



THE IMPACT OF EUROPEAN UNION LEGISLATION ON CADASTRAL SURVEYORS: A COMPARATIVE ANALYSIS AND RESULTS IN THE EUROPEA AND TÜRKİYE

* Orhan ERCAN 

*Ankara University, Applied Sciences Faculty, Real Estate Development and Management Department, Ankara,
TÜRKİYE*
orhanercan@ankara.edu.tr

Highlights

- In member countries, there are differences in conducting cadastral surveyor activities.
- Türkiye, exhibits differences compared to the European country averages in certain aspects.
- It is an important necessity to enact an EU law that each country can use to ensure uniformity in implementation.



THE IMPACT OF EUROPEAN UNION LEGISLATION ON CADASTRAL SURVEYORS: A COMPARATIVE ANALYSIS AND RESULTS IN THE EUROPEA AND TÜRKİYE

* Orhan ERCAN 

Ankara University, Applied Sciences Faculty, Real Estate Development and Management Department, Ankara,
TÜRKİYE
orhanercan@ankara.edu.tr

(Received: 26.09.2023; Accepted in Revised Form: 11.10.2023)

ABSTRACT: The task of keeping the cadastre up to date, which is as crucial as its establishment, is carried out by cadastral surveyors. The Lisbon Treaty has been a crucial development that has had profound effects on various professions in the countries that are members of the European Union. This shift is bolstered by measures and legislations that encourage open markets, simplify information sharing, and promote the compatibility of data, exemplified by initiatives like INSPIRE, the Bologna Process, and Small Act Business. This article undertakes an examination of the implications of European Union legislation on the field of cadastral surveying, encompassing a comprehensive analysis of various facets, including the levels of education required, the procedures for licensing and authorization, the duration of validity, affiliations, operational modalities, activities, quality control mechanisms, responsibilities, professional insurance, and the continuous professional development requirements for licensed cadastral surveyors engaged in post-cadastre services across Europe and Türkiye. The article includes a comparative analysis of cadastral surveying practices in European countries and Türkiye, and provides recommendations for completing legislative efforts aimed at achieving greater uniformity in European practices and addressing identified deficiencies within Turkish practices.

Keywords: EU legislation, Turkish legislation, Cadastral surveyors, Post cadastre activities, INSPIRE

1. INTRODUCTION

The surveying profession is a combination of legal, economic, environmental, societal and technological aspects. There are two important branches of our profession as land management and geospatial technologies and they are complementary to each other.

The concept of cadastre, which lies at the core of modern land administration, serves as the primary tool for parcel management, essentially encompassing the land registry. The potential of cadastres to enhance land management and contribute to effective governance is particularly pronounced in contemporary land administration, as highlighted by sources such as [1]-[2]-[3], and the International Federation of Surveyors (FIG) in 1995. There is a digital divide in terms of cadastre establishment and management depending on the development level of the countries and the constructive ownership approach. Effective Land Management Framework – FELA [4] and Integrated Geospatial Information – IGIF [5] documents prepared, which can be accepted as framework documents on land management by the United Nations (UN) within the scope of 2030 Agenda, with the motto "no one left behind", in order to close the digital divide between countries in terms of cadastre and geospatial data production. These documents can be a guide both for countries that have not been cadastre until now, as well as for countries that have had cadastre but need renewal.

In general, a cadastre comprises the geometric description of a parcel, alongside other descriptive information about the parcel, including ownership, value, development, and more [6]. A succinct definition of cadastre can be found in Article 1 of the Turkish Cadastre Law, which defines it as follows: Cadastre is the process of establishing the land register, as stipulated by Turkish Civil Law, based on the

country's coordinate system and using cadastral or topographic cadastral maps. Its purpose is to define the legal status of land properties, delineate property boundaries on maps, and lay the infrastructure for a spatial information system.

The land registry is a direct outcome of the initial cadastre, providing a comprehensive view of both the geometric and legal aspects of properties. In countries where legal cadastre is maintained, these records are managed under the responsibility of the state, in accordance with the principles of registration and clarity, in order to show the property details and related rights in a transparent manner.

The recent priorities in Europe, whether they are members or not, indicate an almost historical necessity for cooperation, collaboration, and enhanced alignment among countries. However, every surveyor is aware that the foundation of their profession, which comprises legal and technical aspects such as private property rights, spatial planning, etc., is the prerogative of each state.

It is known that both a cadastre and a land registry are in operation in European Union (EU) Member Countries. The majority of the cadastral systems are either centred around fiscal or legal aspects, while some are transitioning from fiscal to legal orientations. National Mapping and Cadastral Agencies (NMCA) hold a significant role in relation to the activities of cadastral and property surveyors, frequently acting as license providers, supervisors, and coordinators [7]-[8]-[9].

The cadastre functions as a dynamic system, emphasizing the ongoing significance not only of its initial establishment but also of keeping it up to date [6]. The responsibility for conducting post-cadastral survey transactions and ensuring the system's up to date is carried out by Licensed Cadastral Surveyors (Property Surveyors) who are authorized to act on behalf of the public in Türkiye, as in most countries in EU.

In Türkiye, some of the demand-driven (post-cadastre) technical tasks related to cadastre were initiated to be carried out by the Licensed Survey and Cadastre Engineers' Bureaus (LIHKAB), established by the law enacted in 2005 [10]. During the process, disputes arose between Free Survey and Cadastre Engineers (SHKM) and LIHKABs, especially regarding authority, responsibility, and market share, leading to a re-evaluation of the law. In 2021, a new LIHKAB law came into effect. Although the new LIHKAB law appears to have resolved disputes between LIHKABs and SHKMs, it has brought along other problems [11]- [12].

While the impact of EU regulations on the surveying field may appear complex, many professional surveyors across EU have discovered that practical limitations imposed by national borders are less significant. Several studies have been conducted to understand the provisions of EU laws concerning surveyors in cross-border operations, as well as the issues related to the ability of surveyors to work in the EU free market and how to address them. The Council of European Geodetic Surveyors (CLGE) conducted the Impact of EU Legislation on Cadastral Surveying in 2010 [8], European Requirements for licensed cadastral surveyors Activities studies and 2018 [8] with the aim of establishing consistency in the implementation of cadastral surveyors' activities within the EU by defining their scope, national conditions, and requirements. The study from 2018 [9] underwent subsequent revisions and expansions, culminating in the publication of all three studies mentioned.

In this article, the legal framework of cadastral surveying, activities of cadastral surveyors, the impact of EU legislation on cadastral surveying, and the national terms and conditions, as well as common characteristics of licensed cadastral surveyors within the EU, are discussed. A comparative analysis has been conducted on education level, licenses/authorizations, validity period, affiliation, modes of practice (civil servant, individual, company, etc.), activities, quality control, liability, professional insurance, sanctions, and continuous professional development for licensed cadastral surveyors in the EU and Türkiye. Recommendations guiding the practices have been presented based on the research findings. Information regarding the activities of licensed cadastral surveyors in the EU, as required for the study, has been sourced from CLGE publications within the scope of the study.

2. CADASTRAL SURVEYING WITHIN THE FRAMEWORK OF THE EUROPEAN UNION LEGISLATION

The EU is a system that was established with the 1957 Treaty of Rome and has progressively evolved. This system, the phenomenon of the EU, is a system of values. At the core of the EU values system, there is the concept of democracy, human rights, the rule of law, and a free-market economy that operates with institutions and rules. Built upon these foundations, the EU has gradually become a centre of attraction for the continent and, more broadly, for the world.

With the approval of the Lisbon Treaty in December 2009, the path towards a more transparent and democratic Europe was opened. Various initiatives, such as INSPIRE, e-governance, Global Monitoring for Environment and Security (GMES), and Public Sector Information, grounded in the European legal framework, were initiated to achieve these intentions. In these initiatives, there are principles that point to the freedom of movement of workers, the freedom to establish a business, and the freedom to provide services in Member States [7]- [8].

2.1. Legal Framework of Cadastral Surveying in the EU

Articles 39, 45, 43, and 49 of the EU Treaty establish the legal framework for the cadastral surveying profession in the EU. In addition to this, the Bologna Process [13]-[14]-[7], the Lisbon Strategy [7]-[15] for Growth and Jobs 2008-2010 and 2009-2014, INSPIRE [16], and the Small Business Act also have impacts on the profession.

In Figure-1, the cadastre, property, and land management system mentioned are professionally operated by Publicly Appointed or Regulated Property Surveyors, all of whom operate within a liberal profession [17]. This profession plays a significant role in countries where the legal transfer of cadastre and land registration duties to the private sector has occurred.

Property surveyors can be defined in the cadastral process as follows:

- Civil Servants are government officials who conduct cadastral activities on behalf of the state.
- Publicly Appointed Property Surveyors act as the state's representatives during the cadastral process, essentially working "on the state's behalf" in this context.
- Regulated Property Surveyors operate within the cadastral process under varying degrees of public legal regulations that may be more or less restrictive.

As shown in Figure 1, as announced in 2008 and 2018, Article 39 of the EU Treaty deals with employment in the public sector, excluding activities under state monopoly, and the freedom of movement (activities carried out by civil servants). Article 43 regulates the freedom to establish businesses through professional agreements involving mutual recognition (activities conducted by private sector professionals acting on behalf of government authorities). Article 45 concerns the freedom to establish businesses, excluding activities connected with official authority (activities carried out by publicly appointed professionals). Article 49 pertains to the freedom to provide services (activities are not regulated, employment is regulated by the free market) [7].

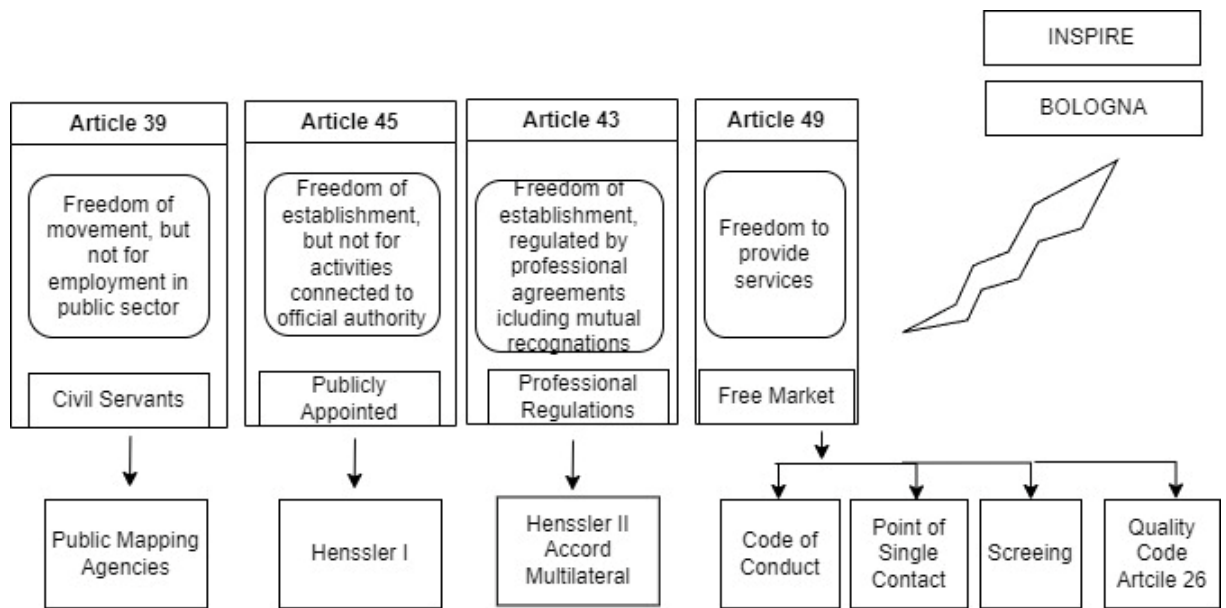


Figure 1. Context and impact of the Treaty establishing the European Community

Article 39 of the EU Treaty [16] grants freedom of movement to workers, excluding those in public services. This provision does not apply to employees in public services. The article also allows individuals to travel and work in another Member State and be treated as a national of that country.

Job-seeking surveyors (excluding public services) can freely move to other Member States and search for employment [18]. It is important to note that public service work is an exception for cadastral surveyors because in many countries, cadastral surveying activities are controlled by the government.

Article 45 of the EU Treaty makes an exception for activities related to "the exercise of official authority" apart from the right to establish a business. Article 45 refers to "activities" rather than "professions." Cadastral surveying carried out within the capacity of "Publicly Appointed Surveyors" on behalf of the State, based on national law, for the performance of specific activities, is interpreted as "exercise of official authority."

Article 43 of the EU Treaty provides the opportunity for surveyors to establish a business in another Member State under conditions similar to or the same as those granted to nationals of that State. These conditions include compliance with the professional rules, conditions, and qualifications in the host country. Directive 2005/36/EC on the "recognition of professional qualifications" provides guidelines for the interpretation of regulations in this regard [19].

Article 43 prohibits restrictions on the freedom to establish a business for nationals of one Member State within the territory of another Member State. This prohibition also applies to restrictions on the establishment of commercial agencies, branches, or subsidiaries set up within the territory of another Member State by nationals of any Member State.

The freedom to establish a business includes the right to start and operate as an independent worker and to establish and manage an enterprise, subject to the conditions established by the legislation of the host country, without prejudice to the provisions of the EU Treaty relating to capital.

Special qualifications, such as association memberships or supervision, allow a surveyor operating under the regulations/restrictions of a Member State to be part of a "Regulated Profession" under Article 43. Limitations within national laws may be acceptable, but they should not discriminate against other EU nationals; they should be appropriate, necessary, reasonable, and not overly restrictive. This aspect of the business is important for surveyors, particularly those covered by Article 45 - the exercise of official authority.

Any national of one Member State legally established in another Member State may provide services temporarily and occasionally with their professional qualifications without the obligation to meet the

qualifications of that State. However, service providers must also prove two years of professional experience if the profession is not regulated by that Member State.

The host Member State may request the service provider to submit a declaration, including details of insurance coverage and other documents such as a nationality certificate, a legal establishment certificate, and professional qualification documents, annually before providing any service within its borders.

Article 49 of the EU Treaty is important for surveyors because it offers the opportunity for activity in a free and unregulated market. Any service provided by Member States or private companies is subject to this directive. This article ensures the free movement of services between Member States and prohibits any restrictions on the provision of cross-border services (although certain qualifications may be required, as outlined in Article 43 and Directive 2005/36/EC) [19]. Services can be provided by both legal entities and individuals. Directive 2006/123/EC on Services is the relevant regulation in this regard.

2.2. Other Influences and Developments

The Bologna Process, aimed at creating the European higher education area [13]-[14]-[7], the Lisbon Strategy that shapes the structure and overall perspective of the EU economy [7]-[20], and the INSPIRE Directive that focuses on the collection and sharing of environmental spatial data among public institutions [21]-[7], along with the Small Business Act (SBA) recognizing the central role of SMEs in the EU economy, are among the developments directly affecting the cadastral surveyor's profession, among others. At the core of these efforts lie principles related to freedom of movement of workers, the liberty to establish enterprises, and the freedom of providing services across the Member States.

2.2.1. Bologna Process

The Bologna Process is a reform process aimed at establishing the European Higher Education Area (EHEA). The goal of the Bologna Process is to create a European higher education area by 2010. It aims to ensure that academic institutions in this area have comparable and compatible academic degree and quality standards across all of Europe. Based on the declaration signed in Bologna, Italy in 1999, three priorities were established: the introduction of bachelor's, master's, and doctoral degrees; quality assurance and recognition of qualifications; and finally, the study cycle. This commitment also entails professional quality assurance and recognition of engineers conducting surveying activities. Türkiye has been a part of the Bologna Process since 2001 [13].

2.2.2. Lisbon strategy 2008-2010

The Bologna process initiated a series of reforms in Member States. This process aligns with the program of the Lisbon Strategy for Growth and Employment and establishes cooperation between Member States and the European Community. According to the Lisbon strategy, a stronger economy will promote sustainable development and social inclusion, along with social and environmental policies that encourage job creation. The Lisbon Strategy aimed to address the low productivity and economic growth stagnation in the EU, and it included the formulation of various policy initiatives to be implemented by all EU member states.

Between 2000 and 2010, the Lisbon program focused on advancing collaboration and promoting growth and employment. By adopting the Small Business Act to facilitate the potential growth of small enterprises and improve innovation conditions, the European Community supports the free movement of knowledge across all of Europe [30]-[7].

This open-market approach is related to the field of surveying. Open real estate markets are crucial for the development of a single market in Europe. Effective and efficient cadastre and land registry processes will significantly contribute to the objectives of the Lisbon Agenda.

2.2.3. INSPIRE Directive

The directive 2007/2/EC of the European Parliament and the Council dated March 14, 2007, established the Spatial Data Infrastructure (INSPIRE) in the European Community. The INSPIRE directive outlines a general framework for the Spatial Data Infrastructure, which is intended to serve the environmental policy objectives of the European Community. This directive has a focus beyond national borders. INSPIRE is based on and operates through the spatial data infrastructures established and maintained by the 27 Member States of the EU, addressing 34 spatial data themes necessary for environmental applications [21].

The INSPIRE Directive has requested that Member States commit to ensuring the compatibility and usability of their spatial data infrastructures within the Community and in a cross-border context by adopting additional legislation or common Implementing Rules (IRs) for certain specific areas, as follows:

1. Metadata
2. Interoperability of spatial data sets and services
3. Network services, e.g., data discovery and service viewing
4. Data specification and data and service sharing
5. Monitoring and reporting of services

The impact of the INSPIRE directive on cadastral surveying will be significant, as Member States are only required to expose the data they already possess, without any obligation to collect new data.

2.2.4. The Small Business Act

The Small Business Act (SBA) demonstrates the Commission's political will to acknowledging the pivotal role of Small and Medium-sized Enterprises (SMEs) within the EU economy by establishing a policy framework. Its primary objective is to enhance the overall approach to entrepreneurship and promote the principle of prioritizing small businesses in policy-making, spanning from regulations to public services. Its aim is to provide support to SMEs in addressing challenges that impede their growth. Across Europe, the SBA is applicable to all independent companies with fewer than 250 employees, encompassing 99% of all European businesses.

In some countries, the SBA can significantly influence various surveying activities and licensed surveyors/companies.

2.3. Impact of EU Legislation on Cadastral Surveying

Effective cadastre highlights land ownership, land value, land use, and land development matters for all individuals, aiming to enhance trust and confidence in real estate property, promote security, safety, peace, and peace-building, stimulate real estate markets and the construction sector, facilitate economic development through fair income systems, play an essential role in the development of states and economies by establishing preparedness, resilience (in the face of increasing climate sensitivities), sustainable consumption, and strong institutions [4]. The establishment, maintenance, and adaptation of cadastral systems at the country level must align with local conditions, changing global contexts, and evolving political, technological, economic, environmental, and societal landscapes. It is precisely at this point that the activities and applications of licensed cadastral surveyors will lead the way in this change and transformation.

The CLGE is a non-governmental organization that represents and supports the interests of the geodetic surveying profession in the private and public sectors in Europe [22]-[23]-[17]-[13]-[24]-[2]. The CLGE representing the majority of the geodetic surveying profession in Europe.

2.3.1. Cadastral Surveyors Activities in EU Countries

Cadastral surveying activities are typically regulated by the State and are only allowed to be conducted by licensed (authorized) individuals. Professional standards and qualifications for Publicly

Appointed and Regulated Surveyors vary across European countries. The main activities performed by EU Cadastre surveyors are defined under eight main headings [7]-[8]-[9], these are:

- i. Cadastral (technical) field measurements
- ii. Marking parcel corners
- iii. Providing advice/consultation to landowners
- iv. Certification, approval of cadastral plans obtained from relevant authorities
- v. Land valuation
- vi. Recording of updated cadastral data into cadastral databases
- vii. Defining land use restrictions
- viii. Preparation (correction) of land planning documents

2.3.2. The national terms-conditions and common characteristics of cadastral surveyors within the EU

There is a Cadastre and Land Registry in all EU member states. Just under 62% of countries have a single authority, while approximately 33% of them maintain separate authorities for overseeing both Cadastre and Land Registry. In some countries, cadastral work is ongoing, and a portion of the country has not yet been cadastrated. National Cadastre (and Mapping) and Land Registry Institutions play a significant role as providers, supervisors, and coordinators in cadastre and cadastral surveying activities.

Certain countries, including Norway, Spain, and Sweden, do not have a system for licensing cadastral surveyors. In these nations, the responsibilities of cadastral surveying are fulfilled either by employees of a NMCA (e.g., Sweden), municipal bodies (e.g., Norway), or through individual contracts with public authorities (e.g., Spain). The operational status of licensed cadastral surveyors is depicted in the Figure-2.

The guarantee of land ownership is a fundamental element for a stable and prosperous society as well as a modern economy. Europe's Cadastre and Land Registry organizations have long provided such secure, reliable, and authoritative information. In member countries, cadastral property measurements are carried out by public servants, publicly appointed surveyors, licensed cadastral surveyors, and unlicensed professional surveyors registered with the relevant professional association. Figure-2 indicates that 22% of cadastral surveying are conducted by public servants, 17% by publicly appointed surveyors, and 13% by surveyors registered with the chamber but without a license. Additionally, Figure-2 shows that 42% of cadastral measurements are carried out by licensed cadastral surveyors. These results demonstrate the absence of a standardized approach in European practices.

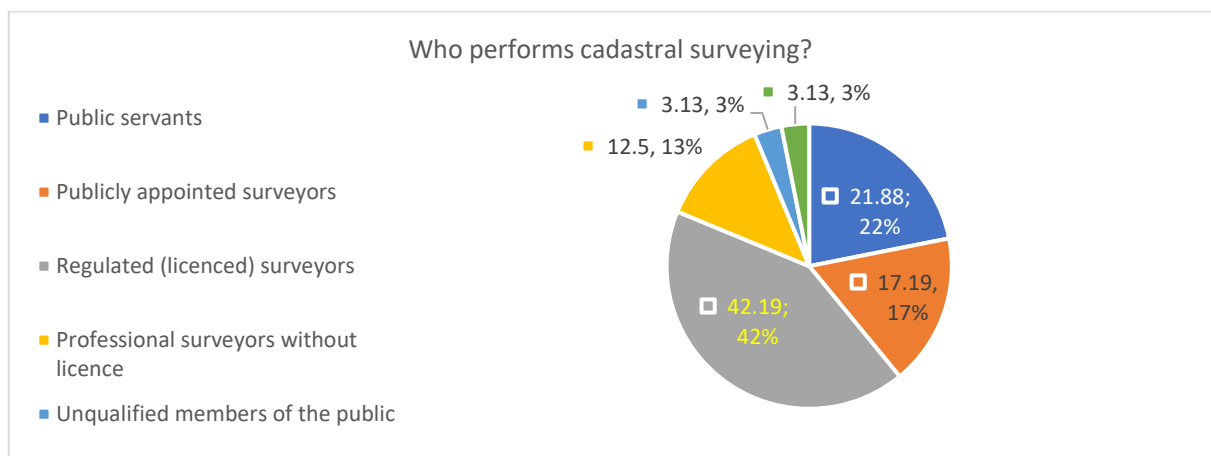


Figure 2. Who performs property surveying?

The number of surveyors in a country depends on the size of the market and the volume of work it generates. For example, in Balkan countries, as a result of the granting of property rights, there has been an increase in cadastral projects, and spatial planning, construction work, and real estate markets have

started to develop. As a result, the number of surveyors in these countries is higher than the number of cadastral surveyors in Western European countries, as can be seen in Figure 3. Countries such as Poland, Romania, Bulgaria, Greece, Latvia, and Serbia have a relatively higher number of licensed cadastral surveyors.

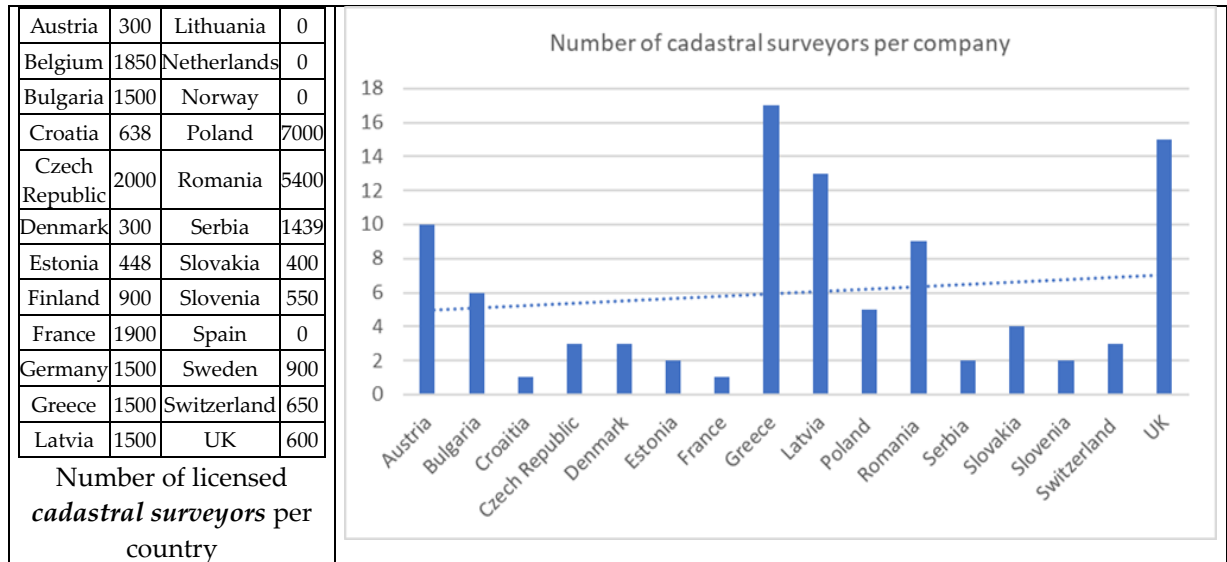


Figure 3. Number of licensed cadastral surveyors and licensed companies

Due to market conditions, the workforce intensity per licensed firm varies; small firms employ 1-2 licensed cadastral surveyors, while medium-sized firms (SME) employ 10-20 licensed cadastral surveyors (Figure 3). The level of development of cadastral systems in member countries varies depending on the development of their economies and real estate markets. This situation affects the number of cadastral surveying companies in each country (Figure 4). In some countries, cadastral surveying is a public task, and licensed companies do not exist in those countries (for example, Sweden and Finland). In other countries, individuals are licensed, and the licensing status of companies is not considered separately (for example, Germany).

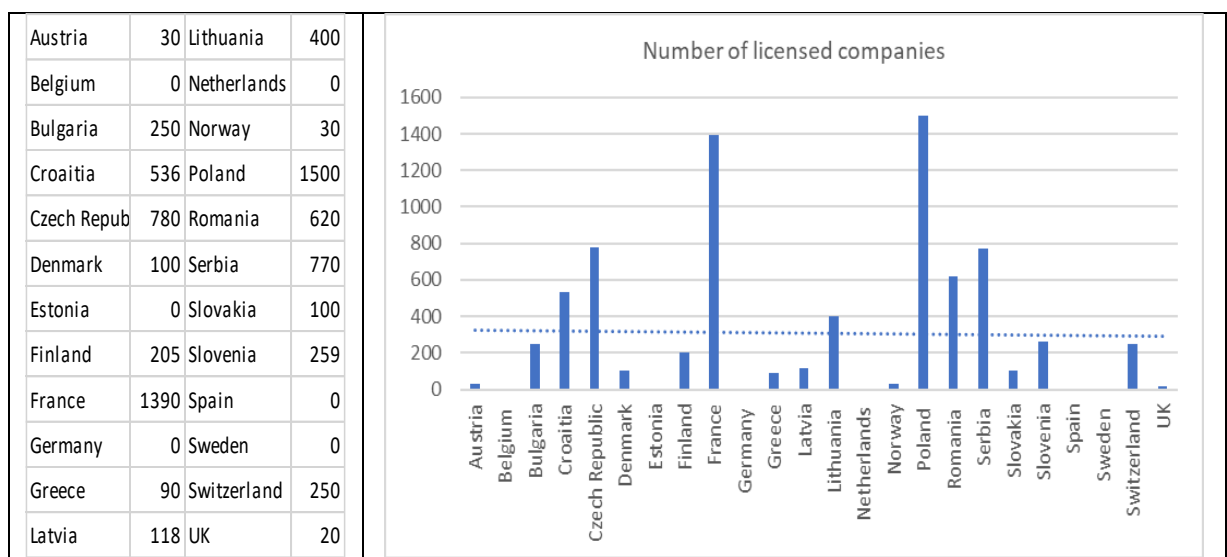


Figure 4. Number of licensed companies

In licensing (authorization) requirements (Figure 5), it can be observed that there are different conditions across Europe. Generally, the minimum requirements for Surveying Engineers applying for a

license typically include education in geodesy (or related fields) and a specified period of professional experience. Common requirements for a license in Europe: university education and professional practice.

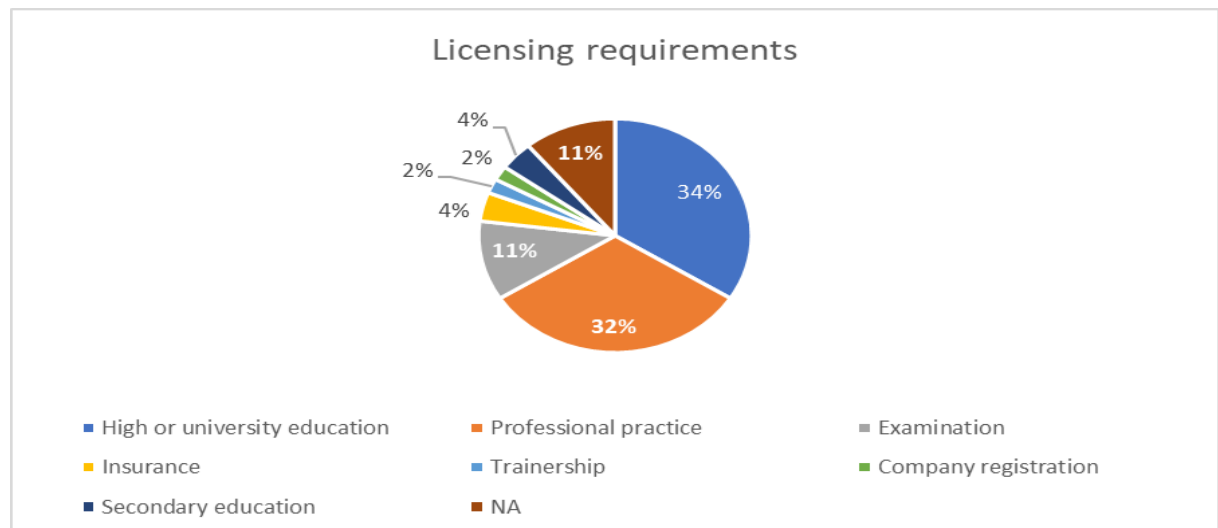


Figure 5. Licensing (authorisation) requirements

Usually, NMCA's or Chambers of Surveying Engineers provide licenses. In cases where Surveying Engineers are employed by NMCA's, a separate licensing is not required. However, in some member countries, licensing is provided in collaboration between the Ministry and the Chamber of Surveying Engineers (Figure 6).

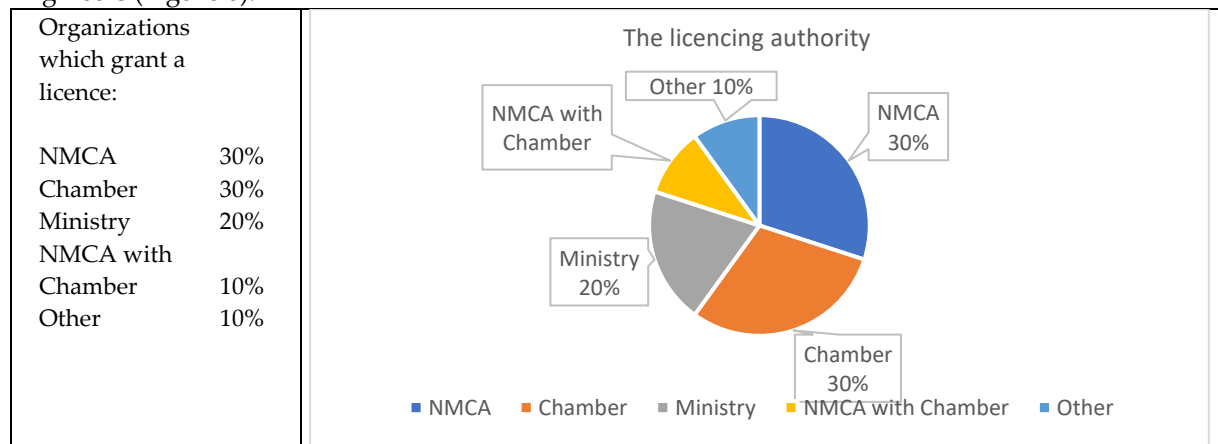


Figure 6. Licensing authorities

NMCAs, authorized to oversee the management of national cadastres and land registries, maintain a continuous interest in the work carried out by surveyors engaged in cadastral activities. These activities serve as the foundation for the cadastral database in numerous countries. In addition to data collection, the majority of respondents also noted that NMCAs are involved in various other responsibilities. These include coordinating the activities of licensed cadastral surveyors (Figure 7), quality control (Figure 8), supervising surveying activities (Figure 13), conducting training programs (Figure 15-16), and managing sanctions (Figure 14). In member countries, it can be observed that quality control is carried out to a significant extent by NMCA (49%), followed by Ministries (15%), Chambers (15%), and local authorities (12%) (Figure 8).

Continuous quality control is implemented for the activities of licensed cadastral surveyors, except for those serving as public servants in public organizations. In countries following a blended approach, both private licensed cadastral surveyors and government employees must adhere to identical regulations and be registered with or affiliated to the same register or chamber.

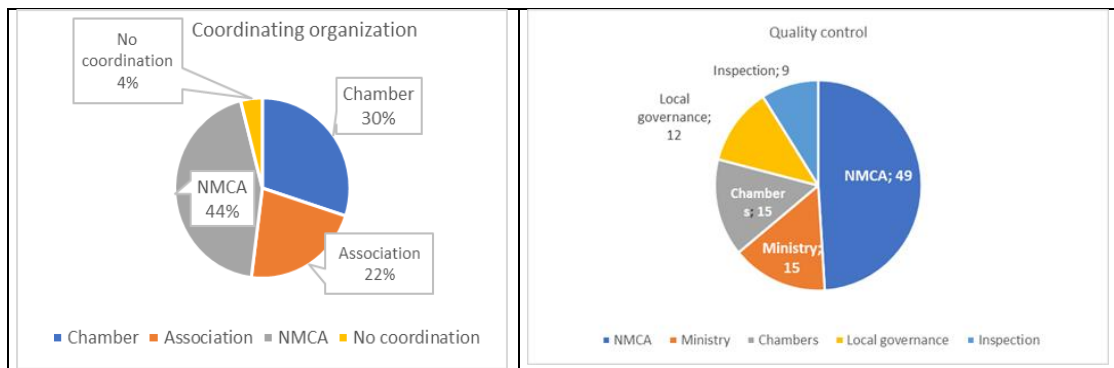


Figure 7. Coordinating organization

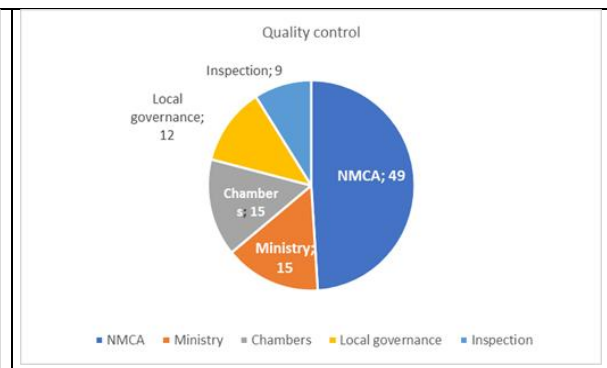


Figure 8. Quality control

The majority of licensed cadastral surveyors' bear liability for both their property surveys and the production of cadastral data. In Figure-9, liability is depicted in the data produced by cadastral surveyors. In all countries that responded to this question, it is observed that the responsibility is 5 years or more in duration, with approximately 78% indicating a duration of 10 years or more. The trend towards a mandatory insurance is growing. It has been observed that the responsibility for quality and accuracy lies with the cadastral surveyor in 75% of the member countries (Figure 9 and 10).

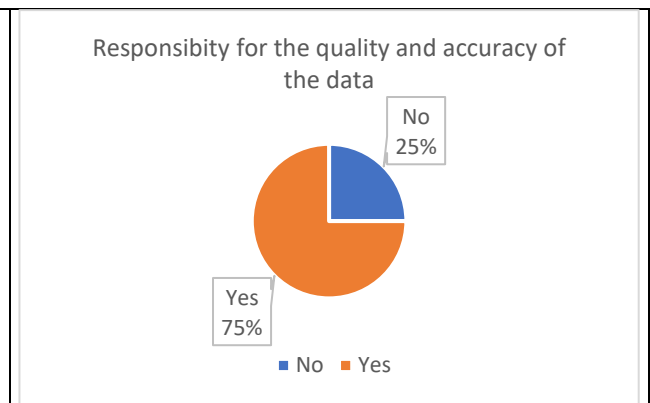
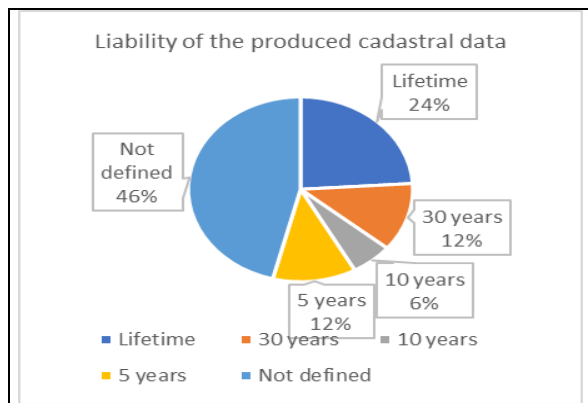


Figure 9. Liability of the produced cadastral data Figure 10. Responsibility of quality and accuracy

Compulsory insurance applies only to private licensed cadastral surveyors. State guarantees apply to the activities of Publicly Appointed Surveyors according to national public procurement conditions. Therefore, additional insurance is not necessary. Compulsory insurance terms and coverage may vary. For instance, errors in cadastral documents can be handled in different ways, such as addressing damage caused by licensed cadastral surveyors to a third party's property (e.g., fence, sidewalk, etc.). Figure-11 demonstrates that a significant amount of compulsory insurance is required for the license.

Throughout Europe, there is no common practice regarding the compulsory duration of practical experience that a cadastral surveyors must undergo before obtaining a license (Figure 12). The compulsory professional practice period varies between one and five years, typically around two or three years. In countries where licensed cadastral surveyors work as employees of the NMCAs, the compulsory professional practice period has not been defined.

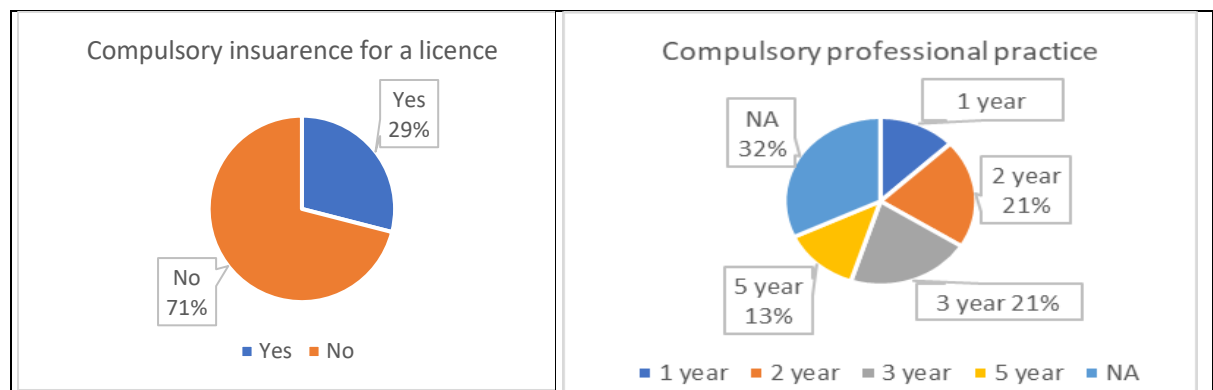


Figure 11. Compulsory insurance for licence

Figure 12. Compulsory professional practice

The supervision of licensed cadastral surveyors' activities is generally carried out by NMCAs (49%). Additionally, the Ministry, Chamber, and municipalities are also among the regulatory bodies (Figure 13). In the majority of the countries, sanctions continue to be enforced by the State Agency or chamber. The types of sanctions mainly include suspension (27%), termination (25%), fine (23%), and notice (27%). Extra training is also among the applied sanctions. The rate of resorting to court within the scope of sanctions is around 5% (Figure 14).



Figure 13. Supervision of licensed cadastral surveyors' activities

Figure 14. Sanctions

The common requirements for licensing of cadastral surveying activities are a high or university education in geodesy and related disciplines followed by a period of professional practice. In many countries, there is a state examination at the end of the traineeship. It appears that the mandatory Continuous Professional Development (CPD) experiences an increasing trend since it is required in more and more countries (Figure 15). Universities and high schools mainly provide training and education to licensed cadastral surveyors, but chambers and associations play an important role organising training courses and raising qualification (Figure 16).

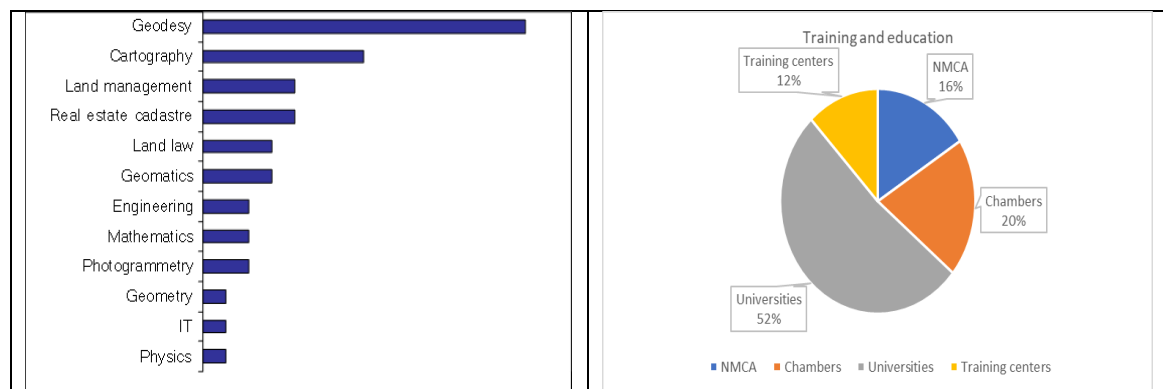


Figure 15. Disciplines for education

Figure 16. Training and education

3. LICENSED SURVEY AND CADASTRE ENGINEERING BUREAUS (LIHKAB) AND CADASTRAL SURVEYORS IN TÜRKİYE

3.1. The legal framework and practices of the cadastre system in Türkiye

The highest legal norm governing ownership rights in Turkish law is the Constitution of the Republic of Türkiye. As outlined in the Constitution, individual possesses ownership and inheritance rights which may only be limited by laws in the interest of the public. The exercise of ownership rights must align with the public interest (Turkish Constitution, Article 35). Within the Turkish legal framework, the official land register is subject to state supervision and responsibility, and it records the legal status of real properties. The sole authority for land registration and land registry transactions related to real property in Türkiye is the (TKGM).

Cadastral parcels are demarcated by official boundaries and are assigned unique parcel numbers to establish precise land boundaries. In the cadastre system implemented in Türkiye, known as the judicial (legal) cadastre, there are typically two components. The first component is a written record containing information about the owner of each parcel and other details, such as rights, responsibilities, and restrictions related to the parcel. On the other hand, the second component encompasses a detailed demarcation of the parcel in the form of cadastral maps (plans) and field survey documents cross-referenced with the first part. The legal cadastre assumes that the boundaries of the parcels registered in the land book during the establishment of the cadastre were ensured by cadastral maps, which are an integral part of the legal cadastre [25]. In Türkiye, the initial cadastre has been completed. As of the year 2023, there are approximately a total of 58.8 million cadastre parcels, and the cadastre of more than 15 million rural parcels has been renewed with the participation of the private sector. Land registration transactions have been conducted through the Land Registry and Cadastre Information System (TAKBIS) since 2005.

3.2. Licensed Survey and Cadastre Engineers and Bureaus (LIHKABs)

LIHKAB's are bureaus that operate on behalf of the public. Surveyors who meet the necessary requirements are authorized to work on behalf of the public with the license certificate they receive. The work they perform is considered a public service, and their activities are viewed as serving the public interest.

According to Law No. 5368, certain cadastral technical procedures that were previously monopolized and guaranteed by the state have been delegated to licensed bureaus established by law. These bureaus are granted both construction and control authority and responsibility. Therefore, the TKGM, being the primary entity responsible for public service, exercises superior monitoring and supervisory authority over these licensed bureaus, maintaining its responsibility. In this context, it follows the principle that these services are provided by cadastral directorates in locations where licensed bureaus have not been established.

3.2.1. LIHKABs legislation

LIHKABs were established by Law No. 5368 in 2005 [10], and the operational guidelines and principles for these bureaus were specified by the Regulation, which came into effect in 2008. However, this Regulation was later repealed, and a new regulation was issued in 2013.

According to the Law No. 6083 dated 2010 regarding the Organization and Duties of the TKGM; the provision allowing the activities of LIHKAB to be supervised by the TKGM under the provisions of Law No. 5368, including granting licenses to LIHKAB and determining and monitoring the operational procedures and principles of these bureaus, was provided.

The above provision was reiterated while listing the duties of TKGM in the Presidential Decree No. 4 on the Organization of Ministries, Related and Associated Institutions and Organizations and Other Institutions and Organizations, published in 2018.

With the amendment to Law No. 7317 dated 2021 [11], Law No. 5368 regarding LIHKAB has been updated to its most current version. Consequently, with this change in law, the previous LIHKAB Regulation dated 2013 was repealed, and a new Regulation was published for LIHKAB [12]. Additionally, with the implementation of Directive No. 2022/2, TKGM repealed its directive regarding licensed bureaus, numbered 2010/13.

3.2.2. Duties of LIHKABs

The licensed bureau is responsible and authorized to perform and oversee cadastral technical services, including cadastral operations that are not subject to registration, cadastral surveys, land demarcation, and plan preparation. This includes responsibilities for changes in property use subject to registration, establishment or abandonment of easements, consolidations, and abandonment of rights.

The licensed bureau is also obligated to carry out other tasks and operations determined by the Authority, which are of a nature similar to cadastral technical services. The duties of Cadastre Directorates are outlined in Figure-17. Demand-dependent works shown in two separate boxes in Figure-17 are the responsibility of LIHKABs [26].

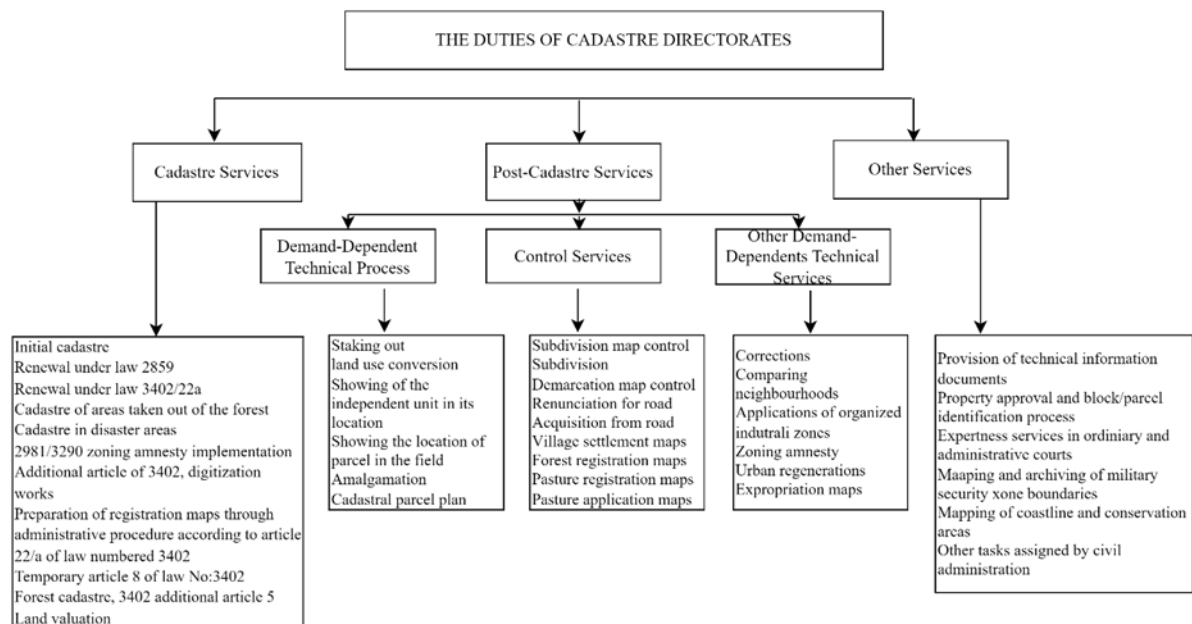


Figure 17. The duties of cadastre directorates and the responsibilities of LIHKABs.

Licensed cadastre surveyors may also engage in independent surveying and cadastre engineering and consulting activities during the period they conduct their activities under this Law.

3.2.3. Authorities, and Responsibilities of LIHKABs

3.2.3.1 The conditions for obtaining a license and being able to open a licensed bureau

According to the LIHKAB Regulation, the requirements for obtaining a license and being able to open a licensed bureau are as follows:

- Being a citizen of the Republic of Türkiye,
- Not being deprived of public rights,
- Having the capacity to exercise civil rights,

- Not being sentenced to imprisonment, even if the specified periods have passed, according to the Turkish Penal Code,
 - Not having received a dismissal penalty from civil service,
- In addition to these general requirements, the specific requirements for being able to obtain a license are as follows:
- Being registered with the Chamber of Survey and Cadastre Engineers (HKMO),
 - Having worked as a survey and cadastre engineer in the public or private sector for a minimum of ten years,
 - Not having received a temporary suspension or dismissal penalty from the profession according to the provisions of the Turkish Union of Chambers of Engineers and Architects (TMMOB) Law at the time of application
 - Depositing the required collateral in the bank and having it blocked in the name of the TKGM.

3.2.3.2 Establishment

An engineer who qualifies to receive a license shall submit the minimum required personnel and equipment list, along with a copy of the license, to the HKMO before commencing duties at the bureau address. The registration of the licensed bureau with HKMO is mandatory before commencing work at the bureau address.

3.2.3.3 Commencement of Work

A licensed engineer must commence work within one month from the date of receiving the license, except in cases of force majeure. The licensed engineer shall notify the local authorities, cadastral directorate, and HKMO representatives in writing about starting work and the bureau address. The licensed bureaus cannot commence work unless a proper notification is made, and the relevant cadastral directorate approves compliance with the specified procedures by the Authority.

3.2.3.4 Cancellation of the License

In addition to the permanent cancellation of the license, the license may also be cancelled upon the request of the license holder, upon reaching the age of 65, upon losing the conditions specified in the law to open a bureau, or upon later discovery that the conditions are not met. The license of those to whom the license is granted but do not open a bureau will be revoked by withdrawing and cancelling the license.

3.2.3.5 Training and Education of Licensed Engineers

Licensed cadastral surveyors who qualify to establish a licensed bureau and commence operations shall undergo mandatory and paid practical training lasting at least two days on cadastral technical services and real property and cadastral legislation by the Authority. Additionally, participation in in-service training programs organized by TKGM is required.

Individuals who have completed their engineering education from any faculty or department related to Surveying Engineering, Geodesy and Photogrammetry Engineering, or Geomatic Engineering within Türkiye are eligible for membership in the HKMO. As outlined in Article 135 of the Constitution of the Republic of Türkiye, individuals working in public institutions and public economic enterprises have the choice of whether or not to become members of the chamber. However, for surveyors not covered by these exceptions, membership in the chamber is a mandatory requirement to practice their profession in this field. In this context, licensed bureaus and licensed cadastral surveyors are required to become members of the HKMO. Licensed bureaus, furthermore, have their own association, and membership in this association is not mandatory.

3.2.3.6 Personnel

To ensure the uninterrupted operation and provision of services, licensed bureaus are obliged to employ at least one engineer in addition to the license holder and at least two individuals with titles of technician or technologist related to the profession and field.

As of September 2023, there are 20,484 registered engineers with HKMO. Roughly one-third of the engineers registered with HKMO work in the public sector, while two-thirds work in the private sector. In the country, there are 1,476 private companies, 2,365 offices, and 689 LIHKABs, and their proportional distributions can be seen in Figure 18. Before the legislative change in 2021, the number of active LIHKABs was 225, employing 257 licensed cadastral surveyors and 756 technicians. After the change, the number of licensed cadastral surveyors is 1,468.

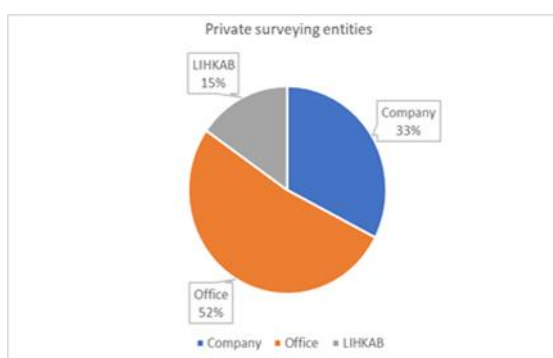


Figure 18. The distribution of companies, bureaus, and LIHKABs

3.2.3.7 Inspection

Licensed bureau activities are audited at least once a year by the TKGM Regional Directorate and twice a year by the cadastral directorate. Inspections are carried out by personnel authorized by the Authority for inspection purposes. Based on the evaluation of the inspection results and appeals by the Authority, penalties for deficiencies and shortcomings, depending on their nature and recurrence, may include warnings, reprimands, temporary or permanent license cancellations, and fines.

3.2.3.8 Return of the License Certificate

In the event of the cancellation of the license certificate, the licensed engineer or, in the event of the licensed engineer's death, their heirs must return the license certificate to the relevant cadastral directorate within three months. The received license certificate is promptly sent to the Directorate of Cadastre at the TKGM.

3.2.3.9 Legal and Criminal Liability

Individuals authorized to perform cadastral technical services under the Law in licensed bureaus are considered public officials for the purposes of the Turkish Penal Code. If any damage arises from the actions of the bureaus, those at fault will be held liable under Article 1007 of the Turkish Civil Code.

Licensed cadastral surveyors and their employees are prohibited from disclosing to third parties or using for purposes other than the provided service any information they acquire through their work, even after leaving the profession. They are also held responsible for any resulting damages, in accordance with Article 1020 of the Turkish Civil Code.

As in 2023, licensed cadastral surveyors are liable for their property surveys and cadastral data and document production.

3.2.3.10 Service Obligations and Code of Conduct

A licensed bureau is obligated to conduct cadastral technical services within its jurisdiction from the date it commences its activities. A licensed engineer demonstrates the required reputation and trust in both internal and external conduct related to the profession. They may not unjustly gain benefits from anyone in relation to their duties. Information and documents acquired by licensed cadastral surveyors and bureau employees due to their duties cannot be used in violation of the Personal Data Protection Law and relevant legislation.

3.2.3.11 Service Fees for Licensed Bureaus

The fee schedules for cadastral technical services provided by licensed bureaus, except for the initial determination, are determined and announced by the Authority, in consultation with HKMO, within the first week of January each year.

4. TRENDS

On an international level, significant efforts have been undertaken concerning cadastral systems and applications, such as Cadastre 2014, Vision Statement on Cadastre and Land Registration in Europe, 1998 [27], Impact of EU Legislation on Cadastral Surveying [6], European Requirements for Property Surveyors – ERfPS', 2018 [8], UN Framework for Effective Land Administration – FELA, [4], and 'Integrated Geospatial Information Framework – IGIF [5], as well as Fit for Purpose Land Administration [28]-[29], and more. One of the most pivotal publications that guide the future and applications of cadastre is Cadastre 2014. It has developed the vision of cadastre being highly specialized to a large extent, requiring cadastre to demonstrate the entire legal status of the land, eliminating the distinction between maps and records, and promoting collaboration between the public and private sectors [7]- [27].

Eurographics emphasizes the importance of securing property rights through state guarantee in property ownership and the continuation of public trust. It underscores the significance of cadastral systems in establishing an effective real property market and emphasizes the vital role of real property markets and related financial markets in contributing to economic development. It also underscores that cadastral parcel constitute the core data set of the INSPIRE Directive. In light of advancements in e-government and e-commerce, it calls for the integration of all legal and technical information related to cadastral parcels. Furthermore, it advocates the development of public-public and public-private partnerships, aligning with EU policies within the framework of social, economic, and environmental development [30].

The outcomes of these two studies shed light on the trends of surveyors worldwide, specifically within the EU. In summary:

1. The distinction between map and records will disappear. Technical and legal information of cadastral parcels should be shareable in an integrated manner.
2. Cadastre is of vital importance for effectively functioning real estate markets and related financial markets
3. Cadastral parcels constitute the core spatial data set of the INSPIRE Directive.
4. Cadastre is among the most crucial components supporting EU's economic, social, and environmental policies.
5. Cadastre will largely become privatized, and public-private partnerships practices will be developed
6. Aligned with this vision, cadastre will serve as the fundamental data provider for other public institutions (public-public).

Almost all of the mentioned trends are applicable within cadastral practices in Türkiye. Currently, within the completion project of initial cadastre works and immediately thereafter, in forest cadastre and rural cadastral renewal works, the technical aspects of the cadastre have been tendered to the private sector, ensuring significant participation from private entities in cadastral works. In recent years, three-dimensional cadastral projects have also been carried out with the participation of the private sector. Post-cadastral services have been provided by licensed cadastral surveyors through LIHKABs since 2005. Türkiye's cadastre has been the main data provider for approximately 1,000 institutions and organizations in recent years.

5. DISCUSSION and RESULTS

EU is a prominent political and economic union comprised of 27 member countries, collectively representing 30% of the nominal gross domestic product of world nations. The Union is in the process of enlargement, currently engaged in membership negotiations with 9 candidate countries and 1 potential country. The CLGE stands as a leading European Surveying Association, boasting 38 member countries (comprising 27 EU member states and 11 other European nations), and a membership base of approximately 100,000 surveyors. CLGE has undertaken significant initiatives related to cadastral surveyors, addressing critical aspects such as the preservation of real property, the role and future of cadastral surveyors within the profession, education, standards, codes, and the visibility of the profession. Notable efforts by CLGE encompass works such as the Code of Professional Qualifications, Sustainable Fit for Purpose, Portrait of EU Surveyors, and European Requirements for Property Surveyors.

In evaluating the conducted studies, it has been determined that, in certain countries, land registry and cadastre activities are executed under the responsibility of two separate institutions, resulting in the existence of two distinct databases. In many CLGE member countries, cadastral activities are conducted by cadastral surveyors. While many CLGE member countries engage cadastral surveyors in conducting cadastral activities, Table-1 illustrates variances among them concerning critical aspects such as professional qualifications, legal status, licenses/authorizations, liability, professional practice, insurance, quality control, affiliation, job and discipline requirements, and ethical codes.

As a consequence of this confusion, it has been understood that the profession of cadastral surveying, which does not reflect the basic competencies, qualifications, profile and expertise of licensed cadastral surveyors, and due to these differences, produces both cadastral maps and property records, integrates them and is the owner and updater of the basic data set of the European spatial data infrastructure, is not where it should be.

The European standard should be defined in accordance with EU Directive 2005/36, encompassing all aspects, from the establishment of licensed bureaus to their operations, including quality control and insurance. This aims to ensure consistent application across the activities of EU licensed cadastral surveyors. In this context, CLGE is actively engaged in formulating the European Geodetic Surveyors Act (EGSAct), aiming to create a comprehensive policy that delineates the position, function, and responsibilities of licensed cadastral surveyors in the future advancement of Europe. The goal is to promote awareness and understanding of the significance of geodesy and geoinformatics in cadastral survey activities and their role in the progress of both Europe and the world [23].

In Table-1, licensed bureaus in Türkiye, as detailed, exhibit similarities with EU practices in specific aspects. In Türkiye, some post-cadastre activities, previously managed by units within cadastral directorates, were shifted to LIHKABs under the law enacted in 2005. By 2021, this law underwent amendments, eliminating the mandatory licensing exam and granting licensing rights without examination to engineers who have completed 10 years since their diploma date. Prior to 2021, the number of LIHKABs was 225; however, after the legislative change, it significantly increased to 689.

Yet, another critical aspect pertains to professional practice. Survey engineering education in Türkiye generally focuses on geodesy, photogrammetry/remote sensing, and GIS, with minimal emphasis on land management and cadastre courses. Each faculty offers the option of pursuing a master's degree in cadastre for those interested in specialization. It is evident that enabling licensed cadastral surveyors to obtain a

license without prior practical experience in LIHKABs or cadastral directorates for a few years will pose certain challenges in property-related practices. Moreover, the limited duration of in-service programs provided to LIHKABs and the absence of ethical rules for practitioners in such a critical field as property are among other challenges.

2/3 of survey engineers working in the private sector in Türkiye categorically work in companies, free survey and cadastre engineering offices (SHKM) and LIHKABs. This situation has been posing longstanding problems between SHKMs and LIHKABs regarding their areas of duty, authority, and their potential to conduct business.

With the new law, LIHKABs were also given the authority to provide SHKM services. Conversely, since business owners working as SHKM may have the right to obtain a license after completing 10 years from the diploma date, similar to other engineers, they were also given the authority to establish LIHKABs. The advantage that this practice provides to LIHKABs is that they are given the authority to work in other areas of the sector in addition to the duties assigned to them by law.

Table-1. Comparative qualifications in the professional field, alongside business and disciplinary prerequisites.

EU (CLGE countries)	Türkiye
Is the Land Registry and Cadastre a single authority?	
Just under 62% of countries have a single authority.	Yes, single authority.
Is the cadastre completed for all countries?	
In some countries a portion of the countries has not been cadastrated yet.	Cadastre has been completed nationwide.
Who performs property surveying?	
approximately 77% of property surveying are performed by either public or private licensed cadastral surveyors, 28% of them are conducted by public, 48% by private cadastral surveyors, and 24% by both types.	Performed by LIHKABs, if there is no LIHKAB in that district, personnel appointed by the cadastre directorate.
Is there a property surveyor for all countries?	
Certain countries do not have a system for licensing cadastral surveyors.	Yes
Licensing requirements?	
Common requirements for a license in Europe: university education and professional practice.	University education and professional experience.
Licensing authority?	
Usually, NMCA's or Chambers of Surveying Engineers provide licenses.	TKGM
Is there a professional skills exam to obtain a license?	
Approval of professional skills, generally based on an examination, by state/federal board or commission, professional state recognized commission, second state examinations commission etc.	No. As professional experience, only the 10 years following the diploma are considered significant. Whether there is professional experience in the cadastre directorate or LIHKABs is not being requested.
Validity period	
The period of validity of licenses or authorisations has no limitation in time.	Up to the age of 65, 65 years is the mandatory retirement age of public staff in Türkiye.
Average number of licensed bureaus?	
In some countries, there are no licensed bureaus. In others, it varies in the range of 20 to 1,500.	692
Average number of employees in licensed bureaus?	
Due to market conditions, the workforce intensity per licensed firm varies; small firms employ 1-2 licensed cadastral surveyors, while medium-sized firms employ 10-20 licensed cadastral surveyors.	The minimum personnel required in each bureau is 4, including 2 engineers, one of them being a cadastral surveyor and 2 technicians.

	The number of personnel increases according to the workload of the bureau.
Who performs quality control?	
Quality control is carried out to a significant extent by NMCA (49%), followed by Ministries (15%), Chambers (15%), and local authorities (12%).	TKGM
Affiliation?	
Registration with the chamber is mandatory.	Yes, HKMO
Liability of produced cadastral data and/or documents?	
The majority of licensed cadastral surveyors' bear liability for both their property surveys and the production of cadastral data.	Licensed cadastral surveyors are liable for their property surveys and cadastral data/document production.
Responsibility for the quality and accuracy of the data?	
The responsibility for quality and accuracy lies with the cadastral surveyor in 75% of the member countries.	Fully responsible
Compulsory insurance for a licence?	
The compulsory insurance rate is 29% and applies only to private Licensed cadastral Surveyors.	There is no such requirement.
Compulsory professional practice?	
A minimum of 2-3 years of experience working in a licensed property surveyor's office or within cadastral administration, focused on performing cadastral tasks while pursuing additional education.	There is no requirement for licensed practice in an office and/or land administration as in the EU. Being a surveying engineer for 10 years is sufficient.
Supervision of licenced bureaus activities?	
Typically, NMCAs oversee around 49% of licensed cadastral surveyors' activities. Moreover, regulatory bodies such as the Ministry, Chamber, and municipalities also play a role in supervision.	TKGM
Sanctions?	
In the majority of the country, sanctions continue to be enforced by the State Agency or chamber. The types of sanctions mainly include suspension (27%), termination (25%), fine (23%), and notice (27%). Extra training is also among the applied sanctions. The rate of resorting to court within the scope of sanctions is around 5%.	There are sanctions at different levels.
Education?	
5 Years on University level consisting of a bachelor (3/4 years) and master (1/2 years) in surveying and cadastre science.	4 years on university level of a bachelor education in surveying and cadastre science.
Training?	
Universities and high schools mainly provide training and education to licensed cadastral surveyors, but chambers and associations play an important role organising training courses and raising qualification. The mandatory Continuous Professional Development (CPD) experiences an increasing trend since it is required in more and more countries.	TKGM organizes in-service training at long intervals. There is no Mandatory Continuous Professional Development (CPD) requirement.
Ethical code?	
In many countries, even if it exists in some, there are no written ethical rules.	There is no written ethical code.

6. CONCLUSIONS

The cadastre and land registry play a fundamental role in advancing sustainable development by meticulously collecting, verifying, and ensuring accessibility to pivotal data concerning land and its

inherent characteristics. The continuous maintenance and updating of the cadastre are equally imperative to its initial establishment, as they provide a secure underpinning for interactions between people and the land. NMCAs, serving as the regulatory, executive, and coordinative bodies for cadastral and, by extension, land registry undertakings, have historically furnished reliable and authoritative land information throughout Europe's evolutionary trajectory. In numerous Member States, activities related to cadastre and cadastral renewal hinge on the involvement of licensed private surveyors in addition to public surveyors.

One notable revelation stemming from this study is the conspicuous absence of an EU regulation overseeing the activities of cadastral surveyors across European nations despite the longstanding and efficacious endeavours undertaken by the CLGE. It is increasingly acknowledged as imperative and obligatory to establish legal frameworks that sustain property security and state guarantees, uphold public confidence in property rights and the property system, propel land markets within an efficient and dynamic framework, bolster economic growth, ease the cultivation of robust and sustainable institutional frameworks and societies, promote the evolution of professional policies within member countries, and ensure meaningful and enduring implementations of licensed cadastral surveyors' activities within the EU framework, in conformity with the INSPIRE Directives.

The intended legal framework should take the comprehensive shape of a policy and implementation document, providing guidance to Member States regarding the development, vitalization, strengthening, modernization, and standardization of both cadastre and land administration systems, as well as professional practices. Moreover, it should accommodate the unique characteristics of member countries' local conditions and remain adaptable to the dynamic interplay of global political, technological, economic, environmental, and social dynamics. Such adaptability positions it potentially as a foundational model for future guidance to other nations.

Another significant finding is that cadastral activities and licensed cadastral surveyors' activities in Türkiye are dynamic. The activities that initiated with the LIHKAB law enacted in 2005 were reorganized with the amended law in 2021. This regulation, on one hand, addresses the issues related to the sharing of activities between LIHKABs and SHKMs, while on the other hand, it brings up other problems. The most prominent of these challenges is the provision to grant licenses to engineers who have completed 10 years from the date of their diploma and are under 65 years of age, and if they request, a license will be granted without the need for a registered judicial and moral evaluation. The major issue among these problems is the provision stating that engineers who have completed 10 years from the date of their diploma but have not reached the age of 65 can be granted a license if they request, provided that they have no registered criminal or moral convictions.

In the context of the quality of documents and data of licensed cadastral surveyors and thus LIHKABs, the following recommendations have been developed:

- i. Grant licenses to cadastral surveyors who successfully achieve a certain outcome in the exams.
- ii. Ensure that surveyors intending to take the exam possess a minimum of 2 years of practical experience in LIHKABs or cadastral directorates before the exam date; disallow those who fail to meet this requirement from taking the exam.
- iii. Conduct the exam process through TKGM in coordination with the HKMO.
- iv. Prepare a detailed user guide that serves as a guide for licensed cadastral surveyors.
- v. Eliminate the requirement for licensed cadastral surveyors to open an office.
- vi. Provide licensed cadastral surveyors with a distinct priority status, both in the public and private sectors, similar to the "expert cadre in the public sector."
- vii. Determine LIHKAB working areas according to regional workload by TKGM.
- viii. Establish effective training and Continuous Professional Development (CPD) programs, determining their content and timing, and efficiently implement both theoretical and practical training.

Due to the increasing priority of land management and cadastre issues on a global scale, licensed cadastral surveyors and free surveyors need to possess knowledge and experience not only in the

technological aspects but also in legal, economic, social, and environmental dimensions of the profession. This will enhance the diversity of the profession and create new job opportunities for them. Another result emerging from this study is that the fields of activity of free surveyors and licensed cadastral surveyors are limited. Under the 'measure, cost, and value' approach, if surveyors actively engage in activities such as land and building valuation, quantity surveying, land acquisition, and technical supervision/advisory for property-related projects of other public institutions, the activities will diversify, and the volume of work will increase.

Declaration of Ethical Standards

As the author of this study, I declare that all ethical standards have been complied with.

Credit Authorship Contribution Statement

In this study, the author contribution rate was determined as 100%.

Declaration of Competing Interest

As the author of this study, I declare that there are no declarations of conflict.

Funding / Acknowledgements

As the author of this study, I declare that no funding or research grant was used in the preparation of this article."

Data Availability

This study does not contain usable data.

REFERENCES

- [1] I. Williamson, S. Enemark, J. Wallace, A. Rajabifard, *"Land Administration for Sustainable Development"*, Esri Press, 380 New York Street, Redlands, California 92373-8100, 2010.
- [2] S. Enemark, 2005, *"Understanding the Land Management Paradigm"*, FIG Commission 7 Symposium on Innovative Technologies for Land Administration, Madison, Wisconsin, USA, 19-25 June 2005.
- [3] Enemark, S, *The Evolving Role of Cadastral Systems in Support of Good Land Governance, The Digital Cadastral Map*", FIG Commission 7 Open Symposium Karlovy Vary, Czech Republic, 9 September 2010.
- [4] UN-GGIM, *"Framework for Effective Land Administration"*, UN Secretariat for the United Nations Committee of Experts on Global Geospatial Information Management Global Geospatial Information Management Section Statistics Division Department of Economic and Social Affairs United Nations, 2020.
- [5] UN-IGIF, *"United Nations Integrated Geospatial Information Framework"*, Second Edition, 2023
- [6] FIG 1995, International Federation of Surveyors (FIG) Publication No. 11, *"The FIG Statement on the Cadastre"*, ISSN:1018-6530 ISBN 0 644 4533 Canberra, Australia, 1998.
- [7] CLGE 2010, *"Impact of EU Legislation on Cadastral Surveying"*, Knowledge Exchange Network "Cadastre and Land Registry" Working Group "Impact of EU Legislation on Cadastral Surveying", Tech. Report, 2010
- [8] CLGE 2018, *"European requirements for cadastral surveyor activities"*, The European Cadastral Surveyor, Tech. Report, 2018

- [9] CLGE 2018R, "European Requirements for Property (Cadastral) Surveyor Activity", The European Cadastral Surveyor, Tech. Report, Revision of 2018.
- [10] LIHKAB 2005, "Law on Licensed Survey and Cadastre Engineers and Bureaus", Law Number: 5368, Ankara, Official Gazette: Date: 29/6/2005, Number: 25860, 2005.
- [11] LIHKAB 2021, "Law on amending the Law on Licensed Survey and Cadastre Engineers and Bureaus", Law Number: 7317, Ankara, Official Gazette: Date: 27/4/2021, Number: 32467, 2021.
- [12] LIHKAB 2021R, "Regulation on Licensed Survey and Cadastre Engineers and Bureaus", 25 September 2021, Ankara, Official Gazette Number: 31609, 2021.
- [13] Bologna Process 2018, "Bologna Process", <https://eua.eu/issues/10:bologna-process.html> bologna [Accessed August 2023]
- [14] Bologna Process 2010, "Bologna Process", <https://eua.eu/issues/10:bologna-process.html> bologna [Accessed August 2023].
- [15] Lisbon Strategy, *Briefing note for the meeting of the EMPL Committee 5 October 2009 regarding the exchange of view on the Lisbon Strategy and the EU cooperation in the field of social inclusion*, Directorate-General for Internal Policies Committee on Employment and Social Affairs the Secretariat, European Parliament, 2009-2014.
- [16] EU 2002, "Consolidated Version of The Treaty Establishing the European Community (97/C 340 /03)", C 340/ 173, Official Journal of the European Communities, 1997.
- [17] CLGE 2021, "European Requirements for Property Surveyors", Presented at Athens (GR)- CLGE Seminar @ HARSE Congress, Athens, Greece, 2021.
- [18] A. Littler, "Member States versus the European Union", ISBN: 978-90-04-18658-3, Martinus NIJHOFF Publishers, Leiden, Boston, 2011.
- [19] EU 2005, "Directive 2005/36/EC of the European Parliament and of the Council of 7 September 2005 on the recognition of professional qualifications" (Text with EEA relevance)" (OJ L 255, 30.9.2005, p. 22), 2005.
- [20] FIG/WB, "Fit-For-Purpose Land Administration", joint FIG/World Bank publication No. 60., 2014.
- [21] EU, "Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community" (INSPIRE), 25.4.2007 EN Official Journal of the European Union, 2007.
- [22] M. Grilc, V. Krupa, J. Y. Pirlot, "Towards the European Geodetic Surveyors 'Act, An introduction on Regulations for Property Surveyor in Europe", Romanian Surveying Week, Oradea, Romania, 2023.
- [23] V. Krupa, J. Y. Pirlot, F. Lebourdais, "Protecting Our World, The European Geodetic Surveyors Act, an introduction to a new ID for Geodetic Surveyors in Europe and in the World", FIG Working Week on Conquering New Frontiers Orlando, Florida, USA, 2023.
- [24] CLGE, 2022, "Working for the Profession" PCC - Paris (FR), 2022.
- [25] O. Ercan, "Evolution of the cadastre renewal understanding in Türkiye: A fit-for purpose renewal model proposal", Land Use Policy, Volume 131, August 2023, DOI: <https://doi.org/10.1016/j.landusepol.2023.106755>, 2023
- [26] N. I. Sarı, "Disiplin Hukuku Bakımından Sorumlulukları, Mali Yönden Sorumlulukları, Ceza Hukuku Yönüyle Sorumluluklar", TKGM Antalya Hizmetiçi Eğitim, 31 Mayıs 2023 (Responsibilities in Terms of Disciplinary Law, Financial Responsibilities, Responsibilities in Terms of Criminal Law, TKGM Antalya In-Service Training, 31 May 2023-).
- [27] J. Kaufman and D. Steudler, "Cadastre 2014 - a Vision on Future Cadastral Systems", Working Group 7.1 (Modern Cadastral Systems), Commission 7, FIG and owner of Kaufmann Consulting, Concepts and Project Management for Geomatics, Im Hauffeld, CH-8455 Rüdlingen, Switzerland, 1998.
- [28] UN/ECE, "Land Administration Guidelines", ECE/HBP/96. United Nations: New York, Geneva, 1996.

- [29] UN WPLA, "*Land Administration in Public Private Partnerships Workshop Customers - Co-operation – Service*", Vienna, 12 - 13 September 2002, United Nations Economic Commission for Europe, Working Party on Land Administration Working Party on Land Administration, 2002.
- [30] Larakker, P., 2008, EuroGeographics' Vision on Cadastre and Land Registration in Europe 2012, Integrating Generations FIG Working Week 2008 Stockholm, Sweden, 2008.