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ORIGINAL ARTICLE

Comparative analysis of selected national legal systems governing geodesy and cartography: identifying potentially adaptable solutions for the Polish legal system

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Abstract

This article compares national legal systems governing geodesy and cartography and identifies solutions potentially relevant to Poland. The study applies an original research framework comprising three interrelated functional-legal analytical dimensions: institutional organisation, professional regulation of surveyors, and the submission and administrative control of surveying results. Six European jurisdictions were purposively selected for comparison with Poland to capture institutional and regulatory variation. The analysis is based mainly on legal acts and other primary legal materials, complemented by literature on land administration and geospatial governance. Surveying results are classified by legal function rather than by national categories of surveying works, providing a common basis for comparing submission and control requirements. The comparison highlights the importance of consistency between institutional organisation, professional regulation and administrative control. Recurring solutions include clearly identifiable organisational responsibility for cadastral functions, explicit allocation of professional or institutional responsibility, and concentrating administrative control on results with direct cadastral or legal significance. For Poland, the findings support strengthening institutional specialisation and coordination of cadastral functions. They also support strengthening professional responsibility mechanisms, including statutory professional self-government as one possible solution, statutory continuing professional development and compulsory professional liability insurance. Administrative verification could reflect the legal significance of results, with enhanced verification of cadastral/legal results and control of engineering/technical results limited to what is necessary to incorporate them into public datasets. These directions address identified features and problems of the Polish system rather than advocating the transfer of any single foreign model.

Keywords: geodesy and cartography, comparative legal analysis, institutional organisation, surveying profession, cadastre

1 Introduction

This study compares the legal regulation of geodesy and cartography in Poland and six other European jurisdictions. It examines differences in public administration organisation, professional regulation, and the submission and administrative control of surveying results to identify legal and institutional solutions relevant to the Polish system.

Contemporary land administration research increasingly treats cadastral and geospatial systems not only as technical infrastructures but also as institutional and governance arrangements. Existing analytical frameworks address, among other issues, institutional capacity in land administration (Enemark and van der Molen, 2008), Fit-for-Purpose Land Administration (Enemark et al., 2014), national institutional arrangements for geospatial information management (Crompvoets and Ho, 2019), and governance and policy coherence in geospatial data infrastructures (Casiano Flores et al., 2021). Studies on Poland have also applied broader land-administration frameworks to assess the national system's capacity to fulfil its functions (Dawidowicz et al., 2020). Against this background, the present study adopts a comparative legal perspective. It focuses specifically on the institutional organisation of geodesy and cartography, professional regulation of surveyors, and the legal mechanisms governing the submission and administrative control of surveying results. The development of the Land Administration Domain Model (LADM) further illustrates the

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importance of explicitly defining responsibilities for land-related information across different organisations and ensuring interoperability between distributed land-administration functions (Lemmen et al., 2015). The second edition of LADM extends this approach through interconnected standards covering land registration, valuation and spatial planning, while supporting the identification and coordination of responsibilities across land-administration institutions (van Oosterom et al., 2025).

This article examines national legal systems using a uniform comparative approach. It proposes an original research framework based on three interrelated functional-legal analytical dimensions: the institutional organisation of geodesy and cartography, the regulation of the surveying profession, and the submission and administrative control of surveying results. Rather than treating individual countries as isolated case studies, the proposed framework enables the reconstruction and comparison of national legal systems using uniform analytical criteria. It facilitates the identification of legal and institutional solutions with potential relevance beyond the analysed jurisdictions. To compare submission and administrative control requirements, the study classifies surveying results by legal function rather than by national categories of surveying works.

On this basis, the study addresses the following research questions:

1. To what extent can diverse national legal systems governing geodesy and cartography be analysed using a common set of functional-legal criteria?
2. How do the selected national legal systems differ in institutional organisation, professional regulation of surveyors, and the submission and administrative control of surveying results?
3. Which recurring legal and institutional arrangements can be identified across the analysed jurisdictions?
4. Which of these arrangements may be relevant to further developing the Polish legal system, given its existing institutional and professional structure?
5. How is the legal significance of cadastral functions and surveying results reflected in the scope of professional regulation and verification mechanisms across the analysed jurisdictions?

Given the study's doctrinal and comparative character, the research is structured around research questions rather than empirical hypotheses.

The following section presents the methodological assumptions, research material, and comparative framework adopted in this study.

2 Research methodology

For this study, as illustrated in Figure 1, an original research framework based on uniform comparative criteria was developed and applied to enable a comparative analysis of national legal systems governing geodesy and cartography. The framework is based on the identification of three interrelated functional-legal analytical dimensions:

1. the institutional organisation dimension, concerning the institutional structure and institutional allocation of geodetic reference, topographic mapping and cadastral functions;
2. the professional regulation dimension, concerning the existence of professional qualifications, licensing or certification systems, the legal regulation of professional liability, and, in particular, whether a statutory professional self-government of surveyors exists;
3. the submission and administrative control dimension, concerning the legal framework governing the submission of surveying results to competent public authorities and the mechanisms for administrative control and verification of the submitted documentation.

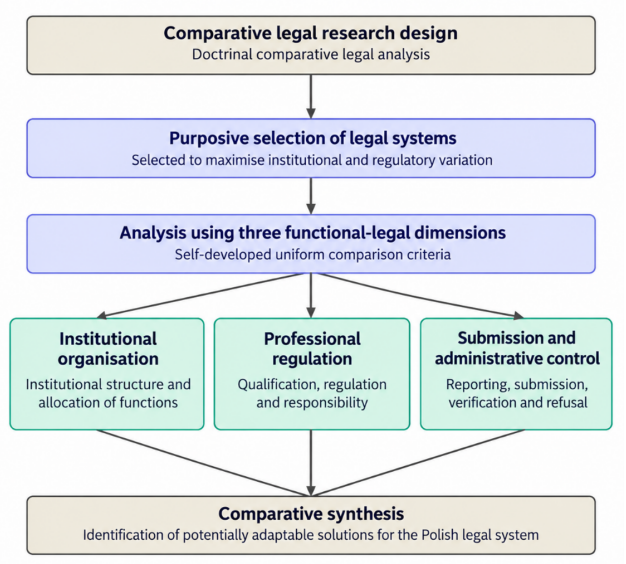


Figure 1: Research framework for the comparative analysis of national legal systems governing geodesy and cartography

Together, these three functional-legal analytical dimensions cover the principal legal and institutional elements selected for comparison in this study. The proposed methodology ensures comparability across the analysed systems regardless of their institutional and legal diversity, thereby enabling the identification of legal and institutional solutions characteristic of individual national systems.

Previous comparative studies in the field of geodesy have focused primarily on cadastral systems and land administration systems (e.g. Kaufmann and Steudler, 1998; Steudler and Kaufmann, 2002; Center of Legal Competence, 2004; Steudler, 2014; Dawidowicz and Źróbek, 2018; Budkowski et al., 2023; Jahani Chehrehbargh et al., 2024). Earlier comparative work on European cadastre and land-registration systems also treated clear institutional competencies, coordination between cadastre and land-registration institutions, liability for errors and quality-management mechanisms as distinct elements relevant to comparative assessment (Center of Legal Competence, 2004). Comparative studies of the surveying profession involved an analysis of professional competence models (Plimmer, 2001) and legal regulations governing cadastral surveyors (including licensing, quality control, professional liability, insurance, and continuing professional development) across European countries and Turkey (Ercan, 2023).

The following countries were selected for the comparative analysis: Austria, Belgium, France, Slovakia, Sweden and the United Kingdom (England). These countries are not the primary subject of the research but serve as selected comparative cases illustrating different legal and institutional arrangements.

The jurisdictions were selected purposively rather than as a statistically representative sample. The selection followed a maximum-variation logic and was intended to capture contrasting legal and institutional arrangements relevant to the three analytical dimensions. The criteria included: (1) the degree of centralisation or decentralisation of geodetic and cadastral administration; (2) the degree of institutional integration of geodetic, mapping and cadastral functions; (3) different approaches to professional regulation, ranging from state licensing and statutory professional self-government to systems without individual statutory licensing; (4) different mechanisms for the submission and administrative control of surveying results; and (5) different cadastral and land-registration traditions, including continental and common-law arrangements. Slovakia was additionally included as a post-socialist jurisdiction providing a particularly relevant comparative point for Poland. The

selection therefore aimed to maximise institutional and regulatory variation rather than reproduce the statistical structure of European states.

For each jurisdiction, the primary legislation was identified through official national legal databases. The analysis covered legal acts governing: (1) institutions responsible for geodetic reference networks, topographic mapping and cadastral or land-registration functions; (2) professional qualification, licensing and disciplinary regulation of surveyors; and (3) reporting, submission, verification and refusal mechanisms applicable to surveying results. Where necessary, the analysis included implementing regulations and other normative instruments to reconstruct how these legal arrangements operate.

Austria, Belgium, France, Slovakia and Sweden, as Member States of the European Union, also operate within the common legal framework established by the INSPIRE Directive, which harmonises selected aspects of the spatial information infrastructure. The Directive establishes common rules concerning metadata, interoperability and the sharing of spatial datasets, including cadastral parcels and coordinate reference systems. The Directive does not harmonise national institutional arrangements for geodesy and cartography, which national law primarily determines.

The research materials included legal acts in force in selected European countries, representing various legal and institutional frameworks, as of the date specified in Table 1.

Table 1 presents the principal legal acts constituting the primary source material for the comparative analysis. These acts define the institutional organisation of geodesy and cartography, regulate the surveying profession, and establish the legal framework for cadastral procedures in the analysed countries. In addition to the legal acts listed in Table 1, the analysis also covered implementing regulations adopted under those acts, as well as regulations, ordinances, guidelines, and other normative instruments issued by the authorities responsible for geodesy and cartography in the respective countries.

Table 1 does not include legal acts governing registers of rights in real property in countries where such registers remain institutionally separate from geodetic and cartographic administration (e.g. the land and mortgage register in Poland). Such acts are included only where they regulate institutions that are organisationally integrated with, or formally coordinated with, geodetic and cadastral administration, as they are directly relevant to the analysed organisational model (see Section 4).

In some countries, comprehensive legal acts govern matters relating to geodesy and cartography, including cadastral registration and the regulation of the surveying profession. In other jurisdictions, the relevant legal framework is fragmented and consists of several statutes and implementing regulations embedded in different branches of law. In particular, in some countries the cadastre forms part of the tax law system.

The analysis of the applicable legal regulations made it possible to reconstruct the national legal systems governing geodesy and cartography and to compare the institutional solutions adopted in the analysed countries. It should also be recognised that, alongside binding legal regulations, non-statutory mechanisms of considerable practical importance may operate in individual jurisdictions.

Furthermore, the scope and structure of the data maintained in official public registers, including topographic information, geodetic control networks, and cadastral data, vary considerably between countries. The analysed countries also represent different land-registration arrangements, in which cadastral and legal registers may be institutionally integrated or institutionally separate, with varying degrees of legal and procedural coordination.

3 Institutional organisation of geodesy and cartography

The first identified functional-legal analytical dimension concerns the organisation of geodetic and cartographic administration. The institutional structure established by legal regulations is a fundamental element of the national system governing the performance of public tasks in geodesy and cartography.

Table 2 presents institutions directly responsible for maintaining the analysed geodetic, mapping, and cadastral functions; supervisory bodies that do not directly maintain the analysed datasets are therefore not included. The analysis focuses on institutional arrangements rather than on differences in the scope or content of the datasets maintained within individual systems.

The comparative analysis of the national legal systems revealed two main dimensions of the institutional organisation of geodesy and cartography: the degree of centralisation and the degree of institutional integration. The first dimension describes how public responsibilities are distributed between central and local administration, whereas the second concerns the institutional allocation of geodetic, cartographic, and cadastral functions.

Within the first dimension, the degree of centralisation, we can distinguish between decentralised and centralised models. Among the analysed countries, Poland represents a distinctive decentralised model in which local government authorities perform key geodetic, cartographic and cadastral functions. This contrasts with the remaining countries, where these functions are predominantly organised within central state administration (centralised model). Although some countries involve local authorities in selected cadastral functions (for example, municipalities operating municipal cadastral authorities in Sweden), this does not alter the predominantly centralised character of their administrative systems.

Within the second dimension, the degree of institutional integration, two broad organisational models can be distinguished: the integrated model and the functionally divided model. The distinction concerns the allocation of responsibility at the national level; local implementation may involve separately organised authorities.

In the integrated model, the principal geodetic reference, topographic mapping and cadastral functions are linked through a common national authority. Austria concentrates these functions within the Federal Office of Metrology and Surveying (Bundesamt für Eich- und Vermessungswesen). In Sweden, Lantmäteriet links them at the national level, while authorised municipal cadastral authorities also conduct local property-formation proceedings and related cadastral registration. In Slovakia, the Geodesy, Cartography and Cadastre Authority of the Slovak Republic (Úrad geodézie, kartografie a katastra Slovenskej republiky) has central responsibility for these fields, while district offices (okresné úrady), organisationally part of the Ministry of the Interior, carry out local cadastral tasks.

By contrast, the functionally divided model allocates these responsibilities among separate institutions. This approach is used in France, where the National Institute of Geographic and Forest Information (Institut national de l'information géographique et forestière) maintains geodetic reference systems and topographic mapping. At the same time, the Directorate General of Public Finances (Direction générale des finances publiques) performs cadastral functions through its territorial cadastral services and the National Cadastre Documentation Service (Service de la documentation nationale du cadastre). Belgium has a similar institutional division, where the National Geographic Institute (Institut Géographique National/Nationaal Geografisch Instituut) is responsible for geodetic reference systems and topographic mapping. In contrast, the General Administration of Patrimonial Documentation (Administration générale de la Documentation patrimoniale/Algemene Administratie van de Patrimoniumdocumentatie) carries out cadastral administration and forms part of the Federal Public

Table 1: Principal legal acts and official legal-information sources used in the comparative analysis (legal status as of 30 June 2026)

Country	Legal source	Principal legal acts (original title and English translation)
Poland	https://isap.sejm.gov.pl	• Ustawa z dnia 17 maja 1989 r. Prawo geodezyjne i kartograficzne (Act of 17 May 1989 on Geodetic and Cartographic Law) • Rozporządzenie Ministra Rozwoju, Pracy i Technologii z dnia 27 lipca 2021 r. w sprawie ewidencji gruntów i budynków (Regulation of the Minister of Development, Labour and Technology of 27 July 2021 on the Land and Building Register) • Rozporządzenie Ministra Rozwoju z dnia 28 lipca 2020 r. w sprawie uprawnień zawodowych w dziedzinie geodezji i kartografii (Regulation of the Minister of Development of 28 July 2020 on Professional Qualifications in Geodesy and Cartography)
Austria	https://www.ris.bka.gv.at	• Bundesgesetz vom 3. Juli 1968 über die Landesvermessung und den Grenzkataster (Vermessungsgesetz – VermG) (Federal Act of 3 July 1968 on Land Surveying and the Boundary Cadastre) • Bundesgesetz vom 2. Feber 1955 über die Grundbücher (Allgemeines Grundbuchsgesetz 1955 – GBG 1955) (Federal Act of 2 February 1955 on Land Registers) • Bundesgesetz über Ziviltechniker (Ziviltechnikergesetz 2019 – ZTG 2019) (Federal Act of 2019 on Civil Engineers) • Verordnung des Bundesministers für Digitalisierung und Wirtschaftsstandort über die Berufsbezeichnung der Ziviltechnikerinnen und Ziviltechniker (Ordinance on the Professional Title of Civil Engineers)
Belgium	http://www.ejustice.just.fgov.be	• Loi du 8 juin 1976 portant création de l'Institut géographique national/Wet van 8 juni 1976 tot oprichting van het Nationaal Geografisch Instituut (Act of 8 June 1976 establishing the National Geographic Institute) • Arrêté royal du 17 février 2002 portant création du Service public fédéral Finances/Koninklijk Besluit van 17 februari 2002 tot oprichting van de Federale Overheidsdienst Financiën (Royal Decree of 17 February 2002 establishing the Federal Public Service Finance) • Arrêté royal du 3 décembre 2009 relatif à l'organisation des services du Service public fédéral Finances/Koninklijk Besluit van 3 december 2009 betreffende de organisatie van de diensten van de Federale Overheidsdienst Financiën (Royal Decree of 3 December 2009 concerning the organisation of the services of the Federal Public Service Finance) • Loi du 27 mars 2023 protégeant la profession et le titre de géomètre-expert et créant un Ordre des géomètres-experts/Wet van 27 maart 2023 tot bescherming van het beroep en de titel van landmeter-expert en tot oprichting van een Orde van landmeters-experten (Act of 27 March 2023 on the Protection of the Profession and Professional Title of Geometer-Expert and Establishing the Order of Geometer-Experts)
France	http://www.legifrance.gouv.fr	• Décret n° 2011-1371 du 27 octobre 2011 relatif à l'Institut national de l'information géographique et forestière (Decree No. 2011-1371 of 27 October 2011 relating to the National Institute of Geographic and Forest Information) • Décret n° 2008-310 du 3 avril 2008 relatif à la Direction générale des finances publiques (Decree No. 2008-310 of 3 April 2008 relating to the Directorate General of Public Finances) • Décret n° 2010-983 du 26 août 2010 portant statut particulier du corps des géomètres-cadastreurs des finances publiques (Decree No. 2010-983 of 26 August 2010 establishing the special regulations governing the corps of cadastral surveyors of public finances) • Loi n° 46-942 du 7 mai 1946 instituant l'Ordre des géomètres-experts (Law No. 46-942 of 7 May 1946 establishing the Order of Geometer-Experts) • Décret n° 96-478 du 31 mai 1996 portant règlement de la profession de géomètre-expert et code des devoirs professionnels (Decree No. 96-478 of 31 May 1996 regulating the profession of geometer-expert and establishing the Code of Professional Conduct)
Slovakia	http://www.slov-lex.sk	• Zákon č. 215/1995 Z. z. o geodézii a kartografii (Act No. 215/1995 Coll. on Geodesy and Cartography) • Vyhláška Úradu geodézie, kartografie a katastra Slovenskej republiky č. 300/2009 Z. z., ktorou sa vykonáva zákon Národnej rady Slovenskej republiky č. 215/1995 Z. z. o geodézii a kartografii v znení neskorších predpisov (Decree No. 300/2009 Coll. of the Geodesy, Cartography and Cadastre Authority of the Slovak Republic implementing Act No. 215/1995 Coll. on Geodesy and Cartography, as amended) • Zákon č. 162/1995 Z. z. o katastri nehnuteľností a o zápise vlastníckych a iných práv k nehnuteľnostiam (Katastrálny zákon) (Act No. 162/1995 Coll. on the Real Estate Cadastre and on the Registration of Ownership and Other Rights to Real Estate) • Zákon č. 180/2013 Z. z. o organizácii miestnej štátnej správy a o zmene a doplnení niektorých zákonov (Act No. 180/2013 Coll. on the Organisation of Local State Administration and Amendments to Certain Acts) • Zákon č. 487/2021 Z. z. o Komore geodetov a kartografov (Act No. 487/2021 Coll. on the Chamber of Surveyors and Cartographers)
Sweden	http://www.riksdagen.se	• Förordning (2009:946) med instruktion för Lantmäteriet (Ordinance (2009:946) with Instructions for Lantmäteriet) • Lag (2000:224) om fastighetsregister (Land Register Act (2000:224)) • Fastighetsbildningslag (1970:988) (Property Formation Act (1970:988)) • Lag (1995:1393) om kommunal lantmäterimyndighet (Act (1995:1393) on Municipal Land Survey Authorities)
United Kingdom (England)	http://www.legislation.gov.uk	• Ordnance Survey Act 1841[1] • Land Registration Act 2002 • Land Registration Rules 2003

1 The Ordnance Survey Act 1841 remains formally in force, but its practical significance today is limited. The Ordnance Survey Trading Fund Order 1999, which formerly governed Ordnance Survey's operations, was revoked in 2016; since 2015, Ordnance Survey has operated as Ordnance Survey Limited, a government-owned company under the Companies Act 2006, rather than under a sector-specific act.

Table 2: Institutional organisation of geodetic reference networks, topographic mapping and cadastral or land-registration functions in the analysed countries

Country	Institutions responsible for geodetic reference networks and topographic mapping	Institutions responsible for the cadastre	Combined institutional overview (geodetic reference networks, topographic mapping, cadastre)
Poland	central level: Główny Geodeta Kraju (Surveyor General of Poland)/Główny Urząd Geodezji i Kartografii (Head Office of Geodesy and Cartography) (geodetic networks, topographic mapping); regional level: marszałek województwa (marshal)/marshal's offices (topographic mapping); local level: starosta (head of county)/county offices[2] (geodetic networks, topographic mapping)	local level: starosta (head of county)/county offices	central level: Head Office of Geodesy and Cartography (geodetic networks, topographic mapping); regional level: marshal's offices (topographic mapping); local level: starosta (head of county)/county offices (geodetic networks, topographic mapping, cadastre)
Austria	central level: Bundesamt für Eich- und Vermessungswesen (Federal Office of Metrology and Surveying)	central level: Federal Office of Metrology and Surveying, territorial offices[3]	central level: Federal Office of Metrology and Surveying (geodetic networks, topographic mapping), territorial offices (cadastre)
Belgium	central level: Institut Géographique National[4] (National Geographic Institute)	central level: Administration générale de la Documentation patrimoniale[5] (General Administration of Patrimonial Documentation), which is a department of Service Public Fédéral Finance[6] (Federal Public Service Finance), territorial offices	central level: National Geographic Institute (geodetic networks, topographic mapping); General Administration of Patrimonial Documentation, territorial offices (cadastre); Geometer-expert - retention of cadastral survey documentation
France	central level: Institut national de l'information géographique et forestière (National Institute of Geographic and Forest Information), territorial offices	central level: Direction générale des finances publiques (Directorate General of Public Finances (DGFiP)), including the Service de la documentation nationale du cadastre (National Cadastre Documentation Service); territorial cadastral services	central level: National Institute of Geographic and Forest Information, territorial offices (geodetic networks, topographic mapping); Directorate General of Public Finances, including the National Cadastre Documentation Service and territorial cadastral services (cadastre); Geometer-expert - retention of cadastral survey documentation
Slovakia	central level: Úrad geodézie, kartografie a katastra Slovenskej republiky (Geodesy, Cartography and Cadastre Authority of the Slovak Republic); territorial level: district offices	central level: Geodesy, Cartography and Cadastre Authority of the Slovak Republic; territorial level: district offices (okresné úrady), acting through their cadastral departments (katastrálne odbory)[7]	central level: Geodesy, Cartography and Cadastre Authority of the Slovak Republic (geodetic networks, topographic mapping); territorial level: district offices (cadastre, detailed geodetic control records and provision of cadastral data for state mapping)
Sweden	central level: Lantmäteriet (Swedish Mapping, Cadastral and Land Registration Authority), territorial offices	central level: Lantmäteriet (Swedish Mapping, Cadastral and Land Registration Authority), territorial offices[8]	central level: Lantmäteriet (Swedish Mapping, Cadastral and Land Registration Authority) – geodetic networks, topographic mapping and cadastre integrated within a single authority
United Kingdom (England)	central level: Ordnance Survey Limited (government-owned company)	central level: HM Land Registry	central level: Ordnance Survey (geodetic networks, topographic mapping); HM Land Registry (land registration)

2 Starosta can delegate tasks and powers to the mayor at the municipality's request, including issuing administrative decisions, under an agreement and certain conditions (Article 6a(4) Act of 17 May 1989 on Geodetic and Cartographic Law).

3 Territorial offices are subordinate organisational units of the central authority and should not be understood as self-government bodies.

4 Dutch: Nationaal Geografisch Instituut.

5 Dutch: Algemene Administratie van de Patrimoniumdocumentatie.

6 Dutch: Federale Overheidsdienst Financiën.

7 District offices form part of local state administration within the organisational framework of the Ministry of the Interior, while ÚGKK SR directs and controls the performance of cadastral administration (Act No. 180/2013 Coll., § 2; Act No. 162/1995 Coll., §§ 11–12 and 18).

8 The Government may grant permission for a municipality to establish a municipal cadastral authority and to be responsible for the activities of the authority (Section 1 of Act of 14 December 1995 on Municipal Land Survey Authority).

Service Finance (Service Public Fédéral Finances/Federale Overheidsdienst Financiën). In England, the national mapping agency, Ordnance Survey, is responsible for topographic mapping, while HM Land Registry, a non-ministerial government department, administers land registration in England and Wales.

Austria, Sweden and Slovakia therefore link responsibility for geodetic reference systems, topographic mapping and the cadastre at the national level, although they organise local cadastral tasks differently. Poland has a similar institutional linkage, although responsibilities are distributed across different levels of administration. In particular, county authorities (starostas) carry out cadastral tasks as delegated government administrative duties and form part of the statutory Geodetic and Cartographic Service[9]. In contrast, Belgium, France and England allocate cadastral and land registration functions to institutions separate from those responsible for national mapping and geodetic infrastructure. Consequently, an important dimension of institutional organisation is the degree to which these functions are linked at the national level and how local cadastral tasks are allocated.

Taken together, these two dimensions illustrate the diversity of organisational arrangements for geodesy and cartography across Europe. Except for Poland, all analysed countries rely primarily on centralised administrative structures. However, they differ considerably in how they allocate responsibilities among institutions, ranging from fully integrated to functionally divided models. These differences may partly reflect the role assigned to the cadastre, alongside other factors shaping institutional structure and the distribution of public responsibilities.

4 Purpose of the cadastre as a factor influencing institutional organisation

The comparative analysis considers the different purposes assigned to the cadastre in the analysed countries. According to FIG (1995), "cadastre is normally a parcel based, and up-to-date land information system containing a record of interests in land (e.g. rights, restrictions and responsibilities). It usually includes a geometric description of land parcels linked to other records describing the nature of the interests, the ownership or control of those interests, and often the value of the parcel and its improvements. It may be established for fiscal purposes (e.g. valuation and equitable taxation), legal purposes (conveyancing), to assist in the management of land and land use (e.g. for planning and other administrative purposes), and enables sustainable development and environmental protection". This definition illustrates that the cadastre may serve a variety of purposes (fiscal, legal, administrative and planning). It suggests that the functions assigned to it may be associated with different institutional arrangements in national geodetic and cadastral systems. The traditional International Federation of Surveyors (FIG) definition of the cadastre remains widely accepted in international literature. More recent research increasingly considers the cadastre within the broader concept of Land Administration Systems (LAS) (Williamson et al., 2010), where it is regarded as a fundamental component of land administration. European comparative practice has also highlighted that the broader reuse of cadastral information increases the importance of data quality and legal reliability, particularly where cadastral data are combined with other datasets and used as a basis for public or private decision-making (Steudler, 2018).

In Poland, the Land and Building Register contains information on land parcels, buildings, premises, and their owners, and is legally recognised as the real property cadastre. However, the legal status of real property is determined through the land and mortgage register, which district courts maintain. Similar systems differ considerably across Europe in both their institutional structure and the scope of recorded data. The analysed countries also differ in the relationship between cadastral and legal registers. Institutional separation does not necessarily imply legal or procedural independence. Austria provides a clear example: the cadastre is maintained within the Federal Office of Metrology and Surveying (Bundesamt für Eich- und Vermessungswesen) structure, while the land register is maintained within the judicial system, but the two components are procedurally coordinated, and their maintenance is synchronised (Ernst, 2018; Steudler, 2018). Belgium likewise distinguishes cadastral and legal-security functions within the broader Patrimonial Documentation framework, while digital processes link them (Neckebroeck and Jacmain, 2018). The comparison therefore treats institutional location and the degree of legal and procedural coordination as separate characteristics rather than assuming that institutionally separate registers operate independently. In this study, a coordinated dual system denotes an arrangement in which cadastral and legal registers remain institutionally distinct but are legally and procedurally interconnected. England represents a distinct model based on land registration rather than on a traditional cadastre. Under the Land Registration Act 2002 (Section 60), title plans are based on the principle of general boundaries, meaning that they indicate only the approximate extent of land parcels and do not determine the precise legal boundary.

The study further demonstrates that the purpose assigned to the cadastre varies substantially among the analysed countries. In Belgium, the cadastre retains an important fiscal function, particularly for property valuation and cadastral income, but its role extends beyond taxation. Cadastral spatial documentation is updated using surveyors' plans, and the precadastration procedure links the prior identification of new parcels with the preparation of real-property transactions (Neckebroeck and Jacmain, 2018; Steudler, 2018). In France, cadastral administration likewise retains a strong fiscal orientation and remains institutionally linked to the financial administration. In Poland, Austria and Sweden, it performs multiple functions, including administrative and legal functions. England represents a separate model based on a land registration system rather than a traditional cadastre.

The comparison does not indicate that the function assigned to the cadastre alone determines institutional organisation. It does, however, show a clear association between the cadastre's purposes and its institutional location.

In Austria, Slovakia and Sweden, where the cadastre performs broader legal and administrative functions, cadastral responsibilities are integrated more closely with national surveying and land-administration structures. The function of the cadastre should therefore be regarded as one factor explaining differences in institutional organisation rather than as the sole determinant. The Austrian system also illustrates that the legal significance of cadastral information may differ within a single national system. Parcels entered in the Legal Boundary Cadastre (Grenzkataster) have legally secured boundaries based on formally established surveying documentation, whereas parcels remaining in the Fiscal Cadastre lack the same legal boundary effect (Ernst, 2018; Steudler, 2018). This distinction confirms that the legal significance of cadastral information cannot be inferred solely from the cadastre's institutional location.

5 Professional regulation of the surveying profession

The second functional-legal analytical dimension examined in this study concerns the regulation of the surveying profession. Together with the organisation of geodetic and cartographic administration, it constitutes one of the principal elements differentiating national

9 The Geodetic and Cartographic Service is defined in the Act of 17 May 1989 on Geodetic and Cartographic Law. For a detailed discussion of its organisational structure and legal status, see Porucznik (2026).

legal systems governing geodesy and cartography. The regulatory framework shapes the formal mechanisms through which professional competence and responsibility are defined and through which the quality of geodetic data is safeguarded.

The scope of activities entrusted to surveyors varies considerably between countries. Other professions may perform certain tasks assigned to surveyors in one jurisdiction in another. Consequently, the scope of surveying activities is not uniform across Europe, making direct comparison of professional regulation models more complex. As noted by Plimmer (2001): "Surveying, as a profession, has developed in different ways and encompassing different surveying activities in different countries, in order to reflect the national needs which have developed over time. Thus, while a similar range of surveying activities may be undertaken in different countries, there may be differences between the way these activities are grouped as a recognised 'profession'. (...) The research has identified discrepancies between the professional activities undertaken by different kinds of surveyors in different European countries, with some kinds of surveying activities demonstrating a greater or lesser degree of international commonality".

The definition of the function of a surveyor adopted by FIG in 2004 states that:

"A surveyor is a professional person with the academic qualifications and technical expertise to conduct one, or more, of the following activities:

- to determine, measure and represent land, three-dimensional objects, point-fields and trajectories,
- to assemble and interpret land and geographically related information,
- to use that information for the planning and efficient administration of the land, the sea and any structures thereon; and
- to conduct research into the above practices and to develop them" (FIG, 2004).

Across the analysed countries, surveyors are represented by professional organisations with different legal status, ranging from private professional associations to statutory professional self-governing bodies whose membership constitutes a legal requirement for practising the profession. Owing to the diversity of their legal status and competences, this study adopts a definition similar to the concept of professional organisation proposed by Plimmer (2001), while limiting the analysis to organisations established by law.

Accordingly, the term professional self-government is used in this study to refer to statutory professional organisations[10] that, in addition to representing surveyors and their interests before external bodies, including national governments:

1. award professional qualifications; and/or
2. award practising licences; and/or
3. regulate the conduct and competence of surveyors.

For this study, the terms "protected professional title" and "reserved activities" are used in the sense set out in Article 3(a)–(b) of Directive (EU) 2018/958[11].

Table 3 summarises the principal arrangements for professional authorisation or recognised professional titles, the existence of statutory professional self-government, and the bodies responsible for professional oversight and discipline for the status identified. It does not provide an exhaustive inventory of certificates, identification documents or requirements for particular activities. Additional instruments are discussed in the accompanying text where they are necessary to explain the national regulatory framework. Professional titles are distinguished from professional authorisation, and the scope of professional authorisation is not assumed to coincide with the scope of reserved activities.

The comparison of the analysed European countries reveals significant differences in the regulation of the surveying profession. The comparison distinguishes state-granted professional authorisation, authorisation administered by statutory professional bodies, and combinations of state and professional regulation. These arrangements are considered alongside title-based regulation and systems without individual statutory licensing.

In Poland, a state authority grants professional qualifications, and public authorities also handle disciplinary matters. In Slovakia, the Chamber of Surveyors and Cartographers grants professional authorisation and exercises professional oversight and disciplinary powers over authorised surveyors and cartographers. Belgium and France represent models in which professional self-government bodies exercise central licensing and disciplinary functions. Austria represents a mixed model, in which a state authority grants professional authorisation after consulting the Chamber of Civil Engineers, while professional self-government exercises disciplinary oversight. A notable example is Belgium, where the Act of 27 March 2023 established the Order of Geometer-Experts as the new regulatory body for the profession (the Act entered into force in 2025).

The scope of professional authorisation and the extent of reserved activities vary considerably among the analysed countries. In Belgium and France, certain surveying activities, particularly those related to boundary determination and cadastral or legally significant procedures, are reserved to professionals holding the required professional qualification or authorisation. In contrast, other technical surveying activities do not fall within the same scope of reserved activities. In France, certain boundary-related surveying activities are statutorily reserved for géomètres-experts, creating a statutory professional monopoly over those activities (Autorité de la concurrence, 2018). Under Article 2 of Law No. 46-942 of 7 May 1946 establishing the Order of Geometer-Experts, this monopoly covers the boundary-defining surveying work and associated topographical plans and documents specified in Article 1, point 1, subject to the statutory exceptions. This statutory distinction is also reflected in the case law: the Cour de cassation held that documents which have the effect of fixing new property boundaries and creating associated real-property rights fall within the statutory monopoly, unlike documents of a purely fiscal nature without effects on property boundaries or rights[12]. In Austria, an Ingenieurkonsulent für Vermessungswesen is authorised to perform a wide range of surveying activities. However, this authorisation does not confer an exclusive right to perform every activity within its scope (Funk and Marx, 2002; § 3(6) of the Federal Act of 2019 on Civil Engineers). In Slovakia, authorisation verification covers statutorily specified activities including both cadastral and selected engineering surveys. In Poland, professional qualifications are required for the independent functions defined in Article 42 of the Geodetic and Cartographic Law. Article 43 distinguishes seven scopes of professional qualifications: situational and height measurements, setting-out and as-built surveys; boundary determination, subdivision and legal surveying documentation; basic geodetic surveys; geodetic services for investment projects; surveying for agricultural and forest land management; map compilation; and photogrammetry and remote sensing.

National legal frameworks may also require additional credentials or qualifications for specific professional functions, independent of the general professional authorisation presented in Table 3. Slovakia provides an example of such an arrangement. The preukaz geodeta is a state-issued surveyor card used when exercising specified statutory access rights. At the same time, a separate certifi-

10 The United Kingdom represents an exception, since the Royal Institution of Chartered Surveyors (RICS), although not established as a statutory public-law body, performs an important regulatory function in relation to the surveying profession.

11 Directive (EU) 2018/958 of the European Parliament and of the Council of 28 June 2018 on a proportionality test before adoption of new regulation of professions (EUR-Lex: https://eur-lex.europa.eu/eli/dir/2018/958/oj).

12 Cour de cassation (2022, No. 21-86.499).

Table 3: Professional regulation of surveying in the analysed countries

Country	Status of professional self-government	Professional authorisation/title	Authorising/title-conferring body	Professional oversight/ disciplinary body
Poland	no statutory professional self-government	geodeta uprawniony (authorised surveyor)	state authority: Surveyor General of Poland	state authorities: disciplinary commissions at the voivodeship level, Appeal Disciplinary Commission at the central level; judicial review by the competent court of appeal
Austria	since 1913[13], Ziviltechnikerkammern (Chamber of Civil Engineers)	Ingenieurkonsulent für Vermessungswesen (Ziviltechniker) (authorised civil engineer for surveying)	state authority: competent federal minister, after consultation with the relevant Chamber of Civil Engineers	professional self-government
Belgium	since 2025[14], Ordre des géomètres-experts/Orde van landmeters-experten (Order of Geometer-Experts)	géomètre-expert/landmeter-expert (geometer-expert)	professional self-government	professional self-government
France	since 1946, Ordre des géomètres-experts (Order of Geometer-Experts)	géomètre-expert (geometer-expert)	professional self-government	professional self-government
Slovakia	since 1996[15], Komora geodetov a kartografov (Chamber of Surveyors and Cartographers)	Autorizovaný geodet a kartograf (authorised geodesist and cartographer)	professional self-government	professional self-government
Sweden	no statutory professional self-government	not applicable – no individual statutory professional authorisation system	not applicable – no professional licensing system	not applicable[16]
United Kingdom (England)	no statutory professional self-government; strong role of RICS[17], since 1868	Chartered Land Surveyor[18]	Royal Institution of Chartered Surveyors (RICS)	Royal Institution of Chartered Surveyors (RICS)

13 The statutory professional representation of Austrian civil engineers dates back to 1913. The current legal framework is provided by the Civil Engineers Act (Ziviltechnikergesetz 2019).

14 Established by the Act of 27 March 2023 on the Protection of the Profession and Title of Geometer-Expert and Establishing the Order of Geometer-Experts, entered into force in 2025.

15 Established by Act No. 216/1995 Coll. on the Chamber of Surveyors and Cartographers, which entered into force on 1 January 1996. The current legal framework is provided by Act No. 487/2021 Coll. on the Chamber of Surveyors and Cartographers.

16 At Lantmäteriet, Section 26 of Ordinance (2009:946) with Instructions for Lantmäteriet provides for a personnel responsibility committee within the authority.

17 The Royal Institution of Chartered Surveyors (RICS) was founded in 1868 and received a Royal Charter in 1881, which sets out its objectives (RICS, 2020).

18 The title of Chartered Land Surveyor, conferred privately by RICS rather than by state licensing, is nonetheless legally protected and listed on the Register of Regulated Professions in the UK (see UK Government (nd)).

cate of special professional competence (osvedčenie o osobitnej odbornej spôsobilosti) is required for designated verification functions[19]. These instruments perform specific legal functions and should therefore be distinguished from the professional authorisation of an autorizovaný geodet a kartograf. Table 3 does not present them as separate professional titles.

Sweden represents a distinct model of professional regulation. There is currently no individual statutory licensing system for surveyors and no statutory professional disciplinary system comparable to those identified in the other analysed jurisdictions. The public authority conducting the cadastral proceedings primarily bears responsibility for the correctness of cadastral procedures. Individual surveyors remain subject to the general rules governing public employees, including applicable criminal and employment liability.

Sweden previously maintained statutory authorisation requirements for certain surveying and mapping activities under the Mätningskungörelsen of 1974. As noted by Jämtnäs et al. (2022, pp. 2–3): "The MK law from 1974 mandated that surveying and mapping should be carried out by chartered/authorized surveyors (...). But the nearly 400-year-old system of chartered surveyors in Sweden came to an end in 2010, when the MK law was repealed." The authors identify changing market dynamics, including the growth of private enterprises and increasing demand for surveying services, as the main driver for this transition, which occurred alongside the rapid spread of GNSS-based positioning technologies.

Under the Swedish Real Property Formation Act, the competent cadastral authority conducts cadastral procedures, and the appointed cadastral surveyor acts on its behalf. According to Paasch

19 Act No. 215/1995 Coll. on Geodesy and Cartography § 7(1)–(4), § 9(2) and § 14(1).

(2024, pp. 220–221), "today there are no formal, legal requirements for a specific education of any kind for cadastral surveyors responsible for the cadastral procedures". Cadastral authorities instead rely on internal training, practical preparation and quality-management procedures. Paasch further notes that "the person in charge of the cadastral process acts as a representative for the cadastral authority. In case of mistakes and procedural errors in the cadastral process, the organisation is held responsible, not the civil servants". Concentration of cadastral responsibility within a public authority does not eliminate the need for explicit quality-management mechanisms. Lantmäteriet identifies continuous quality improvement, measurements of information quality, user feedback, and cooperation with other organisations as ongoing elements of managing the Real Property Register (Svensson and Andersson, 2018).

The Swedish case demonstrates that statutory professional self-government is not the only institutional arrangement used to organise responsibility for cadastral procedures. An alternative arrangement concentrates responsibility for the cadastral process within the competent public authority. However, this solution's direct transferability to Poland is limited by the fundamentally different allocation of surveying activities between public authorities and a large private sector of licensed surveyors.

For surveying services more broadly, Jämtnäs et al. (2022) describe a contractual approach to quality assurance: Lantmäteriet's surveying and mapping guidelines are not legally binding in themselves, but their requirements become binding when incorporated into contracts.

England represents a title-based model of professional regulation. RICS confers and regulates the Chartered Land Surveyor title and exercises professional oversight of its members and regulated firms. At the same time, access to surveying activities is generally not subject to an individual statutory licensing system. Membership of the Royal Institution of Chartered Surveyors (RICS) is voluntary but widely recognised within the profession. The UK Register of Regulated Professions lists Chartered Land Surveyor, with RICS acting as the regulatory body. This reflects the fact that the professional title is protected and regulated through RICS's internal regulatory framework rather than a statutory state licensing system. The absence of general statutory licensing does not mean the absence of professional quality-assurance mechanisms: RICS professional standards set technical and professional requirements for its members and regulated firms (RICS, 2014). Another important professional body is the Chartered Institution of Civil Engineering Surveyors (CICES), established in 1969 and granted a Royal Charter in 2009[20]. Its Royal Charter provides for assessing membership qualifications and disciplinary procedures applicable to its members (Chartered Institution of Civil Engineering Surveyors, 2009).

Among the countries analysed, statutory professional self-government exists in Austria, France, and Slovakia, where it has been part of the professional regulatory model for many years. Belgium is the most recent example, with the Order of Geometer-Experts beginning operations in 2025. As a post-socialist country, Slovakia is of particular comparative interest, as it introduced statutory professional self-government for surveyors as early as 1996. In Poland, however, no such institution currently exists, although a designated group of experts[21] is working on proposals to establish such a self-governing body.

Continuing professional development (CPD) and professional liability coverage form part of several of the analysed regulatory frameworks, although their legal basis and scope differ. In France[22], Belgium[23] and Slovakia[24], legislation provides for both requirements, subject to the applicable personal scope and exemptions. Austria[25] also imposes statutory continuing professional development obligations on Ziviltechniker, with detailed requirements for practising engineering consultants. In England[26], RICS requires continuing professional development from its qualified members and professional indemnity cover from its regulated firms. The latter requirements arise from professional-body regulation rather than a general statutory regime applicable to all surveyors. As Ercan (2023, p. 1091) points out, "the mandatory Continuous Professional Development (CPD) experiences an increasing trend since it is required in more and more countries". Polish legislation does not currently impose a statutory continuing professional development requirement on licensed surveyors or compulsory professional liability insurance.

Overall, the comparison reveals different allocations of authorisation, professional oversight and disciplinary functions between public authorities and professional institutions. The absence of individual statutory licensing does not imply the absence of professional or institutional requirements.

6 Submission and administrative control of surveying results

This section examines the third functional-legal analytical dimension: the submission and administrative control of surveying results. It compares notification obligations, mandatory submission requirements, the scope of authority control and the legal form of refusal or non-acceptance.

The analysis is based on the applicable legal regulations. However, the practical implementation of these regulations may differ from the legal model established by statutory provisions. For example, in Poland, legislation provides for the formal, technical, and legal verification of the results of reported surveying works. Porucznik and Hanus (2024) identified a mismatch between the statutory scope of verification and the documentation required for submission, which limits the authority's ability to assess compliance with surveying standards. They also distinguished acceptance of documentation into the national geodetic and cartographic resource from the subsequent assessment of its suitability for updating cadastral data.

Since legal classifications and the scope of surveying activities differ across the analysed jurisdictions, the comparison does not rely on national categories of surveying work. Instead, surveying results were classified by their legal significance into two analytical categories: cadastral/legal results (CR), i.e. results intended to support changes in cadastral or land-registration data, the identification of property boundaries, or legally significant dealings in land. Engineering/technical results (ER) comprise the other engineering and technical outputs examined in the study that do not perform this direct cadastral or land-registration function. The distinction concerns the function of the submitted result, not the overall purpose of the assignment. It does not imply that ER are legally irrelevant or that a single assignment can produce only one category of results.

Activities performed internally by public authorities are outside the external submission-and-acceptance relationship examined

20 Chartered Institution of Civil Engineering Surveyors (nd).

21 As of 18 November 2025, the Surveyor General of Poland appointed a team to establish a professional self-government of licensed surveyors (Surveyor General of Poland, 2025).

22 Decree No. 96-478 of 31 May 1996 regulating the profession of geometer-expert and establishing the Code of Professional Duties, Articles 33 and 47.

23 Act of 27 March 2023 on the Protection of the Profession and Title of Geometer-Expert and Establishing the Order of Geometer-Experts, Articles 23 and 31(2); see also Article 24.

24 Act No. 487/2021 Coll. on the Chamber of Surveyors and Cartographers, § 13(2)(c) and (g).

25 Ziviltechnikergesetz 2019, § 12(8); Ingenieurkonsulent:innen-Berufsfortbildungsverordnung 2024, § 1–2 and 6.

26 RICS (2021), Appendix A: Professional obligations to RICS.

in this dimension. Work commissioned from an external surveying professional is not excluded solely because the client is a public authority; its inclusion depends on the statutory reporting, submission and review regime applicable to that work. Their institutional allocation, including responsibilities for geodetic reference networks and cartographic functions, remains part of the institutional analysis presented in Section 3.

For comparative purposes, the "formal" category refers to required documents and procedural conditions; the "technical" category concerns the compliance of plans or data with applicable geodetic and cadastral requirements; and the "legal" category relates to the analysis of legal conditions relevant to a given procedure. However, these categories do not imply a uniform scope of analysis across different countries.

Table 4 presents the results of the analysis. The column entitled "Legal form of refusal/non-acceptance" refers to the form in which a negative outcome concerning the submitted surveying result or plan is formally expressed. It does not include any preceding procedural stages, such as requests to remedy deficiencies or correct the submitted documentation, which may form part of the administrative procedure in individual legal systems. The classifications in Table 4 therefore represent the author's comparative synthesis, based on a systematic analysis of the relevant legal acts, implementing regulations, and administrative procedures governing cadastral and surveying activities in the analysed countries.

For comparative purposes, a reporting obligation means a statutory requirement to notify a competent public authority of the performance or intended performance of specified surveying activities. It is distinguished from the subsequent obligation to submit the results of those activities.

The comparative analysis of submission and administrative control arrangements reveals significant differences in the legal mechanisms for receiving and examining surveying results within cadastral and land-registration procedures.

Polish legislation requires notification of statutorily specified surveying works, subject to exemptions. Slovak legislation instead imposes specific information duties and requires the submission of selected surveying results; it does not establish a comparable general work-notification regime. The systems differ, however, in how they organise verification. In Slovakia, selected cadastral/legal results are subject to authorisation verification by an authorised surveyor, and certain results submitted to state documentation are additionally subject to official verification performed on behalf of the competent district authority by a cadastral employee possessing specific professional competence. Thus, the Slovak system combines professional verification with official administrative verification rather than relying exclusively on verification by the public authority. Both systems retain a significant public role in regulating the submission and incorporation of surveying results into official public registers, although the organisation of verification differs.

Austria, Belgium and France share a pattern of limited or purpose-specific data transfer. In these countries, submission obligations focus on cadastral or legally significant procedures and on results relevant to cadastral or land-registration systems, rather than extending to all surveying work. In Austria, responsibility is divided sequentially between the licensed surveyor and the cadastral authority. The surveyor conducts the surveying activities, including the necessary involvement of the owners, and prepares the surveying documentation. The cadastral office subsequently performs formal and legal checks, along with an examination of the technical content, before certification (Ernst, 2018). In Belgium, the competent administration may decline to issue a reference for a boundary plan that does not meet the prescribed requirements and must inform the applicant of the reasons. In France, the cadastral service may formally reject a document d'arpentage following verification and return it to the practitioner with a letter explaining the reasons for rejection.

Across the analysed systems, public authority involvement is linked more closely to the use of surveying results in cadastral and land-registration procedures than to the performance of surveying activity itself. Where a result is used to support a change in cadastral data, the identification of a property in a legal instrument, or an entry in a land register, the applicable procedure provides for its submission, examination or incorporation by the responsible institution. The point at which this occurs, who must initiate the procedure, and the scope of examination differ between jurisdictions. The absence of a general duty to notify surveying activity therefore does not mean that results used in these procedures remain outside institutional procedures.

The FIG Statement on the Cadastre already distinguished between cadastral surveying and the examination and recording of its results. This document identified quality assurance and practitioners' responsibility as elements of this process (FIG, 1995).

Sweden and England represent distinct approaches based on different legal assumptions. In Sweden, public authorities carry out cadastral surveying and incorporate cadastral data into the official registers through administrative procedures. In England, statutory requirements arise within land registration procedures and are addressed primarily to applicants rather than directly to surveyors. The system provides state-backed title registration through the land register. Still, it does not guarantee the precise legal position of property boundaries, which official maps represent as general boundaries. Where the exact position of a boundary needs to be established, landowners may commission a surveyor to prepare a plan or provide expert evidence[27]. A surveyor's assessment does not by itself resolve a boundary dispute or cause the boundary to be recorded as determined in the register.

Within the analysed jurisdictions, the results indicate a relationship between the scope of administrative control over surveying results and the legal significance of the information incorporated into official land registers.

7 Comparative synthesis and implications for the Polish legal system

Following the research framework presented in Figure 1, the findings are synthesised below across the three functional-legal analytical dimensions.

7.1 Institutional organisation

Regarding the institutional organisation of geodesy and cartography, the findings do not support the conclusion that any of the analysed institutional arrangements may be regarded as universally optimal. Rather, the adopted solutions are closely linked to the historical development of public administration, the organisation of the State, and the functions assigned to the cadastre.

In Poland, the potential adaptation of foreign solutions should be assessed in the context of the existing institutional model, which has evolved over many years under specific legal, organisational and financial conditions. Transferring a substantial proportion of surveying and cadastral responsibilities to local government authorities required significant organisational and financial investment, particularly in the digitisation and maintenance of official geodetic and cartographic databases. Consequently, any fundamental restructuring of the current institutional model would require careful consideration of both its legal and financial implications.

One issue requiring further consideration concerns the institutional organisation of the cadastre. Comparing submission procedures provides another reason to treat cadastral and land-registration functions as a distinct institutional responsibility. Even where surveying activity itself is not generally notified to a public

27 HM Land Registry (2026), sections 3–4.

Table 4: Reporting, submission and administrative control of surveying results in the analysed countries

Country	Notification/reporting obligation	Scope of mandatory submission[28]	Scope of authority control (formal/technical/legal)	Legal form of refusal/non-acceptance
Poland	yes[29]	yes (specified CR, ER)	formal, technical and legal	administrative decision
Austria	no general obligation	yes (CR – limited scope)	formal, technical and legal	administrative decision refusing plan certification
Belgium	no general obligation	yes (CR – limited scope)	formal and technical, including prescribed legal information	reasoned notice of non-issuance of the plan reference
France	no general obligation	yes (CR – limited scope)	formal, technical and legal (limited to prescribed conditions of the document)	rejection of the document d'arpentage with an explanatory note
Slovakia	no general obligation[30]	yes (specified CR and ER)	formal and technical; legal in registration proceedings	for results subject to official verification: return without verification, accompanied by a protocol of identified deficiencies
Sweden	no	CR within authority-led proceedings; no general external submission	formal, technical and legal within authority-led proceedings	not applicable – no separate acceptance of an external survey result
United Kingdom (England)	no	CR within specified registration procedures; no general surveyor submission	formal, technical and legal within registration proceedings	not applicable – no separate acceptance of an external survey result

Legal sources for Table 4:

- Poland: Articles 12(1), 12a(1), 12b(1), (3) and (6)–(8), and 12c(1) Act of 17 May 1989 on Geodetic and Cartographic Law.
- Austria: § 39 of the Act of 3 July 1968 on Land Surveying and the Boundary Cadastre.
- Belgium: Articles 2–5 of Royal Decree of 18 November 2013; Article 2 of the Ministerial Decree of 18 November 2013, as amended.
- France: Article 25 of Decree No. 55-471 of 30 April 1955; DGFiP, BOI-CAD-MAJ-10-30 (version of 12 May 2021)[31], I.B, § 10; II.A, §§ 50–70; II.B, § 80; IV, § 170.
- Slovakia: Act No. 215/1995 Coll., §§ 6–9 and 12, and Act No. 162/1995 Coll., §§ 18(1)(e), 31 and 67(5); Decree No. 300/2009 Coll., § 44(1)–(4) and § 46(4).
- Sweden: Property Formation Act (1970:988), Chapter 4, §§ 1, 25, 25a and 31.
- United Kingdom (England): Land Registration Act 2002, section 60; Land Registration Rules 2003, rules 118–120.

28 CR denotes cadastral/legal results and ER denotes engineering/technical results, classified by the function of the result rather than by national categories of surveying activity. "Limited scope" means that mandatory submission applies only to specified results or procedures within the indicated category; it does not imply that all CR or ER results must be submitted. The Swedish and English entries also distinguish results produced within authority-led proceedings from documents supplied by applicants in registration procedures.

29 For statutorily specified surveying activities, subject to exemptions (Articles 12(1) and 12c(1) Act of 17 May 1989 on Geodetic and Cartographic Law).

30 Specific information duties and submission of selected results, rather than a general duty to notify surveying activity (Act No. 215/1995 Coll. on Geodesy and Cartography § 12).

31 DGFiP (2021).

authority, legally significant results enter an identifiable procedure before they are used to change official records or support registration. For Poland, this supports clearly assigned responsibility, decision-making competence and resources for maintaining cadastral data and examining the results on which those data depend. It does not, by itself, determine whether a separate authority or a specialised unit within a broader administrative structure should perform these functions.

The comparison reveals that cadastral or equivalent land-registration functions are organisationally identifiable across the analysed systems, either through separate institutions or through specialised structures or territorial units within integrated authorities. This issue has also been addressed in the Polish literature. Nogalski et al. (2023, p. 26, author's translation) observed that "existing arrangements are characterised by a low level of task coordination, a significant dispersion of institutions and entities holding documentation on land and the structures located on it, and a concentration, at county level, of tasks relating to the maintenance of the public registers under consideration." The present study confirms that the institutional organisation of geodesy and cartography remains closely linked to the functions assigned to the cadastre. Consequently, any future organisational reforms should first be preceded by a clear determination of the objectives that the Polish cadastre is expected to fulfil.

7.2 Professional regulation

The comparison identifies different combinations of professional authorisation, institutional responsibility and verification for surveying activities of direct cadastral or legal significance. Austria combines privately performed licensed surveying with subsequent examination and certification by the public cadastral authority. By contrast, Sweden allocates responsibility for cadastral procedures primarily within the public authority. The comparison therefore does not establish a uniform relationship in which greater legal significance necessarily entails more extensive individual licensing.

Among the analysed countries, statutory professional self-government exists in Austria, Belgium, France and Slovakia. While it has formed part of the professional regulatory model for many years in Austria, France and Slovakia, the Belgian Order of Geometer-Experts has operated since 2025. Slovakia is of particu-

lar comparative interest because, despite sharing a post-socialist legal tradition with Poland, it introduced statutory professional self-government for surveyors as early as 1996. The Swedish case provides a contrasting arrangement: statutory authorisation requirements for certain surveying and mapping activities ceased in 2010, while public authorities organise cadastral procedures.

In Poland, more than 18 600 surveyors are currently authorised to practise, including over 13 000 (approximately 70%) with scope 2 qualifications, covering boundary determination, subdivision of real property, and the preparation of legal surveying documentation[32]. Considering both the number of qualified professionals and the scope of activities entrusted to them, transferring all cadastral surveying currently performed by private professionals to public authorities, following the Swedish model, would require a fundamental restructuring of the existing institutional and organisational framework. At the same time, more than 1 300[33] students graduated from university programmes in geodesy in 2024, over 1 400[34] in 2025, while more than 1 100[35] graduates completed secondary technical surveying education in 2024. These figures indicate the scale of Poland's surveying qualification and training.

Previous analysis of the Polish framework identified a mismatch between the entities subject to inspection procedures and those bearing disciplinary responsibility, along with insufficiently specified consequences for failing to implement corrective measures (Porucznik, 2026).

The comparison indicates that statutory professional self-government is one regulatory mechanism adopted in most of the analysed European jurisdictions. In Poland, the Surveyor General of Poland is currently working on this issue. For Poland, the findings support statutory professional self-government as one option for reforming professional regulation. The comparison further shows that stronger mechanisms of professional responsibility can coexist with a more limited role for direct administrative intervention in professional regulation. This provides a basis for considering greater reliance on professional self-regulation exercised by a statutory professional body responsible for licensing, professional standards, and disciplinary oversight. Unlike a comparison with other Polish professions, the international comparison examines how regulation of the same professional field relates to cadastral administration and the control of surveying results. It supports the proposed professional self-governing body as one functionally justified arrangement, without establishing its superiority over all alternative forms of regulation.

The study further indicates that statutory continuing professional development requirements and compulsory professional liability insurance constitute elements of professional regulation in several of the analysed countries. Directive (EU) 2018/958 expressly recognises continuous professional development as a regulatory mechanism that may help ensure that professionals keep abreast of developments in their respective fields, subject to the principle of proportionality. In Poland, no statutory continuing professional development requirement currently applies to licensed surveyors. These mechanisms could complement future reforms of the professional regulatory framework.

7.3 Submission and administrative control

Regarding the submission and administrative control of surveying results, the comparative analysis indicates that, in most of the analysed countries, submission obligations focus on cadastral or legally significant procedures and on results relevant to cadastral or land-registration systems.

On this basis, one possible direction for future reform would be to differentiate the scope and intensity of administrative verification according to the legal significance of the submitted results. Enhanced verification should focus on cadastral/legal results (CR), i.e. results intended to support changes in cadastral or land-registration data, the identification of property boundaries, or legally significant property transactions. In contrast, engineering/technical results (ER), which do not perform a direct cadastral or land-registration function, should be subject only to the level of administrative control necessary for their incorporation into the relevant public datasets, resources or registers. This result-oriented differentiation reflects the comparative observation that several jurisdictions concentrate mandatory submission or certification requirements on cadastral or legally significant results. The comparison shows that professional responsibility and administrative verification can coexist in different combinations and should not be treated as mutually exclusive mechanisms. The Slovak example illustrates how verification of legally significant cadastral results can be linked to specific professional qualification requirements for those performing it.

The findings suggest that strengthening professional responsibility and reducing routine administrative verification may be treated as complementary rather than alternative reform directions.

The comparative analysis demonstrates that the legal and institutional arrangements captured by the three functional-legal analytical dimensions are interrelated. The institutional organisation of geodesy and cartography shapes the allocation of public responsibilities, which in turn links to the regulatory arrangements governing the surveying profession and to the scope of administrative verification of surveying results. Consequently, changes in one dimension may affect the other two.

The proposed solutions should not be understood as recommendations to transplant any particular foreign legal system into Poland. Rather, the comparative analysis identifies institutional, professional, and procedural solutions that, with appropriate adaptation to Polish legal, organisational, and financial conditions, may provide valuable directions for further development of the national legal system governing geodesy and cartography.

The directions for adaptation presented in Table 5 were not selected based on their numerical prevalence among the analysed jurisdictions. They were selected where the comparative analysis identified a legal or institutional mechanism corresponding to a relevant feature or problem of the Polish system identified in the present study or in the author's previous research. The proposed directions therefore reflect the functional compatibility of particular mechanisms with the existing Polish institutional and professional framework.

The directions for adaptation presented in Table 5 address specific features and problems identified in the Polish system. The comparative analysis identified different legal and institutional mechanisms used to meet comparable functional needs, from which the study selects those compatible with Poland's existing institutional and professional framework. Together, the proposed mechanisms form a coherent model for allocating functions and responsibilities rather than a set of isolated foreign solutions.

8 Discussion and conclusions

The comparison shows how institutional organisation, professional regulation and administrative control combine to allocate responsibility for surveying and cadastral procedures. The institutional, professional and control arrangements captured by the three dimensions are closely interrelated. The comparative analysis suggests that no single national legal model is universally optimal. Rather, the findings point to the importance of internal consistency between institutional organisation, professional regulation and the administrative control of surveying results.

32 Head Office of Geodesy and Cartography (2026).
33 Statistics Poland (2025).
34 Statistics Poland (2026).
35 Horbaczewska (2024).

Table 5: Comparative findings and proposed directions for adaptation in Poland

Functional-legal dimension	Comparative finding	Polish-system rationale	Proposed direction for adaptation in Poland
Institutional organisation	Cadastral or land-registration tasks are carried out by identifiable organisational units – either as separate institutions (Belgium, France and England) or as specialised departments or territorial units within an integrated administrative system (Austria, Slovakia and Sweden).	At county level, the same authority combines responsibility for cadastral functions, local geodetic reference networks and topographic mapping, with cadastral administration forming part of its broader remit. Polish research cited in this study also identifies coordination and institutional-fragmentation problems in the organisation of land- and building-related public registers.	Strengthen the institutional specialisation and coordination of cadastral functions; where sufficient functional distinctness cannot be achieved within the existing structure, organisational separation should provide an alternative mechanism.
Professional regulation	Statutory professional self-government performs important regulatory functions in Austria, Belgium, France and Slovakia. In Sweden, the surveying profession is not subject to a comparable system of statutory professional self-government or general individual licensing.	Poland has a large private sector of licensed surveyors performing legally significant functions, while no single professional institution combines responsibility for professional standards, ethics, complaints and comprehensive disciplinary accountability. Transferring cadastral surveying currently performed by private professionals to public authorities would require fundamental restructuring of the existing system.	A functionally justified solution is to establish a statutory professional self-governing body that provides an institutional framework for professional standards, ethics and disciplinary accountability, subject to appropriate external oversight.
Professional regulation – CPD	Legally required CPD exists in Austria, Belgium, France and Slovakia; RICS applies CPD requirements to qualified members in England.	The current Polish framework does not provide for a statutory continuing professional development requirement for licensed surveyors. Directive (EU) 2018/958 recognises continuous professional development as a regulatory mechanism that may ensure that professionals keep abreast of developments in their field, subject to proportionality.	Introduce a statutory continuing professional development requirement for licensed surveyors, with its scope and intensity proportionate to the regulated professional functions performed.
Professional regulation – liability protection	Professional liability coverage is required by legislation in Belgium, France and Slovakia; RICS-regulated firms are subject to professional indemnity requirements in England.	Licensed surveyors in Poland perform independent professional activities that may give rise to liability towards clients or third parties.	Introduce compulsory professional liability insurance for licensed surveyors performing independent professional functions, with coverage proportionate to the risks associated with those functions.
Submission and administrative control	Submission obligations concentrated on cadastral or legally significant procedures and on results relevant to cadastral or land-registration systems (Austria, Belgium, France, United Kingdom (England) – a specific case).	In Poland, mandatory verification applies to a broad range of submitted surveying results, while previous research has shown that such verification does not necessarily permit a comprehensive assessment of their correctness.	Differentiate the scope and intensity of administrative verification according to the legal significance of surveying results, with enhanced verification concentrated on cadastral/legal results and administrative control of engineering/technical results limited to the extent necessary for their incorporation into the relevant public datasets or resources.

The present study has not only identified the principal differences between the analysed legal systems. It has also revealed legal and institutional solutions that recur across several jurisdictions and may inspire the future development of the Polish legal system. In several of the analysed systems, responsibilities are more clearly differentiated between public authorities and professional regulatory structures. Public authorities primarily maintain official registers, protect the public interest, and control results with direct cadastral or legal significance. In contrast, statutory professional self-government bodies or other professional regulatory institutions handle professional standards, professional ethics and, in some jurisdictions, disciplinary oversight. These arrangements illustrate an alternative distribution of regulatory functions in which professional responsibility may play a greater role. At the same time, public oversight remains concentrated on areas of direct public and legal significance.

Where statutory professional self-government also performs licensing or market-entry functions, its potential advantages should be weighed against the costs of occupational licensing, including barriers to entry and higher regulatory costs (Kleiner, 2015). Where such a body is established, its legal design should ensure effective external oversight of the public functions it is entrusted with. Such oversight may also reduce the risk that professional regulation becomes excessively influenced by the interests of the regulated profession itself.

The French debate also cautions against equating professional competence with membership of a statutory body. The Autorité de la concurrence emphasised that competence rests on validated knowledge and skills and that alternative institutional arrangements can also safeguard professional independence and integrity (Autorité de la concurrence, 2018, paras. 113–123).

In 2003, the Belgian government favoured federal councils over a professional institute partly because of costs; parliamentary consultations also raised concerns about balanced representation of self-employed, salaried and public-sector surveyors and appeal procedures (Belgian Chamber of Representatives, 2003). Two decades later, the minister justified higher membership fees for the proposed Order by citing the federal councils' limited resources and lack of legal personality, which constrained action against unlawful professional practice (Belgian Chamber of Representatives, 2023). For Poland, this experience highlights the need to define membership, representation and appeal mechanisms, and to align the body's powers and funding with its assigned responsibilities, rather than assuming that its establishment alone resolves problems of professional accountability.

Any Polish reform introducing new or amended restrictions on access to, or the pursuit of, the surveying profession would also need to be assessed under Directive (EU) 2018/958. The Directive requires an ex-ante, objective and independent proportionality assessment, justification by public-interest objectives, and consideration of whether less restrictive measures could achieve the same purpose. It expressly requires consideration of the relationship between reserved activities and professional qualifications, organisational and supervisory arrangements, compulsory membership or authorisation schemes, continuing professional development and professional liability insurance. Relevant stakeholders, including persons outside the profession concerned, should also be allowed to express their views.

When considering the potential adaptation of foreign legal solutions, it should be recognised that Poland has operated under a decentralised model of geodetic and cartographic administration for many years. This institutional arrangement has significantly influenced both the organisational structure and the financing of public surveying and cartographic tasks. The present study does not provide a sufficient basis for a comprehensive structural reorganisation, because comparative performance, implementation costs and implementation feasibility fall outside its scope. Any assessment of the adaptation potential of foreign solutions should take into account Poland's existing organisational, financial and human-resource conditions, including the number of licensed surveyors and the current model for financing geodetic and cartographic administration. Nevertheless, the study identifies several legal and institutional solutions that may merit further consideration in Poland, including:

1. consideration of the organisational separation or strengthening of cadastral functions;
2. strengthening the professional responsibility of surveyors, including consideration of statutory professional self-government with appropriate external oversight;
3. differentiating the scope and intensity of administrative verification according to the legal significance of the submitted results, with enhanced verification concentrated on cadastral/legal results (CR) intended to support changes in cadastral or land-registration data, the identification of property boundaries, or legally significant property transactions, while engineering/technical results (ER) would be subject only to the level of administrative control necessary for their incorporation into the relevant public datasets, resources or registers.

The comparative findings, considered alongside Polish research on the organisation of cadastral and related public registers (Nogalski et al., 2023) and the author's previous analyses of verification and supervisory procedures (Porucznik and Hanus, 2024; Porucznik, 2026), suggest that cadastral functions may require a higher degree of institutional specialisation than is currently provided for in the existing administrative structure. This emphasis on specialisation and coordination aligns with the distinction between coordinating functions, redistribution of competences and information-sharing systems developed by Crompvoets and Ho (2019, pp. 146–150). It also reflects a governance perspective in which coherence concerns whether institutional arrangements reinforce rather than undermine one another (Casiano Flores et al., 2021). The increasing complexity of cadastral systems, including the development of assumptions for 3D cadastre and integrated land management systems, may further reinforce the need for institutional specialisation in this area.

Among the jurisdictions examined in this study, the Polish legal system represents a distinctive combination of extensive decentralisation, broad professional licensing and comprehensive administrative verification. One practical consequence of the current Polish model is the absence of a single institution responsible for supervising professional ethics, examining complaints about the conduct of licensed surveyors and exercising comprehensive professional disciplinary oversight. At the same time, the Polish system demonstrates a partial separation of functions and responsibilities. While the surveyor is responsible for carrying out the work, the submitted results are subject to administrative verification before their incorporation into the relevant public resources or registers. The coexistence of professional responsibility and administrative verification does not, by itself, demonstrate an overlap of legal responsibility. The Austrian arrangement provides a useful comparator: a licensed surveyor produces the surveying documentation and the cadastral authority then examines and certifies it, creating distinct stages within a shared-responsibility process (Ernst, 2018). For Poland, the relevant question is therefore whether responsibility for producing, verifying and incorporating surveying results into public registers is allocated with sufficient clarity, rather than whether professional and administrative responsibility coexist.

The proposal to establish a statutory professional self-government for surveyors also aligns with previous research and the author's findings on fragmented legal mechanisms for ensuring the proper performance of tasks in the fields of geodesy and cartography. Establishing a statutory professional self-government could strengthen the profession's capacity to develop professional standards independently and to respond more effectively to technological developments. Likewise, mandatory

continuing professional development and compulsory professional liability insurance could help strengthen protection for both surveyors and their clients.

The study has certain limitations. The purposive selection of jurisdictions was designed to maximise institutional and regulatory variation and does not exhaustively represent European legal systems. Future comparative research should examine additional jurisdictions, including federal and regionally differentiated cadastral systems.

Recent land-administration research examines applications of artificial intelligence in land-administration systems (Hosseini et al., 2025), while Jämtnäs et al. (2022) emphasise documented data quality and fitness for subsequent use. Recital 26 of Directive (EU) 2018/958 further recognises that technological developments may change information asymmetries between professionals and service recipients. For the regulatory framework examined here, this raises questions about how competence requirements, verification, and responsibility should be adapted as data collection and processing become increasingly automated. Future research should therefore examine the regulatory implications of automated surveying, AI-assisted geospatial data processing, 3D cadastral solutions and distributed-ledger or blockchain-based land-registration technologies.

The analytical framework shows that legally and institutionally diverse systems can be compared using common functional-legal criteria while accounting for national specificities. The framework and findings provide a basis for extending the comparison to other jurisdictions and for further research on the development of the Polish legal system governing geodesy and cartography. Classifying surveying results by legal function, rather than by national categories of surveying works, enabled comparison of submission and administrative control requirements.

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