The Integration of Artificial Intelligence and Big Data: Driving Productivity Improvements and Enhancing Decision-Making in IT Management

Arakelyan Gurgen A.
PhD, Professor at Chair of Financial markets and Institutions,
Armenian State University of Economics (Yerevan, RA)
https://orcid.org/0009-0009-0985-4372
arakelyan.gurgen@gmail.com
Mikayelyan Sevak S.
PhD, Professor at Chair of Financial markets and Institutions,
Armenian State University of Economics (Yerevan, RA)
https://orcid.org/0009-0003-1615-9139
sevakmik@gmail.com

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Արհեստական բանականության և մեծ տվյալների ինտեգրումը. ՏՏ կառավարման ոլորտում արտադրողականության բարելավման և որոշումների կայացման բարելավման խթանում

Առաքելյան Գուրգեն Ա.
տ.գ.թ. ֆինանսական շուկաների և ինստիտուտների ամբիոնի դասախոս,
Հայկական պետական տնտեսագիտական համալսարան (Երևան, ՀՀ)
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Ամփոփագիր. Այս ուսումնասիրությունը հետազոտում է, թե ինչպես արհեստական բանականության [ԱԲ] և մեծ տվյալների ինտեգրումը ազդում է ՏՏ կառավարման արտադրողականության և որոշումների ընդունման որակի վրա՝ տարբեր ոլորտներում: Մեթոդաբանորեն կիրառվել է «տարբերությունների տարբերությունների» [DiD] մոտեցումը՝ համեմատելու ԱԲ/Մեծ տվյալներ ներդրած և դրանք չկիրառած ընկերությունների արդյունքները՝ հաշվի առնելով կազմակերպության չափը և ոլորտային առանձնահատկությունները: Հետազոտությունն իրականացվել է 143 ընկերությունների հիման վրա՝ ՏՏ, մանրածախ, կրթություն և ֆինանսներ ոլորտներում՝ գնահատելով արտադրողականությունն ու որոշումների ընդունման արագությունն ու ճշտությունը միջամտությունից առաջ և հետո:
Վերլուծության արդյունքները ցույց են տալիս, որ ԱԲ-ն ու մեծ տվյալները հատկապես բարձր օգուտ են տալիս տվյալա-հագեցած ոլորտներում, ինչպիսիք են մանրածախը, մինչդեռ ՏՏ և ֆինանսների ոլորտներում արդյունքները ավելի տարբերակված են՝ ընդգծելով ոլորտային և չափային տարբերությունների կարևորությունը: Որոշ ընկերություններ արձանագրել են արագ որոշում կայացման և արտադրողականության զգալի աճ, մինչդեռ մյուսների մոտ նկատվել են նվազումներ կամ դանդաղ առաջընթաց՝ կախված տեխնոլոգիաների ներդրման մակարդակից:
Ուսումնասիրությունն ունի կիրառական արժեք՝ ցույց տալով, որ ԱԲ-ի և մեծ տվյալների արդյունավետ օգտագործումը կարող է էապես բարձրացնել կառավարման արդյունավետությունը. այն օգտակար է ՏՏ ղեկավարների, ռազմավարական պլանավորողների և տվյալահեն ոլորտների համար, որոնք նպատակ ունեն բարելավել իրենց արտադրողականությունն ու որոշումների ընդունման որակը:
Հանգուցաբառեր և բառակապակցություններ՝ Արհեստական բանականություն, Մեծ տվյալներ, ՏՏ կառավարում, Որոշումների ընդունման արդյունավետություն, Արտադրողականության բարձրացում, Ճյուղային ազդեցություն, Տեխնոլոգիական ինտեգրում

Интеграция искусственного интеллекта и больших данных: повышение производительности и улучшение процесса принятия решений в управлении ИТ

Аракелян Гурген А.
к. э. н., лектор Кафедры финансовых рынков и институтов
Армянского государственного экономического университета (Ереван, РА)

Микаелян Севак С.
к. э. н., лектор Кафедры финансовых рынков и институтов
Армянского государственного экономического университета (Ереван, РА)

Аннотация. Переход к «зелёной» экономике – это глобальный императив, который меняет подходы к экономическому росту, одновременно защищая окружающую среду и содействуя социальной справедливости. Он направлен на повышение благосостояния людей и снижение экологических рисков на основе принципов энергоэффективности, низкоуглеродного развития и оптимального использования ресурсов. Устойчивое финансирование является ключевым фактором этого перехода, интегрируя экологические, социальные и управленческие факторы в финансовые решения и направляя капитал на экологически и социально устойчивые проекты. Международные рамки и принципы играют важную роль в интеграции рыночного регулирования и задач охраны природы.
В регионе Южного Кавказа, включая Армению, «зелёный» переход сталкивается с проблемами изменения климата, истощения ресурсов и устаревших моделей развития. Несмотря на политические и регуляторные препятствия, в регионе формируется устойчивая финансовая среда, поддерживаемая международными организациями и национальными инициативами. Для Армении, которая уязвима к изменению климата, энергетической зависимости, водному кризису и вырубке лесов, «зелёная» экономика является приоритетом. Страна поставила перед собой цели по расширению использования возобновляемых источников энергии и лесовосстановлению. Развитие устойчивой финансовой системы включает в себя принятие руководящих принципов Центрального банка, разработку «зелёной» таксономии и выпуск устойчивых облигаций. Международные партнеры оказывают финансовую и техническую поддержку, способствуя росту зеленых инвестиций в различных секторах.
Ключевые слова и фразы: Искусственный интеллект, Большие данные, IT-менеджмент, Эффективность принятия решений, Повышение производительности, Отраслевой эффект, Технологическая интеграция

Introduction

There has been a huge change in the organizational practices with the growing momentum in information technology over the years especially in the integration of Artificial Intelligence (AI) and Big Data. These have been increasingly utilized for better decision making, increasing efficiency, optimizing resources and decreasing risk in organizations across all industries. However, while AI and Big Data present immense possibilities, the actual realization of the potential of these technologies to enhance performance and speed, with better quality, has been elusive. Furthermore, issues of ethical data privacy and accountability that arise with their integration into sensitive sectors like healthcare and finance further muddy the waters.

This paper **aims** to examine how AI and Big Data directly impact organizational performance, which can be useful in developing existing research. In addition, this study looks into how these technologies affect productivity and decision-making while providing a detailed case study of their adoption across various sectors. The DiD method is used to compare the performances of firms that have implemented these technologies and those that have not. In addition, the research reveals the size of the firm and its industry context as key moderating factors in the effectiveness of AI and Big Data use.

The particular **questions** to be addressed in this study are [**1**]: How does the integration of AI and Big Data affect productivity in IT management [**2**]; What effect do they have on decision-making speed and quality [**3**]; Do the effects of integrating AI and Big Data differ by industry and firm size?

This study is **important** on many levels, as it helps to deepen the understanding of how and why AI and Big Data have become essential tools of IT management in the modern world. It also offers practical findings that can be used by businesses to improve their performance and decision making, while also taking into account important ethical issues related to the use of these technologies.

Literature review

The integration of AI and Big Data has recently become a significant game changer in the IT management of organizations and has led to improvements in performance and decision making in most industries. This synthesis aims to identify the various roles that AI and Big Data play in improving organizational performance in relation to IT management [Cui, Xu, & Sun, 2024].

The use of AI is seen as a way of improving decision making in IT management. Lahamid [2023] explains how AI can function to support or take over the decision-making process to enhance the internet business plans. Fernández et al. [2022] agree with this, focusing on the innovation project management with the help of AI-based tools. In the same manner, Big Data analytics increases the business value by increasing the level of customers' satisfaction and the speed of decision making [Ionescu & Andronie, 2021], as stated by Liu et al. [2023] for the purpose of performance and resilience improvement in supply chains.

Also, the use of AI in logistics and supply chain management shows the possibilities for increasing the effectiveness of operations. Apart from, this, Zhu [2024] also adds that AI can be used in the improvement of resource allocation and customer service through the use of data analysis. Furthermore, the integration of Big Data in IT management improves the strategic innovation process [García-Fernández, Claver-Cortés, & Tarí, 2022], while Liu et al. [2023] explain that it can help organizations adapt to changing market conditions and become more innovative. Heripracoyo et al. [2019] also state that Big Data improves the innovation capacity of the digital creative industries by using data to develop strategies for growth. In customer relationship management, the capability of Big Data to analyze customer data is essential in increasing customer interaction as pointed out by Luo and Li [2022]. Big Data also enhances customer satisfaction especially in the cultural and creative industries through the implementation of intelligent audits and real-time data flow.

The use of AI and Big Data is critical in the improvement of an organization's knowledge management. According to Bencsik [2021], the ability of AI to support knowledge processes increases organizational effectiveness. According to Taboada et al. [2023], the use of AI in project management is in the planning, measurement, and uncertainty management, which enables organizations to generate insights from the large datasets to innovate and make decisions. Furthermore, Rožman et al. [2022] state that having a positive AI culture is important for employees' engagement and the cooperation between human and machine intelligence is vital for the effective integration of AI. As for the impact of AI on human resource management, AI can help in the area of recruitment, performance appraisal, and project management by improving the decision making with regard to schedule, cost and time lines according to Al-Asadi [2023]. The combination of AI and Big Data increases the effectiveness of operations, adaptiveness of the organization and its productivity [Annam, 2024].

The implementation of AI in financial management can be seen as an attempt to improve the effective allocation of resources and increase operational performance. Dong [2018] pointed out that AI technologies can use Big Date to support better financial decisions and, therefore, better budget planning and management of resources. This integration also enables organizations to respond more quickly to changes in the market. According to Gao [2023], Big Data analytics is able to redefine the way of financial decision making by supplying real time information for investment and risk management. In the complex financial environment, the access to timely and accurate information is very important for decision making. Huang [2022] also pointed out that Big Data enhances management accounting thus improving on market perception and operation performance.

Big Data provides a large amount of security logs in the form of structured and unstructured data, and AI works on them to identify threats and react to them early. Galla et al. [2022] developed machine learning models that were trained on real-time Big Data streams to recognize atypical behaviors that are likely to constitute a threat to security. However, the issue of privacy versus security remains one of the most debated topics. Since, in the case of AI, the models have to be trained with a large amount of data that is usually sensitive, there are concerns about the model's fairness and accuracy [Osasona et al., 2024], thus creating a research gap that requires robust data governance and secure federated learning frameworks.

The educational sector also benefits from the integration of Big Data and AI in IT management. Nda and Tasmin explain that Big Data is a crucial part of the digital transformation of educational institutions by helping to improve data collection and usage for better outcomes [Nda & Tasmin, 2019]. The application of Big Data in education helps to personalize learning and increase the effectiveness of administrative activities, which in turn results in improved learning achievements and student satisfaction.

Both Big Data analytics and AI are revolutionizing both project and IT management by enhancing decision making and improving operational performance. Savio [2023] explains that the application of Big Data in project management results in better performance by providing real time decision making and corrective actions to the project plans. This approach enables managers to recognize problems before they occur, thus leading to better project performance. In IT management, predictive maintenance is a key concept enabled by AI, which helps in reducing operational costs by predicting system failures from data analyzed through Big Data [Santos et al., 2015]. Also, the machine learning algorithms are able to analyze huge amount of IT system logs through distributed frameworks like Hadoop, thus improving the scalability and the time of operations [Mickie and Elson, 2025].

Despite these advancements, there is still a need to solve the problems of integrating real time data streams into the workflow, as Lee and Kane [2021] propose to develop adaptive, AI powered systems that can run without intensive human involvement. AI automation is identified by Chinta [2021] as a key enabler of IT workflows, for example, in incident management and performance monitoring. However, the current automation tools that are based on historical data and may not be robust enough to deal with new form of disruptions highlight the need for adaptive learning.

In general, AI and Big Data are used to gain insights and perform routine tasks that can have a transformative impact across marketing, fraud detection, and customer service [Mohanty & Mishra, 2023; Ghimire et al., 2020]. With skills shortage and integration problems still an issue, any organization that wants to harness these technologies to achieve rapid growth and enhance efficiency must invest in the right training and infrastructure [Ali Ahmadi, 2023]. There are various aspects of strategic IT management where AI-enabled dashboards give real-time information on the system's performance and return on investment, while discussions are still ongoing on the current AI algorithms' ability to grow with the rate of IT data [Arora. et al., 2024; Sharma et al., 2024].

Methodology

Authors used a variety of methods to examine the effects of AI and big data on IT management. In particular, performance analysis and scientific mapping were employed through bibliometric analysis techniques, while questionnaire survey methods were used with pre-defined research models. Although these approaches are useful for understanding thematic relationships and data-driven outcomes, the Difference-in-Difference [DiD] method has the capability to estimate causal effects more rigorously. The DiD method looks at changes in outcomes over time between a treatment group that has been exposed to AI and big data integration and a control group that has not. This approach reduces time-invariant confounding factors, and therefore provides a more accurate estimation of the effects of AI and big data on IT management than other approaches by separating the effects of these variables from other broader external variables.

The DiD is a powerful statistical technique widely used in management research to estimate the causal effects of treatments or policy changes by comparing the differences in outcomes between a treatment group and a control group over time [Fredriksson, A. and Oliveira, G.M.d., 2019]. This approach is particularly useful in situations where randomized controlled trials are not feasible, and the researchers can make causal inferences from observational data. Schiozer et al. offer a full tutorial on how to do DiD analysis in management, finance, and accounting and include natural experiments and quasi-experimental designs [Schiozer et al., 2021]. They also explain that DiD can reduce the threat of unobserved confounding variables that are constant over time to increase the validity of the causal inferences made from the observational study.

Furthermore, the use of DiD can be applied in different organizational settings, including the assessment of the effects of management and leadership on productivity [Cabitza et al, 2020]. Guner et al. explain that management practices are the main source of variations in productivity across firms and that changes in management practice can have a high economic value of productivity gains [Guner et al., 2015]. This is in line with Bloom et al. who argue that management practices are the main source of total factor productivity differences and, therefore, support the use of DiD in management interventions evaluation [Bloom et al., 2016].

Given that this method fully aligns with our objectives and the questions we aim to address, we employed DiD to analyze the causal effect of integrating AI and Big Data into IT management. The DiD method compares differences in outcomes between a treatment group and a control group before and after the intervention, in order to avoid the effects of other factors that may influence the results. The treatment group includes organizations or areas that have adopted the use of AI and Big Data in their IT management, while the control group includes organizations that have not adopted these technologies. The comparison is made between the pre- and post-treatment eras, and the variation in the outcome changes between the two groups is used as the estimate of the effect of the intervention.

To evaluate the effects, two main dependent variables are considered: productivity and decision-making efficiency. An indicator such as the number of tasks accomplished within the observation period will be used to measure productivity. The productivity data will be gathered both before and after the integration of AI and Big Data to determine any changes that may have been brought about by the intervention. Decision-making efficiency will be determined by an indicator such as the speed of decision-making in hours and the quality of decision-making, which will be rated on a scale [e.g., 1-5]. In addition, employee perception surveys will be conducted to find out from the employees the extent to which decision making has been enhanced by the intervention.

Apart from this, we will also include several independent variables in the analysis of the study. The treatment status will be a dummy variable where 1 represents the treatment group which are companies or departments that adopted AI and Big Data while 0 represents the control group which are companies or departments that did not adopt these technologies. Time is another binary variable which represents whether the data is collected during the pre or post treatment period and 0 is given to the pre-treatment period and 1 is given to the post treatment period.

Furthermore, the study will control for factors such as firm size, industry type, and technology investment. Firm size will be measured by the employment size of the firm while industry type will be used to capture any differences in productivity across the different sectors.

Results

In order to ensure that the data collected is relevant and enough for analysis, the following criteria were used in the selection of companies for this study. To begin with, the fields that are currently experiencing the growth of AI and Big Data applications were considered, such as the IT, Education, Finance, and Retail sectors [Mkrttchian, 2002; Merdinyan, G., & Siakas, K. [2009]]. These industries were selected for analysis because they are among the most affected by technological changes and rely heavily on data analysis.

The size of the companies chosen, 150 in all, was determined by a cut-off that struck a reasonable balance between practicality and the size that would be required to produce a sufficiently large sample [Baker, A. C., Larcker, D. F., & Wang, C. C., 2022]. The objective was to include enough diversity in company size and sector, and yet gather data that would allow examining meaningful differences in the use of AI and Big Data. Out of these, 143 companies provided valid responses, which is an excellent response rate that increases the credibility of the results.

We also intentionally shifted our attention to decision-makers, IT managers, and department heads—people who are most likely to play a role in the actual implementation and management of these technologies within their companies [Melkumyan, A., & Sahakyan, M., 2022]. This guarantees that the information collected embodies sound opinions on productivity, decision-making speed, and decision-making quality with and without the application of AI and Big Data.

Additionally, companies were chosen according to their size, and a classification system that distinguishes between small, medium, and large enterprises [where small is defined as having up to 50 employees, medium is 50-250 employees, and large is more than 250 employees]. This selection criterion enabled us to study the impact of AI and Big Data on the companies of different sizes and to conclude how company size affects the adoption and productivity of these technologies. To this end, we have included a wide range of companies in our sample in order to determine whether the effects of AI and Big Data vary according to the size of the company and its sectoral affiliation.

All in all, we collected 346 responses that covered various KPIs. The questions used in this survey were specifically designed to determine the quantitative influence of AI and Big Data on major operational outcomes like performance, speed of decision making and decisional accuracy. Every question was chosen to make sure we can pull a comprehensive comparison before and after the technological intervention.

1. Company/Dept Identifier: This question is helpful in sorting the responses according to the specific company or department. Thus, the identifiers can be used to classify the responses and make comparisons across companies and departments and understand where AI and Big Data have the maximum impact.

2. *Time [Pre or Post intervention]*: Using data collection at two points in time [pre- and post-intervention], we can compare performance metrics before and after the implementation of AI and Big Data. The pre/Post analysis is important to establish whether the changes in the productivity and decision making are as a result of the integration of these technologies.

3. *Treatment [Yes or No]*: This question determines whether the company or the department has embraced AI and Big Data technologies. Using the treated and the non-treated entities, we can establish a control group that will enable us to use more sophisticated analyses, including Difference-in-Difference to try and isolate the true effect of the intervention.

4. *Productivity:* This means assessing productivity in terms of the number of tasks completed within a 6-month period, which enables us to see the direct effect on output. This metric is significant in determining if the adoption of AI and Big Data has enhanced operational effectiveness. It offers practical proof as to whether these technologies result in real enhancements to work flows and output.

5. *Decision-Making Speed and Quality*: These indicators explain the impact of AI and Big Data on decision making processes in an organization. Speed is measured by the time it takes to make strategic decisions and quality is rated on a 1 – 5 scale. These metrics are critical because they capture the extent to which the technology enhances not only the speed of decision making but also the decisional propriety, which in turn affects the overall performance of the company.

The questions were carefully formulated in order to gain a holistic view of how AI and Big Data integration impacts operational efficiency [productivity] and decision-making effectiveness [speed and quality], which would be very useful in understanding the strategic value of these technologies.

Assessing Productivity Using DiD

Using the above data, we first need to determine how AI and Big Data integration impacted productivity in the treated companies as opposed to the non-treated companies. We will be implementing the DiD model for this purpose.

First, we have to Calculate the average productivity change in the treatment group:

- o Pre-treatment: 180.20
- o Post-treatment: 231.64
- o Change for treated group: 51.44

Then, we have to Calculate the average productivity change in the control group:

- o Pre-treatment: 194.13
- o Post-treatment: 198.94
- o Change for control group: 4.80

The Difference-in-Differences Estimate is calculated by finding the difference in changes between the treated group and the control group.

The formula is:

DiD Estimate=[Change for treated group]−[Change for control group]= 51.44 - 4.80=46.64

Therefore, the Difference-in-Differences Estimate is 46.64. This means that the AI and Big Data integration enhanced productivity by 46.64 units as opposed to the control group.

Findings

The observed productivity post treatment is between 100 and 350. The companies with the best post treatment productivity are from the IT and Retail sectors and the productivity levels are 350 which indicates that AI/Big Data may have had a relatively strong impact on productivity in these sectors. Four companies across the IT, Retail and Education sectors had the lowest post treatment productivity levels which were approximately 100. This may suggest that the intervention may not have had as great an impact or may have even been detrimental to productivity in these sectors.

The decision-making speed post treatment varies from 4.3 to 11. The greatest enhancement in decision-making speed, 4.3, was seen in the IT sector, which means that IT companies may gain the most from the application of AI and Big Data in terms of the speed of decision-making. On the other hand, the worst enhancement in decision-making speed was noticed in the same sector and was 11. This suggests that while IT companies can greatly benefit from these technologies, their effectiveness may vary depending on implementation or context.

The quality of decision-making post treatment is between 2 and 5. The greatest enhancement in decision-making quality was observed in the IT sector, and the score was 5, which means that AI/Big Data may help to give better decisions in this area. To build on the analysis, it is advised to monitor the treatment effects across time in future work. Companies go through rising levels of productivity and decision-making efficiency as they implement AI/Big Data strategies and tools into their systems. Thus, obtaining data at different points in time can help to reveal how companies learn to use AI/Big Data and how they can enhance their performance.

This is also interesting to see whether the treatment effect differs by industry, firm size, or initial level of productivity. For example, the greatest boost in performance and decision-making was observed in companies from the IT sector, which witnessed an enhancement in productivity by 350 and decision-making quality being rated 5. Thus, it can be assumed that the IT industry may be one of the greatest providers of benefits from the application of AI/Big Data. By contrast, companies in the Finance sector experienced lesser enhancements as compared to the others since their operations were already efficient before the intervention.

In the IT sector, some companies had negative growth or low increases in productivity; some of them even indicated a decrease in productivity from 200 to 150. Nevertheless, there were some companies which showed a remarkable enhancement in productivity, with the help of which productivity touched 150-350 levels.

The Finance industry had mixed results. Some companies experienced enhancement in productivity and the levels increased from 110 to 170, while others witnessed low levels of deterioration from 140 to 130.

For the most part, retail companies had moderate to high increases in productivity, with productivity levels increasing from 100 to 350. Customer reviews of education companies were also rather diverse: some of them indicated significant enhancements [from 130 to 260], while the others pointed to moderate reductions in performance levels [from 140 to 110].

When considering the speed of decision-making, the IT sector had some decreases or slight changes and the time was measured in hours [7-11 hours]. Nevertheless, there were a few companies that showed enhancement, which led to a reduction in decision-making time from 10 to 5 hours.

The Finance industry also had divergent outcomes in decision-making speed, with some companies enhancing from 9 to 6 hours, while others had modest declines from 7 to 8 hours.

Most retail companies experienced moderate to large enhancement in decision-making speed, which ranged from 10 to 4 hours. The decision-making time in the Education sector also increased and decreased significantly, it decreased from 8 to 4 hours in some companies and increased from 6 to 9 hours in others.

In terms of significant changes, both Education and Retail sectors showed the most enhancement in both productivity and decision-making speed, while the IT and Finance sectors had limited changes or even deterioration, particularly for companies with steady or small fluctuations.

Discussion

The purpose of the study was to find out how the integration of AI and Big Data into IT management affects productivity and decision making. The findings help to enhance the knowledge on how the application of AI and Big Data enhances the performance of organizations in different industries, sizes of the companies and different operational settings.

1. Effect of AI and Big Data on Productivity in IT Management

The retail sector was the most productive with a DiD of about 71.55 units after the intervention. This is because retail operations are data intensive and thus the application of AI and Big Data in the management of resources and processes leads to better results. On the other hand, companies in the IT industry had either negative or no productivity effects at all. It is possible that since IT firms have previously identified and addressed many of the issues, there is less of a gain to be had from the application of AI and Big Data.

These results show that while the application of AI and Big Data improves productivity, the level of impact is industry-specific. It has been observed that data-rich sectors like retail do better than industries that are more process oriented such as IT.

2. Speed and Quality of Decision Making

The study also looked at the impact of AI and Big Data on decision-making speed and accuracy. The results showed that decision-making speed was most enhanced in the financial industry, while the education sector had the least enhancement. This could mean that effects of AI and Big Data on decision making could be different in different sectors based on the nature of the processes.

Likewise, decision-making quality also changed: The finance and retail sectors grew better, while the education sector had more modest increases. This is in line with the idea that AI and Big Data could be more useful in sectors where data is heavily involved in decision making, for instance, healthcare.

These results show that AI and Big Data can improve decision making, but the magnitude of the improvement depends on the kind of decisions that are being made and the current decision-making system.

3. Firm Size and Industry Type as Moderators in the Effectiveness of the Use of AI and Big Data.

Small companies had moderate to large increases in decision-making speed. For example, smaller companies in the retail sector had significant improvements, as did some in the education sector. Medium-sized companies had mixed results; for instance, some companies in the finance industry had improvements, while others had declines.

Large companies in the IT sector had a varied performance, with some of them declining and others having moderate enhancement in the decision-making speed. Among small companies, some in the education sector had dramatic improvements, with one company increasing from 130 to 260 and a small retail company increasing from 95 to 350. By comparison, large IT companies had minimal changes.

In general, small companies had the most significant enhancements in decision-making speed; hence, education and retail were most affected, while medium and large companies especially in IT and finance had more stable or smaller changes.

The results of this study are consistent to a large degree with the findings of other authors, confirming that the convergence of AI and Big Data has the potential to boost productivity and decision-making processes in many industries. Data-intensive industries such as retail and finance have experienced huge productivity and decision-making speed and quality increments. This is consistent with earlier research that indicates industries that deal with high amounts of data are in a stronger position to take advantage of AI and Big Data technologies.

Nevertheless, the research indicates that IT companies seem not to gain as much benefit from the integration of AI and Big Data. This tendency can be attributed to the fact that information technology companies have already streamlined many processes using a range of leading-edge information technologies. As these companies tend to be the first to use technological innovations, there might be relatively little room for them to enhance operational efficiency by using Big Data and artificial intelligence alone. Thus, the influence of Big Data and artificial intelligence on information technology firms may be low relative to other industries with a less level of technological innovation.

Conclusion

The application of AI and Big Data has different effects on productivity and decision making in organizations of different sizes across various industries. The retail and finance industries have seen a large increase in productivity and decision-making speeds due to the data-driven nature of these organizations. This is because many of the smaller firms in these sectors were able to gain a lot from these technologies and there was a noticeable improvement in the decision-making process and the overall production.

However, the IT sector showed a more complicated picture. Some IT companies experienced enhancement in decision-making processes and quality while others had low or even negative productivity growth. This could be because the sector is already highly optimized and dependent on technology, and the potential benefits of AI and Big Data may be harder to achieve.

In general, this study highlights the role of industry sector and company size as key factors that condition the success of AI and Big Data integration. Thus, those industries that are more data-dependent, including retail and finance, are in a better position to take advantage of these technologies while more digitized sectors such as IT may need more tailored strategies to achieve meaningful results.

Therefore, for the effective integration of AI and Big Data, companies should align these technologies with their particular business functions and match them with the existing infrastructure and workflows. Future work should aim to determine how large firms and highly automated sectors can best use AI and Big Data to enhance productivity and decision making.

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