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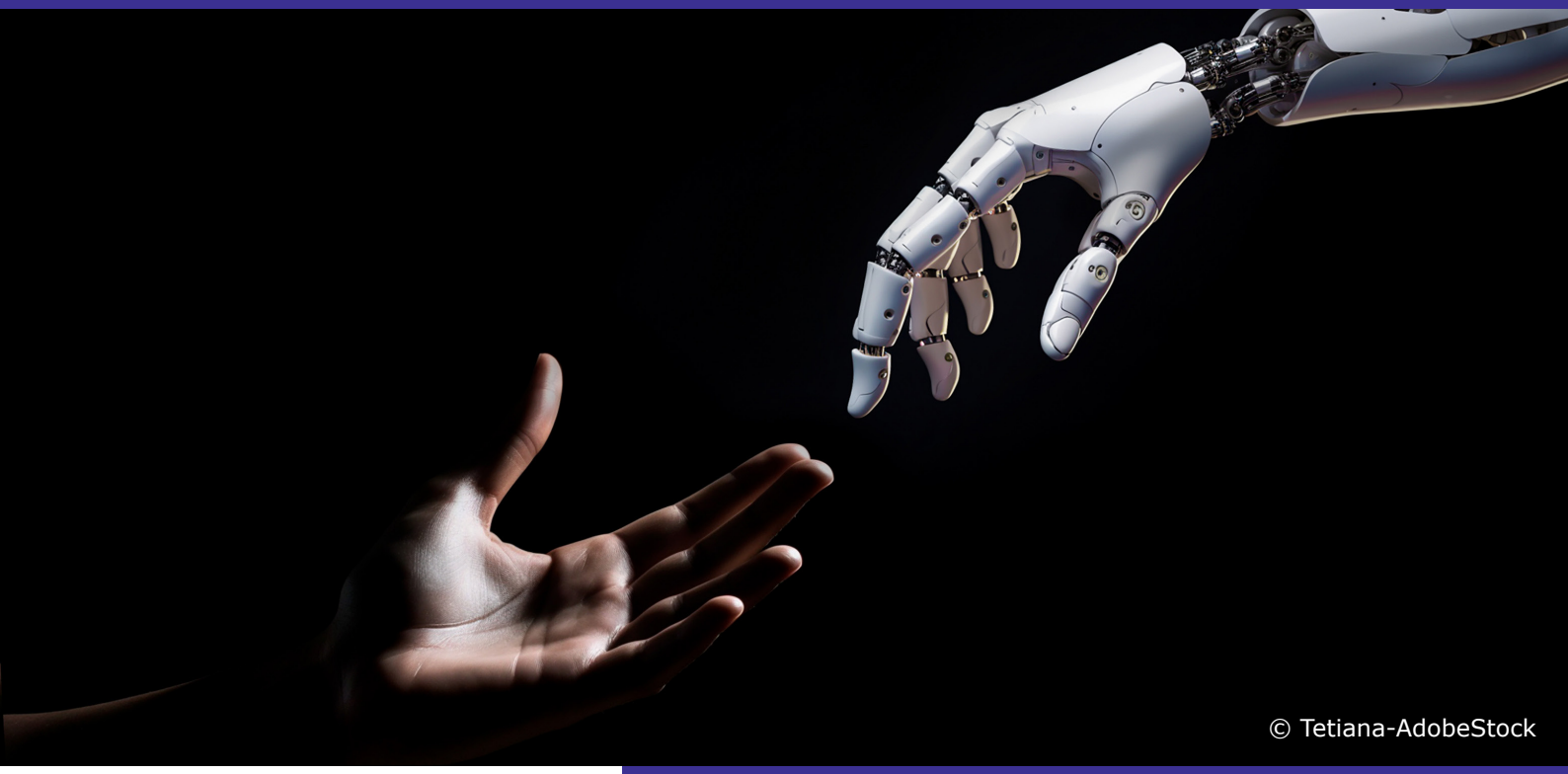

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LIGHTS - Technology

Firms' AI adoption: Challenges and first remedies

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Abstract

In our Impact Paper, we investigate the challenges of AI adoption within firms. Despite substantial investments, a majority of AI initiatives do not reach fruition due to various hurdles including implementation challenges, a gap between AI solution supply and demand, and strategic misalignment. We collect secondary data from 66 white papers from key AI service providers and leading consulting firms, and apply topic modeling algorithms to understand the practical challenges firms face when adopting AI. After that, we employ the technology-organization-environment (TOE) framework and Upper Echelons theory to identify the crucial factors influencing AI integration. Doing so, we uncover 11 core themes associated with AI adoption, highlighting the pivotal role of executive leadership in navigating these challenges, fostering a culture conducive to AI, and aligning AI initiatives with strategic business objectives. Our findings offer strategic insights for leaders aiming to leverage AI's potential effectively within their organizations.

Keywords: AI adoption, strategic leadership, topic modelling, upper echelons theory

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Firms' AI adoption: Challenges and first remedies[1]

Introduction

Despite the promise and extensive investments in artificial intelligence (AI), up to 80 percent of corporate AI initiatives fail (Bojinov, 2023). While there is excitement about AI's potential to revolutionize industries, this often focuses on specific applications of large language models (LLMs) and GPTs. However the broader AI landscape also includes diverse technologies and approaches that face similar challenges. These range from implementation hurdles to a gap between the available AI solution and the actual demand, along with strategic misalignment. This mismatch points to a crucial need for leadership at the helm of the organization in navigating AI adoption—a role primarily occupied by top executives and CEOs whose decisions shape the strategic direction of their organizations.

The adoption of AI into a firm's core business is not merely a technological upgrade but a strategic transformation that requires a strategic vision, a deep understanding of AI's capabilities and limitations, and an organizational culture conducive to embracing change (Fountaine et al., 2019). The gap between the demand for AI solutions and the available supply is not just a matter of technological shortage but also reflects a shortfall in strategic alignment and integration capabilities within organizations. This gap underscores the important role the leadership's strategic vision, commitment, and understanding play in navigating the challenges of AI adoption. The influence of top executives goes beyond decision-making to shaping organizational culture, aligning AI initiatives with overarching business goals, and addressing the challenges of integration, from technical hurdles to workforce adaptation.

This Impact Paper builds on research by Dong et al. (2023) and delves into the dynamics of AI adoption by examining secondary data from white papers published by leading AI service providers and consulting firms. Using the topic modelling algorithm, we extract common challenges mentioned in the dataset, which allows us to unravel the complexities of supply and demand in AI solutions. By applying Upper Echelons theory, we offer a new perspective that is more practitioner-oriented, highlighting the critical role of top executives in bridging the gap between AI's potential and its practical realization within organizations. Through this exploration, we hope to contribute insights into the strategic and managerial implications of AI adoption, and offer guidance for decision-makers navigating the promising yet risky journey of integrating AI into the core of their organizations.

Research method

This study uses secondary data collected from white papers published by top AI service providers, such as Amazon and IBM, and leading consulting firms such as McKinsey and BCG. A total of 66 white papers were retrieved from 15 firms. The white papers were manually investigated to discard case studies or industry-specific use cases. This ensured that only content on the general knowledge of AI service providers would be analyzed, so as to preserve the results' generalizability.

The data were then cleaned using Python toolboxes. The pdf files were converted into txt files. Numbers, punctuation, and characters not forming English words were removed.

[1] This Impact Paper is based on findings from Dong and colleagues (2023). We add the Upper Echelons theory to narrow down the general TOE perspective and offer a more hands-on perspective for decision-makers.

Empty tokens and common stop words shorter than two letters were discarded. Words that are high in occurrence but do not contribute to meaningful insights, such as “data”, “computer”, “McKinsey”, etc. were deleted. After that, the entire bag of words was analyzed to form collocations (tokens that co-occur frequently in the corpus). This resulted in 16 collocations, such as “artificial_intelligence,” “machine_learning,” “use_case” and “supply_chain.” The final data preparation step was “aggressive” cleaning, whereby common and uncommon tokens based on the document frequency threshold were removed. The final corpus for analysis consisted of 3,410 words.

After that, a topic modelling algorithm called Latent Dirichlet Allocation (LDA) was applied to understand the main topics of the corpus. It is considered a “soft clustering” way of grouping documents according to their underlying themes. The essence of LDA is to represent posteriorly a document on several topics with some probabilities (Blei et al., 2003).

The topics obtained from LDA are further categorized using the technology-organization-environment (TOE) framework. This is a classic lens to classify and clarify the factors obtained from topic modelling, and to further understand the key challenges in AI adoption (Depietro et al., 1990). Finally, the Upper Echelons theory is used to discuss the findings.

Findings

Most of the findings from the topic modelling are based on Dong et al. (2023). In this impact paper, we highlight some of the most important findings we obtained from our analysis of the data.

The output of the LDA algorithm was a coherent score, on the basis of which a total of 11 topics were decided. The topics are labelled “Artificial intelligence”, “Algorithm”, “Skill”, “Worker”, “Vision”, “Scale”, “State”, “ERP”, “Organizational”, “Services” and “Use cases”.

Using a TOE framework as a theoretical lens, we categorize and explain themes obtained from the previous topic modeling algorithm. The key contexts of the framework are, naturally, technology, organization and environment. The topics were allocated into the three contexts. After that, the challenges under the topics are illustrated. Table 1 illustrates those challenges.

Table 1: Challenges in EAI implementation, analyzed using the TOE framework (Dong et al., 2023)

Context	Topics	Challenges
Technology	Artificial intelligence, algorithm, ERP	Complexity of software functionality
		Complexity of integrating systems
		Potential bias in algorithms
		Performance measures are not adapted to ensure changes
		Challenges in measuring and proving business value
		Analytics roles are poorly defined
		Data accuracy is not ensured
		Explainability of models and outputs is not clear
		Lack of relevant data

		Security and privacy concerns
		Technical difficulties, such as bugs, hardware connectivity, or interfaces with older systems
		Data privacy and integrating issues
Organization	Worker, skill, organizational, vision, scale	Lack of top management commitment and support
		An implementation team is not properly selected
		Integrating AI into the company's roles and functions
		Uncertainty regarding the added value of AI
		Uncertain ROI for AI
		Inadequate training of users
		Inadequacy of qualified staff
		Executives lack a clear vision
		Lack of skills in AI
		Organizational structure
Environment	State, service	Lagging behind direct and indirect competitors who have already implemented AI
		Difficulty in aligning AI solutions with the firm's vision
		Lack of/poor support provided by vendors
		Ethical, social, and regulatory implications
		Lack of availability from implementation partners
		Data strategy and governance

The challenges from the topic modelling can be further reviewed from two different perspectives: the AI vendors and the AI users. Interestingly, both parties often have contradicting opinions on the same challenge. Table 2 highlights some of them.

Table 2: Vendors and users have different opinions on the challenges of AI implementation (Dong et al., 2023)

Vendors' perspective	**Users' perspective**
AI software is already comprehensive	The output of AI software cannot explain real problems
There is a lack of relevant data to implement AI	There are concerns about the security and privacy of data
The user has not properly selected an implementation team	The vendor has not provided sufficient support for AI implementation

Firms have a slow AI adoption rate	Managers are uncertain about the added value and ROI of AI adoption
Executives do not have a clear vision on AI adoption	It is difficult to align AI solutions with the company vision

These contradictions reveal the fact that there exists a gap between the features demanded by end-users and the skills possessed by and focused on by AI service providers. For example, whereas vendors are asking for more data to implement AI, users are hesitating to do so due to privacy concerns.

Another important finding is that the topics and challenges found are inter-connected. Indeed, it is difficult to address any single challenge without evaluating it in the holistic AI ecosystem, with technological, organizational and environmental aspects. For example, insufficient skills to implement AI sounds like an technological issue, but it can also be driven by a lack of management support (organization issue) or perhaps by the misunderstanding between the vendor and the user (environmental issue).

Discussion

The insights drawn from our analysis of 66 white papers from leading AI service providers and consulting firms reveal a complex landscape of AI adoption marked by significant challenges and contradictions. Adopting an Upper Echelons perspective (Hambrick and Mason, 1984; Hambrick, 2007), we delve into the crucial role that top executives play in guiding their firms in adopting AI. This theoretical lens, emphasizing that organizations are a reflection of the top executives' cognitive bases and experience, offers a nuanced understanding of strategic decision-making processes and the organizational outcomes.

Executive influence on AI adoption

Our analysis highlights a growing recognition among CEOs and top executives of the strategic necessity to integrate AI into their business models. This shift reflects a strategic acknowledgment of AI's potential to be a game-changer in enhancing operational efficiency, customer experience, and competitive positioning. However, this enthusiasm to embrace AI is not without external pressures. Stakeholder expectations—ranging from investors and analysts to board members—can steer executives towards hastened AI initiatives. This rush, often motivated by the desire to manage impressions (the "more is better" fallacy), empire building, and the urge to keep up with competitive dynamics, might not always be underpinned by a solid rationale or a deep understanding of AI's intricacies. Such scenarios underscore the importance of balancing the drive for technological advancement with a critical assessment of its strategic fit and viability.

An interesting example of executive influence on AI adoption is Satya Nadella's leadership at Microsoft. Entering the CEO office in 2014, Nadella pivoted Microsoft towards AI integration at its strategic core, aiming to reposition it as a leader in AI and cloud computing. This strategy was not just a pursuit of new technology but a calculated effort to harness AI for operational efficiency and innovative product offerings, such as Azure's AI services and AI enhancements in Office 365. Nadella's approach illustrates the balance between embracing AI and critically assessing its strategic fit, demonstrating that successful AI adoption is underpinned by a clear vision and strategic alignment (McKinsey, 2018).

Strategic vision and AI adoption

A clear and coherent strategic vision in AI adoption is often complicated by the multifaceted challenges identified in the white papers. These challenges, ranging from the complexity of software functionality to the inadequacy of qualified staff, highlight the gap in understanding that many executives face regarding AI's capabilities and limitations. The vision-setting process, however, is fraught with these challenges. Many CEOs and top executives, despite their enthusiasm for AI, lack detailed knowledge of its capabilities and limitations. As AI becomes enveloped in a bunch of buzzwords and inflated promises, distilling a clear and actionable strategic vision becomes increasingly complex. This gap in understanding can lead to misaligned expectations and missed opportunities in harnessing AI's full potential.

A recent study by Deloitte (2024) reinforces this perspective, highlighting the importance of CEOs in setting the tone and vision for generative AI adoption within their organizations. Success in digital transformation, potentially adding significant value, relies on CEOs envisioning generative AI not just as a tool for operational efficiency but as a fundamental element in redefining business models and strategies. This requires a shift in leadership approach, from exploring proofs of concept to making critical capability investments, thereby aligning generative AI with the overall business strategy.

Leadership and organizational resistance

The thematic analysis of the white papers reveals a significant barrier to AI adoption: organizational resistance. This resistance, driven by fears of job displacement, and concerns over reorganizations, stresses the necessity for transparent and inclusive leadership. A lack of clear communication and transparency from top management can create a disconnect, leading to skepticism and resistance at lower organizational levels. This underscores the need for CEOs and senior executives to include AI adoption not only in strategy but in fostering an organizational culture that supports change, innovation, and technology acceptance.

Cognizant provides an illustrative example (Pirard & Cartwright, 2023). The company focused on shifting employees' resistance to AI into acceptance and advocacy by implementing a series of strategic interventions. Understanding and addressing the multifaceted fears of job displacement, the mystery surrounding AI, and the concerns of reorganizations were key. Cognizant employed education as a primary tool to demystify AI, conducting seminars, workshops, and interactive training sessions to make employees active participants in the AI journey. Additionally, involving employees in decision-making processes related to AI, creating a climate of trust through transparent communication, and ensuring consistent engagement with the workforce to voice concerns were crucial strategies. These actions helped in transforming resistance into a supportive culture for AI adoption.

The European approach to artificial intelligence

Europe is actively fostering excellence in AI for its global competence. Its focal point is not only on the development and application, but also the ethical standards of AI. Since its initial effort in drawing up a guideline on AI ethics in 2018, the European Commission has published a number of guidance documents to ensure the safety and trustworthiness of AI (European Commission, 2024). The world’s first comprehensive AI law was ratified by the European Parliament in March 2024.

Our secondary data are collected from leading AI vendors and consulting firms, almost all of which are US-based. The analysis of these data does not reveal a clear mainstream topic on ethical AI issues. This may be partly because the purpose of these articles is to support vendors in selling AI products, rather than deterring potential customers by highlighting the problems associated with AI. However, it can be observed that the ethical dimension of AI is a distinct feature of Europe's AI strategy, which is less critically recognized by other leading economies such as the U.S. or China.

Europe's unique focus on AI ethics is a double-edged sword. On the one hand, the risk-based approach can protect European stakeholders from the outset. On the other hand, it may also cause European firms to miss some initial development opportunities.

Managerial implications

Leadership commitment to AI adoption

Top executives must recognize AI's strategic importance, transcending its role from a peripheral technology to a core component of business strategy. This commitment should be grounded in a deep understanding of AI's capabilities and limitations, avoiding the pitfalls of adopting technology based on external pressures or alluring trends. With this commitment, a data strategy and governance structures are crucial for responsible AI adoption. This includes addressing privacy concerns, ensuring ethical AI use, managing data acquisition, and establishing clear regulations. AI governance should be woven throughout the organization, with existing governance frameworks adapted to reflect the nuances of AI technology.

Developing a strategic vision for AI

A coherent and actionable strategic vision for AI is paramount. Leaders are tasked with aligning AI initiatives with the firm's broader objectives while identifying opportunities for leveraging AI for value generation. This process is challenging, as it necessitates a departure from simple exploration to making substantial investments in AI capabilities. To do so, a holistic approach is essential. This transcends the mere implementation of technology to encompass strategic alignment, cultural adaptation, and organizational readiness. A rigorous assessment of AI's strategic fit is essential, coupled with a commitment to transparent communication.

Overcoming organizational resistance

Effective leadership is crucial in transforming resistance to AI into organizational acceptance and advocacy. Educational initiatives, and inclusive decision-making processes such as Open Strategy (for more see Hautz et al., 2017) are key strategies for fostering a culture supportive of AI adoption. In addition, cultivating a culture that prioritizes learning and innovation is paramount. Executives are encouraged to lead by example, demonstrating an openness to exploring new technologies and approaches. This involves engaging in open strategy discussions, executive change communication, and investing in a future-ready workforce. By promoting a culture of continuous learning and adaptation, organizations can better navigate the challenges and opportunities presented by AI.

Practical steps for executives

- Commit to understanding AI: Dive deep into AI technologies to make informed strategic decisions.
- Align AI with business goals: Ensure that AI initiatives resonate with the firm's objectives and explore how AI can create additional value.
- Cultivate a supportive culture: Lead efforts to foster an organizational environment that is receptive to change, emphasizing continuous learning and innovation.
- Communicate transparently: Engage in open dialogue about AI's role within the firm, addressing potential concerns and outlining the benefits across levels.
- Empower through inclusion: Involve employees at various levels in the AI adoption process, making them feel valued and reducing resistance.

In conclusion, the path toward successful AI adoption is challenging and requires an approach centered around strategic vision, organizational alignment and understanding. By embracing these managerial implications, decision-makers should be better equipped to face the challenges of AI integration, unlocking new avenues for change and growth in an increasingly digital world.

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