MRJ
ISSN: 2520-5250
URL: mrjour.com
Modern Research Journal
مجلة البحث العلمي العصري

Modern Research Journal, Online, Peer-reviewed, Multidisciplinary
Volume 1, Issue 1, July 2026
ISSN: 2520-5250
Website: URL: mrjour.com

The Impact of Technological Development on: The Legal Practices of Public Administration

Palestine as a Case Study

(A foundational, Descriptive and Analytical Study)

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Abstract

This research addresses the legal and technical dimensions of information technology and its use in the legal actions of the public administration in Palestine. The study begins by clarifying the differences between electrical and electronic devices, and between analogue and digital electronic systems, whilst explaining the technical principles underlying the operation of modern electronic devices, particularly the binary system, electronic memory, data storage and processing mechanisms, and the basic components of electronic devices in general.

The research also examines the differences between traditional (paperbased) documents, records and data and their electronic equivalents, and reviews the categories of software and applications used in public administration; the study distinguishes between applications that operate based on direct user instructions and those that operate autonomously via automated systems or using artificial intelligence technologies.

The study also addresses the use of information technology in administrative decisions and contracts under Palestinian law, with a particular focus on the provisions of the 'Palestinian Electronic Transactions Law' and the extent to which public administration authorities may rely on electronic means in concluding legal transactions.

The research highlights legislative shortcomings relating to the regulation of electronic administrative decisions and contracts, and discusses the legal implications associated with notification, enforceability, legality, equality, and the evidential value of electronic correspondence

and signatures.

The study concludes that, whilst Palestinian legislation has authorised the use of electronic means in certain government transactions, this regulation remains limited and insufficient to accommodate the specific legal nature of administrative acts in the digital environment. Accordingly, the study recommends the enactment of specialised administrative legislation capable of regulating electronic administrative decisions and contracts in a manner that keeps pace with technological developments, whilst ensuring compliance with

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constitutional principles and the principles of legality, legal certainty and equality before the law.

Keywords: administrative law, information technology, electronic devices, electronic documents, administrative decision, administrative contract, electronic administrative decision, electronic administrative contract.

Research Objectives

This research aims to answer the following main question:

What is the impact of technological development on the legal actions of the public administration in the State of Palestine?

Sub-questions raised by the research:

1. How can a distinction be made between modern technological devices and tools, and to what extent have they developed and how are they used?
2. How can a distinction be made between different types of data, documents, records and complex data – both traditional paperbased and electronic – and what are their uses?
3. How can one distinguish between different types of technological programmes and applications, their level of development, their level of intelligence and their uses in public administration?
4. What are the nature, manifestations and implications of the use of information technology in the legal actions of public administration in Palestine, what is its legal basis, and what are the limits and prospects of this use?

Research Problem

The research problem lies in the existence of multiple manifestations of technological development, alongside the multitude of technological devices and means, and the diversity of data, programmes and technological applications, and varying degrees of development and complexity. All these factors have, in different ways, influenced the legal practices of the public administration in Palestine, raising questions about the nature of these devices,

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data and programmes, the ways in which they are utilised in the legal practices of the public administration in Palestine, and the limits and prospects of such use.

Research methodology

The researcher employed a foundational, descriptive and analytical approach to this study.

Research Plan

This study has been divided into two main sections, each of which is subdivided into

A. Chapter One: Distinguishing between devices, tools, data and software associated with technological development and their uses
    1. Section One: Distinguishing between the types of devices, components and tools associated with technology and their uses.
    2. Section Tow: Distinguishing between types of documents, records, and traditional and electronic paper-based data.
    3. Section Three: Distinguishing between types of software and applications, their level of intelligence, their development and their uses.
B. Chapter Two: The use of information technology in the legal proceedings of the public administration in Palestine.
    1. Section One: The use of information technology in administrative decisions in Palestine
    2. Section Tow: The use of information technology in administrative contracts in Palestine

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Chapter One

Distinguishing between devices, tools, data and software associated with technological development and their uses

Section 1

Distinguishing between types of technological devices and components and their uses

Sub-section 1

Distinguishing between types of electrical and electronic devices

The fundamental difference between electrical and electronic devices lies in the way they process electrical energy and their intended purpose; Electrical devices (such as heaters, fans and light bulbs) convert the electrical energy passing through them, via metallic conductors such as copper and aluminium and simple components such as coils and transformers, into other forms of energy (such as thermal, kinetic or light energy), respectively.

Electronic devices (such as computers, smartphones and cameras), on the other hand, control the flow of electrons—which represent electrical charges—passing through them via semiconductors such as silicon and microcomponents such as resistors, capacitors, transistors and integrated circuits (ICs), with the aim of processing data and information.

Electrical appliances use alternating current (AC) with a significant voltage difference or high voltage (220 volts in homes), whilst electronic devices operate using direct current (DC) with a small voltage difference or low voltage (5 or 12 volts), This difference is clearly evident in the fact that electronic devices can be powered by batteries.

Generally speaking, electronic devices are considered a specialised branch of electrical appliances, as the former often operate within the latter to control and operate them in

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sophisticated ways. An example of this is the automatic washing machine or smart washing machine, which is essentially an electrical appliance that converts electrical energy into kinetic energy but is equipped with a smart electronic panel containing software that executes the user's instructions entered into the panel; these are converted into software commands to carry out the washing task automatically, in accordance with the instructions entered by the user.

It can be seen from this classification that all electronic devices can be considered electrical devices, but not vice versa; that is, an electrical device is not necessarily an electronic device.

Sub-section 2

Distinguishing between analogue and digital electronic devices

Electronic devices that process data and information comprise two types: analogue electronic devices and digital electronic devices. The fundamental difference between them lies in the way they process and represent data and information. This can be detailed as follows:

1. In terms of signal nature, analogue devices rely on continuous wave signals that vary over time. The signal can take any value within a specific range (such as radio waves or sound); an example is an analogue clock, where the hands move continuously and seamlessly. Digital devices, on the other hand, rely on discrete or intermittent signals that are not continuous; data is represented using the binary number system (0 and 1), where the value '1' represents the 'On' state and the value '0' represents the 'Off' state.

   An example of this is a digital clock, where the reading changes intermittently and in discrete steps.
2. In terms of data accuracy and quality, analogue devices provide a true representation of reality (such as gramophone records, which record sound waves

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exactly as they are), but they are highly susceptible to noise and interference, which may reduce their quality over time. Digital devices, on the other hand, are more accurate and resistant to interference; digital data can be copied and stored an unlimited number of times without losing quality, as it is based on fixed and specific numerical values.

3. In terms of processing capabilities, analogue devices are usually designed to perform a specific task (such as amplifying sound in a loudspeaker) and require complex electronic circuits and precise physical designs. Digital devices, on the other hand, are characterised by high flexibility and the ability to analyse, store and process data with high precision; they can be reprogrammed to perform entirely different tasks by updating, developing and adding software to them.
4. As regards the method of storing data and information, analogue devices use cassette tapes, traditional video tapes and classic discs for storage. Digital devices, on the other hand, utilise read-only memory (ROM), random access memory (RAM), hard disks, compact discs (CDs) and flash memory.

It can be seen from this classification that all digital devices are electronic devices, but the reverse is not necessarily true; that is, an electronic device is not necessarily a digital device. Similarly, all analogue devices are electronic devices, but the reverse is not necessarily true; that is, an electronic device is not necessarily an analogue device.

In summary, electronic devices generally comprise two types: analogue electronic devices and digital electronic devices. All rely on controlling the flow of electrons passing through their internal components, whatever those components may be, with the aim of processing information and data, regardless of the method of processing or its purpose, It should be noted that digital devices are considered more advanced and modern than analogue ones; however, this has not limited or prevented the use of both types to this day, given the distinct features offered by each.

Sub-section 3

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The general application of the term 'Electronics' to both analogue and digital devices

Despite the differences we have outlined between analogue and digital electronic devices, it is customary to use the term 'electronic devices' or 'electronics' in general to refer to both types without distinguishing between them.

There are two reasons for this generalised use of the term 'electronic devices' or 'electronics' without distinguishing between the two types (analogue and digital). The first reason is the continued use of both types of devices in various countries and the lack of a clear distinction between them in many devices that combine the characteristics of both types; the second reason is the absence of any intention to compel individuals and various bodies to use a specific type of Such electronic devices, whether of the latest or older generation, for example, are subject to the material and knowledge-based capabilities and skills of individuals and various organisations, as well as the extent of their willingness or ability to keep pace with the digital developments that have affected electronic devices; all this is in addition to the features that analogue devices still retain.

The following example illustrates in detail the concept of using the term 'electronic devices' as a model case, highlighting the two types of electronic devices—analogue and digital—their interconnection, and the reasons why no distinction is made between them to this day.

Fax machines that combine analogue and digital features

A traditional fax machine is an analogue electronic device in terms of how it transmits data via telephone lines; it converts documents into continuous analogue audio signals for transmission over the telephone. Modern fax machines, however, utilise more complex technology; they rely on a fax modem (fax modem), which is a dual-purpose hybrid electronic device.

Internally, it functions as a digital device that scans documents, converts them into digital format and sends them over the internet; however, it also operates as an analogue device when connected to traditional telephone lines to send documents in the conventional

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manner. It also processes and converts digital data into analogue audio signals for transmission over telephone networks, and the reverse is true when receiving documents, as it receives analogue signals and converts them into digital data to display on the connected computer.

Generally speaking, the primary function of a modern fax machine is to process and convert data from digital to analogue form—and vice versa—whenever necessary for sending or receiving documents; more importantly, it reverses this conversion when required. In other words, technological advances have led to the modern fax machine relying on modern digital mechanisms whilst retaining the ability to be compatible with traditional analogue networks. The main reason for the continued reliance of modern fax machines on traditional analogue wave signals is to ensure seamless communication between modern and traditional fax machines, thereby guaranteeing proper communication between them without the need to purchase modern digital equipment. Furthermore, specialised software and applications have been developed that function as fax machines, which stores data on computers and sends and receives faxes electronically in a manner similar to sending and receiving emails.

Sub-section 4
Means of data storage and transfer between electronic devices and the characteristics of their components

As mentioned earlier when discussing electronic devices, they rely on discrete or intermittent, non-continuous signals, in which data is represented using the binary system, a number system based on only two digits: zero and one (0, 1), where the value ‘1’ represents the ‘on’ state, indicating the flow of electric current or electrons through electrical circuits, whilst the value ‘0’ represents the ‘off’ state, indicating the absence of electric current or electrons in the circuits. This binary system is used to represent all data, information and program instructions. The computer is considered a typical electronic device, the

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manufacture of which relies on millions of tiny electronic switches connected to resistors, capacitors, transistors and integrated circuits (ICs) that have only two electrical states: (1), which signifies the presence of an electric current and the flow of electrons, or the 'On' state, and (0), which signifies the absence of an electric current and the absence of electron flow, or the 'Off' state.

Clarifying the difference between the decimal system and the binary system

A. The decimal system: In Arabic, a 'digit' is defined as a single numeral, and the set of numbers referred to by this term consists of only ten digits, namely: (0, 1, 2, 3, 4, 5, 6, 7, 8, 9). This system is therefore called the decimal system, and it is the one used in everyday life. In Arabic, the concept of a 'number' refers to a contiguous sequence of these digits, that is, a sequence comprising digits belonging to the decimal system. The number 1982 consists of four consecutive digits from the decimal system—namely 2, 8, 9 and 1—which, when arranged in this order, represent the number 1982, with each digit having a different value in its respective place (units, tens, etc.).

B. The binary system: Similarly, there are the nonary and octal systems, etc., and even the binary system, or the binary number system, which consists of only two digits: zero and one. It follows that all binary numbers will consist of a sequence of only these two digits, such that the value of each digit in a binary number is either (1) or (0). This is why the binary system is favoured in the electronics industry, specifically in the manufacture of electrical circuits and transistors upon which the manufacture of such devices relies; this is because it is the best way to express them physically, electrically or electronically. For instance, when a set of on/off switches is arranged in a series of adjacent electrical circuits, it will appear to represent a number written in the binary system, such as the number (01001).

How data is stored in digital memory

The memory of an electronic device or computer consists of small cells capable of storing the digit '1' or the digit '0', depending on whether the circuit allows an electric current to pass through or blocks it. Each of the digits '1' or '0' is called a 'bit', short for the term

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'binary digit', meaning a single digit or place value in the binary system. Using ones and zeros, it has been possible to construct a complete digital code to represent numbers, letters and special characters used in writing, as well as all other types of data, and to store them in the memory of electronic devices, such that each can be represented by eight 'bits', which together are called a 'byte'. For example, the letter 'A' can be represented by the following bits: 11000001, whilst the letter 'B' is represented by the following byte: 11000010. In this way, it has become possible to store all types of data in the memory of electronic devices. Even images are divided into very small dots called 'pixels', and each pixel is represented by a code using the binary system as well, such that this code determines the colour of that dot in the same way as numbers and letters are determined; by combining vast quantities of these dots, digital images and digital video are formed.

In general, memory and other storage media in electronic devices are used to store all types of data electronically—numbers, letters, words, symbols, images, videos and all other types of complex data—which are encoded and represented electronically by a contiguous sequence of the digits (0, 1) in the binary system, which are easy to understand physically or electronically in electronic devices, given that they are a compact array of transistors and open or closed electrical circuits that either allow or prevent the passage of electrons or electrical current.

Distinguishing between the hardware and software components of a computer

Electronic devices, such as computers and smartphones, comprise hardware components and non-physical or software components. Hardware components include the Central Processing Unit (CPU) and the Arithmetic Logic Unit (ALU), which act as the device's 'brain'; the motherboard, which connects and controls the components; and two types of memory: Read-Only Memory (ROM) and Random Access Memory (RAM); internal fixed storage devices, such as the hard disk in a computer or mobile phone; and input devices such as: the keyboard, the mouse, the scanner, the microphone, the camera and the stylus; and output devices such as: the monitor, the printer, audio speakers, and external storage devices such as: compact discs (CDs), USB flash drives and flash memory, all of which

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function as both input and output devices simultaneously to transfer and process data to and from electronic devices.

As for software components, these include operating systems, which are responsible for managing and running the system and its components, such as Windows and Macintosh on computers, and Android and iOS on smartphones. There are also programmes and applications designed to perform specific tasks, such as the wordprocessing programme Word and the spreadsheet programme Excel, as well as firmware—software embedded in the electronic device and stored in its read-only memory (ROM)—due to its necessity and importance for the device's operation and to prevent it from being accidentally deleted by the user.

Data and information, on the other hand, are processed by the electronic device and stored in its memory or internal storage units; they are input via input devices and output via output devices as required.

The rationale for distinguishing between types of electronic devices, their components and the ways in which they store data in their various memory types lies in determining the extent to which electronic communication is possible, as well as the methods of storing, transmitting and receiving data between them, given the importance of this matter in the execution of electronic transactions, as will become clear later in this research.

Section Two

Distinguishing between types of documents, records and data: traditional paper-based versus electronic

Sub-section 1

Distinguishing between traditional paper-based documents and electronic documents

A paper document is a document written on paper by hand, by typewriter, or by any other means, such as documents written using computer software and then printed and produced in paper form, or those paper copies obtained using document photocopiers. As paper

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documents accumulate over time, they are usually sorted, organised, stored and archived in folders and physical containers designated for archiving. Specific methods are adopted for organisation and alphabetical or chronological indexing, as required, so that they can be easily retrieved and reused at any time.

An electronic document, on the other hand, is a document by nature, but is stored as an electronic file in a virtual container on the main storage device (hard disk) of the electronic device or on any external storage unit that can be connected to it (such as: compact discs (CDs), USB flash drives and flash memory). A document may also be electronic by origin, meaning that it was created using specialised word-processing software installed on computers, smartphones or other electronic devices, such as Microsoft Word,

It is also sufficient for it to be merely an electronic copy taken from the original paper document, whether handwritten, typewritten or photocopied, which is then stored electronically as a digital file by means of digital imaging, scanning or any other method, and stored on the electronic device's primary hard drive or on any external storage device connected to it.

Sub-section 2
Distinguishing between traditional paper records and spreadsheets and their electronic equivalents

A traditional paper record is a record consisting of a collection of information or data which, taken together, constitute a description of a situation relating to a specific person (such as birth records or staff payroll records) or relating to a specific item or transaction (such as a budget expenditure record or a goods receipt record), Records are organised and presented in paper spreadsheets, whether handwritten, typed on a typewriter or produced by any other means, such as being organised and entered using spreadsheet software on a computer and then printed out, or as paper copies obtained using a photocopier. This type of data is usually sorted, organised and stored in designated files or in specific ledgers, such

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as the journal and general ledger in the field of accounting and financial management, or in specific books and periodicals in the field of statistics. As records, ledgers and periodicals accumulate over time, they are usually organised, stored and archived in physical containers designed for archiving, and specific methods of organisation and chronological indexing are adopted to facilitate retrieval and reuse at any time when required. An electronic record, on the other hand, is a record by its very nature and shares the same characteristics as a traditional record; that is, it consists of a collection of information or data which, taken together, form a description of a situation relating to a specific person, thing or matter, but which has been created and entered into an electronic spreadsheet within an electronic file and stored in a virtual container on the electronic device's main hard drive or on any external storage device to which it can be connected (such as: compact discs (CDs) and record to be included in a spreadsheet within a file created using specialised spreadsheet software, such as Excel, on computers, smartphones or other electronic devices, It is also acceptable for the record to be included in a spreadsheet within a database that is more complex than a standard spreadsheet, and which is part of a database management system such as Access or Oracle, or other specialised software and applications used by the entity maintaining those records, such as accounting software, human resources management software and other commercial software and applications. In all cases, an electronic record retains its interrelated data, with a primary key used to distinguish between records; examples include the use of a national ID number, a personal ID card number or a payment voucher number as a unique identifier to ensure that records are not duplicated in the database.

Sub-section 3

Distinguishing Between Traditional Complex Paper-Based and Electronic Data Types

Traditional complex paper-based data comprises a mixture of multiple data types, such as text combined with shapes, drawings, engineering designs, maps and images, which may be

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hand-drawn or created using manual drawing and engineering design tools, or obtained by any other means, such as those designed using specialised computer software and then printed and produced in paper form, or paper copies obtained using document photocopiers. It is customary to use this type of data as files attached to documents, such as images of engineering designs attached to a project or contract file, or to treat them as standalone paper documents. Over time, they are sorted, organised, stored and archived in physical containers designated for archiving, in the same way as ordinary paper documents are stored and archived.

Complex electronic data, on the other hand, comprises text data alongside shapes, images and static graphics, as well as more complex data such as that containing audio, moving images and video and interactive applications, which are saved and stored on electronic devices in the form of electronic files that vary according to file type, such that they are saved and stored as electronic files in virtual containers on the electronic device's main hard drive or on any external storage device that can be connected to it (such as: compact discs (CDs), USB flash drives and flash memory). A file may also be electronic by nature, meaning that it has been created using graphic design and engineering software, or software for video production, animation and interactive applications found on computers, smartphones or other electronic devices. It is also acceptable for the file to be originally in paper form, consisting of a collection of documents containing drawings, images, maps, certificates and paper engineering designs that have been compiled and preserved electronically within a digital file by means of digital imaging, scanning or any other method, and subsequently stored on the electronic device's primary hard drive or on any external storage device that can be connected to it. The file may also comprise a single type of complex data or a mixture of several types of such data, known as 'multimedia', which requires greater storage space depending on the quality and clarity of the sound and images it contains.

The problem with distinguishing between traditional and electronic data types

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The rationale for distinguishing between traditional paper-based and electronic data types, and the methods of conversion between them, lies in identifying the origin of the document and whether it is electronic or paperbased, thereby attributing legal effect to the source from which the document or record originated. For example, this helps to distinguish between a traditional administrative decision and an electronic administrative decision; A traditional administrative decision that is printed on paper, then photographed using a digital camera, and sent as an electronic file attached to an email to the person concerned by that decision, does not mean that the administrative decision has become an electronic decision; rather, it remains a traditional decision but has been sent electronically, a point which will be addressed in the second section when examining administrative decisions.

Section Three

Distinguishing between types of software and applications, their level of development and their uses

The types of software and applications commonly used in public administration can be divided into two categories: the first comprises programmes and applications that perform tasks electronically according to the user's instructions and wishes; the second comprises programmes and applications that perform tasks electronically but automatically and of their own accord, without intervention from the user.

Sub-section 1

Programmes and applications that carry out tasks electronically in accordance with the user's instructions and will

The researcher considers that this type of programme and application can be divided into two categories as follows:

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A. Programmes and applications that can be used by a single user

The programmes and applications that carry out tasks electronically according to the user's instructions and will vary in number according to the variety of tasks they perform. These include, as previously mentioned, programmes specialising in word processing, programmes for processing graphics, images and engineering designs, spreadsheet programmes, database management systems, programmes for processing, producing and editing video and animation, and other more complex programmes and applications.

In all these examples, the user opens the programme or application and enters the data they wish to process (such as words in word processing software and numbers in spreadsheet software) and then proceeds to give commands and instructions to the programme or application so that it processes the data in the manner the user desires, until the final results are obtained, which the user then saves as an electronic file in the format of the programme used and stores on the electronic device they are using, They may also copy or transfer the file to an external storage device (such as CDs, USB flash drives and flash memory).

There are a number of additional options available to the user, depending on the type of software being used and the type of digital file being produced, such as converting an editable text file into a non-editable PDF file – which stands for Portable Document Format–or issuing a command to print this file using the printer connected to the electronic device to obtain a hard copy of the file.

In all the above cases, we note that the user opens the programme, enters data and instructions for processing, then obtains the results and saves them electronically or prints them on paper; the task is completed at the user's sole discretion and without the need for intervention from other users, meaning that they can carry out all these tasks independently and of their own volition.

B. Programmes and applications requiring the combined will of two or more parties

There are programmes and applications that cannot be used by a single user acting alone; these are programmes and applications that involve communication between users in

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various ways, where the use of the programme or application depends on both parties having it installed so that they can use it and benefit from the service it provides. This can be simply illustrated by comparing it to the way people communicate using a telephone; it goes without saying that this can only happen if both parties have a telephone, as well as knowing the telephone number of the person they wish to contact.

Examples of such programmes and applications include email platforms (E-Mail) Mail, such as Google's free Gmail service, or the free government email service provided by the General Administration to users in ministries and public bodies, as well as other programmes and applications for communication between users, such as SMS text messaging applications on mobile phones and text, voice and video chat applications on smartphones, such as WhatsApp. Or programmes that are custom-developed and integrated into the General Administration's websites or mobile applications, where they enable the provision of specific electronic services or allow the public to make electronic enquiries about those services, with replies and responses provided electronically by the relevant staff member within the General Administration. Or, at the very least, the purpose of these programmes, applications and websites—and even in certain circumstances, email platforms merely serve to display, publish or transmit information on the part of the public administration, such that the role of the public or users on the receiving end is limited to merely being aware of, accessing or reading it, thereby concluding the task undertaken by the employee or user who created it.

The rationale behind distinguishing between these types of programmes

The rationale for distinguishing between types of programmes and applications lies in differentiating the methods of handling and circulating documents using various types of devices, programmes and applications, and in the extent to which the software or application used enables the correct completion of the transmission and reception process between users, the verification of the dates of sending and receiving electronic messages and files, and the identification of methods for proving the dates of dispatch or receipt of such messages and files, This is due to its importance in determining the effective date and

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expiry of administrative decisions as one of the legal acts of the public administration, as will become clear later in the second section, where this matter varies according to the type of programme or application and the features it provides to verify the successful completion of these operations and to establish certainty regarding their completion.

Sub-section 2

Programmes and applications that perform tasks electronically in an automated manner without the user's intervention

The researcher considers that this type of programme and application can be divided into two categories as follows:

A. Programmes and applications that perform tasks electronically in an automated manner and, ostensibly, of their own accord

Although there are many programmes and applications that perform tasks electronically in an automated manner of their own accord without any intervention from the user, this does not mean that such programmes and applications always act of their own volition; this automatic behaviour may simply be the result of a literal execution of instructions previously set by the user, which are referred to as the 'programme'. A programme usually consists of a set of instructions written in the form of programming statements containing numerous directives and constraints, such as: 'If this, then do that...", or if that, then do this' (If Then… Else If… Then), and other such instructions.

The more complex the programme, the more it must execute these instructions with high precision and without errors; provided, of course, that the programme itself is correct and free from errors, the results planned and intended by the programmer, the user operating the programme, or the public administration body that set the instructions from the outset will ultimately be achieved. This occurs when the programme is designed and the source code is written, a process known as automation—that is, making the process automatic.

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A typical example illustrating this type of programme and application is the electronic attendance and time-and-attendance system used in some public administration bodies, where employees use a magnetic card at a designated machine upon arriving at and leaving the workplace, This machine is linked to an employee payroll database equipped with software instructions containing precisely defined mathematical equations to make automatic deductions from employees' salaries based on the number of hours of lateness and days of absence during the month. The programme automatically makes the deductions each month and transfers salaries to employees' bank accounts once the deductions specified by the programmer in the mathematical equations—which were previously determined by the public administration body using the programme—have been applied. All of this is carried out automatically without any user intervention.

The simplest use of this type of programme is merely the automatic aggregation of the number of hours of lateness and days of absence, followed by printing the table on standard paper and sending it to the finance department at the start of each month for use in calculating deductions and paying salaries manually.

In any case, although the programme here operates electronically of its own accord, this 'autonomy' is merely an illusion, because in reality the programme has merely carried out the specific instructions set out for it in the code written by the programmer employed by the public administration body which had previously taken the decision and determined the rates of deduction from employees' salaries in its administrative decisions of its own volition; As for the programme, it merely executed these instructions electronically as part of an administrative automation process designed solely to save time and effort, and which has no connection to the administrative decision.

B. Smart programmes and applications that carry out tasks electronically in an automated manner and, in fact, of their own volition

There exists a category of smart programmes and applications that perform tasks electronically and automatically, without the actual intervention of users' will – not merely in appearance. These programmes and applications possess autonomy and the ability to

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think and make decisions they deem appropriate, based on 'Artificial Intelligence' (AI). This essentially involves the ability to analyse big data using pattern analysis algorithms and neural networks, which aim to generate predictions and forecasts and to learn deeply from historical data stored in the system or programme; and, over time, it acquires the experience and ability to deal with new, unprogrammed situations, choose the appropriate course of action and solve problems autonomously by comparing these new situations with historical data it has stored relating to similar past situations, and learning from them. It is worth noting that such programmes and applications are characterised by their ability to think and make decisions in a manner that closely resembles the way humans think, make decisions and learn from their own experiences. Furthermore, over time and as experience and data accumulate within the programme, its ability to learn autonomously from these new experiences and accumulated data increases, and it improves its ability to make appropriate decisions, just as happens with humans when their experience grows and they learn cumulatively from the decisions they make. All of this takes place without any human intervention, except for the human's involvement in building the algorithms on which it relies –algorithms specialised in data analysis, data mining and deep learning.

The difficulty in distinguishing between these types of programmes

The difficulty in distinguishing between these types of advanced programmes and applications lies in analysing, understanding and resolving the issue of legal liability for the actions carried out through them, and the jurisprudential disputes raised by this issue, particularly with regard to the question of attributing fault for the actions carried out by the programme—whether to the individual, the programme's manufacturer, the operator, or, in the worst-case scenario, to the artificial intelligence itself. All this takes into account the errors or breaches of the law that may mar such actions, which range in severity from mere simple errors resulting from minor programming faults in the construction of algorithms, to the commission of serious constitutional violations such as racial discrimination between individuals, and the consequences of deliberately programming, designing and constructing

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algorithms that behave in a racist manner. An example of this is algorithmic discrimination between men and women in staff recruitment testing.

Chapter Two

The Use of Information Technology in the Legal Actions of the Public Administration in Palestine

The use of information technology in the legal proceedings of the public administration in Palestine is relatively limited, and is less advanced than that practised by public administration bodies in developed countries. This is attributable, on the one hand, to a lack of technological capacity and knowledge, and, on the other hand, to the absence of specialised legislation and laws that regulate such actions in a clear, specific and precise manner. This research has been divided into two sections examining the use of information technology in the issuance of administrative decisions and the conclusion of administrative contracts, based on a review and analysis of the relevant legislative texts, whilst linking and integrating these findings with those presented in the previous study.

Section One

The use of information technology in administrative decisions in Palestine

It is well established in legal doctrine that an administrative decision is effected merely by the public administration's expression of its will, which gives rise to legal effect, regardless of the manner of such expression, even if it is through silence. Nevertheless, the Palestinian legislature has expressly authorised government bodies to use electronic means in certain transactions, as specified in Article 42 of the Electronic Transactions Law, the first and second paragraphs of which provide as follows:

1. Any government department or body may, through the use of electronic means,

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do the following:

a) Accept the filing, submission, creation or storage of documents in the form of electronic records.
b) Issue any authorisation, licence, decision or certificate, or create or store documents.
c) Accept fees or any other payments.
d) to issue calls for tenders and receive tenders relating to government procurement.

2. Where the Government decides to carry out any of the tasks referred to in the preceding paragraph electronically, it may specify the following:

- The means by which such records are created, filed, stored, submitted or issued.
- The procedures by which tenders are invited, bids are received and government procurement is carried out.
- The type of electronic signature required, including the requirement that the creator use an electronic signature.
- The method and format by which the electronic signature is to be affixed to the electronic record, and the standard with which the certification service provider to whom the document is submitted for storage or filing must comply.
- Appropriate control processes and procedures to verify the integrity, security and confidentiality of electronic records, payments or fees.
- Any other specifications, conditions or provisions for the submission of paper documents, if required in relation to electronic records concerning payments and fees.

Although this provision authorises the General Administration to use electronic means in issuing administrative decisions, the legislator has not obliged it to adopt the use of electronic means as an alternative to traditional means in issuing administrative decisions, but has left this choice to it to exercise in certain circumstances, whilst it continues to issue administrative decisions in the traditional manner as a matter of course and in accordance with the terms and conditions governing them.

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Nevertheless, the researcher excludes cases in which a public administration body issues administrative decisions by traditional means but resorts to the use of electronic means solely for the purpose of publishing electronic copies of those decisions on display screens or on its own websites, or for sending an electronic copy of an individual administrative decision to the email inbox of the person concerned by the decision, as this is merely a means of transmitting decisions rather than issuing them; it is analogous to the method of sending traditional paper post to a physical postbox, as both are locations specific to the recipient, who holds the key (whether a physical key or a password), and the administrative decision reaches them in either paper or electronic form.

On the other hand, the researcher considers that sending a traditional administrative decision via electronic means is similar to sending it by fax, with the fundamental difference being that computers and smartphones are digital electronic devices, whereas a fax machine is an analogue electronic device; thus, all the processing operations that take place

The conversion of a document sent via computer effectively takes place when it is sent by fax, albeit in a different manner: the paper-based administrative decision undergoes processing and conversion into an electronic file within the sending fax machine, is then re-encoded, and is output as a paper document by the receiving fax machine.

Nevertheless, the advent of the fax machine has never given rise to any jurisprudential disputes or legal issues concerning the issuance of decisions and their provisions, or even the designation of an administrative decision as a ‘fax decision’, Furthermore, transmission by fax has not been among the methods recognised by law for proving service of an administrative decision, such as registered letters with acknowledgement of receipt sent by post or telex, or notification by an official of the administration; the decisive factor is always the date on which the decision is deemed to have been received, which is determined by the date of signature confirming receipt of the decision in all cases. The researcher endorses the criticisms raised by Dr Mohammed Shabir (2015) regarding the Palestinian legislator’s failure to address the legal aspects and provisions governing the

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issuance of administrative decisions using electronic means, given the distinct nature and provisions of such decisions, as they are issued by the public administration in its capacity as a public authority holding a position distinct from that of individuals, and that it would have been more appropriate for the legislator to include such provisions in legislation specifically governing the legal acts of the public administration and the issuance of administrative decisions by electronic means, given the distinctive nature of this type of decision and its provisions, which differ from those of traditional administrative decisions and require further detail and provisions in legislation pertaining to administrative law.

Nevertheless, the researcher considers, from a technical and practical standpoint, that it is important to distinguish between the use of technology at the sole discretion of one party and its use requiring the convergence of two wills, as previously noted in the preceding section, by analogy with the principle of the requirement for the meeting of two wills when concluding a traditional contract between any two parties, namely the condition of offer and acceptance in the contract. This means that the public administration's initiative to use electronic means to correspond with individuals (the offer) will require the consent of those individuals to such use (the acceptance). Furthermore, this consent requires the individual to provide the public administration with their email address (in the case of emails) or their mobile phone number (in the case of text messages text). Consequently, it is inconceivable that a public administration body would initiate the use of electronic means with individuals for whom it does not have telephone numbers or email addresses; in other words, the condition of 'consent' is not met. Conversely, upon scrutinising the provisions set out in Article (42) and examining their interrelationship and interdependence, as well as their inclusion in the same paragraph of this article, and even upon scrutinising the wording used by the legislator in those provisions—which centres on the term 'acceptance' more than once, it is possible to infer the legislator's intention, which was directed towards codifying the authority of the public administration to 'accept' applications received from individuals in order to complete the procedures set out in that Article using electronic means, whenever it receives such applications from individuals. This interpretation is

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supported by the list set out in sub-paragraph (b): 'the issuance of any authorisation, licence, decision or certificate…', all of which are regarded as responses to requests that individuals may initiate by submitting them to the public administration electronically, whether via the public administration's website or by email. Similarly, the provision in subparagraph (a): 'acceptance of the filing, submission, creation or storage of documents in the form of electronic records', and the provision in subparagraph (c): 'acceptance of fees or any payments', all of which confirm the validity of the researcher's belief that these all relate to the legalisation (of acceptance) issued by the public administration authority as a response to requests from individuals (affirmative action), in line with the technical concept of this type of electronic communication and the requisite mutual consent of both parties to such communication, in addition to the detailed restrictions, conditions and provisions set out by the legislator in the second paragraph of the same Article (42): '… if it decides to carry out any of those tasks electronically'.

The researcher also considers it necessary to distinguish between types of administrative decisions issued at the request of individuals on their own initiative and via online applications (affirmative decisions), which serve their specific interests and which they may rely upon vis-à-vis third parties—such as applications for work permits, building permits and the like—where the public administration responds to them (acceptance) and issues the requested decision electronically in accordance with the authorisation granted to it by the legislature; and the need to distinguish these from other types of decisions which the public administration initiates and issues of its own accord, publishing and notifying them through traditional legal channels—which are invoked before the law and subject to scrutiny regarding the determination of their effective dates and entry into force— but it resorts to the use of electronic means as an additional, optional method of publication such decisions or their notification to the individuals concerned electronically. An example of this is the case cited by the legislator in subparagraph (d) of Article (42), in which the public administration authority is authorised to: "to issue tenders and receive bids relating to government procurement". Although this sub-clause is thematically linked to matters of

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administrative contracts, which will be discussed in the second section, its inclusion here in this article is considered authorisation for the public administration to use electronic means in (advertising) the launch of such tenders as an additional, optional means, with the aim of increasing the reach of the advertisement both domestically and internationally, broadening the scope of participation in the tender, and saving time and effort in enquiring about and receiving tenders electronically. As for the subject matter, the topic of tenders within the context of administrative contracts will be addressed in the following section.

Entry into force and implementation of administrative decisions

The rationale for distinguishing between the use of electronic means in issuing, publishing or transmitting regulatory or individual administrative decisions as a primary method, or using them as an additional optional method undertaken by the administrative authority in parallel with the issuance of a traditional administrative decision, lies in the method of determining the date of publication or the date on which the person concerned is notified of the individual decision and becomes aware of it, as this date determines the date on which the decision takes effect and becomes binding upon them; furthermore, this date is significant in determining the start of the period for appealing against administrative decisions, which the legislator has set at 60 days following notification of the decision.

The methods recognised by law for proving notification of a traditional administrative decision are registered letters with acknowledgement of receipt sent by post, telegram, or notification by an official of the administration; the date of becoming aware of the decision is always determined by the date of signing for receipt of the decision. Conversely, the legislator has not explicitly provided for any evidence to prove service of an electronic decision; and rightly so, given the technical difficulties involved, as there is no standardised method by which to determine this, and due to the multitude of programmes and applications used electronically.

By analogy with the use of the term ‘penetration’ in physics to denote the ability of radiation or light to pass between two media of differing densities—such as the passage of light from air into glass or water—it is possible, by analogy with this concept, to liken the

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state of entry into force and effect in law to a process of transmission of the law or an administrative decision lies between two distinct zones separated by a line (the 'line of effect'), which is represented by the date of publication, announcement or notification of the decision and awareness thereof; this process represents the transition from a stage in which the administrative decision was not in force ('air') to a stage in which it becomes in force ('glass'). The following diagram illustrates this concept:

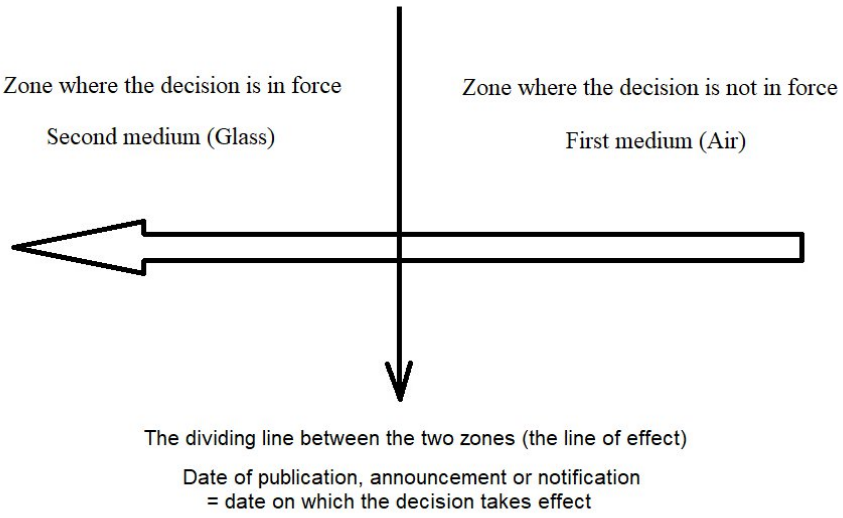


Figure 1: Illustration of the concept of legal effect by analogy with the concept of light passing from one medium to another in physics

Section Two

The use of information technology in administrative contracts in Palestine

Dr Mohammed Shabir (2015) considers that the Electronic Transactions Law has established some important provisions for regulating the conclusion of electronic contracts, by recognising the theories of offer and acceptance through the use of electronic means and

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the binding nature of the expressions associated with them, as well as the concepts of electronic contracts and electronic tendering, and by conferring legal validity upon the signature.

Although it is available online, the legislator has been criticised for failing to address the traditional restrictions and conditions governing the conclusion of administrative contracts, such as the availability of financial authorisation, authorisation to contract, and the selection of the most suitable contractor, amongst others, which the author considers a legislative shortcoming attributable to the law's failure to recognise the specific nature inherent in administrative contracts, as legal acts carried out by the public administration and governed by administrative law—a flexible body of law whose rules are more influenced than any other by technological development and the specific provisions required by such development.

The researcher concurs with the views and criticisms put forward by Dr Mohammed Shabir (2015) regarding her views and criticisms, and further adds that the ambiguous wording of this law has left the door open for the administrative authority to choose whether to use electronic means as a supplementary method or to adopt them as an alternative to traditional methods in the conclusion of contracts and tenders; this could raise questions regarding the legality of this legal act (contracting) or even to suspicions regarding the unconstitutionality of the legal text itself, which relates to a breach of the principle of equality between individuals or between companies in society—those who are not adept at, or even do not favour, the use of technology or the internet and are not comfortable with it when it comes to concluding contracts or agreements, or even conducting electronic correspondence. The researcher also considers that the use of electronic means between any two parties should, from the outset, be based on a mutual agreement between the parties to use them, as it is an optional rather than a mandatory means, This is similar to what was noted when discussing the issue of administrative decisions issued electronically in connection with the public administration's acceptance of applications submitted by individuals via the internet.

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Although the legislator has set out numerous provisions and rules relating to the conclusion of electronic contracts—to the extent that a separate chapter entitled 'Electronic Contracting' has been devoted to them—the researcher believes that the law does not explicitly provide for the public administration to make use of these provisions, which means that the public administration cannot rely on them when concluding electronic contracts. Support for this view can be found in the title the legislator assigned to Chapter Seven, namely 'Electronic Government Transactions', which implies that Article 42—the sole provision in this chapter—is also the only one applicable to the acts of the public administration under this Act. The researcher endorses the view of Dr Mohammed Shabir (2015) that the legislator has overlooked other types of legal acts by the public administration, such as tenders and direct administrative contracting, and has confined itself to mentioning only the procedure for submitting tenders without addressing the conditions and mechanisms of implementation, this confirms that the authorisation to use electronic means is limited to this procedure alone.

In conclusion, the researcher believes that the legislator has authorised the public administration to use electronic means as an additional, optional method solely when carrying out certain legal acts specified in Article 42; consequently, it is not permitted to carry out any other legal acts using electronic means, other than those stipulated in that article under this law.

On the other hand, the legislator has further set out certain important provisions and restrictions in Decree-Law No. 8 of 2014 concerning public procurement, specifically in Chapter IV entitled 'Procedures for the Procurement of Supplies, Works and Non-Consultancy Services', where Article 30 specifies the form of correspondence and stipulates in its first paragraph that: "All documents, records, notices, decisions and other forms of correspondence referred to in this Decree-Law shall be in writing." However, the second paragraph further stipulates that: "Electronic correspondence shall be authorised by a decision of the Council", which means that the use of electronic correspondence in communications relating to procurement operations is permitted. It also authorised the

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Council to specify the means, methods and mechanisms to be used for exchanging information and to meet all requirements regarding signatures, the conduct of meetings with tenderers, methods of obtaining information on electronic submission procedures, and information security measures or time-stamping where tenders are to be submitted electronically.

It is clear from these provisions, and others contained in the Act, that the legislator has established as a general rule that all correspondence referred to in this Act must be in writing; this is the general principle.

However, the use of electronic correspondence has been permitted by a decision of the Council as an optional exception. It is also noted that the legislator's intention was to grant the public administration the absolute right to determine all the requirements, means, methods and mechanisms to be used, as well as other precise technical details necessary for the implementation of these electronic procedures, The reason for this is not only that the public administration holds authoritative power and occupies a position distinct from that of individuals, and therefore has the right to determine all such details, but also because the legislator intended the choice to rest with the public administration to ensure the availability of the technical and technological capabilities, capacities and expertise that can uses them so that it can carry out these electronic procedures to the fullest extent and in the manner it is capable of, whilst preventing any possibility of errors on its part due to a lack of proficiency in using technology for which it has not been designated and for which it lacks the technical competence to utilise.

The legislator has also required public authorities, when carrying out procurement via electronic means: "to ensure that procurement is carried out using information technology systems and software (including those relating to the authentication and encryption of information) that guarantee non-discrimination; that these systems and technologies are available to all competitors and interoperable with generally available information technology systems; and that they do not restrict the participation of competitors in the procurement process, (Article 30, paragraph 4, sub-paragraph (a)). This means that the

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Palestinian legislator authorises the public administration to use advanced information technology systems characterised by autonomous decision-making, such as programmes based on artificial intelligence, analytical and data-mining algorithms, and deep learning—as previously referred to in the preceding section. The legislator has explicitly stipulated the need for the contracting authority to ensure the absence of discrimination, referring specifically to algorithmic discrimination between individuals or companies when conducting electronic procurement.

On the other hand, although the legislator has set out numerous provisions and rules relating to the conclusion of electronic contracts—to the extent that a separate chapter entitled 'Electronic Contracting' has been devoted to them—the researcher considers that the Electronic Transactions Law does not explicitly provide for the public administration to make use of these provisions. This means that it is bound solely by the provisions of Chapter Seven of this Law, entitled 'Government Electronic Transactions', which contains Article 42. This article sets out certain procedures relating to the submission of tenders, without, however, requiring their full implementation electronically; the provisions governing this are set out in the Public Procurement Law.

In summary, the legislator has generally set out certain restrictions on the conduct of electronic contracting whilst leaving the freedom to specify further technical details to the administrative body carrying out this electronic procedure, in accordance with the capabilities available to each administrative body; this is a sound and appropriate approach, offering a degree of flexibility commensurate with the flexibility of administrative law governing the legal acts carried out by public administration bodies, particularly with regard to technological issues, which vary depending on the bodies using the technology and the resources available to them.

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Summary, Findings and Recommendations

1. Electronic devices are considered a specific branch of electrical devices; furthermore, electronic devices generally comprise two types: analogue electronic devices and digital electronic devices. All of them rely on controlling the flow of electrons passing through their internal components, whatever those components may be, with the aim of processing information and data, regardless of the method of processing or its purpose.
2. Despite the differences between analogue and digital electronic devices, it is customary to use the term ‘electronic devices’ or ‘electronics’ generally to refer to both types without distinguishing between them. It should be noted that digital devices are considered more advanced and modern than analogue ones; however, this has not limited or prevented the use of both types to this day, given the distinct features offered by each. There are two reasons for this. The first reason is the continued use of both types of devices in various countries and the lack of a clear distinction between them in many devices that combine the characteristics of both types; the second reason is the absence of any intention to compel individuals and various organisations to use a specific type of such electronics—such as the newer or older type, for example— as this depends on the material and knowledge-based capabilities and skills of individuals and organisations, and the extent to which they are willing or able to keep pace with the digital developments affecting electronic devices, in addition to the features that analogue devices still retain.
3. The modern fax machine is a prime example illustrating both analogue and digital electronic devices, their interconnection, and the reasons why no distinction is made between them to this day; The key advantage of the modern fax machine lies in the fact that it combines the characteristics of both analogue and digital devices, enabling it to process and modify data and convert it from digital to analogue form and vice versa, whenever this is necessary for sending or receiving documents when

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communicating with other types of digital or analogue fax machines; more importantly, it must be able to reverse this adjustment when required.

4. Generally speaking, memory and other storage media in electronic devices are used to store all types of data electronically—numbers, letters, words, symbols, images, videos and all other types of complex data—such that they are encoded and represented electronically by a contiguous sequence of the digits (1, 0) in the binary system, which is easily understood physically or electronically in electronic devices as a contiguous array of transistors and electrical circuits that are either open or closed, allowing or preventing the passage of electrons or electrical current.
5. The key to distinguishing between types of electronic devices, their components and the ways in which they store data in their various types of memory lies in determining the extent to which electronic communication is possible and the methods of storing, transmitting and receiving data between them, given the importance of this in the execution, transmission and reception of electronic transactions of all kinds.
6. A distinction can be made between traditional paper-based and electronic documents, records and complex data based on how each type of data is created, stored and transmitted as an electronic file or printed as a paper document. The rationale for distinguishing between traditional paper-based and electronic data types, and the methods of conversion between them, lies in identifying the origin of the document and whether it is an electronic or paper document; thereby attributing the legal effect to its source, which gave rise to that document or record; and consequently distinguishing, for example, between a traditional administrative decision and an electronic administrative decision, A traditional administrative decision that is printed on paper, then photographed using a digital camera, and the image sent as an electronic file attached to an email to the person concerned by that decision, does not mean that the administrative decision has become an electronic decision; rather, it remains a traditional decision but has been sent electronically.

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7. A distinction can be made between software programmes and applications that perform tasks electronically in accordance with the user's instructions and wishes, whether these are the wishes of a single individual or the mutual agreement between two parties—the sender and the recipient. The rationale for distinguishing between these types of software programmes and applications lies in distinguishing the methods of dealing with documents and the methods of their circulation amongst the various parties using such programmes and applications, and the extent to which the programme or application in use provides the means to confirm the correct completion of the transmission or receipt process between users, to verify the dates of sending and receiving electronic messages and files, and to distinguish the methods of proving the dates of dispatch or receipt of those messages and files, given their importance in determining the effective date and expiry of administrative decisions as one of the legal acts of the public administration; this varies depending on the type of software or application and the features it provides to verify the successful completion of these processes and to establish certainty regarding them.
8. The types of software and applications commonly used in public administration can be divided into two categories: programmes and applications that perform tasks electronically according to the user's instructions and will, and programmes and applications that perform tasks electronically in an automated manner and of their own accord, without the intervention of the user's will. The rationale behind distinguishing between these types of advanced software and applications lies in analysing, understanding and resolving the issue of determining legal liability for actions carried out through them, as well as the jurisprudential disputes raised by this issue, particularly with regard to the question of attributing fault for the actions carried out by the programme—whether to the individual, the programme's manufacturer, or the entity operating it—or, in the most recent and complex cases, to artificial intelligence itself. All this takes into account the errors or breaches of

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the law that may mar such actions, which range in severity from mere ordinary errors resulting from simple programming errors in the construction of algorithms, to the commission of serious constitutional violations such as racial discrimination between individuals, resulting from the deliberate programming, design and construction of algorithms that behave in a discriminatory manner. An example of this is algorithmic discrimination between men and women in recruitment testing programmes that rely on software and applications utilising artificial intelligence algorithms.

9. The researcher considers that sending a traditional administrative decision via electronic means is analogous to sending it by fax, with the fundamental difference being that computers and smartphones are digital electronic devices, whilst a fax machine is an analogue electronic device; thus, all the processes that take place processing and conversion of a document sent via computer actually takes place when it is sent by fax, albeit in a different manner: the paper-based administrative decision undergoes stages of processing and conversion into an electronic file in the sending fax machine, is then re-encoded, and is output as a paper document in the receiving fax machine. However, the advent of the fax machine has never given rise to any doctrinal disputes or legal issues concerning the issuance of decisions and their provisions, or even the designation of an administrative decision as a 'fax decision', Nor has transmission by fax been among the methods recognised by law for proving service of an administrative decision, such as registered letters with acknowledgement of receipt sent by post or telex, or notification by an official of the administration; the decisive factor is always the date on which the decision is deemed to have been received, which is determined by the date of signature confirming receipt of the decision in all cases.

10. Although the legislator has set out numerous provisions and rules relating to the conclusion of electronic contracts—to the extent that a separate chapter entitled 'Electronic Contracting' has been devoted to them—the Electronic Transactions

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Law does not expressly provide for the public administration to avail itself of those provisions. This means that it is bound solely by the provisions of Chapter Seven of this Law, entitled "Government Electronic Transactions", which contains Article 42. This article sets out certain procedures relating to the submission of tenders, without, however, requiring that these be carried out entirely electronically; the provisions governing such procedures are set out in the Public Procurement Law.

11. The legislator has generally set out certain restrictions on the conduct of electronic contracting, whilst leaving the administrative body carrying out this electronic procedure free to determine further technical details, in accordance with the capabilities available to each administrative body, This is a sound and appropriate approach, offering a degree of flexibility commensurate with that of the administrative law governing the legal acts carried out by public administrative bodies, particularly with regard to technological matters which vary according to the bodies using them and the resources available to them in terms of hardware, tools and computer software, as well as the human capacity to operate and manage them.

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