# REALISING FULL POTENTIALS OF ARTIFICIAL INTELLIGENCE (AI) IN A DIGITAL ECONOMY: A NUMERICAL REVIEW APPROACH

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**Abstract**

*Artificial Intelligence (AI) is widely considered as a driving force in the current digital economy, with many firms having already invested in AI. Since AI is unconstrained by humans' cognitive limitations and inflexibility, and thus a key assumption in popular press is that AI is crucial for firms' success in digital economy. However, surprisingly, many managers indicate they are yet to benefit from their AI investments. To address this issue, this paper summarises the extant literature on AI in business and management fields to identify how AI can create competitive advantages and underpin the key barriers that prevent AI from realizing its full potentials. Our results suggest AI can increase revenue by improving employee productivity, increasing consumer evaluation, setting competitive price and creating unique resources. AI can also reduce cost by improving efficiency and reducing risks. However, our results also indicate that AI adoption, task nature and AI management are the key barriers preventing AI from realizing its full potentials. This is because AI lacks interpersonal skills. Thus, it is encouraged that future research should focus on improving AI's interpersonal skills.*

**Keywords:** Artificial Intelligence, Literature Review, Digital Economy, Digital Privacy

## Introduction

Artificial Intelligence (AI) has been impactful especially in the area of digital economy. Schwab (2023) argues that we are in the fourth industrial revolution where advances in digital technologies blur the boundary between the physical, digital, and biological spheres. What differentiates the fourth industrial revolution from previous ones are the velocity and scope of changes in the entire economic system. This is

empowered by emerging technology breakthroughs in fields such as artificial intelligence (hereafter AI) (Rong, 2022; Xue & Pang, 2022). However, humans' interaction with AI is not a recent phenomenon. It can be traced back to 1950s when Alan Turing developed the Turing Test to address the question whether machines could think (Turing, 1950). The initial intention to create AI was to use intelligent machines to augment human intelligence by overcoming humans' cognitive limitations and inflexibility (Jain et al., 2024). Thus, before the 1980s AI was mainly used for simple problem solving (e.g., basic calculation in playing checkers) (Minsky, 1961). Later on, researchers in Stanford University developed expert systems to simulate the behaviour of domain experts (Feigenbaum, 1981). Technically, it was a success, with the expert system producing similar judgments as human experts with reasonable accuracy (Sebrechts et al., 1991). However, due to limitations of hardware technologies at that time, expert systems did not attract significant business interests (Jain et al., 2022).

But can AI benefit business in digital economy? Wilson & Daugherty (2023) argued that investing in AI could generate revenue much quicker, twice the speed of laggards. But among the 2500 executives surveyed, fewer than 40% of them indicated their business benefited from using AI (Ascarza et al., 2023). This is echoed by Guha et al., (2024). By interviewing senior managers in retailing were their research suggested that the short-to-medium-term impact of AI might not be as promising as popular press suggested.

To answer this question, there is need to identify how AI can create competitive advantages in digital economy and underpin the key barriers that prevent AI from realising its full potentials. To achieve this aim, this paper reviews and synthesizes existing literature in different disciplines such as economics (Calvano et al., 2022), marketing (Davenport et al., 2023), operation management (Cui et al., 2022), accounting (Fedyk et al., 2022), finance (Gu et al., 2023), information systems (Zhang et al., 2023) and management (Choudhury et al., 2023). This can provide unique insights to managers about how to integrate AI in their business successfully.

**Literature review**

This paper uses literature review to answer the research question because review studies can synthesize piecemeal findings (Hulland & Houston, 2022) and address ambiguities in prior research by spotlighting critical unanswered questions (Palmatier et al., 2023). To provide a comprehensive coverage of the literature, articles were searched in all business and management fields via Scopus and EBSCO databases using the following keywords: “AI”, “artificial intelligence”, and “intelligent machines”. (See Table 1).

**Table 1** Journal list

| No. of Journals | Academic field Journal title | AJG ranking [a] | Impact factor [b] |
|---|---|---|---|
| 1 | Accounting Review of Accounting Studies (RAS) | 4 | 4.011 |
| 2 | Accounting Contemporary Accounting Research (CAR) | 4 | 4.041 |
| 3 | Accounting Journal of Accounting and Economics (JAE) | 4* | 7.293 |
| 4 | Accounting Journal of Accounting Research (JAR) | 4* | 4.446 |
| 5 | Economics Review of Economic Studies (RES) | 4* | 7.833 |
| 6 | Economics Quarterly Journal of Economics (QJE) | 4* | 19.013 |
| 7 | Economics Journal of Political Economy (JPE) | 4* | 9.103 |
| 8 | Economics American Economic Review (AER) | 4* | 10.540 |
| 9 | Entrepreneurship, Entrepreneurship Theory and Practice (ETP) | 4 | 9.993 |
| 10 | Ethics Journal of Business Ethics (JBE) | 3 | 6.331 |
| 11 | Finance Review of Financial Studies (RFS) | 4* | 8.414 |
| 12 | Finance Review of Finance (RF) | 4 | 5.059 |
| 13 | Finance Journal of Financial and Quantitative Analysis (JFQA) | 4 | 4.337 |
| 14 | General Management Journal of Applied Psychology (JAP) | 4* | 11.802 |
| 15 | General Management Journal of Management (JM) | 4* | 13.508 |
| 16 | General Management, Management Science (MS) | 4* | 6.172 |
| 17 | General Management Academy of Management Review (AMR) | 4* | 13.865 |
| 18 | General Management Academy of Management Journal (AMJ) | 4* | 10.979 |
| 19 | Information Systems Journal of Management Information Systems (JMIS) | 4 | 7.838 |
| 20 | Information Systems Information Systems Research (ISR) | 4* | 5.49 |
| 21 | Information Systems MIS Quarterly (MISQ) | 4* | 7.198 |
| 22 | Innovation Research Policy (RP) | 4* | 9.473 |
| 23 | Marketing Journal of Marketing Research (JMR) | 4* | 6.664 |
| 24 | Marketing Journal of Marketing (JM) | 4* | 15.360 |

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|---|---|---|---|
| 25 | Marketing, Marketing Science (MS) | 4* | 5.411 |
| 26 | Marketing Journal of Retailing (JR) | 4 | 11.190 |
| 27 | Marketing Journal of Consumer Psychology (JCP) | 4* | 5.989 |
| 28 | Marketing Journal of the Academy of Marketing Science (JAMS) | 4* | 14.904 |
| 29 | Marketing Journal of Consumer Research (JCR) | 4* | 8.612 |
| 30 | Operations Management Production and Operations Management (POM) | 4 | 4.638 |
| 31 | Operations Management Manufacturing and Service Operations Management (MSOM) | 3 | 7.103 |
| 32 | Organization Studies Organizational Behavior and Human Decision Processes (OBHDP) | 4 | 5.606 |
| 33 | Strategy Strategic Management Journal (SMJ) | 4* | 7.815 |

[a] Based on latest Academic Journal Guide 2021, published by Chartered Association of Business School.

[b] Based on latest Journal Citation Reports published by Clarivate Analytics.

**AI conceptualisation**

Extant literature defines AI as "programs, algorithms, systems or machines that demonstrate intelligence" (Shankar, 2024). In other words, by using key technologies such as machine learning and natural language process, AI can "correctly interpret external data,to learn from such data, and to use those learning to achieve specific goals and tasks through flexible adaptation" (Haenlein & Kaplan, 2023). Since AI is used in various aspects of the digital economy, extent literature classifies AI into different types. For example, Davenport and colleagues argue that different AIs differ on their levels of intelligence: task automation vs. context awareness. While task automation is standardised and rule-based AI applications, context awareness requires AI applications to "learn how to learn" (Davenport et al., 2022). Thus, context awareness AI applications can address complex tasks by making context-specific responses that are beyond their initial programming by humans (Davenport et al., 2022). However, whether context awareness AI applications exist or even possible to develop is questionable (Reese, 2023).

Although researchers classify AI in different ways, they agreed that AI as machines are unconstrained by human cognitive limitations and inflexibility (Balasubramanian et al., 2022). Thus, AI can be trained on large and complex datasets to make efficient, accurate and consistent decisions. Such skills are important for companies to build competitive advantages

in digital economy (Dawar & Bendle, 2023). For example, Edelman and Abraham (2022) argued that personalised customer experience is a key competitive advantage in the current marketplace. Thus, companies need to use AI to assemble high-quality customer experience data to offer personalised service. Competitive advantages can lead to increased revenues and/or reduced cost. But can AI help companies achieve these business outcomes? The next section discusses this second research question in details.

**Table 2**

(Part 1) Distribution of articles published by year

| Year | JCR | JFQA | JM | JMIS | JMR | JPE | JR | MISQ | Management Science | Marketing Science |
|---|---|---|---|---|---|---|---|---|---|---|
| 2018 | | | | | 1 | | | | 1 | |
| 2019 | 1 | | | | 1 | | | | 2 | 1 |
| 2020 | 1 | | | | | 1 | 1 | | | |
| 2021 | | 1 | 1 | | | | | 1 | 1 | 1 |
| 2022 | | | 4 | 1 | 2 | | 1 | | 3 | |
| **Total** | 2 | 1 | 5 | 1 | 4 | 1 | 2 | 1 | 7 | 2 |
| Part 2 | | | | | | | | | | |
| **Year** | **MSOM** | **OBHDP** | **POM** | **QJE** | **RAS** | **RES** | **RF** | **RFS** | **PR** | **SMJ** |
| 2018 | | | | | | | | | | |
| 2019 | | | | | | | | 1 | | |
| 2020 | | | | | 1 | | 1 | 1 | | 1 |
| 2021 | | 1 | | | | | | | | 2 |
| 2022 | 3 | | 2 | 1 | 1 | 1 | | | 2 | |
| **Total** | 3 | 1 | 2 | 1 | 2 | 1 | 1 | 2 | 2 | 3 |
| Part 3 | | | | | | | | | | |
| **Year** | **AER** | **AMJ** | **AMR** | **CAR** | **ETP** | **ISR** | **JAE** | **JAMS** | **JAR** | **JBE** | **JCP** |
| 2018 | | | | | | | | | | | |
| 2019 | | | | | | | | | | | |
| 2020 | 1 | | | | | | 1 | | | | 1 |
| 2021 | | | 1 | 1 | | 4 | | 1 | 1 | | |
| 2022 | | 1 | 1 | | 1 | 2 | | 10 | | 3 | 1 |
| **Total** | 1 | 1 | 2 | 1 | 1 | 6 | 1 | 11 | 1 | 3 | 2 |

**The impact of AI on business in digital economy**

Increasing revenue

Extant literature suggests AI systems can increase revenues (Padigar et al., 2022) (see Table 3). For example, in Airbnb, adopting AI increases average daily revenue by 8.6% even though the average nightly rate drops by 5.7% (Zhang et al., 2022). Implementation of AI customer service chatbots generates a 0.22% abnormal stock return, with B2B firms gaining more than their B2C counterparts (Fotheringham & Wiles, 2022). Indeed, research has

repeatedly demonstrated that stock market responds favourably to firms using AIs (Bahmani et al., 2022). Padigar et al. (2022) further argued that this is more evident among companies with a powerful marketing department. This is because such firms are considered as having superior marketing resources and assets to ensure the success of AI related innovations. Previous research further suggests that AI systems increase revenue by improving employee productivity (Kim et al., 2022), increasing consumer responses (Crolic et al., 2022), setting competitive price (Calvano et al., 2022), creating unique resources (Gregory et al., 2022; Krakowski et al., 2022). In terms of employee productivity, Kim et al. (2022) opined that AI helps employees to adapt to customers' needs more effectively. Tong et al. (2022) suggest AI increases the accuracy and consistency of the analyses of employee information, and the relevance of feedback to each employee. This helps employees achieve greater job performance, creating values for companies (Tong et al., 2022).

In terms of consumer responses, Xue et al. (2022) report that undisclosed chatbots are four times more effective than inexperienced workers in engendering customer purchases. Zierau et al. (2022) document voiced-based (as opposed to text-based) bots promote flow-like user experience, increasing consumers' brand evaluations. However, Crolic et al. (2022) caution that such effect depends on consumers' emotional states. Their research finds when consumers are angry, AI has a negative impact on consumer evaluation and subsequent purchase intentions (Crolic et al., 2022).

AI also leads to competitive pricing. Calvano et al. (2020) report using algorithms leads to setting super competitive prices without communicating with other firms. Other researchers argue AI can help firms create unique resource (Gregory et al., 2022). Krakowski et al. (2022) argued that human-AI interaction creates a new resource to build competitive advantage. They further argue such resource is unrelated or even negatively related to human original capability. Gregory and colleagues propose the unique resource created by AI links to data network (they call it “data network effect”). In other words, advances in AI make digital platforms learn more from the data they collect from users, which, in turn, create more value to each user by offering personalised services (Gregory et al., 2022). In short, extant literature suggests AI can increase revenue in different ways ranging from improving employee productivity to creating unique resources. But can AI reduce cost? This is another research question. The next section answers and discusses this.

**Table 3**

Key mechanisms of AI increasing revenues

| Mechanism | Article | Field | Method | Key Findings |
|---|---|---|---|---|
| Improve employee productivity | Kim et al.(2022) | Marketing | Experiment | AI helped tutors adapt to students' learning needs and improve academic Performance. But tutors who significantly contributed to the firm's |

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| | | | | revenue benefited little from AI. |
| | Luo et al. (2021) | Marketing | Experiment | Middle-ranked human agents benefited most from AI coach. But bottom- and top-ranked human agents benefit little. However, restricting the training feedback level increases performance for all agents. |
| | Tong et al.(2021) | Management | Experiment | Undisclosed AI improved employees' job performance by significantly increasing the relevance of feedback to each employee. |
| Increase customer evaluation | Luo et al. (2019) | Marketing | Experiment | Chatbots were four times more effective than inexperienced workers in engendering customer purchases. But disclosing of chatbot identity had a negative impact. |
| | Crolic et al. (2022) | Marketing | Secondary data analysis + experiment | When customers were angry, chatbot anthropomorphism had a negative effect on customer satisfaction and subsequent purchase intentions. |
| | Zierau et al. (2022) | Marketing | Experiment | Voice-based (as opposed to text-based) bots led to more positively-valenced service experiences and more favourable behavioural firm outcomes because it promoted more flow-like user experiences. |
| Charge competitive price | Calvano et al. (2020) | Economics | Experiment | Algorithms consistently charged supercompetitive prices in an oligopoly model of repeated price competition. |
| Create unique Resource | Krakowski et al. (2022) | Management | Experiment | In the context of chess, human-AI intersection created a new resource that drove performance. In addition, this resource was unrelated or even negatively related to humans' original capability. |

**Direction for Future Research**

AI has been a key factor underlying companies' competitive advantage in digital economy (Rong, 2022; Xue & Pang, 2022).Unconstrained by human cognitive limitations and inflexibility (Balasubramanian et al., 2022). AI's 'hard' data skills can both increase revenues (Mishra et al., 2022; Padigar et al., 2022). However, AI's lack of interpersonal skills makes people reluctant to adopt it (Kyung & Kwon, 2022), only outperforms humans in objective tasks that can be difficult to manage.

First, a common finding in extant literature is that people consider AI as machines, and thus it lacks feeling (Bigman & Gray, 2024). In marketing, researchers

have begun to focus on anthropomorphism to see how imbue AI with human features can mitigate the negative perception that AI cannot feel (Uysal et al., 2022). A recent meta-analysis (Blut et al., 2024) finds that anthropomorphism has a positive effect on consumers' intentions to use AI. However, whether these results can be generalised to other groups of stakeholders (employees, investors) remain unclear. More importantly, there is no known study that directly tests the impact of humanising AI on firm values. Thus, future research needs to explore whether anthropomorphising AI can have a positive effect on firm value. In addition, future research needs to explore the key mechanism(s) underlying the impact of AI anthropomorphism on firm values. Does it improve employee productivity, create unique resources and/or reduce risks? Blut et al. (2024) also, encourages future research to examine the 'dark-side' of AI anthropomorphism. For example, anthropomorphising AI may demotivate co-workers, as they may feel dehumanized (Fügener et al., 2024). In addition, consumers may feel they are not valued by companies if they are served by robots (Uysal et al., 2022). Thus, understanding of the negative impact of anthropomorphising AI can help companies make an informed decision about the benefits and risks of anthropomorphism. Previous research also argues AI works best when it augments humans rather than replaces humans (Luo et al., 2024). Thus, a key challenge for managers is how to harness the potentials of a human þ AI team? In other words, what role should AI play when it works with human employees? Is it an assistant, a monitor, a coach or a teammate (Babic et al., 2023)?

Secondly, the existing literature envisions AI should be capable of feel human emotions and consider them in decision making (Davenport et al., 2023). One way to do that is to focus on artificial empathy (Liu-Thompkins et al., 2023). Liu-Thompkins and colleagues define artificial empathy as an ability of AI agents to detect and adapt to humans' cognitive needs and emotional states. They further argued that artificial empathy entails perspective taking, empathic concerns (e.g., emotion recognition) and emotional contagion (e.g., appropriateness appraisal, selective emotional mimicry). Thus, future research needs to explore how the three elements of artificial empathy can be incorporated in AI design. More importantly, future research needs to explore whether imbuing AI with artificial empathy can make it outperform humans on subjective tasks, which, in turn, have a positive effect on firm value. In health care, future research can explore whether artificial empathy increases patients' adoption of AI by making patients perceive it as warm and showing genuine care. In marketing, researchers can test whether artificial empathy increases the emotional value of a brand such as a luxury fashion brand. Future research can also compare the impact of the three elements of artificial empathy to see which one is the most important to generate positive business outcomes.

Thirdly, privacy concern is a key factor preventing people adopting AI (Uysal et al., 2022). Davenport and colleagues point out this is perhaps because consumers are

afraid that their data may be reused for the reasons different from those intended (e.g. loyalty card data used for telemarketing). Alternatively, their personal data may contain others' information (e.g. family) (Davenport et al., 2023). Thus, at an individual level, future research needs to explore how consumers/employees/investors balance their privacy concerns against the benefits of personalised recommendations. Do they consider privacy concerns as a necessary cost to pay to get their personalised offers? If yes, what is the maximum cost they are willing to sacrifice? At a policy level, Davenport et al. (2023) calls for future research to identify the best governing mechanism for data privacy management. Does it require legal regulation? Or is self-regulation sufficient? At a firm level, future research needs to explore how managers incorporate relevant ethics in their AI strategy and its implications for data management practice. Researchers interested in this area can use Xue & Pang (2022)'s framework to guide their empirical studies.

Fourthly, the lack of transparency about the inputs and processes leading to AI decisions is a key barrier for medical professionals and other employees (Lebovitz et al., 2024). One way to mitigate this issue is to provide explanation. For example, Marchand & Marx (2024) find that explanations of the reasoning that lead to AI recommendations outperform recommendations without explanations. However, explaining AI inputs and processes may make companies lose their commercial secrets. Thus, a key challenge for managers is how to balance business interests against AI transparency. Future research can interview managers to see what factor(s) they consider when striking a balance between transparency and commercial secrets. In addition, cross-culture studies are needed to see how different institutional environment and culture differences shape managers' decisions differently.

Alternatively, researchers can use different ethical theories (Xue & Pang, 2022) to guide managers' decisions on this issue.

| **Issues** | **Key Challenges** | **Possible Research Areas** | **Key Research Questions** | **Managerial and practical considerations** |
|---|---|---|---|---|
| Lack of feeling | Low adoption among patients (Kyung and Kwon, 2022) | Anthropomorphism | 1) What is the impact of AI anthropomorphism on firm value?<br>2) What is the 'dark-side' of AI anthropomorphism? | 1) Investing in humanisation<br>2) Keep AI's human co-workers motivated |
| | Not suitable for | Empathy | 1) How can | 1) Use human- |

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| | subjective tasks (Castelo et al., 2019) | | artificial empathy be incorporated in AI design?<br>2) Can artificial empathy increase AI's warmth?<br>3) Which element of artificial Empathy perspective taking, empathy concern and emotional contagion) is the most effective? | inspired AI (e.g., Replika) to recognise and understand human emotions<br>2) Using AI to ask people meaningful questions and adjust to their linguistic syntax |
| Lack of transparency | Surveillance anxiety and low adoption (Uysalet al., 2022) | Privacy | 1) How people balance privacy concerns against the benefits of personalisation ?<br>2) What is the maximum private information they are willing to disclose?<br>3) How to effectively manage data privacy? | 1) Manage consumers' private information ethically<br>2) Seek consumers' consent first<br>3) Increase transparency of how algorithms work |
| | Algorithm Aversion(Dietvorst et al., 2015) | Explanation | 1) How to strike a balance between transparency and protecting commercial secrets?<br>2) How managers make ethical decisions on this issue? | 1) Decide how much information to disclose regarding its algorithm<br>2) Set relevant ethical standards to manage algorithm |

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|---|---|---|---|---|
| | Difficult to manage AI human teams (Fügener et al., 2021) | Autonomy | 1) What factor(s) make people value autonomy in AI-mediated environment?<br>2) Do these factor(s) vary acrosscultures? | 1) Decide how to delegate tasks among human (vs.AI)<br>2) Use AI to augment (not replace)human |

Finally, autonomy is important in interacting with AI because it reduces algorithm aversion (Dietvorst et al., 2023) and makes employees accept behaviour tracking. However, due to AI's high predictive accuracy, Davenport and colleagues argue that consumers may feel lose a sense of autonomy because their decisions can be predicted by AI (Davenport et al., 2023). Thus, an interesting question awaits future research is that what factor(s) make consumers value perceived autonomy in AI-mediated environment. To answer this question, future research can explore individual differences to see whether certain personality traits are more important than others. Alternatively, future research can explore cultural differences to see whether autonomy is more valued in certain cultures than others. In addition, researchers can use different ethical theories to provide a normative guideline about how to incorporate autonomy in AI design.

## Conclusion

Unconstrained by humans' cognitive limitations and inflexibility, AI is widely considered as a key asset for firms' competitive advantage in digital economy. However, surprisingly, many managers indicate they are yet to benefit from their AI investments (Ascarza et al., 2023; Guha et al., 2024). Thus, through a literature view, the main purpose of our research is to summarize how AI can create competitive advantages in digital economy. Another goal of our research is to underpin the key barriers preventing AI realize its full potentials. Our research suggests AI's 'hard' data skills can benefit business by increasing revenue and/or reducing cost. However, the research also indicates that AI lacks interpersonal skills, leading to low adoption, difficult to manage and performance varying across tasks.

The research extends extant literature on several fronts: first, by integrating research insights across different disciplines (e.g., economics, marketing), our research offers a more complete understanding of how AI can create values in digital economy. Second, by synthesizing existing piecemeal findings, our research spotlights an important but unanswered question in existing AI literature – how to address AI's lack of interpersonal skills. Third, more importantly, our research identifies five key areas, namely, anthropomorphism, artificial empathy, data privacy, AI explanation and autonomy that future research needs to focus to effectively address AI's lack of interpersonal skills.

The research also has important practical implications. AI systems are

unconstrained by human cognitive limitations (Balasubramanian et al., 2022). Therefore, to benefit from AI investments, managers can use AI systems to improve work efficiency. This can be done by using AI to search information (Grennan & Michaely, 2024) or augmenting existing labour force (Yang, 2024). Due to AI's high prediction accuracy, managers can also use AI to predict customer demand (Blohm et al., 2025) and manage supply chains (Cui et al., 2022). However, as AI systems are widely considered as lack of feelings and thus managers need to use them on objective rather than subjective tasks.

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