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Digitisation of the Provincial Directorate of Land Survey and Property Registration in Algeria: Applications and Challenges

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Abstract:

Following the merger of the cadastral and property registration services into a single administration called the Provincial Directorate for Cartography and Property Registration, which is responsible for the implementation of the property system and the preparation of cadastres, this merger was established by Executive Decree No. 21/393 of 18/10/2022, which defines the organisation of the external services of the General Directorate for National Property and its powers.

The aim of the merger was to reduce the various discrepancies resulting from the existence of two separate administrations and the lack of coordination between them, which affected the services provided to citizens. At the same time, the legislator decided to create a modern electronic administration by activating the digitalisation of the Directorate's activities, in order to keep pace with technological and information developments and thus achieve strategic advantages in the provision of public services.

Our aim was to highlight the foundations of the digitisation applications of the Directorate of Land Surveying and Property Registration, with the aim of understanding the services covered by surveying, while also highlighting the challenges of digitisation, including obstacles and future prospects.

Keywords: Digitalization, upgrading, State Directorate of Land Surveying and Real Estate Preservation, electronic management

INTRODUCTION

The State has endeavoured to modernise and improve the services provided by the Land Registry and the Property Registry, from the time when these services were independent to the time when they were merged into a single administration¹. This has

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been achieved through the provision of programmes, applications and the introduction of electronic platforms and other technological equipment, with the main objective of optimising three aspects “time, effort and cost”.

The Provincial Directorate of Surveying and Property Registration is one of these services, given its crucial role in ensuring the security of property. The digitalisation of its administration will contribute to improving its services and increasing its transactions.

This raises the question of the applications and challenges of digitising the Provincial Directorate of Land Surveying and Property Registration. On this basis, we have decided to deal with the applications of administrative digitisation in the Provincial Directorate of Land Surveying and Property Registration in the first section, followed by the challenges of digitisation in the second section.

Section One: Applications of administrative digitisation in the Provincial Directorate for Land Surveying and Property Registration

The applications of administrative digitisation in the Provincial Directorate for Land Surveying are manifested in internal and external applications, which include

First requirement: Internal applications of administrative digitisation in the Directorate

As in any administrative body, the programmes and applications used in the Directorate can be divided into two categories:²

1. Management programmes: These are programmes that facilitate the management of various aspects of the institution, such as human resource management programmes, inventory management programmes and others. These programmes vary from province to province as they rely heavily on the efforts of local technical staff.

2. Technical software: This category includes programmes involved in processing legal information for landowners and the Geographical Information System for Real Estate. The Central Administration oversees most of the applications in this category, including development and training, as these programmes are the backbone of land surveying operations. It is this category of programmes that we will examine in this requirement.

This requirement has been divided into two sub-sections: the first entitled “Digitisation of General Land Surveying Activities” and the second entitled “Digitisation of Real Estate Registration Activities”.

First subsection: Digitisation of General Surveying Activities

Since surveying is a technical and legal process aimed at identifying all the data necessary for a complete and clear understanding of the identity of the property³, we encounter two main categories of survey data that form the basis of the cadastral information system:⁴

1. Descriptive information: This includes the definition of the property unit (its area, nature, characteristics, etc.) and the identification of its owner (name, surname, address, occupation, etc.).⁵

2. Graphical information: This refers to the determination of the physical layout of properties based on survey maps and plans⁶ that accurately represent their geographical location in reality.

Based on the above, we will discuss the programs used in the Directorate that fall under the digitisation of surveying activities⁷.

Firstly: DFG programme

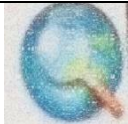



This programme was used for the capture and production of cadastral documents to be sent to the provinces in the event of disputes. It was replaced by GIC in 2008. DFG consists of a database of descriptive information and a programme interface for managing this database, which allows the addition of new ownerships and properties, the modification of previously recorded data and the processing of data in accordance with the Directorate’s procedures, such as the electronic extraction of official documents⁸.

Second: ARCGIS Programme

Also known as the Geographic Information System (GIS) programme, ARCGIS is a platform related to geographic information systems and sciences. It is a suite of programs offered by ESRI that enables the creation, management, sharing and aggregation of geographic data, as well as the analysis and presentation of geographic information in the form of accurate maps⁹.

The ArcGIS Desktop programme consists of four sub-programmes:

Figure 01: Components of the ArcGIS Desktop application

Subprogram	Name:	Description	Program icon
ARC			
ARC Map		Allows data to be displayed, digitised, edited and printed.	
ARC Catalogue		Used for file management (creating, moving, copying, etc.).	
ARC Scene		Provides a 3D interactive simulation or display.	
ARC Globe		Displays global data in three dimensions.	

Source: Tahami Sadek, User Guide for ARC GIS Program Level One, First Edition, p. 6.

In general, ARC GIS is a powerful tool for land surveying and management, used for collecting, processing, analysing, planning, designing and sharing information. It also facilitates the linking of owner information tables with property information tables.

Second: ARC Map programme

The ARC Map program is of great importance as it is used to handle maps and drawings in terms of data entry and coding information related to each entity¹⁰ (polygon, line, point) within the components of the geographic map. It also relies on linking the property to the survey section and property part number to facilitate the automatic calculation of the area. The ArcGIS and ARC Map programmes are linked to store information about the landowners and the properties themselves, with a legal dimension provided by the national identification number¹¹.

Fourth: DEMETER programme

The DEMETER programme is designed for graphic design and drawing within a database in Key.don.Rep¹² format. It was adopted by the Survey Administration as a means of ensuring the preservation of the geographical data contained in the plans drawn up by surveyors in the field. Its use has been discontinued in favour of the ARC Map programme mentioned above.

Fifth: PHOTOGRAMETR programme

Photogrammetry, or the PHOTO GRAMETR programme, is used to process aerial photographs taken by a special camera mounted on an aircraft. It corrects these images to produce orthophotos using a technique known as POINTS DE CALAGE, which is an adjustment or preparation method that supports the assembly of aerial images¹³. This is then used to produce accurate maps for use in the field, allowing data to be recorded and leaving it to the field surveyor to fill in any gaps¹⁴.

This technique is closely linked to the camera used, and there are currently many programmes that allow images to be processed and linked. The programme has been used in various fields, including topographic mapping¹⁵.

In addition to all of the above, a computer engineer from the Directorate of Surveying and Property Registration in the Province of Blida indicated that the Surveying Administration has been working diligently and seriously to digitise all surveying documents into a dedicated digital database. This is considered to be the documented field phase, as property numbering is directly linked to the survey documents.

The SOLA project, derived from the Angolan experience, is fundamentally based on the alignment of field data with the survey plan at the national level¹⁶.

Second subsection: Digitisation of real estate registration

In an interview with Ennahar TV, the Director General of National Property stressed the State's commitment to improving administrative procedures in the real estate sector. He stated that in order to improve property registration services, it is essential to revive the MACF application¹⁷. The aim of this initiative is to protect real estate assets from reckless exploitation. It is worth noting that the issuance of Executive Decree No. 21-251, which dissolved the National Land Survey Agency, played a significant role in achieving this process by mandating the digitisation of property data and revising the research methods and procedures for the purification of ownership

through the digital publication of general land survey documents and the real estate cadastre.

In this context, a project for the digitalisation of property registration activities has been implemented in order to improve the services provided as part of the modernisation of the working methods and management style of digital administration, particularly as regards the procedural aspects of document and contract authentication. This leads us to consider the creation of a single database for the preservation of documents and archives in a modern digital system, which will help protect them from damage and deterioration.

With regard to the Director General's comments, the MACF application allows for the immediate issuance of all documents requested by citizens, such as negative certificates, copies of contracts and procedures related to notifications. This was confirmed by a computer engineer from the Directorate of Land Surveying and Property Registration in the Province of Blida¹⁸, who stated that one of the key digital systems adopted to modernise property registration activities is MACF, which focuses primarily on the owner and the property. It facilitates access to information on both the property and the owner, whether a natural or legal person, in a digital manner to provide real-time information.

The digitisation of positive and negative title deeds has been implemented, allowing electronic payment through the Gold Card. In addition, efforts have been made to link the database of the General Directorate of National Property with various ministries, in particular the Ministry of the Interior, the Ministry of Housing and the Ministry of Justice.

The Digital Property Identification Number (NIM)

This system creates a digital identification number for properties, known as the NIM, which serves as a national registration number. In general, we can say that this application has been revitalised and updated, extending its use to all property registration administrations, with tangible benefits from this digital service.

Services provided by the application

The services provided by this application can be summarised as follows:¹⁹

1. Automated searches within property register information:

Unlike traditional manual services, which take time and effort, the available automated applications allow for the search of various contracts and registered or digitised information. This streamlines the process of accessing information or obtaining a copy of a document when required.

2. Electronic archiving of property registry documents:

This involves the creation of a data content and information system for the Property Register as an alternative to paper archives.

3. Digital monitoring of the filing process:

The filing process is the starting point within the property registry management for completing or rejecting the notification of documents subject to registration. This process is governed by legal texts that define its substantive and procedural scope, as well as its timeframes, which are crucial and have significant legal implications, leading to financial rights and other matters. If the automated filing system is effectively managed, it will allow access to the automated registration of contracts and documents requiring registration through digitisation.

Second requirement: External applications of administrative digitisation in the Directorate

Among the prominent applications or platforms announced in the field of digitisation of land surveying and real estate registration activities, the digital platform “Aqar” (first sub-section) and the digital platform “Espace Algérie” (second sub-section) will be discussed in this requirement.

First subsection: Aqar Platform

The Aqar platform is a digital government initiative that provides comprehensive services in the real estate sector, with the aim of simplifying administrative procedures related to real estate, improving the quality of services provided to citizens, and creating a more transparent administrative environment.

The launch of this platform began in January 2022 and will be gradually opened to institutional sectors, economic operators and citizens from May 2022. The Aqar electronic platform provides several services for both citizens and contractors, including:

Services for citizens:²⁰

This service allows citizens and users of real estate information to access the platform to request information and documents in exchange for electronic payment of service fees. These requests concern the following information and documents:

1. Request for a cadastral map.
2. Request for an extract from the status of the section (cc12)²¹.
3. Request for copies of registered contracts or a mortgage registration table or its cancellation.
4. Request for an extract from the Property Register.

This process is carried out immediately after the electronic registration of the request, with the assigned official uploading the attached documents for each request and starting their processing according to the current procedures, until another software for the electronic processing of information is implemented.

If the processing results in the file being accepted, the applicant will be informed by e-mail on the same day of the date set for consulting the information or documents requested. In the event of a refusal, the applicant will also be informed by e-mail on the same day, together with the reasons for the refusal.

Second sub-section²²: Services for Contract Writers

This service is available to contract writers (notaries and real estate managers) registered on the Aqar platform, and gives them access to the functions of the “Contract Writer” unit, allowing them in particular to:

1. Access survey documents online.
2. Automatically issue online a cadastral extract (PR4bis), a fundamental document in all property updating processes.
3. Obtain the required survey documents in digital format, with the possibility of drafting contract extracts directly on the platform.
4. Issue receipt confirming the deposit of the application and payment of the fees through an online savings account.

5. Assign a unique national reference to each document issued by the Aqar platform to ensure its validity.
6. Introduce a new function for the online submission of Property Announcement Files through a dedicated section entitled “Submission of Property Announcement Files”, ensuring complete tracking of the submission process.
7. Generate a receipt with a unique national reference that is automatically issued to the Notary upon submission of the Property Announcement file.
8. Notify the Notary of the status of the file (in process or rejected).
9. Regularly inform the notary in the event of a deposit rejection or a procedural rejection.

Second subsection: Geographical portal “Espace Algérie

The geographic portal “Espace Algérie” is a platform launched by the Ministry of Finance, specialised in real estate, by defining precisely the surveying and property information. This will make it easier to plan and take various decisions relating to urban development.

The announcement of this electronic portal was made during the signing of an agreement for cooperation and digital data exchange between the Finance and Housing, Urban Planning and City sectors, which took place at the Ministry of Finance. The event was attended by the Minister of Finance “Laziz Faid”, the Minister of Housing “Mohamed Tarek Belaribi”, the Minister of Transport “Mohamed Habib Zehana”, as well as the Director General of the National Housing Bank and the Director General of National Property, in addition to the President of the National Chamber of Notaries and staff from both ministries.

The portal’s services were initially launched in the Algiers region, with plans to gradually extend it to all areas of the country. The Minister of Finance mentioned that the “Espace Algérie” geographical portal will allow citizens and professionals to request various services, such as:²³

1. Extraction of survey documents (cc11, cc12, cc14)²⁴.
2. Extraction of cadastral plans (Extraits Des Plans Cadastraux).

The portal also offers additional services related to property transfer extracts, copies of contracts, mortgages, cancellations and petitions, which can be issued initially in the real estate offices in Algiers as a pilot phase, before being extended to all real estate offices throughout the country. This expansion includes connecting these services to the fibre optic network, which is currently about 75% complete.

Announcement of new services;

Mr Faïd announced that in the “next few days”, a service will be launched for requesting the property register via the portal. This service will allow the status of requests to be tracked from the date of submission to the date of receipt. It will allow professionals and citizens to pay the fees and charges related to these services through electronic payment methods using the Gold Card or the Interbank Card. This electronic portal will facilitate the exchange of real estate data between different ministerial sectors, thus improving the interoperability of information between different government institutions²⁵.

Chapter Two: Challenges of Digitisation in the Provincial Directorate of Land Survey and Property Registration

Digitisation is seen as the optimal solution for achieving property security by reducing the chaos and violations that have plagued this sector in recent years. This sector plays a crucial role in various aspects of life, including the political, economic and social spheres.

To meet this challenge, efforts have been made to allocate various material, human and legal resources to achieve the highest levels of development in real estate transactions in terms of ease and quality, through the application of administrative digitalisation to the activities of the relevant services and bodies, including the Provincial Directorate of Land Surveying and Property Registration. This sector has received attention in the modernisation of its administration and services.

However, a pertinent question arises: Have these efforts to develop this sector been realised in practice? (First requirement) If so, what are the state’s future ambitions in this area? (Second requirement)

First requirement: The reality of digitisation in the Provincial Directorate of Surveying and Property Registration

Despite the efforts of the Algerian government to modernise the real estate sector and its systems since 2006, the progress of digitalisation remains below 5%. This slow progress is due to several obstacles, which will be discussed later. The provincial directorates for surveying and property registration are carrying out the digitisation independently, which means that the progress of these updates varies from one province to another, depending on the effort invested in achieving this goal²⁶.

In this context, we will look at the different barriers that have directly hindered the progress of digitisation in practice, which can be divided into material and political barriers (first sub-section) and human and organisational barriers (second sub-section).

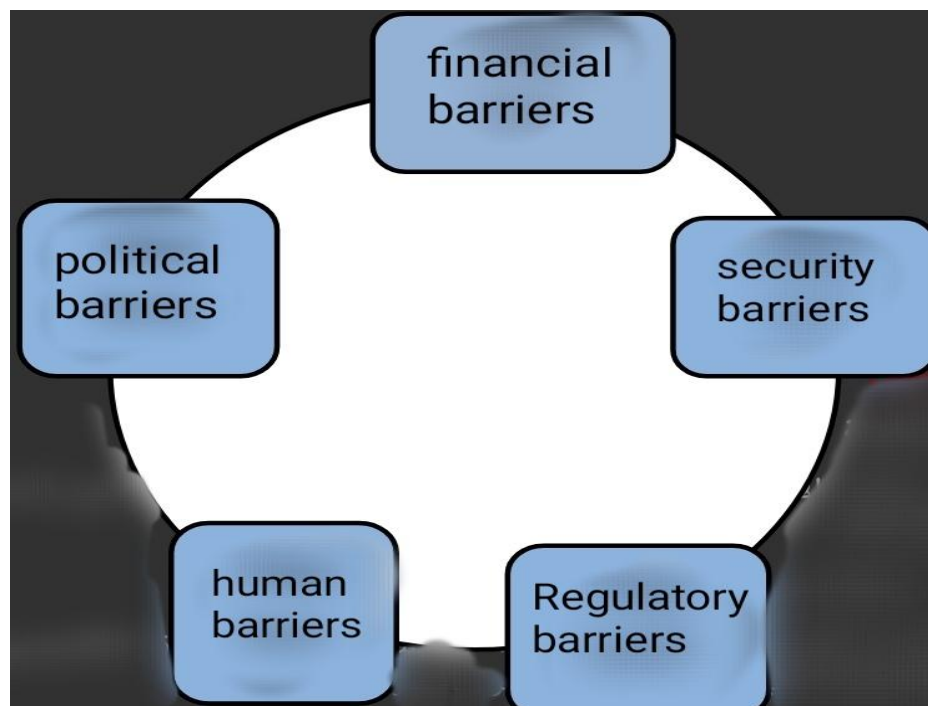


Figure 01: Barriers to administrative digitisation in the Provincial Directorate of Surveying and Property Registration

Source: Prepared by the students

First subsection: Material and political barriers

Lack of material resources and weak political will are major obstacles to the transition from traditional administration to modern management systems.

1. Material barriers:

- Insufficient resources: There is a notable lack of financial resources needed to support the infrastructure required for the implementation of electronic management within the Directorate, in particular for the creation and improvement of networks and the development of hardware and software²⁷.

- Maintenance challenges: Some Directorates face limited resources to carry out the maintenance of their equipment and networks, including the replacement of internal components of certain equipment²⁸.

2. Political barriers:

- The lack of a strong political commitment to drive the digital transformation process can stall initiatives and hinder the allocation of necessary funds and resources.

Second sub-section: Human and Organisational Barriers

The following human and organisational barriers also contribute to the challenges faced in the digitalisation process:

1. Human resource constraints:

- There is a lack of human resources dedicated to the infrastructure needed to implement e-government at directorate level.

2. Integration challenges:

- The merger of the land surveying and real estate registration departments has created a high demand for various modern technologies within the relevant departments, leading to increased costs and further complicating the digitisation efforts.

Second subsection: Political barriers

Political will has always played a crucial role in the development of various sectors, including real estate. This was highlighted by a computer engineer from the Directorate of Land Survey and Property Registration in the province of Blida, who noted that political control within administrations is a major reason for the slow progress of various institutions towards modern electronic management. This slowdown occurs because the project conflicts with their interests, such as property confiscation and encroachment. Therefore, the political obstacles can be summarised as follows:

- 1. Lack of a clear strategic vision:** There is a lack of a clear strategic vision regarding the implementation of digitisation and the use of technology.
- 2. Ineffective political administration:** The absence of an active political administration that supports the transition to e-government and assesses the political support needed to convince administrative units of the need to adopt modern technology and keep pace with the digital revolution²⁹.
- 3. Neglect of participatory approaches:** There is a failure to adopt participatory approaches in decision-making and to benefit from the experience and expertise of active stakeholders.

Third sub-section: Human and administrative barriers

Human and administrative barriers also have an impact on the digitisation of the Directorate, which can be outlined as follows:

First: Human barriers

- **Cybersecurity issues:** There are challenges in electronic security and difficulties in communicating through modern technology, resulting in many administrative staff being unaware of recent technological developments and lacking the knowledge to handle and use them³⁰.
- **Neglect of training:** There is a clear neglect in the retraining and education of the staff of the Directorate in the new procedures related to the merger of the Surveying and Property Registration Departments, as well as in the use of modern technological tools.

- **Lack of qualified human resources:** There is a lack of qualified human resources capable of operating and maintaining modern equipment and machinery³¹.
- **Weak recruitment processes:** There is insufficient recruitment and awareness of qualified people to operate these machines.

Second: Organisational barriers³²

1. **Weak planning and coordination:** There is a lack of effective planning and coordination at senior management level regarding e-government programmes.
2. **Failure to implement necessary organisational changes:** The necessary organisational changes to implement e-government within the Directorate have not been implemented, in particular with regard to the definition of responsibilities, interdepartmental relationships and workflow.
3. **Reliance on traditional methods:** The administrative and organisational levels continue to rely on traditional approaches and resist the principles of modern management.
4. **Resistance to change:** Staff within the Directorate are reluctant to adopt modern technologies and practices, fearing for their job security and future due to a lack of training and skills required for new roles.

In addition to the challenges to the digitisation process mentioned above, the following security-related issues remain significant:³³

1. **Weak internet connectivity:** There is insufficient internet flow and coverage throughout the country.
2. **Lack of legal framework:** There is a lack of legal and regulatory frameworks to accelerate the implementation of e-government.
3. **Concerns about data security:** There are significant concerns among users of administrative services about potential security breaches that could compromise their data, leading to deletion, manipulation or misuse for illicit purposes.
4. **Lack of security software:** There is a lack of software to monitor and control deliberate breaches.
5. **Information security challenges:** **Information security challenges encompass a wide range** of elements, some of which are technical, related to the systems, software

and devices used, while others are related to the individuals and administrative bodies that manage electronic administrations worldwide.

Second requirement: Future prospects for modernising the activities of the Directorate of Surveying and Land Registration

The Minister of Finance “Laziz Faid” announced the launch of the Data Centre for the Financial Sector. This centre will include information related to all directorates of the ministry. During a practical session at the Senate dedicated to oral questions, chaired by “Saleh Fojail”, the President of the Council, and attended by several members of the government, Mr. Faid explained that “the Ministry of Finance will be enriched by a data centre that will include, for the first time, information from various digital platforms related to the different services and general directorates of the ministry, especially in the fields of taxation and public customs”.

This centre has been developed within the Ministry of Finance by national experts who have created various applications for this new digital facility. In the context of the sector’s digitisation efforts, the minister confirmed that his ministry’s circle has adopted a series of measures that include the integration of modern information and communication technologies in all management practices in the sector in order to improve public service. He also added that priority has been given to modernising the activities of land surveying and property registration, given the importance of these tasks in preserving and protecting property rights and effectively contributing to the organisation of the national property market³⁴.

On this basis, the requirement has been divided into two subsections. The first subsection deals with the concept of the Data Centre, while the second sub-section discusses its importance.

First subsection: The Data Centre Concept

What is a data centre? ³⁵

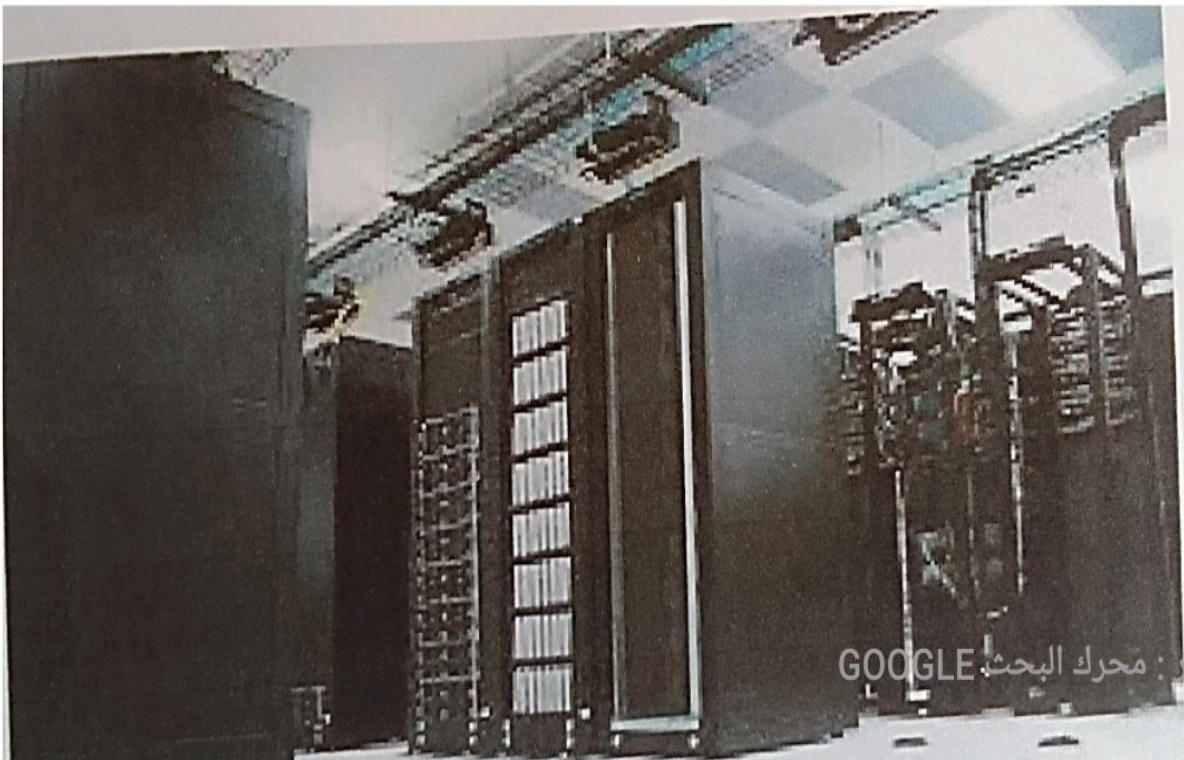
A Data Centre, or “DATA Centre”, is a large facility that houses a large number of servers that operate around the clock and are connected to the Internet at very high speeds, primarily for the purpose of hosting websites.

These servers operate entirely online with robust primary and backup power supplies. They are used for various hosting services, including:

- Full server hosting
- Virtual Private Servers (VPS)
- Reseller Hosting
- Shared Hosting

The facility housing these servers is equipped with specialised cooling systems to maintain optimum temperatures for the equipment. It also has advanced data protection systems to safeguard the information stored on these servers, as well as high quality fire suppression systems. These servers are responsible for storing and managing data and information for all users of the websites hosted on them, adhering to privacy policies to prevent data breaches, all of which are continuously monitored.

Figure 02: DATA CENTRE



Source: Google monitor

Second subsection: Key Components of a Data Centre³⁶

The key components of a data centre include:

1. Adequate building space: A suitably sized facility to house the components of the data centre.
2. Stable power supply: A consistent and stable power supply.
3. Backup power generator: An automatic backup generator that activates in the event of a power failure.
4. Powerful cooling system: A robust cooling system that maintains optimal temperatures for the servers and the data centre as a whole.
5. Server Racks: Designated areas for housing servers and their components, such as racks or network shelving.
6. High Speed Internet Connection: At least one stable high-speed Internet connection, with multiple connections from different providers preferred.
7. Surveillance system: A camera surveillance system to control access and permissions to different areas of the Data Centre based on individual permissions.
8. Web and file servers: Depending on the type and nature of the data centre, this may include web servers or file servers.
9. Staff facilities: An area for staff, including a control room for management and monitoring.
10. Safety and Security Systems: Fire protection and emergency response systems.
11. Internal Networking Equipment: Devices such as routers, switches, cabling and firewalls.

In addition, the components of a data centre may vary depending on its size and purpose, requiring different tools and components.

Second subsection: The importance of the data centre

Data centres play a crucial role in the operations of various sectors due to the significant importance of data, especially with ongoing technological advancements. Data itself is the backbone of today's economy, so it is essential to provide the latest electronic technologies to protect and optimise its use. This is what makes data centres so valuable in today's society, as they have the capacity to receive, analyse and store huge amounts of data.

A computer engineer from the Provincial Directorate of Land Surveying and Property Registration in Blida³⁷ emphasised that the digitisation process within the Directorate and in the property sector in general is progressing rapidly. He noted that the sector is currently upgrading the data centre that will host digital data for state property management, as well as taxation and treasury. This improvement will facilitate a more efficient and faster digitisation process, enabling citizens, professionals and various ministerial departments to better use and access digital information and obtain numerous documents from their offices through various recently launched digital platforms, such as the Aqar platform and Espace Algérie.

He referred to comments made by the Director General of National Property at the Ministry of Finance in a press interview, in which he stated that state technologies are 100% digitalised and only need time to be implemented in the Data Centre and to be disseminated to all services and categories. He pointed out that this development will directly contribute to streamlining the immediate delivery processes of documents and information related to negative certificates, copies of contracts and property cards, which are part of the digitalisation of external services for the management of national property. He also stated that this exemplary process would facilitate public service to citizens by allowing the elegant and automated extraction of property registers and other documents. In addition, the digitisation process for local communities will enable the provision of the necessary documents to launch a comprehensive development, especially in the field of real estate³⁸.

It can be said that the Data Centre has two prominent meanings:³⁹

First: The data centre as a big digital analyser

This digital hub not only collects data, it reads between the lines and analyses it with great precision and depth. It connects this data with other information, creating complex relationships that can only be understood through traditional human analysis.

Second, the data centre as a key service facilitator

As technology evolves, so must the services provided by data centres. This evolution allows different entities equipped with their own data centres to easily exchange information, avoiding common problems such as network congestion or delays due to storage capacity. As a result, these centres play a crucial role in the existence of many practical electronic applications and platforms in the real estate sector and other areas.

They facilitate the uploading and sharing of files with multiple parties, such as the “Aqar” platform and the “Espace Algérie” electronic portal.

Conclusion

Despite recent efforts to move from slow, traditional manual management to a modern digital management characterised by speed, accuracy and simplicity at the Provincial Directorate of Land Surveying and Property Registration, the reality of this transformation remains limited compared to what was announced in terms of the scope, effectiveness and role of the project in promoting transparency while eliminating favouritism and bureaucracy. This limitation can be attributed to various obstacles, be they material, political, human or organisational. Nevertheless, the future prospects of the cadastre and property registration digitisation project, including the establishment of a dedicated data centre, represent a significant gain that complements what has been achieved so far. It shows that it is not impossible to achieve a modern, up-to-date administration. Although the process may be slow, the efforts being made are a reality that deserves recognition.

In order to effectively address the difficulties encountered in the digitisation process of the Provincial Directorate of Land Surveying and Property Registration, we propose several solutions:

1. Improve the infrastructure:

Develop the infrastructure of the Directorate by integrating the latest software and information technologies relevant to the real estate sector. In addition, improve programmes and applications that reinforce the concepts of modern administration over traditional methods.

2. Staff training:

Provide staff training in technology to ensure a qualified human resource pool while optimising the budget.

3. Inter-departmental coordination:

Facilitate coordination between cadastral surveying and property registration by standardising the operating rules for both services. Strengthen cooperation between different departments within the Directorate to avoid chaos and achieve maximum system efficiency.

4. High quality digital systems:

Develop high-quality digital systems by establishing laws and regulations governing the use of artificial intelligence.

5. Partnerships with start-ups and research institutions:

Establish partnerships with startups, universities and research centres to promote innovation and collaboration, thereby accelerating the digital transformation process.

6. Prioritise cybersecurity:

Prioritize cybersecurity as a guarantee of Algeria's digital sovereignty, protecting it from breaches and data leaks on the global internet.

Footnotes:

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¹²- Interview with Aoussaadi Meriama, Assistant Computer Engineer at the Directorate of Land Surveying and Real Estate Registration of the Province of Blida, 28 March 2002.

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¹⁵- Ajout Souhaila, Filah Mohamed Mustafa, "Application of Photogrammetric Surveying Techniques in the Service of Archaeological Heritage - The Ayuminium Site as a Model", Journal of Archaeological Studies, Vol. 19, No. 1, 2021, p. 347.

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¹⁹- Ben Maamar, "Modernisation of the Real Estate Registration Administration", Journal of Legal and Social Sciences, Ziane Achour University, Djelfa, Vol. 7, No. 01, 2022, pp. 1552-1553.

²⁰- Nisma Sherit, "Digitalisation and its role in the management of real estate assets in Algeria", thesis submitted for the Master's degree in Law with a specialisation in Real Estate Law, Faculty of Law, Arab Tebessi University, Tebessa, 2022-2023, p. 55.

²¹- See annex no. 01.

²²- Government Notary Directorate for State Property (contract editors), available at the electronic link.:!
<https://bawabatic.DZ/?req-informations&id-629>

²³- Launch of the geographical portal “Espace Algérie”, accessible via the electronic link on 15 March 2024 at 12:40.

²⁴- See annexes (02), (03).

²⁵- Launch of the geographic portal “Espace Algérie”, same reference.

²⁶- Interview with Bourouih Amin, computer engineer at the Directorate of Land Surveying and Property Registration of the Province of Blida, dated 12 March 2002.

²⁷- Makbed Ali, Bourkri Djilali, “Obstacles to the Implementation of Electronic Administration in Algerian Universities - A Case Study of the University Centre of Tissemsilt”, Journal of Law and Political Science - Economic Studies 19, Ziane Achour University, Djelfa, p. 228.

²⁸- Makbed Ali, Bourkri Djilali, same reference, p. 228.

²⁹- Ben Dadi Hicham, Saidi Abdelkader Maamar, “Digitalisation of the Public Service and the Principle of Adaptability of Public Facilities”, thesis submitted in fulfilment of the requirements for the Master’s degree in Law with a specialisation in Economic Law, Faculty of Law and Political Science, Qasdi Merbah University - Ouargla, 2022/2021, p. 44.

³⁰- Lamiya Allal, Souad Boukeid, “Obstacles to the Implementation of Electronic Administration in Algerian Public Institutions - A Field Study at the University Services Directorate - Jijel and Its Associated Residences”, supplementary thesis for the Master’s degree in the specialisation of Organisation and Work, Department of Sociology, Faculty of Humanities and Social Sciences, Mohamed Sidik Ben Yahia University - Jijel, 2018-2019, p. 88.

³¹- Same reference, p. 89.

³²- Mohamed Ghazal, “New Trends in Local Administration in Algeria: Electronic Administration as a Model”, thesis for the Master’s degree in Political Science - Specialisation in Local Administration, Department of Political Science, Dr. Moulay Tahar University - Saida, Faculty of Law and Political Science, 2019-2020, pp. 76-77.

³³- Draï Zreik M. Abdul Salam Abdul Lawi, “Electronic Administration in Algeria: Between Challenges and Future Stakes”, Journal of Humanities and Social Sciences, Issue 05, 2021, p. 186.

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³⁴- Inauguration of a data centre: A data centre for the financial sector was inaugurated, accessible at [elbadilabc.dz](<https://elbadilabc.dz>) on 25 November 2023 at 08:40.

³⁵- What is a data centre: Detailed information on what a data centre is can be found at [here](<https://notatec.com/what-is-a-datacentre#what-is-data-centre>), accessed on 22 March 2022 at 23:09. This page provides insight into the purpose, types and components of data centres.

³⁶- Additional data centre insights: More information about data centres can be found at [arhostingdean.com](<https://arhostingdean.com/data-centre>), accessed on 17 April 2024, at 09:20.

³⁷- A conversation with Bourouih Amin, a computer engineer at the Directorate of Land Surveying and Real Estate Registration of Blida Province, was conducted on 12 March 2024.

³⁸- same reference

³⁹- An interview with Aoussaadi Meriama, an assistant computer engineer at the same directorate, took place on 28 March 2024.