
Technology and Institutions: What can research on Artificial Intelligence (AI) technology and institutions learn from each other?

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Abstract

Artificial Intelligence (AI) is not contained within the walls of technological organizations; over the decades, it has significantly impacted other industries due to the exponential practical implications of the technology and major break throughs as a result of AI implementation.

Many authors have conducted relevant research about AI and its assistance in industries like banking and finance, education, manufacturing, healthcare, and others to find direct correlation between application of AI technology in data analysis, decision-making, end user impact and satisfaction, time, and cost savings.

This study aims to perform in-depth analysis of various previous studies, and to conduct market research to comprehend the meeting point of Artificial general intelligence and Institutions and what they have to offer to each other; a detailed analysis of the way various strategies applicable through machine learning, deep learning techniques, voice and face recognition applications, expert systems assisting in comprehending customer behavior and patterns, and to identify potential demand, automation of key functions of inter-organization departments through algorithms, and building blocks that form institutions can be adopted by AI for future models and prospectives, and also to understand any gaps in the practical implications of AI that institutions can possibly incorporate in the future; thereby increasing efficiency and effectiveness of both AI and Institutions.

Artificial Intelligence in Current Education

The mention of artificial intelligence brings to mind a supercomputer, a computer with immense processing capabilities, including adaptive behavior, such as inclusion of sensors, and other capabilities, which enable it to have human-like cognition and functional abilities, and indeed, which improve the supercomputers interaction with human beings. Indeed, different motion pictures have been made to showcase the abilities of AI, such as in smart buildings, such as the ability to manage air quality in a building, temperatures, and or playing music depending on the sensed mood of the occupants of the space.

Within the education sector, there has been increased application of artificial intelligence, going over and above the conventional understanding of AI as a supercomputer to include embedded computer systems. For example, embedded into robots, AI, or computers and supporting equipment enable the creation of robots that improve the learning experience of the student, from the most basic unit of education, early childhood education. Indeed, Timms posited that cobots or the application of robots, working together with teachers or colleague robots (cobots) are being applied to teach children routine tasks, including spelling and pronunciation, and adjusting to the students' abilities. Similarly, the web-based and online education, as enumerated in different studies, has transitioned from simply availing materials online or on the web for students to simply download, study, and do assignments to just pass, to include intelligent and adaptive web-based systems that learn instructor and learner behavior to adjust accordingly, to enrich the educational experience. Artificial intelligence in education, according to Chassignol et al., has been incorporated into administration, instruction or teaching, and learning.

Nature of Artificial Intelligence

Artificial intelligence (AI) is conventionally heavily associated with computers. However, it is evident, from a review of the various articles, particularly within the context of the education sector, that while computers may have formed the basis the development of artificial intelligence, there is a gravitation away from the computer

alone, the hardware and software, or the equipment, as being artificial intelligence. Embedded computers, sensors, and other emerging technologies have facilitated the transfer of artificial intelligence to machines and other items, such as buildings and robots.

Indeed, Chassignol et al. provides a two-faceted definition and description of AI; they define AI as a field and a theory and as a field of study, they define AI as a study area in computer science. Further AI pursuits are aimed at solving different cognitive problems commonly associated with human intelligence, such as learning, problem solving, and pattern recognition. As a theory, Chassignol et al. defined AI as a theoretical framework guiding the development and use of computer systems with the capabilities of human beings, more particularly, intelligence and the ability to perform tasks that require human intelligence, including visual perception, speech recognition, decision-making, and translation between languages.

The Future of Learning: AI-driven Education

AI-driven education is disrupting traditional teaching approaches and shaping the future of technology in industry. AI solutions for education analyze enormous data sets using sophisticated algorithms, providing personalized and adaptable learning experiences. Students get personalized learning, immediate feedback, and access to immersive technologies like augmented and virtual reality in education. Conversational AI in education, like chatbots and virtual tutors, offers quick assistance, promoting independent learning. AI chatbots for education are revolutionizing the way students learn. With their natural language processing and machine learning algorithms, these chatbots provide instant and personalized support to students, answering their questions and guiding them through the learning process. Creating interactive and engaging learning experiences allows students to grasp concepts more easily and retain information better.

Technology and Institutions

According to Cairns (2017) Artificial Intelligence (AI) technology and educational institutions can learn from each other in several ways, fostering a mutually beneficial relationship. Here are some key areas of exchange.

Personalized Learning

AI Learning from Institutions

AI can learn about the diverse learning needs and preferences of students in different contexts. By analyzing data on student performance, engagement, and interactions, AI can adapt content and resources to better suit individual learners.

Institutions Learning from AI

Educational institutions can learn from AI's ability to deliver personalized learning experiences at a scale. They can implement AI-powered tools and platforms to enhance adaptive learning, providing tailored content and support to each student.

Data-Driven Decision-Making

AI Learning from Institutions

AI can learn from institutions' expertise in educational data collection, management, and analysis. This includes understanding the nuances of student demographics, performance metrics, and contextual factors that influence learning outcomes.

Institutions Learning from AI

Educational institutions can benefit from AI's advanced analytics capabilities. AI can help identify trends, patterns, and insights in large datasets, enabling more informed decision-making regarding curriculum development, resource allocation, and instructional strategies.

Accessibility and Inclusivity

AI Learning from Institutions

AI can learn from institutions' efforts to create inclusive learning environments for students with diverse needs, including those with disabilities. Institutions have expertise in designing accessible content, providing accommodations, and ensuring equal access to educational resources.

Institutions Learning from AI

AI can offer solutions for automating accessibility features, such as text-to-speech and closed captioning, to make educational content more inclusive. Institutions can adopt AI-driven tools to enhance accessibility measures and provide a more equitable learning experience.

Curriculum Design and Content Development

AI Learning from Institutions

AI can learn from institutions' subject matter expertise, curriculum design principles, and pedagogical approaches. This includes understanding the nuances of different disciplines and the instructional strategies that best facilitate learning in specific domains.

Institutions Learning from AI

Institutions can leverage AI for content curation, generation, and recommendation. AI can analyze vast repositories of educational content to identify relevant resources, suggest materials for specific topics, and even generate custom learning materials.

Literature Review

The article establishes the benefits of utilizing technology and solutions that are supported by Artificial Intelligence in organizations belonging to different industries; as the authors attempt to study factors like decreased cost, increased revenue, and improved business process efficiencies that are documented by various organizations. Businesses that have embraced the updates in technology have reaped the benefits organizationally and environmentally; by improved data management, and updated technology to keep up with industry standards (Enholm, Papagiannidis, Mikalef, & Krogstie, 2021). The adoption of AI and its other formats were a change that needed to be supported by the top management, introducing technology using a top-down approach to make the process more acceptable to the employees.

This study also defines key terms like Artificial intelligence, machine and deep learning, and the difference between AI and information technology. The environment where the organization operates evolves with the implications of AI, and many challenges that traditional methods failed to address have successfully been overcome with AI that benefits the overall environment and industry. The below framework establishes the two-way benefits and value creation between AI and institutions, along with the process of leveraging these benefits for both improved technology and to create superior business value.

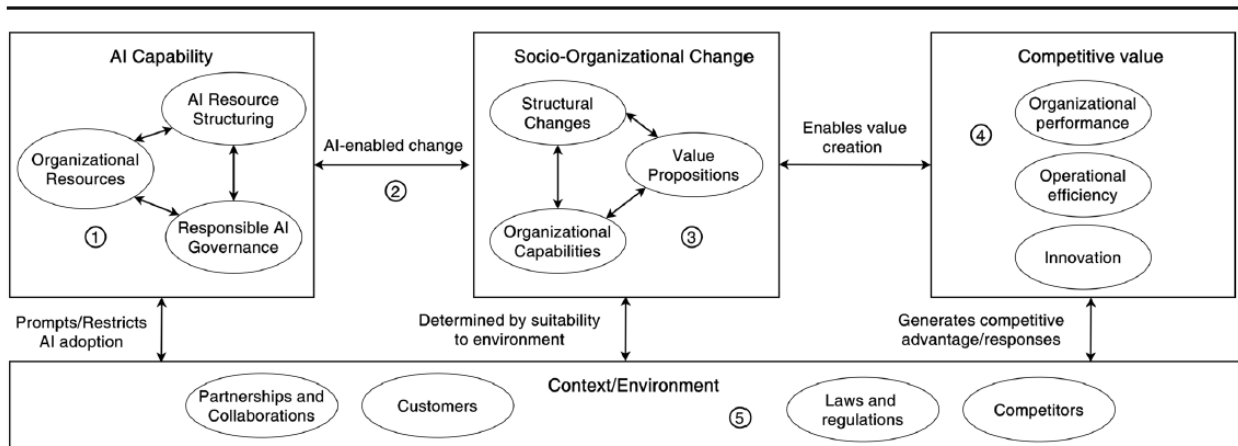


Image source citation: (Enholm, Papagiannidis, Mikalef, & Krogstie, 2021).

The fields of Artificial Intelligence technology and advanced technology like Robotics have played a major role in the digital transformation of organizations, and in contributing towards development of growing economies and government organizations. The author studies the various interdisciplinary technologies of AI in the fields of engineering, technology, and business (Ayoko, 2021). Components that have been examined are cultural factors, technology in strategic decision making, reduction of redundant tasks, improvement of processes and streamlining them have been keenly examined and documented in the article. The author divides and studies both internal and external transformation strategies and the benefits thereby leading to overall understanding of

the technological benefits resulting from the changes. The multi-disciplinary approach adopted by the author is refreshing as different perspectives are studied in-depth from various organizations with different structures and even differences in geographical locations.

Artificial intelligence and related technologies have the capability to create massive impact on many industries, researchers have especially studied the benefits in the public health care organizations where patient care and experience can be improved multiple folds with the implementation of AI. Technology has the ability to provide impactful insights into healthcare from a multitude of perspectives, including social, behavioral, and environmental that have not existed before. Innovations in medical devices that can be worn by patients and can transmit real time data and readings to ensure adept care by the physicians has also increased the efficiency factor of healthcare. Special data about different factors like pollution, weather related effects, greenhouse gas emissions, etc. can be gathered easily and interpreted to provide analysis and results forecast so corrective measures can be rolled out (Fisher, & Rosella, 2022).

Although there are ample benefits, technology still has the probing need to learn and evolve where there is a lack; research findings note the disparity in healthcare accessibility in rural areas where technology cannot be implemented due to infrastructure limitations, deficiencies identified in measures to ensure inaccurate data predictions and gaps in data prediction models. The below image is a relevant visual depiction of six priority factors that are necessary to use AI and build on the relationship matrix between technology and public health organizations.

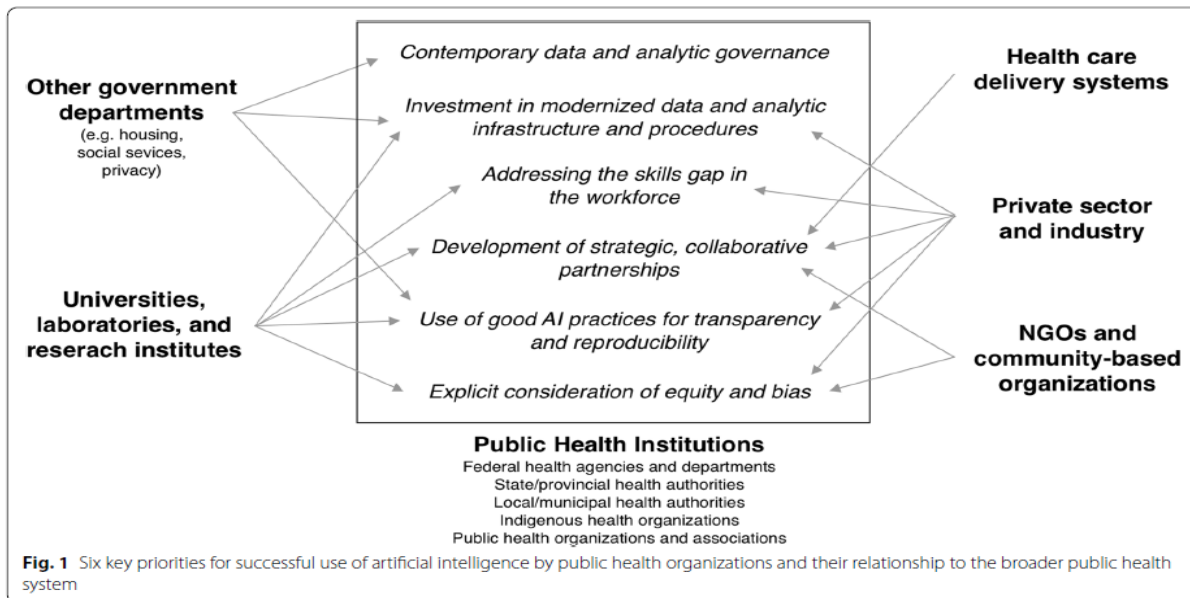


Image source citation: (Fisher, & Rosella, 2022).

Research has been conducted to comprehend the exponential growth of Artificial Intelligence (AI) which has been a disruptive technology bringing change and innovations into the industry over the decades. Various traditional concepts and structures have become obsolete due to the rapidly changing environment for technology and organizations are in the race to adapt to the advances that can catapult their performance and returns. Although AI was developed to enhance correlation and theoretical implications on data originally, the benefits have multiplied with the advent of frequent innovation and core functional changes. Thousands of technology patents for various industries have been registered for AI by many countries, all indicating the utility of technology and its superior ability to solve problems of bigger magnitude and huge volumes of data. Many researchers have also performed in-depth analysis of AI and its applications in institutions, the top ten articles and citations have been displayed in the table below (José, Juan, José, & Jaime, 2021).

Article	C	Year	Authors	Journal
Managerial applications of neural networks: The case of bank failure predictions	625	1992	Tam, K. Y., Kiang, M. Y.	Management Science
Alignment between Business and IS Strategies: A Study of Prospectors, Analyzers, and Defenders	608	2001	Sabherwal, R., Chan, Y. E.	Information Systems Research
Modeling supply chain dynamics: A multiagent approach	557	1998	Swaminathan, J. M., Smith, S. F., Sadeh, N. M.	Decision Sciences
Conformance checking of processes based on monitoring real behavior	537	2008	Rozinat, A., Van der Aalst, W. M. P.	Information Systems
Credit rating analysis with support vector machines and neural networks: A market comparative study	505	2004	Huang, Z., Chen, H., Hsu, C.-J., Chen, W.-H., Wu, S.	Decision Support Systems
Yahoo! for amazon: Sentiment extraction from small talk on the Web	432	2007	Das, S.R., Chen, M. Y.	Management Science
Telos: Representing Knowledge About Information Systems	431	1990	Mylopoulos, J., Borgida, A., Jarke, M., Koubarakis, M.	ACM Transactions on Information Systems
Corporate distress diagnosis: Comparisons using linear discriminant analysis and neural networks (the Italian experience)	401	1994	Altman, E. I., Marco, G., Varetto, F.	Journal of Banking and Finance
Time series properties of an artificial stock market	378	1999	LeBaron, B., Arthur, W. B., Palmer, R.	Journal of Economic Dynamics and Control
Bankruptcy prediction using neural networks	363	1994	Wilson, R.L., Sharda, R.	Decision Support Systems

Note: C: Total number of citations.

Image source citation: (José, Juan, José, & Jaime, 2021)

The above research indicates the growth of scientific interest in the applications of technology in institutions and the interrelations factor between both. The trend has shifted towards technology and institutions as both can benefit from each other for greater economic strength, welfare of the industry and environment, countries with most patents for technologies have gained influential recognition by implementing AI in different fields of management.

Conclusion

AI in education initially took the form of computers and computer-related systems, and later, the form of web-based and online education platform. Embedded systems have made it possible to use robots, in the form of robots or humanoid robots as teacher colleagues or independent instructors, as well as chatbots to perform teacher or instructor-like functions. The use of these platforms and tools have enabled or improved teacher effectiveness and efficiency, resulting in richer or improved instructional quality. Similarly, AI has provided students with improved learning experiences because AI has enabled the customization and personalization of learning materials to the needs and capabilities of students. Overall, AI has had a major impact on education, particularly on administration, instruction, and learning areas of the education sector or within the context of individual learning institutions.

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