

# Opportunities and Challenges of AI Adoption by the Abu Dhabi Police: A Review Study

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To Link this Article: <http://dx.doi.org/10.6007/IJAREMS/v13-i3/22719> DOI:10.6007/IJAREMS/v13-i3/22719

Published Online: 18 September 2024

## Abstract

Artificial Intelligence (AI) is increasingly vital in modern policing, offering significant opportunities to enhance public safety and operational efficiency. The objective of this review paper is to examine the potential benefits and challenges of AI adoption by the Abu Dhabi Police in the UAE. Using a methodology review approach, this study analyzes existing literature on AI applications in law enforcement, focusing on predictive policing, surveillance, and decision-making. The findings highlight AI's potential to shift police operations from reactive to proactive models, optimizing resource allocation and improving crime prevention. However, challenges such as data privacy, ethical concerns, technological complexity, and organizational resistance are identified as major barriers. The study contributes to the improvement of Abu Dhabi Police strategies for successful AI integration, including workforce training, cybersecurity measures, and the development of ethical guidelines. Future research should explore the ethical implications of AI in policing, community trust, and the creation of balanced policies that ensure accountability and effectiveness in law enforcement.

**Keywords:** Artificial, Intelligence, Opportunities, Challenges, Police, Abu, Dhabi.

## Introduction

Artificial Intelligence (AI) stands as one of the most transformative technological advancements of the 21st century, shaping various aspects of society, economy, and governance. At its core, AI refers to the simulation of human intelligence processes by machines, primarily computer systems. These processes include learning, reasoning, problem-solving, perception, and language understanding. AI technologies encompass machine learning, where algorithms are trained to recognize patterns and make predictions based on vast amounts of data, as well as natural language processing, enabling machines to comprehend and generate human language.

In recent years, AI has seen unprecedented growth and application, revolutionizing industries ranging from healthcare and finance to transportation and entertainment. AI-driven innovations like chatbots, recommendation systems, and autonomous vehicles have become integral parts of everyday life. Machine learning algorithms power virtual assistants

like Siri and Alexa, offering personalized user experiences (Harris 2022). Additionally, AI plays a pivotal role in data analysis, enabling businesses and researchers to extract valuable insights from massive datasets (Sunarti et al. 2021). However, alongside its immense potential, AI raises ethical and societal concerns. Issues related to privacy, bias in algorithms, job displacement, and the ethical implications of autonomous decision-making are subjects of intense debate (Mikalef and Gupta 2021). Governments, researchers, and industries are collaboratively working to establish guidelines and regulations to ensure the responsible development and deployment of AI technologies.

As the field of AI continues to advance, it is crucial to explore its adoption in specific sectors like law enforcement, such as in the case of the Abu Dhabi Police sector, to understand its impact comprehensively. Such research helps navigate the challenges and opportunities presented by AI, fostering a balanced integration that benefits society while addressing ethical and societal concerns. The rising demand for AI technology in police spheres mirrors its pervasive influence on contemporary society. AI systems have become omnipresent, infiltrating various domains and exhibiting increasing competence across diverse functions. Its appeal lies in its perceived cost-effectiveness, speed, and reduced error rates compared to human labor, often replaced through automation (Dorhetso and Quarshie 2023). A study commissioned by Microsoft, surveyed public sector organizations in Western Europe before the onset of the COVID-19 pandemic. The research revealed that two-thirds of these organizations considered AI a top digital priority. The pandemic, by necessitating the shift of processes, services, and people online, accelerated AI adoption in the public sector. Governments, forced to set an example, led this transformation. Although literature suggests that AI adoption in public sectors lags behind the private sector, this lag may present an unexpected opportunity, especially in police sector. By learning from the successes and failures of other industries in their AI endeavors, government agencies can glean valuable insights and best practices. This presents a significant opportunity for the public sector, paving the way for widespread and swift AI adoption. The current momentum underscores the urgency for a comprehensive study to assess the relative importance of factors driving AI adoption and implementation in the public sector. Several studies (Alhajeri and Safian 2023; Dorotic, Stagno, and Warlop 2023; Al Shamsi and Safei 2023; Sharma, Yadav, and Chopra 2020) have explored these driving factors in the public sector. However, these studies often suggested that these factors are interconnected, leaving the relative significance of individual success factors in AI adoption and implementation in the public sector unexplored (Dorhetso and Quarshie 2023).

### **AI and UAE's Initiative**

2017 was a watershed in the history of UAE government's policy to adopt technology to enhance its services towards its citizens, when the Centennial Plan was announced for Vision 2071 (Petratos, Ljepava, and Salman 2020). This announcement introduced a long-term vision plan for the government. The Centennial Plan has been envisioned as a platform to carry UAE from the current its current status towards a prosperous future. This vision document envisions success of UAE government's policies and services targeted towards its citizens to a new level with the use of latest technology. For the purpose the Centennial Plan encompasses several different fields and sectors. The primary focus of the UAE Centennial Plan covers four important priorities of the UAE government, viz. government, education, economy, and community (Yasmin, Refae, and Eletter 2024). With the implementation of this

vision the UAE government envisions to achieve expertise which shall help achieve the best government, best education, best economy, and the happiest communities (Belpoliti et al. 2021). To make this vision clear it can be assumed that the aspirational target of the UAE government is to achieve the tag of the best country in the world by 2071. The centennial plan is a vision document that envisions acquisition of technology and its usage to bring the services of the government above par from the governments across the western hemisphere of the world (Khajarian, Angell, and Batra 2023). For achieving this vision there are numerous pre-conditions which go beyond adoption of technology. There must not only be a change in the mindset, but also in the level of acceptance and adoption of such technologies. Augmenting responsibility and readiness both mentally and logistically is also necessarily mandated. This means that UAE government will not only have to work on enhancement of working human capital but will also have to work on numerous other initiatives and strategies to prepare the government structure and mindset by equipping the existing workforce with knowledge, skills, and abilities (KSA) required to survive in a fast moving and dynamic environment filled with uncertainty and complexity (Khajarian, Angell, and Batra 2023).

As a follow up the UAE Government in October of the same year announced its Artificial Intelligence plan, which again is a strategic plan document, envisioned as the first project planned to implement the Centennial Plan objectives of the UAE Government. The unique strategy transitions UAE government to a completely new phase of becoming an AI driven government as shown in Figure 1 (Almarzooqi 2019).

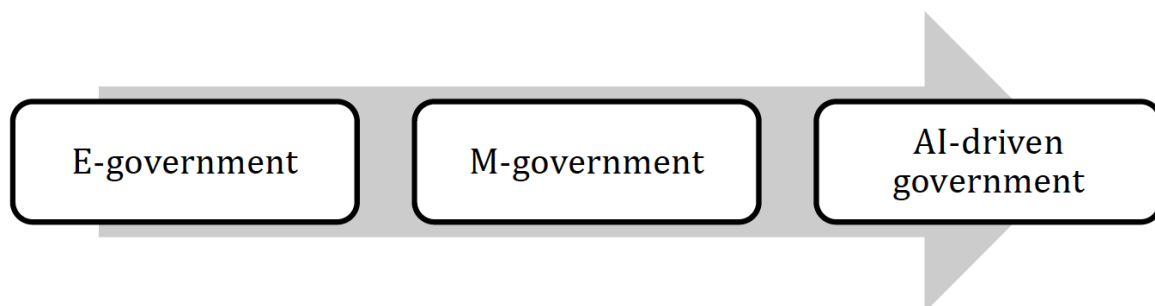


Figure 1. UAE government technological transition phases (Source: Almarzooqi, 2019).

UAE Government's Artificial Intelligence plan will implement strategies to adopt the latest technologies available in the field of Artificial Intelligence to enhance the efficacy and efficiency of the government (Storozhenko 2023). The plan aims to achieve an ambitious goal of implementing AI strategies in a way that all the functions and services of UAE government are based on technologies using Artificial Intelligence. The plan aims to implement and deploy AI based technologies in all the sectors of the UAE government which range from transportation to space; education to energy and so forth. The UAE government envisages that in case of successful implementation of its strategy of deploying AI technologies, the current per annum operating costs of the government services will see a steep downward trend. In fact, it may go well beyond 50% in savings (UAE 2031, 2018). As no policy implementation is successful without an adequate investment in the research and development, UAE government also envisions having big investments in not only AI research and development but also hosting international events and exhibitions showcasing world-class AI technologies and platforms (Government.ae, 2021).

### *AI and government functions*

Artificial Intelligence can prove to be a tool that helps governments achieve efficiency in provision of its services to the citizens. It has a wide range of applications and potential uses withing several aspects of government functions, including

- Prediction: Prediction can be used in several areas of government function. Ranging from health sector, where identifying communities prone to certain disease can be predicted, to education, where users outcomes can be predicted based on past data and policy measures can be identified for course corrections. Policing is another field where prediction can play a major role in crime prevention (Almarashda et al. 2021).
- Detection: AI can be used in numerous ways and in different sectors like banking, finance, law and order etc. for identifying abnormal patterns (Alzaabi and Shuhaiber 2022).
- Image recognition: Again, AI can be used to the optimal in sectors such as healthcare, transportation, or policing for automation and facilitation of provision of government to citizen services (Othman and Al Hammadi 2023).
- Natural Language Processing. Utilizing the technology AI systems can process a wide range of data from human speech or text, through chatbots or through sentiment analysis etc (Hussein Al-shami et al. 2022).
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### *AI readiness for government*

With such an ambitious plan and the vision layout by the UAE government, the pertinent question that can be asked is whether a government is capable to implement AI in its efforts to enhance and improve its public services, and if so, then to what extent?

Government's vision of implementing and deploying AI starts with a simple plan of buying and using it. But, it is important to acknowledge that several challenges still form big challenges to the effectively implementation of AI, which includes the lack of skilled AI professionals, concerns about data privacy and security, and the complexity of AI technology itself (Almuraqab, Alrae, and ... 2023). The government then needs to be ready for the disruptive nature in which AI can be used and implemented. This typically means that the agency needs to prepare for multitude of areas, which may be critical for AI implementation. Government will need adequate planning to re-tool and re-skill the human capital in terms of both soft skills and hard skills. Furthermore, necessary changes and adaptations are also pertinent for existing processes and linkages, whether backward linkages or forward linkages in terms of data management and in the way it has been used and stored. Refining and re-imagining existing processes, employees' approach toward partnership, and development and deployment of the necessary infrastructure and logistical chains for the necessary data and technical management necessary for deployment of AI (Soudi and Bauters 2024). Delloitte Insights has come up with a broad framework for a government which willing to proceed beyond initial projects (Buren, Chew, and Eggers, 24 January 2020). The Delloitte Insights states that

It is helpful to consider the following distinct but interdependent areas in which to assess AI readiness: strategy; the organizational dimensions of people and processes; the technology-

focused dimensions of data; technology and platforms; and the ethical implications of this transformative capability (ibid.) (see figure 1).

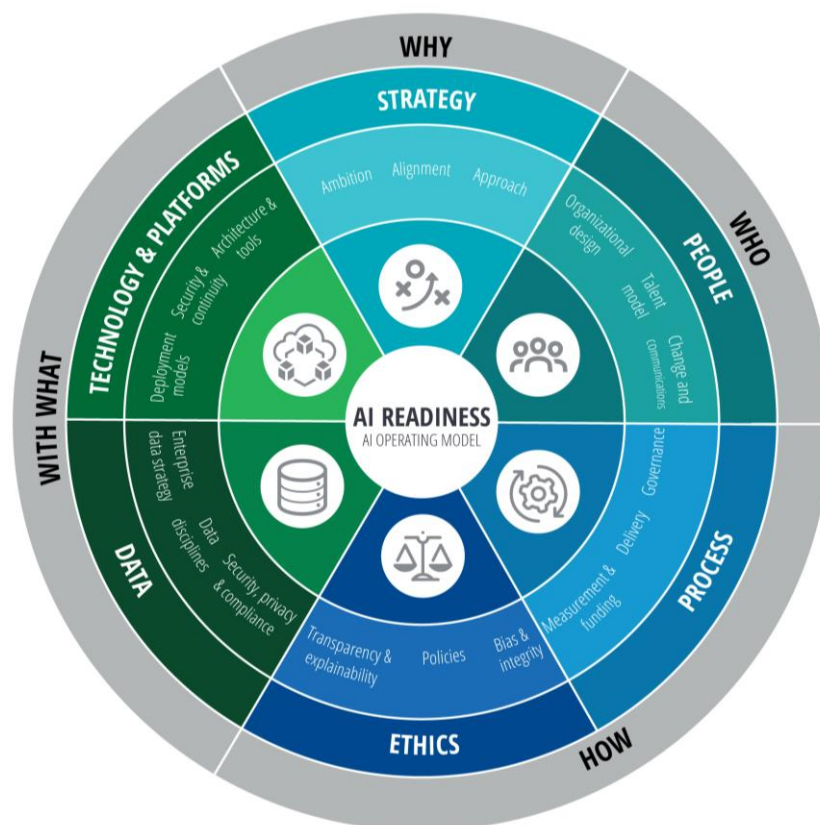


Figure 2. AI readiness across six areas

Source: Deloitte Insight Article "Crafting and AI strategy for government leaders" (Buren, Chew, and Eggers, 24 January 2020).

The six sectors which have been identified in the above figure may be critical for an agency's desire to implement AI technologies and will need appropriate action and review of current strategies on road to implement AI in their organization. These sectors will help the organization set up an initial baseline to measure their existing capacities and readiness for implementation of strategies for implementation of AI strategies:

- **Strategy.** Since AI is a transformative technology, alignment on direction and level of ambition is crucial (ibid).
- **People.** Government agencies may face challenges around accessing and recruiting necessary technical skills, as well as helping existing employees develop and deploy AI skills (ibid).
- **Processes.** It is very important to stablish, define, and design processes, controls, and governance systems to enable successful AI implementation (ibid).
- **Data.** AI is only as good as the data upon which it is built, and its appetite for data is voracious (ibid).
- **Technology and platforms.** Development of appropriate AI technology and platforms to operationalize AI assets, including interoperability, and the computing environment is crucial (ibid).



- **Ethics.** This is an important aspect for AI driven services as it can easily be prone to bias and lack of transparency may lead to lack of trust. Therefore, it is important to place mechanisms to understand and prevent AI bias, promote fairness and transparency, ensure privacy, values, and integrity in AI-driven initiatives (ibid).

### *The 2020 Government AI Readiness Index*

As part of its AI for Development (AI4D) initiative, a project to quantify the readiness of the governments for adoption of AI for their services was commissioned by Canada's International Development Research Centre (IDRC) (Oxford Insights, 2021). In 2017 Oxford Insights under IDRC came out with the Government AI Readiness Index. The latest version the 2020 index, which is its third iteration, the Government AI Readiness Index ranks governments around the world according to their readiness to implement AI in the delivery of public services to their citizens (Oxford Insights, 2021).

The index uses the following hypotheses, each of which corresponds to a fundamental pillar of government AI readiness:

1. The Government needs to be willing to adopt AI, and able to adapt and innovate to do so (ibid).
2. The Government needs a good supply of AI tools from the technology sector (ibid); and
3. These tools need to be built and trained on high quality and representative data and need the appropriate infrastructure to be delivered to and used by citizens (ibid).

Under each of these pillars are dimensions that further specify how each of these conditions need to be fulfilled

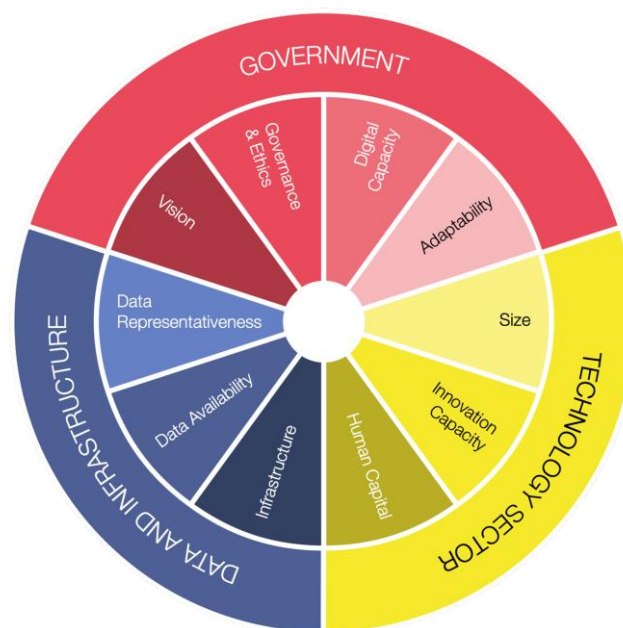


Figure 3. The pillars and dimensions of the Government AI Readiness Index (Source: Oxford Insights, 2021).

As a sub-index of the readiness index the report also highlights an index on responsible use. As the governments implement AI for execution of their public service delivery, there is also a need to develop and use the technologies in a responsible manner. This index measures indicators across 4 dimensions: inclusivity, accountability, transparency, and privacy. As per

the report these dimensions cover the OECD principles on artificial intelligence (Oxford Insights, 2021).

#### *UAE and AI readiness index*

UAE ranks 16<sup>th</sup> out of 172 countries in AI readiness Index globally. It is at the top position in the Middle East and North Africa (MENA) region comprising of 18 countries (ibid.). Having an ambitious approach towards adopting the AI technology has helped UAE figure so high in the index. The report ranks UAE at 7<sup>th</sup> position in the pillar representing the government which shows the seriousness of the government in implementation of its AI adoption strategy (ibid.). The weakness of UAE is however reflected in the technology pillar of this index where UAE slips to a 21<sup>st</sup> position globally and to 2<sup>nd</sup> position regionally (ibid.). In the responsible use sub-index, which for the year 2020 covers only 34 countries, UAE stands at 26<sup>th</sup> positing, which can be a cause for concern for the government which through its centennial plan envisions UAE to be the world's best country by 2071 (ibid.). Figure 4 shows the score of UAE's readiness index across the pillars and dimensions in the sub-index.

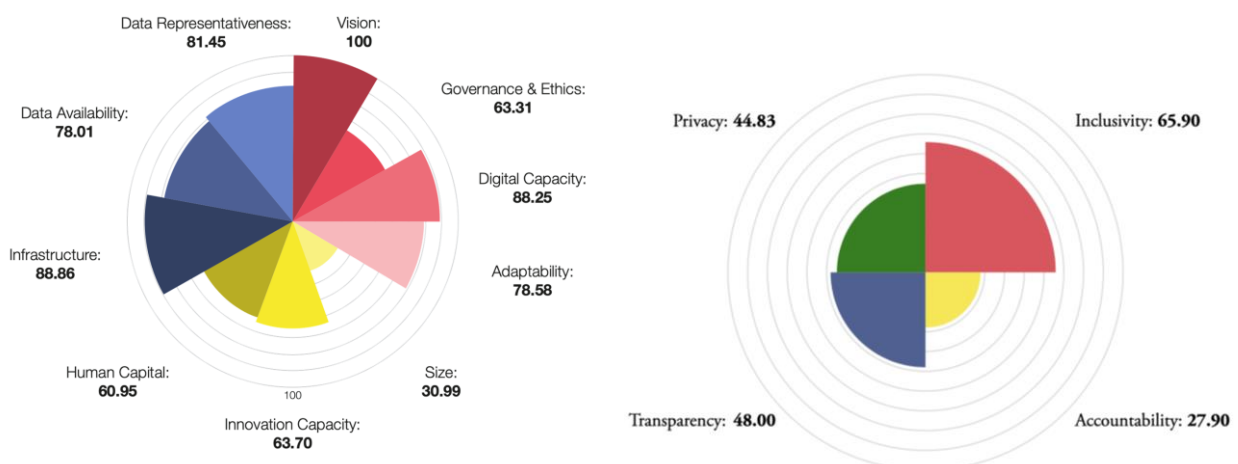


Figure 4. UAE's score in the AI Readiness Index and the Responsible use Sub-index.

Source: Oxford Insights, 2021

Having an ambitious layout of government's vision and efforts for adoption of AI based technology it is now necessary for the UAE government to focus its attention of the aspects which will help achieve its ambitious plans (Oxford Insights 2021).

#### **Artificial Intelligence in the UAE Police**

In the UAE's efforts to combat and prevent crime, artificial surveillance, predictive policing, and big data utilization by law enforcement have become increasingly prominent (MENA Herald, 2018; Shouk, 2019a). AI and big data have already achieved a "zero crime" environment in specific Dubai communities through the implementation of the AI-powered program "Oyoon" by the Dubai Police. This program utilizes AI data analytics to solve crimes and identify security gaps across various locations, operating independently across numerous city cameras (Shouk, 2019b). Col Suleiman Al Kaabi, director of innovation and foresight at Abu Dhabi Police, emphasizes the transformative potential of AI in reshaping decision-making as technology bridges the natural and artificial realms (Malek, 2018, p. 1).

While the Abu Dhabi Emirate has diligently prepared its citizens for an AI-driven future, there remains a significant gap in officer training, especially concerning newly introduced intelligent automated tools and optimizing big data potential (Babuta, 2017). Law enforcement officials often manually sift through vast data, unaware of available automated tools that could save time. Adequate technology training is lacking, yet the effectiveness of analytical tools depends on the operator's proficiency, underscoring the need for investment in officer training for new technology systems. Within the Abu Dhabi Police AI strategy, the Department aims to transition from reactive policing to full operational predictive policing (Abu Dhabi Police GHQ). The reactive stage involves responding to reported crimes without pre-emptive measures, relying on response time for effectiveness. Proactive policing involves some pre-emptive actions based on general data, including frequent patrols, surveillance, and engagement in crime hotspots. The Department is advancing toward the ultimate stage of its policing strategy: predictive policing. In this phase, technology is used proactively to generate intelligence, enabling pre-emptive crime prevention and effective crime management. Given this strategic direction, focusing on the adoption and optimal implementation of predictive policing through comprehensive training and collaborative learning is imperative (Kirschner et al., 2018).

Artificial Intelligence (AI) holds paramount significance in bolstering community security and advancing policing strategies, particularly within the Abu Dhabi Police. The successful integration of AI into law enforcement operations hinges upon collaborative efforts from researchers and scientists, who lend their insights to identify pivotal factors in security intelligent systems (Bailao et al., 2022). However, the adoption of AI in public sector settings, including law enforcement agencies like Abu Dhabi Police, presents multifaceted challenges such as community security (Alhajeri and Safian 2023), leadership and technological facilities (Mcmanus and Chairperson 2019). These challenges encompass administrative hurdles, transparency issues, and the need for organizational transformations. In addition, the lack of skilled AI professionals, concerns about data privacy and security, and the complexity of AI technology itself form challenges to adopt AI in UAE context (Almuraqab, Alrae, and ... 2023). Therefore, the adoption of artificial intelligence (AI) by law enforcement agencies, specifically the Abu Dhabi Police, is influenced by a complex interplay of technological, environmental, and organizational factors (Mcmanus and Chairperson 2019). Technologically, challenges emerge from ensuring high-quality, unbiased data, understanding complex AI algorithms, and safeguarding against cybersecurity threats (Alhajeri and Safian 2023). Environmental factors encompass legal and ethical considerations, public perception, and judicious allocation of resources. Organizational hurdles include fostering leadership support, cultivating an innovative organizational culture, and establishing effective collaborations with technology partners. Even though these challenges have been generally discussed, most of the past studies either focused on technological factors (Al Shamsi and Safei 2023), leadership (Almarzooqi 2019) or examining the relationship of specific technological factors with police performance (Alhajeri and Safian 2023). This leaves a gap of understanding the overview of the technological organizational and environmental factors that affect AI adoption in police department and how it affects several aspects of police service innovation performance. Driven by the TOE framework, this research aims to identify and explain how technological, environmental and organizational factors influence AI adoption in the Abu Dhabi Police.



**Finding and Discussion**

As shown in Table 1, the integration of Artificial Intelligence (AI) in the operations of the Abu Dhabi Police offers transformative potential in enhancing the efficacy, efficiency, and effectiveness of law enforcement activities. The deployment of AI can significantly augment various policing functions through predictive policing, enhanced surveillance, operational efficiency, data-driven insights, and improved decision-making. AI enables the shift from reactive to predictive policing by analyzing vast datasets to forecast criminal activities and trends. This proactive approach allows for pre-emptive measures, thereby preventing crimes before they occur and enhancing public safety. Additionally, AI-powered surveillance systems, like the Oyon program in Dubai, leverage data analytics to monitor and analyze video feeds from numerous cameras across the city. This technology aids in crime detection, identifying suspicious activities, and addressing security gaps in real time.

Moreover, automation through AI reduces manual data processing, allowing officers to focus on critical tasks. For instance, AI can streamline administrative duties, process crime reports, and manage databases, leading to faster response times and more efficient resource allocation. The capability of AI to analyze extensive datasets can provide valuable insights into crime patterns and hotspot areas, assisting law enforcement in devising targeted strategies for crime prevention and resource deployment. The integration of AI into policing strategies fosters better decision-making through data-driven evidence, enhancing the accuracy of investigations and supporting the development of informed, strategic policies.

Despite the numerous benefits, the adoption of AI within the Abu Dhabi Police faces several significant challenges that need to be addressed to ensure successful implementation. One major challenge is the lack of skilled professionals. The effective utilization of AI technologies requires personnel with specialized skills in AI and data analytics. There is a notable gap in the availability of trained officers proficient in handling AI tools, necessitating substantial investment in training and development programs. Furthermore, AI systems rely on vast amounts of data, raising concerns about data privacy and security. Ensuring the protection of sensitive information and maintaining public trust are critical issues that need robust cybersecurity measures and transparent data handling policies.

Additionally, AI technologies are inherently complex and require a deep understanding of their algorithms and functionalities. This complexity poses a challenge in terms of implementation, maintenance, and integration with existing systems. The use of AI in policing also raises ethical and legal questions, particularly concerning surveillance, bias in AI algorithms, and the potential for infringing on individual rights. Addressing these concerns requires the development of clear guidelines, ethical frameworks, and oversight mechanisms. Introducing AI technologies necessitates organizational change, which can encounter resistance from personnel accustomed to traditional policing methods. Overcoming this resistance involves fostering a culture of innovation, securing leadership support, and promoting the benefits of AI adoption. Implementing AI technologies requires significant financial investments in infrastructure, software, and training. Ensuring that resources are judiciously allocated and that the benefits outweigh the costs is essential for sustainable AI integration.

Table 1

*AI adoption Opportunities, Challenges and Possible Solution*

Opportunities	Challenges	Possible Solutions
Predictive Policing	Lack of Skilled Professionals	Invest in comprehensive training and development programs
Enhanced Surveillance	Data Privacy and Security Concerns	Implement robust cybersecurity measures and transparent data handling policies
Operational Efficiency	Technological Complexity	Provide specialized training and support for understanding AI algorithms and functionalities
Data-Driven Insights	Ethical and Legal Considerations	Develop clear guidelines, ethical frameworks, and oversight mechanisms
Improved Decision-Making	Organizational Resistance	Foster a culture of innovation, secure leadership support, and promote the benefits of AI adoption
	Resource Allocation	Ensure judicious allocation of financial investments and conduct cost-benefit analysis

**Conclusion**

The adoption of AI by the Abu Dhabi Police presents a promising opportunity to revolutionize law enforcement through enhanced surveillance, predictive policing, and data-driven decision-making. However, realizing these benefits requires addressing challenges related to skill gaps, data privacy, technological complexity, ethical considerations, organizational resistance, and resource allocation. By strategically navigating these challenges, the Abu Dhabi Police can leverage AI to create a safer, more efficient, and more effective policing environment, aligning with the UAE's broader vision of becoming a global leader in AI-driven governance and public service delivery.

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