



## The public-private partnership (PPP) in the provision of land registry and cadastre services in Türkiye

Volkan Deniz <sup>1</sup>, Mert Kayalık <sup>1</sup>, Osman Sami Kırtıloğlu <sup>1</sup>, Zeynel Abidin Polat <sup>\*1</sup>

<sup>1</sup>İzmir Katip Çelebi University, Department of Geomatics Engineering, Türkiye

[volkandenizmy@gmail.com](mailto:volkandenizmy@gmail.com); [mert.kayalik@ikcu.edu.tr](mailto:mert.kayalik@ikcu.edu.tr); [osmansami.kirtiloglu@ikcu.edu.tr](mailto:osmansami.kirtiloglu@ikcu.edu.tr); [zeynelabidin.polat@ikcu.edu.tr](mailto:zeynelabidin.polat@ikcu.edu.tr)

Cite this study: Deniz, V., Kayalık, M., Kırtıloğlu, O. S., & Polat, Z. A. (2023). The public-private partnership (PPP) in the provision of land registry and cadastre services in Türkiye. *Advanced Land Management*, 3 (1), 41-53

### Keywords

Public-Private Partnership  
Land management  
Cadastre  
SWOT analysis

### Research Article

Received:13.03.2023  
Revised: 10.05.2023  
Accepted: 22.05.2023  
Published:09.06.2023



### Abstract

The tendencies of privatization and reorganization in the world turn the tasks done by the public sector into the private sector. The Public-private partnership (PPP) is defined as the project that the public and private sector cooperate on the financing, operation and management of the environment, housing, transportation, water, sewage, solid waste, and land management. The use of PPP as an effective tool in developing infrastructure and superstructure projects and providing faster and more quality services has a long history. The use of PPPs for land administration services is less common, though there are a few notable successes in developed countries. Many of the tasks necessary for the establishment and maintenance of a cadastral system can be realized by the private sector under public control. Activities such as preparation and registration of title deeds, cadastral mapping, zoning implementations can be carried out by private sector or mixed economic organizations. As emphasized by the Cadastre 2014 vision, the PPP approach can provide a model for completing land administration-based reforms throughout the country and maintaining the success of a given project. The aim of study is to help identify the most appropriate strategy for ensuring private sector, and public institution (General Directorate of Land Registry and Cadastre-GDLRC), which is the responsible for land administration and cadastre system in Türkiye, cooperation. In this study, the activities carried out jointly by GDLRC and private sector were determined and the legal, institutional and technical situation required for carrying out these activities were analyzed. As a result of the analysis, superior or weaknesses of the public-private sector cooperation in current land administration and cadastral system in Türkiye with opportunities and threats arising from the external environment were identified by the SWOT matrix. According to the SWOT analysis, the biggest obstacle to public-private cooperation is the existence of too many legislations and institutions on land administration. In order to further increase the cooperation between the public and private sectors, it is necessary to eliminate the deficiencies in the legislation and to develop policies for the participation of the private sector in land administration activities.

## 1. Introduction

Increasing globalization trends, developments in information and communication technology, economic crises and increase in demand for public services have directed public administrators to different searches. In parallel with these developments, there have been serious changes in the manner of public administration. These changes significantly affected the provision of public services [1]. Concepts such as transparency, accountability, effectiveness and efficiency in public administration have gained more importance [2]. While the importance of international collaborations has increased with these changes, public-private partnership practices have come to the fore.

Public-private partnership, known internationally as PPP, is a financing model. It is used to prevent the postponement or inability of the goods and services to be offered by the state due to the insufficient budget of the construction works. This model is preferred because of the benefits such as reducing costs arising from public investments, using the dynamism of the private sector in the public service, and effectively distributing the risk. For the private sector, the recycling of the investment is guaranteed by various privileges. The PPP practices used extensively in both developed and developing countries. It has been concentrated in many areas such as infrastructure services, urban development projects, health services, environmental and energy services, transportation services, social services, cultural services and other infrastructure services [1,3]. In Figure 1, the sectoral distribution of the amount of PPP projects in developing countries between 1990-2018 is given. According to these data, while the electricity sector in the developing countries has the highest investment amount with approximately \$910 million, this sector is followed by the highway, railway, communication, airline, port management, water-wastewater management, natural gas, environment and finally the transportation sector.

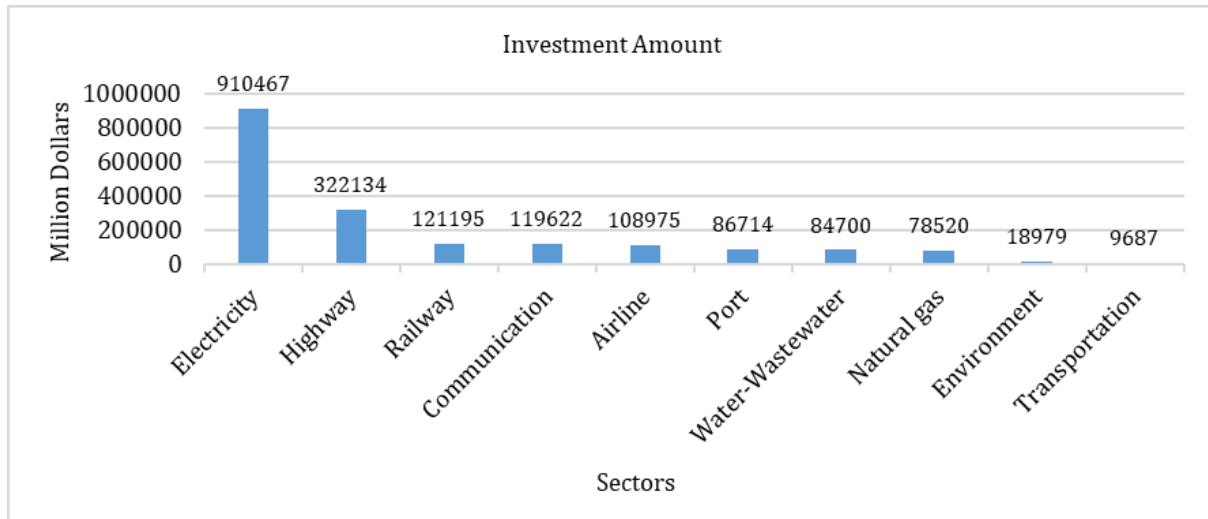


Figure 1. The PPP projects investment amounts in developing countries between 1990-2018 [4]

Another area where public institutions [5, 6] provide services is land management. Land management involves the recording, processing and distribution of information related to ownership, value and use of land and its associated resources [7]. Therefore, it is associated with many public services. In this context, it is necessary to provide land management services in a sustainable structure. For this, as emphasized in the Cadastre 2014 Vision, the PPP is required in land management.

A service for land administration is provided through processes such as data collection, survey, registration, planning, implementation and control. In addition to the public institution, many private sector actors such as notaries, lawyers, valuation specialists, insurance companies, map companies and offices are involved in this process. For a sustainable land administration, data collection, recording, processing, sharing, determining the right targets, financing power, service costs and human resources are required to be handled properly. In order to achieve this, the PPP will be a suitable model. In this study, the current situation of PPP for the execution of land registry and cadastre services in Türkiye were analyzed. In addition, some suggestions were made to ensure the technical, legal and institutional sustainability of the model.

## 2. Material and Method

### 2.1. General overview on PPP concepts

There is no general consensus on the definition of the concept of PPP. In general, it is defined as “based on a contract, investment and services are realized by sharing the costs, risks and benefits of the project in a balanced way between the public and private sector” [8].

The PPP is the mechanism of public sector to supply and implement public infrastructure and/or services using the private sector's resources and expertise. The PPP combines the skills and resources of both the public and the private sector by sharing risks and responsibilities. This enables the public sector to benefit from the private sector's expertise and focus on policy, planning and regulation [9].

The PPP model provides some benefits to the public and private sector. Ndandiko and Ibanda emphasize that the main advantage of PPP is the introduction of commercial (financial) discipline to the public [10]. For example, some expenses of a service provided by public institutions such as service, maintenance and control can be covered

by the private sector according to the PPP model. In addition, delays in the completion of some projects due to insufficient infrastructure and human resources can be eliminated with the cooperation of the private sector.

From the perspective of the private sector, PPP provides new jobs to the private sector. Especially by undertaking the provision of a full package service, it is possible to operate in a wide market including design, construction, operation and maintenance [11]. In addition, the experience provided by public cooperation allows the private sector to increase its capacity to do business in other countries and increase its competitiveness [10]. The PPP model ensures the growth and stability of the private sector.

In other words, PPPs allow the private sector to access low-risk, secure and long-term investment opportunities through public contracts. Such contracts revive local industry and labor markets, provide private capital flows and investment opportunities. With the PPP model, public institutions save resources. Thus, financial resources are created for other public services [10].

Despite all its potential benefits, PPP is not an easy method to implement. The concept has some obstacles in itself. Zhang and Asce analyzed the barriers to PPP, combined them, expressed them in different formats and classified them into six categories [12-13].

These are,

- Social, political and legal risks,
- Unfavorable economic and commercial conditions,
- Framework of less efficient public procurement,
- Insufficient financial engineering techniques,
- Public sector problems,
- Problems related to the private sector.

## 2.2. The PPP in land administration

The use of PPP in the land administration derived from the fact that land administration institutions in many countries have become progressively aware of the importance of good services to the citizen [7]. This partnership is exceedingly influenced by changes in the business sector and the rapid increase in use of information technology. The basic driving forces behind the creating of PPPs are increased public-based service expectations and demands, the need for financial investment for delivering public services, changing service delivery styles, and the encouragement of competition [7].

Generally, the concept of PPP aims to benefit from the expertise and trust of the private sector, provided that accountability is under the control of the public institution. For this reason, the tasks to be carried out with PPP and the basic tasks that should remain in the public sector should be clearly defined by considering the individual conditions of each country. The PPP model for land administration has generated considerable interest amongst land-based public agencies and the private sector, as nearly 70 percent of the world's population still does not have access to low-cost services associated with land administration [14]. While PPPs have been successfully launched in sectors like construction and transportation, using of this model in land administration is poorly understood, especially in developing economies.

The several PPP models for land administration could be classified based on the qualification of responsibility held by the public institutions and by the private sector. In some instances, the public institutions maintain full responsibility of service operations, maintenance of the necessary substructure and service, while in other instances the public institutions create a framework wherein the private sector takes the full responsibility containing investments. However, in practice, these arrangements are hybrid in nature [15]. Allocation of responsibilities among the public and private sectors for the various options is provided in the Table 1. A brief description of each of the PPP models listed in Table 1.

**Table 1.** Comparison of PPP models in terms of various options

Option	Asset Ownership	Operations & Maintenance	Capital Investment	Commercial Risk	Contract Duration
Service Contract	Public	Public & Private	Public	Public	1-2 years
Management Contract	Public	Private	Public	Public	3-5 years
Lease	Public	Private	Public	Shared	8-15 years
Concession	Public	Private	Private	Private	25-30 years
BOT/BOO	Private & Public	Private	Private	Private	20-30 years
Divestiture	Private or Private & Public	Private	Private	Private	Indefinite (may be limited by license)

### **2.2.1. Service contract**

The public agency receives support from the private sector in the form of a Service Contract for a service that requires technical expertise. The duration of the service contract can vary from 1 to 2 years. The coordination of tasks and responsibility for investments lies with the public agency [15].

### **2.2.2. Management contract**

The public agency transfers the responsibility and maintenance of operation to the private sector through a Management Contract. The duration of the management contract usually ranges from 3 to 5 years [15]. The main purpose of this method is to rapidly increase the technical capacity of the public institution and its effectiveness in performing certain tasks.

### **2.2.3. Lease**

With lease arrangement the private sector takes on the responsibility of operating and maintaining the assets of the public agency for a lease payment. The duration of the leases usually ranges from 8 to 15 years. Within the scope of lease arrangement, the public and the private operator work closely.

### **2.2.4. Concession agreements**

In this agreement model the private sector is not only responsible for operating and maintaining the public's assets, but also for bringing in investments. The service fee to be paid to the public administration is collected by the private investor [15]. With the end of the concession, all goods and assets related to the service are transferred directly to the public administration. The duration of the concession agreements usually ranges from 25 to 30 years.

### **2.2.5. Build operate transfer (BOT)**

With the BOT arrangement the private sector undertakes to build, operate, maintain and transfers the ownership of the asset to the public. During the period of the agreement (e.g., 20-30 years) the public pays a fee to the private sector [15].

### **2.2.6. Divestiture**

It is an elaborated form of concession agreement wherein the ownership of assets is also transferred to the private sector. This contains all of management buy-out or transfer of shares. The role of the public is very limited and only performs its regulatory task.

Using PPP model in land management provides some possible benefits. The possible benefits of PPP modeling are provided below.

### **2.2.7. Release of capital**

the PPPs often permit the public sector to transform upfront capital expenditure into a flow of ongoing service payments [15]. This enables projects to proceed when the availability of public capital is constrained, thus bringing forward much needed investment.

### **2.2.8. Faster implementation**

The private sector has a wide range of experience, potential to access resources and opportunities in the management, procurement and execution of important projects. Therefore, the requested services will be offered faster with the contribution of the private sector.

### **2.2.9. Improved quality of service**

A better public administration structure can be created by providing higher quality services with the competence of the private sector in terms of efficiency [16].

### **2.2.10. Risk sharing**

With the PPP model, public agency transfers some risks (e.g., capital, construction, environmental, economic, operational and political risks) to the private sector partner. The most important rule in this risk transfer is to determine the risk distribution of between public and private partners on the basis of “what risks they can better manage” [17].

### **2.3. The analysis of PPP in land administration in Türkiye**

General Directorate of Land Registry and Cadastre (GDLRC) is an important public institution aiming at effective, economic and efficient use of public resources within the framework of strategic priorities. GDLRC performs approximately 9 million transactions annually and provides direct service to approximately 25 million people. The number of transactions performed by GDLRC in the last 10 years and the circulating capital and fee income obtained from these transactions are given in Table 2. Considering the data in Table 2, the workload of the institution is quite high. With the changing public administration approach, GDLRC has started to benefit from the power of the private sector in order to provide a better service to citizens.

**Table 2.** The number of transactions performed by years and the fee income from these transactions

Year	Number of transaction	Income generated (Turkish Lira)
2009	6,971,198	1,804,418,370
2010	6,079,011	3,469,313,821
2011	5,875,531	4,272,460,521
2012	6,190,454	4,637,488,940
2013	6,751,304	6,823,826,863
2014	7,294,519	7,774,581,952
2015	7,710,390	9,122,986,065
2016	8,277,762	10,062,357,716
2017	8,390,980	10,693,331,783
2018	8,896,441	11,290,552,696
2019	10,315,145	10,924,221,197
2020 (first quarter)	3,019,897	4,398,396,046

The services that private sector components support under the PPP model are notaries, lawyers, map companies, real estate valuation companies, map and cadastral engineering offices, licensed map cadastral offices and insurance companies.

#### **2.3.1. Notaries**

People who want to benefit from many services provided by GDLRC can apply with their legal representatives. In order for the application to be valid, it is required to issue a power of attorney belonging to the representatives of the parties at the notary. In addition, notary publics have the authority to approve the contracts made in transactions such as contract of support for life and real estate sales contract. When considered in this context, notaries are a private sector component that takes an active role in land management. Notaries charge various amounts for these services. In return, it provides legal assurance. Thus, notaries share the risk with the public institution.

#### **2.3.2. Lawyers**

Arrangements on Article 18 of Law No. 3194 in urban areas, land consolidation studies in rural areas and expropriation studies for some large projects are activities that cover the wide area and change the property status of many properties. Therefore, it is frequently subject to property cases. Public institutions receive support from lawyers to resolve property disputes between citizens and the public. When considered in this context, lawyers are another private sector component that takes an active role in land management.

#### **2.3.3. Map companies**

Take part in the realization of the engineering processes that fall into the field of geomatics engineering. These companies cooperate with the public institution especially in terms of property cadastre, regeneration of cadastre and digitization of cadastral maps and in the realization of many projects such as land consolidation and urban transformation. Public institutions have such services provided to map companies by tender. For example, within the scope of the Land Registry and Cadastre Modernization Project, 2,336,658 parcels have been tendered in 2,266 units, 1,640,073 parcels have been completed, and works on 701,036 parcels are ongoing. Similarly, since 2010,

GDLRC has been receiving support from the private sector through tender in order to complete the renovation and digitization of the property cadastre throughout the country [18]. The number of parcels registered as a result of the renewal-digitization studies, which were made by map companies between 2010 and 2018, are given in Figure 2.

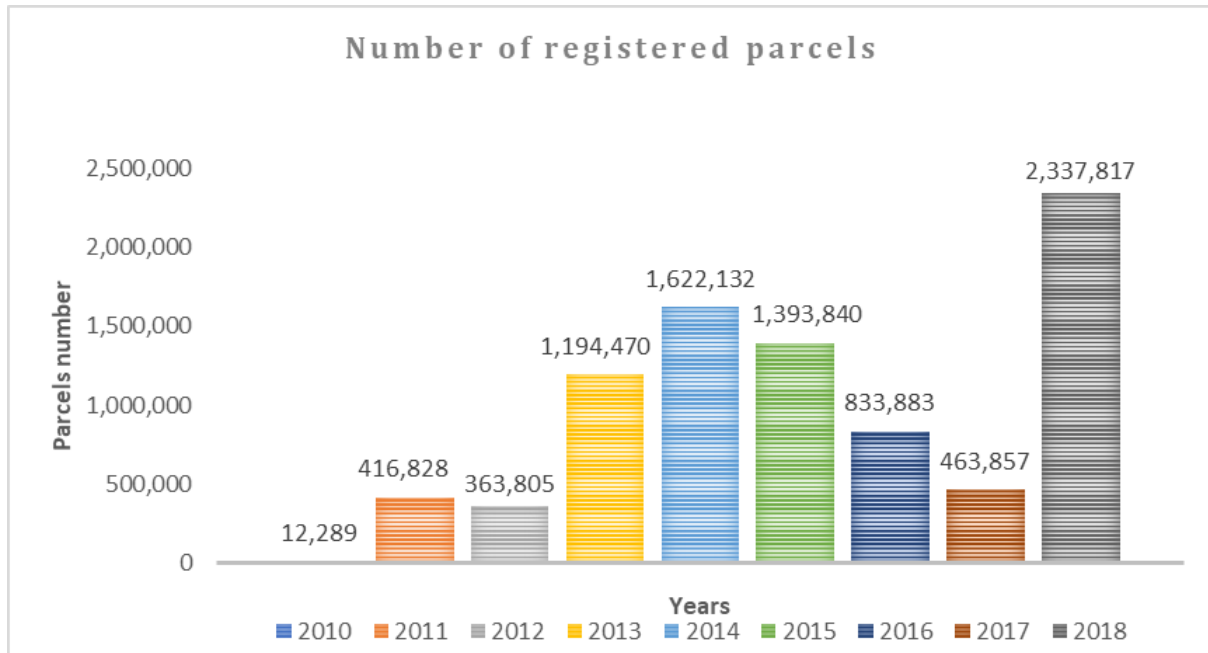


Figure 2. Number of parcels registered by completing renewal-digitization works via Tender [18]

In addition to cadastral studies, support is also received from map companies in the production of 3D city models and orthophoto maps. In this context, studies on evaluation of “Creation of 3D City Models and 3D Cadastral Bases” tenders are continuing on a 5,500 km<sup>2</sup> residential area planned for 2018 [18]. Tender studies have been initiated to scan the architectural projects (to support the 3D cadastre project [19]) and official bills in our land registry offices. Orthophoto maps are used for the renewal and updating of cadastral maps, for accuracy and integrity checks after renewal. In this context, 1:1000 scale real orthophoto production work is made to map companies by tender. GDLRC put out a tender for 5 parts in 2019 and carried out control and acceptance processes in 3 parts. The real orthophotos of the contractor firms, whose production has been completed, have been checked and accepted by the staff of the Department of Mapping.

General Directorate of Agricultural Reform, Ministry of Food, Agriculture and Livestock carries out land consolidation activities. Since the execution of these activities requires a large number of labor and time, the institution has these practices implemented by the private sector through the tender procedure. Especially map companies play an important role in the realization of these applications. The evaluation of 1:5000 scale photogrammetric orthophoto images, making soil classification maps, conducting land survey interviews, planning the parcel, preparation of the cadastral file based on registration, are the work items made by map companies within the scope of land consolidation.

The parceling studies mentioned in article 18 of the Zoning Law No. 3194 are the works of public institutions. The technical procedures necessary for the realization of these studies are made to the map and law companies by tender.

#### 2.3.4. Real estate valuation companies

In cases such as inheritance sharing and foreclosure, there are problems in determining the value of the real estate and they are the subject of the lawsuit. Courts receive support from real estate appraisers or companies to determine the value of the real estate subject to the case. Valuation companies and valuation experts play an active role in the determination of the value of the real estate [20-23]. According to Turkey Valuation Expert Unity (TDUB in Turkish) data, a total of 133 valuation companies are authorized by the Capital Markets Board (CMB); 128 of these are actively preparing reports [24]. Valuation reports are signed by the valuation expert who prepared the report. Therefore, they are responsible for the legal risks that may arise from all transactions. These companies charge the valuation reports they prepare from real or legal persons.



### **2.3.5. Map and cadastral engineering offices**

The change files required for subdivision, amalgamation, change of breed, right of easement, road leaving, road formation, restriction maps, parceling maps, expropriation maps are prepared by freelance map offices. The geomatics engineer signs the documents issued for these procedures [25]. Therefore, they also assume possible risks that will prevent the completion of the transactions. In addition, these offices receive the financial value of their services from real or legal persons.

### **2.3.6. Licensed map cadastral offices (LİHKAB in Turkish)**

They are private offices authorized to do work on behalf of the public. The transactions to be done are limited by law and cannot do other works. Licensed map cadastre offices are responsible for the construction and control of cadastral technical services, such as the registration of transactions that are subject to registration (e.g., change of breed, the right of easement right), and the construction and control of non-registered transactions (e.g., showing the parcel and the real estate on site). Although Licensed map cadastre office is a private sector structure, it has responsibilities coming from the law. Therefore, it is responsible for the legal risks that may arise from all transactions. Licensed map cadastre offices get the financial value of the service they provide from real or legal persons.

### **2.3.7. Insurance companies**

Compulsory earthquake insurance policy regarding the real estate is required for all transactions requiring registration or cancellation on the land registry. This document is provided by insurance companies. Insurance companies are a private sector component that plays an active role in completing transactions. Insurance companies provide the fees of the earthquake insurance policy issued by the real or legal persons in demand. They have no legal responsibility for land registry and cadastral transactions.

The land management services where the private sector components and the public work together are listed in [Table 3](#). In addition, these private sector components can take an active role in one or more phases of service (e.g., measurement, design, planning, implementation). [Table 4](#) is listed the stage of the service supported by the private sector components. The numbers in the cells where the rows and columns intersect in [Table 4](#) show the number of the services in [Table 3](#). For example, map offices play a role in document preparation, measurement, data collection and design stages of 16, 17, 18, 19 and 20th activities listed in [Table 3](#).

## **3. Results and Discussion**

In land management, PPP collaboration is done slightly differently from other traditional PPP models. In traditional PPP models, the construction, operation and maintenance of a transportation project (e.g., highway, bridge construction) or a public building (e.g., hospital, school) is in question. However, in land management, a certain stage or all of a service provided by the public is made to the private sector. There are also some differences in terms of financing the public-private sector service. Cooperation between public institutions and the private sector in land management is done at the request of the public or compulsory by law. For example, while insurance companies issue compulsory earthquake insurance policy pursuant to the law numbered 587, licensed map cadastral offices provide services based on the law numbered 5368. Pursuant to the Notary Law, Notaries carry out warrant of attorney, contract of support for life and real estate sales contract. Apart from these, the construction of the property cadastre, the digitization of the cadastral maps, the cadastral renewal, orthophoto production, the expropriation maps, the land consolidation and the urban area applications are carried out with the support of the private sector in line with the public's request. The financing of PPP originating from the law is provided from the real or legal person served. Financing of voluntary PPP is covered by the relevant public institution.

Optional PPPs are carried out under a contract. A tender is held to determine the private sector component that will take part in this cooperation. The duration of the cooperation, the responsibilities of the private sector and the contract price are specified in this tender specification. PPPs regarding land management also differ in terms of the duration of the service. Optional PPPs are long-term activities that take years. Services are generally completed within a few hours or days within the scope of law-related PPP. In this respect, it is completed in a much shorter time than contract-based PPPs.

**Table 3.** Land management services supported by the Private Sector

Rank	Activities related to land management	Private sector components							
		Notary	Lawyer	Map companies	Appraisal Companies	Map Offices	Licensed Map Cadastral Offices	Insurance companies	
1	Sales	✓						✓	
2	Donation	✓						✓	
3	Barter	✓						✓	
4	Subdivision	✓							
5	Merging of parcels	✓					✓		
6	Constitution of servitude	✓					✓	✓	
7	Mortgage	✓						✓	
8	Right of usufruct	✓					✓	✓	
9	land use conversion	✓					✓	✓	
10	Boundary survey						✓		
11	Describing the location of the parcel and the independent section						✓		
12	Family residence annotation	✓						✓	
13	Correction	✓							
14	Construction servitude	✓						✓	
15	Condominium establishment	✓							
16	Renunciation for road					✓			
17	Formation maps from the road					✓			
18	Bounding maps	✓				✓			
19	Parceling maps					✓			
20	Village layout maps					✓			
21	Contract for lifelong support	✓							
22	Preliminary contract for real estate sale	✓							
23	Expropriation maps								
24	Inheritance sharing	✓			✓			✓	
25	Determining the value of real estate				✓				
26	Cadastral renewal			✓					
27	First cadastre			✓					
28	Digitization of cadastral maps			✓					
29	Orthophoto map making			✓					
30	Land consolidation		✓	✓					
31	Application of Article 18 of the Zoning Law		✓	✓					

**Table 4.** The role of the Private Sector in the services it supports

Stages of the transaction in the realization of the activities	Private sector components						
	Notary	Lawyer	Map companies	Appraisal Companies	Map Offices	Licensed Map Cadastral Offices	Insurance companies
Authentication	1-9, 12-15, 18, 24						
Document preparation	21,22				16-20		1-3, 6-9, 12, 14, 24
Valuation				24,25			
Data collecting			26-31		16-20		
Measuring			26-31		16-20		
Design			26-31		16-20		5,6,9-11
Legal process		30,31					
Planning			26-31		5,6,9-11		
Application			26-31		5,6,9-11		
Tracing					5,6,9		
Control					5,6,9-11		
Financing							



Public and private sector undertake the risks that may arise in voluntary PPPs. Within the scope of PPP originating from the law, the risks that may arise are undertaken by the private sector. Activities related to services in PPPs arising from the law are generally carried out according to the law to which the relevant private sector component (e.g., notary, insurance companies) is subject. Activities related to services in voluntary PPPs are generally carried out in accordance with the Privatization Practices Law No. 4046 and the Public Procurement Law No. 4734. When considered in this context, there is no special law controlling the PPP regarding land management. This negatively affects the provision of services in a more sustainable structure.

The current status of PPP that applies on the land management activities in Türkiye were discussed above in many respects. The model used in PPP was compared in terms of “financing”, “risk sharing”, “duration”, “basis of cooperation” and “control” and the results are given in Table 5. Considering the land management activities in which notaries take part, the financing dimension is provided by real and private persons, while the basis of the relevant activities is the Law No. 1512. These activities are controlled by both the public and private sectors. The possible risk is eliminated by the private sector. Considering the land management activities in which lawyers take part, the financing dimension is provided by the public institution, while the demand of the relevant public institution constitutes the basis of the relevant activities. These activities are controlled by both the public and private sectors. The potential risk is shared by the private sector and public institutions. Considering the land management activities in which the mapping companies are involved, the financing dimension is provided by the public institution, while the demand of the relevant public institution forms the basis of the relevant activities. These activities are controlled by both the public and private sectors. The possible risk is shared by the public institution. Considering the land management activities in which the appraisal companies take part, the financing dimension is provided by real and legal persons, while the demand of the relevant public institution constitutes the basis of the relevant activities. These activities are controlled by the private sector. The possible risk is eliminated by the private sector. Considering the land management activities in which the mapping offices take part, the financing dimension is provided by real and legal persons, while the basis of the relevant activities is the Law No. 6083. The control of these activities is carried out by the public institution. The possible risk is eliminated by the private sector. Considering the land management activities in which Licensed map cadastral offices play a role, while the financing dimension is provided by real and legal persons, the basis of the relevant activities is the Law No. 5368. The control of these activities and possible risk sharing is provided by the public institution and the private sector. Considering the land management activities in which insurance companies take part, the financing dimension is provided by real and legal persons, while the basis of the relevant activities is the Law No. 587. The control of these activities is carried out by the public institution and the private sector. The possible risk is eliminated by the private sector.

**Table 5.** Comparison of the transactions contributed by the private sector according to the criteria of the PPP model

Private Sector Components and the land management activities they contribute*	Criteria for the model of public-private partnership				
	Finasman	Risk sharing	Duration	Basis of cooperation	Control
Notary (1-9, 12-15, 18, 21, 22, 24)	Real or legal person	Private sector	Short-term (hourly or daily)	Based on Law No. 1512	Public and private sector together
Lawyer (30, 31)	Public institution	Public and private sector together	Medium term (Weekly or monthly)	Demand of public institution	Public and private sector together
Map companies (26-31)	Public institution	Public and private sector together	Long-term (Annual)	Demand of public institution	Public institution
Appraisal Companies (24, 25)	Real or legal person	Private sector	Short or medium term	Demand of public institution	Private sector
Map Offices (16-20)	Real or legal person	Private sector	Short or medium term	Based on Law No. 6083	Public institution
Licensed map cadastral office (5, 6, 8-11)	Real or legal person	Public and private sector together	Short or medium term	Based on Law No. 5368	Public and private sector together
Insurance companies (1-3, 6-9, 12, 14, 24)	Real or legal person	Private sector	Short-term (hourly or daily)	Based on Law No. 587	Public and private sector together

\*The codes of the activities are given in parentheses. Activity names can be found in Table 3 using these codes.

Due to the necessity and increasing importance of PPPs, it offers a potential model that can be applied in general for sustainable land management. In order to transform this model into a useful structure, it is necessary to determine its current state first. In this context, considering the PPP, the existing structure was analyzed using

SWOT technique. SWOT analysis has been developed as the most important tool for obtaining information that will provide the most ideal use of the resources and capabilities of various systems and structures in their environment [26]. However, the most important and fundamental aim of SWOT analysis is to identify the strengths and weaknesses related to the subject and the opportunities and threats that support these situations. SWOT analysis is a suitable technique for determining the strengths and weaknesses of institutions involved in land administration, and to identify opportunities and threats arising from the external environment [27]. Therefore, the legal and technical and institutional strengths and weaknesses of the current state of the cooperation process between the public and the private sector, and the opportunities and threats arising from the external environment have been identified and listed in Table 6.

**Table 6.** SWOT analysis

Factors Criteria	Internal Factors		External Factors	
	Strengths	Weaknesses	Opportunities	Threats
Legal	<ul style="list-style-type: none"> <li>• The Law on The Making of Some Investments and Services within The Framework of The BOT Model</li> <li>• Public Procurement Law No. 4734</li> <li>• Privatization Law No. 4046</li> </ul>	<ul style="list-style-type: none"> <li>• Existence of broad and complex circulars, regulations and laws on land administration</li> <li>• Inadequate legislation focused on public-private sector cooperation</li> </ul>	<ul style="list-style-type: none"> <li>• Supporting and adopting the Cadastre 2014 vision</li> <li>• Frequent emphasis on PPPs in declarations published on land management</li> </ul>	<ul style="list-style-type: none"> <li>• Existence of a large number of legislation and complex legal structure</li> <li>• Frequent changes in the Public Procurement Law No. 4734</li> </ul>
Technical	<ul style="list-style-type: none"> <li>• Transition of the entire organization to TAKBİS</li> <li>• Continuous project development depending on the need</li> </ul>	<ul style="list-style-type: none"> <li>• Transferring the land registry-cadastre information to digital media</li> <li>• Too much processing load</li> </ul>	<ul style="list-style-type: none"> <li>• The development of satellite and mobile technologies and the ability to collect spatial data regardless of distance</li> <li>• Developments in information and communication technologies</li> <li>• There are 1700 active notaries spread across the country.</li> <li>• Presence of 3122 freelance surveying offices spread across the country</li> <li>• 225 active Licensed map cadastral offices spread across the country</li> <li>• 133 active real estate valuation companies</li> </ul>	<ul style="list-style-type: none"> <li>• High labor costs in the private sector</li> <li>• Problems in the control of the public over the private sector</li> <li>• Not using the existing capacity of the private sector</li> </ul>
Institutional	<ul style="list-style-type: none"> <li>• The land registry and cadastre activities are under the responsibility of a single institution</li> <li>• High-limit corporate budget</li> <li>• Widespread organizational structure</li> <li>• Deep-rooted corporate history</li> </ul>	<ul style="list-style-type: none"> <li>• Inadequacies in control and supervision</li> <li>• Lack of qualified and expert personnel</li> </ul>	<ul style="list-style-type: none"> <li>• Development of non-governmental organizations, public and private sector cooperation practices</li> <li>• Strong private sector structure</li> </ul>	<ul style="list-style-type: none"> <li>• Inability of the institution to receive sufficient share from the general budget</li> <li>• Absence of a sustainable national land management policy</li> <li>• Private sector companies being affected by economic crises much faster</li> </ul>

The strengths of the legal cooperation between the public and private sectors are the existence of the Public Procurement Law and the Privatization Law. The weakness of the current system is the existence of broad and complex legislation on land administration and the inadequacy of legislation focused on Public-Private sector cooperation. Adoption of the Cadastre 2014 vision and the frequent emphasis on public-private partnership in the declarations published on Land Management are important opportunities of the current system. Frequent changes in the Public Procurement Law are a threat to the existing system. Technically, the strengths of the existing public

and private sector cooperation are the transition of the entire organization to TAKBIS and the continuous development of projects depending on the need. The weakness of the current system is that the land registry and cadastral information is not completely digitized and there is too much processing load. The developments in information and communication technologies and the existence of notaries, mapping offices and valuation companies throughout the country are important opportunities of the current system. High labor costs in the private sector, problems in the control of the public over the private sector, and the existing capacity of the private sector not being used are threats to the existing system. The strengths of the existing cooperation between the public and private sectors from an institutional point of view are that the land registry and cadastre activities are under the responsibility of a single institution, a strong corporate budget, a widespread organizational structure and a deep-rooted institutional background. Inadequacies in control and supervision, lack of qualified and expert personnel are the weaknesses of the current system. The development of non-governmental organizations, public and private sector cooperation practices and the strong private sector structure are important opportunities of the existing system. The absence of a sustainable national land management policy and the fact that private sector companies are affected by economic crises much faster are a threat to the current system.

#### **4. Conclusion and Recommendation**

The PPP models were initially used to provide the financing needed to meet the infrastructure investments of countries. Today, with the emergence of efficient business skills of the private sector, it has begun to be used in different fields. Thus, public institutions have the opportunity to focus more in areas such as coordination of investments, general planning, supervision and policy making.

It has been seen that many public institutions in Türkiye used by the PPP and it was determined that these models have many benefits. This situation triggered the use of PPPs in land management. In particular, GDLRC receives support from the private sector in land registry and cadastral transactions. In this study, the current situation analysis of public-private sector cooperation was made. As a result of the analysis, the strengths and weaknesses of the existing partnership were identified and external threats and opportunities were identified. In order to carry out PPP practices more successfully in land management, some improvements should be achieved at the legal, technical and institutional level. Legal, technical and institutional recommendations are as follows.

Legal recommendations,

- Public-private sector cooperation in land management activities is regulated according to the Public Procurement Law No. 4734 and the Privatization Law No. 4046. These laws regulate the all cooperation of public institutions and the private sector. In addition to these laws, legislation focusing on public-private sector cooperation in land management should be regulated.
- The jurisdiction structure (e.g., judicial justice, administrative justice) to be applied in case of public and private sector disagreements should be determined.
- The tender specifications prepared by the public institution for service procurement should be arranged in a way to encourage the private sector.
- In order for the private sector to contribute more, positive changes should be made in the current legislation.

Technically recommendations,

- In order to carry out transactions such as sales, donation and expropriation, the value of the real estate needs to be determined. These valuation procedures are sometimes carried out by the commissions established by the relevant public institution. However, the commission may consist of people who do not have enough expertise or experience in the valuation business. In this case, some errors can be made in determining the real value of the real estate. Therefore, the valuation process of all real estates that the public needs should be done by valuation companies.
- GDLRC performs an average of 9 million transactions annually. Approximately one fourth of these transactions constitute sales. This creates a very large workload for the institution. In order to reduce this density, notaries should be empowered to make sales transactions.
- There are 3122 freelance map cadastral engineering offices spread across the country and 225 active Licensed map cadastral offices. Tasks should be given to make more use of the technical possibilities of these two private sector stakeholders.

Institutional recommendations,

- Information on services with PPPs should be announced transparently by the public agency.

- Lack of qualified and expert personnel experienced in control and supervision should be eliminated.
- At stages such as data collection, measurement, design and planning for activities, the authority should be transferred to the private sector and only institutional control and audit should be carried out. In this way, time and cost can be saved.

The dynamism of the private sector in public cooperation, effective resource use, rapid mobility and the ability to offer a new perspective are the positive sides of the private sector. The private sector-based cooperation of public institutions provides an important opportunity for public institutions to create a sustainable land administration.

## **Funding**

This research received no external funding.

## **Author contributions**

**Volkan Deniz:** Investigation, Conceptualization and Writing. **Mert Kayalık:** Reviewing, Editing and Original draft preparation. **Osman Sami Kırtılođlu:** Investigation, Conceptualization, Writing and Visualization. **Zeynel Abidin Polat:** Investigation, Conceptualization, Methodology, Writing and Editing.

## **Conflicts of interest**

The authors declare no conflicts of interest.

## **References**

1. Eriçok, R. E. (2019). Türkiye’de kamu-özel ortaklığına ilişkin güncel durum. *Maliye Araştırmaları* 3, 175-194
2. Kaul, I., & Conceicao, P. (2006). Why revisit public finance today. *The new public finance: Responding to global challenges*. New York: Oxford University Press (for the UNDP), 3-27.
3. Kılıçaslan, H. (2017). Devletin deđişen rolü ve kamu özel işbirlikleri. Ankara, Savaş Yayınevi, 148
4. The World Bank. (2018). Private participation in infrastructure database (PPI). <https://ppi.worldbank.org/en/snapshots/rankings>
5. Ersin, M. (2021). A study on smart urbanization research in Mersin Metropolitan Municipality. *Advanced Land Management*, 1(1), 7-15.
6. Doğruyol, F. Y., & Taktak, F. (2022). Assessment of the post-disaster assembly areas in the Merkez District of Uşak Province in Turkey. *Advanced Land Management*, 2(1), 1-12.
7. Creuzer, P., & B. Kjellson. (2005). Public-private partnership (PPP) in land administration. United Nations, Committee on human settlements, Working party on land administration, 1-6.
8. T.C. Kalkınma Bakanlığı. (2018). Kamu-özel işbirliği raporu 2017: Dünyada ve Türkiye’de kamu-özel işbirliği uygulamalarına ilişkin gelişmeler raporu.
9. The World Bank. (2016). About public-private partnerships. <https://ppp.worldbank.org/public-private-partnership/about-public-privatepartnerships>.
10. Ndandiko, C., & Ibanda S. J. (2015). Public-private partnerships guidelines for local governments.
11. Sarısu, A. (2009). Kamu-özel işbirlikleri. Yaklaşım Yayınları, Ankara.
12. Zhang, X. (2005). Paving the way for public-private partnerships in infrastructure development. *Journal of construction Engineering and Management*, 131(1), 71-80.
13. Şahin, M., & Uysal, Ö. (2008). Kamu ekonomisi perspektifinden kamu-özel sektör ortaklıkları. Ekin Basım Yayın Dağıtım.
14. Land Equity International. (2018). Exploring PPPs in land administration. Research & Analysis on Land Administration.
15. The World Bank. (2006). Cost recovery policies, PPPs and sustainability of land records management in India. Workshop on Land Administration and Land Policy.
16. Nikolic, I. A., & Maikisch, H. (2006). Public-private partnerships and collaboration in the health sector: an overview with case studies from recent European experience, Health, Nutrition and Population (HNP) Discussion Papers
17. Uysal, Y. (2017). Yerel yönetimlerde kamu özel işbirliği (KÖİ) uygulamalarının iki yönü: avantajlar ve dezavantajlar. *Kent Akademisi*, 10(2), 169-199.

18. TKGM, (2018). 2018 yılı idari faaliyet raporu
19. Döner, F., & Bıyık, C. (2022). Three-dimensional cadastre-from two-dimensional plan to three-dimensional digital model. *Advanced Land Management*, 2(1), 40-50.
20. Alkan, M., & Polat, Z. A. (2021). Lisans ve lisansüstü düzeyinde verilen taşınmaz değerlendirme eğitiminin değerlendirme lisansı sınavı kapsamında değerlendirilmesi. *Geomatik*, 6(1), 15-30.
21. Büyük, G., & Ünel, F. B. (2021). Comparison of modern methods using the python programming language in mass housing valuation. *Advanced Land Management*, 1(1), 23-31.
22. Özsubaşı, B., & Ertaş, M. (2022). The spatial evaluation of the real estates in the Konya-Hacıyakmak Neighborhood with the analytical hierarchy process method. *Advanced Land Management*, 2(2), 51-59.
23. Kayalık, M., & Polat, Z. A. (2023). CBS destekli nominal taşınmaz değer haritasının 3 boyutlu sunumu: Berlin Eyaleti örneği. *Geomatik*, 8(2), 180-191.
24. Türkiye Değerleme Uzmanları Birliği. (2018). Değerleme sektörü analizi. [http://www.tdub.org.tr/Images/Uploads/TGBM\\_rapor\\_2018\\_3\\_cayrek\(ilk\\_9ay\).pdf](http://www.tdub.org.tr/Images/Uploads/TGBM_rapor_2018_3_cayrek(ilk_9ay).pdf)
25. Erdem, N. (2021). Content analysis of real estate valuation courses taught in geomatics engineering departments in Turkey. *Advanced Land Management*, 1(1), 1-6.
26. Uçar, D., & Doğru, A. Ö. (2005). CBS projelerinin stratejik planlaması ve Swot analizinin yeri. *TMMOB Harita ve Kadastro Mühendisleri Odası*, 10.
27. Aydinoglu, A. Ç. (2011). Sosyoteknolojik yaklaşımlarla konumsal veri altyapısı kurulması sürecinde mevcut durum değerlendirmesi. *TMMOB Harita ve Kadastro Mühendisleri Odası 13. Türkiye Harita Bilimsel ve Teknik Kurultayı*.



© Author(s) 2023. This work is distributed under <https://creativecommons.org/licenses/by-sa/4.0/>