Public-Private Partnership Experience in the International Arena: Case of Turkey

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Abstract: Public-private partnership (PPP) models are frequently used in construction projects worldwide. The experiences of developed and developing countries vary depending on existing legal, economical, social, and political environments. Although there are some common challenges, risks, limitations, and success factors, practicing PPP framework is also dependent on country-specific factors. In this paper, first the state of the art in frequent PPP practicing regions/countries such as Europe, the U.K., and China are summarized; and a review of PPP experience in the U.S. is presented. Then, Turkey, where different PPP models have been used for nearly three decades, is analyzed in more depth as an example for developing countries. A new PPP law has been drafted to expand the legal context and types of models and overcome the existing limitations since the first introduction of PPP projects in Turkey in early 1980s. An intensive PPP literature survey has been made to present the common success factors, risks, limitations, and challenges in Europe, the U.K., China, U.S., and Turkey as well as understanding the differences in the implementations. A viable economic environment, proper contractual arrangements for appropriate risk allocation, well-established legal basis, public support, transparency, and a central unit to standardize the procedures are determined to be major factors for successful PPP projects. **DOI: 10.1061/(ASCE)ME.1943-5479.0000213.**

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Introduction

A public-private partnership (PPP) is a collaboration between a government agency and one or more private enterprises to provide a public service. The underlying concept is to allow the public agency to satisfy a specific public need while minimizing the use of limited public funds. PPP projects are generally preferred for projects where the government states its need for capital-intensive and long-lived infrastructure (Savas 2000). It can be described as an agreement between a host government and a private entity for supplying infrastructure assets and services by the private sector (Rebeiz 2011). According to an Organisation for Economic Co-operation and Development (OECD) report (2008), a PPP can be defined as an agreement that takes place between the government and one or more private partners; and the service delivery objectives of the government should be aligned with the profit objectives of the private partners. A wide range of economic and social infrastructure projects have utilized the PPP delivery method; however, it is mainly used to build and operate roads, bridges, tunnels, light rail networks, hospitals, schools, traffic control systems, and water and sanitation systems [International Monetary Fund (IMF) 2004].

Expertise and private sector funds are combined for the implementation of major construction projects, which have traditionally been built by governments. PPP approaches are established in different forms, including involvement of the private sector in financing, design, construction, operation, maintenance and, in some cases, concessional ownership of major facilities (Li et al. 2005). Although the variety in the types of agreements causes difficulties in defining a unified description for PPP projects, most definitions in the literature have common features and characteristics (Akintoye et al. 2003). Basically, a license or concession is granted to the private sector to deliver infrastructure services of a certain type for specific length of time (McCowan and Mohamed 2007).

Governments form partnerships with private sector resources for several drivers like economical recession, inadequate public resources, lack of expert knowledge particularly for special projects, and different political factors. The major motivating factors for developing countries in pursuing PPP agreements are providing incentives for improved efficiency and performance, enabling governments to enforce contracts by establishing relationships between governments and providers of services, and providing access to skills and technologies from the private sector (Public-Private Infrastructure Advisory Facility 2007). According to Li et al. (2005), these agreements can provide enhanced government capacity, innovation in delivering public services, reduction in the cost and time of project implementation, and transfer of major risks to the private sector.

Objective of the Paper

The PPP concept and its applications have been reviewed intensively by many researchers in different countries. Many surveys have been conducted to identify the critical success factors and challenges worldwide. Additionally, the state of practice of PPP in many developed and developing countries has been reported by several professionals and scholars. Looking into the Turkish case as a developing country, it is possible to find a vast number of articles and reports about the Turkish PPP experience. The existing literature mainly depends on experts from legal firms

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and public agencies, and academic papers and research are mainly generated by public relations, finance, or law departments. However, the development of legislations, limitations, and challenges in PPP projects have been reviewed and reported much less frequently in the construction management context. As a country that is in need of diverse public services to meet the demand of new infrastructure construction and rehabilitation of the existing infrastructure, cooperation with the private sector seems to be one of the options to provide a solution where government funding is insufficient. Turkey has been one of the first developers of PPP laws in the world (Yondem 2012a) and the PPP legal context has improved over the years. As a result, applications of PPP for construction projects has gained acceleration accordingly in sectors like power, roads, airports, harbors, marinas, hospitals, and health campuses throughout Turkey.

This paper consists of two parts. The first part presents a brief review of PPP implementations in different regions/countries, including Europe, the U.K., and China as well as the U.S., where the use of PPP is relatively common. In the second part, the experience, legislative framework, and practiced models in Turkey are described with a case study from the energy sector. The evolution of PPP models in Turkey is summarized as an example of a developing country where the implementation of PPP projects is prioritized with government policies particularly over the past decade. Additionally, comparisons are made to outline the similarities and differences in diversification of infrastructural needs, investment sectors, legal context, and PPP models in selected countries/regions.

PPP Experience in Selected Parts of the World

Worldwide, several types of PPP projects have been executed in both developed and developing countries (Zhang 2005). According to the U.S. Department of Transportation Federal Highway Administration (2005), 2,096 infrastructure projects totaling nearly US$887 billion were financed using a PPP model between 1985 and 2004 throughout the world. Depending on the existing economical, legal, social, and environmental factors, countries apply different models of PPP.

Apart from region-specific reasons affecting the success of the projects, there are similar critical success factors influencing performance parameters. Zhang (2005) conducted a survey to identify the relative significance of critical success factors based on worldwide expert opinion and analyzed responses from 42 different organization/institutions in a number of countries, including Australia, India, Japan, Peru, Philippines, China, Malaysia, Singapore, South Africa, Thailand, the U.K., and the U.S. The results showed that the five critical success factors were (1) economic viability, (2) appropriate risk allocation via reliable contractual arrangement, (3) sound financial package, (4) reliable concessionaire consortium with strong technical skills, and (5) favorable investment environment.

In countries with many state-owned enterprises, including many developing countries, post-socialist countries and countries in Western Europe, the delegation of public services is provided by the transfer of enterprise ownership from the state to private entities as a whole or in part (Savas 2000). Governments in Europe are in search of new institutional arrangements to provide services to meet public interest (Osborne 2005). As a result, different models of PPP projects are applied in European countries.

According to the European Investment Bank report prepared by Kappeler and Nemoz (2010), in countries like the U.K., France, Spain, and Italy, PPP is equivalent to a concession, where the services provided are paid for by the public; in others, PPP projects can be used in outsourcing and joint ventures. In this report, a database of 1,340 PPP projects with a capital value of €254 billion reaching financial close (project contract and financing documentation have been signed and conditions precedent to initial drawing of the debt have been fulfilled) has been analyzed by country and sector to outline the state of the art of PPP projects in Europe. The projects were selected from between 1990 and 2009 and only projects equal to or larger than €5 million were included in the database. The share of PPP projects in European countries can be seen in Table 1. Of all these projects, the U.K. has the largest share of PPP projects with 67.1%, which represents 52.5% of the total PPP project value. The U.K., Spain, France, Italy, Germany, and Portugal account for 93% of all PPPs by number and 83.6% by value of projects (Kappeler and Nemoz 2010). The majority of these projects are in education, health facilities, and transportation sectors.

In the U.K., PPP projects have mainly been developed through the Private Finance Initiative (PFI), which was first announced in 1992 (Li et al. 2005). PFI can be described as a particular way of financing that involves designing, building, financing, and operating facilities by the private sector, where PPP is used as a generic term with more flexible methods of financing and operating (European Services Strategy Unit 2001). PPP/PFI models are applied in sectors like health, education, transport, and defense, with the largest number in the health sector (Akintoye and Chinyio 2005). In this model, the projects go through three stages: planning, procurement, and contract management and the aim is to combine the advantages of competitive tender, flexible negotiation, and transfer risk away from the public sector (Bing et al. 2005). The National Audit Office (2009) reported that out of 114 projects completed between 2003 and 2008, 69% of them were delivered on time and 65% came within budget.

Despite the mature PPP market, flaws in the system still exist. According to Carrillo et al. (2008), the main barriers in PFI projects are (1) the lengthy bidding period, (2) continuing lack of sufficient PFI expertise within the public sector, (3) lack of knowledge transfer between projects, and (4) negative public opinion about the value for money provided by the private sector. Li et al. (2005) conducted a questionnaire survey to examine the critical success factors for PPP/PFI construction projects in the U.K. The results showed that a strong and good private consortium, appropriate risk allocation, and available financial market are the most important factors.

Compared with policies and practices in other countries, the U.S. is relatively a slow mover in adopting the PPP approach (Garvin 2010), although private sector participation in U.S. infrastructure projects can be seen in a variety of ways for more than 200 years (KPMG 2007). According to the U.S. Department of Transportation Federal Highway Administration (2004), PPP projects are defined as a contractual agreement formed between public and private sector partners, which allows more private sector

Table 1. Percentage Shares of Projects Reaching Financial Close in European Countries between 1990 and 2009

Country	% number of projects	% of value of projects (€ millions)
U.K.	67.1	52.5
Spain	10.1	11.4
France	5.4	5.3
Italy	2.4	3.3
Germany	4.9	4.1
Portugal	3.1	7
Other countries	7	16.4

participation than is traditional. Deteriorated and aging infrastructure and underfunding of new investments are the main reasons for adopting PPP projects (Papajohn et al. 2011).

The major types of PPP projects used in the U.S. since 1991 are design-build (70%), concession (11%), design-build-finance-operate (5%) and design-build-finance (5%). The remaining portion of all the projects are shared by other types of PPP projects such as build-operate-transfer, design-build-maintain and design-build-operate-maintain. (U.S. Department of Transportation Federal Highway Administration 2007). The benefits of PPP projects are described by the Federal Highway Administration as follows:

- Stronger working relations between public sector agencies and private sector providers;
- Reduction of financial constraints;
- Faster delivery with the private sector motivated to minimize the delays in order to minimize costs;
- Greater cost efficiency and productivity;
- Integration of design, construction, maintenance and operation that helps to optimize expenditure and maximize innovation through a life-cycle approach;
- Greater choices for different project delivery approaches based on the nature of each project
- Increased competition; and
- Risk management to share the risks with the private sector.

PPP programs are primarily driven by state governments in the U.S. (Garvin 2010) and PPP experience varies from state to state (Papajohn 2011). The U.S. Department of Transportation Federal Highway Administration (2007) reported that the structures and delivery methods are dependent on enabling statutes and regulations, the capabilities of all members of the PPP to execute their roles and responsibilities, flexibility to identify and resolve issues that arise during all project phases, underlying taxation arrangements that can reduce the costs, and the ability of markets to deliver financing structured to suit each PPP.

One of the advantages for European countries is that PPP programs are primarily driven by the national government, which creates consistency and stability across the nation (Garvin 2010). However, some of the states have already enabled PPP legislation in the U.S. (PricewaterhouseCoopers 2010). Although the autonomy among the states has certain advantages, having 50 unique PPP markets in the U.S. would deter private participation and drive up transaction costs (Garvin 2010).

Several strategies are addressed against the major issues in the U.S. PPP market. According to the U.S. Department of Transportation Federal Highway Administration (2007), the major issues and impediments that require addressing strategies are (1) legal and technological, (2) funding and finance, (3) environmental, and (4) administrative. A KPMG report (2007) suggests implications for contemporary and future arrangements based on the analysis of case studies of the U.S. projects. First, the acquisition and procurement system must be transparent to preserve the credibility of system. It is also suggested that, all procurements should be competitively awarded and a reasonable definition of the scope of the desired works and services must be provided. It is important for the public sector to understand all the risks and transaction costs to optimize and balance the risks and rewards of all stakeholders.

When compared with other advanced countries, the PPP delivery method can still be considered immature in China, although the concept is well received and widely adopted (Chan et al. 2011). There is demand for more and improved public infrastructure in China, which is experiencing rapid growth in economic development (Cheung and Chan 2011).

According to the World Bank (2013a), the total number of infrastructure projects reaching financial closure is 1,018 projects with a total investment of US$116.4 million by 2011. Of all these projects, transport represents the largest sector (US$49.5 million and 409 projects), while China ranked first by the number of projects that were developed with private participation between 1990 and 2011 in developing regions (World Bank 2013b).

Most of the PPP projects involve large consortiums with foreign companies (Adams et al. 2006). Several studies have attempted to identify the risk factors of PPP projects in China. Ke et al. (2010) used a survey to identify risk allocation in PPP projects in China and Hong Kong and compared them to those in the U.K. and Greece. The results showed that in China and Hong Kong, the public sector retained most political, legal, and social risks, and shared most microlevel risks and force majeure. The public sector in the U.K. was most able to transfer the PPP risks to the private sector followed by Greece, Hong Kong, and China. Cheung and Chan (2011) analyzed the three most common types of large-scale projects in China: water and waste water, power and energy, and transportation. The top two identified risks are (1) government intervention and (2) public credit, which stands for unrealistic and unreasonable guarantees made by Chinese local governments. According to a questionnaire-based empirical study, Chan et al. (2011) found that the most important risk factors in Chinese PPP projects were government intervention, government corruption, and poor public decision-making processes.

Evolution of PPP Projects in Turkey

Developing countries like Turkey are in need of diverse public services to meet the demand of new infrastructure construction and rehabilitation of the existing. At this point, funding is one of the key issues in meeting this increasing demand. Government funding is insufficient most of the time, which actually makes way for cooperation with the private sector to remove the financial burden on the government budget.

According to the Private Participation in Infrastructure Database (World Bank 2011), investment in Europe and the Central Asia region concentrated on two countries, the Russian Federation and Turkey. Turkey accounted for 16 of the 23 new infrastructure projects, with private participation reaching financial or contractual closing. For example, two 36-year port concessions were signed for Samsun Port and Bandirma Port in the Black Sea Region, which totalled around US$300 million in 2010. In the power distribution sector, in addition to three grids previously transferred to the private sector by the concession model, seven were transferred between 2007 and 2009 (Delmon and Delmon 2010). As of 2011, operation of 21 distribution grids have been transferred to the private sector (Yondem 2011).

The concessions given to the private sector in Turkey date back to 1910 with the "law on concessions related to public services." Based on a general definition, it is still the fundamental legislation for PPP projects in Turkey (Kolcuoglu and Demirkan Attorneys at Law 2012). Through the 1980s, it was the public sector's duty to provide infrastructure services and it was unusual to delegate the duty to the private sector by using the concession method (Delmon and Delmon 2010). The program of funding and constructing large infrastructure in Turkey using a build-operate-transfer (BOT) model started in 1984 (Halpin and Senior 2010). It was also reported as the first BOT law in the world with the objective to integrate with international markets and increase the private sector's role in the economy (Yondem 2012a).

Turkey has created several policies for delegating public services to the private sector. Power plant projects were executed in the mid-1980s as part of a privatization plan (Algarni et al. 2007).

Table 2. The Number and Distribution of PPP Projects in Turkey According to Sector (Data from Yondem 2012b)

Sectors	Number	Percentage (%)
Energy projects	53	41
Highway and roadside facilities	21	16
Harbor projects	19	14
Airport projects	14	11
Marina projects	14	11
Border gates	8	6
Hospital	1	1

However, the unwillingness of the government to provide guarantees against country risks, legislative limitations, lack of sufficient experience in packaging BOT projects, prolonged bureaucracy, and ineffective tendering and award processes resulted in low realization of BOT projects in the late 1990s (Ozdoganm and Birgonul 2000). In time, other alternative methods such as transfer-of-rights (TOR), build-operate (BO), and build-lease-transfer (BLT) were also designed to close the infrastructure investment gap (Delmon and Delmon 2010). Funding infrastructure projects by using several models of PPP has witnessed significant success over the past decade.

Several laws and legislations have been enacted and amendments also have passed the parliament to remove the limitations of PPP projects. PPP models are used for projects in sectors like power, roads, airports, harbors, marinas, hospitals, and health campuses. The numbers and distribution of these projects according to their sector as of the end of 2011 are listed in Table 2, while the total investment was US$28 billion as of December 2011.

The distribution of PPP models used in these projects is shown in Fig. 1.

Legal Context of PPP Projects in Turkey

Beginning with the passage of the first law related to the application of BOT projects in 1984, numerous laws and legislation have been introduced to establish the legal basis of different PPP models instead of a single PPP law or regulation. A chronological list can be seen in Table 3, which shows the major active PPP laws.

Law No. 3096 was enacted in 1984 to regulate the generation, transmission, and distribution of electricity by means of concession agreements under the BOT model (Ministry of Development 2012). Private entities can construct and operate facilities that produce

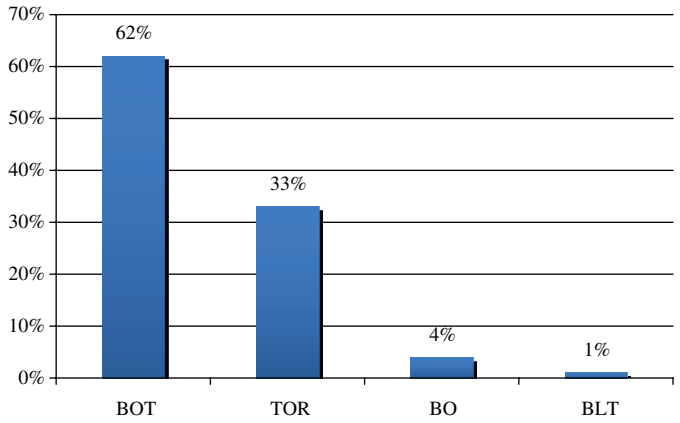

Fig. 1. Distribution of PPP models in Turkey (data from Eliguzeloglu 2012)

Table 3. PPP Laws and Models in Turkey

Law number	Year of enactment	Model	Definition
3096	1984	BOT, TOR	Authorization the private entities to generate, transmit, distribute and trade electricity other than the Turkish Electricity Administration
3465	1988	BOT, TOR	Commissioning of entities for access controlled motorways (highways) construction, maintenance and operation other than the General Directorate of Highways
3996	1994	BOT	Commissioning of certain investments and services for BOT implementations
4046	1994	TOR	Arrangements for the implementation of privatization and amending certain laws and decrees with the force of law
4283	1997	BO	Construction and operation of electricity generation plants and regulation of energy sales in the BO model
5335	2005	TOR	Transfer of operation rights of airports and passenger terminals other than General Directorate of State Airports Authority
5396	2005	BLT	Regulation on the construction of health facilities on a lease-and-build basis and the restoration of the services and areas in facilities other than medical service areas on the restore-and-operate basis

Note: BOT: build-operate-transfer; BO: build-operate; TOR: transfer of rights; BLT: build-lease-transfer.

electricity with the permission of the Ministry of Energy and Natural Resources according to this law and the concession period can be arranged for up to 99 years. With the expiration of the concession period, the facility is entirely transferred to the government by the private entity with all kinds of movable and immovable properties free of debt and pledge.

The enactment of Law No. 3465 in 1988 eliminated the monopoly of the General Directorate of Highways by allowing private entities to construct, maintain, and operate highways using BOT or transfer-of-operational-rights (TOR) models. The agreements can be arranged for up to 49 years. At the end of the agreement period, the road project is transferred back to the government. The private entity is required to provide a bid bond of 1 to 3% of the total investment. If the awarded private entity fails to enter into contract or provide a performance bond, then the bid bond amount is automatically transferred to the public entity (Ministry of Development 2012).

The aim of Law No. 3996 (issued in 1994) is to enable private entities to invest in projects and services that require advanced technology or significantly high financial resources by using the BOT model (Ministry of Development 2012). The type of projects or services may include bridge, tunnel, dam, highway, drinking water, utility water, communication, railway, border gates, ports, airports, electricity generation, transmitting and distribution, and preventing environmental pollution. The public administration submits the project proposal to the Higher Planning Council (HPC) provided with the signed approval of the related minister. The private entity needs to have experience in the area of the PPP project or is a consortium that is established and at least one of the entities in the consortium should have experience in the area of the related PPP project. The bidding can either be closed or negotiated, which is organized by the public administration. A bid bond should be submitted at an amount specified by the public administration.

After the contract is awarded, a performance bond of 1% of the total investment is provided. Agreements arranged according to this law have periods up to 49 years and are subject to Turkish Republic legislation and also to arbitration. All investment and services are transferred to the government at the end of the agreement period.

The Privatization High Council and the Directorate of Privatization Administration are in charge of carrying out the privatization activities in Turkey based on Law No. 4046, which was enacted in 1994. The purpose of this law is to regulate the principles for privatization, which aims to improve productivity in the economy and to reduce public expenditures (Privatization Administration 2012a). Possible methods of privatization are sales (either transfer of public entity assets/services or shares), rent, transfer of operational rights, establishment of real rights on property, and a revenue sharing model (Privatization Administration 2012b).

In order to avoid the concessional limitations and shortcomings of Law No. 3096, Law No. 4283 was issued in 1997, which is based on the BO model. This law allows private companies to construct, own, and operate thermal plants for energy production. It excludes hydroelectric, geothermal, and nuclear energy production, which are basically the focus of BOT models. The maximum contract period was determined as 20 years. The private company is responsible for providing a favorable environmental impact statement report. The amount of bid and performance bonds are specified based on the type and capacity of the plant and stated in the contract by the public administration. The bid bond amount is automatically transferred to the public administration if the awardee withdraws from the bid or fails to provide the performance bid bond.

Law No. 5335 was enacted in 2005. It is related to authorizing the General Directorate of State Airports Authority total or partial transferring of operating rights for the airports and passenger terminals to the private sector using TOR models. The contract terms can be up to 49 years. The aim is to utilize the experience and technology of the private sector to provide more economical and efficient public service.

Law No. 5396 is the principle law for health sector-specific PPP projects and the scope of the legislation allows the public and private sectors to cooperate in providing health services (GAE Law Firm 2011). It was enacted in 2005 to establish the guidelines for constructing and renovating health facilities. Later, regulations were enacted in 2006 on health facilities allowing for private operation of services and areas other than medical. It included the details on construction, renovation, furnishing, supply, maintenance, and operation (other than medical services) of health facilities within the framework of the PPP models. The contract between the public administration and private contractors is subject to private law, rather than administrative law as stated for other PPP models. The contracts based on administrative law have limited flexibility, which grant superior authority to the administration/public party, as opposed to private law contracts, in which both parties have equal status (Delmon and Delmon 2010). This increased the interest in health sector projects since the administrative law favors the administration by definition. The contracts can be prepared with concession periods of up to 49 years.

Limitations of the Existing Legislation in Turkey

Despite the three decades of experience and an active PPP market in Turkey, the implementation of PPP projects have had several limitations and difficulties. Most of the time, (1) timely preparation of project documents with sufficient quality cannot be provided, (2) economic and technical aspects would not be thoroughly assessed, (3) public sector ownership can be weak since the finance and operation of the projects are on the private sector side, and (4) public officials may lack experience in the PPP procurement process (Mecit 2011).

A central institution would be effective in guiding public entities through complex public service procurement methods (Delmon and Delmon 2010). Such a unit would become a center of knowledge by formulating the national PPP strategy, ensuring the compliance of PPP projects with national development plan objectives, annual programs and sectoral policies, appraising, evaluating, prioritizing, selecting, and monitoring projects, and standardizing the processes and documentations for the implementing institutions (Mecit 2011).

There are successful applications of central PPP units in several countries. For example, "Partnerships Victoria" was introduced in 2000 for Australia; this unit coordinated 22 projects worth $11.5 billion in capital investment (Partnerships Victoria 2012). It is a part of the Commercial Division of the Department of Treasury and Finance. Using this approach, strong value for money was delivered that was mainly driven by (1) optimal risk transfer, (2) whole-of-life costing, (3) innovation, and (4) asset utilization (Partnerships Victoria 2001). The average savings through PPP is estimated as 9% compared to the public sector, and only 22% of PPP projects had run over budget versus 73% for line agency construction projects (Cuttaree 2007).

Partnerships U.K. was the central unit in the U.K. until 2010. That year Infrastructure U.K. was established, which aims to bring together the project and program delivery capability of Partnerships U.K., the lending capability of The Infrastructure Finance Unit, and the policy development capability of the Treasury (Farquharson and Encinas 2010). The National Audit Office (2009) reported that out of 114 PPP projects completed between 2003 and 2008, 69% were delivered on time and 65% came within budget.

Another country that has established a successful central PPP unit is South Africa. This unit was established by the National Treasury, which has the final authority in PPP agreements (Burger 2006). It started with five professionals selected from the public and private sectors, and now the team comprises 17 professionals from sectors such as health, energy, water, transport, tourism, accommodation, education, waste, budget support, contract management, project delivery, business development, and international relations (National Treasury of Republic of South Africa PPP Unit 2012).

In Turkey, the stakeholders in PPP projects are the Ministry of Development (formerly the State Planning Organization), Ministry of Finance, Treasury, Public Procurement Agency, Privatization Administration, line ministries, and municipalities (Tekin 2010). The Ministry of Development is responsible for macroeconomic planning and coordination of the projects. The Ministry of Finance and Treasury are concerned with budgetary issues and providing state guarantees, respectively. The public procurement agency supervises the tenders. All other entities mentioned above are responsible for the implementation of PPP projects.

There are several efforts underway in Turkey to improve coordination and implementation of the PPP projects. To give an example, a dedicated PPP unit has been established by the Department of Public Private Partnership under the Ministry of Health to shorten construction periods, which generally takes 8 to 10 years due to insufficient budgets, and remove the financial burden from the government until the targeted health facilities become operational. Another unit has also been established at the Ministry of Development in 2011 under the General Directorate of Investment Programming, Monitoring and Evaluation to ensure compliance with legal context and quality.

Another key impediment, particularly for BOTs, is the long authorization process. Two High-Planning Council (HPC, which is basically a mini-Cabinet) approvals were necessary; one at the beginning and the other at the end of the process (Guner 2012). The new BOT regulations require one HPC step at the beginning and then the implementation contracts can be approved by relevant ministries.

Lack of model diversity and the inconsistent and disorganized state of regulations governing PPP models are also challenging factors that affect the success of projects during implementation. The scope of the existing legislation limits the models to BOT, BOO, TOR, and BLT. With the additional effect of lack of synchronization between PPP laws to the shortcomings of existing legislation, the government initiated the establishment of a new PPP law. This law was drafted by the State Planning Organization in 2007 and was called "the Draft Law on Fulfillment of Investments and Services through Public and Private Partnerships" (Kolcuoglu 2012). According to Tekin (2010), the expectations of this law are

- Better definition in the PPP concept;
- Well-structured PPP legislation;
- Establishment of a central PPP unit;
- Introduction of new models;
- Extension of the scope of applications;
- Providing objective project selecting procedures; and
- New approaches to risk management.

One of the most efficient ways to provide clear and specific support to a PPP framework is to establish a policy through a PPP law (Public-Private Infrastructure Advisory Facility 2012a). With these key provisions, the draft law is expected to improve the current state of the art of existing PPP law and implementations by addressing the basic concerns of private investors. The first and second versions of the draft law were declared in October 2006 and November 2007, respectively. However, it has not been approved yet as of this date.

Turkish Energy Sector PPP Experience—A Hydroelectric Dam Project

Turkey is a country that relies heavily on external energy resources. Only 27.5% of the demand for energy was met by domestic production in 2005 (Republic of Turkey Ministry of Energy and Natural Resources 2006). In other words, Turkey's total energy imports correspond to 72.5% of the total energy supply. Starting in the 1980s, Turkey has invested more than US$28 billion in PPP projects, in which 41% are in the energy sector (Yondem 2012b). It is estimated that the total investment need of the energy sector will be more than US$120 billion by the year 2020 (Republic of Turkey Ministry of Energy and Natural Resources 2010). Construction of new power plants and rehabilitation of existing plants are required to meet the increasing demand. Through the end of 2011, the investment in 53 PPP energy projects was US $6.5 billion out of a total of US$28 billion for all public private investments (Yondem 2012b).

One of these projects is the Birecik hydroelectric dam, which is located in southeastern Anatolia on the Euphrates River. It was part of the Southeastern Anatolia Project Guneydogu Anadolu Projesi (GAP), which is an integrated regional development project in the context of sustainable development (GAP Regional Development Administration 2012a). Twenty two dams and 19 plants are planned to be constructed within the context of the Southeastern Anatolia Project (GAP Regional Development Administration 2014). The region lies on plains in the basins of the lower Euphrates and the Tigris; and 20% out of Turkey's irrigable land is in this region (GAP Regional Development Administration 2012b). The region is bordered by Syria to the south and Iraq to the southeast.

The project was the first BOT project, where the first call for tender was made in 1986; however, the construction started in 1996 with delays due to several legal issues. The Southeastern Anatolia Project Regional Development Administration was authorized to guide, monitor and assess the activities. Private sector involvement was preferred due to the difficulties in public financing capabilities (GAP Regional Development Administration 2014). A relatively low level of equity was provided by the sponsors with a guaranteed return and redemption of equity from the project itself (Worm et al. 2013).

There were several objections to the construction of this project. The level of funding was a concern. Also, the construction region was rich in archeological sites, which would be submerged after project completion. The project affected 44 settlements and approximately 30,000 people. To help people in resettling and adapting to their new environments, the GAP Regional Development Administration (2012c) launched a project called "Resettlement, Employment and Economic Investments of People Affected by the Birecik Dam," which was supported by the United Nations Development Programme (UNDP). Compensation, introduction of new crop types, and nonagricultural sources of income were included in the economic activities of the project. As a result, the project was completed in 2001 with a total investment of US $1.4 billion and it will be transferred to the government after 15 years (O'Mahony and Gunnigan 2010). It is a multipurpose project for producing energy (672 MW) and providing irrigation and potable water (Verbund Birecik 2014). A multinational consortium is operating the dam.

The GAP Regional Development Administration prefers the use of PPP models for the rest of the dams and plants as it removes the financial burden from the public resources (GAP Regional Development Administration 2014). According to the General Directorate for State Hydraulic Works, the unit investment cost for a dam with a hydroelectric plant varies between $1,000 and $1,500/kW and the unit investment cost for Birecik Dam was reported as $1,100/kW (Tutus 2007).

The use of PPP models in Turkey for electricity production is not limited to this region. The Birecik Dam was the first BOT project implemented in Turkey. One-quarter of the country's power generation, 8,500 MW, were completed using different PPP models (O'Mahony and Gunnigan 2010). Among these, 4 natural gas, 18 hydroelectric, and 2 wind power plants were constructed under the BOT model (Tekin 2010). The planning of more power plants using the PPP scheme has been completed and 18 thermoelectric, 27 hydroelectric, and 54 river hydroelectric are in the pipeline (Tekin 2010).

Comparison of PPP Use across Various Countries

Governments decide to implement PPP projects for similar reasons, such as minimizing the use of limited public resources, benefiting from the expertise, experience and technology of the private sector that would lower the project delays and cost overruns. Despite sharing common motivation factors in pursuing PPP projects, the development trends, models used, legal context and legislations differ from one country to another. Depending on country's needs and conditions, governments decide on the sector, where they want to use PPP and the appropriate PPP model to execute their projects.

In the previous sections, important characteristics of selected countries and regions *vis-à-vis* the use of PPP was briefly described. For Turkey, the existing legal context, sectors where

Table 4. Regional Distribution of PPP Projects Worldwide between 1985 and 2011 (Data from Public Works Financing 2011)

Region	Percentage (%)
U.S.	9
Canada	6
Mexico, Latin America and The Caribbean	11
Europe	46
Africa and Mid-East	4
Asia and Australia	24

investments were made, limitations and challenges during implementation were outlined. In this section, a comparative study is conducted to underline main differences and similarities between PPP practice in Turkey and other parts of the world. The comparisons are based on diversification of infrastructure needs and investment sectors, legal context and PPP models used.

Diversification of Infrastructure Needs and Investment Sectors

According to World Economic Forum (2012), annual worldwide investment required to close the infrastructure deficit is US$2 trillion over the next 20 years. Public Work Financing (2011) reports that total value of funded PPP transport, water, and building facility projects between 1985 and 2011 is US$774 billion worldwide. Table 4 shows the regional distribution of these projects.

Several factors contribute to the decision in developing an infrastructure project; thus, the implementation level of projects using PPP models changes from one country to another. In addition to different levels of implementation, investment sectors also vary geographically. The diversification of infrastructure needs establishes the basis for the variation in development trends. Developing countries tend to attract private sector investments primarily in the delivery of key infrastructure (Public-Private Infrastructure Advisory Facility 2012b). The infrastructure needs in such countries creates political pressure and governments have to sustain the participation of the private sector in order to satisfy growing public demands.

Several international organizations and initiatives provide support for the delivery of infrastructure projects in developing countries. The Public-Private Infrastructure Advisory Facility (2009, 2010, 2011, 2012b), which aims to increase private sector participation in emerging markets in collaboration with the World Bank and International Finance Corp., approved US$18.9 million, US $11.2 million, US$7.8 million, and US$10.9 million of funding in 2009, 2010, 2011, and 2012, respectively. It is supporting smaller and focused activities and the supported regions are grouped as Sub-Saharan Africa, Middle East and Europe, Latin America and the Caribbean, East Europe and Central Asia, East Asia and the Pacific, and South Asia. The breakdown of investment sectors can be seen in Fig. 2.

Energy and multisector projects that include activities providing support to the public-private partnership across infrastructure sectors are the top two recipient sectors of available funds (Public-Private Infrastructure Advisory Facility 2012b). For example, Sub-Saharan Africa was the largest recipient region in 2012 (53%), where infrastructure needs are greatest. The power sector is the primary supported sector as a consequence of infrastructure gap in this region. In general, the rapid industrialization of emerging regions and the integration of developing countries into the world economy increase the demand for infrastructure investment (World Economic Forum 2012).

In countries where the PPP concept has a longer history, new demands and maintenance of existing infrastructures are the major drivers in implementing PPP projects. Investment sectors and PPP models used vary depending on the increasing demands. In developed countries with a higher PPP maturity curve, the use of PPPs into new sectors has expanded (Deloitte 2006). For example, hospitals, schools, prisons, roads, and defense facilities are constructed in the U.K., which is a model country for its use of PPP (Abdel Aziz 2007). Between 2005 and 2009, 35 and 34% of total PPP projects were implemented in the education and health sectors, respectively (Kappeler and Nemoz 2010). Sectoral diversification continues in other European countries. Outside the U.K., transportation projects represented 41% of the total PPP projects, which comprised 76% of the value of PPPs in Continental Europe (Kappeler and Nemoz 2010).

In the U.S., the private sector has been involved in different infrastructure projects in a variety of ways for more than 200 years (KPMG 2007). As the highway system matured, the need for repairing and expanding the network of roads, bridges, and tunnels has escalated (U.S. Department of Transportation Federal Highway Administration 2007). Annual investment required to attain a state of good repair is estimated to be US$18 billion over the next 20 years (U.S. Department of Transportation Federal Highway Administration 2010). With public funds lacking, the PPP seems an attractive alternative.

The first private sector involvement in infrastructure development in China was seen in the power industry in the 1980s and the participation continued with transportation, water supply, gas supply, and waste disposal projects (Ke et al. 2010). PPP/BOT was the first model introduced and two stages of PPP market development were seen in the country. In the first stage, between the mid-1980s and mid-1990s, the projects were mostly in the

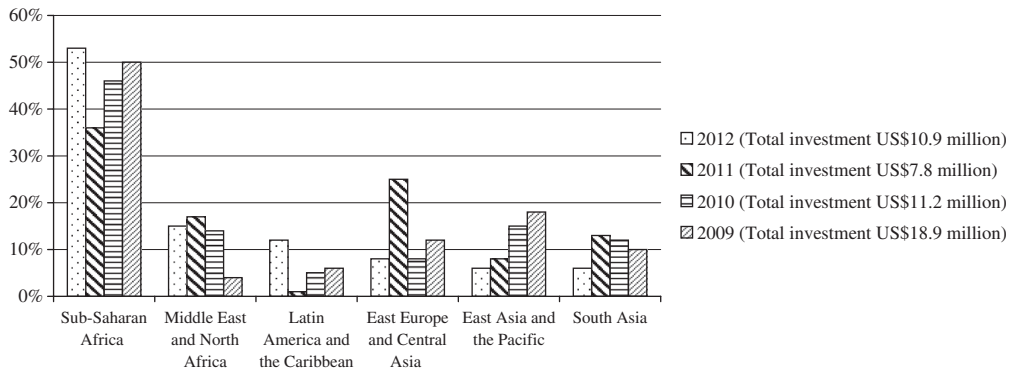

Fig. 2. Funding by investment sectors (data from Public-Private Infrastructure Advisory Facility 2009, 2010, 2011, 2012b)

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Table 5. PPP Sector Opportunities by Region/Country (Data from Deloitte Research 2006; World Bank 2013b; Yondem 2012b)

Country/region	PPP sector opportunities
Continental Europe	Transportation, water, wastewater and waste, education, housing/urban regeneration, hospitals, prisons, defense
U.K.	Transportation, water, wastewater and waste, education, housing/urban regeneration, hospitals, prisons, defense
U.S.	Transportation, water, wastewater and waste, prisons, defense
China	Transportation, water and sewerage, telecom, energy
Turkey	Power, highway and roadside facilities, marinas, harbors, airports, health facilities, water and sewage, border gates

power and water sectors (Cheng and Wang 2009). The second stage started in the early 2000s and private sector involvement was allowed in areas such as power, communications, railway, airline, and petroleum (Cheng and Wang 2009).

Looking into Turkey, power plants were the first projects executed using the BOT model. As laws and legislation evolved, new sectors were introduced into the PPP market. These laws enabled private sector participation in sectors such as roads, airports, harbors, marinas, hospitals, and health campuses other than power plants. The involvement of the private sector in infrastructure projects is supported as a government policy, resulting in a variety of invested sectors. It is evident that among developing countries, Turkey represents a relatively mature PPP culture encompassing various sectors of infrastructure.

The sectoral distribution of PPP models in different region/countries is shown in Table 5.

Legal Context and PPP Models Used

The evolving legal context and the PPP models used follow different ways and forms for countries using this project delivery method. Pressure is exerted on the governments due to introduction of PPP, as it is important in economic development, regeneration, and a mechanism for developing infrastructure (Chan et al. 2010). The legal framework should be established or improved due to dynamic nature of a country's requirements. Accordingly, models used vary across countries. Table 6 shows the most commonly used models in the U.K., Continental Europe, the U.S., China, and Turkey.

Table 6. PPP Models Used by County/Region

Country/region	PPP models
Continental Europe	DBOM, DBO, BOOT, BOO, joint venture (Deloitte 2006)
U.K.	PFI, joint venture, concessions, outsourcing, sales of equity stakes in the state-owned business (Akintoye et al. 2003)
U.S.	DB, DBFO, DBF, concession, BOT, DBM, DBOM (U.S. Department of Transportation Federal Highway Administration 2010)
China	BOT, concession, equity transfer of state-owned enterprises (Meng et al. 2011)
Turkey	BOT, TOR, BO, BLT (Eliguzeloglu 2012)

Note: DBO: design-build-operate; DBOM: design-build-operate-maintain; DB: design-build; DBF: design-build-finance; DBFO: design-build-finance-operate; DBM: design-build-maintain; BOOT: build-own-operate-transfer; TOR: transfer of rights; BOO: build-own-operate; BOT: build-own-operate; BO: build-operate; BLT: build-lease-transfer.

The U.K. is known as a leader in modernizing the methods of the delivery of public infrastructure and services, and finding new ways of partnering with the private sector (her majesty (HM) Treasury 2012). In addition to PFI, there is a wide range of business structures and partnership arrangements, such as joint ventures, concessions, outsourcing, and the sale of equity stakes in state-owned businesses (Akintoye et al. 2003).

Starting in the U.K., the PPP market has grown throughout Continental Europe. The European Commission organized three groups of instruments for blending PPP projects with EU funds. These are (1) financial engineering instruments enabling private finance to be used, where it would not otherwise have been the case, (2) sectorally focused grants that incentivize promoters to undertake projects in the pan-European interest, and (3) EU Structural Funds supporting the cohesion policies of the Union and individual Member States (European PPP Expertise Centre 2011). Frequently used PPP models used in the region include design-build-operate-maintain (DBOM), design-build-operate (DBO), build-own-operate (BOO), and build-own-operate-transfer (BOOT) (Deloitte 2006).

The PPP market in the U.S. is dominated by the transportation sector and PPP experience and legislation varies from state to state (Papajohn et al. 2011). Less than half of the 50 states allows PPP delivery methods in transportation (Garvin 2010). Major issues experienced in PPP projects in the U.S. are reported as legal and technological, funding and finance, environmental, and administrative (U.S. Department of Transportation Federal Highway Administration 2007). The vast majority of the PPP projects in the U.S. implemented since 1991 are design-build (DB), concession, design-build-finance-operate (DBFO), and design-build-finance (DBF) (91%). The remaining portion use other types of PPP methods, including BOT, design-build-maintain (DBM), and DBOM. (U.S. Department of Transportation Federal Highway Administration 2007).

In China, during the first stage of development, PPP projects were developed using the BOT model. In the second stage, a series of new policies and relevant regulations have been promulgated since 2001 and the government formally permitted private sectors and foreign businesses to invest in public utility projects through the introduction of concession arrangements and equity transfers of state-owned enterprises in 2002 (Meng et al. 2011). The announcement of promulgations changed the limited PPP market profile from major cities to an international status widening the locations, invested sectors, and used PPP models.

In Turkey, the BOT model was the first PPP model used beginning with the program of funding and constructing large infrastructure in the mid-1980s. As infrastructural demands increased and varied by sector, other models such as TOR, BO, and BLT were also introduced. Several laws and legislation have been enacted and amendments have also passed the parliament to eliminate the limitations of PPP projects.

Summary

PPP models are used worldwide in a variety of sectors to close the gap between public service needs and the financial capabilities of governments. The extent and type of the projects implemented mainly depend on economic, legal, social, and environmental factors in addition to expectations that can vary according to countries.

There are some common challenges, risks, limitations, and success factors for such projects independent from the region/country.

First, a viable and stable economic environment is crucial for the successful execution of a PPP project. Such an environment provides opportunities for the private sector to invest in such projects and be confident that they can get a return on their investment during the concession period. Contractual arrangements provided with appropriate risk allocation is another important factor that affects project performance. It is also reported that a central governmental unit would be helpful to standardize the procedures and improve the project processes. On the other hand, a structured and well-established legal basis is essential for promoting the application of PPP projects. Governments in different countries are using several PPP models suitable for their economic, social, environmental aspects, and needs in public infrastructure and services.

Countries share common motivation factors in pursuing PPP projects; however, infrastructure needs vary from one country to another. Developed countries mostly focus on new demand and the maintenance of existing infrastructures. Investment sectors also vary from country to country with common sectors being transportation, energy, health, defense, education, and water facilities. On the other hand, in developing countries, delivery methods using different models of PPP are mostly used in power projects, transportation, water facilities, and telecom projects.

Turkey, in particular, is one of the countries that uses PPP models frequently and has for nearly three decades. The legal context is evolving and new types of models are being introduced to provide diversity. The new PPP law is drafted to overcome the existing limitations and improve the approval procedures on the government side. Establishment of a central PPP unit is aimed to organize and regulate projects for consistency.

There is wide variation in PPP delivery methods. With the introduction of TOR, BO, and BLT schemes, investment sectors have widened from the power sector to highways, harbors, marina, airports, border gates, and hospitals. As a developing country, Turkey is planning more PPP projects in the near future such as the 3rd Bosphorus Bridge and connection highways, which is estimated to cost more than $2.5 billion based on a BOT model. The information presented in this paper summarizes the PPP experience of various countries and provides a review of these countries' practices and regulations in regards to the PPP.

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