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The Impact of Employing Artificial Intelligence on Public Utility Services

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Abstract. The use of AI technologies is introducing a dramatic change to public utilities because of the widening application in many aspects of administration and services. This change has had direct impact on the quality of services delivered to the people in the form of speed, accuracy and delivery mechanisms, and has also altered the arrangement of relationship between the administration and the service beneficiaries. The provision of public services is no longer conducted as a conventional input based on the manual process; it is becoming more and more dependent on the smart system that can process and analyze the information and make the decision or suggest the solution automatically or semi-automatically. Against this backdrop, several implications of using artificial intelligence in public utilities have been identified be it in the nature of enhancing efficiency and the quality of performance, or the legal and regulatory concerns that it can present in respect to accountability, transparency as well as safeguarding rights. Therefore, AI has assumed one of the leading roles in the creation of the public services and in the reconstruction of the law concerning the functioning of the public utilities in Iraq.

Keywords: Artificial Intelligence, Public Utility, Public Services, Administrative Decision, Legal Responsibility, Legality.

Introduction

First: Definition of the Topic

The administrative activities of the modern world are experiencing a qualitative shift due to the rapid evolution of the sphere of artificial intelligence technologies that become one of the key posts in the modernization of the work of the public utilities [1][2]. The trend toward the use of intelligent systems in many spheres of service provision by the incumbent administrations, has led to a direct impact on the character of the services provided by the government, as well as on the structuring and delivery ways of the latter to the beneficiaries [3][4][5].

The traditional mechanisms of delivering public utility services that are grounded on manual processes and paper-pencil transactions no longer suffice to supply the continuous operation of such services; instead, they are becoming more digitalized and can be applied in the analysis of data, automating processes, and assisting the administration in making decisions regarding the provision of the service [6][7][8][9]. The change has altered the relationship between the administration and the service users and resulted in the introduction of the new pattern of services, which are speedy, accurate and flexible in its performance [10][11][12][13].

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Artificial intelligence has also helped to restructure the workflow in the sector of the public utilities in terms of minimizing the administrative time, better provision of resources, and increased response to the needs of the population in real-time [14][15][16][17]. As a result, the service delivery environment has experienced a transformation, more reliant on the digital data analysis and automated data processing, but maintaining the legal nature of the given activity as the one designed to accomplish the public interest [18][19][20][21].

Against this background, the implementation of the public utility services is currently provided in a technological setting in which smart tools overlap legal provisions [22][23][24][25]. This has affected the processes of providing the public services and administration techniques in regards to speed, precision and optimization of resources. Besides, utilization of artificial intelligence technologies necessitates constant coordination between the demands of the technological progress and needs of the legal legitimacy, making sure that the principles of legality, equality and safeguard of rights and freedoms are observed within the framework of a properly regulated law [26][27][28][29][30].

Second: Importance of the Research

The significance of the research is explained by the topicality of the topic of the use of artificial intelligence in the work of the public utility and its immediate influence on the process of delivering the public services, their quality and efficiency. Its relevance is also seen against the view of growing dependence on intelligent systems by administrative bodies in the management of the services offered to the people. This significance of the research is also supported by the fact that it is related to a tangible administrative reality, which is experiencing a fast shift to the digital world, which is why the study of its legal and regulatory consequences is critical to guarantee a balance between technological effectiveness and the need to protect the rights. The study is also useful in elucidating the boundaries in the application of artificial intelligence in the context of the work of the public utilities under the constant pressure of the principle of legality [31][32][33].

The relevance of this topic is also enhanced by the fact the Iraqi state is trying to develop its own public services with the help of digital transformation, which is why it is necessary to study the legal framework of the said transformation and find out to what extent it is sufficient to meet the technological progress. Besides, the study helps to illuminate the challenges that can be caused by the use of intelligent systems in the service industry, be it the issue of responsibility, transparency, or data security [34][35][36].

Third: Research Problem

The research issue is in establishing the scope of influence of the use of artificial intelligence on the nature of the public utility services in terms of their efficiency, quality, and organizational mechanisms and the scope of impact of the transformation on the legal guarantees of offering the public services. The other issue is also to determine whether the law at hand can accommodate this technological change and control its impact.

The problem is more complicated as to whether the general principles of administrative law are sufficient to control the application of intelligent systems in the framework of the public utilities, or whether the particularity of the artificial intelligence needs a more specific approach to legislation that dictates the administrative responsibility and guarantees the preservation of the rights of individuals. In this respect, the study aims at providing an answer to the following question: To

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what extent does the Iraqi legislative framework follow the use of artificial intelligence in public utility services and guarantee the control of its legal consequences?

Fourth: Research Objectives

1. To explain the meaning of artificial intelligence and what it entails in the administrative world.

2. To examine the effect of artificial intelligence use on efficiency and quality of services in the public utilities.

3. To elaborate on the role that intelligent systems played in shaping the mechanisms of service delivery in the public.

4. To discuss the issues and legal obligation that come up because of the use of artificial intelligence in public utilities.

5. To determine how well the Iraq legislative system is able to control this technological revolution.

Fifth: Research Methodology

To solve the proposed research problem, the study will refer to the analytical approach to examine the legal texts on the functioning of the public utilities and evaluate the level of their correspondence to the fact of the artificial intelligence application. The paper also uses some of the jurisprudential views and the appropriate court decisions to elucidate the legal aspects of the subject.

Sixth: Research Plan

To solve the proposed research problem, the study will refer to the analytical approach to examine the legal texts on the functioning of the public utilities and evaluate the level of their correspondence to the fact of the artificial intelligence application. The paper also uses some of the jurisprudential views and the appropriate court decisions to elucidate the legal aspects of the subject.

Methodology

The current study sought to contribute to measuring the effect of the use of professional artificial intelligence technologies in the performance of public utility services in the scope of Iraqi administrative law, And from within a quantitative analytical legal method. The research were based mostly on analytical overview of legal texts, statutory provisions, case law and academic works on artificial intelligence, e-administration and regulation of public utilities. The research examined some relevant Iraqi legislation to determine to what degree the current legal rules shape the use of intelligent systems within the context of administrative work, which is limited to the Electronic Signature and Electronic Transactions Law No. 78 of 2012, the Iraqi Civil Code No. 40 of 1951, the State Council Law No. 65 of 1979 and the Constitution of the Republic of Iraq of 2005. This part of the study examined the decisions of the Iraqi courts, including the rulings of the Administrative Court and the Federal Supreme Court, by showing how general principles of the

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administrative law have been implemented toward administrative decisions affected by computerized or intelligent systems. Methodologically, this also entailed an overview of modern legal writing, doctrinal, and academic literature on the use of artificial intelligence in public administration and its consequences for service delivery, accountability, and legality. By systematic interpretation and comparative assessment of such legal sources, the research examined the impact of artificial intelligence technologies on the organization of public utility services and the ways it affects efficiency, service quality, administrative control, and decision making processes. It then zoomed in on the legal challenges raised by the uptake of IST, including transparency, data protection, administrative liability, and whether the general legislative framework is fit for the technology. The study was conducted by integrating doctrinal legal analysis with legislative and judicial examination, and the study aimed to present a legal vision for the transformation of artificial intelligence in public utility services, and to answer whether the existing Iraqi legal regulations could fit the implications of this technological change.

Result and Discussion

Section One
The Conceptual Framework for Employing Artificial Intelligence in Public Utility Services

In current times, the public utilities are undergoing a swift change due to the advancement in technology and the growing application of intelligent systems to conduct the administrative tasks. The application of artificial intelligence is not a case of organizational choice any more, it is a component of modern administration that strives to enhance its services and has to work out the system of its functioning. Considering this change, there is a necessity to establish the notions related to artificial intelligence within the sphere of administration. Accordingly, it becomes necessary to examine the conceptual framework governing the employment of this technology in light of the rules of administrative law.

Recognizing the importance of this topic and in order to address it with precision, this section is divided into two subsections. The first subsection is devoted to examining the concept of artificial intelligence and its nature in the administrative field, while the second subsection addresses the effects of applying artificial intelligence in public utilities.

First Requirement
The Concept and Nature of Artificial Intelligence in the Administrative Field

Defining the concept of artificial intelligence constitutes a fundamental step toward understanding the scope of its impact on administrative work. Its nature in the administrative field is not limited to being merely a technical tool; rather, it extends to influencing decision-making mechanisms and the organization of public utility performance. In order to achieve a comprehensive legal understanding of the subject, this requirement is divided into two branches. The first branch is devoted to clarifying the definition of artificial intelligence and its technical characteristics, while the second branch examines the forms of applying artificial intelligence in general administrative work.

First Branch

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Definition of Artificial Intelligence and Its Technical Characteristics

The concept of artificial intelligence has been clearly addressed in various doctrinal and technical definitions, depending on the perspective from which it is considered, whether purely technical, legal-functional, or administratively organizational. Therefore, determining its meaning within the framework of public utility services requires reviewing the most prominent approaches that have addressed it through definition and analysis.

Artificial intelligence and its legal role have been addressed by a number of scholars. Some have defined it as: "a branch of computer science concerned with designing systems capable of performing tasks that usually require a degree of human intelligence, such as logical reasoning, learning, and decision-making" . This definition focuses on the theoretical scientific dimension, considering artificial intelligence as an extension of technological development in information processing.

Another group of specialists in the field of artificial intelligence has defined it as: "the ability of electronic systems to analyze vast amounts of data and extract patterns from them, enabling them to issue predictions or decisions relatively independently of human intervention." This approach highlights the element of relative autonomy of the machine as the distinguishing feature between traditional programs and intelligent systems.

Legal scholarship has also attempted to formulate a definition that corresponds to the implications resulting from the use of this technology, defining it as: "any information system based on algorithms capable of affecting the legal positions of individuals, whether by issuing binding recommendations or by making administrative decisions directly or indirectly" . This definition is characterized by its focus on the legal consequences resulting from the use of artificial intelligence, rather than merely its technical nature.

Iraqi legal scholarship has addressed artificial intelligence within the framework of the digital transformation of public administration, defining it as: "an intelligent electronic system employed by administrative authorities to improve performance efficiency and achieve speed and accuracy in delivering public services, within the framework of respecting the principle of legality" . This perspective links artificial intelligence with the concept of electronic administration, considering it an advanced stage in the development of administrative practices.

At the level of Iraqi legislation, it can be observed that the legislator has not provided an explicit definition of the concept of artificial intelligence or its use within the scope of public utility services in the applicable administrative laws. Nor has it directly addressed the issue of administrative decisions issued on the basis of intelligent systems or data-analysis algorithms. Rather, it has indirectly moved toward regulating the digital environment through certain related legislations, most notably the Electronic Signature and Electronic Transactions Law No. 78 of 2012, which addressed the legal framework for electronic transactions and their evidentiary value, without establishing a comprehensive regulation for the use of intelligent systems in public administration. Article (2) of the Electronic Signature and Electronic Transactions Law No. 78 of 2012 states that: "This law aims to achieve the following: First providing the legal framework for the use of electronic means in conducting electronic transactions; Second granting legal validity to electronic transactions and electronic signatures and regulating their provisions; Third enhancing confidence in the authenticity and integrity of electronic transactions."

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Thus, Iraqi legislation in its current form does not distinguish between the mere use of electronic means in performing public services and the employment of artificial intelligence systems capable of analyzing data and producing recommendations or decisions that affect the legal positions of individuals. The existing legal texts address the validity of electronic signatures, the evidentiary value of digital documents, and the regulation of electronic exchange; however, they do not directly regulate the mechanisms of intelligent systems within public utilities, nor do they specify the controls related to the legality of decisions based on them .

Since Iraqi legislation has not established a specific definition of artificial intelligence in the administrative field, it can be defined within the framework of public utility services as: "a technical-legal system based on algorithms and automated data processing aimed at supporting, directing, or issuing administrative decisions, while the legal competence and final responsibility remain attributed to the competent administrative authority." This definition implies that artificial intelligence does not constitute a substitute for administration, but rather a tool among its instruments, and that a decision even if based on advanced digital processing remains an administrative decision in its legal nature, subject to the principle of legality and to the oversight of the competent judiciary.

Finally, it can be stated that employing artificial intelligence in public utility services is not limited to introducing computers or digital systems into administrative work; rather, it represents a qualitative transformation in the method of managing the public utility itself. In its traditional form, public service relied on the intervention of the public employee in examining requests, assessing facts, and balancing legal considerations. However, with the employment of intelligent systems, part or even the entirety of this process may be carried out through the analysis of data and pre-programmed criteria, which leads to faster completion and a reduction in human error. At the same time, this development raises legal questions concerning transparency, the possibility of appeal, and the limits of responsibility for technical errors.

Accordingly, the absence of specific legislative regulation concerning artificial intelligence in Iraqi public administration does not mean that it falls outside the legal framework. Rather, it remains subject to the general rules of administrative law, particularly the principle of legality, the principle of equality among beneficiaries of public utility services, and the principle of continuity of public utilities, until legislative intervention occurs to regulate this technology in a more specific and precise manner.

Second Branch
Forms of Applying Artificial Intelligence in General Administrative Work

General administrative work has witnessed significant transformation in recent years as a result of the introduction of artificial intelligence technologies into the structure of public utilities. This development has directly affected the methods of service delivery, decision-making mechanisms, and systems of control and planning. Artificial intelligence is no longer merely a supporting technical tool; rather, it has become an active element in developing administrative performance and achieving institutional efficiency. The forms of applying artificial intelligence in general administrative work vary according to the nature of the activity carried out by the public utility , and the most prominent of these forms can be summarized as follows:

First: Intelligent Automation of Administrative Procedures

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Intelligent automation is considered one of the most prominent and significant forms of applying artificial intelligence in general administrative work, as it represents the transition from paper-based or manual processing of transactions to automated digital processing based on pre-defined algorithms. In the traditional model, a transaction passed through several procedural stages handled by the responsible employee, starting with receiving the request, followed by examining the legal conditions, and ending with issuing the decision. Under intelligent automation, however, these stages can be completed through an electronic system that analyzes the entered data, compares it with legal standards stored in a database, and then issues the result immediately or almost immediately.

This form is clearly evident in services such as issuing official documents, renewing licenses and permits, vehicle registration, paying fees and taxes, and other services that rely on clearly defined objective conditions. In this context, artificial intelligence does not exercise broad discretionary authority but rather applies specific rules automatically, which reduces disparities in treatment and strengthens the principle of equality among beneficiaries of public utility services .

Intelligent automation also contributes to reducing direct contact between the employee and the applicant, which limits the possibility of administrative corruption or abuse of power. It imposes a form of technical neutrality based on the abstract application of legal rules without being influenced by personal factors. Nevertheless, this type of automation raises questions about how to handle exceptional cases that require human judgment, which necessitates maintaining administrative or human oversight to ensure that the application of legal texts does not become rigid .

Second: Supporting Administrative Decision-Making

One of the most effective and complicated uses of artificial intelligence in general administration is to support decision-making. The task of an intelligent system is not restricted to going through a specified procedure in this field but includes the ability to process huge volumes of data and derive signs that help the decision-maker to choose the best option. This role is particularly evident in areas such as urban planning, resource management, budget allocation, and the formulation of public policies. Intelligent systems are capable of processing interrelated demographic, economic, and social data, and identifying patterns and trends that may be difficult for humans to discern at the same speed. Based on this analysis, the system can provide multiple recommendations or scenarios, indicating the expected effects of each option. The final decision, however, remains with the competent administrative authority, though it is now grounded in data-driven scientific analysis .

The importance of this application lies in reducing random or personally biased decisions, as it enhances the objectivity of administrative decision-making and contributes to achieving efficiency in managing public resources. Nevertheless, reliance on algorithms in guiding decisions raises the issue of transparency, as individuals may find it difficult to understand the technical foundations on which the decision is based, necessitating the establishment of rules that ensure interpretability of outcomes and their subjection to judicial oversight .

Third: Human Resource Management in the Public Sector

Human resource management has become one of the vital areas in which artificial intelligence has been strongly integrated, due to the volume and diversity of data involved. Modern administration relies on performance analysis, productivity measurement, and identification of training needs tasks that intelligent systems can perform with high efficiency .

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In the field of recruitment, preliminary screening algorithms can be used to evaluate applicants based on objective criteria related to qualifications, experience, and competencies. This saves the time and effort needed to go through hundreds or thousands of applications and supports the idea of equal opportunity when the criteria is created in a non-Partisan manner. In the same manner, the system can conduct performance evaluation of employees on a periodical basis, derive hints of strength and weaknesses, and offer suitable training programs to the employees.

But with the advent of artificial intelligence in this area, legal and ethical issues are brought up related to the preservation of the personal information of employees and the possibility of algorithms being biased against the members of certain groups. Thus, the correct utilization of these technologies should be provided with clear legal protection encompassing transparency and equity.

Focusing on the three applications intelligent automation, administrative decision support and human resource management one realizes that artificial intelligence is not only a technical support, but a structural tool that makes a difference in what work in administration is all about. It alters the administration-beneficiary, decision-data relationship, and shifts the concepts of technology-efficiency and legal-legitimacy guarantees in a context in which the balance must be struck between technology efficiency and assurances of legal validity.

Second Requirement
Effects of Applying Artificial Intelligence in Public Utilities

The implementation of artificial intelligence technologies in the sphere of the public utilities has resulted in the reorganization of service provision approaches and organizational manners in the utilities themselves. This transformation has produced a range of positive impacts affecting both the efficiency and quality of performance. Accordingly, it is necessary to highlight the most significant effects resulting from the application of these technologies in the field of public services. To achieve a comprehensive legal understanding of the subject, this requirement is divided into two branches. The first branch is devoted to illustrating improvements in efficiency, speed, and quality of public services, while the second branch focuses on the use of artificial intelligence as a tool for oversight within public utilities.

First Branch
Improving Efficiency, Speed, and Quality of Public Services

Enhancing efficiency, speed, and the quality of public services is one of the most prominent positive effects of employing artificial intelligence in public utilities, as the primary goal of any administrative development is to improve administrative performance and achieve the public interest with minimal time and cost. Artificial intelligence is not only considered a modern technology but also a tool for reorganizing administrative workflows and developing service delivery patterns . The discussion of this topic is structured as follows:

First: Enhancing Administrative Efficiency

Administrative efficiency refers to the ability of a public utility to achieve its objectives with the least possible use of resources and effort. Intelligent systems contribute to raising efficiency by accurately analyzing data, reducing human error, and automating repetitive routine processes. Many administrative transactions depend on verifying objective conditions that can be programmed within an electronic system, thereby reducing errors resulting from individual discretion or negligence .

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Additionally, big data analytics technologies enable administrations to make decisions based on accurate and up-to-date information, reducing random or poorly considered decisions. Administrations are able to use statistical indicators and predictive analysis, which would contribute to the efficiency of planning and allocation of resources instead of using personal judgment only.

Second: Accelerating Transaction Completion and Reducing Administrative Time

The shortening of time that is needed to transact is one of the most noticeable elements of using artificial intelligence. A transaction would require days or in some cases, weeks in the traditional model as it involves several procedural steps. With automated systems though data processing and verification of conditions may be done in seconds or minutes. Smart systems can get requests electronically, analyze them based on the rules that are set, and provide feedback instantly. This saves on the administrative workload, minimizes the workload on employees and enables them to work on the tasks that involve human judgment or expert skills.

Decrease in administrative time also improves trust of the citizens with the utilities of the state as one of the most important indicators of state work is the speed of response. The efficiency of administration is gauged by the citizens in terms of how far the administration fulfills the requests made by them without needless complexity or time wastage.

Third: Improving the Quality of Public Services

The effects of artificial intelligence are not only in the aspects of speed and efficiency but also in the quality of services provided. The quality of services is determined by precision, simplicity of processes, and appropriateness to the needs of beneficiaries. The intelligent systems are able to propose the continuous improvement of service delivery mechanisms through understanding user behavior and data, which can be aligned with the expectation of the people.

It is also possible to create tailor-made services based on the needs of each group with the help of intelligent systems instead of applying a strict and unified model. As an illustration, the system may guide a citizen to the procedures that can be applied to his or her case, without being taken through unnecessary processes, a factor that enhances total satisfaction. It is also through these systems that procedural mistakes are minimized since the decisions are based on specific rules which are not influenced by mood or work pressure and therefore increase the consistency of the administrative judgment and the similarity of the similar cases.

Nevertheless, it is necessary to design systems properly, constantly update the rules, and make sure that they do not contradict the current legal provisions to accomplish these benefits. The move towards smart administration is not a technological change but a total overhaul of organizations to provide a balance between efficiency in administration and legal protection.

In relation to the international work, the Iraqi government, similar to most others, has been keen on technological integration in all its sectors, which was especially prominent in the recent years, particularly, after the COVID-19 pandemic in 2019 and the consequent international crisis. It resulted in a tremendous change towards digital transformation processes in provision of most of government services via the national government portal, and also via websites of diverse ministries. This revolution also involved streamlining the government processes and encouraging the culture of e-payment.

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It is apparent that the application of artificial intelligence in the utilities has been of a material contribution in the improvement of the administrative performance, speed in the completion of transactions, and quality of services rendered to the citizens. This transition to intelligent systems has made it possible to restructure administrative processes and make them more specific and suitable to the digital space. It has also helped in justifying the use of resources, minimizing errors in the procedures and enhancing satisfaction of those who benefit the services.

Nevertheless, such advantages are not automatic, and they rely on the design of digital systems in accordance with the current legal and regulatory framework. The key to administering smartly is to strike a balance between the technological progress and the observance of the principles of law, equality, and transparency this way the efficiency of the administration can be used to serve the interest of the people instead of substituting the legal protection.

Second Branch
Employing Artificial Intelligence as a Tool for Oversight in Public Utilities

One of the biggest changes in the contemporary administrative work is the use of artificial intelligence in the sphere of oversight. Monitoring over has ceased to be a one period check up or retrospective check up, but is based on real time and predictive data analytics systems. It is especially relevant in state-owned utilities that control a significant amount of financial and human resources and directly offer services to the citizens and these are prone to mistakes, misalignments or cases of administrative bribery. This branch deals with this topic in the following way:

First: Preventive and Proactive Oversight

The technologies of artificial intelligence can allow the administrations to develop preventative control before the violation was made, by analyzing data and identifying the abnormal patterns. The intelligent systems are able to match the financial and administrative operations with the pre-set benchmark indicators and point out when the situation does not match the usual pattern. Through this, the oversight moves towards a retrospective approach that can only identify the errors when they happen and should avoid them before they can become too problematic.

The example of this would be intelligent systems analysis of contract and procurement data in a public utility that can identify unreasonable reoccurrence of transaction with a particular party, inflation of prices over and above the usual market rates, or sectionation of contracts that might indicate bypass of legal process. This kind of analysis is hard to accomplish by other more traditional means as fast and as accurate.

The value of such proactive control can be determined in the Iraqi context due to the extent of the government spending and the variety of administrative organizations that control the budget execution. As an example, disbursement operations within expenditure units related to service ministries and comparing the volume of contracts and the listed prices with the local market prices in Baghdad, Basra, or Erbil, could be monitored using data analysis systems to detect an instance of overpricing or illegal division of contracts prior to their finalization.

The work of Iraqi oversight bodies, including the Federal Board of Supreme Audit and the Integrity Commission can also be supported by these technologies to create common digital platforms that can be used to analyze financial and administrative data in real-time, instead of using post-fiscal-year retrospective audit. Implementation of the use of artificial intelligence in this scenario will

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increase the efficiency of preemptive control and minimize the risk of violations, and the final decision to confirm and act is the properly functioning regulatory body as per the law.

Second: Strengthening Internal Oversight

Artificial intelligence is used in the creation of in-house monitoring mechanisms in the utilities of the people by electronically monitoring how things are being processed and documenting the entire procedure. All actions are digitally recorded which forms a digital trail that can be referred to as and when required to aid in investigations or audit. It is also possible to have intelligent systems that follow the adherence of the employees to procedural rules and send automatic signals in case the authorities are surpassed or administrative sequences are broken. This improves the discipline within the institutions and minimizes the chances of power abuse or process manipulation.

This role can be seen specifically in the Iraqi situation of automating government processes to decrease paper-based operations and decrease direct contact of the employee with the community in order to decrease the chances of corruption by administration. The administrative accountability can be furthered by the fact that since every alteration, every payment, or every approval is registered with the help of electronic systems, that is, the user name of the person who made the required change/disbursement/approval, and the time of the action, are noted, and this fact proves highly advantageous in terms of accountability of the administration.

Third: Supporting External Oversight Bodies

Artificial intelligence is not merely used in internal supervision and it is also applied to external regulatory organizations, like integrity commissions and financial regulatory bodies. Such bodies can use the big data analytics to examine large amounts of information within a limited period and obtain risk indicators that are to be further audited.

The algorithms can be used to categorize the data based on a risk level and prioritize examinations, so the oversight process will become more efficient and objective. Detection of violations is also minimized on the human factor by use of intelligent systems, which lowers the chances of errors or omissions.

Throughout the situation in Iraq, these tools would assist the Federal Board of Supreme Audit and Integrity Commission to review the investment project contracts, appointment files, or payrolls. As an illustration, the data analysis systems can lead to the appearance of duplicate names, salaries paid to people who are not actively working or similar contracts with some organizations in short periods of time as indicators that need to be investigated.

As can be seen in the above, the utilization of artificial intelligence as an administrative control in the utilities is a qualitative improvement in administrative oversight. It allows to replace the retrospective oversight with the preventive and proactive oversight, enhances the efficiency of internal and external control, and helps to protect the public funds and fight the administrative deviations .

Nevertheless, this technological innovation goes unaccompanied by a holistic Iraqi legislative system stating the area of the law in the application of artificial intelligence in oversight. Current laws, be it those governing the operations of financial oversight authorities, integrity authorities, or even common administrative law, do not specifically refer to the practice of depending on

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algorithms and big data analytics to identify the occurrence of violations, but it does not provide explicit provisions as to the administrative liability of the mistakes that the work of intelligent systems may entail. In this regard, it can be concluded that the legislative gap in the transition to smart regulation in the public utilities is obvious, as the general rules continue to be the regulatory system without any specific law that establishes the criteria, protects, and control systems. This state of affairs requires intervention.

Second Chapter
The Legal Framework for Employing Artificial Intelligence in Public Utility Services

The use of artificial intelligence technologies is making the service delivery mechanisms of the public utilities undergo a qualitative transformative process, and it prompts a reassessment of the legal framework used to govern their operations under the circumstances of the digital developments. In that regard, the legislative grounds and legal rules that regulate the application of these technologies should be explained to make sure that the principle of legality and safety of the rights of the beneficiaries of the public utility services are respected, and the primary legal issues in using artificial intelligence in the context of public utility services will be determined. Recognizing the importance of the topic and aiming for precise treatment, this chapter is divided into two sections: the first section addresses the legal basis for using artificial intelligence in public utilities, while the second section discusses the challenges and liabilities arising from its use.

Section One
The Legal Basis for Using Artificial Intelligence in Public Utilities

The use of artificial intelligence in public utilities raises questions regarding its legality and the limits of its legal regulation. Therefore, it is necessary to clarify the legal basis on which the administration relies to adopt these technologies within the framework of administrative law and existing legislation . To achieve comprehensive legal coverage of the topic, this section is divided into two subsections: the first subsection addresses the legitimacy of employing artificial intelligence in light of administrative law principles, while the second subsection outlines the legal and regulatory rules governing the use of intelligent systems in public utilities.

Subsection One
The Legitimacy of Employing Artificial Intelligence in Light of Administrative Law Principles

The legitimacy of employing artificial intelligence in public administrative work is measured by its compliance with established principles of administrative law, particularly the principle of legality, the principle of equality, and the principle of continuity of public services, in addition to the subjection of administrative decisions to judicial review. A technical tool regardless of its level of advancement cannot by itself confer legality on an administrative decision; rather, its legitimacy derives from its conformity with the legal rules governing administrative activity .

Regarding the principle of legality, the administration is obligated to exercise its authority within the limits prescribed by law and must not issue a decision except based on a valid legal basis. In this regard, the analysis or decision-making with the help of an artificial intelligence system would not be a breach of legality, as long as such a competent administrative body is on the decision-making authority and the decision is grounded on stable legal provisions. Artificial intelligence, in this case, acts as an implementation tool or a support system, rather than a source of power on its own.

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About the principle of equality among the beneficiaries of public utility services, intelligent systems can theoretically improve this principle provided that the same criteria is applied to everyone without any form of discrimination. This, however, is subject to the fact that the algorithms are free of bias or minimum other unlawful criteria because any form of deviation in the system development would render the principle of equality invalid thus, influencing the legality of the administrative decision.

Regarding the doctrine of continuity and evolution of the public utilities, the administrative doctrine has defined the power of the administration to arrange and evolve the medium of delivering the public services so as to meet the public interest. Thus, the implementation of artificial intelligence technologies is one of the types of the modernization of the public utilities, especially when it increases the speed of transactions, saves money, and enhances the quality of the services. However, this development should not breach the legal protection of person or immunity of administrative ruling in face of judicial review.

A decision made by an administrative body on an intelligent system is in its legal aspect the same thing: an administrative decision, which may be faulty in its jurisdiction, form, reason, or subject-matter and which may be appealed to by an appropriate court of law in case of any defect. The administration should not be able to use the technicality of the system as an excuse to be responsible since accountability is still vested on it as the competent body.

In the case of the Iraqi legislator and relying on the Electronic Signature and Electronic Transactions Law No. 78 of 2012, it is evident that the term of artificial intelligence was not directly stated, but it pointed to a concept which could be used as an initial legal framework regulating some of the applications. The latter concept of the electronic intermediary as established in Article 1(8) of the law mentioned above states: The electronic intermediary: A program or electronic system that is used to conclude or effect transactions to the full or in part without direct human intervention. This is because this provision recognizes the potential of an electronic system to accomplish, or even carry out, a transaction without requiring direct human intervention which is functionally similar to certain uses of artificial intelligence, namely automated systems that decide, or perform procedures in accordance with a fixed set of algorithms.

Moreover, the Iraqi legislative model of legality is based essentially on the constitutional model of the administrative work. The principle of the law subjecting the state to the law is provided in the Constitution of the Republic of Iraq (2005), and in the Article 13, the supremacy of the law is stated: “No law should be enacted that contradicts this Constitution, and any provision written in the constitutions of regions or any other legal text contradicting to it should be voided. This clause shows that sovereignty and legitimacy are created by the people and therefore any use of the artificial intelligence technologies in the administrative activity should not violate the constitutional and statutory provisions. It is not allowed to establish legal positions or provide obligations and restrictions to people without a clear legislative foundation. The law in the Iraqi system is not a doctrine, but a constitutional law binding all the powers of the state, even the administration, when employing intelligent systems.

Branch Two
Legal and Regulatory Controls Governing the Use of Intelligent Systems in Public Utilities

The application of intelligent systems to the cases of the public utilities is not only a technical process; it is an administrative custom which should meet legal and regulatory restraints to properly

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adjust it to the provisions of the administrative law and assure that technology cannot be used as a method of circumventing the provisions of law, and dangerous of other section of the law and the rights of individuals. Although artificial intelligence is a tool to promote performance, it cannot be used without legal framework that regulates administrative activity. This shall be discussed in the following manner:

First: The Legal Competence and Attribution of the Decision to the Administrative Authority

The only factual issue is that an administrative decision has to be coming out of the authority which is legally competent. Respectively, an intelligent system application to issue or support a decision should not lead to the loss of competence on behalf of employee or legally empowered entity to the electronic system. Intelligent systems lack any active legal personality and cannot be called the source of authority; they are only tools of technical support.

Accordingly, the determination should always be publicly identifiable to the capable administrative authority, and the authority is entirely responsible in law to the content and impact of the determination, even though it has been created or proposed through an algorithm or automated system. In the Iraqi law, it can be seen in the Amended State Council Law No. 65 of 1979 which provides in Article 7: the Administrative Judiciary Court will possess the power to analyze the soundness of administrative orders and decisions made by employees and authorities as employees and authorities in state departments and the public sector...

Based on this provision, it is assumed that an administrative decision is not attributed to a system or electronic program, but to a legal person, i.e. an employee or an authority. Based on this, any ruling that is reached using the intelligent system is legally ascribed to the competent administrative authority and can be re-examined in the court in terms of the rightness of the jurisdiction.

Second: The Principle of Transparency and the Interpretability of the Decision

The principle of legality requires that an administrative decision be justified whenever the law demands it, and that it be understandable and subject to challenge. When intelligent systems are used, it becomes essential to ensure that the basis of the decision can be interpreted, so that it does not become a “technical opaque decision” that individuals cannot contest or appeal .

If the administration relies on a specific algorithm to reject an application or grant a privilege, it must be possible to clarify the criteria on which the system relied, in order to preserve the individual’s right to defense and ensure judicial oversight of the reasoning behind the decision .

Regarding the Iraqi legislator, the law does not explicitly address this matter; however, in reference to Iraqi judicial practice, the Administrative Court has stated in its ruling: *“The public utility exists to achieve the public interest, and it is obligated to continue providing its services regularly and consistently. The administration may not take decisions that result in disrupting this utility or violating the rights of its beneficiaries contrary to the law”* .

In summary, the use of intelligent systems in issuing administrative decisions remains constrained by the need for transparency and interpretability. Technology must not become a veil that obscures the reasons for the decision or prevents individuals from challenging it. Legality requires clarity regarding the foundation of the decision and the ability to subject it to judicial review. Therefore, any use of artificial intelligence is legally acceptable only to the extent that it preserves the right of

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defense and upholds the principle of administrative subordination to the law.

Third: The Principle of Oversight and Accountability

Reliance on intelligent systems must not result in shielding administrative decisions from judicial or administrative review. An automated decision remains an administrative decision in its legal nature and is subject to challenge before the competent court if it suffers from a defect in any of its elements. Additionally, there must be internal mechanisms to review the performance of intelligent systems and assess their accuracy and compliance with legal rules .

The Iraqi legislator has not established specific regulations for intelligent systems or artificial intelligence in public administration. However, some general safeguards were provided through the Electronic Signature and Electronic Transactions Law, which in Article 2 states: *"Electronic transactions shall have the same legal validity as written transactions, provided that the conditions stipulated in this law are met."*

From this provision, it is evident that the legislator acknowledged the possibility of an electronic system executing a transaction without direct human intervention and recognized the legal validity of its outcomes. This is one of the legal justifications of acquiring automated systems in the administrative setting. Nevertheless, the transparency, the extent of the liability in technical mistakes, and the mechanisms to regulate an algorithm-based decision-making are not regulated by the law, which shows a gap in lawmaking to keep up to the high-level application of artificial intelligence to public utilities.

Second Requirement
Challenges and Liability Arising from the Use of Artificial Intelligence in Public Utilities

Regardless of the benefits that artificial intelligence (AI) holds to the operations of government utilities, its application introduces issues of legality and liability in respect of law. Thus, there is also a need to explain the key legal concerns that can be created by the use of intelligent systems in the public administration. In order to have an adequate legal coverage of the topic, this requirement is separated into two parts: the first part concerns the issues related to the application of AI to the sphere of public utilities, whereas the second part is concerned with the legal responsibility of the AI system failures in the context of public utilities.

Section One
Challenges Arising from the Use of Artificial Intelligence in Public Utilities

The introduction of AI in utilities, though it has beneficial effects in the efficiency and speed, poses a list of technical and legal risks, especially with data protection and privacy. The basic mathematical pillars of these systems are big data collection and analysis, and the data being processed by these systems is sometimes personal or sensitive, and therefore the legality of such data processing is one of the key concerns in determining the lawfulness of use. This shall be met in the following way:

First: Forms of Technical Risks Associated with Intelligent Systems

Technical risks are associated with the potential of programming errors, algorithmic biases, or technical failures that influence the integrity of administrative decisions. Artificial intelligence is

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applied based on pre-written rules and algorithms, and any flaws in the programming or the quality of the input information can result in incorrect or unfair results . In addition, the usage of electronic systems linked to networks introduces the administrative to the vulnerability of cyber attacks or data manipulation, which may affect the integrity of the administrative transactions and affections of the citizens. System crashes or cybercrime can interfere with the services, or lead to sensitive information being leaked.

The other risk is called as algorithmic bias based on which intelligent systems can reflect inequitable trends or criteria in case they are developed on imbalanced data or non-objective criteria, which can lead to the discriminatory results that can weaken the principle of equal beneficiaries of the public services.

This kind of risk is especially evident in the situation with Iraq, where the trend among the state institutions is to spread the process of digital transformation and implement electronic systems in spheres like government employment, national IDs and cards, and salary or social benefits management. The legal implications of using intelligent systems when there is no adequate checking of the quality of data or updating could be that legal consequences will be caused which, even though not directly caused by the individual, could interfere with the rights of individuals such as being denied a financial grant or stalling an administrative process simply because of a technical error.

Moreover, the situation with the technical infrastructure of Iraq, though it was evidently developing, also has problems with the stability of the network, the security of information, and the differences in cybersecurity levels between government organizations. It means that there is a higher chance that intelligent systems can be compromised due to malfunctioning or even cyber-attacks, as the use of network integration and centralized databases is growing. Hence, using AI in the Iraqi public utilities requires enhancing the cyber security systems and development of national requirements to test and conduct regular inspections of the intelligent systems to maintain the continuity of the public services and safeguard the people and their trust in the administration.

Second: The Position of Iraqi Legislation on Technical Risks Associated with Intelligent Systems

Individual privacy constitutes a legal value that must be respected when using any technical system in public utilities. Data collected for specific administrative purposes must not be used for other purposes without a legal basis. Moreover, data collection must be proportionate to the administrative objective and not exceed the limits necessary to achieve it. Protecting privacy also requires implementing adequate technical measures to secure databases and prevent unauthorized access, in addition to specifying the individuals authorized to access the data within the administrative entity. Legality is not achieved merely through the existence of a legal basis but also requires ensuring the proper practical application .

The intelligent systems are dependent on the processing of the personal information of citizens (including the civil, financial, health, and employment data). Thus, the security of such data is one of the key preconditions of legality of AI application in the community administration.

In the Iraqi legal system, part of the digital environment is governed by the Electronic Signature and Electronic Transactions Law No. 78 of 2012. Article 12 of this law provides: (“The certification service provider has the duty to the privacy of the information received during its work and not to

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disclose it to a third party other than in accordance with the law.) Based on this provision, it is clear that the legislator was aware of the principle of digital information confidentiality, which can be applied comparatively to intelligent systems that manage the data of citizen. Nevertheless, this legislation fails to offer a broad-based protection of personal data regulation and fails to explicitly consider the processing of data by AI systems.

According to a decision of the Iraqi Federal Supreme Court it was said: ((The sanctity of the private life, correspondence, communications is assured and it cannot be infringed, opened, and observed without appropriate legislation and without a resolution of the competent judicial personage, and without a consideration of the rights of individuals and demands of the common good.)

In this regard, it can be concluded that the Iraqi legislation lacks a legislative gap regarding the regulation of the technical risks related to AI, especially in the spheres of personal data protection, automated data processing controls, and allocation of liability in case of any damages caused by the data breach or misuse. Consequently, to follow the trend of smart administration, it is necessary to have more accurate and detailed legislative intervention that helps create the legal framework of data protection and privacy within the framework of intelligent systems to achieve a balance between technological development, lawfulness, and the rights of the individuals.

Second Branch: Legal Liability for Errors of Artificial Intelligence Systems in Public Utilities

The use of artificial intelligence in the use of public utilities brings up a major problem of defining the legal liability of mistakes that can crop up in these systems. The analysis made by an administrative decision that is made based on an AI system can have flaws in its reasoning, it can be based on mistaken information, or it can be subject to algorithmic bias which can cause harm to an individual or the general interest of the population. As a result, the question is, who is the one to be held accountable by such a mistake? Is it the administration, the programmer or the organization that is contracted to design the system? To respond to this question the discussion is organized in the following way:

First: Liability of the Administrative Authority

An already established rule of administrative law is that an administrative decision is ultimately ascribed to the institution which made it, rather than to the mechanism by which it was drafted. In this regard, the administration cannot be relieved off the liability despite the implementation of an AI system since it is still the administration that will issue the decision, and AI system does not have a legal personality. In case the automated decision causes a harm as a result of the processing errors or the incorrect assessment of the facts, the administrative authority is in charge on the grounds of the administrative fault, as the misjudgment was made in the context of the operations of the public service. It is a sort of continuation of the general principles regarding administrative liability of the actions of administration and the employees.

In the Iraqi context, this liability may be pegged in the general provisions of the Iraqi Civil Code No. 40 of 1951, as amended, especially in the Article 219 provision which puts into place the responsibility of a superior over the action of his or her subordinate. According to it: ((The government, the city, and other organizations that offer a governmental service, as well as any individual who takes advantage of an industrial or a commercial enterprise, are obligated to the damages, which are caused by the employees of the given organization, when the damages are the outcome of the performance of their responsibilities or the consequence of the given actions of the

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employees of the given entity.)

Based on this provision, it is evident that the administration would bear damages occasioned by the efforts of the employees whenever they occur in the discharge of their duties or its consequences. This can be applied to automated decisions made by the AI systems embraced by the administrative authority. An example of this is that; where an Iraqi administrative body has an electronic system to filter applications to be appointed, to provide licenses or to collect tax, and someone is denied a right which is by right of him, the decision was made in its name, and on its behalf, and even though it was performed using a modern technological device.

Second: Liability of the Employee or System Operator

There can be questions about the liability of a worker who trusted the results of the system without an adequate analysis, or the inaccuracy of the information keyed in by a worker and caused the wrongful decision. In this instance, a disciplinary or civil liability can be determined in case gross negligence or bad faith can be proved. The extent of this liability however is determined by the level of actual authority that the employee is given to access the outputs of the system and the extent to which the technical error is clear. When the mistake is concealed, or it is caused by the sophisticated programming bug, the employee might be innocent of the offense, and the liability should be kept by the utility itself.

The lack of certain laws that clearly establish the distribution of accountability on automated administrative decisions is the main reason why this issue emerges in the Iraqi context. Article 7 of the Law of Discipline of State and Public Sector Employees No. 14 of 1991, as amended, says: (“In case of an employee breaching their duties or committing a prohibited act, he/she will be punished according to one of the sets sanctions provided in this law).

Accordingly, the general provisions of this law hold the employee accountable for actions committed in the performance of their duties or as a consequence thereof, without explicitly addressing cases where decision-making relies on intelligent systems. This legislative gap may, in practice, result in holding an employee responsible for outcomes over which they did not have full technical control.

Third: Liability of the System Designer or Provider

If the intelligent system was developed by an external company or entity contracted by the administration, an error resulting from a programming flaw may give rise to contractual or tort liability on the part of that entity, according to the terms of the contract and the provisions of civil law. However, this liability does not absolve the administration of responsibility toward the affected party, because the relationship between the citizen and the administration remains based on the administrative decision issued by the administration. Consequently, the administration may bear liability toward third parties, while retaining the right of recourse against the contracted entity if it is proven that the error arose from a technical defect in design or execution .

Regarding Iraqi legislation, there is no specific provision regulating liability arising from errors of intelligent systems in public utilities. Instead, the matter falls under the general rules of administrative liability and the civil law provisions concerning liability for harmful acts . Similarly, the Electronic Signature and Electronic Transactions Law No. 78 of 2012 does not cover liability in case of technical faults in automated systems, it is restricted to establish the legal validity of the

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electronic transactions and some responsibilities in the field of information confidentiality. In this way, there is a loophole in the legislation to fully define the basis of administrative liability of automated decisions, especially in those cases when an error is caused by a complicated algorithm or a self-educating system whose cause of breakdown is hard to accurately establish.

As the above shows, the administrative liability in regard to the mistakes of intelligent systems in Iraqi utility still depends on the general principles of the civil and administrative liability, without any special regulatory framework that considers the specifics of automated decisions and their technical aspects. The existing laws lack a clear definition of an automated administrative decision, and it does not specify the rules to be followed when allocating liability in case of algorithmic malfunctions or mistakes in automated processing of the data. Thus, the juridical gap in the Iraqi legislation on the liability of automated decisions is relative, and it is necessary to form a more accurate legal framework that would keep up with the development of technologies and provide the clearness of the regulations on the mistakes of intelligent systems in the context of the public utilities, guaranteeing the safety of rights and legal clarity.

Conclusion

The use of artificial intelligence (AI) in utilities has become part of a living administrative space, where technical tools conflict with the administrative law regulating the administrative activity. The concept of delivering public services no longer involves use of traditional and manual means of delivering government services; it has been replaced with smart systems that can process data and automate operations and even improve the level of performance. This has changed the ways in which it delivers its public services making them much faster and more precise without changing the legal character of the public utilities as a tool in the attainment of the public interest.

Neither does AI offer the benefits of efficiency and flexibility in handling the state services, it also creates legal and regulatory issues that need to be tackled with an appropriate balance between technological progress and the values of legality, equality, and rights and freedoms safeguarding. Smart administration does not mean unlimited transfer of technology, but it requires its inclination to the unambiguous legal framework that provides the further responsibility of the public utilities and the legal status of the individuals under the rule of law.

Upon concluding this study, several findings and recommendations were reached, as follows:

First: Findings

1. The study has shown that application of AI helped to increase the efficiency of the services of the public utility by automating the processes, facilitating the management of the data and speeding up the delivery of transactions.

2. The intelligent systems were reported to enhance the quality of the services given to the people by minimizing the human error and offering standardized form of request processing.

3. The research suggested that the use of AI could produce threats concerning transparency and accountability, especially when there is a technical malfunction or algorithm biasing.

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4. The shift to smart services impacts the character of the relation between administration and beneficiaries, and requires the definite mechanisms of objection and appeal to the decision-making connected with services.

5. The administrative organization in charge of the public utility is still held legally accountable regarding the consequences of intelligent systems.

6. The research established that the Iraqi legislative system continues to lack specifics in the regulation of the implementation of AI within the state services, which is why it is necessary to develop legislation in line with the digital transformation.

Second: Recommendations

1. Implement clear legislative guidelines that guide the use of AI in the utility sector stating the regulatory provisions of its operation and its legal implications.

2. Laws should be used to establish the liability of the administration when it comes to intelligent systems in a clear manner that explains the foundation of the responsibility and compensation in case of injury.

3. Develop binding regulations to provide openness to the functioning of intelligent systems and allow people to see the cause of the decisions that are made regarding services.

4. Enhance data protection systems in government institutions and also introduce regular standards of intelligent systems regulation.

5. Create training sessions on administrative and legal staff to make sure that AI is used appropriately in the context of legality.

6. Strive to create a multi-layered legislative framework of digital transformation in the public administration in accordance with the principles of the constitution and the need to reconcile efficiency with rights protection.

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