Personas [40]	Describe daily work activities in the context of the selected business process (from 2.1).
3.2	Six W questions [32]	Model a business process (from 2.1) and identify specific problems (what, who, why, when, where, how).
3.3	Crazy 8, 2×2 matrix [27,33]	Generate ideas for possible AI applications.
3.4	Criteria, wireframes [11]	Create a realistic target use case (e.g. using storyboarding from 3.1).
3.5	Test scenarios [50]	The developed AI prototype is tested with potential users.
3.6	Documentation [10]	Structure follows the design phase, incorporating company, process and task level results.

4 Results

The two pilot projects in March 2024 (SME1) and in May 2024 (SME2) demonstrated that the method effectively identifies AI opportunities in business processes. In an initial workshop with SME1, various AI scenarios/use cases were identified and evaluated, leading to three specific AI use cases. These were prioritised in a second workshop, resulting in the selection of a particular process to be supported by AI in the future. In a third workshop, this process was modelled and documented with a focus on knowledge-intensive activities.

Three workshops were also held with SME2. In the first workshop, various tools from the planning phase were applied, including the involvement of their customers. In the second workshop, current business processes were modelled using co-creation. In the third workshop, the implementation within the company's IT and process landscape was discussed and defined, again focusing on knowledge-intensive activities.

The method was iteratively expanded after the literature review and the two pilot projects; first, with an initial validation workshop held in June 2024. Twelve participants (a mix of practitioners from consulting and commercial organisa-

tions as well as business strategy and AI researchers) evaluated and discussed the first phase (design) of the AI strategy method, while expanding the toolset based on their combined experience. For example, at the company level, workshop participants felt that discussions based on open questions are more important than using tools at this early stage of AI strategy development. They also noted that the use of a proposed value chain framework from Porter [44] is not recommended at this stage, as it does not include important strategic dimensions such as the ecosystem and competition. At the process level, the majority of participants found the use of process visualisations a useful approach in workshop settings. However, debate emerged over the definition of 'data-intensive processes', which led to a proposed definition to be used in subsequent workshops. Finally, at the task level, the need for an AI POC (Proof of Concept), prototype or pilot became apparent.

The new method was subsequently tested and enriched through five additional validation workshops with Swiss small businesses (SME3 to SME7) between October 2024 and January 2025. For instance, SME3 highlighted that the method's effectiveness could be increased if participants familiarised themselves with the topic of AI before the strategy workshop. It was also suggested that the various workshop frameworks (such as the capability map and the balanced scorecard) be explained in advance to improve the workshop's flow. SME4 confirmed that the steps and tools build on one another and should not be used independently. In addition, it was recommended that a separate workshop be held for each level of the design phase. This allows sufficient time to analyse the workshop results, clarify ambiguities and plan and prepare for the next workshop. This approach is particularly important for complex AI candidates / use cases.

SME5 showed that the method successfully identified a strategic AI opportunity. Similar to SME3, it became clear that a more detailed explanation and training on the methodology's complex tools – ideally provided in advance – could prevent misunderstandings and reduce the need for additional explanations during the workshop. SME6 demonstrated that the company level (with a focus on capabilities) was crucial and occupied a large part of the workshop. This put the focus on the business impact of AI, while technical discussion was postponed until clarity regarding the objectives of potential AI applications was achieved. Finally, SME7 also succeeded in identifying a strategic AI opportunity, and confirmed various findings from other workshops, such as the importance of providing background information on AI prior to the workshop.

In a subsequent roundtable validation workshop (six months after the publication of the full AI strategy method [41]), participants commanded the method for its high degree of practical applicability, including its top-down approach, and confirmed the strategic importance of the initial two steps (company and process levels) over and above the immediate deployment of AI. However, they also mentioned that the many resource-intensive steps and tools might be overwhelming for a small business, and therefore, it might be beneficial to develop a lean version of the AI strategy method for micro-enterprises.

5 Discussion and Conclusion

The validated AI strategy method, derived through a mix of a literature review and numerous pilot and validation workshops, supports the identification and exploitation of AI opportunities to strengthen innovation and competitiveness through its design phase across the company, process and task levels.

In the design phase, AI-related opportunities and challenges are identified from both market (external) as well as capability and process (internal) perspectives, and solution ideas are generated. At the company level, the proposed tools and discussions enable the identification of products and services (existing or new) for which the use of AI is suitable. At the process level, knowledge- and data-intensive tasks are identified, and the future state (with AI) is defined. At the task level, solution ideas for AI applications are developed, tested and documented.

In the build phase, selected prototypes or project ideas are turned into productive AI-supported (or driven) solutions. It is not just the technical solution that is important, but also how it fits into the organisation's business processes and workflows. The proposed methodology for the build phase consists of two parts: a process model and a categorisation of tools and systems that can be used during implementation of the identified AI use cases. The starting point for the process model for the build phase is the CRISP-DM reference model, which was developed for data mining applications [7,52]. Finally, the run phase addresses corporate governance, IT and data infrastructure, operation and maintenance of AI applications and business processes, and the development of digital skills and change management.

The AI strategy method was made available as a workshop canvas (our main artefact from the DSR project) for practical application in organisations[6]. The method aims to simplify and promote the use of AI in organisations. By providing a structured approach, it removes barriers and facilitates access to AI technologies at the strategic level, leading to successful financial and sustainable performance.

5.1 Implications

The identification of AI strategic opportunities at the company level and the adoption of AI at the process level are critical determinants of organisational innovation, competitiveness and performance in the outgoing fourth and emerging fifth industrial revolutions. By strategically integrating AI technologies, organisations can enhance value creation across products and services, increase the efficiency of operational processes, improve data- and knowledge-driven capabilities, automate tasks and identify or create new business opportunities while fostering sustainable business practices.

Existing literature (e.g., [9,34,36]) shows that AI and societal advancement are deeply interconnected. AI systems reshape economic productivity, education, healthcare, and public governance, offering opportunities for social progress.

[6] Available at https://ai-framework.net/

Despite these potential benefits, many organisations may face substantial barriers to AI adoption, while simultaneously introducing new risks related to inequality, bias, and accountability. These challenges often stem from limited knowledge of AI concepts and a lack of clarity about how AI can be effectively applied within specific organisational contexts. The proposed AI strategy method, developed in collaboration with numerous small businesses, should provide a structured approach that enables organisations to identify, document and implement viable AI use cases in a practical way, thereby helping to strengthen their AI-driven (enabled) competitiveness.

5.2 Limitations

Although the AI strategy method provides a structured process for identifying (design), developing (build), and implementing (run) AI solutions, several potential limitations can be noted. First, the method was developed with a small sample of seven small businesses and therefore lacks empirical large-scale validation. Second, it is presented at a conceptual level.

While this provides clarity, it may not offer sufficiently detailed methodological guidance for organisations with low AI maturity to operationalise these phases independently. Finally, successful development and implementation require organisational resources and digital skills, as well as IT resources and capabilities. These include technical guidance for data preparation, AI model development and evaluation, architecture/infrastructure design, integration with legacy systems, and cybersecurity risk mitigation. Without these technical competencies, organisations might struggle to implement AI digital roadmaps.

Future research could benefit from a larger sample, guidance (or a lean version of the method) for organisations with low AI maturity (and micro-enterprises, including NPOs and government organisations), the notion of a bottom-up (rather than a top-down) approach to identifying strategic AI opportunities, and coverage of the technical dimensions (alongside ethical and regulatory considerations) not addressed in the current framework.

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