# The Use of Artificial Intelligence Applications in the Management of Secondary Education Schools: A Comparative Study Between Japan and the Kingdom of Saudi Arabia

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## Abstract

Artificial Intelligence AI has enabled the creation of computer systems capable of emulating human processes to handle vast amounts of data and solve intricate problems. AI has gradually started to revolutionize the methods used by instructors to educate, the ways students learn, and the functioning of schools, leading to obvious consequences for school management and leadership. This study intends to examine the utilization of artificial intelligence applications in the administration of secondary education schools through analysis of preliminary evidence. Within this framework, the reports from international organizations and the papers available about important institutions in the countries under investigation, particularly ministries of education, were thoroughly analyzed based on the identified themes. Furthermore, the countries' desires for integrating AI into schools were contrasted based on different themes. The research findings indicate a pressing requirement for additional research to explore the utilization of artificial intelligence applications in order to fully optimize its capabilities in strengthening educational administration. The latest research suggests that using artificial intelligence technologies into educational administration duties Nevertheless, there remains a significant amount of knowledge to be gained regarding the ethical implications, privacy issues, and possible drawbacks associated with the integration of artificial intelligence technologies in education. Research has emphasized the importance of collaboration and substantial investment in rigorous research by researchers, policymakers, and educational institutions to ensure the responsible implementation of artificial intelligence tools.

**Keywords:** use of artificial intelligence applications, artificial intelligence applications, management of secondary education schools, Japan and the Kingdom of Saudi Arabia.

## 1. Introduction

The proliferation of intelligent information systems and the associated challenges have profoundly affected various aspects of life and institutions. Consequently, there is a growing need to adopt new artificial intelligence mechanisms to reshape strategies in response to the rapid

technological advancements showcased by artificial intelligence applications, which have emerged as a novel domain in the field of computer science (Chen et al., 2020). The aim is to create highly intelligent computers built to mimic human intellect, enabling them to efficiently complete complex tasks that demand both high intelligence and speed. While artificial intelligence has various applications across different industries, its significance is particularly critical in the field of management, since it plays a crucial role in shaping the future. Effective management is the foundation upon which institutions strive to outperform one another in their endeavors. Simultaneously, the increasing speed of technological advancements is not matched by the swift progress of legal regulations (Vinay, 2023).

The emergence of artificial intelligence has presented various legal challenges, particularly in determining the applicability of existing legal regulations to address the wide range of legal issues that arise from artificial intelligence. These issues include the recognition of legal personhood and the complexities surrounding administrative decision-making (Erumit et al., 2024). As a result of this growth, most modern administrations have a strong inclination to shift the activity. The transition from a paper-based administrative system to an electronic system is necessary for better management of administrative activities. This shift aims to create awareness and convince the public administration of the importance of utilizing technological innovations and their precise procedures in decision-making processes (Ogunode et al., 2023). With the increasing use of technology, such as computers, the Internet, and mobile phones, individuals are now able to express their opinions and agreements with others in order to efficiently and effectively carry out their activities. This has led to the management of public facilities and the regulation of various issues in accordance with the law and individual preferences (Magdy, 2021). Legal practitioners are required to thoroughly investigate all contemporary administrative concepts in order to keep up with advancements in administrative practices. One of the most notable advancements in legal studies that has gained popularity is the concept of smart automation and the automation of administrative decisions. This relies heavily on the utilization of contemporary administrative information systems and artificial intelligence applications, particularly expert systems. This relies on a vast dataset that will furnish information to administrative decision-makers at every level of management (Mohammed et al., 2021).

Most institutions have transitioned from traditional types of administration to modern types that utilize technology and leverage artificial intelligence techniques. This shift aims to enhance the overall efficiency of institutional performance, with a particular focus on schools. Several advanced artificial intelligence technologies have emerged, surpassing production limits and demonstrating exceptional effectiveness (Alotaibi & Alshehri, 2023). As a result, researchers have diligently studied these technologies to adapt them for use in educational institutions, aiming to enhance management quality and enable school staff to utilize these advanced systems. (Al-Behairi & Aliliani, 2024). The benefits of artificial intelligence lie in its capacity to effectively assess problems, address them, and deliver relevant information based on the circumstances to attain outcomes with a high degree of efficiency (Hagag et al., 2023). Additionally, these solutions aid in streamlining the decision-making process and reducing the time required for deliberation and discourse on various matters. Student achievement serves as a measure of school performance quality, hence school objectives prioritize enhancing this

achievement, which can be enhanced through the utilization of artificial intelligence (Alshihri, 2024).

Many schools – in developing nations – have resorted to advance and enhance their administrative systems due to the lack of alternative options. Consequently, some schools have adopted electronic administration by incorporating artificial intelligence into their administrative processes (Kaur et al., 2020). Artificial intelligence-driven management represents a distinct departure from standard management practices as a result of its novel and sophisticated capabilities that are challenging to forgo. Many schools now rely heavily on modern technology for many aspects of their operations, such as planning, organizing, directing, and computerized monitoring (Al-Jehani et al., 2021). The present study aims to examine and contrast the utilization of artificial intelligence applications in Japan and KSA for the administration of secondary education institutions.

Research questions

The aim of this study is to examine the following inquiries.

1. What is the reality of using artificial intelligence applications in the management of secondary education schools in both Japan and the Kingdom of Saudi Arabia?

2. What are the similarities and differences in the use of artificial intelligence applications in the management of secondary education schools in both Japan and the Kingdom of Saudi Arabia?

## 2. Literature review

The term "artificial intelligence" describes a set of tools and techniques designed to help machines reason and adapt in response to complex and often unexpected situations. It includes things like decision-making, intelligent agents, machine learning, and natural language processing (Singh & Mishra, 2021). This technology is widely acknowledged as a thriving one, with its sophisticated applications found in a wide range of industries. It finds extensive use in the services we develop and use, and its problem-solving applications in various fields are expanding at a steady rate, such as computer vision image processing and systems for detecting malware and viruses (Gocen & Aydemir, 2020). AI is a powerful tool with many smart uses in the academic and administrative spheres of modern institutions, serving to accomplish their stated goals. According to Ilić et al. (2021), this can be used for school management and is made by skilled individuals.

Improving technical systems and gaining important information that helps with goal-achieving and skill development is the main reason why educational institutions should incorporate AI technologies. According to Zafari et al. (2022), this ultimately helps the institution stand out and fosters personal growth among its members. Applications of artificial intelligence serve as a strategic tool in many fields that gives institutions a competitive edge by increasing productivity, creating extra revenue streams, and cultivating customer loyalty. More efficient work

completion, more engaging client experiences, and better profitability forecasting are all possible thanks to it (Wang, 2021). The use of AI has the potential to resolve pressing global issues like the Corona crisis and armed conflicts. Using educational technology and its tools, can improve the educational system by offering creative solutions (Salas-Pilco & Yang, 2022). There are many ways in which AI is improving education: by making educators and educational leaders more effective, by raising the bar for educational quality, by facilitating student learning, and by providing them with future-ready abilities. Training computers to mimic human cognitive capacities and work habits would improve human life while also making once tedious tasks much easier for machines to accomplish. Even better than the humans who came before them (Meng & Sumettikoon, 2022). Automation of formerly manual processes or tasks is one way in which artificial intelligence applications boost corporate performance and efficiency. Furthermore, AI can maximize performance and accomplish goals that humans cannot, all because of its extraordinary data comprehension and analysis abilities (Yousuf & Wahid, 2021).

Some of the many advantages of implementing AI into classrooms include students' increased ability to reflect on their own learning and make decisions based on data and algorithms that have been artificially constructed. Not only that, but technology could help with or possibly replace human intellect in some jobs (Tyson & Sauers, 2021). According to Ahmad et al. (2021), AI can quickly adapt variables to different situations, correct errors quickly, and improve accuracy and speed at the same time. Computer simulations that imitate human intelligence and abilities like thinking, understanding, hearing, speaking, and performing various tasks can help students develop life skills, improve their creativity, and understand scientific concepts through the use of smart education programs (Kaur et al., 2020). Smart robotics, natural language processing, expert systems, line and image recognition, sound processing, vision systems, and weather forecasting are just a few of the many domains where its exceptional speed and precision come into play. It can operate for long periods of time without becoming bored or tired, has great data management abilities, shows signs of inference and perception, can identify patterns, and can mimic social and emotional intelligence. According to Ogunode et al. (2023), AI use has broadened to include fields such as engineering, education, and medicine.

Changes in many areas of society have resulted from advances in IT and the Fourth Industrial Revolution. Changes to the process for making administrative choices pertaining to public employees will result from these innovations, the most notable of which are databases, interacting with the Internet, and the trend towards modern technology management (Algethami, 2024). A product of modern information technology, the electronic administrative decision is a powerful instrument that the government can use to fulfill its mandate, communicate its policies, and accomplish its goals for the benefit of the public. Among the most crucial requirements for administrative decisions made electronically is that the decision included in the absence of explicit legislative mandate, electronic signatures are treated as formal procedures (Hassan, 2022). A digital signature is a collection of protocols that confirms the identity of the person making a choice and his agreement with the terms of the action for which the signature is given. The decision cannot be considered valid or enforced until this signature is included, as it is a crucial step in establishing the decision-making authority and the availability of the person with jurisdiction that the legislator requested in the administrative decision (Yas et al., 2024).

The administrative decision-making process has evolved thanks to the widespread use of information and communication technologies, which classify people based on their traits rather than their identities. This shift in focus has had a significant impact on the evolution of management. When making this kind of decision, it's important to have all the relevant facts and information readily available to the decision-maker (Aloqaily & Rawash, 2022). With the old-fashioned method of data transfer, it was possible for multiple parties to receive the same data at once. The utilization of the worldwide information network (the Internet) has recently made this communication much quicker, cheaper, and more precise. Both the administration's own requests and electronic requests containing submitted data have contributed to the influence of technology on administrative decisions pertaining to individuals. Notifying the requesting party (often through email) of the outcome of his request and communicating that decision to him (Alzahrani, 2022).

The information and technology revolution has brought about tremendous changes that modern institutions, such as schools, are grappling with. As these changes have started to grow and develop, they have affected the rise in efficiency and effectiveness of administration, which in turn have caused schools to see wide-ranging changes and problems at the level of administrative thinking (Hararah, 2023). Recently, school administrators have embraced a wide range of strategies to accomplish their aims and those of their communities. These strategies include (searching for an integrated framework for development that achieves the ability to compete and survive), developing behaviors, changing organizational structures, and modifying policies and methods (Faraj, 2022). Using AI is one of the newest ways to organize, develop, and improve school administration's performance. AI is one of the most important and modern subjects of study in school administration, which encompasses a set of interrelated principles that form an integrated approach to doing work at a distinguished level of quality (Fadlelmula & Qadhi, 2024).

School administrations have implemented artificial intelligence to enhance educational outcomes by increasing the quality of instructional activities. To achieve this objective, it is necessary to have effective management that can enhance the level of engagement between the school and the community through a variety of innovative and sustainable programs and activities (Singh & Mishra, 2021). The administration necessitates leaders who possess the capacity to confront significant transformations and obstacles, as well as the competence and resolute determination to achieve success. Utilizing artificial intelligence and implementing the necessary adjustments in school management concepts and work systems can enhance service performance, lower costs, simplify administrative processes, and promote administrative transparency inside schools (Gocen & Aydemir, 2020). Consequently, it is imperative for schools to provide comprehensive training to administrators at all levels, enabling them to comprehend and effectively utilize artificial intelligence in their leadership roles. This is crucial to prevent any diminishment in their capacity to manage and oversee school staff, as well as to avoid any deficiencies in providing guidance, supervision, and support to personnel with diverse inclinations and requirements. The institution requires individuals with proficient leadership abilities, adeptness in negotiation, and expertise in crisis management (Ilić et al., 2021).

Examining the steps involved in using AI in the classroom reveals the need for thorough research, deliberate planning, and exact execution, as well as the establishment of a conducive setting and supporting infrastructure, to guarantee success (Zafari et al., 2022). In addition, competent management and close oversight are necessary for optimal administrative outputs, which in turn demand top-notch follow-up and supervision to guarantee top-notch services. Based on the information provided, it is evident that using artificial intelligence in school administration involves transforming all paper-based administrative operations into electronic processes using different programs and electronic technologies for administration. The advent of artificial intelligence will revolutionize conventional management practices by introducing new functions such as electronic planning, electronic organization, electronic guiding, and electronic control (Wang, 2021). According to Salas-Pilco and Yang (2022), there are three perspectives on the incorporation of AI into organizational management. The first perspective views AI as a useful tool for enhancing decision-making processes. The second perspective highlights the potential for AI-human collaboration to enhance human capabilities. The third perspective regards AI as a potential threat that could render humans obsolete in various aspects of life. Regardless of their ideological stance, it is clear that principals, as managers and leaders of schools, must address the potential and problems presented by artificial intelligence technology in the field of education (Meng & Sumettikoon, 2022).

Principals are expected to both incorporate AI technology into their management and leadership practices and encourage teachers to do the same by modifying their attitudes and actions (Yousuf, & Wahid, 2021). According Tyson and Sauers (2021), the lack of sufficient technological infrastructure or digital tools is not the only issue. The failure of teachers to fully understand and incorporate their role in teaching and learning is also a problem. Hence, the provision of these technologies by school administrators and their utilization in school management would not lead to a lasting change without the sincere endeavors of the school staff. Therefore, it is crucial for principals to prioritize the following actions: providing support for teachers' professional development in relation to new technologies, involving them in decision-making and strategic initiatives, fostering a culture of trust and innovation, and promoting teachers' confidence in their own abilities and in the collective pursuit of these innovative goals (Ahmad et al., 2021).

## 3. Method

This study employed a comparative analytical method to examine the websites of schools specializing in management with artificial intelligence, international reports, and relevant ministry websites in Japan and KSA. The specific purpose was to describe the situation within a defined framework. Comparative analytical is a recommended approach for doing descriptive analyses, which involves accumulating and examining data from many sources to uncover the existing condition (Creswell, 2007). This study followed a comparative analytical procedure consisting of four phases proposed by Merriam (2009). The survey was done by consulting prior research and relevant publications as references for literary analysis and comparison. Its purpose was to explain and assess the actual implementation of AI in school administration, as well as to study the similarities and differences between Japan and KSA.

## 4. Findings and Discussion

The research questions will be used to explain the results. The first inquiry asks about the actual implementation of artificial intelligence applications in the management of secondary education institutions in Japan and KSA. This inquiry will be addressed by examining and deliberating on the practicality of implementing artificial intelligence AI applications in the management of secondary education institutions in the aforementioned countries. The focus will be on the elements that influence the implementation process, as well as the assessment system.

Using artificial intelligence applications in school management in Japan

1. Factors affecting the use of artificial intelligence applications in school management in Japan:

- Geographic and demographic factors: The Japanese archipelago is situated in East Asia, with over three thousand dispersed islands. These communities have limited primary economic resources, so they have chosen to prioritize investment in education, which they consider to be their key advantage. Japanese education has achieved the highest level of output globally. Japanese education holds world records in the global educational management system. Japan's climate is consistently temperate, allowing for year-round studying opportunities. The issue of declining birth rates poses a significant quandary in Japan, which has had a direct impact on the educational system. Each year, the student population dwindles, with the majority residing in the capital and other big cities. These urban areas house (40%) of the total population, which accounts for only (6%) of the country's land area. In terms of geographical area, the capital and major cities experience high population density, which puts significant strain on the education system due to the large number of students. In rural and remote places with low population density, many forms of school management have emerged, including electronic management and management utilizing artificial intelligence.

- Economic factors: Japan underwent various circumstances that contributed to its reform. The educational reform of 1868 marked Japan's initial endeavor to foster comprehensive development across multiple domains. The reform pioneers made the decision to create a national educational system in order to develop a skilled workforce that was required for the industrialization drive. This was done to meet the societal demand at that time and to fully utilize the human potential. And his endeavors to acquire the necessary workforce. This system was developed by top educational planners who carefully studied and incorporated the leading theories and systems from Germany, Italy, America, and France during this time period. According to Chen et al. (2020), Japan had outperformed all nations in the steel sector by 1967, with the exception of the United States and the Soviet Union. Notably, Japan predominantly produces its steel using raw metal and scrap materials imported from other places. In 1970, Japan held the second position in the vehicle industry. The chemical and composite materials industry, renowned for its significant scale, saw tremendous growth in the past, surpassing British textile factories and approaching the production levels of American factories, thereby expanding its global presence. Japan holds the distinction of being the world's largest country in shipbuilding.

Consequently, as its economy progressed, its education system made tremendous advancements transparent.

- Political factors: Following the conclusion of World War II, Japan experienced a significant defeat and came under American control. This event had far-reaching effects on various aspects of Japanese life, including education. Therefore, a new educational reform was initiated in 1947. This reform aimed to broaden educational opportunities, enhance teaching methods, extend compulsory education to nine years, and diversify specializations in secondary and higher education. Consequently, the educational system's structure became more streamlined, resulting in a complete eradication of illiteracy and increased accessibility to higher education. Following the Hiroshima bomb assault, Japan had a resurgence and shown enhanced capabilities.

2. Assessment of using of artificial intelligence applications in school management in Japan

- Data: Implementing artificial intelligence applications necessitates the availability of diverse data types and quantities. However, the primary obstacle confronting many organizations presently is not a shortage of data in general, but rather a scarcity of valuable and easily accessible data specifically tailored for the desired artificial intelligence solutions. Artificial intelligence applications have been advantageous for educational institutions in Japan, since they have enabled the development of educational software and applications that enhance the education management process. These tools also integrate research and analysis capabilities, making the learning experience more fun. Artificial intelligence applications in education management have a beneficial influence by addressing administrative challenges and providing diverse solutions.

- Individuals (human capabilities) in the school: This dimension focuses on the attitude, roles, and skills necessary for the development and implementation of AI initiatives within or outside educational institutions in Japan. Artificial intelligence programs will lack effectiveness unless individuals are well trained in the necessary technical skills and provided with ongoing functional assistance. Thus, schools in Japan made a deliberate effort to establish a balance between leadership, school culture, and change management to guarantee that individuals are prepared, motivated, and capable of utilizing and investing in artificial intelligence applications.

- Infrastructure: Infrastructure is a crucial component for operating artificial intelligence applications, encompassing software, hardware, and the organizational framework for developing and investing in artificial intelligence. As a result, Japanese schools are implementing a well-defined strategy for their infrastructure to minimize risks, speed up the achievement of goals, broaden the range of AI investments that will remain relevant in the future, and synchronize the lifespan of the AI model across different applications.

Using artificial intelligence applications in school management in Saudi

1. Factors affecting the use of artificial intelligence applications in school management in KSA:

- Geographic and demographic factors: KSA encompasses a significant portion of the Arabian Peninsula, spanning diverse and expansive territories. To the west lies the Tihama plains along the Red Sea, followed by the Sarawat mountain range, which gradually rises in elevation towards the south. In the central region of the country lies the Najd Plateau, while the Al-Nafud Desert occupies the northern part, and the Al-Ahqaf Desert stretches across the southern region. Adjacent to the west lies the Dahna Desert, which is then succeeded by coastal lowlands to the east. The huge desert known as the Empty Quarter is located in the south-east of the country, and there are no rivers inside the country's borders. The climate of the Kingdom is primarily desert, characterized by scorching heat and lack of rainfall in the summer, low temperatures in the winter, and significant seasonal precipitation in most regions. The Kingdom's terrain and climate exhibit significant variation due to its northern and southern regions. The Kingdom is distinguished by arid desert regions, mountainous terrain, and flat areas. Its climate ranges from a desert environment to one marked by severe cold. The geographical diversity of a region has significant implications for the development of its educational system. The geographical factor has influenced the implementation of artificial intelligence systems by enabling the delivery of distance education through educational platforms during extreme weather conditions, such as heavy rain and flooding. This has led KSA to establish virtual educational platforms that utilize artificial intelligence principles. The geographical aspect also impacts pupils, as the Ministry of Education and general education institutions consider the geographical climate to create an environment conducive to quality education, taking into account the extreme heat and cold weather conditions (Alshihri, 2024). KSA is making efforts to create suitable conditions based on geographical factors in order to facilitate student learning and ensure the smooth progress of the educational process. This includes the utilization of modern technologies and artificial intelligence systems that are compatible with the country's climate.

- Economic factor: KSA is renowned for its vast petroleum reserves, making it the largest exporter of oil globally. Additionally, it possesses significant mineral resources and has experienced a notable agricultural revival, contributing to its status as one of the wealthiest nations in the world. Following the discovery of oil in 1938, the natural resources had a crucial role in revitalizing industry and trade. KSA is among the wealthiest nations globally, primarily because of its vast reserves of petroleum. Additionally, the country possesses significant natural resources and has experienced a notable revival in its agricultural sector. The natural resources played a crucial role in revitalizing industry and trade (Alshihri, 2024). This led to a significant expansion in these sectors, and the state's educational system was directly influenced by its revenues. In 1393 AH, the Ministry of Education had a budget of (12) billion Saudi Riyals, which gradually increased each year. By the year 1436-1437 AH, the education sector was allocated (217) billion Saudi Riyals. The economic progress and industrial expansion in KSA have had a favorable impact on both export and import commerce. It is not feasible to compare the business activity in the Kingdom when it was first created to the extensive progress that the Kingdom has accomplished now across multiple sectors. The trade in this country has seen a significant transformation. The significant transaction is derived from a restricted, temporary commerce that heavily depends on the Hajj season, for instance, transitioning to a trade established on stable economic principles. The economic factor has impacted the artificial intelligence system by

investing heavily in education and allocating sufficient funds to enhance the Kingdom's educational system and enable its economy to compete with the most advanced systems globally. This necessitated a focus on technology and the implementation of an artificial intelligence system, alongside a commitment to investing in human resources and providing them with comprehensive training to effectively engage with KSA. Saudi Arabia aims to optimize its capabilities by fostering a culture of excellence and coordinating endeavors to accomplish Vision 2030 through the establishment of technical complexes centered around the artificial intelligence system. Saudi Arabia not only focused on educating and training its workforce, but also utilized its economic resources to support advanced education that rivals that of other nations. Saudi Arabia has also set up electronic learning facilities, like the National Center for Education electronic.

- Political factors: KSA government operates under a monarchical system. The judicial, executive, and regulatory bodies work together to carry out their respective functions in alignment with this system. The king serves as the ultimate authority for these branches. The regulatory authority is tasked with establishing rules and regulations to promote the welfare of the state and combat corruption, in accordance with the principles of Islamic Sharia. It also exercises its jurisdiction in this regard. The powers of this system align with those of the Shura Council and the Council of Ministers. KSA created an education strategy plan that received approval from the Council of Ministers through Resolution No. (779) on 9/16/1389 AH. The document remains effective and influential in the present time. It encompasses various elements aimed at promoting education policy, particularly the Education Technology Organization and the artificial intelligence system. It asserts that the fundamental purpose of education is to prepare all children in the nation by equipping them with experiences, information, and skills. The influence of the political factor on the artificial intelligence system is clearly seen in its connection to education. This is evident in the requirement for educational institutions to have legislation that governs their funding, management, and the prioritization of the use of artificial intelligence in public education, such as educational platforms in KSA. The political component also influences societal growth and the levels of political and intellectual autonomy. In politically stable and diplomatically harmonious autonomous nations, the educational system remains steadfast, hence influencing the incorporation of contemporary technologies in education. The political factor in KSA plays a crucial role in shaping educational policy. It is closely linked to the political culture and influences the priorities and choices regarding the integration of information technology in public education. This is evident in the Kingdom's Vision 2030. This suggests that achieving desired goals in public education requires the diligent and dedicated application of human efforts, specifically through the utilization of artificial intelligence systems. It is important to adhere to the laws and regulations set by KSA regarding the implementation of artificial intelligence systems in education.

2. Assessment of using artificial intelligence applications in school management in KSA

- Data: The implementation of artificial intelligence applications requires the presence of a wide range of data kinds and varying amounts of data. Currently, the main challenge faced by many businesses is not a lack of data in general, but rather a shortage of valuable and readily

available data that is especially customized for the intended artificial intelligence solutions. The utilization of artificial intelligence applications in educational institutions in KSA has proven to be beneficial. These applications have facilitated the creation of educational software and tools that improve the management of education processes. Additionally, these technologies incorporate research and analysis functionalities, enhancing the educational experience with a sense of enjoyment. AI applications in education management have a positive impact by effectively tackling administrative obstacles and offering a wide range of solutions.

- Individuals (human capabilities) in the school: This component focuses on the mindset, roles, and abilities required for the creation and execution of AI projects inside or outside Saudi educational institutions. AI initiatives won't be very successful unless people receive adequate training in the relevant technical skills and continuous functional support. Consequently, Saudi educational institutions deliberately endeavored to achieve equilibrium among leadership, school culture, and change management in order to ensure that people are ready, driven, and equipped to invest in and make use of AI applications.

- Infrastructure: Infrastructure, which includes hardware, software, and the organizational structure for investing in and developing AI, is essential to the operation of artificial intelligence systems. Because of this, Saudi educational institutions are putting into practice a well-thought-out infrastructure strategy aimed at reducing risks, expediting goal attainment, expanding the scope of AI investments that will hold value over time, and coordinating the AI model's lifespan across various applications.

The similarities and differences in the use of AI applications in the management of education schools in both Japan and KSA

The rapid advancement of artificial intelligence applications has compelled the education system in KSA to embrace intelligent digital systems that enhance the development of the Saudi educational community. Efforts are being made to establish mechanisms for enhancing and evolving AI application systems within the Saudi education system. The Saudi educational system has embraced AI and digital communication as an alternative to traditional methods. This virtual environment relies on advanced technology and accelerates the learning process. “Madrasati” platform and the Robotech Educational Club in Mubarraz have faced challenges and difficulties in implementing digital communication methods through AI applications. The uses of AI are limited by the lack of training and experience in handling this form of communication. KSA has been recognized for its leadership in the field of information technology and AI systems. To embrace the latest technological advancements, KSA launched its Vision 2030, which aims to incorporate AI into various sectors, particularly public education. As part of this vision, the city of NEOM is being developed at a significant cost of over half a trillion US dollars. NEOM is designed to be an AI-based city, where the number of robots is expected to surpass the human population in the future.

In its Vision 2030, KSA recognized the importance of schools in the development of nations and agreed with Japan on this matter. Both countries acknowledged the need for modern preparations in managing schools. As a result, KSA implemented a five-year teaching license, while Japan's

principal license has duration of 12 months. Acquiring it is unattainable, with the exception of a few tests. The Japanese experience differed in terms of the types of tests administered, which included personal, oral, and written interviews. In contrast, KSA only conducted two fundamental examinations: the general educational test and the specialized test. However, it encompassed various criteria that were assessed, such as continual professional development and contact. The principal of school must engage with educators and society, possess proficiency in language and quantitative abilities, be well-versed in teaching methods, have understanding of schools and their management, and be capable of creating an optimal and supportive learning environment. Furthermore, the qualities, duties, expertise, and professional standards align closely with Japan's criteria for selecting and training teachers.

Japan and KSA differ in their acceptance rates for educational establishments. While Japan only accepts a quarter of applicants, despite their enormous number, KSA has a different approach. This is a result of the rigorousness of the entrance and enrollment protocols implemented by its colleges. In Saudi Arabia, individuals who possess a high school diploma and have achieved a satisfactory score on both the aptitude and achievement tests, as determined by the universities they have applied to, are eligible to participate in the selection process. This process involves a weighted evaluation based on percentages, and successful candidates are then able to enroll. Located at the College of Education. Japan distinguishes itself from KSA by combining theoretical knowledge with practical application. In Japan, managers are required to undergo a minimum of (6) months of field training before they can acquire a license. In contrast, the emphasis – in KSA – is primarily on theoretical knowledge rather than practical application. In Japan, the monitoring and supervision of managers during their employment has become increasingly rigorous and now extends beyond individual initiatives to become a legal requirement. Nevertheless, in KSA, the efforts to address various issues might be categorized as individual endeavors, regional initiatives, or obligatory undertakings that span extended durations. KSA continues to exert significant effort in this regard. Considerable financial resources are required to enhance school administration.

## 5. Conclusions

The conventional leadership methods in schools are inadequate to support the educational goals of schools in the age of artificial intelligence. The responsibilities of principals have already shifted from solely managing schools to a more comprehensive approach that requires them to enhance the leadership capabilities of schools through effective principal leadership. In such situations, school principals are also required to demonstrate digital leadership, which involves using AI technology to create a social influence process that can bring about changes in the attitudes, emotions, thoughts, behavior, and/or performance of individuals, groups, and/or organizations. There is a pressing requirement for further research on utilizing AI applications to fully exploit its potential in improving educational management. Current research suggests that integrating AI applications into different educational management tasks has yielded promising outcomes in enhancing the efficiency of administrative and educational processes. Nevertheless, there remains a considerable amount of knowledge to be gained regarding the

ethical implications, privacy issues, and other drawbacks associated with the integration of AI technologies in education. Hence, it is imperative for researchers, policymakers, and educational institutions to collaborate and allocate resources towards rigorous study to guarantee the appropriate and efficient utilization of AI in educational management.

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