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# AN ALGORITHMIC SOCIETY AND ITS IMPACT ON THE COMPETITIVENESS OF ORGANIZATIONS

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**Purpose:** This article aims to provide a deeper understanding of how algorithms influence competitive advantage, organizational decision-making, and potential ethical dilemmas.
**Design/methodology/approach:** The primary research assumption is that the integration and use of algorithms significantly affect organizational competitiveness and communication. Algorithms offer opportunities for enhanced efficiency, improved decision-making, and product differentiation, but they also pose challenges related to transparency, organizational dynamics, and ethics. The central research question is: how do algorithms influence the creation and maintenance of competitive advantage, the dynamics of organizational communication, and decision-making processes within organizations?
**Findings**: The research highlights differences in the adoption and use of algorithms (including artificial intelligence) across countries, identifies the most common application areas of generative AI in organizations, and examines cost reduction and revenue growth driven by GenAI implementation. Additionally, the study explores the level of personal understanding of GenAI and its perceived impact on business processes across various industries.
**Research limitations/implications:** The study faces limitations in assessing the nuanced impact of algorithms on human interactions and in adapting findings to diverse industries. Practically, organizations must balance automation with human oversight to ensure ethical and effective decision-making. Navigating these dynamics is critical to fully leveraging the benefits of algorithms while addressing associated risks.
**Originality/value:** This research provides a comprehensive exploration of how algorithms shape organizational dynamics and competitiveness. It offers practical insights into the diverse applications of algorithms and highlights challenges such as transparency and communication dynamics posed by AI integration. By bridging theoretical perspectives with practical implications, the study delivers valuable guidance for organizations adapting to the transformative impact of AI.
**Keywords:** algorithms, competitiveness, organizational decision-making; generative artificial intelligence (GenAI); business transformation.
**Category of the paper:** scientific research.

## 1. Introduction

The rise of artificial intelligence and machine learning has given birth to an algorithmic society, where algorithms influence decision-making processes in organizations including communication (Gillespie, 2014; Wang, 2019; Cormen et al., 2022).

As organizations seek to enhance their efficiency, agility and competitiveness, algorithms have become a strategic asset. These technologies are redefining competitive advantage by enabling more precise data-driven insights, optimizing operations, and enhancing decision-making. However, while the algorithmic society offers significant benefits for competitiveness, it also introduces challenges related to human interaction and governance and the risk of over-reliance on opaque systems. This article explores the impact of an algorithmic society on organizational competitiveness and communication, examining its potential to drive efficiency and innovation and at the same time reshaping decision-making, and human interactions. Taking into account that today's dynamic business environment is characterized by volatility, uncertainty, complexity, and ambiguity (VUCA) as well as brittleness, anxiety, nonlinearity, and incomprehensibility (BANI) (Cascio, 2020; Grabmeier, 2020) algorithms are playing an increasingly significant role in shaping organizational decision-making and communication. In a VUCA world, algorithms may help organizations navigate uncertainty by offering data-driven solutions that can anticipate market changes and disruptions. This enhances organizational agility and enables quicker responses to unpredictable situations. However, the complexity and ambiguity inherent in a VUCA environment can complicate the effectiveness of algorithms, as they may struggle to account for rapidly changing variables or emergent trends, leading to potential communication breakdowns or misinformed decisions. Similarly, in the context of BANI, the brittleness of algorithmic systems can create rigid decision-making structures that may overlook the nuances of human interaction or lead to a lack of empathy in organizational communication. Algorithms, while efficient, can also foster anxiety among employees The lack of transparency related to use of algorithms can erode trust, making it difficult for employees to understand how decisions are being made, and hindering effective communication.

## 2. Literature review

In today's dynamic global economy, the ability to process and analyze large volumes of data is critical for maintaining competitive advantage. Algorithms enable organizations to make faster and more informed decisions by identifying patterns and trends in complex datasets. This capability allows firms to optimize their supply chains, manage customer relationships

more effectively, and predict market movements with greater accuracy (Agrawal, Gans, Goldfarb, 2018). For example, predictive analytics helps companies anticipate customer demand, allowing them to adjust production levels and reduce operational costs (McAfee, Brynjolfsson, 2012). Moreover, the integration of algorithms into product development processes fosters innovation. Algorithms can analyze vast amounts of market data to inform the creation of products that better meet consumer needs. In sectors like e-commerce and digital marketing, recommendation algorithms have become essential for personalizing customer experiences and driving engagement, directly impacting profitability and competitive positioning (Kellogg et al., 2020; Shin, 2021).

One of the most significant contributions of algorithms to organizational competitiveness is their ability to enhance operational efficiency. Automated decision-making tools and algorithmic management systems reduce the time required to perform routine tasks, enabling organizations to redirect human resources toward more strategic activities (Wilson, Daugherty, 2018). For example, in manufacturing, algorithms are used to streamline production processes, reducing waste and improving quality control, which ultimately enhances competitiveness (Buxmann, Hess, Thatcher, 2021).

Another key application of algorithms that contributes to cost reduction is robotic process automation. By automating repetitive tasks like data entry and transaction processing, employees can focus on higher-value tasks. This automation not only reduces labor costs but also minimizes errors and increases the speed of operations (Autor, 2015). Such efficiency gains allow firms to maintain competitive pricing strategies while offering high-quality products and services, enhances their standing in the market.

Algorithms significantly enhance decision-making capabilities by offering real-time insights and data analysis that would be impossible for human workers to process manually. Machine learning algorithms analyze large datasets to identify trends and correlations, offering organizations actionable insights for decision-making. This is particularly important in industries such as finance and healthcare, where the ability to make rapid, data-driven decisions can be the difference between success and failure (Davenport, 2018). For example, in financial markets, algorithms are used to execute trades at lightning speed, allowing firms to capitalize on fleeting market opportunities. Similarly, risk assessment algorithms enable banks to evaluate the creditworthiness of borrowers more accurately, reducing default rates and enhancing profitability (Agrawal, Gans, Goldfarb, 2018). Such advantages in decision-making enhance an organization's strategic positioning by allowing them to outmaneuver competitors and respond more quickly to market changes. The ability of algorithms to process vast amounts of data has also significant implications for innovation and product differentiation. Algorithms enable organizations to harness big data for insights that drive product development, personalization, and market differentiation. In the context of e-commerce, for instance, firms that deploy sophisticated recommendation algorithms can tailor product suggestions to individual customers, increasing satisfaction and driving business benefits (Shin, 2021).

In industries where disruptive innovation is key to maintaining competitiveness, algorithms facilitate the identification of new business models, markets, and product lines. Firms that effectively integrate AI and algorithms into their innovation processes are better positioned to create unique, differentiated offerings, ensuring long-term competitiveness in dynamic markets (Buxmann, Hess, Thatcher, 2021).

In addition to the above-mentioned impact of algorithmic technologies on the competitiveness of organizations, the impact on organizational communication was also given attention in the research. In particular it should be noted that algorithms introduce complexities to organizational communication. Traditional structures, based on hierarchical flows, are evolving as decision-making shifts to algorithms, altering interactions within organizations Automated systems, such as chatbots, streamline communication but can reduce transparency and create gaps in understanding, as decisions made by algorithms are often hard for employees to interpret (Pasquale, 2016; Gulbrandsen, Just, 2024; Hassan, 2024). Algorithms increasingly support or even replace human decision-making in areas like recruitment and project management (Dastin, 2018). This can lead to faster decisions but also raises concerns about fairness and accountability, especially where encoded biases affect outcomes, potentially eroding trust between staff and management. Trust, a core element of communication, may weaken in environments where algorithms overlook social nuances, risking perceptions of unfairness. Also transparency is critical as algorithms take on decision-making roles. Often opaque algorithms can foster employee alienation (Beer, 2017; Ananny, Crawford, 2018).

## 3. Methods

Given the complex, evolving nature of algorithmic integration in business environments, a comprehensive literature review was conducted to thoroughly examine organizational behaviors, perceptions, and responses to algorithmic influences on competitiveness. This review aimed to explore how algorithms impact decision-making, communication dynamics, and competitive strategies within organizations, providing a theoretical foundation for understanding their transformative effects.

The research utilized a triangulation approach to data reviewing in documents related to algorithmic initiatives, performance reports, and academic literature. This will allow for an assessment of how algorithms affect the competitiveness of organizations.

The collected data will be analyzed using a thematic analysis approach to extract key themes related to the impact of algorithms on competitiveness and help in understanding of the role algorithms play in shaping competitive advantage.

## 4. Results

In analyzing the implications of an algorithmic society for organizational communication and competitiveness, recent studies highlight both transformative potentials and key challenges.

However, the situation in terms of using algorithms (artificial intelligence) in their businesses varies significantly across countries. Chart 1 shows the percentage of companies using this type of tool in selected countries.

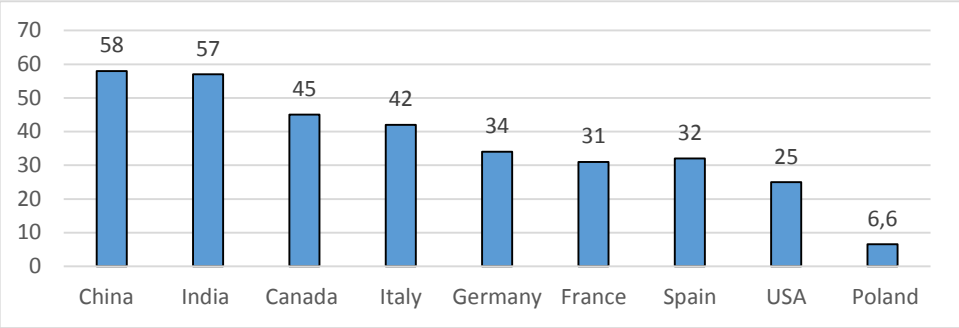


**Figure 1.** Percentage of enterprises adopting advanced artificial intelligence (AI) algorithms across selected countries, illustrating the varying levels of AI utilization in corporate practices globally [%].

Source: Own elaboration based on Polish Economic Institute, Economic Weekly PIE, 2024, https://pie.net.pl/wp-content/uploads/2024/06/Tygodnik-PIE_24-2024.pdf

The PIE report highlights significant economic trends tied to artificial intelligence (AI). Key findings include the transformative role of AI in boosting productivity across industries, especially through automation and predictive analytics. The report indicates that AI is most commonly implemented by service companies, with 20% adoption. In contrast, AI usage is minimal in construction, where only 0.06% of firms report employing it. Similarly, the trade and transport sector shows low adoption rates, at just over 2.5%. Sectors with higher AI adoption tend to believe more strongly in its transformative impact on their operations and industry dynamics.

Another result of the research is the analysis of the areas of application of generative artificial intelligence in organizations. Figure No. 2 shows the adoption of generative AI (GenAI) tools across various organizational functions.

Chatbots and customer interactions have the highest adoption, with 43% already using GenAI and 39% planning to adopt it within the next 6-12 months. Text and image generation are also prominent, with 34% and 27% currently using these tools, respectively, and strong plans for future adoption. Price optimization and customer journey mapping are less commonly used, with only 14% adoption for price optimization.

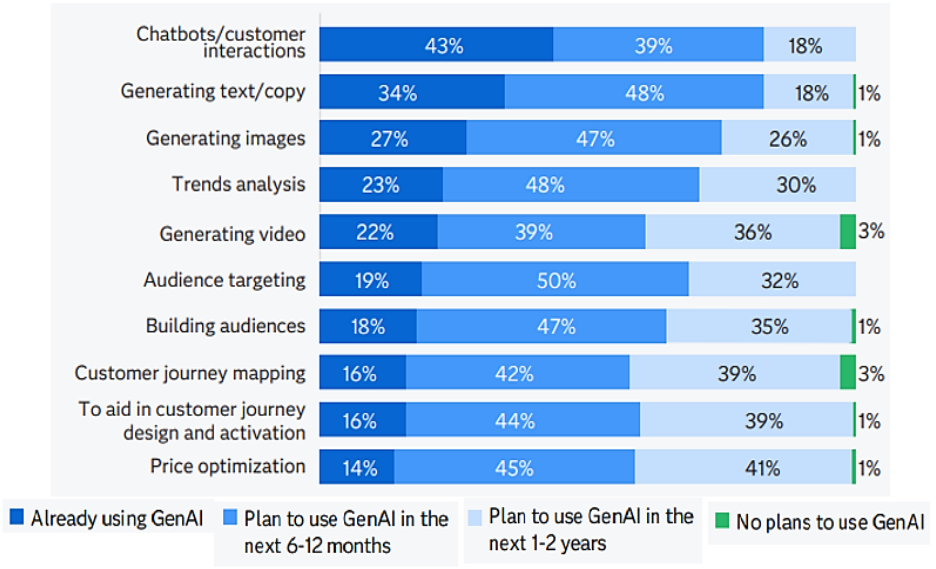


**Figure 2.** Key application areas of generative artificial intelligence (GenAI) in organizations, detailing current usage levels and future adoption plans across functions such as customer interactions, content creation, and analytics.

Source: SAS Institute Inc. Marketers and GenAI: Diving Into the Shallow End.2024. https://www.sas.com/content/dam/SAS/documents/marketing-whitepapers-ebooks/ebooks/en/gen-ai-for-marketers-research-report-114003.pdf

Another analysis shows cost reduction and revenue growth driven by the implementation of generative AI (Figure 3).

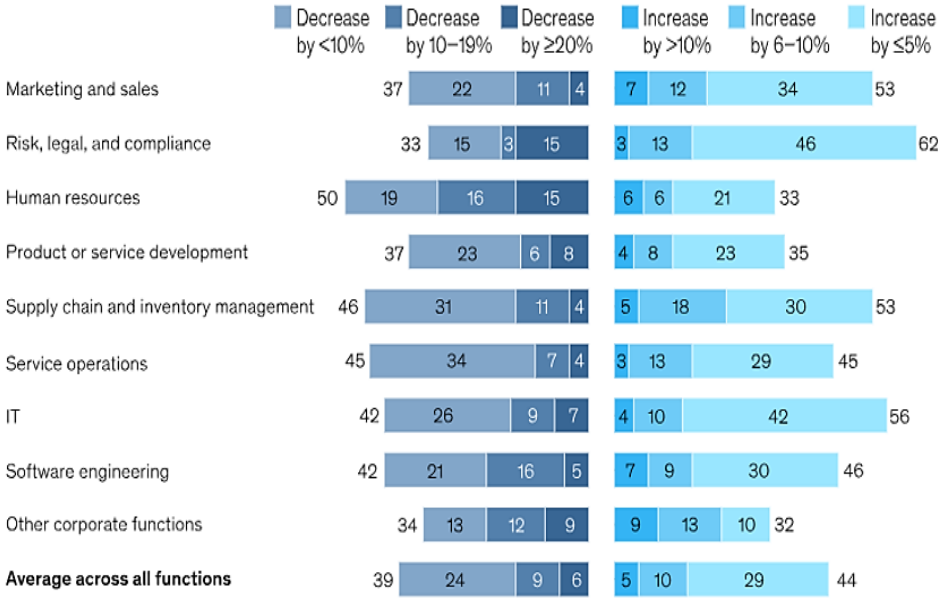


**Figure 3.** Impact of generative AI on cost reduction and revenue growth across various organizational functions, showing percentages of increases and decreases by different ranges of magnitude.

Source: McKinsey. The state of AI in early 2024. https://www.mckinsey.com/capabilities/quantumblack/our-insights/the-state-of-ai#/

The results shown on Figure 3 highlight the impact of AI adoption across various organizational functions. Revenue has notably increased in "Risk, legal, and compliance", with 62% of respondents reporting improvements. Substantial boosts have been realized

in IT (56%) whereas "Marketing and sales", and “Supply chain, and inventory management” are the next two functions achieving similar gains (53%). Costs also decreased across all functions, with the largest decrease observed in People Management (50%).

The SAS Institute report also shows interesting results regarding assessment of personal understanding of GenAI and its potential impact on business processes. As can be seen from Figure 4, the greatest understanding of the impact of GenAI was observed in the Health sector, while surprisingly the smallest in the Banking sector.

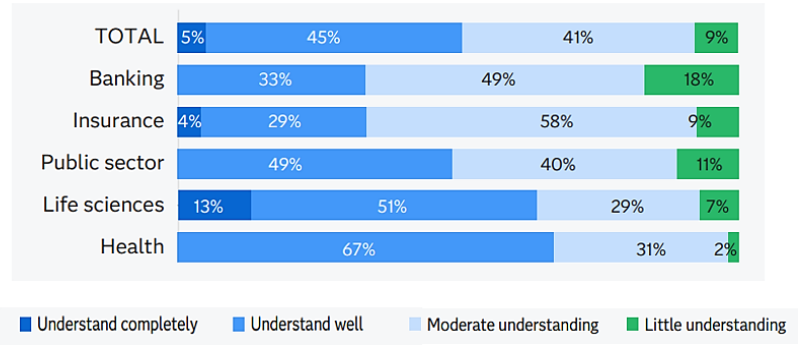


**Figure 4.** Survey results showing the level of personal understanding of Generative AI (GenAI) and its perceived impact on business processes across various industries, categorized by the depth of understanding.

Source: SAS Institute Inc. Marketers and GenAI: Diving Into the Shallow End.2024. https://www.sas.com/content/dam/SAS/documents/marketing-whitepapers-ebooks/ebooks/en/gen-ai-for-marketers-research-report-114003.pdf

As can be seen from the above results, the impact of algorithmic systems on the organizational environment varies across sectors, but common themes across sectors include increased efficiency, enhanced decision-making capabilities, and new communication dynamics. In the area of communication, algorithms in particular contribute to more efficient information dissemination, enable more tailored and timely internal communication, which can improve response times and increase staff engagement. However, there is also a risk that overreliance on algorithmic communication can undermine human-centered interactions, affecting collaboration and empathy in the workplace.

The adoption of GenAI varies significantly across sectors due to differing industry dynamics and challenges. For instance, in construction, regulatory barriers and strict safety standards often delay the integration of AI solutions. The construction sector's low AI adoption rate (0.06%) reflects the complexities of aligning innovative technologies with compliance frameworks and physical-site operations. Conversely, e-commerce, driven by high consumer demand for personalization and efficiency, exhibits greater AI integration. In this sector, GenAI powers customer service chatbots, personalized marketing, and inventory management, helping businesses maintain a competitive edge in a fast-paced market.

Algorithms can offer organizations a strategic advantage by enabling rapid processing of data and generating insights that are key to competitive positioning in rapidly changing markets. For example, in industries such as e-commerce and finance, algorithms are integral to analyzing

consumer behavior and financial trends in real time, allowing companies to quickly adjust strategies and remain competitive. However, the absence of governance frameworks for algorithmic decision-making can lead to ethical and operational risks, including biases and transparency issues.

According to the SAS Institute report, which examines and compares how marketers and IT professionals perceive the benefits and challenges of integrating generative AI (GenAI) into organizational data analysis and operational workflows, both groups recognize its significant potential. Specifically, 61% of marketers and 53% of IT professionals strongly agree that GenAI enhances customer personalization and engagement, underscoring its perceived value in customer-centric strategies. A notable portion of respondents, 58% of marketers and 57% of IT professionals, believe that GenAI will drive innovation and help maintain a competitive advantage. Efficiency gains and cost savings are also highly anticipated, with 56% of marketers and 49% of IT professionals expressing agreement. In terms of predictive analytics and real-time decision-making, over half of marketers (56%) and IT professionals (53%) recognize GenAI's role in improving predictive analytics accuracy. However, fewer respondents see real-time decision-making as a top benefit, with 46% of marketers and 37% of IT professionals agreeing on its importance. Challenges associated with integrating open-source large language models (LLMs), such as issues related to data privacy and compatibility, are acknowledged, but they are largely viewed as manageable, with 48% of marketers and 40% of IT professionals expressing this sentiment. Overall, marketers tend to have a slightly more optimistic view of GenAI’s potential to transform customer engagement and drive innovation, likely reflecting their focus on consumer interaction. IT professionals share this enthusiasm but place greater emphasis on practical challenges, such as data privacy. Despite these differences, both groups broadly agree on the substantial potential of GenAI to improve organizational efficiency and predictive analytics, underscoring its growing importance in strategic operations (SAS, 2024).

## 5. Discussion

The research results highlight the transformative impact of algorithms on organizational communication and competitiveness. While algorithms enhance communication efficiency, they may create standardized patterns that lack personal nuances and contextual awareness, which are essential for fostering effective human interactions. For example, chatbots used in team collaboration can streamline routine queries and provide immediate responses, reducing response times (Sharma et al., 2024). Similarly, automated reporting tools generate real-time performance dashboards, enabling quicker decision-making without manual intervention (Gurjar et al., 2024). Additionally, natural language processing (NLP) algorithms facilitate sentiment analysis in employee feedback, providing managers with insights into team morale

and engagement (Rayhan et al., 2023). Overreliance on such systems can hinder interpersonal collaboration and reduce workplace creativity. This underscores the need for organizations to strike a balance, leveraging algorithmic tools while preserving human-centric communication practices to maintain the depth and quality of interactions (Helberger et al., 2020).

Algorithms have significantly advanced the competitive position of organizations by enabling sophisticated data analysis and predictive capabilities. Industries such as finance and e-commerce particularly benefit, as algorithms provide real-time analysis crucial for rapid market adaptation. However, this competitive advantage introduces challenges, including the reinforcement of biases in decision-making and the difficulty of developing governance frameworks that ensure ethical and transparent use. In VUCA environments, where uncertainty and complexity are prevalent, organizations must implement agile governance systems to adapt algorithms to dynamic market conditions.

Effective governance frameworks are vital for ensuring that algorithmic systems align with ethical principles and organizational objectives. Challenges such as transparency and accountability are increasingly relevant as algorithms mediate interactions between stakeholders. Moreover, the relationship between algorithms and innovation reveals a paradox: while algorithms enhance data-driven insights, they may stifle creativity by imposing rigid structures and prioritizing measurable outcomes. Addressing this paradox requires balancing algorithmic efficiency with a culture that encourages human intuition and open-ended problem-solving.

In summary, algorithms play a dual role in enhancing competitiveness while challenging traditional communication norms. For organizations to effectively leverage these systems, a strategic approach that balances efficiency with ethical and human-centered considerations is essential. As algorithmic influence permeates organizational practices, further research into governance and communication frameworks will be crucial for ensuring the sustainable and responsible use of algorithms in the evolving business landscape.

Limitations of the research include the difficulty of understanding the impact of using algorithms on human interactions and adapting findings across diverse industries. Additionally, rapid technological advancements make predicting future effects challenging.

The use of algorithms has a number of practical and social implications. Practically, balancing automation with human oversight is essential to ensure ethical and effective decision-making. Transparent governance frameworks, tailored industry strategies, and structures preserving interpersonal communication are necessary for responsible implementation. Organizations must carefully navigate these dynamics to leverage algorithms' benefits while mitigating associated risks.

## 6. Conclusion

The research results demonstrate that while algorithms significantly enhance organizational competitiveness and communication, they introduce complex challenges associated with human interaction, governance, and innovation. To effectively operate in the VUCA and BANI environments, organizations must balance leveraging algorithmic capabilities with maintaining robust human oversight. This balance ensures that algorithmic systems remain aligned with organizational values and foster meaningful communication. Transparent, adaptable, and ethically sound algorithmic decision-making processes are paramount for organizational success in an increasingly volatile and uncertain landscape.

Human-algorithm interaction is reshaping workplace dynamics, mediating communication and decision-making processes. While this enhances operational efficiency, it risks reducing empathetic engagement and collaboration among teams. Organizations must ensure that algorithmic systems promote transparency and fairness while adapting to rapid technological changes. Agile governance frameworks and ongoing stakeholder feedback are essential for aligning algorithmic practices with ethical standards and organizational values.

In conclusion, algorithms are transformative but pose complex challenges that require nuanced strategies to address. Organizations must focus on integrating human oversight with algorithmic efficiency to foster adaptability and innovation. Further research should explore how human-centric approaches can be harmonized with algorithmic processes to preserve the value of interpersonal communication and decision-making. Additionally, investigating industry-specific applications will provide actionable insights for leveraging algorithms responsibly and effectively, ensuring long-term organizational success in competitive and rapidly evolving markets.

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