

## **Critical Success Factors for Private Sector Participation in Accomplishing Abandoned Public Sports Facilities Projects in Iran**

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## **Abstract**

Implementing infrastructure development projects using Public-Private Partnership (PPP) delivery method has not been widely successful, particularly in developing countries such as Iran. Therefore, it is essential and dispensable to evaluate the critical success factors (CSFs) for completing abandoned public sports facilities projects (APSFPs) via private sector participation under the PPP model. The current study aims to determine the CSFs for private sector participation in completing APSFPs based in Iran. The significance of this study stems from the criticality of deciding on CSFs as the first step of providing an appropriate platform for completing APSFPs in developing countries, including Iran, and encouraging more successful implementation in practice. This research promotes strategic thinking about public-private partnership strategy and the effective use of resources by identifying CSFs required for completing APSFPs with success. To achieve the research objective, the Delphi survey method was applied to identify CSFs for private sector participation in completing APSFPs in Iran. The hands-on opinions of 10 experts in public sports facilities projects were gathered through three Delphi rounds of survey using a semi-structured questionnaire. The reliability and face, content, and structural validity of the questionnaire were also investigated and checked. A total of 20 CSFs for completion of APSFPs through private sector participation in Iran were determined and analyzed. The identified CSFs were further grouped into five different major factor categories: legal and regulatory, strategic/executive, political/cultural/social, process/structural/human, and economic/financial. The findings of this study suggest that practical effective strategies or pragmatic measures need to be developed to enhance the successful completion of APSFPs in Iran and other developing countries under the PPP delivery model.

**Keywords:** Sports Facilities; Private Sector; PPP; Critical Success Factors; Delphi Survey.

## **1. Introduction**

One of the essential activities for improving the economic infrastructure of every country is the planning and execution of civil projects, for which a large portion of government budgets is allocated each year (France-Mensah, 2019). In addition to the economic value of such projects, their social value is also significant. Specifically, governments have attempted to develop sports projects to improve public health in recent years (reference needed). Consequently, many countries, including developing countries, have experienced the expansion of public sports facilities to improve the overall health of the society.

In Iran, a developing country, the construction of Public Sports Facility Projects (PSFPs) has been booming over the past two decades. This growth is aimed to develop the welfare of citizens and increase socio-economic development indicators and subsequent sustainable development. However, many of these projects have not been completed in the scheduled time, and the construction of these projects has been either stopped or abandoned (Sarvari et al., 2020). Moreover, the economic problems in Iran and the country's situation in the international arena have contributed to the challenges associated with completing the construction of PSFPs (Valipour et al., 2015).

This situation, thus, places more emphasis on the need for systematic planning for the optimal and timely implementation of such projects (Tavassolirizi et al., 2020). Several researchers have investigated the reasons that lead to the abandoned state of public projects. Examples of such reasons include (1) Inadequate supervision and accountability during the project from both public and private parties (Danaei-Fard et al., 2017); (2) Transfer of the entirety of project risk to the private sector (Jin et al., 2019); (3) Starting new projects despite numerous abandoned projects (Sarvari et al., 2020); (4) Introduction of political and partisan problems to the projects (Sadeghi

Shahani et al., 2012); (5) The introduction of high unnecessary costs due to the addition of side applications to the main project (Khosravi et al., 2020); and (6) Lack of sufficient government skills and abilities for transferring projects (Meng et al., 2011).

Completing and financing abandoned infrastructure projects are of major concern for governments, which are always faced with budget constraints (Sarvari et al., 2020). Studies have indicated that the completion of abandoned projects is only possible through the participation of the private sector (Tamošaitienė et al., 2021). Given the current condition in Iran (i.e., problems in the Iran economic system, the necessity of achieving a sustainable economy and exiting the current stagnation), the completion of abandoned projects in Iran is not achievable using traditional investment methods. The solution to this problem requires using and leveraging the potential and capabilities of the private sector (Sarvari et al., 2020).

Similar experiences in other developing countries have shown that the private sector can be better and more successful in carrying out tasks than the public sector (Jirathitikarn et al., 2020). Acceleration of economic development in countries requires decreasing government involvement in non-government-related activities, which can be defined under the umbrella term of privatization. However, what separates the public-private partnership (PPP) concept from typical privatization is that under PPP, governments retain their legal and supervisory roles and, by accepting and minimizing part of the risks, and thus, facilitating the participation of the private sector in various projects (Danaei-Fard et al., 2017). Achieving success in a partnership with the private sector requires transparent rules and regulations (Danaei-Fard et al. 2017), stable economic decision-making (Debela, 2019), transparent pricing (Danaei-Fard et al., 2017), reduced competition in the public sector with private companies (Muhammad & Johar, 2019), the support of foreign investment (Cheung et al., 2012), the belief in private sector capabilities among public

sector (Zheng et al., 2019), the need to adjust expectations from the private sector (Danaei-Fard et al. 2017), and the mindset that supports partnering with the private sector (Sarvari et al., 2021).

Although many research studies have investigated the subject of PPP projects, most of these studies are performed in countries such as Mainland China and the United Kingdom where PPP projects are more common (Zhang et al., 2016). As the construction of APSFPs in Iran is associated with many challenges and, knowing that completing these projects with the limited government capabilities and resources is not feasible, the use of the private sector for partnership through investment, construction, and commissioning of abandoned projects becomes a necessity.

Despite the perceived advantages of private sector partnership in completing abandoned sports facility projects (APSFPs), the Iranian government has been unsuccessful in assigning these abandoned projects and attracting private sector partnership (Shakeri et al., 2014). The government has either been unwilling to accept private sector partnerships or has failed to provide necessary incentives to attract private sector investments in infrastructural projects (Sarvari et al., 2020). While some researchers have focused on PPP adoption through different evaluation methods (i.e., Noorzai et al., 2016ab), the use of private sector partnership in abandoned projects has not been yet investigated. Therefore, a question arises as to what critical success factors (CSFs) are needed for the completion of APSFPs under PPP delivery model. This paper has attempted to fill up this existing knowledge gap by investigating the critical success factors (CSFs) for private sector participation in completing APSFPs particularly in developing nations like Iran.

To achieve the research objective, a literature review was first conducted to gather a list of success factors for private sector participation in civil projects with a focus on sports facility projects. Next, this list was used to create a semi-structured questionnaire that served as the primary data gathering tool to gather experts' opinions regarding success factors for private sector

partnership in the completion of APSFPs. Finally, the 20 identified CSFs were analyzed and divided into five main categories of legal and regulatory, strategic/executive, political/cultural/social, process/structural/human, and economic/financial factors.

## **2. Literature review**

### **2.1. Application of PPP in delivering Sports facilities projects**

Due to the diverse capacities and capabilities of the private and public sectors, their collaboration and combination of abilities and skills, as well as the allocation of risks, can have a substantial impact on the optimal implementation of infrastructure and civil projects (Jin et al., 2019). Typically, PPP contracts are long-term agreements between governments and numerous private sector entities (Sarvari et al., 2020). In any modern community, addressing social and cultural needs is a top priority for the government. Therefore, it is vital to create the required infrastructures to suit these social and cultural requirements (Shakeri et al., 2014). One of the government's most important instruments for achieving sustainable growth and development is the creation of sports infrastructure projects. These projects are distinguished from others by their high financial resource requirements, high construction technology, high technical knowledge requirements, large workload, and time-consuming nature, all of which can have grave economic, technological, and even sociopolitical repercussions for the countries involved (Amiri et al., 2012).

Beginning a new endeavor is equivalent to raising social expectations. When project delays become routine, the gap between expectations and reality exacerbates societal dissatisfaction (Amiri et al., 2012). According to Sarvari et al. (2021), only initiatives with economic, social, and environmental justifications that are compatible with the macroeconomic circumstances should be

executed to reverse this trend. The authors stated that PPP is frequently a viable option for infrastructure development when the government is unable to offer adequate funding. However, this partnership can take various forms and cannot be considered a reliable infrastructural development method. It is especially true for projects involving social facilities, which are often smaller in scale than commercial and infrastructure projects and tend to become more complex. Acceptance of PPP in the construction of social infrastructures is sometimes more challenging than in the building of economic infrastructure (Sarvari et al., 2021). Therefore, the effective implementation of PPP in social infrastructure projects requires the practical expertise and understanding of both parties as well as a sophisticated legal framework (for issues such as the optimum method selection and decision-making). (Tamošaitienė et al., 2021). According to the latest statistics provided by the Management and Planning Organization of Iran, among numerous types of projects, the number of transferable APSFPs to the private sector in Iran is placed second after the water and wastewater projects. However, studies show that various ambiguities and barriers have caused problems for private sector partnerships to complete APSFPs (Danaei-Fard et al., 2017).

## **2.2. CSFs for PPP Projects**

Due to insufficient investment, notably a lack of timely and appropriate finance, construction projects frequently encountered delays, halts, and sometimes failures. Consequently, the necessity to encourage the development of civil projects with financial viability through collaboration with the private sector has risen over time (Dolla & Laishram, 2020). The primary objective of the partnership with the private sector is to boost productivity, which leads to the creation of products and services at the lowest feasible cost and of the greatest possible quality (Li et al., 2005)..

Identifying the factors that influence the success and failure of a project can give a proper framework for evaluating its outcomes. A lack of sufficient and complete knowledge of project success determinants might impede project management, oversight, and performance evaluation. Focusing on success factors can facilitate project management and the project's eventual success. (Liu et al., 2015). Pinto and Slevin (1988) highlighted coordination, communication and relationships, structure and control, supervision and feedback, project relevance, advertising, and management support, as well as incentives and the usage of success criteria as variables with a favorable impact on project outcomes. According to Yuan et al. (2010), managing and working with stakeholders keeps projects on schedule and under budget. Ahmadabadi and Heravi (2019) recognized a transparent bidding procedure, appropriate risk allocation, and excellent cooperation as critical success factors for PPP projects in developing nations. Gundogdu (2019) examined the success criteria for Islamic PPPs with sustainable development goals (SDGs) and the Islamic financial components of these projects.. According to Ahmed & Sipan (2019), excellent governance, accessible financial markets, sound economic policies, monetary stability, and the commitment of the public and private sectors are some of the most crucial characteristics for affordable housing PPP projects in Nigeria. The study by Zheng et al. (2019) found twenty-one major risk indicators having substantial influence on the retained value of PPP highway projects. According to Debela (2019), the most significant element influencing the success of road building projects is project management and management abilities, with the usage of qualified contractors also being crucial considerations. Yun et al. (2015) shown that greater organizational competency for improved project implementation had the greatest impact on projects requesting PPP contracts.

Abukeshek et al. (2021) determined that the top three CSFs for sports facilities were: (1) an effective safety management plan; (2) an effective project performance; and (3) an effective quality



management plan. Chileshe et al. (2021) proposed four essential aspects for the growth of PPP projects: (1) training and education; (2) benchmarking and lessons learned; (3) knowledge transfer and experience sharing; and (4) institutional changes. According to Osei-Kyei et al. (2022), the United States, China, and the United Kingdom are the three most prolific nations for PPP research. This study indicates that underdeveloped countries require further research in this field.

A review of the relevant body of research revealed that CSFs in PPP projects might vary depending on the kind of project and PPP project (Table 1). Furthermore, CSFs differ from country to country. For the purpose of identifying the CSFs of PPP project execution in APSFPs, previous research was evaluated in depth and breadth. To ensure the exhaustiveness of the discovered CSFs, additional criteria were used to find relevant studies, including research subject and title, location (developing or developed), kind of project, authors, and year of research. The CSFs for various projects were identified through a research of the relevant literature. Then, CSFs or important variables were identified in a variety of PPP efforts. CSFs for PPP projects are also categorised. The CSFs of private sector partnerships have been taken from the extant literature and shown in Table 2. The research included in the table examined CSFs in a variety of PPP project types., including road projects (Debela, 2019; Ahmadabadi & Heravi, 2019; Sadeghi Shahani et al., 2012; Yuan et al., 2010), housing projects (Kavishe & Chileshe, 2019; Muhammad & Johar, 2019; Kavishe & Chileshe, 2018), sport facility projects (Shakeri et al. 2014; Amiri et al., 2012), water and wastewater projects (Sarvari et al., 2021) and energy projects (Noruzi et al., 2015). In the meantime, the literature review revealed that no investigation has been conducted on the usage of private sector partnerships in abandoned projects.

This research has utilized various techniques to classify the discovered success criteria. For instance, Muhammad and Johar (2019) separated internal and external success elements for PPP

initiatives. Both Danaei-Fard et al. (2017) and Noruzi et al. (2015) divided success variables into economic/financial, political/legal, structural/organizational; process/strategies, operational/human, and social/cultural categories. In addition, Amiri et al. (2012) utilized managerial, social/cultural, economic, and political/legal categories to classify success elements, whereas Sadeghi Shahdani et al. (2012) categorized them according to economic, infrastructure, legal, and social variables.

Table 1. Selected research publications relevant to the study

No.	Source	Focus	Type of project	Identification method			Evaluation method			Country	
				Questionnaire survey	Interview	Literature review	MCDM	Fuzzy	Statistical analysis	Developed country	Developing country
A	Yuan et al. (2010)	Performance Objectives of PPP	Infrastructure			✓	✓	✓			✓
B	Sadeghi Shahdani et al. (2012)	Barriers of PPP implementation	Road Transportation			✓	✓				✓
C	Zhang et al. (2016)	CSFs of PPP implementation	Infrastructure	✓		✓			✓	✓	✓
D	Noruzi et al. (2015)	CSFs of PPP implementation	Energy		✓	✓	✓				✓
E	Sanni (2016)	CSFs of PPP implementation	Infrastructure			✓			✓		✓
F	Danaei-Fard et al. (2017)	Barriers to the PPP implementation	Infrastructure		✓	✓			✓		✓
G	Gao, (2018)	Selecting PPP contractor	Infrastructure		✓	✓	✓				✓
H	Debela (2019)	CSFs of PPP implementation	Road Transportation			✓			✓		✓
I	Ahmadabadi & Heravi (2019)	CSFs of PPP implementation	Road Transportation	✓	✓	✓			✓		✓
J	Jiang et al. (2019)	Risks of PPP implementation	Infrastructure		✓	✓	✓	✓			✓
K	Muhammad & Johar (2019)	CSFs of PPP implementation	Housing		✓	✓			✓		✓
L	Osei-Kyei et al. (2019)	CSFs of PPP implementation	Infrastructure		✓					✓	✓
M	Sarvari et al. (2021)	Barriers of PPP implementation	Water and Sewage	✓	✓	✓	✓	✓			✓

Table 2. CSFs for implementation of PPP projects extracted from the literature review

No.	CSFs	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Lack of conflict of interest between PPP laws and other regulations		●				●							
2	Existence of suitable upstream legal frameworks and sufficient legal capacities including necessary regulations		●						●	●				
3	Access to clear and transparent contracts and comprehensive and stable frameworks for contract management		●	●			●	●	●	●				
4	Sufficient capacity for offering incentives – exemptions for partnership projects	●					●	●						
5	Determination and implementation of a comprehensive and detailed framework for quality control and risk management of PPP projects by upstream organizations.		●							●	●	●	●	●
6	Regulations for supporting and incentivizing private sector investment in legal areas		●			●		●						
7	Defining side applications and utilities to attract investment						●							
8	Simplified taxation situation for PPP projects						●							
9	Investor's confidence in projects' technical and financial studies carried out by government organizations							●						
10	Lack of complexity and difficulty in providing necessary infrastructures in PPP projects												●	
11	Attention to investment in spatial planning and development plans						●							
12	Lack of questionable international position of the country due to sanctions		●											
13	Political stability and strategic government planning with access to comprehensive roadmaps for support of private companies in the implementation of infrastructural projects		●		●								●	
14	Stability of government agreements with changes in the governments and not stopping of PPP plans in infrastructural projects			●			●							
15	Low political and social risks						●							
16	Fair conflict resolution process in PPP projects												●	
17	Strong understanding of PPP projects on their effects on the macro economy among politicians and decision-makers				●									
18	Lack of government involvement in private sector decisions and lack of unnecessary limitations, resulting in increased incentive and desire for partnership in the private sector		●				●							
19	Cooperative and group work culture and active use of expert opinions and private sector partnership in projects by the government						●							
20	Access to a clear and transparent definition of the PPP process and structure													●

No.	CSFs	A	B	C	D	E	F	G	H	I	J	K	L	M
21	Strong understanding among government organizations and decision-makers regarding PPP and familiarity of supervisory organizations with the importance of the subject of partnership						●							
22	Management stability in the public sector and its effects on the implementation of strategic visions			●										
23	Existence of professional organizations dedicated to PPP projects			●										
24	Lack of involvement of the political sector in professional activities of executive organizations						●							
25	Strong organizational frameworks such as banking system, insurances, and customs to support the PPP business model		●											
26	Lack of infrastructural problems in the investment management system	●												
27	Coordination between various organizations and authorities in public and private sectors for preventing overlapping duties and parallel activities											●		
28	Access to feasibility studies before the initial phases of partnership and sufficient localized knowledge, skills, and capabilities for implementation of sports facility projects								●			●		
29	Identification of project risks and optimal risk distribution between parties in sport-related construction, maintenance, and commissioning projects									●	●			●
30	Ease of ownership over lands required for sports PPP projects													●
31	Using the capacities of the financial market for financing partnership contracts					●								
32	Specified priorities for investment and PPP						●							
33	Compatibility of bank load conditions with PPP projects													●
34	Exitance of suitable methods for use of national development fund and Islamic Development Bank loans by the private sector for completion of national projects and development plans						●							
35	Considering the implementation of PPP projects as part of national economic and civil policies and making suitable decisions regarding the use of income obtained from the transfer of sports facility projects											●	●	
36	Low implementation cost and low delay between defining sports facility projects and their commissioning and confidence regarding their future					●							●	
37	Lack of international sanctions that results in increased costs of transactions and lower access to foreign products and services and decreasing the risk of foreign investment		●											
38	Existence of a centralized system for following the negotiation process and financing of projects before signing contracts and the possibility of monitoring each project								●			●		
39	The active role of stock and securities markets in private sector financing		●											
40	The financial return of economic activities in sports facility projects and return of investment for private companies due to suitable financing and support					●							●	

### 3. Research Methodology

The current study aims to provide clear guidance for the proper completion of APSFPs by the public sector through the evaluation of CSFs under PPP contracts. The methodology employed to achieve the research objective is outlined in Figure and consists of three phases: 1) literature review, 2) the Delphi survey technique, and 3) data analysis.

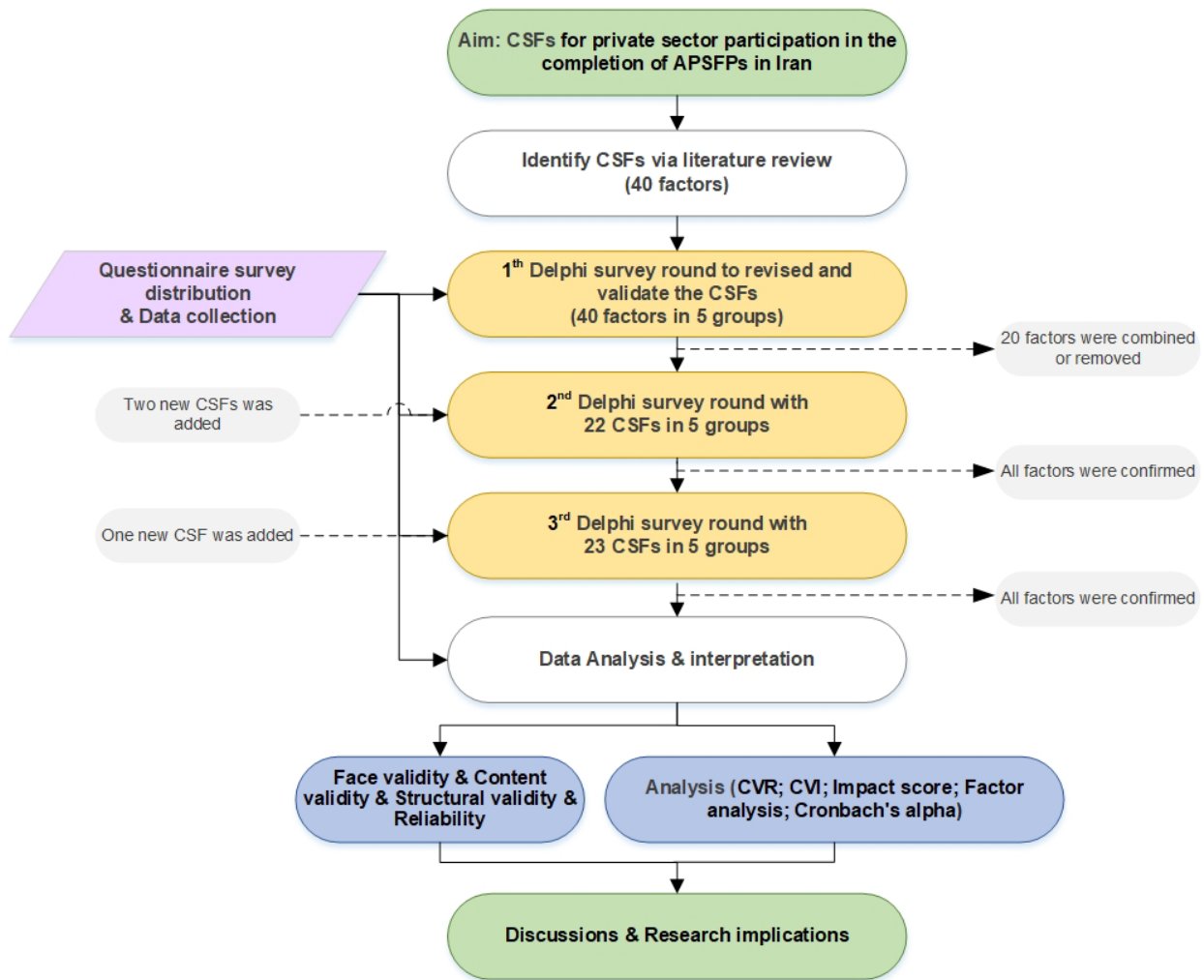


Figure 1. The overall research design for the study

#### 3.1. Literature review process

A literature review was conducted to identify CSFs for PPP contracts in APSFPs. A total of identified 40 CSFs for PPP contracts regarding the completion of abandoned civil projects were identified (Table 1).

### **3.2. Delphi Survey Technique**

Once the CSFs were identified from the existing literature, a three-round Delphi survey method was used to screen and evaluate these CSFs. This technique aims reach a consensus among experts on a specific topic by distributing questionnaires in consecutive rounds (Mashayekhi et al., 2005), and is valuable when the issue can benefit from collective and subjective judgments or decisions and when group dynamics do not allow for effective communication (e.g., differences in time, distance, and personality conflicts) (Grime & Wright, 2016). The Delphi technique was selected for the advantages it offers over other similar methods such as brainstorming (i.e., reducing bias and prejudice; simplicity; and facilitating access to experts).

No strict and explicit rules were imposed regarding selecting experts receiving Delphi questionnaires. However, the general rule was that the quality of experts is more important than their quantity (Rafieyan et al., 2022). As a result, participants in the Delphi survey are experts, critics, and panelists with sound knowledge and abundant experience in the matter at hand and sufficient time and necessary communication skills for participation (Yeung et al., 2007). In these surveys, the number of experts involved is usually less than 50 and often between 10 to 20 (Sadeghi et al., 2021). The actual number of experts involved depends on factors such as sample homogeneity, Delphi goal, difficulty range, decision quality, team research ability, internal and external validity, data collection time, available resources, and the scope of the problem being investigated (Chan & Choi, 2015). The current study used a purposive sampling technique for selecting target experts, like the method used by other similar studies (Rafieyan et al., 2022).

Teddie and Yu (2007) describe the purposive sampling technique as a mixed-method sampling technique where the selection of cases is based on those that will provide the most useful information and some generalisability. According to Wellington (1996), purposive sampling can be valuable in following up on contacts, checking data from similar organizations, and exploring a specific field (Fulwood, 2014).

Ten experts were selected from both public and private sectors active in sports facilities projects in Iran based on their knowledge and expertise. All the experts participating in this study have experience in sports facilities projects. They are among the decision-making managers of the public and private sectors regarding the assignment and completion of APSFPs. To ensure the quality of the responses, the respondents were selected from experts who (i) have worked experience in at least five different sports projects; and (ii) have been involved in implementing PPP projects in the last one/two years. Table 3 shows the demographic characteristics of the experts participating in the Delphi process.

Table 3. Demographic characteristics of experts participating in the Delphi process.

Type	Average relevant work experience									Number of PPP projects involved				Education level		
	Construction or investment			Sports facilities			PPP projects									
	21 years or more	11 to 20 years	21 years or more	Less than 10 years	11 to 20 years	21 years or more	Less than 10 years	11 to 20 years	21 years or more	Less than 5	6 to 10	11 to 15	16 or more	Bachelor	Masters	Doctorate
Delphi participants	0	6	4	2	8	0	0	6	4	0	2	4	4	0	0	10

The 40 CSFs were then evaluated in an initial evaluation. This resulted in the questionnaire for the first Delphi round consisting of 30 factors. Key identified success factors were divided into five main categories (legal and regulatory, strategic/executive, political/cultural/social,



process/structural/human, and economic/financial factors). This categorization is similar to the one used in the studies by Danaei-Fard et al. (2017), Noruzi et al. (2015), and Amiri et al. (2012).

An open-ended questionnaire was prepared and then distributed to 10 subject matter experts. The experts were asked to read the initial questionnaire and state their opinions (Hassanzadeh et al., 2012). The questionnaires were then collected. Based on the feedback collected from the experts, the number of factors was reduced to 22. In the second round, a second questionnaire comprising these 22 factors was delivered to the experts. Their opinions were utilized to increase the number of factors in the third round to 23. The final findings of the distribution of the new questionnaire to experts are presented in Table 4.. Moreover, three factors (i.e., (1) Providing alternative solutions for commissioning of sports facilities projects in case of change in the initial target market; (2) Existence of private companies with strong financial capabilities for PPP completion of APSFPs; and (3) Proper implementation of codified processes for quality control of PPP projects by relevant organizations) in the first round; and one factor (i.e., Guarantee regarding the purchase of products by the public sector after completion of APSFPs by the private sector) in the second round were suggested by experts, which were approved in the next round. As shown in Table 4, the experts eliminated 21 CSFs after three rounds of the Delphi survey. The authors believe that the elimination of this volume of CSFs could be due to the differences of CSFs of PPP implementation in APSFPs compared to other public facility projects.

Table 4. CSFs for PPP in completion of APSFPs identified after 3 Delphi survey rounds

Category	#	Critical Success Factors (CSFs)
Legal and regulatory	1	Presence of upstream legal capacities, clear and transparent contracts and comprehensive legal framework for contract management, and sufficient legal capacities including necessary regulations
	2	Presence of regulations for supporting the private sector (contract flexibility, definition of side applications, and necessary utilities) in APSFPs
	3	Lack of conflict between PPP projects and other regulations
Strategic	4	Existence of private companies with relevant experience and knowledge for the implantation of PPP projects

Category	#	Critical Success Factors (CSFs)
	5	Existence of private companies with strong financial capabilities for PPP completion of APSFPs
	6	Investors' confidence in technical and financial studies conducted by executive organizations
	7	Proper implementation of codified processes for quality control of PPP projects by relevant organizations
	8	Proper implementations of risk management processes and optimal risk distribution among parties in PPP projects
	9	Facilitating administrative processes (issuing of permits, licenses, etc.) for PPP projects
	10	Guarantee regarding the purchase of products by the public sector after completion of APSFPs by the private sector
Political/cultural/social	11	Government's ability for attracting foreign investment by providing investment guarantees in Iran at the international level
	12	Political stability and governments' commitment to previous agreements even with a change in governments and the existence of a strong and constant roadmap guaranteeing continued support for the private sector in the assigned projects
	13	Sufficient understanding and knowledge among politicians and decision-makers regarding PPP projects and their macroeconomics effects.
	14	Lack of government involvement in private sector decisions and lack of unnecessary limitations, resulting in increased incentive and desire for partnership in the private sector
Process/structural/human	15	Existence of professional and dedicated organizations for the preparation of PPP projects
	16	Strong organizational frameworks such as banking system, insurances, and customs to support the PPP business model and prevent overlapping of duties
	17	Feasibility studies before implementation of projects (identification of required and sufficient local skills, knowledge, and abilities and for completion of APSFPs, reevaluation of project's financial status and target markets, etc.)
Economic/financial	18	Using the capacities of different financing methods for partnership projects (including capital market, national and international loans, stock market, etc.)
	19	Providing supporting financial facilities with predetermined structures for commissioning of APSFPs by the private sector
	20	Existence of suitable tax incentives and financial facilities for partnership projects to attract investment
	21	Lack of delay in commissioning of completed partnership sports projects to guarantee the return of investment and gains for private sector investors.
	22	Decreasing the transaction costs and improving access to foreign products and services and decreasing the risk of foreign investment by removing international sanctions
	23	Providing alternative solutions for commissioning of sports facilities projects in case of change in the initial target market

The reliability of the questionnaires was investigated using Cronbach's Alpha and SPSS® software. SPSS® is a software used by research scientists which helps them process critical data in simple steps. Cronbach's Alpha is the most common method for evaluating the internal reliability of questionnaires used in many studies and determining the compatibility between items measuring a construct. A final Cronbach's Alpha value of 0.7 or higher means that the item must remain within the scale (Drost, 2011). In the current study, the calculated Cronbach's Alpha for the entire questionnaire was 0.946, indicating the questionnaire's suitable reliability. Furthermore,

the Cronbach’s Alpha values calculated separately for each factor were higher than 0.7, indicating practical reliability of all aspects.

Furthermore, the face and content validity of the questionnaire was evaluated based on several experts in the field of PPP and construction management. The confirmatory factor analysis method was employed using the SPSS® software.

### 3.3. Data Analysis

#### 3.1.1. Content Validity

For determining the content validity of a questionnaire, the Content Validity Ratio (CVR) and Content Validity Index (CVI) are employed (Hosseini et al., 2015). The approach given by Bahr et al. (1984) and Lawshe (1975) was utilized to determine content validity in the present study (Hassanzadeh et al., 2012). In this procedure, a panel of experts in domains related to the questionnaire’s subject matter is chosen to offer an accurate and exact evaluation (Fayazi et al., 2019). Lawshe (1975) proposes a minimum of four participants, but Bahr et al. (1984) offer a minimum acceptable content validity index of 0.6, which is fulfilled by choosing at least eight participants (Hassanzadeh et al., 2012). In the current study, ten experts participated in the examination of the questionnaire’s content validity. Table 5 displays the demographic features of these specialists.

Table 5. The characteristics of experts participating in validity tests

Type	Average relevant work experience			Number of PPP projects involved	Education level
	Construction or investment	Sports facilities	PPP projects		

	21 years or more	11 to 20 years	21 years or more	Less than 10 years	11 to 20 years	21 years or more	Less than 10 years	11 to 20 years	21 years or more	Less than 5	6 to 10	11 to 15	16 or more	Bachelor	Masters	Doctorate
Face Validity	3	7	0	10	0	0	4	6	0	5	1	4	0	5	5	0
Content Validity	0	8	2	10	0	0	6	4	0	5	1	0	4	3	7	0

The Content Validity Ratio (CVR) was proposed by Lawshe in 1975. Using a three-part Likert scale, experts examine the questionnaire and score each item as “necessary,” “helpful but not necessary,” or “not required.” Equation 1 is then utilized to get the CVR value.:

$$CVR = \frac{\left[ \frac{n-N}{2} \right]}{\frac{N}{2}} \quad (1)$$

This equation indicates the total number of experts, where n is the number of experts chosen for the “item is required” option. The lowest acceptable CVR score for 10 experts based on the total number of experts who evaluated the item is 0.62 (Hassanzadeh et al., 2012). In addition, for the purpose of identifying hidden variables (factors and dimensions), each item contains a question asking the experts, “Do you feel this categorization is accurate?” to solicit their input. Waltz and Bausell’s technique for measuring CVI was utilized. Using a four-point Likert scale, experts evaluate the “importance,” “clarity,” and “simplicity” of each item. Then, CVI values are calculated using Equation 2.:

$$CVI = \frac{\text{Experts giving the item a score of 3 or 4}}{\text{Total number of Experts}} \quad (2)$$

The minimum acceptable value for CVI is 0.79, and items with CVI values less than 0.79 are eliminated (Fayazi et al., 2019).

### 3.1.2. Face Validity

The quantitative face validity is measured using the Item Impact Score measure. Some of the target group members were asked to evaluate the items according to their importance based on the 5-point Likert scale measures (1 indicating the lowest and 5 indicating the highest importance). Then, Item Impact Score is calculated using the following equation:

$$\text{Item Impact Score} = \text{Frequency (in percentage)} \times \text{Importance} \quad (3)$$

For an item to be accepted, its Item Impact Score should not be lower than 1.5, and only items with Item Impact Scores of 1.5 or higher are retained (Fayazi et al., 2019).

### *3.1.3. Structural Validity (Factor Structure) of the measure*

In the final step of questionnaire evaluation, its structural validity is evaluated, which determines the factor structure of the measure. Structural validity indicates the compatibility between the results obtained from the scale with the theories upon which the ranking is based. The best method for measuring structural validity is Structural Factor Analysis. This test can determine whether items in the questionnaire measure the desired factors or not. In Structural Factor Analysis, items designed for evaluating a particular characteristic or property must have similar factor loads, and these factors should be significant (Cronbach, 1970).

In the current study, “Structural Equation Modeling (SEM)” method was carried out using Partial Least Squares (PLS) approach. The algorithm for this analysis evaluates the model’s fitting (fitting of the measurement model, structural model, and overall model). It tests the research hypotheses (Lin et al., 2020).

Factor reliability, convergent validity, and divergent validity were used to evaluate the fitting of the measurement model. Factor reliability used to assess the internal Reliability includes three criteria of Cronbach’s Alpha reliability value, Composite Reliability (CR), and Factor Loadings. It is a method for Reliability that offers some advantages over the traditional Cronbach’s Alpha

measure. CR measures the Reliability of items not as an absolute value but based on the correlation between their constructs. Items with higher factor loadings have a more significant effect in their calculation.. It is necessary to use both measures to evaluate better Reliability. A lower limit of 0.7 has been proposed for the CR measure (Lin et al., 2020). Convergent validity is another method for evaluating the fitting of measurement models used to model structural equations. Fornell & Larcker (1981) proposed using Average Variance Extracted (AVE) to measure convergent validity. The acceptable values for AVE are higher than 0.5 (Malekakhlagh et al., 2016).

In the final evaluation stage, the factor loadings of items and divergent validity are evaluated. Factor loadings are calculated using the correlation of a construct's items with that construct, and their acceptable value is 0.4 or more (Hulland, 1999). A suitable factor loading indicates that the variance between a build and its items is higher than the measurement error (Henseler et al., 2015).

The proposed criterion by Fornell & Larcker (1981) was used to determine the divergent validity of the measurement model. According to this criterion, the acceptable divergent validity of a model indicates that a construct is more correlated to its factors than other factors. Fornell & Larcker (1981) stated that divergent validity is acceptable when the AVE value for each construct is higher than the shared variance between that construct and other constructs in the same model.

$$CR = \frac{CI}{RI} \quad (4)$$

## **4. Results and Discussion**

### **4.1. Statistical Analysis**

The results presented in Table 6 show that only 20 items have acceptable face and content validity. Therefore, the items “Investors’ confidence in technical and financial studies conducted by executive organizations”; “Government’s ability for attracting foreign investment by providing investment guarantees in Iran at the international level” and “Providing supporting financial

facilities with predetermined structures for commissioning of APSFPs by private sector” were rejected.

Table 6. The results of content and face validity evaluation

#	Face validity results	Content validity results			
		CVI-1	CVI-2	CVI-3	CVR
1	✓	✓	✓	✓	✓
2	✓	✓	✓	✓	✓
3	✓	✓	✓	✓	✓
4	✓	✓	✓	✓	✓
5	✓	✓	✓	✓	✓
6	✗	✓	✗	✗	✗
7	✓	✓	✓	✓	✓
8	✓	✓	✓	✓	✓
9	✓	✓	✓	✓	✓
10	✓	✓	✓	✓	✓
11	✗	✗	✗	✓	✓
12	✓	✓	✓	✓	✓
13	✓	✓	✓	✓	✓
14	✓	✓	✓	✓	✓
15	✓	✓	✓	✓	✓
16	✓	✓	✓	✓	✓
17	✓	✓	✓	✓	✓
18	✓	✓	✓	✓	✓
19	✗	✗	✓	✗	✗
20	✓	✓	✓	✓	✓
21	✓	✓	✓	✓	✓
22	✓	✓	✓	✓	✓
23	✓	✓	✓	✓	✓

Table 7 shows the results of convergent validity and reliability for each of the six main factors. Based on the reported Cronbach's Alpha and CR values, all hidden variables have Cronbach's Alpha and CR values higher than 0.7, indicating good model reliability. Furthermore, the AVE value for all hidden variables is higher than 0.5, indicating good convergent validity of the measurement model.

Table 7. The reliability and convergent validity results for each clustered factor category

<b>Factor Category</b>	<b>Cronbach's Alpha Value</b>	<b>Rho_A</b>	<b>CR</b>	<b>AVE</b>
Legal and regulatory	0.794	0.797	0.881	0.715
Strategic/executive	0.845	0.925	0.888	0.595
Political/cultural/social	0.744	0.744	0.855	0.664
Process/structural/human	0.814	0.815	0.890	0.729
Economic/financial	0.797	0.857	0.805	0.797

The factor loadings for model components were extracted using SmartPLS software program, and the results are presented in Figure 2. As can be seen, all measures have acceptable factor loadings.



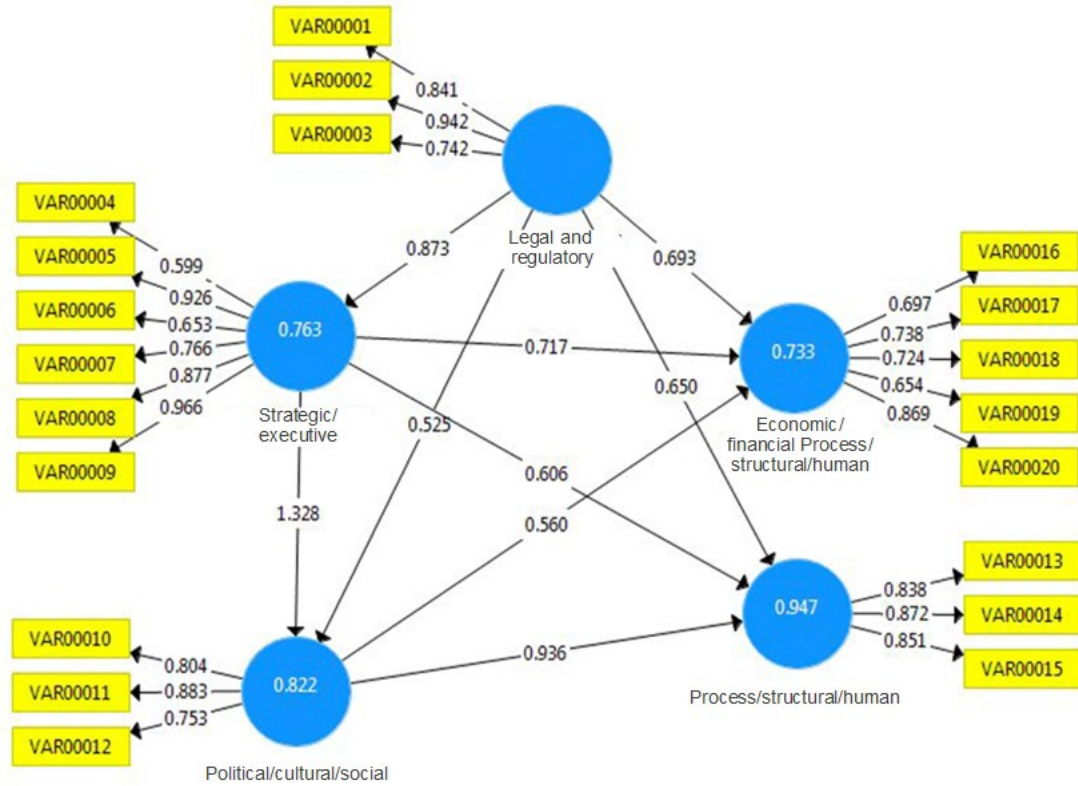


Figure 2. The Structural Factor Analysis model of the study

SmartPLS software uses the matrix presented in Table 8 to evaluate the divergent validity of the model, where each cell in the matrix is the correlation coefficient value between factors and the PLS of each element (Mirzaei, 2016). Since the PLS values of the factors presented in the matrix's main diagonal are higher than the correlation coefficient values, divergent validity is acceptable and good fitting of the measurement model is confirmed. Finally, Table 9 shows the CSFs for PPP in completing APSFPs in Iran with confirmed validity and reliability.

Table 8. The results of divergent validity for studied factors

Factor Category	Legal and regulatory	Strategic/executive	Political/cultural/social	Process/structural/human	Economic/financial
Legal and regulatory	0.845				
Strategic/executive	0.873	0.771			
Political/cultural/social	0.635	0.870	0.815		

Process/structural/human	0.649	0.863	0.972	0.854	
Economic/financial	0.818	0.834	0.650	0.758	0.740

Table 9. CSFs for PPP in completion of APSFPs identified with confirmed validity and reliability

Category	No.	CSFs
Legal and regulatory	1	Presence of upstream legal capacities, clear and transparent contracts and comprehensive legal framework for contract management, and sufficient legal capacities including necessary regulations
	2	Presence of regulations for supporting the private sector (contract flexibility, definition of side applications, and necessary utilities) in APSFPs
	3	Lack of conflict between PPP projects and other regulations
Strategic/executive	4	Existence of private companies with relevant experience and knowledge for the implementation of PPP projects
	5	Existence of private companies with strong financial capabilities for PPP completion of APSFPs
	6	Proper implementation of codified processes for quality control of PPP projects by relevant organizations
	7	Proper implementations of risk management processes and optimal risk distribution among parties in PPP projects
	8	Facilitating administrative processes (issuing of permits, licenses, etc.) for PPP projects
	9	Guarantee regarding the purchase of products by the public sector after completion of APSFPs by the private sector
Political/cultural/social	10	Political stability and governments' commitment to previous agreements even with a change in governments and the existence of a strong and constant roadmap guaranteeing continued support for the private sector in the assigned projects
	11	Sufficient understanding and knowledge among politicians and decision-makers regarding PPP projects and their macroeconomics effects.
	12	Lack of government involvement in private sector decisions and lack of unnecessary limitations, resulting in increased incentive and desire for partnership in the private sector
Process/structural/human	13	Existence of professional and dedicated organizations for the preparation of PPP projects
	14	Strong organizational frameworks such as banking system, insurances, and customs to support the PPP business model and prevent overlapping of duties
	15	Feasibility studies before implementation of projects (identification of required and sufficient local skills, knowledge, and abilities and for completion of APSFPs, reevaluation of project's financial status and target markets, etc.)
Economic/financial	16	Using the capacities of different financing methods for partnership projects (including capital market, national and international loans, stock market, etc.)
	17	Existence of suitable tax incentives and financial facilities for partnership projects to attract investment
	18	Lack of delay in commissioning of completed partnership sports projects to guarantee the return of investment and gains for private sector investors.
	19	Decreasing the transaction costs and improving access to foreign products and services and decreasing the risk of foreign investment by removing international sanctions
	20	Providing alternative solutions for commissioning of sports facilities projects in case of change in the initial target market

#### 4.2. CSFs-Based Implementation Framework

Pradhananga et al. (2021) highlighted the need for further examination to advance construction practices in developing countries with economic and political barriers. The current study documents information that can help build a plan for how to best proceed in completing APSFPs in Iran (and other developing countries with similar situations) under the PPP model. Although other developing countries' economic, political, and institutional frameworks may vary from Iran, the authors expect some critical factors to succeed in PPP projects in other developing countries to be analogous to Iran. Sarvari et al. (2021) highlighted that most developing countries lack the necessary laws, institutions, and infrastructure to implement PPPs. The findings of this study indicate that it is critical to consider a set of CSFs for the completion of APSFPs in Iran and other developing countries under the PPP model.

A review of previous studies shows that CSFs of implementation of PPP projects may not be the same depending on the type of project. Moreover, these factors are different in each country as well as developing and developed countries. However, the current study's findings were almost consistent with the following research.

Ahmadabadi & Heravi (2019), in their study, have shown that a transparent bidding process, proper risk allocation, and appropriate participation between public and private parties are the most critical factors to succeed in PPP projects in developing countries. Based on the conducted research by Danaei-Fard et al. (2017), the critical factors to private sector investment in the development of infrastructures in Iran include the economic situation, political and legal, organizational structure, project executive, and human factors. In another similar study, Nowruzi et al. (2015) acknowledged that political factors, along with economic and infrastructural factors, are the most critical factors in the successful PPP implementation in the development of infrastructures in Iran. Amiri et al. (2012) also prioritized the main obstacles to constructing sports facilities privatization:

organizational, socio-cultural, economic, political, and legal barriers. Finally, they explained the role and function of social media as one of the most important institutions in developing private sector participation in the form of four social, informational, leisure, and emotional processes. Sadeghi Shahdani (2012) also divided the main factors in developing PPP projects into economic, infrastructure, legal, and social groups.

Meanwhile, the current study has contributed to bridging the research and knowledge gap of the CSFs for partnership with the private sector in sports facilities projects. Theoretically, the identified list of CSFs in partnership with the private sector provides a checklist of success factors and their dimensions that can be used as a consultative toolkit by both private and public sectors, policymakers, and other stakeholders. This can form the bedrock of policy formulation and development of implementation strategies for Iranian private and public construction firms and others in the Middle East. Also, stakeholders can improve their chance of success when implementing PPP in sports facilities projects by focusing on the critical success factors that cause their completion.

Practically, the study results contribute to managing sports facilities projects by identifying CSFs for partnership with the private sector in these projects. Furthermore, this work advances knowledge and expertise regarding CSFs for PPP projects, especially for completing APSFPs. This guides policymakers, governments, and top management of public and private sectors on where to concentrate their interventionist policies towards completing APSFPs. Furthermore, the grouped CSFs can be used as a resource and finance allocative function for better resource distribution and policy execution for completing APSFPs.

In this section, strategies and measures for enhancing the successful completion of APSFPs in Iran and other developing countries under the PPP model are based on the clustered factors,

namely (i) legal and regulatory; (ii) Strategic/executive; (iii) Political/cultural/social; (iv) Process/structural/human; and (v) Economic/financial, were developed with the aid of the CSF-based research framework. These strategies have been developed based on the identified CSFs in the previous steps. This framework consists of three outer layers and a central core. The outermost layer consists of CSFs, while the central and inner layers consist of the "strategies or measures" and "Improvement" layers, respectively. The central core also shows that considering effective strategies or measures could help enhance the successful completion of APSFPs in Iran as a developing country. The strategy to support the "legal and regulatory" category focused on developing a comprehensive legal and contract framework. Subsequently, clear, and transparent agreements and the development of legal capacities are helpful to legal risk mitigation and Increase trust between the private and public sectors. In developing countries, there is a lack of clear and proper legal regulations for implementing private investment in general construction facilities, which leads to delays, and disputes between contracting parties. There is a need to establish a comprehensive legal and contract framework that can encourage and enhance the implementation of PPPs in public projects, such as that in developing countries. Both public and private sectors need to draw up a comprehensive legal and contract framework before participation. In addition, the strategy to enhance the "Strategic/executive" category is to guarantee the profitability of the private sector after the projects' operation. Uncertainty in the profitability of projects for the private sector is one of the main obstacles to the successful participation of the private sector in the public project investment in developing countries (Sarvari et al., 2020). It can be due to several reasons, including a lack of political and economic stability and high investment risk. Therefore, the existence of such strategies that lead to reduced investment risks could be an effective measure to ensure the profitability of the projects for investors. It is the liability of the government bodies to

control and track necessary executive measures and strategies to ensure the success of the project. In this regard, some of the effective measures include codified processes for quality control of projects, proper implementations of risk management and allocation processes, facilitating administrative procedures, and guarantee regarding the purchase of products by the public sector.

Moreover, the approach to support the "Political/cultural/social" category provides the proper context for political stability and governments' commitment to previous agreements even with government change. Lack of long-term plans or inability to implement these plans is a common issue in infrastructure development in developing countries, which is also true for Iran. The lack of support for the timely and successful completion of ongoing projects by the new government is one of the reasons why many infrastructure projects in Iran remain unfinished (Sarveri et al., 2020). Therefore, a strategy to cover the lack of government support for previous under-construction projects is critical for the timely completion of the projects. A solid and constant roadmap guaranteeing continued support for the private sector in the assigned tasks is necessary. Moreover, the culture of lack of government involvement in private sector decisions could help the private sector in taking steps to implement infrastructure projects with more freedom of action. It can be the first step to making optimal private sector capacity in the construction and operation of infrastructure projects.

Moreover, the approach to support the Furthermore, a strategy to cover the "Process/structural/human" category is to establish and use professional organizations to prepare PPP projects. By selecting a professional project institution, the chances of project success can be increased by accurate assessments and awareness of investments, risks, feasibility studies, knowledge, and capabilities required to build the project. A specific budget for the establishment of the PPP organizations must be assigned. In addition, Hiring PPP experts from developed

countries will help faster knowledge transfer to professional organizations. It is even possible to get help from foreign companies with sufficient experience to implement PPP projects independently.

Furthermore, the strategy to support the "Economic/financial" category focused on quick commissioning of completed partnership projects to guarantee the return of investment and gains for private sector investors. Due to the economic issues of developing countries (e.g., high inflation in Iran), in case of delay in the operation of completed projects, the project's success in terms of private sector investment will face serious challenges. Delay in operation can affect the marketing of projects. The "Economic/financial" category has always been one of the critical issues in developing countries. The annual inflation in Iran severely impacts the quality of construction and limits innovation. Such hyperinflation also leads to a decrease in inventory, access to equipment and machinery issues, labor strikes, conflict in worksites, and restrictive labor regulations. The government must provide the legal and executive conditions for the rapid operation of the project. While providing alternative solutions for the commissioning of completed projects in case of change in the initial target market must be considered. In addition, a detailed picture of the CSFs-based research is elaborated in Figure 3.

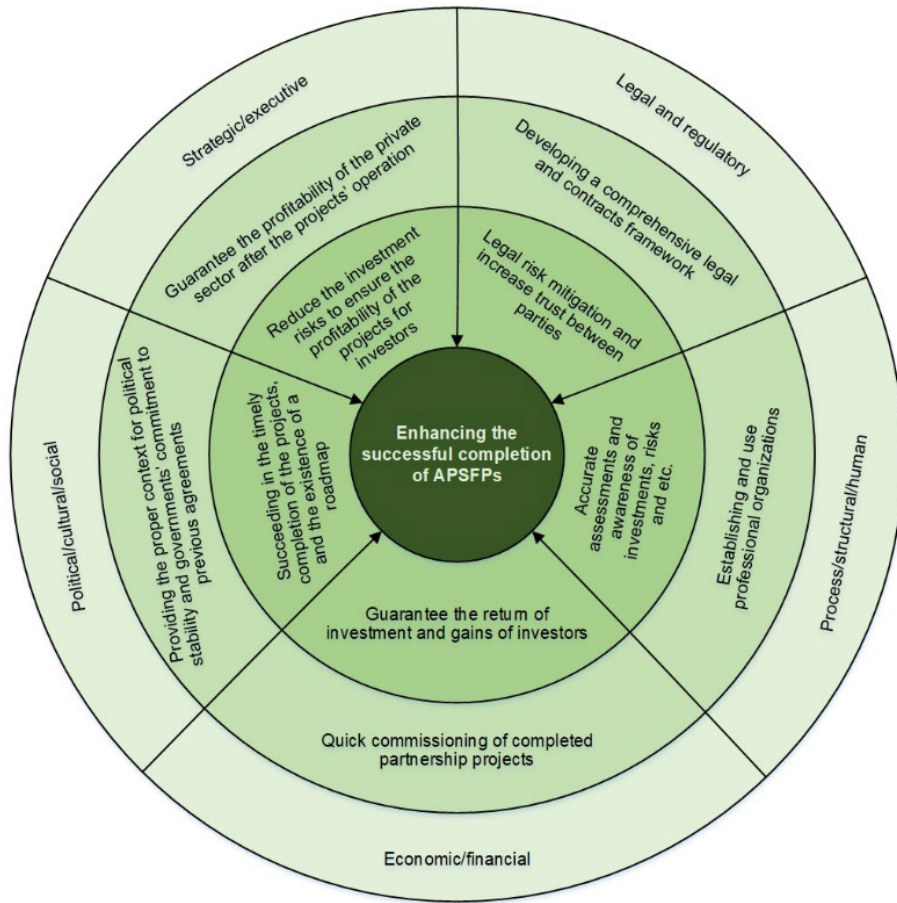


Figure 3. CSFs-based implementation framework incorporating effective strategies and pragmatic measures for enhancing the successful completion of APSFPs

## 5. Conclusions

This study aimed to determine CSFs of private sector participation in APSFPs, a topic which was shown to not have been investigated in the existing body of knowledge. To achieve the research objective, a comprehensive review of the relevant literature was conducted. The review led to the identification of 40 CSFs for various PPP projects in road construction, housing, sports, water & wastewater, and energy. Then, experts from the public and private sectors evaluated these 40 identified CSFs in three Delphi rounds of survey. Subsequently, 23 initial CSFs for PPP in APSFPs were identified. These factors were further divided into five main factor categories, where content validity, face validity, and structural validity tests were used to evaluate each item. As a result of



this evaluation, a total of 20 CSFs for PPP in completing APSFPs were identified and clustered into five main factor groups: (1) legal and regulatory, (2) strategic/executive, (3) political/cultural/social, (4) process/structural/human, and (5) economic/financial.

There are a few limitations to this study. The method adopted, i.e., the Delphi technique, has internal reliability and validity limits. In particular: considering the reliability problem of the Delphi study (i.e., two or more different groups of experts can lead to different results even if facing the same questions/phenomena); and the criteria for qualitative studies (i.e., truthfulness, applicability, consistency, and confirmability) were followed to ensure that credible interpretations of the findings are produced. Following these criteria cannot limit the involvement of different panels that may lead to obtaining the same results. Despite that, results emerging from the Delphi study can be considered reliable as the best (in terms of knowledge and expertise) possible panelists are involved. Concerning the validity problem (i.e., whether the produced results are the proper expression of the investigated phenomena), the involvement of a respondent with excellent knowledge in the field is the most used approach within the technique, and this also solves the problem of convergence of opinions that can occur over three rounds of the Delphi technique. However, it is true that this study involved a small number of experts, even though their expertise was in line with the study's aims and that this number is similar to works in the same field adopting the Delphi method.

Future studies should increase the validity of the results by interviewing a larger group of experts or expanding their scope to that of other developing countries. Additionally, comparing the results of similar studies conducted in developed countries to that of developing countries could lead to novel results. Furthermore, the socio-demographic characteristics of the experts

participating in the initial phase of identifying CSFs in PPP implementation in APSFPs can play a role through their opinions regarding the existence and importance of CSFs. Therefore, a novel prospect will be to carry out future quantitative studies regarding the effects of socio-demographic characteristics and other psychological variables on the definition and evaluation of CSFs in PPP implementation at the individual and group levels. Based on the results of the current study, future research studies should aim to determine which specific capabilities in the private sector will allow for the successful completion of abandoned projects; how PPP can help in fostering the exchange of knowledge and skills between public and private sectors; what suitable project financing strategies are necessary for completion of APSFPs; and how public and private sectors can work together to facilitate the successful completion of these projects in future. Furthermore, since this research focuses on determining the CSFs of private sector participation in APSFPs, future studies can also aim to assess the importance of each CSF for PPP implementation on this type of projects. Future studies that aim to evaluate many sports facilities projects can generalize the current study results. Furthermore, as suggested by Sarvari et al. (2021), future investigations can be conducted to compare the findings across different public facilities projects based on the development level of the target country to determine any perceived similarities and differences behind. The work presented in this paper has provided a sound research methodology and reported on the key results that could be helpful to other developing countries in the same region, or with similar regional political circumstances to Iran as these countries seek to build more infrastructures in near future.

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