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WHAT IS YOUR AI STRATEGY? SYSTEMATICALLY INTEGRATING SELF-LEARNING TECHNOLOGIES INTO YOUR BUSINESS STRATEGY

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Although artificial intelligence (AI) is currently a top management priority for firms, its strategic adoption still poses complex challenges. Essentially, strategists have to consider that today's AI systems differ from other digital systems due to their unique self-learning abilities (i.e., machine learning). However, existing strategy literature has not yet offered systematic guidance on how to appropriately manage such self-learning technologies with respect to a firm's business strategy. Consequently, this paper tries to advance the literature by developing a novel approach that builds on the inherent characteristics of contemporary AI systems—that is, their potential task superiority, black box perception, and dynamic nature. More specifically, we contribute to management theory and practice by deriving a practical framework that summarizes the five most important questions to ask in order to formulate an effective AI business strategy. We explain each framework question with multiple real-world examples, underline the relevance of strategic fit, and provide three illustrative AI business strategies from companies with different organizational backgrounds. Finally, we critically discuss the implications of our work for scholars and practitioners.

Due to the continuous progress in the field of artificial intelligence (AI), research and practice increasingly highlight various business opportunities for firms (Berg, Raj & Seamans, 2023; Shollo, Hopf, Thiess & Müller, 2022). For example, AI can impact operational and financial performance (Davenport & Ronanki, 2018; Reis, Ruivo, Oliveira & Faroleiro, 2020)—for example, through improving internal efficiencies, upscaling customer value, or facilitating managerial decision-making (Benbya, Davenport & Pachidi, 2020). The latest survey results by Dewar, Keller, Malhotra, and Strovink (2023) and Gartner (2023) underline the technology's outstanding relevance, as they found that adopting disruptive AI technologies is currently one of the top priorities for boards. Thus, supported by the explosive rise of ChatGPT and others, global AI spending has reached $150 billion in 2023 and is expected to further grow significantly (Shirer, 2024).

However, the strategic adoption of today's AI technologies is a complex and transformative endeavor that can significantly change how firms conduct their business (Agrawal, Gans & Goldfarb, 2024; Burström, Parida, Lahti & Wincent, 2021). Indeed, it is frequently emphasized how difficult it is to implement AI with perceivable impact (Ångström, Björn, Dahlander, Mähring & Wallin, 2023; Benbya et al., 2020; Brock & von Wangenheim, 2019; Chui, Hall, Mayhew, Singla & Sukharevsky, 2022). For instance, although many organizations have begun to deal with the technology (Brock & von Wangenheim, 2019; McElheran et al., 2024), several studies have reported AI project failure rates of above 70% (e.g., Ångström et al., 2023; Panikkar, Saleh, Szybowski & Whiteman, 2021; Ransbotham, Khodabandeh, Fehling, LaFountain & Kiron, 2019). The result is that firms who often lack experience and knowledge about AI face high pressure to successfully exploit it in line with their business strategy (Borges, Laurindo, Spínola, Gonçalves & Mattos, 2021; Li, Li, Wang & Bennett Thatcher, 2021).

Essentially, strategists have to consider that contemporary AI systems differ from other digital

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technologies due to their unique self-learning abilities—that is, machine learning (Berente, Recker, Gu & Santhanam, 2021; Brynjolfsson & Mitchell, 2017). Nonetheless, the existing strategy literature has not yet provided systematic guidance on how to effectively manage self-learning technologies with respect to a firm's business strategy. Similarly, AI business scholars have predominantly focused on the adoption process instead of answering fundamental strategy questions. To address this gap and advance the literature, we introduce a novel strategic approach that builds on the inherent characteristics of self-learning technologies—namely, their potential task superiority, black box perception, and dynamic nature. More precisely, we contribute to management theory and practice by deriving a pragmatic framework that summarizes the five most important questions to formulate a sound AI business strategy.

After showing the boundaries of the existing strategy literature, we will explain the inherent characteristics of self-learning AI technologies and derive our AI business strategy wheel framework. Next, we will thoroughly explain our framework in detail and underline the relevance of strategic fit. Finally, we describe three effective AI business strategies from real-world firms and critically discuss the implications of our work for both research and practice.

INTEGRATING AI INTO BUSINESS STRATEGY

Why We Need to Advance the Existing Strategy Literature in Regard to Today's AI

While business strategies consist of different but mutually important elements (Hambrick & Fredrickson, 2005; Nag, Hambrick & Chen, 2007), they often strongly rely on the utilization of technologies for becoming effective (Bharadwaj, 2000; Zahra & Covin, 1993). Hence, technologies significantly impact (a) the markets in which a company wants to be active (Miles, Snow, Meyer & Coleman, 1978; Morris, Schindehutte & Allen, 2005), (b) the means to access these markets (Lee & Lieberman, 2010; Madhok, 1997), (c) how a company differentiates itself from industry rivals to win the market (Barney, 1991; Porter, 1985, 1996), (d) the targeted logic of becoming profitable (Rhyne, 1986; Zahra & Covin, 1993), and (e) the temporal perspective concerning the speed and sequence of selected actions (Leiblein, Reuer & Zenger, 2018; Porter, 1991). It is crucial to maintain a continuous alignment among all these elements and corresponding decisions, including the integration and compatibility of technologies (Bharadwaj, El Sawy, Pavlou & Venkatraman, 2013; Goodhue & Thompson, 1995; Hambrick & Fredrickson, 2005; Porter, 1996; Zajac, Kraatz & Bresser, 2000).

Over the last decades, firms have increasingly started to exploit digital technologies to achieve their goals (Mithas, Ramasubbu & Sambamurthy, 2011; Reich & Benbasat, 1996). For that reason, scholars have argued to systematically unify the exploitation of digital technologies in relation to a firm's business strategy (Bharadwaj et al., 2013; Chanias, Myers & Hess, 2019; Grover & Kohli, 2013). In other words, one should connect IT and business strategies to form a novel digital business strategy. To be successful, such a digital business strategy must be built on the inherent technological characteristics of digital systems (Bharadwaj et al., 2013; Kane, Palmer, Phillips, Kiron & Buckley, 2015).

Nevertheless, when it comes to the strategic adoption of contemporary AI applications, one has to consider that their inherent working mechanisms differ significantly from other digital technologies (Berente et al., 2021; Brynjolfsson & Mitchell, 2017). Unlike traditional information systems and early AI research,[1] which were both manually programmed (Buchanan & Smith, 1988; Russell & Norvig, 2020), contemporary AI is primarily characterized by its unique self-learning ability—better known as "machine learning" (Berente et al., 2021; Choudhary, Marchetti, Shrestha & Puranam, 2023; Jordan & Mitchell, 2015). Accordingly, for systematically integrating AI within their business strategy, firms have to understand the technology's distinctive characteristics compared to hand-coded information systems.

Consequently, the existing literature cannot be applied to systematically integrate self-learning technologies within a firm's business strategy. Unfortunately, AI management scholars have also not focused on fundamental strategy questions—yet. Instead, they have predominately concentrated on organizational adoption processes (e.g., Enholm, Papagiannidis, Mikalef & Krogstie, 2022; Jöhnk, Weißert & Wyrtki, 2021) and technical capabilities (e.g., Sjödin, Parida, Palmié & Wincent, 2021; Weber, Engert, Schaffer, Weking & Krcmar, 2022). As a

[1] Early AI research (also known as "symbolic AI") focused on manual coding. Prominent examples are expert systems that were programmed based on the knowledge extracted from human domain experts (Buchanan & Smith, 1988; Minsky, 1991). A detailed overview regarding the field of AI is provided in Appendix A.

result, there is a pressing need to advance strategy literature and investigate how an AI-oriented business strategy that builds on the inherent characteristics of self-learning technologies can be created (Berente et al., 2021; Borges et al., 2021).

Understanding Self-Learning Technologies

Whereas there exist different machine learning techniques (e.g., supervised, unsupervised, or reinforcement learning), contemporary AI systems can autonomously detect massive amounts of decision rules, including those that humans may be unaware of (Boyacı, Canyakmaz & Véricourt, 2023). Self-learning algorithms develop their behavior (i.e., decision rules) by statistically identifying correlative data patterns that allow them to "improve automatically through experience" (Jordan & Mitchell, 2015: 255). With high-quality data, algorithms can be trained to achieve a very effective decision-making behavior for its deployment purpose. Hence, we define contemporary AI as systems being able to autonomously learn and perform cognitive tasks that typically require human intelligence (Kaplan & Haenlein, 2019; Russell & Norvig, 2020; Simon, 1991).

Since self-learning technologies can vary significantly, we distinguish them in terms of their main functionality[2] and the specificity of their deployment task contexts (Figure 1). First, one can differentiate whether a system focuses on generative or predictive functionalities. Whereas generative AI algorithms[3] statistically create meaningful content mainly in the form of text, images, video, code, or audio (Grimes, von Krogh, Feuerriegel, Rink & Gruber, 2023), predictive AI[4] statistically estimates outputs for certain input parameters that can be used for classification, forecasting, and decision-making tasks (Agrawal, Gans & Goldfarb, 2022). Second, self-learning systems can be deployed for one or multiple tasks (Brynjolfsson & Mitchell, 2017; Russell & Norvig, 2020). However, the more specific the training context, the better an AI fits to a certain task but the less it is usually generalizable to other tasks.[5]

Self-learning systems typically come with three inherent characteristics that firms need to understand. More precisely, contemporary AI is marked by its potential task superiority, black box perception, and dynamically changing nature (Berente et al., 2021).

AI's potential task superiority. With good data, self-learning systems can acquire powerful decision rules, including those that humans might be unaware of. For that reason, they are the first technologies able to cognitively outperform human beings (Grace, Salvatier, Dafoe, Zhang & Evans, 2018; Simon, 1991). Nonetheless, contemporary AI can only be superior for tasks that capitalize on the technology's inherent strengths. For example, due to their strong learning speed and capacity, as well as their logical decision-making, intelligent machines have demonstrated their powerfulness in tasks dealing with large amounts of information (Brynjolfsson & Mitchell, 2017). Based on that, an algorithm can form effective decision rules to generate meaningful content or make well-elaborated predictions to enhance the performance of one or multiple deployment tasks. However, AI systems are also shaped by several weaknesses. For instance, they are less appropriate for socioemotional interactions and extraordinary task contexts, not covered during the training (Huang & Rust, 2018; McKendrick & Thurai, 2022). In addition, even though an AI can support creativity (Jia, Luo, Fang & Liao, 2023), managing uncertainty still requires human ideation and context awareness (Brynjolfsson & Mitchell, 2017; Wilson & Daugherty, 2018). Concerning the strengths and weaknesses of AI, firms should wisely decide whether and how it should be adopted.

AI's black box perception. Due to their cognitive limitations (Boyacı et al., 2023; Simon, 1990), individuals can often not understand complex algorithmic behavior (Barredo Arrieta et al., 2020; Guidotti, Monreale, Ruggieri, Turini, Giannotti & Pedreschi, 2019). Hence, many AI systems are black boxes for them. Whereas the level of understandability depends on the underlying statistical model and a human's AI expertise, opaque systems can evoke a problematic adoption paradox as firms wanting to exploit them can neither understand nor validate the correctness of their self-learned decision rules (Barredo Arrieta et al., 2020; Burt, 2019; Lebovitz, Levina & Lifshitz-Assa, 2021).

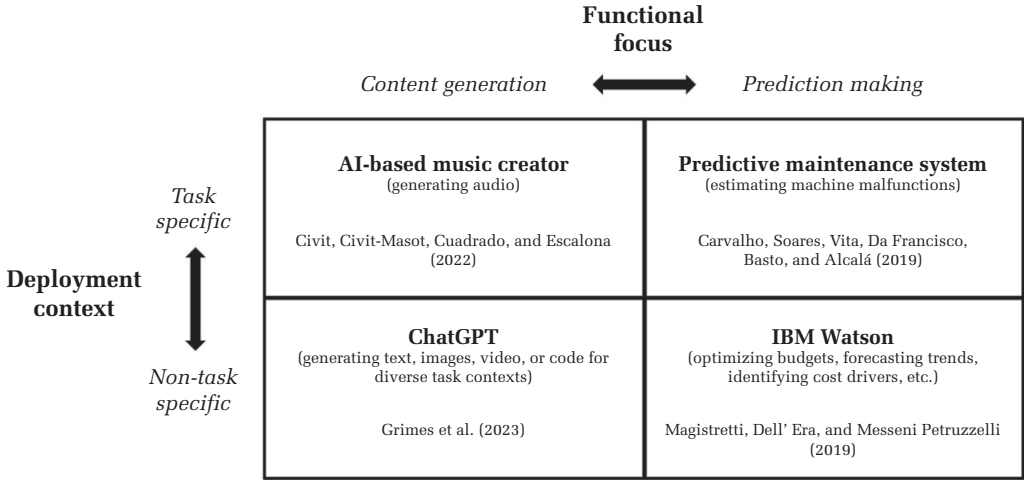
[2] AI applications can also combine predictive and generative functionalities.

[3] In particular, AI systems like ChatGPT that can process and generate complex human language are currently very popular. Their underlying decision-making algorithms are known as "large language models" (Berg et al., 2023).

[4] Although "predictive AI" is also known as "discriminative AI," it can be applied for many tasks, such as sales forecasting, customer segmentation, and fraud detection.

[5] The field of artificial general intelligence targets the development of universally applicable machines. However, experts are unsure whether humans can ever create such a level of AI (Adams et al., 2012; Goertzel, 2014).

FIGURE 1
Classifying Self-Learning Technologies



The utilization of unvalidated algorithms, in turn, can come with severe negative consequences, such as incorrect outputs (Doshi-Velez & Kim, 2017), human mistrust (Glikson & Woolley, 2020; Vanneste & Puranam, 2024), system misuse (Mayer, Strich & Fiedler, 2020), security threats (Cheng, Lin, Shen, Zarifis & Mou, 2022), or algorithmic biases like gender or race discrimination (Mehrabi, Morstatter, Saxena, Lerman & Galstyan, 2022).

AI's dynamically changing nature. Because the field of AI is hallmarked by various research streams and has seen huge paradigm shifts in the past, firms must properly deal with the dynamically changing nature of self-learning systems (Halevy, Norvig & Pereira, 2009; Russell & Norvig, 2020). Indeed, contemporary AI systems are altering the existing technology landscapes significantly, as witnessed by current progress in disciplines like computer vision, natural language processing, and robotics (Berg et al., 2023; Brynjolfsson & Mitchell, 2017; Jordan & Mitchell, 2015). Another recent example of AI's dynamic nature is the explosive availability of generative AI applications such as ChatGPT, which astonished both scholars and practitioners simultaneously. As a matter of fact, although current estimates suggest that generative AI could raise global GDP by up to 7% (Goldman Sachs, 2023), very few firms have anticipated this strong technological shift (Edelman & Abraham, 2023).

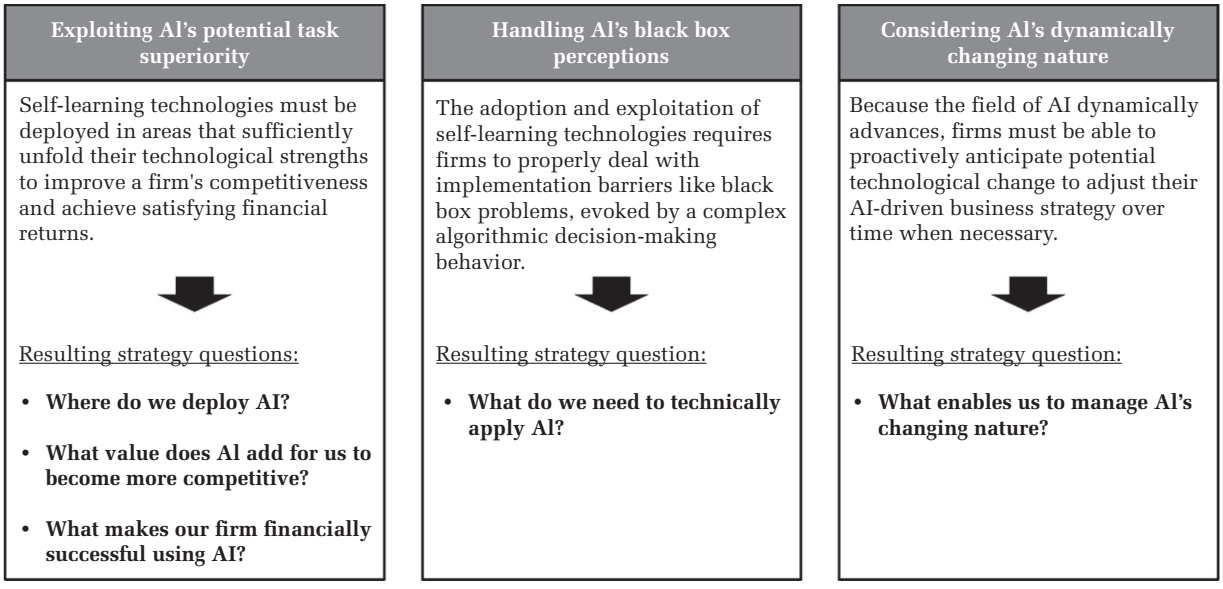
What an AI Business Strategy Must Be About

According to Hambrick and Fredrickson (2005: 52), a business strategy is "a central, integrated, externally oriented concept of how the business will achieve its objectives." Thus, an AI business strategy systematically bundles and exploits self-learning technologies to achieve individual firm goals. For this, it must build on the inherent characteristics of self-learning technologies—that is, the strategy must effectively exploit AI's potential task superiority, appropriately handle black box perceptions, and proactively deal with the technology's dynamic nature. Accordingly, with respect to the components of a business strategy (Hambrick & Fredrickson, 2005; Porter, 1996), we derive five essential questions that firms need to thoroughly answer in order to formulate an effective AI business strategy (Figure 2).

First, since the strategy has to purposefully exploit AI's potential task superiority, firms have to identify deployment areas that sufficiently unfold the technology's self-learning strengths (Brynjolfsson & Mitchell, 2017). More precisely, companies have to find adoption areas that significantly benefit from AI's learning power, speed, and logical decision-making to improve the performance of a specific or non-specific task context with statistical prediction-making, content generation, or a combination thereof. As a result, the first—and perhaps most—fundamental question toward formulating an AI business strategy is: "Where do we deploy AI?"

Relatedly, AI adoption should support firms in better attracting the market and, in the best case, achieving a competitive advantage (Kemp, 2023; Krakowski, Luger & Raisch, 2022). In fact, the task superiority of self-learning systems can leverage customer value and operational efficiencies in multiple

FIGURE 2
Questions that an AI Business Strategy Must Answer



ways (Verganti, Vendraminelli & Iansiti, 2020). Consequently, to differentiate within the industry, an AI business strategy needs to answer the question: "What value does AI add for us to become more competitive?"

Importantly, winning the market does not necessarily imply good financial results (Barney, Mackey & Mackey, 2023). This implies that the exploitation of AI's task superiority must be directly linked to the financial performance of a firm, too. This means that higher customer value or gained operational efficiencies must be transferred into satisfying financial returns (Ransbotham et al., 2019; Reis et al., 2020). For that reason, a third dimension specifies: "What makes our firm financially successful using AI?"

However, if self-learning technologies cannot be successfully implemented, their impact is limited. Therefore, an AI business strategy has also to properly manage technological implementation barriers like algorithmic black box perceptions to succeed (Enholm et al., 2022; Li et al., 2021). Strategists must find proper handling mechanisms to validate their AI systems. In addition, a successful implementation might require several technological assets, such as IT infrastructure, people, or organizational change promotion (Berg et al., 2023; Lee, Kim, Choi & Kim, 2022). As a result, a fourth question is: "What do we need to technically apply AI?"

Lastly, due to the continuously progressing field of AI, firms must proactively anticipate potential technological change to adjust their current actions when necessary (Russell & Norvig, 2020; Shollo et al., 2022). In fact, quick responses are critical to creating first-mover advantages or reacting to forward-rushing competitors on time (Mahidhar & Davenport, 2018). This means strategists have to answer the question: "What enables us to manage AI's changing nature?"

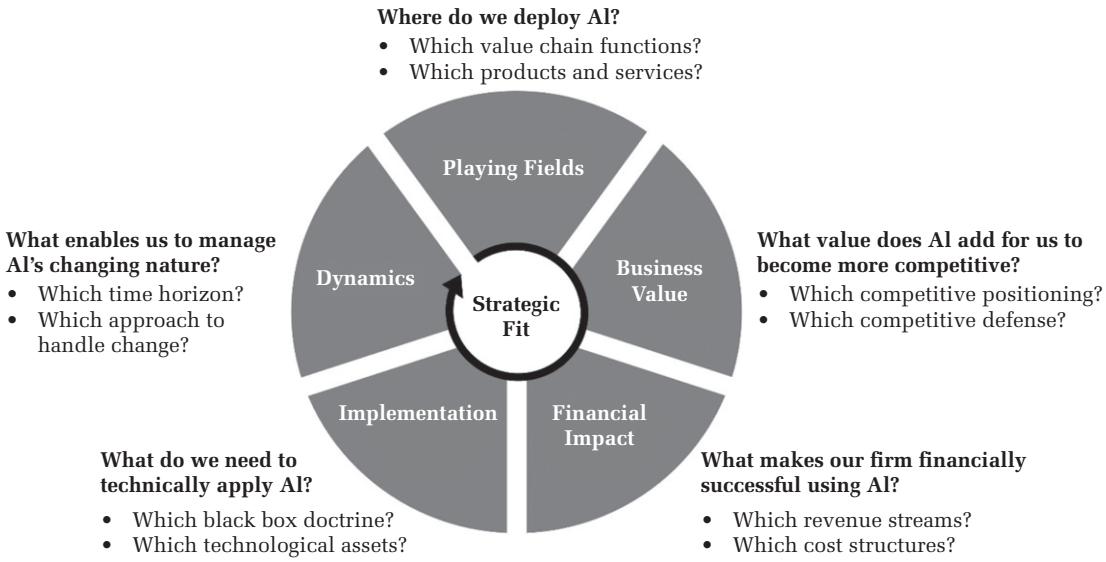
INTRODUCING THE AI BUSINESS STRATEGY WHEEL

While an effective AI business strategy must comprehensively answer all of these five questions, each of them requires making multiple complex decisions. Therefore, we have created a novel practitioner-oriented framework—the AI business strategy wheel (Figure 3)—that assists firms in systematically addressing these questions for their individual business context. While we will demonstrate how to approach each question in detail, we illustrate our theoretical debate with a collection of concrete real-world examples (Table 1). In addition, further teaching material is provided in Appendices B and C.

Playing Fields: Where Do We Deploy AI?

As a first step, strategists should identify playing fields—that is, where and to what extent self-learning technologies should be adopted by a firm. While effective playing fields can be both internal

FIGURE 3
The AI Business Strategy Wheel



value chain functions or external products and services, they substantially unfold AI's technological strengths for creating or enhancing strategically relevant firm competencies (Brynjolfsson & Mitchell, 2017; Gama & Magistretti, 2023; Murray, Rhymer & Sirmon, 2021). Competencies are created when predictive or generative functionalities significantly improve the performance of one (i.e., task-specific) or multiple (i.e., non-task-specific) impactful deployment contexts within a playing field. In contrast, when adoption areas do not sufficiently benefit from AI's strengths, the technology's impact is limited. For example, the U.S. newspaper chain Gannett targeted to deploy generative AI for strengthening writing skills, but experienced a relatively low performance as many articles still required human context awareness and ideation (Wu, 2023). Ultimately, to identify innovative playing fields, firms should look for inspiration inside and outside their industry (Boudreau & Lakhani, 2009).

Value chain functions. From an internal perspective, one needs to determine the functional firm areas in which AI should be deployed. Indeed, intelligent machines can significantly enhance operational efficiencies within primary or secondary value chain functions (McElheran et al., 2024; Porter, 1985). For instance, AI-based industry robots can largely impact production skills by accelerating assembly lines or detecting erroneous material components. Alternatively, a self-learning procurement or HR software can independently select the most reliable suppliers or best-fitting job candidates. Overall, AI systems can be used for both enhancing *existing skills* and establishing *new skills*. However, we recommend starting with enhancing existing ones because companies might be more familiar with them (Davenport & Ronanki, 2018). The focus for this should lay on upscaling business-critical skills; in the best case, those that competitors do not have. Alternatively, to create novel skills, managers can concentrate on replicating the most relevant skills of leading competitors or identify firm functions that are expected to be central in the future.

Market offerings. Since products and services are equally important playing fields, AI strategists should think about reshaping *existing offerings* and creating completely *new offerings* with AI features, too (Babina, Fedyk, He & Hodson, 2024). Again, due to experience, it might be a good start to redesign existing offerings with AI. For instance, it could be a quick win to integrate AI features into digital products or to develop complementary platform services and apps. However, the creation of novel offerings or the digitization of analogous products and services pay off, too. Even though such endeavors usually require a lot of R&D resources, they might be a very good source for differentiation and allow first-mover advantages (Mahidhar & Davenport, 2018). Ultimately, a clear prerequisite for selecting these playing fields is that customers

TABLE 1
Real-World Examples for the AI Business Strategy Wheel

Playing fields	Business value	Financial impact	Implementation	Dynamics
Value chain functions	***Competitive positioning***	***Revenue streams***	***Black box doctrine***	***Time horizon***
Existing skills • *Coca-Cola* and *Kraft Heinz* improve their existing marketing and sales skills with a non-task-specific generative AI system that creates social media posts, advertisements, customer emails, etc. (Cui, van Esch & Phelan, 2024; Gvirtz & Acar, 2023).	*Higher customer value* • *Netflix* offers personalized streaming recommendations (Kumar, Rajan, Venkatesan & Lecinski, 2019), *IKEA* gamifies designing rooms (Mishra, Satarkar & Joshi, 2024), and *Walmart* simplifies with autonomous vehicle deliveries (Dearborn, 2021).	*Existing streams* • *Airbnb* adopted a self-learning system to improve the match between the demand and supply of its vacation booking platform to attract new users and upscale provisions (Verganti et al., 2020).	*Pure performance focus* • Automation firm ABB's predictive maintenance is primarily evaluated by its accuracy (ABB, 2024).	*Short-term (radical)* • Due to potential first-mover advantages, *IBM* wants to rapidly become the central supplier for enterprise generative AI solutions that unify information collection, analytics, and decision-making (Moorhead, 2024).
New skills • To counteract a lack of talent, *Unilever* and *Saint-Gobain* concentrate on building HR skills with predictive AI for the specific task of assessing job candidates (Booth, 2019; Chevalier, 2022).	*Lower price* • *Disney* focuses on saving movie budgets (Chmielewski & Hu, 2023), *BMW* targets higher productivity for its shop floors (Seidel, 2020), and *SAP* adopted an AI assistant that helps employees with their daily decision-making (Franzen, 2023).	*New streams* • Cloud software provider and Amazon daughter Amazon Web Services (*AWS*) offers additional bookable AI features to its subscribed customers that can complement the existing service functions of the firm (Wiggers, 2019).	*Expert understandability* • Medical MRI systems by Siemens Healthineers need expert validation (van Giffen & Ludwig, 2023). *Nonexpert understandability* • Allianz justifies its algorithmic fraud suspicions to involved employees and affected customers (Allianz, 2024).	*Long-term (incremental)* • Agricultural technology firm *John Deere* makes rather long than short-term investments to construct innovative autonomous farming vehicles that can be sold in the future (Lambert, 2023).

TABLE 1
(Continued)

Playing fields	Business value	Financial impact	Implementation	Dynamics
Market offerings	***Competitive defense***	***Cost structures***	***Technological assets***	***Handling change***
Existing offerings • *Oral-B's* AI toothbrushes are explicitly trained for estimating brushing performance (Peters, 2019) and *Nespresso* embeds a generative AI chatbot into coffee machines for non-specific customer communication tasks (Lucio, 2018).	*Data protection* • Since the space and defense industry is seen as critical for both civil and military applications, *Airbus* puts a very high priority on protecting its internal IT systems and external market offerings (Airbus, 2022).	*AI automation* • Japanese insurance company *Fukoku Mutual Life* substituted several office workers with AI to save labor costs regarding the task of analyzing medical patient data (McCurry, 2017).	*IT assets* • *Uber* required additional software to collect customer and driver data for training their complex platform algorithms (Eyert, Irgmaier & Ulbricht, 2022).	*Internal signals* • The tech firm *Simmer.AI* organizes internal technology competitions for exchanging new ideas (Kangur, 2022).
New offerings • The algorithmic financial advisory of *JPMorgan* and the virtual environments by *Meta* are task-specific AI systems that unify predictive and generative functionalities (Hong, Pan, Gong & Chen, 2023; Randieri, 2023).	*Upscaling* • *Amazon* and *Alibaba* mutually connect different logistic systems to create unique network effects that increase their operational efficiencies and make imitation complex and costly (Mertz, 2023; Zhang, Pee & Cui, 2021).	*AI augmentation* • *General Electric* supports human employees with AI to accelerate product development times and increase design quality (Bogaisky, 2019).	*Non-IT assets* • Whereas fashion firm *Levi Strauss* conducts boot camps to increase its internal AI literacy (Harreis, Koullias, Roberts & Te, 2023), *SAP* and *Microsoft* announced a strategic partnership for the development of generative AI systems (Bessa, 2024).	*Industry signals* • Sports outfitter *Nike* transferred the customer trend for personalization into a tool that suggests size-fitting shoes (Thomas, 2019). *Industry-independent signals* • The trend radar by logistic firm *DHL* maps and evaluates current technological research trends (Mahnken, 2022).
		Strategic fit		
	• Luxury watch manufacturer *Rolex* should be cautious when adding AI to its physical products since customers explicitly value human craftsmanship (Tekic & Koroteev, 2019)			

perceive AI features as valuable (Gursoy, Chi, Lu & Nunkoo, 2019). Otherwise, customer value can be even destroyed (Tekic & Koroteev, 2019).

Business Value: What Value Does AI Add for Us to Become More Competitive?

AI adoption should improve a firm's competitive positioning—that is, its targeted value–price ratio—within the industry (Iansiti & Lakhani, 2020; Porter, 1985). Indeed, the utilization of today's AI can be a powerful source of competitive advantage through increased customer value and decreased price levels (Kemp, 2023; Krakowski et al., 2022; Porter, 1996). Nevertheless, long-term business value can only be obtained when an AI-enabled positioning is defendable against imitation efforts (Hartmann & Henkel, 2020). Facebook, for example, has repeatedly copied AI features from its rival Snapchat, causing the loss of several unique selling points (Ingram, 2017). Thus, the prevention of imitation must become a strategic topic, too.

Competitive positioning. For being successful in the market, firms must assess if they will use AI to increase customer value, offer better prices, or a combination thereof. First, there are many ways in which AI can increase customer value. For example, self-learning algorithms enable a *personalization* to the habits and preferences of individual customers (Enholm et al., 2022). Further, AI can raise *availabilities*—for example, by offering twenty-four seven customer support with chatbots (Adam, Wessel & Benlian, 2021). It also allows for *gamification* and *simplification*, which is useful for exhausting or demanding customer tasks such as doing sports (Uhm, Kim & Lee, 2023). Second, to offer better prices, firms must use AI to reduce their costs. For example, AI can be applied to increase human (Tschang & Almirall, 2021) and machine *productivity* (Carvalho, Soares, Vita, Da Francisco, Basto & Alcalá, 2019), to *decrease expenses* (Nam, Dutt, Chathoth, Daghfous & Khan, 2021), or to *facilitate organizational decision-making* processes (Shrestha, Ben-Menahem & von Krogh, 2019). Irrespective of prioritizing the value or price side of the equation, unique positionings can lead to strong competitive advantage (Kemp, 2023).

Competitive defense. For achieving long-term impact, successful positions must be defended against potential imitators. Because the development of powerful AI applications mainly depends on good training data, there must be a high priority for *data protection*. Indeed, disclosure enables competitors to train similar or even better systems (Hartmann & Henkel, 2020). To avoid this, the most critical training data must be identified. This usually concerns data that a firm has exclusive access to or where it makes use of large network effects (Gregory, Henfridsson, Kaganer & Kyriakou, 2021). Afterward, one should assess cybersecurity measures such as antivirus software, anomaly detection, network control, and firewalls to protect both algorithms and data (Gama & Magistretti, 2023). An equally important way to defend a competitive positioning is "upscaling"—that is, mutually connecting AI systems (Fountaine, McCarthy & Saleh, 2021; Hagiu & Wright, 2020). Interconnected algorithms can share learning data to generate strong network effects, which increases the overall system's power and makes imitation attempts much more complex (Iansiti & Lakhani, 2020).

Financial Impact: What Makes Us Financially Successful Using AI?

An AI business strategy can only be successful when it systematically transfers created business value into profit (Davenport & Ronanki, 2018; Li et al., 2021). However, although self-learning technologies can significantly enhance the financial performance of companies (Burström et al., 2021; Reis et al., 2020), it is often reported how difficult it is to capture positive financial returns from AI investments (Benbya et al., 2020; Ransbotham et al., 2019). For instance, IBM's healthcare AI system was sold after the company invested substantial amounts of money over multiple years (Duffy, 2022). Ultimately, to impact a firm's profit margin, strategists need to think about how AI can impact revenue streams and cost structures.

Revenue streams. To capture monetary returns, AI strategists have to evaluate how customers should pay for the added value enabled by AI features (Reis et al., 2020; Shollo et al., 2022; Teece, 2010). Notably, customers do not necessarily have to pay with money. Instead, customer data are also a valuable means of payment because they can be utilized to train algorithms, or they can be sold to third parties. A first approach can be to leverage *existing revenue streams*. Useful innovative features usually attract more customers and justify higher prices or premium subscriptions (Verganti et al., 2020). However, AI allows a company to generate *new revenue streams*, too. For example, one can offer bookable AI features compatible with existing products and services or add a pay-per-use logic to a basic subscription model. In such a scenario, customers can decide whether to buy certain technology add-ons or not.

Cost structures. Besides income, a firm can impact its financial performance by rearranging cost structures within selected playing fields through new configurations of human and AI resources (Choudhary et al., 2023; Jarrahi, 2018). Indeed, AI can create cost advantages by substituting or augmenting employees. Cost advantages, in turn, can be used to offer better prices or increase profit margins. For instance, high levels of *AI automation* make firms more independent from the human workforce, such as through being less affected by sick leaves, fluctuations, or salary costs (Coombs, Hislop, Taneva & Barnard, 2020; Tschang & Almirall, 2021). Thus, humans can take over other tasks that they are better at with respect to their individual strengths. Nevertheless, instead of substituting employees, it is often more beneficial to augment them with AI, as many tasks require both human and AI strengths. In fact, *AI augmentation* can lead to very powerful human–machine collaborations because both can concentrate on task portions where they outperform the other (Krakowski et al., 2022; Wilson & Daugherty, 2018).

Implementation: What Do We Need to Technically Apply AI?

To successfully exploit self-learning technologies, strategists must ensure a smooth implementation. However, the past has shown that AI adoption is technically complex and often fails (e.g., Ångström et al., 2023). In particular, black box perceptions can be problematic, as witnessed by the U.S. real estate firm Zillow, which experienced a big financial loss due to incorrect home price forecasts (Metz, 2021). The complex algorithm often overestimated the value of real estate, so Zillow had write-downs worth hundreds of millions of U.S. dollars. Further, AI implementation typically requires certain technological assets (Berg et al., 2023). While these can be both internally developed or externally acquired, they are valuable resources that facilitate organizational change (Lee et al., 2022; Sjödin et al., 2021; Weber et al., 2022).

Black box doctrine. To handle black box perceptions properly, firms can choose among three different doctrines. First, when AI failures are uncritical and task stakeholders are not personally affected (Barredo Arrieta et al., 2020; Doshi-Velez & Kim, 2017), managers can select a "pure performance" doctrine. In this approach, systems only are validated by satisfying output results. Second, an "expert understandability" targets the design of inherently transparent AI systems by manually controlling algorithmic learning processes.[6] For this, experts validate the most important decision variables as done in tasks like medical diagnosing or financial decision-making. Third, a "nonexpert understandability" is useful when tasks are not critical, but stakeholders are personally affected. Therefore, this doctrine focuses on generating human-friendly explanations to justify algorithmic outputs for AI laymen. Such explanations must be intuitive, informative, and stakeholder-oriented—that is, they directly address the understandability needs of individual AI users. Ultimately, it is also possible to combine different black box doctrines with respect to unique adoption contexts.

Technological assets. AI strategies usually require certain technological assets to be effective (Berg et al., 2023; Lee et al., 2022). First, processing power, data storage, sensors, or more AI knowledge are often necessary "IT assets" for the smooth adoption and exploitation of self-learning systems (Sjödin et al., 2021; Weber et al., 2022). Essentially, IT assets can be both internally developed or externally acquired. For instance, the internal development of additional software solutions to collect suitable training data and the external acquisition of cloud services, that are needed to obtain sufficient processing power and data storage, is common. However, besides IT-related investments, firms typically need "non-IT assets," too. As an example, it is a typical phenomenon that strategists must convince colleagues, customers, and other stakeholders regarding technological change (Enholm et al., 2022; Li et al., 2021). Also, technology partnerships with other firms can bundle resources (Hagedoorn & Schakenraad, 1994). In particular, data pooling among organizations can be a powerful instrument for training and implementing outstanding algorithms (Bammens & Hünermund, 2021).

Dynamics: What Enables Us to Manage AI's Changing Nature?

An AI business strategy requires a clear time horizon that delineates the period in which the predefined actions should be taken. Nevertheless, due to AI's dynamic nature, it is also critical to adjust a strategy when necessary (Baabdullah, Alalwan, Slade, Raman & Khatatneh, 2021). Hence, companies

[6] Essentially, human intervention might limit the algorithm's self-learning power, which is described as a "performance–understandability trade-off" in literature (Guidotti et al., 2019; Rai, 2020).

must proactively anticipate internal and external technological change signals. This is easier said than done, as demonstrated by the various companies that have failed to identify and interpret these signals. For example, Kodak missed the step toward digital photography (Lucas & Goh, 2009) and Nokia underestimated the disruptions stemming from smartphone innovators like Apple (Vuori & Huy, 2016).

Time horizon. Firms can select between a more radical or incremental time approach. First, a *short-term* perspective leaves relatively less space for flexibility, can be very costly, and is exposed to high risks of failure—for example, due to inexperience. However, when things are done very quickly, one could exploit first-mover advantages or catch up to leading competitors (Mahidhar & Davenport, 2018). In particular, start-ups or companies with strong digitized processes might be suitable for pursuing radical approaches. In contrast, even though a *long-term* perspective consumes more time and may overlook temporary opportunities, it affords the chance to better experiment and refine one's strategy when new things are learned (Brock & von Wangenheim, 2019). Overall, such incremental approaches are often more beneficial for traditional firms that are characterized by relatively established processes and structures.

Handling technological change. Due to AI's dynamic nature, strategists must be able to identify potential change signals from three different sources—namely, within the firm, within the industry, and outside the industry (Dosi, 1982; Hess, Matt, Benlian & Wiesböck, 2016; Rip & Kemp, 1998). First, internal change signals can evoke organizational restructurings or the creation of novel market offerings. Indeed, employees who operate with AI on a daily basis are likely to develop innovative ideas that should be exploited. Besides, industry stakeholders like suppliers, partners, competitors, and customers can send important signals of change. For instance, novel customer trends or innovations from competitors might have a big influence on the existing strategy. Third, scientific breakthroughs at research institutions, start-ups, or open-source platforms are industry-independent signals. The same is true for institutional AI regulations such as the European Union AI Act that might force firms to retrain or limit their algorithms due to data protection or copyright reasons (Laux, Wachter & Mittelstadt, 2024).

The Relevance of Strategic Fit

Strategists must ensure that their decisions are not isolated endeavors but integral components of a forward-looking and logically consistent plan that is suitable to achieve their business objectives. Therefore, systematically adopting and exploiting self-learning technologies can only be successful when a strategic fit is created (Hambrick & Fredrickson, 2005; Porter, 1996). This means considering and transferring internal and external firm contexts into each dimension of an AI business strategy. Additionally, strategic fit requires a logical consistency between all of the framework's dimensions and corresponding decisions. In fact, even though each dimension of our framework is an essential part of a strategy, success can only be achieved when all components are well elaborated, aligned, and mutually reinforcing one another. Consequently, appropriate AI strategies identify suitable playing fields, improve a firm's competitive positioning, enable satisfying financial returns, specify effective implementation endeavors, and handle AI's dynamic nature proactively.

PRESENTING THREE FITTING AI BUSINESS STRATEGIES

To further illustrate our framework and the relevance of fit, the next section presents three effective AI business strategies from firms with different organizational backgrounds. While the strategies are summarized in Figure 4, these cases are primarily intended to provide managers with valuable ideas about how to apply our framework in various industry contexts. As this is very sensitive data, we decided to leave company names anonymous here. However, we have included general background information about each organization in Appendix D.

Creating Technical Project Management Skills in the Mobility Sector

Company A is active in the mobility industry and constructs individualized high-quality mass transportation solutions such as train systems. This business is especially characterized by a few global players that are in a continuous price battle for getting order receipts typically worth multiple billions of USD. The majority of customers are governmental institutions that are limited by their budget, so there is typically not much space for price negotiations. Moreover, due to continuous globalization, the competition within the industry has additionally been reinforced. Accordingly, Company A's management board perceives self-learning technologies as a

FIGURE 4
An Overview of Three Fitting AI Business Strategies

Company A: Creating Technical Project Management Skills in the Mobility Sector

Value chain functions:
New skills: Engineering, logistics, and production with an intelligent knowledge management system (non-task-specific generative AI)

Time horizon:
Short-term: 1–2 years

Handling change:
- *Internal signals*: AI competence center
- *industry signals*: Competitive benchmarking
- *Industry-independent signals*: Technology assessment council

Competitive positioning:
Lower price: Higher employee productivity, better project decision-making, reduced expenses

Competitive defense:
- *Data protection*: Anomaly detection, access control, etc.
- *Upscaling*: Company-wide system rollout

Black box doctrine:
Expert and nonexpert understandability: While experts validate the system, users want to ensure data correctness

Technological assets:
- *IT assets*: Utilization of external cloud services, external acquisition of a large language model
- *Non-IT assets*: Employee training programs

Revenue streams:
New streams: Winning more tenders with better prices

Cost structures:
AI augmentation: Facilitating planning, avoiding misalignments

Company B: Leveraging Customer Value with AI-Based Robotic Household Appliances

Market offerings:
- *Existing offerings*: Robotization of core kitchen portfolio (non-task-specific predictive AI)
- *New offerings*: Digital cleaning robots (non-task-specific predictive AI)

Time horizon:
Long*-term*: 4–5 years

Handling change:
- *Internal signals*: Bottom-up idea exchange
- *industry signals*: Global customer surveys, industry fairs
- *Industry-independent signals*: Investing in AI start-ups

Competitive positioning:
Higher customer value: Simplification, personalization, sustainability

Competitive defense:
- *Data protection*: Firewalls, data encryption, etc.
- *Upscaling*: Interconnected kitchen devices that mutually share user data

Black box doctrine:
Nonexpert understandability: Users want to understand why devices behave in certain ways

Technological assets:
- *IT assets*: In-house development of product platforms, utilization of external cloud services
- *Non-IT assets*: AI-driven technology branding

Revenue streams:
- *Existing streams*: AI product versions leverage sales and enable premium margins
- *New streams*: Provisions via a product-integrated app platforms

Company C: Improving R&D and Product Competencies in the Pharmaceutical Industry

Value chain functions:
Existing skills: R&D with algorithmic simulations (task-specific predictive AI)

Market offerings:
New offerings: Novel medical products like a rare disease identifier (task-specific predictive AI)

Time horizon:
Long-term: 5+ years

Handling change:
- *Internal signals*: In-house experimentation
- *Industry signals*: AI legal department
- *Industry-independent signals*: University collaborations

Competitive positioning:
- *Higher customer value*: Simplification, personalization
- *Lower price*: Higher employee productivity, better R&D decision-making, reduced expenses

Competitive defense:
- *Data protection*: International patent enforcement, R&D firewalls, anomaly detection, etc.
- *Upscaling*: Bundling patient data from medical trials

Black box doctrine:
Expert understandability: Experts need to validate that chemical simulations are correct

Technological assets:
- *IT assets*: In-house development of medical device software, hiring cybersecurity experts, acquiring AI start-ups
- *Non-IT assets*: Research alliances

Revenue streams:
New streams: Noval product offerings with premium margins

Cost structures:
- *AI automation*: Substituting humans for chemical simulations
  AI augmentation: Supporting humans in evaluating side effects

unique opportunity to systematically outcompete its rivals.

Company A wants to intensively focus on the internal playing fields that can save the highest costs. Correspondingly, as projects are long-term endeavors and require a lot of administrative effort, the board prioritizes the creation of strong technical project management skills in its engineering, logistics, and production departments. Indeed, project management costs in these functions are seen as one of the highest firm cost drivers. Hence, AI systems might be very useful to achieve operational efficiencies for the design and construction of train systems. For doing so, the company targets the adoption of a non-task-specific generative AI-based knowledge management system, processing 90% of all company-wide project management data. With this system, employees should be able to generate project reports, bills of materials, production plans, and more via a text-based chatbot interface, similar to ChatGPT.

The creation of business value favors a highly price-oriented positioning to compete with firms that offshore their firm functions to low-cost countries. For that reason, the target is to reduce the average project costs by 5%–10% while maintaining the same high-quality standards. Accordingly, the knowledge management system should save costs, with higher employee productivity, better decision-making, and less spending due to miscalculations. For its defense, Company A understands that highly sensitive firm and customer data are processed. It is putting much effort into cybersecurity measures for its network, such as anomaly detection and multi-staged access controls. The AI tool is also planned for a company-wide rollout, which reinforces the system's internal reach but also makes imitation efforts more complex.

As the ultimate business goal is to grow in terms of profit, Company A is about to create novel revenue streams by winning more future tenders. However, the overall profit margin is planned to be only slightly increased, to offer lower prices. The required cost advantages should be primarily realized by augmenting employees. The knowledge management system is intended to support humans through a central planning system to better align engineers, managers, and customers.

The technical implementation selects a combined expert and nonexpert understandability approach. Since incorrect project information can lead to costly changes or reputational losses, report generation must be validated by experts. Furthermore, more than 95% of users will be AI laypeople but need to understand the correctness of the extracted data for their individual project tasks. Thus, the system automatically explains its behavior via text messages when humans ask for it. Concerning technological assets, a large language model is needed to process written information. Due to limited resources and time, Company A externally acquired such a model and complementary cloud services for operating it. Remarkably, internal experts must further train the system with individual company-related data. As the knowledge management tool is rolled out company-wide, international AI training programs are scheduled to train employees on how to use the system properly.

Concerning dynamics, Company A knows that competitors are focusing on price reductions, too. To quickly save customer contracts, a radical one-to-two-year time horizon with many upfront investments is chosen. Besides, as the board was also surprised by the sudden rise of generative AI, it strengthened its skills to anticipate change signals. For example, the firm founded an in-house AI competence center to better investigate potential adoption use cases. In addition, competitive benchmarks help to observe the technology adoption of industry rivals. Finally, a technology assessment council regularly evaluates current AI research streams.

In sum, the presented AI business strategy presents a high level of strategic fit. Using a powerful AI-based knowledge management system can create strong project management skills in its engineering, logistics, and production departments. These, in turn, allow cost reductions that can be transferred into price reductions to save future governmental tenders. Equally important, the selected black box doctrines minimize costly project changes or reputational losses, and the external acquisition of technology assets is in line with the relatively radical time horizon. Also, the mechanisms for anticipating technological change can strongly help the firm to observe what competitors are doing and to adjust their strategy when needed.

Leveraging Customer Value with AI-Based Robotic Household Appliances

Company B is an internationally renowned B2C household appliance manufacturer, focusing on premium electronic kitchen devices. Its business context is particularly shaped by a strong dependency on customer trends concerning sustainability and robotization. Accordingly, the market is typically won by differentiating with high-quality products

that serve customer preferences better than those of its competitors. Another important sales driver is a continuous marketing presence for building a strong brand image.

Company B is convinced that contemporary AI systems are a powerful instrument for their business strategy. Due to its ongoing need for customer-centricity, a clear focus on market offerings is obligatory. This includes playing fields that are directly related to its core products, including more than 20 global and regional product series featuring refrigerators, ovens, dishwashers, microwaves, and so on. More precisely, with respect to the trend of robotization, it aims to integrate non-task-specific predictive AI algorithms into its bestsellers so that they can learn to fulfill distinctive kitchen jobs automatically. Nonetheless, Company B is also investing in the development of novel products such as self-learning cleaning robots that are compatible with different surfaces like floors, windows, and even cooktops.

Due to its product-oriented playing fields, Company B concentrates on generating business value by leveraging product attractivity with simplification, personalization, and sustainability. For instance, ovens and microwaves can learn to prepare favorite customer dishes independently. Alternatively, dishwashers can regulate water and energy consumption themselves and refrigerators can communicate with users regarding food levels. For defense, product firewalls and data encryption systems, for example, are embedded to prevent product hacking and protect collected customer data. A high device interconnectedness allows the sharing of data so that, for instance, ovens can ask for preheating when an item is taken out of a fridge.

Company B plans to achieve a financial impact by upscaling existing revenue streams instead of rearranging cost structures. Current surveys estimate that up to 60% of its customers would be interested in such smart kitchen devices. This indicates that offering products with and without AI features might allow high profit margins because customers can decide whether they want to pay for technology add-ons or not. Besides, many kitchen devices should be additionally equipped with a novel app platform. This creates a novel revenue stream, as app providers have to pay provisions for each user.

Due to several AI adoption failures in the past, the firm has learned how important appropriate implementation mechanisms are. As customers might be interested in the behavior of their complex devices, a nonexpert understandability doctrine generates simple acoustic or text-based explanations to announce or justify actions. This can prevent users from getting frustrated in cases of unintended behavior. In terms of technological assets, Company B is currently developing the product app platform internally while acquiring external cloud services. Second, it plans to invest largely in non-IT assets, such as a marketing campaign that aims at establishing an AI-driven technology brand image to support future sales promotions.

As robotic developments are very time consuming, a four-to-five-year time horizon was chosen. For dealing with internal change signals, a regular bottom-up idea exchange with the board is applied, and, to constantly align with customer preferences, global surveys should anticipate novel user trends and a customer's willingness to pay. Another approach to perceive industry change is regular visits to international fairs to compare one's own products with those of competitors. Lastly, the firm invests in various cross-industry robotic AI start-ups, which can provide useful technological insights for the future.

Overall, Company B's decisions are also mutually reinforcing one another. As the competition depends on customer trends, the firm addresses them with AI in its products. On top of that, with the help of a strong competitive defense and high customer acceptance, premium profit margins are possible. Whereas the black box approach is also customer oriented, the identified technological assets organize relevant IT investments but also increase customer awareness through a sales-promoting branding campaign. Lastly, a long-term perspective that observes all relevant change sources allows the firm to learn and rapidly adjust its strategy over time.

Improving R&D and Product Competencies in the Pharmaceutical Industry

Our last case is about a globally active pharmaceutical company with a firm history of more than 100 years. From the beginning, Company C focuses on the creation and testing of novel drugs and medical devices. Importantly, this industry is shaped by a very high time criticality for product developments and patent registrations to access a novel market before competitors. As the firm continuously gained technological experience with its previous digitization efforts, the board decided that the time seemed right to systematically integrate self-learning technologies into its existing business strategy.

Unlike the other two cases, Company C concentrates on value chain functions and market offerings. First, due to the time criticality and very high costs

of product development, one major deployment area is the R&D department, which is responsible for approximately 20% of the total operating firm expenses. Hence, it is particularly hoped that several task-specific predictive AI systems will enhance existing R&D competencies. Based on this, the company targets the development of novel medical drugs. Nonetheless, it also explores novel AI market offerings such as a prediction-based rare disease identifier for the specific task of medical diagnosing. The board strongly believes that such a product could largely innovate hospitals.

To create business value, the firm's positioning approaches high customer value and corresponding cost reduction to impact its profit margin (i.e., they are not transferred into better prices). Accordingly, the focus is on developing drugs and products that are highly simplified and personalized. More specifically, novel drugs should contain exact dosages of multiple substances tailored to the requirements of an individual patient. Alternatively, medical products can learn about distinctive symptoms to allow a better diagnosis. To reduce costs, AI should extend employee productivity, facilitate R&D decision-making, and reduce expenses by narrowing down the number of potential drug candidates to lower the number of medical trials. To defend its positioning, patent affairs are aggressively pursued on an international basis. Moreover, several cybersecurity measures like database firewalls and network anomaly detections protect critical research results. Lastly, the firm strives to mutually connect medical devices to upscale its large patient network and generate more training data.

A financial impact should be realized by both generating new revenue streams and finding better cost structures. Since registered patents can create sustainable first-mover advantages, Company C aims at financially capturing the most customer value with high price premiums for their future products. On top of this, AI tools should reduce R&D costs by automating and augmenting tasks. As an example, while biochemical simulations can be highly outsourced, interpreting potential side effects in medical trials still needs physicians and medical engineers.

Medical product development is seen as highly critical because task failures can harm human life. Moreover, conducting research and medical trials with ineffective drug candidates is costly. Thus, as medical engineers need clarity about substances or the working mechanisms of clinical devices, AI implementation orientates an expert understandability doctrine. Concerning technological assets, Company C internally develops software solutions to better collect data from its unique patient network. Also, it is constantly hiring cybersecurity specialists and plans the acquisition of medical AI start-ups to enrich its internal skills and accelerate implementation. Lastly, the board is currently discussing potential research collaborations with organizations from all over the world.

Because of the multifaceted R&D processes, Company C adopts a long-term strategy with a time horizon of more than five years. However, to deal with potential change, the firm organizes internal experimentation days in which AI experts are asked to creatively solve R&D problems. In addition, the firm founded a legal AI department to address data and patent challenges in the highly regulated pharmaceutical industry. Another attempt involves establishing an international technology hub to foster university collaborations. This allows the firm to be at the forefront of medical AI research and to attract highly skilled individuals.

Regarding fit, facilitating R&D processes can strongly decrease the average time-to-market, which leverages customer value and reduces costs in parallel. In addition, after patent registration, long-lasting first-mover advantages with high profit margins are possible, enabled by novel revenue streams and task-oriented AI automation and augmentation. Relatedly, expert understandability reduces the likelihood of critical task failures, and the chosen technological assets reinforce the speed and effectiveness of AI adoption. Finally, the strategy particularly looks for legal and research change signals that might impact the R&D department.

DISCUSSION

An AI Business Strategy Must Be Continuously Challenged

The purpose of our work has been to assist firms in formulating effective AI business strategies that build on the inherent characteristics of self-learning technologies (Berente et al., 2021). More precisely, with respect to the strategy dimensions of Hambrick and Fredrickson (2005) and the idea of strategic fit (Porter, 1996), we have underlined that an effective AI business strategy must identify suitable playing fields, improve a firm's competitive positioning, enable satisfying financial returns, specify proper implementation endeavors, and handle AI's dynamic nature proactively.

Nevertheless, due to the high importance and transformative nature of AI, practitioners must put

in much effort to prevent the creation of bad AI strategies. Consequently, managers need to continuously validate the quality of their selected decisions. For instance, does an AI strategy really achieve my overall firm goals? Is it enhancing or creating core competencies? Is differentiating my firm from industry rivals? Can it make a financial impact? Is it technologically and structurally implementable? What do I have to change over time? In addition to a qualitative assessment, we would like to highlight the relevance of quantitative measures, too. For instance, while determining the return on investments of adoption projects, revenue growth, and cost reductions might be good financial control metrics, productivity per employee, market share, or customer satisfaction might be suitable non-financial ones.

Ultimately, we encourage scholars to steadily advance our framework. Further empirical studies such as large-scale surveys or in-depth case studies should foster the debate about AI strategies and corresponding decision alternatives. Perhaps one can also identify certain strategy archetypes suitable for specific types of organizations. In addition, future research can implement the AI business strategy wheel within firms that are relatively struggling with the technology. This method can also be used to compare the behavior and performance of a company that is using our framework with one that relies on conventional approaches. Similarly, it is promising to investigate the strategies of technology leaders and compare them with our results.

Management Research and Practice Need a Balanced Perspective on AI

With this paper, we hope to initiate a scientific and practitioner-oriented discourse about the strategic management of self-learning technologies. However, while existing literature predominately focuses on the bright side of AI, we also want to highlight the technology's various limitations and negative side effects that are important for strategy (Acar, 2024). This is crucial because the past has witnessed that, when expectations have been too high, the field of AI has seen several disappointing winters (Russell & Norvig, 2020).

First, self-learning systems are shaped by several fundamental technological weaknesses so that they cannot be adopted and exploited anywhere within a firm (Brynjolfsson & Mitchell, 2017). This particularly concerns tasks that primarily require human strengths such as context awareness, imagination, or social–emotional interaction (Huang & Rust, 2018; Wilson & Daugherty, 2018). A lack of knowledge and experience regarding the strengths and benefits of the technology can be a major reason for failure (Davenport & Ronanki, 2018; Enholm et al., 2022; Li et al., 2021). Therefore, firms must be clear about what the technology can do and what it cannot do in order to strategically succeed in organizational change.

Second, AI adoption might evoke huge negative side effects. For instance, the technology can create strong power asymmetries between firms (Grewal, Guha, Satornino & Schweiger, 2021). These, in turn, can evoke very opportunistic behavior, especially when firms depend on external AI capabilities for running their business. In addition, AI is shaped by many ethical, security, and legal problems (Cheng et al., 2022; Enholm et al., 2022). It will be crucial to create sophisticated governance mechanisms aligned with firm values and regulations. Also, while contemporary AI redesigns organizational structures and job markets, high levels of human resistance and inertia will occur (Agrawal, Gans & Goldfarb, 2024; Brynjolfsson & Mitchell, 2017).

When strategists do not critically assess the technology's limitations and potential side effects for their business, AI adoption can be even counterproductive. Practitioners need a more balanced attitude toward AI and should perceive the adoption of self-learning technologies as powerful tools rather than a compelling strategy dogma. In other words, whereas firms should indeed continuously search for business opportunities, it is equally important to critically evaluate them regarding potential negative consequences. For that reason, we encourage scholars to better investigate the dark side of AI for businesses and strategy (Cheng et al., 2022; Grewal et al., 2021). It will be important to determine for which kinds of tasks AI can be adopted and for which not. Future studies should also explore how AI might impact firm dependencies, opportunism, human resistance, ethical and safety concerns, and more. This will help us to better manage AI's positive and negative effects on business and society.

CONCLUSION

In this paper, we proposed a novel practitioner-oriented framework—the AI business strategy wheel—that summarizes the five most important questions toward strategically adopting self-learning technologies with respect to their inherent characteristics. Further, we underlined the relevance of strategic fit and presented three effective AI business strategies from companies with different organizational

backgrounds. Finally, we have critically reflected on our work and suggest that both strategy research and practice require a balanced perspective on AI.

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APPENDIX A
DEFINING THE FIELD OF AI

Early AI (manual coding)	**Contemporary AI (self-learning)**	
Manually programmed algorithms that consist of effective domain-specific decision rules, extracted from the knowledge of human experts (Buchanan & Smith, 1988; Russell & Norvig, 2020)	Machine learning algorithms that autonomously detect massive amounts of correlative data patterns to form effective decision rules, including those that humans may be unaware of (Berente et al., 2021; Jordan & Mitchell, 2015)	
Expert system	***Generative AI***	***Predictive AI***
Early AI applications have been functionally applied for cognitively demanding expert tasks such as identifying complex and unknown organic molecules or diagnosing bacterial infections (Buchanan & Smith, 1988; Minsky, 1991)	The function of creating meaningful content in the form of text, images, video, code, or audio. In particular, the power to generate complex human language, as seen with ChatGPT and others, is currently popular (Berg et al., 2023, Grimes et al., 2023)	The function of estimating outputs for certain input parameters that can be used for different types of classification and forecasting, as well as decision-making tasks (Agrawal et al., 2022)

APPENDIX B
GUIDING QUESTIONS FOR FORMULATING A FITTING AI BUSINESS STRATEGY

Playing fields	**Business value**	**Financial impact**	**Implementation**	**Dynamics**
Value chain functions	***Competitive positioning***	***Revenue streams***	***Black box doctrine***	***Time horizon***
• Which firm functions are currently the most important ones for your business? • Which firm functions will become more important in the future? • Which skills do you have but not your competitors and vice versa?	• Which value–price ratio do you want to achieve with AI? • How can AI impact customer value propositions? • How can AI generate operational efficiencies that can be transferred into better prices?	• What should be the means of payment? • What are your existing revenue streams and how can you leverage them? • Where and how can you establish novel revenue streams?	• What happens in case of task failures evoked by an AI? • Which task stakeholders are personally affected by an AI's decision output? • What must be understood by experts and what by nonexperts?	• How flexible is your organization and its environment for change? • Where can you achieve first-mover advantages or catch up with competitors? • Where do you need to gain experience first, or invest for the long run?

(Continued)

Playing fields	Business value	Financial impact	Implementation	Dynamics
Market offerings	***Competitive defense***	***Cost structures***	***Technological assets***	***Handling change***
• Where can you get AI inspiration inside and outside your industry? • To which existing products and services can you add AI features? • Which novel AI innovations might fit into your portfolio?	• What is your most important training data and how can you protect it? • What might be necessary to improve your existing cybersecurity measures? • Which systems can be mutually integrated?	• Where are employees currently working the most ineffectively? • How can AI be used to substitute humans when algorithmic strengths are superior? • How can AI be used to compensate for human weaknesses and reinforce their strengths?	• What IT systems and human expertise do you need to train and utilize AI systems? • How do you handle human resistance regarding technological change? • With whom might it be beneficial to enter a technology alliance?	• Where do the most important change signals come from? • How can you perceive these change signals? • How can you adjust your AI strategy over time?

Strategic fit

- What are the key characteristics of your business?
- How can you transfer these key characteristics into a strategy?
- How do you ensure logical consistency in your decisions?
- How do you achieve a constant fit over time?

APPENDIX C
COMMON MISTAKES WHEN FORMULATING AN AI BUSINESS STRATEGY

Playing fields	Business value	Financial impact	Implementation	Dynamics
What to avoid	***What to avoid***	***What to avoid***	***What to avoid***	***What to avoid***
• Adopting AI for areas that do not make a strategic impact or unfold its strengths • Not specifying the needed AI functionalities and deployment context • Starting with very complex playing fields without having sufficient knowledge or experience • Destroying skills or customer value with unnecessary AI adoption	• Unclear or unrealistic competitive positionings • No specification of how AI directly impacts customer value or prices • Underestimating data protection and other cybersecurity needs • Developing non-connectable AI silos and omitting network effects	• Expecting inadequate revenue levels (too high or low) • Assuming a homogenous willingness to pay from customers • Automating tasks that are more suitable for augmentation and vice versa • Augmenting humans inadequately	• Ignoring black box problems • Overlooking task stakeholder and their distinctive understandability needs • Lacking critical IT infrastructure or AI specialists • Underestimating the impact of human resistance, strategic collaborations, etc.	• Determining unfeasible strategy time horizons • Hasty or inert strategy adjustments over time • Not covering all relevant change signal sources • Ignoring or falsely interpreting change signals

Strategic fit

What to avoid

- Not knowing the key characteristics of a business
- Inadequately reflecting the business context for decisions
- Making mutually misaligned decisions
- Forgetting to regularly challenge a formulated strategy

APPENDIX D
ORGANIZATIONAL BACKGROUND INFORMATION ABOUT THE THREE CASE COMPANIES

	Company A	**Company B**	**Company C**
Industry	***Mobility***	***Household appliances***	***Pharmaceuticals***
Business focus	Engineering technologically sophisticated passenger and freight transportation vehicles such as trains	Manufacturing premium household appliances with a special focus on electronic kitchen devices	Developing and testing novel drugs and medical products for various international markets
Customer target	Governments (B2G)	Private customers (B2C)	Business customers (B2B)
Major geographic markets	Africa, Asia, Europe, North America	Asia, Europe, North America	Global
Industry characteristics	• Global competition • Omnipresent price pressure due to fixed governmental budgets • Tenders are typically worth multiple billions of USD • Complex engineering projects	• Strong industry dependency on customer preferences • High importance of branding • Regional and global product series • International industry collaborations	• Large and aggressive competitors • Time-critical product development • Outstanding relevance of patents and compliance with governmental regulations • R&D as a very large cost driver
Industry trends	Decarbonization, digitization, globalization, and urbanization	Decarbonization and robotization	Demographic shifts, novel vaccinations, and personalized drugs
Employees[a]	20–50	50–100	50–100
Revenue[b]	10–20	10–20	50–100
Revenue growth[c]	5–10	1–2	10–20
Profit[d]	2–5	2–5	10–20

[a]2023—in thousands.
[b]2023—in billion USD.
[c]average last three years—in %.
[d]2023—in billion USD.