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Research Article

Building laws and regulations in the Arab Republic of Egypt as a means to preserve urbanization

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Abstract:

This study addresses the establishment and development of a Geographic Information System (GIS) aimed at compiling, storing, and managing a comprehensive database encompassing all spatial and descriptive data related to the general master plan, strategic development plan, detailed zoning plans, and officially approved subdivisions, with initial implementation focused on Cairo Governorate. The proposed system seeks to articulate a future vision for urban development at the governorate level, extending down to the individual building or unit. The GIS framework will include a multi-dimensional dataset comprising architectural, legal, regulatory, infrastructural, and socio-demographic information, The objective is to create a unified, interoperable system that allows for real-time approvals, decision-making, and data extraction, based on the pre-integrated and pre-verified datasets, conditions, and regulatory requirements within the system. This would transform decision processes from time-consuming administrative workflows into rapid reviews that enable instantaneous and informed decision-making. The research then shifts its focus to the application of the sustainability principle, through the adoption of digital signature technology by officials across the relevant, supporting, and complementary entities involved in administrative procedures. This approach emphasizes the elimination of printed documents, drawings, plans, or approvals, by establishing a centralized, unified digital system that replaces fragmented and paper-based processes. In doing so, the system would clearly define the roles and responsibilities of each entity, as mandated by legislation or designated decision-makers. Moreover, the platform would be made accessible not only to stakeholders and applicants (request initiators), but also to service providers—including local administrative units, affiliated agencies, and executing entities. By the conclusion of the study, the proposed system aims to contribute directly to enhancing quality of life for all parties involved. When the system has a direct positive impact on the individual's experience and access to services, it fulfills the core objective of the research. Additionally, it serves to eliminate both intentional and unintentional violations or procedural errors committed by service providers (local authorities, relevant agencies, and implementation bodies), while significantly accelerating and streamlining work processes, ensuring real-time performance and decision.

1. Introduction

Interrelation Between Engineering Sciences and Legislative Frameworks in the Context of Urban Development and Construction Regulation in Egypt Undoubtedly, engineering sciences in their various disciplines play an essential and impactful role in the development and construction of human settlements. While engineering encompasses all aspects of life, law operates in parallel [6] , scripting a shared narrative and forming an enduring relationship with engineering throughout the course of societal progress.

The lack of awareness or neglect of legal and legislative dimensions significantly undermines the effectiveness of engineering work and exposes

practitioners to risks ranging from structural failures, human casualties, and the loss of national wealth and heritage, to criminal and civil liabilities. Such negligence may also lead to the deterioration of the architectural and urban character of cities.

A historical review of the legislative framework governing construction in Egypt reveals a long trajectory of laws, beginning as early as 1889, spanning Khedival, Royal, and Republican eras. This culminated in Law No. 106 of 1976 concerning the regulation of construction activities, its subsequent amendments and military decrees, and finally the issuance of the Unified Building Law No. 119 of 2008 along with its executive regulations and amendments [1,2] .

To date, temporary zoning and building regulations remain in force in certain areas due to the absence of finalized detailed plans. Moreover, various Reconciliation Laws—notably Law No. 17 of 2019 (amended by Law No. 1 of 2020) and its executive regulations, as well as Law No. 187 of 2023—have been introduced to address the issue of unlicensed informal construction. However, these laws often contradict the Unified Building Law and its regulations, resulting in legal and administrative ambiguities [2] .

The proliferation of ministerial circulars, decisions, and varying building regulations—often unknown, forgotten, superseded, or conflicting—has further exacerbated operational confusion, leading to inefficiencies in implementation and accountability, disruption of urban development, and unjustified punitive actions against public servants and stakeholders.

In 2021, new building regulations were issued by the Supreme Council for Urban Planning and Development and approved by the Cabinet of Ministers in its session held on March 31, 2021. Based on these regulations, Circular No. 86 of 2021 was issued by the Minister of Local Development to all governors, introducing restrictive height limitations compared to previously issued permits. This resulted in erratic building skylines and considerable discontent among stakeholders due to reduced allowable building heights.

Additionally, the new system introduced Special-Purpose Units, primarily universities, responsible for issuing site validity reports and building permits in compliance with the new regulations, architectural typologies, and applicable controls. Subsequently, Ministerial Decree No. 296 of 2021 added Article 139 to the executive regulations of the Unified Building Law [4] , assigning responsibility to the Licensing, Inspection, and Monitoring Unit of the Armed Forces Engineering Authority to conduct final inspections and issue encrypted compliance certificates confirming adherence to occupancy permits, approved plans, and finished construction.

Reinforcing this, Ministerial Circular No. 55 of 2021 mandated that no utility connections be provided to any property without review and approval by the aforementioned unit. This shift from a centralized licensing authority to a multi-agency system significantly complicated the permit issuance process and lengthened procedural timelines.

In response to the controversies surrounding building height restrictions, another ministerial circular was issued, allowing citizens to submit applications for exceeding the newly established height limits. However, this process required meeting ten detailed conditions, highlighting the increasing procedural complexity and bureaucratic burden.

Later, Ministerial Circular No. 180 of 2024 introduced streamlined procedures aimed at facilitating citizen engagement [6,7]. It reduced the number of steps in the building permit issuance process from 15 to only 8 and abolished requirements such as:

- Submitting cadastral coordinate tables or officially registered ownership deeds for obtaining site validity reports.
- Submitting a registered title deed when applying for a building permit—only proof of ownership is now required.
- Review of permits by university special-purpose units.
- Review of permit applications by the governor-led committees at the governorate level.

Instead, permit applications and related documents are now reviewed by locally formed committees led by the heads of local administrative units. These reforms reflect a growing recognition of the impracticality and limitations of the previous building regulations and signal a move toward more efficient and citizen-centered procedures.

Moreover, the legislative landscape is further complicated by a series of complementary laws and codes related to construction and urban planning, including:

- Law No. 144/2017 on the rules for disposing of state-owned private property.
- Law No. 92/2018 regulating mobile food units.
- Law No. 154/2019 on public shops.
- Law No. 208/2020 on advertisements.
- Law No. 150/2020 regulating on-street vehicle parking.
- Law No. 10/1990 on expropriation for public benefit.

- Law No. 222/1955 on levying betterment charges due to public works.
- Law No. 140/1956 on public road occupancy.

Additionally, relevant Egyptian Building Codes include:

- The Code for Fire Safety and Prevention in structural design and implementation.
- The Code for Designing Public Spaces and Buildings for Persons with Disabilities.
- The Code for Safety Standards in Multi-Purpose Structures (Garages), among others.

Since the inception of construction-related laws and their complementary codes, the procedural workflow remains archaic and overly complex. A disjointed relationship between laws, executive regulations, circulars, and internal directives has led to procedural inconsistencies, erroneous decisions during permit evaluations [7] , and execution errors—all of which compromise the integrity of the urban development system.

In light of the foregoing, a set of fundamental citizen rights has been established with regard to the built environment and the right to live in a suitable, safe[9] , and sustainable urban context. These rights include:

- The right to urbanism (access to equitable and inclusive urban development).
- The right to participate in and manage urban planning processes and contribute to fair and sustainable urban development.
- The right to adequate housing.
- The right to access appropriate public services.
- The right to secure tenure, whether individual, collective, or cooperative.
- The right to public space.
- The right to equitable access to local and urban infrastructure and public services.
- The right to access information related to urban planning and land use.
- The right to cultural and architectural heritage.
- The right to a sustainable environment.
- The right to public transportation and free movement within the city.
- The right to a clean and healthy environment.

In parallel, the rights of public sector employees—particularly those tasked with implementing and overseeing urban development processes—must also be recognized and safeguarded to ensure the effectiveness and integrity of public service delivery[1,10] .

Before outlining these rights, it is essential to define the public service function:

The public (governmental) function is the set of responsibilities performed by public employees in the course of their duties. It is governed by administrative law, internal regulations, and ministerial circulars that reflect national policy frameworks. The efficiency of public service is directly tied to the competence and performance of public employees. Hence, improving public employee performance leads to institutional development and, ultimately, national advancement.

Accordingly, the rights of public employees must be seriously considered and ensured, including:

- Establishing a clear, organized, and controlled set of mechanisms and standards for each task assigned to the public employee.
- Incorporating employee feedback regarding job functions, including advantages and challenges.
- Ensuring continuous professional development and training, aligned with local and international technological advancements.
- Providing support systems and enabling tools necessary for employees to perform their duties effectively.
- Guaranteeing a fair and equitable compensation system, including monthly salaries and periodic incentives based on employee performance and task commitment.
- Maintaining a safe and healthy work environment, offering legal protection, and defining responsibilities and tasks precisely for each employee within their respective roles.

Based on the aforementioned context, and in pursuit of the objectives of this research, a proposed integrated system for a high-precision spatial database has been designed. This system aims to minimize procedural errors in handling citizen requests and to ensure their efficient and timely processing. Through this proposal, authorized personnel will have real-time access to all applicable laws, regulations, codes, ministerial circulars, and administrative directives,[12] thereby enhancing both compliance and performance.

The system is conceptualized as a Geographic Information System (GIS) with the following core components:

1. **Compilation and Storage of Comprehensive Urban Planning Data**

- Collecting and maintaining all spatial and planning data related to the **master plan**, **strategic development plan**, **detailed zoning plans**, and **officially approved subdivisions**, beginning with **Cairo Governorate**.
- Defining the **urban development vision** at the governorate level, in alignment with regional planning frameworks and Egypt's socio-economic development strategies.
- Identifying prioritized development projects, implementation phases, and assigning clear roles to relevant public and private entities involved.

2. **Maintenance, Analysis, and Integration of Property-Level Data**

For each property (building or unit), the system will store and update the following information:

- External visual perspective of the building, where available.
- Identification of distinguished architectural styles, if applicable.
- Verification of actual ownership and secure tenure.
- Current structural condition of the property.
- Issued permits and licenses.
- Administrative decisions (e.g., demolition orders, planning modifications such as density reductions, renovation, or demolition).
- Legal actions (e.g., stop-work orders, violation notices, and further procedures as per building regulations).
- Classification of public and private state-owned lands and vacant plots, along with the road network.
- Demographic and social profiling of residents per unit:
    - Population count,
    - Educational and health status,
    - Age,
    - Social condition,
    - Identification of uninhabited units.

3. **Geo-referencing of All Plots and Properties**

- Each land parcel or property, whether publicly or privately owned, will be identified by **precise geospatial coordinates** rather than addresses, which often vary across institutions.

4. **Linking Spatial Data with Legal and Regulatory Frameworks**

- The system will integrate spatial data with applicable laws, executive regulations, ministerial circulars, and both general and location-specific planning requirements.

Example 1: If a circular is issued suspending permits (building or demolition) in a specific area, the system will automatically disable interactions with that zone, ensuring full compliance and eliminating the need for manual communication of such decisions.

Example 2: If a directive is issued prohibiting public road occupancy in a given area, this restriction is immediately embedded in the system, which blocks any permit issuance attempts in those areas.

5. **Unifying Data and Real-Time Coordination Across Relevant Entities**

The system will establish **data interoperability and centralized integration** among all relevant and supporting institutions involved in administrative procedures, including:

- The **Presidency of the Republic**
- The **Cabinet of Ministers**
- Respective **ministries** (according to their jurisdiction), including:
    - The **Ministry of Local Development**
    - The **Ministry of Housing, Utilities, and Urban Communities** (and the Technical Inspection Authority for Building Works)
    - The **Supreme Council for Urban Planning and Development**
- **Spatial Monitoring Units**
- **Military Survey Authority**
- **Engineering consultancies**
- **Civil Aviation Authority**
- **National Organization for Urban Harmony**
- **Public Cleanliness Authority**
- **Armed Forces Operations and Engineering Authorities**
- **Egyptian Reinsurance Pool for Construction Civil Liability**
- **Engineers Syndicate**
- **Real Estate Registration Authority**
- **Ministry of Interior**
- **Utility service providers**
- **Civil Defense**
- **Real Estate Tax Authority**
- **Administrative and Public Prosecution Authorities**
- **Civil Registry**, and others.

Each institution would operate within its legal jurisdiction, with the system enabling **instant approvals, data retrieval, and decision-making**, based on the previously integrated datasets (per point 2), thereby reducing time to mere **verification and validation** rather than processing from scratch.

6. **Error Minimization**

When fully implemented, the system will significantly reduce the likelihood of human or

procedural error, potentially to near elimination, due to automated compliance checks and centralized oversight.

7. **Achieving Sustainability Through Digital Transformation**

The system promotes **sustainability** by adopting **electronic signature technologies** for all relevant personnel. No physical printing of plans, permits, or approvals will be required. Instead, the process will be fully digitized within a **centralized, non-fragmented electronic platform**, with clear **accountabilities and responsibilities assigned** to each entity and user based on role, ensuring traceability and regulatory compliance.

Based on the foregoing, the research has been structured into four main parts.

Part One: Introduction and Overview of Building Laws and Related Legislation

This section provides a theoretical introduction to the building laws in Egypt, along with the complementary and related legislative frameworks governing urban development and construction[13].

It includes the following key components:

1. **An overview of the historical and legal development** of building laws and regulations, as well as the legal instruments that complement or intersect with them.
2. **Identification of the characteristics and features** of building laws and regulations, including their legal, administrative, and technical dimensions.
3. **Definition of the main objectives** behind the issuance and enforcement of building legislation, such as ensuring public safety, sustainable urban growth, and protection of architectural heritage.
4. **Analysis of the key challenges and obstacles** related to the implementation of current building legislation and its associated laws.
5. **Examination of formal versus informal construction practices**, including an exploration of the underlying social, economic, and institutional causes of informality.
6. **Proposed solutions and interventions** to address the identified challenges in legal enforcement and compliance.

1-1 An overview of the historical and legal development of building laws and -regulations, as well as the legal instruments that complement or intersect with them.

Historical Evolution of Building Laws and Related Legislation in Egypt The development of building laws and their complementary and related legislations in Egypt can be traced back to approximately 1889, when the first Regulatory Law was issued to govern construction activities. This early regulation primarily addressed urban layout and building alignments. Over time,[1,15] these laws evolved through Khedivial and Republican eras, culminating in the issuance of Law No. 51 of 1940, which is considered the first legislation to comprehensively regulate building practices. This law was associated with the earlier organizational regulation issued in December 1889, which mainly focused on public roads and alignment lines. Law No. 51, however, expanded the scope to include building design and its integration with the surrounding urban environment.

Key provisions of this law included restrictions on building height in relation to street width, minimum floor heights, internal courtyards for ventilation and lighting, and fire safety measures—all aimed at ensuring the development of healthy and safe residential buildings and public spaces.

In parallel, Law No. 52 of 1940 was enacted to regulate land subdivision as a pre-construction planning phase. Later, Law No. 656 of 1945 was introduced to replace both the 1889 decree and Law No. 51 of 1940, consolidating them into a single legal framework. This unified law remained in force for nearly eight years and was subsequently amended several times to add more detailed technical requirements or modify existing ones for improvement.

Subsequent building laws reflected broader political contexts, governance structures, and even wartime needs. Law No. 45 of 1962 retained much of the content of its predecessor while introducing more detailed technical aspects such as street widths, building heights, setbacks, projections, and new standards for staircases and window openings to ensure construction quality[15,30] .

Then came the Building Regulation and Supervision Law No. 106 of 1976, which underwent multiple amendments from 1981 to 1992. Its executive regulations were issued via Ministerial Decree No. 237 of 1977, [29,30]containing comprehensive construction details. This law operated in tandem with Law No. 52 of 1940 on land subdivision until the latter was repealed and replaced by Urban Planning Law No. 3 of 1982.

In 1996, Law No. 101 was introduced to amend the 1976 Building Law, along with Law No. 107 concerning the Housing Projects Finance Fund. Over the years, various military orders, cabinet decisions, judicial rulings, and administrative circulars were issued, resulting in a complex web of interconnected legal instruments.

The 1976 Law and its amendments became entangled with other major legislations such as the

Civil Code, Penal Code, Tenancy and Real Estate Laws, Public Utilities Laws, Urban Planning, Public Procurement Law, Engineer Syndicate Regulations, Construction Contractors Union Guidelines, and technical codes issued by the Housing and Building Research Center. Additional intersecting authorities included Civil Aviation, Military Zoning, Antiquities, and others.

Eventually, these developments led to the issuance of Unified Building Law No. 119 of 2008 and its executive regulations. These were followed by specific building conditions tailored to different zones, many of which remain temporary due to the delay in issuing detailed local plans. Also, Reconciliation Laws, namely Law No. 17 of 2019, as amended by Law No. 1 of 2020, and later Law No. 187 of 2023, were introduced to address unlicensed and informal constructions.[19] While these reconciliation laws conflicted with the Unified Building Law, their declared aim was to provide legal solutions for existing unregulated buildings.

Complementary and associated legislations were also enacted, including: those previously stated.

In 2021, new building requirements were approved by the Supreme Council for Urban Planning and Development and endorsed by the Council of Ministers in its session on March 31, 2021. Subsequently, Ministerial Circular No. 86 of 2021 was issued by the Minister of Local Development to implement what became known as the New Building Permit System. However, in practice,[18] this system proved difficult to apply due to the complexity of the regulations and the insufficient training of licensing authorities. The new requirements imposed significant height restrictions and other conditions that conflicted with previous permit practices, disrupting the skyline uniformity and causing grievances among applicants.

Universities were involved in issuing site validity reports and building permits under these new regulations. Consequently, Ministerial Decree No. 296 of 2021 amended Executive Regulation No. 119/2008, assigning the Engineering Authority of the Armed Forces responsibility for final inspections and compliance certification. This was reiterated in Ministerial Circular No. 55 of 2021, which instructed governors not to provide utilities to any building unless certified by the Engineering Authority. This multi-agency approval process significantly complicated and delayed permit issuance.

To address issues caused by height restrictions, another circular from the Minister of Local Development allowed citizens to apply for increased height limits under specific conditions. The process, however, involved ten procedural steps, reflecting bureaucratic complexity.

Eventually, Ministerial Circular No. 180 of 2024 was issued to simplify the licensing process, reducing it from 15 steps to 8 and eliminating several documentation requirements, including notarized ownership contracts and geographic coordinates. It also canceled the role of universities and provincial committees in permit review,[20,28] delegating full authority to local unit-level committees chaired by the heads of local units.

This sequence of conflicting and overlapping laws, circulars, and decisions has led to a fragmented and inefficient system. Instead of consolidating procedures, the proliferation of uncoordinated regulatory instruments has produced legal and administrative confusion,[27,22] undermining the practical applicability of building laws and resulting in inconsistent implementation on the ground.

1-2 Identification of the characteristics and features of building laws and regulations, including their legal, administrative, and technical dimensions.

- The Building Law and its related legislations are implemented through legal instruments and mechanisms such as building, subdivision, and demolition permits, as well as certificates of compliance, all within the framework of the Master Plan for Urban Development and the Land Use Plan.
- The Building Law intersects with various branches of law—public laws such as administrative and criminal law, and private laws including civil, real estate, and commercial law. It also relates to other legal domains such as environmental and water laws, among others.
- The implementation of building legislation necessitates the involvement of multiple entities that cooperate to monitor individual actions and execute public processes.
- The construction sector is a fertile ground for legal disputes, due to the multiplicity of substantive and procedural rules governing it. This complexity leads to a wide range of conflicts. Private disputes fall under the jurisdiction of ordinary courts such as civil or commercial courts, while public disputes are subject to administrative courts.
- The Building Law blends private legal provisions, especially those relating to private property such as individual construction,[19] with public legal rules, given that the law also governs the role and scope of intervention of public

administrative authorities (the State) in the urban development process.

1-3 Definition of the main objectives behind the issuance and enforcement of building legislation, such as ensuring public safety, sustainable urban growth, and protection of architectural heritage.

- Identifying buildable land plots based on their type, location, and the manner in which they may be developed, as well as establishing the general rules that must be met by any construction in terms of specifications and the regulatory requirements it must comply with.
- Establishing rules and procedures to regulate and protect land use areas, whereby the Building Law defines standards for land occupation, whether through prohibition or by imposing specific forms of land utilization. Compliance with these standards is ensured through legal mechanisms such as building permits, subdivision permits, land division permits, and demolition permits, which are administrative documents issued by local authorities.
- Regulating the urban expansion of cities and eliminating informal (unregulated) construction.
- Ensuring a balanced distribution of urban development between national and local levels by encouraging urban decentralization,[16] thereby addressing spatial disparities and reducing urban congestion in cities at the expense of rural areas.
- Accordingly, the Building Law seeks to safeguard urban public order and aesthetic public order, i.e., the visual harmony and beauty of cities.

1-4 Analysis of the key challenges and obstacles related to the implementation of current building legislation and its associated laws.

The current urban planning legislations in Egypt are characterized by a complex and overlapping array of laws and executive regulations, headed by the Building Law and its Executive Regulation, as previously outlined in the theoretical framework. Upon further study, several challenges in the implementation of these legislations have been identified, including:

- The law does not account for population control in relation to the capacity of services that can be provided within a given area or city (e.g., educational, service, commercial, administrative, and other facilities). The application of building height regulations, based on the rule of "one and a half times the width of the widest adjacent street," allows for excessively dense construction, resulting in high population densities—particularly in the absence of detailed plans.
- The building permit procedures are excessively complex and burdensome, which has driven many citizens to resort to unauthorized construction to avoid the lengthy and bureaucratic process. Applicants face numerous stages: verifying property ownership documents, obtaining a site validity certificate based on planning and zoning criteria, and often confronting challenges due to the lack of a detailed plan for Cairo Governorate. Even when such a certificate is issued, additional approvals are required—such as from the Civil Aviation Authority, the Ministry of Antiquities (in certain areas), the Improvement Directorate, the Utility Mapping Center, utility companies, the Waste Management Authority, and the Armed Forces Operations Authority—all of which must be secured prior to license issuance. [22,24] This contradicts the required documents listed in Articles 112 and 115 of the Executive Regulation of the Building Law, which do not mandate all these approvals. However, these requirements are often imposed by ministerial or gubernatorial decisions rather than the law itself, leading to inconsistencies and confusion among administrative staff.
- The law fails to consider the traffic impact of the large population densities resulting from high-rise construction. As a result, many urban roads are insufficiently wide, barely accommodating pedestrian traffic.
- The law does not ensure sunlight penetration to all building floors—particularly the lower ones—as it neglects the angle of sunlight incidence. [26] This issue is exacerbated by height regulations and minimum courtyard dimensions required for ventilation and natural lighting.
- The legal procedures required for addressing a single building violation are lengthy and cumbersome, placing a significant burden on civil courts due to the multitude of associated legal cases.
- Fines imposed under the law, which are calculated as a percentage of the value of the violation, accrue daily without

suspension. This results in overwhelming financial penalties that make reconciliation or payment practically impossible. Moreover, other fines, such as those equating to twice the value of the violation, do not take into account social or economic circumstances.

- There is a clear mismatch between approved urban plans and the actual built environment, especially regarding existing street widths and land-use allocations.
- Land-use designations in master plans have become purely theoretical, as it is often impossible to implement subdivision projects in already fully developed residential areas. Such areas are typically owned by multiple individuals, making joint subdivision projects unfeasible. Consequently, no permits can be issued, and the unlawful construction remains unregulated.
- The law does not differentiate between urban and rural characteristics, applying the same regulations to both affluent urban districts and rural areas (e.g., El-Marg, Dar El-Salaam, Ezbet El-Nakhl). This uniformity makes implementation impractical in informal or village-like settlements. Moreover, no distinction is made in the legal procedures for violations inside versus outside the officially recognized urban boundaries.
- The building regulations fail to consider geographic and societal conditions, leading to widespread encroachment on public lands and a dramatic increase in informal and illegal construction.
- There is severe deficiency in the performance of urban planning departments across governorates, which has delayed the issuance of detailed plans. This has contributed to the acceleration of unregulated construction, [27] particularly in Cairo, rendering detailed plans ineffective as tools for legalization or resolution.
- There are significant obstacles in issuing permits for public utility projects located outside the official urban boundaries (e.g., water and sewage stations, electricity networks, grain silos, schools, hospitals), even though such projects are vital to the state's development goals.
- The relationship between urban planning authorities and related public entities is poorly coordinated, resulting in unclear roles, responsibilities, and rights.
- There is a lack of consistency and balance in urban development patterns, due to the application of uniform planning laws that fail to respect or define the unique urban character of different cities.
- Finally, there is a serious shortfall in the enforcement of planning regulations to improve the urban environment, with no binding or decisive provisions in place to implement urban development goals effectively.

1-5 Examination of formal versus informal construction practices, including an exploration of the underlying social, economic, and institutional causes of informality.

Lack of Alignment Between Population Growth and Urban Development Approximately one million housing units are constructed annually in Egypt—a remarkably high number when compared to the actual rate of population growth. Since the 1950s, three main sectors have been involved in housing production: the informal private sector, which constructs units without obtaining official permits; the formal private sector, which operates within the legal framework and builds after obtaining the required licenses; and the public sector, represented by various governmental bodies, agencies, and affiliated companies.

Among these three sectors, the informal private sector leads in housing production. It encompasses a wide spectrum of Egyptian society—both rich and poor, ranging from ordinary citizens to investors, small and large alike. In 2024, this sector accounted for approximately 77% of all newly built housing units, making it the dominant contributor to housing development.

In second place is the formal private sector, which was responsible for about 15% of total housing output. This category includes individual homebuilders as well as major real estate development firms.

The public sector ranks third, contributing around 8% of the total housing supply. This includes subsidized social housing programs in addition to thousands of units delivered through state-sponsored investment projects.

Annually, the Central Agency for Public Mobilization and Statistics (CAPMAS) conducts a census of the housing units constructed by the formal private sector [28,29] , the informal private sector, and the public sector. According to the data collected from 2000 to 2025, approximately three million buildings were constructed through informal and illegal means. These buildings are estimated to comprise several million housing units, as each structure contains between one to four units per floor, with an average building height of seven

to twelve floors, and in some cases exceeding fifteen floors. These figures are based on administrative violation reports filed by local authorities, as well as CAPMAS's annual housing surveys conducted by designated enumerators.

Additional data sources can also be utilized to estimate the scale of the informal private sector, using methodologies previously applied in the Housing Security Index within Urban Deprivation Indicators. The Ministry of Electricity and Renewable Energy annually reports the number of residential electricity subscribers. By analyzing the yearly increase in subscribers and deducting the number of units constructed by the formal private and public sectors, the remainder represents housing units added by the informal private sector.

Between 2008 and 2024, approximately 21.75 million housing units were constructed, of which 10.5 million units were attributed to the informal private sector, 6.5 million to the formal private sector, and 4.75 million by the public sector (excluding resettlement or relocation housing under urban development programs). These figures are derived from the number of electric meters—both legal and illegal—installed by electricity companies affiliated with the Ministry. A remaining fraction of units either illegally tap into the power grid or are recorded under electricity enforcement actions.

It is evident that the majority of housing development in Egypt is driven by the informal private sector. This phenomenon of informal construction has persisted for over six decades. The data reveals slight fluctuations in the contribution of this sector over the past ten years. In the three years preceding the January 2011 revolution, the informal private sector built approximately 2 million housing units—representing 57% of the total. This figure rose significantly in the subsequent three years (2011–2014), during which the informal sector constructed approximately 3.5 million units, accounting for 81% of the total, indicating a substantial surge[29,30] .

Following the revolution, formal sector production—both public and private—declined by around 22%. It later rebounded, particularly due to large-scale public housing projects initiated in 2017 through 2025 aimed at replacing informal settlements. The corresponding graph shows a marked increase in informal construction between 2010 and 2024, followed by a decline and then another increase. However, this rise could also be partially attributed to the Ministry of Electricity's increased responsiveness to applications for electricity provision to informal units, rather than reflecting a direct increase in construction activity itself.

In response, the Prime Minister issued Decree No. 886 of 2016—amended by Decree No. 231 of 2017—permitting the temporary installation of "coded" electric meters for buildings connected illegally to the power grid. This measure aimed to regularize electricity access without conferring any legal ownership or development rights to violators, pending resolution through legalization or enforcement actions. The Minister of Electricity and Renewable Energy was tasked with issuing the executive regulations for implementation[27,28].

1-6 <u>Proposed solutions and interventions</u> <u>to address the identified challenges in legal enforcement and compliance.</u>

- Scientific Foundations and Reform Dimensions in Urban Development

1- Scientific Referencing: This entails the adoption of legal formulations for methodologies specific to urban planning and development, based on in-depth studies and continuous scientific research aimed at eliminating errors, addressing weaknesses, and overcoming deficiencies on a sound scientific basis. This approach is essential to achieve the intended improvements effectively.

2- Comprehensiveness in Development: Development should encompass all levels of planning, building regulations, and the administrative procedures governing them.

3- Flexibility in Development: This involves adapting to spatial and temporal changes through the integration of new features or restructuring existing systems to achieve optimal and refined outcomes.

4- Appropriateness in Implementation: A thorough analysis of all emerging factors during the implementation phase is essential, with necessary adjustments made in response to any impacts that arise during execution.

5- Adoption of Modernity and Global Trends: Benefiting from the experiences of other nations that have made significant advancements in this field[22] .

- A comprehensive review of the previously approved general structural plan, a full evaluation of the implementation status of the accompanying detailed plans, an assessment of completion rates, and the identification of challenges that have hindered implementation—particularly the impact of urban legislation on execution delays.

- The definition of orientations for the new general structural plan, including its adoption of modern urban concepts that will reflect a development of current urban legislation, based on the analytical results of the planning study and used as a basis for legislative proposals.

Part Two: The Impact of Applying Building Laws and Related Regulations Using Conventional Methods

This section discusses the application of building laws as commonly understood and practiced in the current context. It begins by examining the general strategic plan and exploring the reasons behind the absence or inadequacy of such plans. Subsequently, it addresses the detailed plan, identifying the associated challenges and deficiencies.

It further analyzes the implementation of specific services in accordance with legal provisions and evaluates the shortcomings of such implementation when conducted through traditional approaches. These shortcomings often result in increased informal settlements and illegal construction.

The section also explains the mechanism of land subdivision projects, outlining the difficulties these projects commonly face. Additionally, it elaborates on the building permit process, starting from the issuance of the site validity certificate[15,23] , the challenges in obtaining it, the procedures for issuing building permits, and the subsequent execution steps.

1- Strategic master plan

Law No. 119 of 2008 includes regulations for identifying the needs and priorities of urban development at the local level within the framework of regional and local goals and policies, as well as proposing the necessary projects and an action plan to implement them.

The reasons for the absence of a strategic master plan can be attributed to the following:

- The lack of coordination between Cairo Governorate and the General Organization for Physical Planning (GOPP) in preparing the strategic master plan for Cairo.
- The absence of adequate financial allocations to support the development of the strategic plan.
- The lack of a clear and comprehensive database for the governorate, as well as the necessary strategic frameworks required for integration into the strategic master plan.

2- Detailed Plans:

The detailed plan serves as the executive framework for implementing building regulations, planning directives, and development programs related to land use and infrastructure within the boundaries of the approved strategic master plan for the city. It encompasses all integrated development projects, including urban design, land subdivision schemes, and site coordination proposals aligned with the strategic master plan. Detailed planning focuses on defining precise land uses within urban districts, proposing regulations for plot subdivision[16] , population and building density, construction standards for land parcels, road and sidewalk widths, pedestrian pathways, parking space layouts, types, locations, and areas of public service lands, and routes for public utility networks.

In practice, most districts of Cairo Governorate operate through approved subdivision projects authorized by the competent authority, which include street alignment plans, designated land uses, and detailed plans for certain areas and neighborhoods. Additionally, work is being carried out under temporary building regulations as well as the new licensing system adopted by the Supreme Council for Planning and Urban Development.

2-1 Challenges of Detailed Plans:

- In the absence of a strategic master plan, detailed plans are often developed in isolation from on-the-ground realities[11] , resulting in unregulated construction and the emergence of informal settlements.
- No clear construction requirements are set forth following the approval of detailed plans.
- Most detailed plans conflict with the physical reality due to the lack of comprehensive planning guidelines for the area.

  Example: Streets may be planned where buildings already exist on the ground with issued construction permits.

3- Land Subdivision Projects:

The Building Law regulates the approval procedures for land subdivision projects. According to the law, the relevant governor issues a decree—based on a proposal from the General Directorate for Planning and Urban Development—approving the land subdivision projects and their associated specific conditions. This includes the obligation to implement internal public utilities, or to modify these projects or the existing ones within the urban boundaries of a city or village, without exceeding the planning and building regulations set out in the approved strategic and detailed plans.

In accordance with Law No. 119 of 2008, the issuance of such a decree results in the designation of spaces allocated for roads, streets, squares, gardens, parks, and service facilities as public utilities. These conditions are considered an integral part of the subdivision decision[11,12] , and no amendments may be introduced to an approved or existing subdivision unless such modifications are

approved in accordance with the terms and conditions stipulated in the law and its executive regulations.

The law also stipulates that the request for subdivision approval in areas with approved urban plans must be submitted by the landowner to the local administrative authority responsible for planning and zoning. The application must be accompanied by the documents, drawings, and data specified in the executive regulations. The drawings or any amendments must be certified by engineers or specialized engineering offices according to standards issued by the competent minister. These standards define the qualifications required for engineers based on the size and significance of the subdivision projects, and outline the levels of specialized subdivisions that may only be prepared by specialized consulting engineers.

The administrative authority is obligated to make a decision on the approval request within a maximum period of three months from the date of submission of the required documents and drawings, in accordance with the procedures outlined in the executive regulations.

3-1 Challenges of Land Subdivision Projects:

- Lack of coordination among different subdivision projects in terms of street layout and internal divisions, which leads to overlapping and inconsistencies. Resolving these issues requires site inspections by the Survey and Budget Department within the General Directorate for Planning and Urban Development in Cairo Governorate, often resulting in the need for numerous amendment decisions to the original subdivision plan.
- The absence of clearly defined conditions following the approval of a subdivision plan leads to significant errors during implementation[22] . This opens the door to subjective interpretation by those applying the conditions on the ground and by inspection, oversight, and monitoring personnel, thereby exposing the implementer to accountability and claims of negligence.
- In many cases, the approval process exceeds the legally mandated three-month period and can take up to a year due to repeated modifications caused by the lack of a clear planning framework.
- Issues within the strategic and detailed plans become evident during the execution of land subdivision projects, due to inconsistencies between physical site conditions and what is outlined in planning documents.

4- Building Permit Procedures:

Challenges in Issuing Building Permits Prior to the Implementation of the New Building Permit System (Urban Planning and Building Requirements approved by the Supreme Council for Urban Planning and Development and endorsed by the Cabinet in its session dated 31/03/2021, pursuant to which Circular No. 86 of 2021 was issued by the Minister of Local Development to governors for implementation):

- Despite the approvals formally required by law, additional clearances were often demanded by authorities. These included approvals from the Supreme Council of Antiquities, the National Organization for Urban Harmony, the National Organization for Social Insurance, the Civil Aviation Authority, and utility companies (water, electricity, gas, wastewater), as well as the Cleanliness and Beautification Authority, the Improvement Contribution Department, and proof of registered ownership deeds for the parcel in question. These excessive requirements often resulted in significant delays in the permit issuance process—sometimes extending beyond a year—or even the practical impossibility of obtaining all the necessary approvals.
- These complications led to widespread difficulty in finalizing the approval process for building permits and site validity certificates. The research presents a cumulative inventory of demolition orders issued in relation to various legal frameworks over time. From the researcher's perspective[29,30] , the excessive procedural requirements and the multiplicity of approvals have deterred citizens from pursuing legal construction permits, leading many to opt for unlicensed construction instead.
- This cumulative inventory was compiled by the researcher and submitted to the Governor of Cairo to advocate for modifications in the implementation of the building permit system. The aim was to address the proliferation of demolition decisions resulting from the bureaucratic complexity of the permitting process, as well as the lack of clarity in data, plans, subdivisions, and associated regulatory requirements, all of which hinder efficient permit issuance.
- Moreover, the lack of integration between relevant government bodies further complicated the process, as inter-agency coordination relied heavily on formal correspondence. These communications often took months for responses and were at times lost or overlooked due to the volume and disorganization. In the researcher’s view, proper implementation of the new system, if executed as proposed, would resolve many of the administrative challenges currently facing the permitting process.

- Beyond the standard approvals previously mentioned, additional authorizations were often required, including those from the Supreme Council of Antiquities, the National Organization for Urban Harmony, the National Organization for Social Insurance, the Civil Aviation Authority, as well as all utility service providers (water, electricity, gas, sewage), the Cleansing Authority, and the Improvement Contribution Department. Furthermore, applicants were required to submit a notarized and registered deed for the property in question[26,27] . These cumulative requirements frequently led to significant delays—sometimes extending over a year—or rendered the issuance of building permits practically impossible.
- Residential buildings became strictly limited in their allowable height, abandoning the previous flexible guideline of allowing building heights up to 1.5 times the width of the adjacent street. This change resulted in a decline in interest among property owners to seek building permits under the new conditions, as it directly impacted the economic feasibility of construction.
- In cases where the applicant desired to increase the building height, they were mandated to submit a complete permit application to the Permits, Inspection, and Follow-up Division of the Armed Forces, along with compliance to a ten-step procedural checklist. This was in accordance with Ministerial Circular No. 239 of 2022, issued by the Minister of Local Development to all governors. This requirement significantly compounded the complexity of the process and discouraged many from proceeding with legal construction.
- The definition of a residential building, as per Law No. 119 of 2008, was strictly enforced, thereby prohibiting any commercial or administrative activities within such buildings[1,30] . This measure limited mixed-use development and reduced the attractiveness of residential projects from an investment perspective.
- The requirement of presenting a notarized and registered title deed became non-negotiable, further complicating applications for owners of inherited or informally held lands.
- There was a notable decline in the number of building permits issued, in comparison to pre-2018 figures, when permitting was more active and responsive.
- The decisions to suspend building permits, both new applications and previously issued ones, lacked comprehensive technical and legal assessments. Not only were new applications halted, but even permits that had been granted were suspended pending reassessment, including those under review but not yet approved—paralyzing the entire licensing system until further instructions were received.
- As a result of enhanced oversight and increased public awareness, there has been a significant reduction in the rate of unlicensed construction, reflecting a shift in enforcement policy, though the underlying issues with the licensing process remain unresolved.
- To further complicate the permitting process, Ministerial Decree No. 147 of 2024, issued by the Minister of Local Development to all Governors, mandated the reactivation of review committees for previously suspended building permits. This decree introduced a new condition: a minimum threshold of completed construction work—namely, the foundation and ground floor—must be met for construction activities to continue on buildings with pre-existing permits. Should the level of completed work fall below this threshold[1] , a new building permit must be obtained in accordance with the revised building codes.
- Furthermore, these review committees were instructed to limit their oversight to buildings consisting of a ground floor and up to four additional floors, while any building exceeding this height would fall under the jurisdiction of the Permits Division of the Engineering Authority of the Armed Forces for review and final approval. This new framework represents a direct violation of Law No. 119 of 2008 (Unified Building Law), particularly in cases where permits had already been issued and foundational work had commenced. According to Article 119 of the Executive Regulations of the law, excavation and shoring activities are *not* considered commencement of construction, whereas pouring the foundation does constitute a legal initiation of works[1] , thereby creating vested legal rights for property owners. The issuance of such restrictive decrees without thorough legal and technical consideration is likely to give rise to widespread legal disputes.
- Subsequently, Ministerial Circular No. 180 of 2024 was issued to the governors, outlining a simplified, citizen-friendly permitting process. It reduced the procedural steps for obtaining a building permit to 8 instead of 15, eliminated the requirement to submit a registered deed or coordinate table for the issuance of a site validity certificate[19,20] , and allowed applicants to submit alternative proof of ownership rather than a notarized contract. Additionally, the decree abolished the Special

Character Unit, which was previously responsible for permit review, and dissolved the governor-led provincial review committee, delegating responsibility to a local committee chaired by the head of the local administrative unit.

- The issuance of this circular clearly indicates a lack of realistic assessment in the initial development and enforcement of the new building codes. It also reflects legislative inconsistency, as regulations are being frequently revised or overturned in response to public discontent and procedural bottlenecks.
- Further complicating the regulatory landscape, Ministerial Decree No. 943 of 2024, issued by the Minister of Housing, Utilities, and Urban Communities, amended Articles 110 bis, 112 bis, and 117 bis of the Executive Regulations added by Decree No. 210 of 2021. These amendments repealed the authority of the Special Character Unit and reinstated the administrative unit as the competent entity for issuing site validity and building permits. This rollback further demonstrates the absence of a comprehensive strategic vision in regulatory reform and reveals a disconnect between policy formation and the practical needs of citizens seeking to navigate the permitting process.
- As a result, the system became overly fragmented, characterized by a proliferation of overlapping authorities and contradictory regulations. The continued issuance of circulars and ministerial decisions that conflict with the original building codes has created a state of administrative confusion, undermining the rule of law and weakening the public's confidence in the urban governance framework.

Part Three: Utilizing a Geographic Information System (GIS) for the Implementation of Building Laws and Regulations

- This section addresses the integration of a Geographic Information System (GIS) as a core tool for the enforcement of urban planning legislation and the enhancement of service performance. The aim is to **demonstrate the degree of development in service delivery** through the incorporation of all relevant spatial and administrative data into a unified digital system. This comprehensive dataset is made available to engineers and administrative authorities at the time of permit and license issuance[22] , thus **enabling more informed, accurate, and efficient decision-making.**
- A **pilot GIS-based system** was developed and tested in **Cairo Governorate** to assess its effectiveness in streamlining the issuance of all required permits and licenses. The system allows for the **real-time execution of legal procedures**, including the acquisition of external approvals from concerned authorities, which traditionally caused significant delays. Furthermore, the system incorporates **electronic signature functionalities** for all transactions[23], enhancing transparency, reducing paperwork, and minimizing the potential for administrative corruption or human error.
- By embedding legal and regulatory frameworks into the GIS platform, the proposed model **ensures automatic compliance** with planning and zoning requirements, building codes, and spatial constraints. This represents a critical step toward **digital urban governance**, facilitating seamless coordination among government entities, improving service efficiency, and laying the groundwork for a **comprehensive e-permitting ecosystem**.

3-1 **Activation of the Geographic Information System (GIS)**

The implementation of the Geographic Information System (GIS) plays a critical role in integrating urban planning and development processes. This is achieved through the systematic collection and storage of all data related to the general, strategic, and detailed urban plans, as well as officially approved subdivision layouts. The initiative commenced with Cairo Governorate as a pilot case to define a future vision for urban development at the governorate level, aligning with the broader economic and social development framework of the regional plan. This includes identifying proposed development projects, their priorities, implementation phases, and the roles of both public and private entities in the execution process.

3-1-1 Centralized Data Integration

An official meeting was held with the Governor of Cairo during which the research proposal, including the identified challenges and procedural inconsistencies—such as overlapping authorities, lack of data centralization, and contradictory administrative directives—was presented. The Governor approved the proposal for implementation on a trial basis within Cairo Governorate.

As a result, a pilot project was launched in collaboration with:

- The Network Information Center,
- The Digital Transformation and Technology Center,
- The Main Directorate for Spatial Change Management in Cairo Governorate.

A preliminary unified geospatial database was created, integrating **CAD and BIM source data** into a single geospatial environment through an internal digital mapping system. The system

employed **ArcGIS Indoors** software to enable access to the database, allowing precise identification of the target location for required actions, including:

- Building permits (new constructions, height extensions, or modifications),
- Site suitability certificates,
- Advertising permits,
- Public space occupancy licenses,
- Commercial activity permits,
- Informal building reconciliation processes,
- And other legally required administrative procedures.

This pilot project was applied to a proposed **industrial complex for the manufacture of solar panels**, owned by Cairo Governorate. The pilot demonstrated the practical feasibility of the research concept by showcasing a comprehensive, integrated, and real-time administrative process. This included obtaining external approvals, implementing digital signatures for all transactions, and enhancing decision-making based on accurate spatial data. The outcome confirms the potential for deploying such a GIS-based system to improve service efficiency and regulatory compliance in urban development.

Figure (5) shows the External Perspective View of the Proposed Solar Panel Manufacturing Plant (ArcGIS Indoors). The project was designed by the researcher as part of a collaborative initiative between Cairo Governorate and the Ministry of Communications and Information Technology. Initially, the data related to the proposed project site were collected and compiled. Subsequently, all relevant information concerning the selected location was stored. The site was chosen within the industrial zone of Helwan District, which is governed by the detailed plan issued under Cairo Governorate Decree No. 3914 of 2019. Plot No. A20 was selected, and the data related to this specific parcel of land—including building regulations and planning constraints—were entered into the system. The project was designed by the researcher as part of a collaborative initiative between Cairo Governorate and the Ministry of Communications and Information Technology. The system was accessed in the capacity of a standard user (citizen), utilizing a designated username and national identification number. Subsequently, the required service, namely, the issuance of a Land Suitability Certificate for the designated plot—was selected.

With the implementation of the system, the issuance of the "Site Suitability Statement from a Planning Perspective" is no longer necessary, as the building regulations and planning parameters are now clearly defined and visible to both the administrative authority and the concerned citizen, as well as the design engineer. The system also allows the engineer access to the project's application in order to review the general and specific building requirements for the land parcel and to upload the architectural and structural drawings related to the proposed project for review by the designated engineer from the competent administrative authority.

Once the design engineer completes the project drawings and uploads them onto the land parcel in the system, an automatic notification will be sent to the account of the administrative authority's reviewing engineer, prompting them to assess the uploaded plans against the applicable zoning and building regulations for the specific site. Subsequently, the administrative authority's engineer conducts a design review of the project in accordance with the general and specific requirements of the project, and then forwards it to obtain approvals from external entities through the accounts linked to the administrative authority's system.

Following the approvals from external authorities, which may take up to three days for each authority since the review is conducted through the system and the data and drawings are sent to these authorities immediately, the issuance of permits will therefore be completed within 10 to 13 working days, thereby achieving the intended objective of this process.

Subsequently, the building permit is issued with all relevant data, duly approved by the competent authority, and then delivered to the owner to proceed with submitting the supervision certificate and the construction contract in order to commence the project implementation.

This procedure equally applies to all services provided by the administrative authority, such as occupancy permits, advertising permits, excavation licenses, and other related services, which will be delivered in an expedited manner.

Upon completion of the project, the following data shall be recorded: the external perspective of the building; the actual ownership of the site; determination of the actual ownership of the building or unit ("secure possession"); clarification of the current structural condition of the property; issued permits; administrative decisions (such as demolition decrees or regulatory decisions including mitigation, renovation, or demolition); the possibility of initiating legal procedures including stop-work orders, violation reports, and demolition decrees in accordance with regulatory laws; identification of vacant lands, public and private state-owned lands, and all categories of roads. This data shall be accompanied by the

population count for each inhabited property or unit, as well as the identification of uninhabited units, in addition to the social, health, educational, and demographic information (including age) of each individual.

Applied Example for Issuing a Site Validity Certificate: Plot No. (A20), designated for the project and located in the Industrial Zone of Helwan District, has been subject to a decree issued by the Governor of Cairo prohibiting the issuance of validity certificates or building permits for certain plots of land, including the plot in question.

The governor's decree prohibiting the issuance of validity certificates or building permits for specific land plots is entered into the system using their respective coordinates. Consequently, when such a plot is selected, the system does not allow any processing for it, as it falls within the scope of the governor's decree.

After implementing the system and entering all site-specific data, with integration across all relevant entities — including the Spatial Variables Department, the competent police department, and the relevant prosecution office — the initiation of legal procedures can be executed promptly and in real time. Moreover, all data, requirements, and issued permits become clear and readily accessible to the engineer, thereby enabling accurate and well-informed decision-making

Figure (24) shows the Statement of Legal Procedures

General Recommendations of the Research At the conclusion of this study, the following recommendations are proposed:

1. Implementation of the proposed system, as outlined in this research, since it facilitates the completion of tasks and procedures required by the urban planning engineer. For example, issuing a building permit — which previously required up to a month — can now be completed in as little as three days, given that the system is integrated with all relevant, supportive, and complementary administrative authorities.
2. Establishment of a specialized prosecution office under the name "Local Prosecution," dedicated to local administrative units. Its mandate would be restricted to adjudicating the procedures concluded by the engineering departments of local units and ruling on reports filed regarding construction violations. This would expedite procedures, ensure timely issuance of final judgments against violators, and reduce the workload on the Public Prosecution.
3. Creation of a specialized department within each police station, tasked exclusively with implementing and supporting the outcomes of engineering departments in local administrative units, as well as executing final judicial rulings related to these departments. This department would collaborate with engineering staff to ensure effective enforcement of judicial rulings, akin to the role played by the General Administration of Electricity Police and the Tourism and Antiquities Police.
4. Limiting the issuance of regulations, legislations, administrative instructions, and organizational laws to only two authorities:
   - Cairo Governorate (following review by the General Administration for Technical and Engineering Inspection)
   - The Ministry of Housing, Utilities, and Urban Communities

   This recommendation addresses the current overlap of issuing bodies — including the National Organization for Urban Harmony, decrees by the Prime Minister, ministerial decisions across different ministries, gubernatorial decrees, and legislations from multiple state agencies — which has led to confusion among law practitioners. The original legal framework has been fragmented and conflicted with other regulations, often causing unintended errors by engineers in local units that expose them to legal accountability.
5. Through the application of the aforementioned measures, the time required to issue services would be significantly reduced, while providing engineers with full access to all relevant data and information regarding the plots under study, as well as the applicable laws, codes, and regulations.
6. Preparation of long-term plans and strategic visions should be prioritized, thoroughly studied prior to execution, and developed through continuous field surveys documented via Geographic Information Systems (GIS) for city neighborhoods and districts. These plans must reflect the needs and population growth of residents, consider social diversity, and be

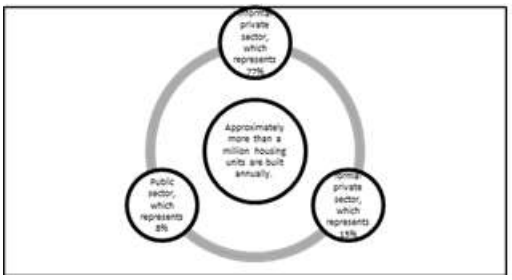

Figure 1 *Residential units implemented in Egypt during the period from 2008 to 2024. "Central Agency for Public Mobilization and Statistics"*

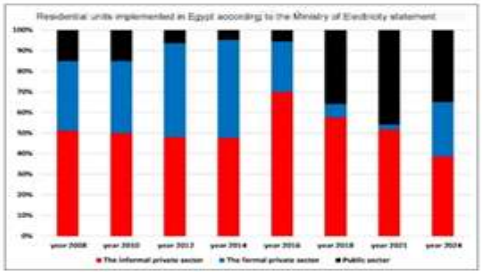

Figure 2 *Residential units implemented in Egypt according to the Ministry of Electricity statement*

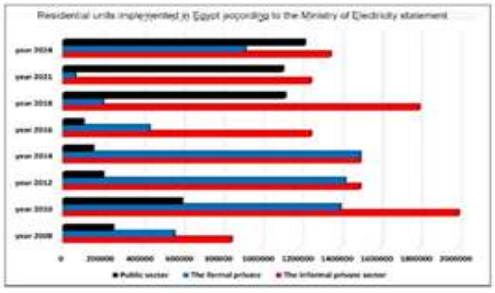

Figure 3 *Residential units implemented in Egypt according to the Ministry of Electricity statement*

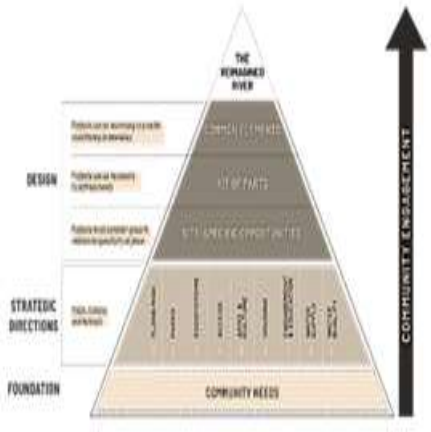

Figure 4 *Strategic plan steps proposed in collaboration with the General Administration of Planning and Urban Development in Cairo Governorate* [*24]*

regularly updated to align with the evolving social and cultural dynamics of the population and their ongoing needs.

Figure 5. *External Perspective View of the Proposed Solar Panel Manufacturing Plant (ArcGIS Indoors)*

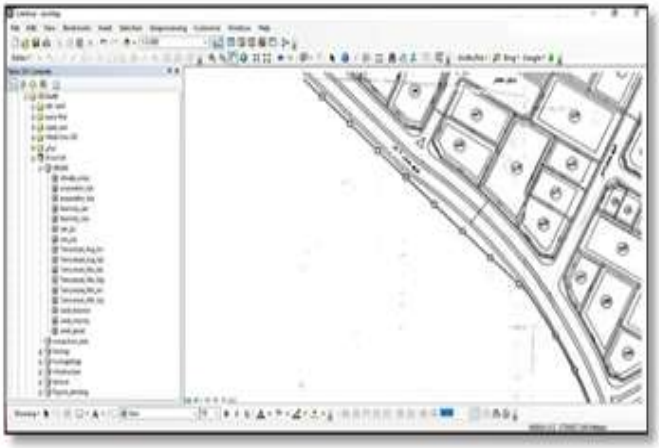

Figure 6 *Input of Planning Data and the Detailed Plan for the Site Under Study*

Figure 7. *The citizen's personal data, including full name and national identification number, were input into the system as part of the authentication and service request process.*

Figure 8. *Statement of services provided by the system.*

Figure 9 *Horizontal plan of the general site and ground floor of the project uploaded by the design engineer.*

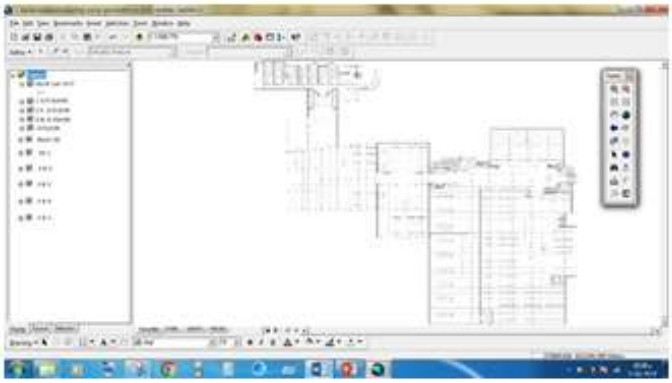

Figure 10 *Horizontal plan of the first floor of the project uploaded by the design engineer.*

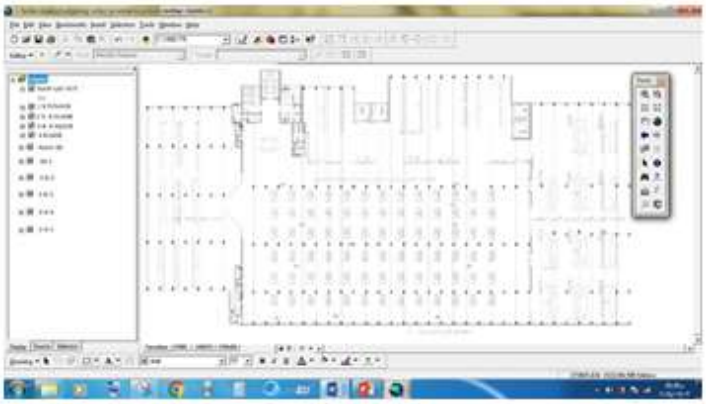

Figure 11 *Horizontal plan of the second floor of the project, uploaded by the design engineer.*

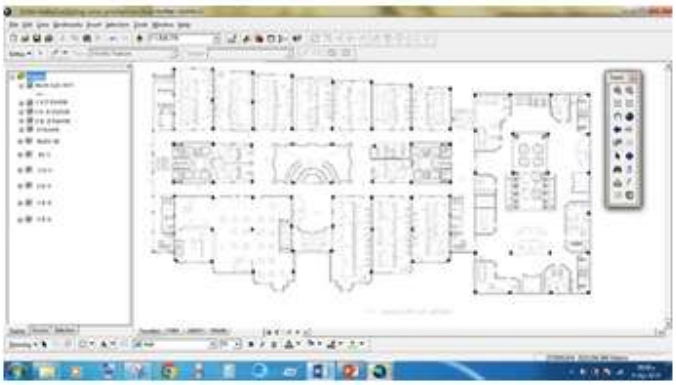

Figure 12 *Horizontal plan of the first floor of the project uploaded by the design engineer.*

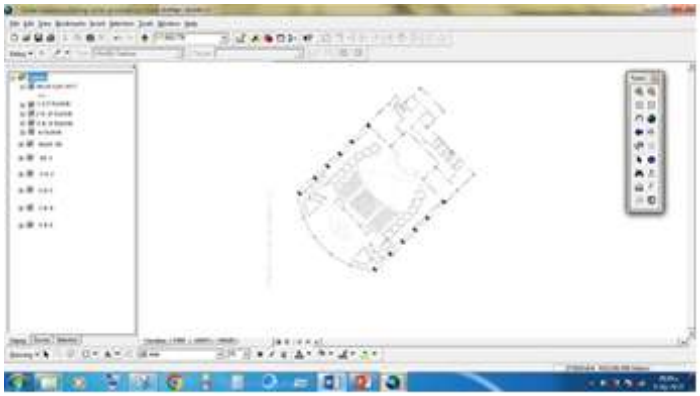

Figure 13 *Horizontal plan of the first floor multi-purpose hall of the project uploaded by the engineer.*

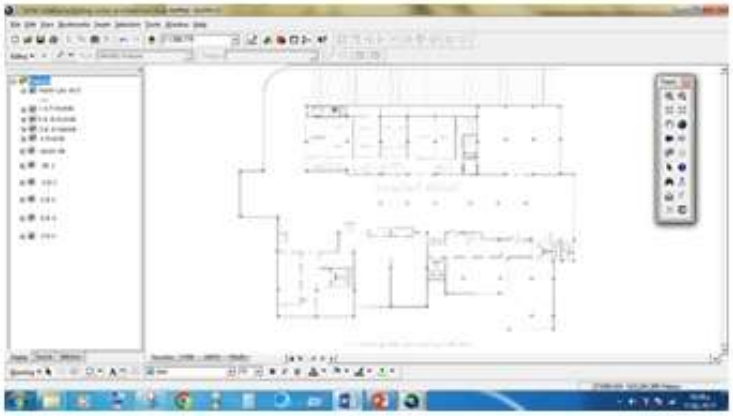

Figure 14 *Horizontal plan of the third floor of the project factory, uploaded by the design engineer*

Figure 15 *Horizontal plan of the ground floor of the hotel project uploaded by the design engineer*

Figure 16 *First floor plan of the hotel project, uploaded by the design engineer.*

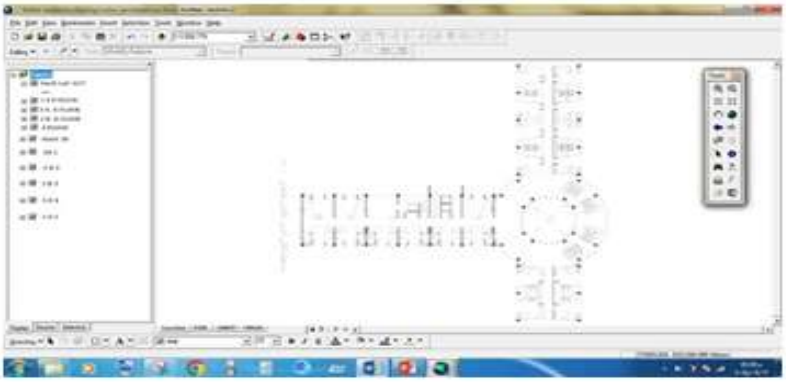

Figure 17 *Section (A–A) of the project, uploaded by the design engineer.*

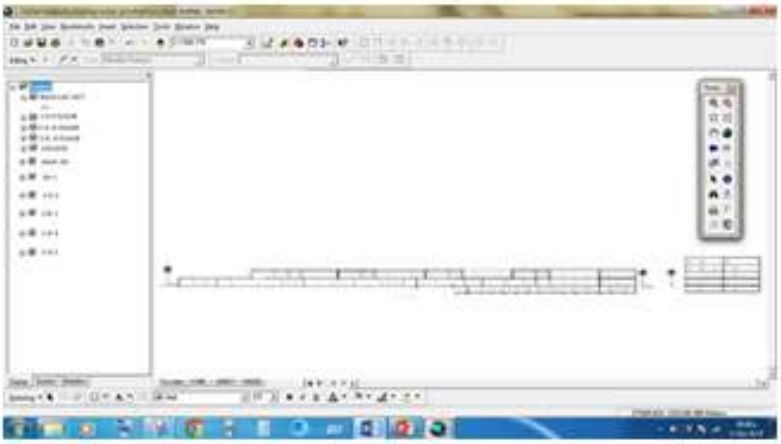

Figure 18 *Section (B–B) of the project, uploaded by the design engineer.*

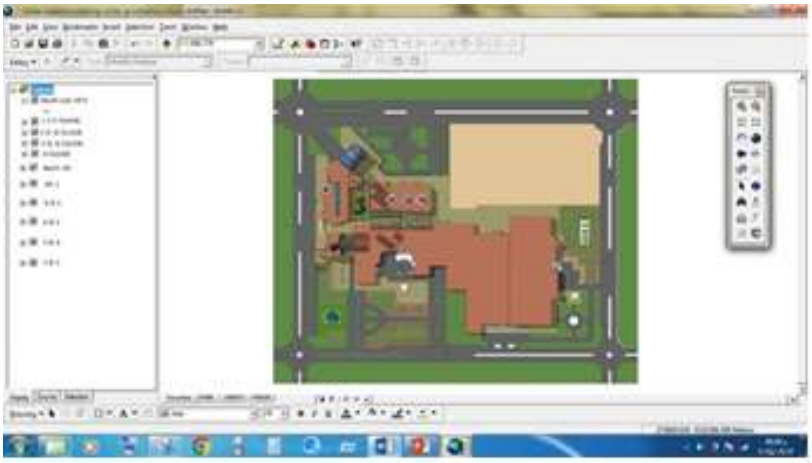

Figure 19 *General site plan of the project, uploaded by the design engineer*

Figure 20 *Main elevation of the project, uploaded by the design engineer.*

Figure 21 *Perspective view of the project, uploaded by the design engineer*

Figure 22 *Approvals from External Authorities*

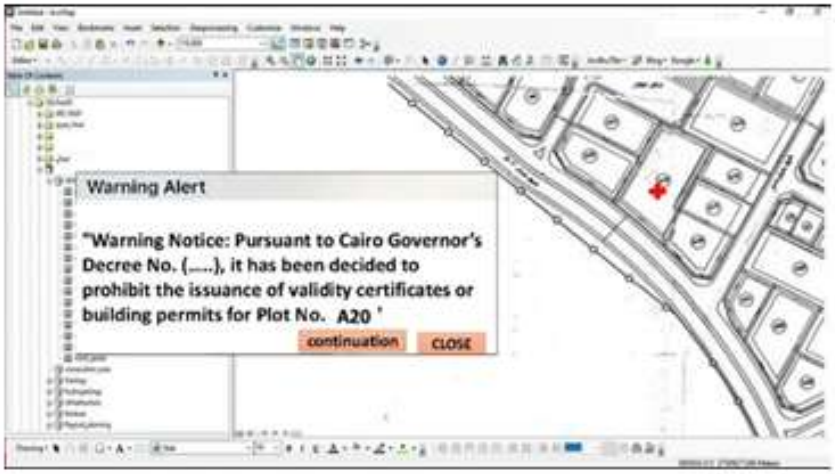

Figure 23 *Warning message in case of a plot restricted from transactions.*

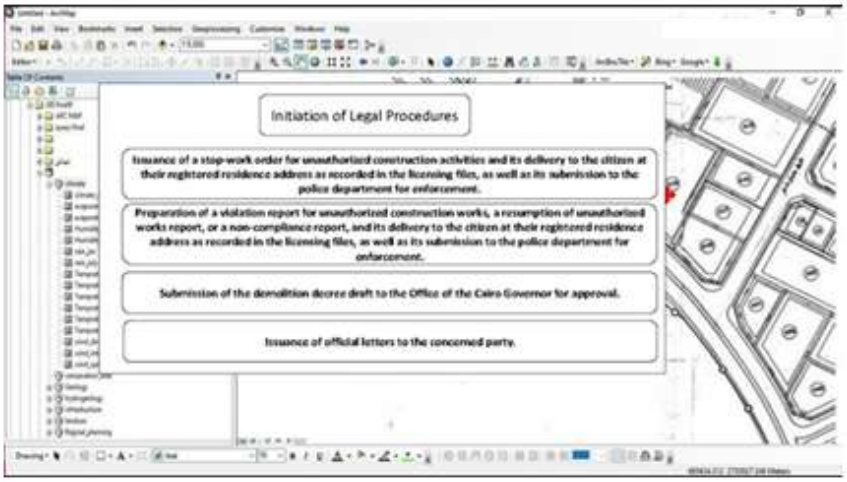

Figure 24 *Statement of Legal Procedures*

Author Statements:

- **Ethical approval:** The conducted research is not related to either human or animal use.
- **Conflict of interest:** The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper
- **Acknowledgement:** The authors declare that they have nobody or no-company to acknowledge.
- **Author contributions:** The authors declare that they have equal right on this paper.
- **Funding information:** The authors declare that there is no funding to be acknowledged.
- **Data availability statement:** The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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