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Towards a City-Based Cultural Ecosystem Service Innovation Framework as Improved Public-Private-Partnership Model—A Case Study of Kaohsiung Dome

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Abstract: This paper explains the concept of a city-based cultural ecosystem service, and how innovations and systematic operations management can help an international city to improve the efficiency and effectiveness of the Public-Private Partnership (PPP) model. Previous studies suggest that most of the PPP models focus on the operation and analysis of PPP construction projects, limited attention of the subsequent operations and management for PPP facilities. This paper thus proposed an integrated PPP management framework with the principles of Cultural Ecosystem Service (CES) and open innovation to support better operations management of PPP projects. While the management of modern PPP projects will inevitably encounter the challenges of cross-disciplinary management and service innovation in the period of operations management, Cultural Ecosystem Service Innovation (CESI) framework is useful to support the practice and continuous improvement. A real-world case of Kaohsiung Dome in Taiwan has been benchmarked and analyzed with empirical data. With in-depth expert interviews, the paper demonstrates the use of CESI framework to support business strategy and operations management for sustainable system development and shared values. Management implications were addressed to promote multiple positive feedbacks with the government, enterprises, and the general public and jointly strive to support the development of a benchmarked city.

Keywords: service innovation; cultural ecosystem; public-private-partnership (PPP); private finance initiative (PFI); growth strategy; sustainable development; business model

1. Introduction

1.1. Research Background

Due to the rapid growth of cities and the needs of quality public services with urban development, public-private-partnership (PPP) model has been increasingly used by government agencies to fund new infrastructure projects, which combines the power of private sectors to accelerate public infrastructure and services with mutual commitments. A success of PPP project is not considered merely on the design and construction but the operations management for public services. Shared values should be considered from the standpoints of the government, company, and the people. After completing the hardware facilities of the PPP project, the private enterprise must inject a new business philosophy in management, that is, implement the business strategy of the city-based cultural ecosystem service innovation (CESI) framework to realize the PPP model of business and city development (Figure 1).

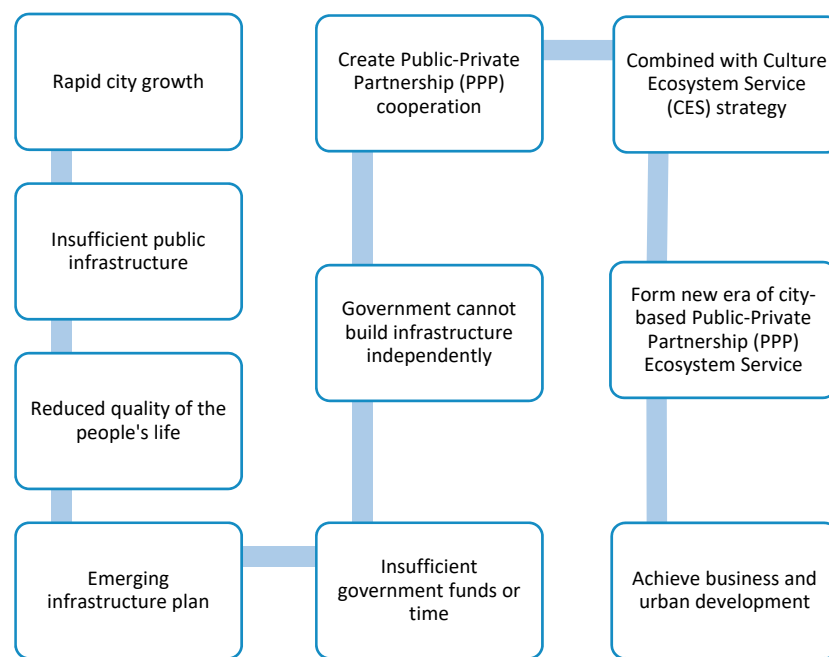


Figure 1. Concept of City-based PPP combined with Culture Ecosystem Service.

The development of international cities depends on the improvement of urban infrastructure. However, when the characteristics of urban public infrastructure are built, sometimes due to insufficient government budget or insufficient professionalism, it is challenging to immediately construct public infrastructure. Therefore, the PPP model will be used to seek the cooperation of private enterprises to introduce private funds, technology, and efficiency and encourage private enterprises to participate in public construction to accelerate the planning and construction of public infrastructure [1]. Many countries in the world such as the United Kingdom, the United States, Canada, Australia, Portugal, Italy, Greece, Turkey, the Netherlands, Ireland, Japan, Singapore and other developed countries, and many other developing countries [2] are using it. The PPP model builds and manages the city's infrastructure with the help of the ample capital and professionalism of the private sector.

PPP covers a wide range of areas, including public transportation, municipal or environmental infrastructure, agricultural and fisheries technology, health and welfare facilities, cultural and educational facilities, recreational facilities, sports and leisure facilities, and exhibition centers, etc. The domed stadium is one of the most popular cooperation modes and international trends for the quality of life and leisure of a city or a country, the development of the sports and fitness industry and the degree of internationalization.

The historical experiences of advanced countries such as the United Kingdom, the United States, and Japan highlight how the “public-private-partnership” that includes both “public participation” and “private participation” plays an important catalytic role for successful urban regeneration. For example, the Wembley Stadium in London as the second largest stadium in Europe and is now the UEFA Football Stadium, the Tokyo Dome and the Nagoya Dome in Japan, and National Stadium Singapore [3,4] are successful PPP model cases to encourage private participation in large-scale sports stadiums.

Cultural ecosystem services are primarily driven by human experience, such as entertainment, health, tourism, educational value, aesthetic appreciation, cultural diversity, inspirational perception, body and mind relaxation, and local sense [5]. The key to the sustainable development of the PPP model of the domed stadium is whether the Cultural Ecosystem Service Innovation (CESI) framework in public facilities can be practiced. CESI is an important framework for future business strategy. Under the premise of pursuing efficiency and profit, the application of CESI business strategy not only enables enterprises to increase their benefits, but also enables the entire relevant people, even the society and the country to obtain the overall benefits, emulating the mutual benefit of the nature

ecosystem. It is only possible to operate sustainably when the enterprise is an inseparable whole for society and the country. Therefore, the CESI framework is the business management theory that helps the PPP model of the domed stadium.

1.2. Research Motivation and Purpose

The motivation of this study is to explore how the benefits of the PPP model can be promoted through the CESI framework after the construction of a domed stadium for an international city. For a city to develop internationally, it is sometimes necessary to use PPP model to build urban infrastructure and provide diverse and high-quality services to the society. Most of previous studies focus on public infrastructure planning, investment, financing, construction and other aspects of the process. After the completion of public buildings, the research on the concepts and strategies of subsequent business management is limited, while the most important thing is whether PPP model can sustain with effective management strategies.

This study aims to explore how the private sector can use the CESI framework in the PPP model to improve the management strategy of the domed stadium in international cities, which is important to the sports and leisure industry, business activities, social economy, people's lives and the internationalization of cities.

2. PPPs and Cultural Ecosystem Service Innovation

In this section, we review the concept of PPP models and Cultural Ecosystem Service Innovation (CESI). Regarding a framework of evaluating how PPPs and private finance initiatives (PFIs) could contribute to sustainable development, previous studies have conducted comprehensive reviews and most of them are PPP models from the perspectives of architecture and engineering [6–9]. It is shown that more than 600 PPP papers published but lack of discussions related to follow-up management after the completion of PPP construction. However, the correct business management philosophy and strategy of the PPP model infrastructure accounts for a critical factor to the sustainable development of the PPP model. Therefore, from the perspective of CESI, it is necessary to analyze how the PPP model dome-type sports venues can more effectively integrate the interactive feedback between the government, the private sector, and the overall public and form a better management model to promote the efficiency of the PPP model.

The concept of CESI (Figure 2) combines the concepts of Cultural Ecosystem Services (CES), Cultural Service Innovation (CSI), Corporate Social Responsibility (CSR), and Creating Shared Value (CSV) to form a sustainable business philosophy for application in PPP mode, to apply in management strategy of the public infrastructure of the PPP model and to promote the sustainable development of the PPP model.

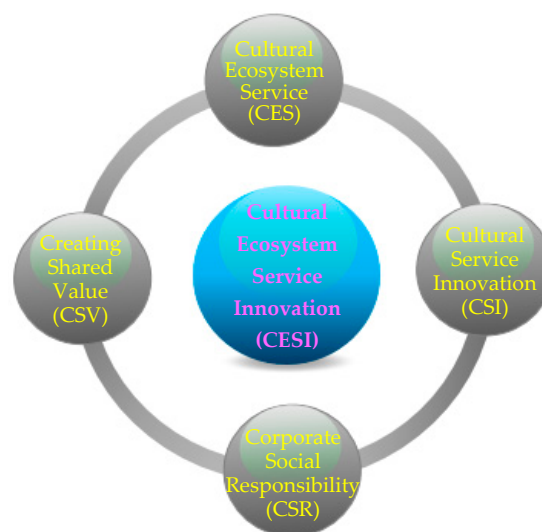


Figure 2. Cultural Ecosystem Service Innovation (CESI) factors.

Correctly understanding the relationship between ecosystem services is the premise for the sustainable management decision-making of various ecosystem services, contributing to the overall improvement of human well-being and the ultimate goal of multi-level human well-being [10]. Previous studies proposed open innovation economy system and social inclusive open innovation models for a mutually beneficial, responsible and respectful way to meet the needs of social ecosystems and the new economy [11,12]. Service innovation refers to the use of new ideas, technologies or means to transform and improve new service methods. The innovation of core services gives consumers a new service experience and value added. Cultural service innovation is to create and develop human values and improve the quality of life. Traditional products or technologies usually exclude human-based cultural services and simply emphasize the pursuit of efficiency as the ultimate goal of the enterprise. However, while pursuing efficiency, it is more important to account for the innovative thinking of cultural services based on human and natural ecology. Only by understanding their own values and capabilities can companies provide more services, create greater corporate benefits, and benefit the relevant society and the public. Therefore, cultural innovation services are the most important issue in business strategy in the present and future.

The broadest definition of corporate social responsibility is concerned with what is—or should be—the relationship between global corporations, governments of countries, and individual citizens. The definition is also concerned with the relationship between a corporation and the local society in which it resides or operates [13]. The popularity of PPPs in recent years is a new model of cooperation that can find long-term solutions to the environmental, social and economic challenges we face. PPPs can bring together national governments, private companies, and community organizations to help build and strengthen brands in businesses, cities, and countries in the process of solving problems. Not everyone realizes that brand building can achieve the goal through PPP-CESI mode operation, which not only helps a company and a PPP model but also contributes to brand building in cities and countries.

While Corporate Social Responsibility (CSR) is prevailing, Creating Shared Value (CSV) “can give rise to the next major transformation of business thinking,” “drive the next wave of innovation and productivity growth in the global economy,” and “reshape capitalism and its relationship to society [14].” The idea of CSV is to allow companies to think more broadly and come up with new ways to design, develop, and sell products. At the same time, it can bring positive results to certain social impacts [15]. The PPP model is derived from the government’s concept of sharing value with public infrastructure. However, the hardware facilities built with the PPP model must still create shared values; provide an ecosystem for PPP products through an advanced and comprehensive management

philosophy; service all levels of the field; strengthen the positive feedback of the ecological value chain; provide new opportunities for the supply chain, operation chain, and consumption chain within the entire PPP model ecosystem; and meet the needs of the social, economic, and cultural parties. Therefore, PPP facilities can be continuously developed.

Cultural Ecosystem Service (CES) is a gateway to raise awareness for the importance of nature for urban life. It comprises the non-material benefits that people derive from nature, including entertainment, aesthetic enjoyment, physical and mental health benefits and spiritual experience. This helps to create a sense of place, promote social cohesion, and is vital to human health and well-being. Previous studies have proposed the importance of collaborative ecosystems and strategic innovation flows supporting the sustainable development for shared values [16,17]. Identification of an ecosystem helps to develop a strategic architecture that facilitates effective actions and leadership with strategic innovation [18]. The construction of culture as a class of ecosystem service presents a significant test of the holistic ambitions of an ecosystems approach to decision making [19]. At the same time, it also explores the balanced benefits of interpreting the ecosystem as the relevant behavior of cultural concerns and deeply understands how the concept of CES and innovation feedback flows produces complex operations and related results.

3. Research Design

3.1. Research Methods

This research is based on the actual operating experience of the Kaohsiung Dome with the following methods:

1. Opinion survey method: The survey sample is based on the personal and group opinion survey data of the official website and paper collection of the Kaohsiung Dome.
2. Empirical research method: case investigation and field research have been conducted. The analysis source of the case study includes the relevant document file records of the overall operation of the Kaohsiung Dome over the years, the practical interviews of the relevant personnel in the library and the cooperation of the participating groups, the actual observation results of the participants, and so on.

3.2. Research Object

Kaohsiung City (Figures 3 and 4) is located in the southwestern part of Taiwan, the largest city in southern Taiwan and an internationally renowned harbor city. It is the political, economic, and transportation hub of southern Taiwan. Kaohsiung City is listed as a “highly self-sufficient” city in the list of world-class cities announced by GaWC in 2018 and ranked as the fifth city among the “Top 10 Cities in the 2018 World’s Most Travelable Cities” by Lonely Planet.



Figure 3. Kaohsiung City harbor-view. (Open Source: Kaohsiung City Government official website [20]).



Figure 4. Kaohsiung City View. (Open Source: Kaohsiung City Government official website [20]).

The Kaohsiung Dome (Figure 5) is a modern comprehensive gymnasium. It is developed as a leisure sports for the people, a large-scale domestic sports event, and an international sports art exchange. In 2005, the Kaohsiung City Government started construction and commissioned the PPP to entrust the private sector to invest in the construction and operation. It was completed in 2008 and the venue for the 8th World Games in 2009. The Kaohsiung Dome provides a high-level, multi-functional stage for people in southern Taiwan, such as competition, performance, sports, conferences, exhibitions, recreation, teaching, etc. It also combines leisure shopping and entertainment centers to greatly enhance the living standards of Kaohsiung.



Figure 5. Skyline View of Kaohsiung Dome. (Open Source: Skyline Vision Studio 2015 [21]).

This research object is Kaohsiung Dome (Figure 6). The opportunity for its birth lies in the development of Kaohsiung City's vision of becoming an international city. Kaohsiung City must enhance the city's living quality and establish the foundation of international publicity by actively striving for international large-scale events. A large-scale multi-purpose gymnasium is needed for the purpose of hosting domestic and foreign sports and leisure arts and cultural activities.



Figure 6. Kaohsiung Dome Building. (Open Source: Kaohsiung Dome official website [22]).

3.3. Research Structure

This research structure divides the case into three parts (Figure 7) to analyze the substantial benefits derived from the mutually beneficial win-win-win relationship between the Kaohsiung City Government, the Kaohsiung Dome, and the public.

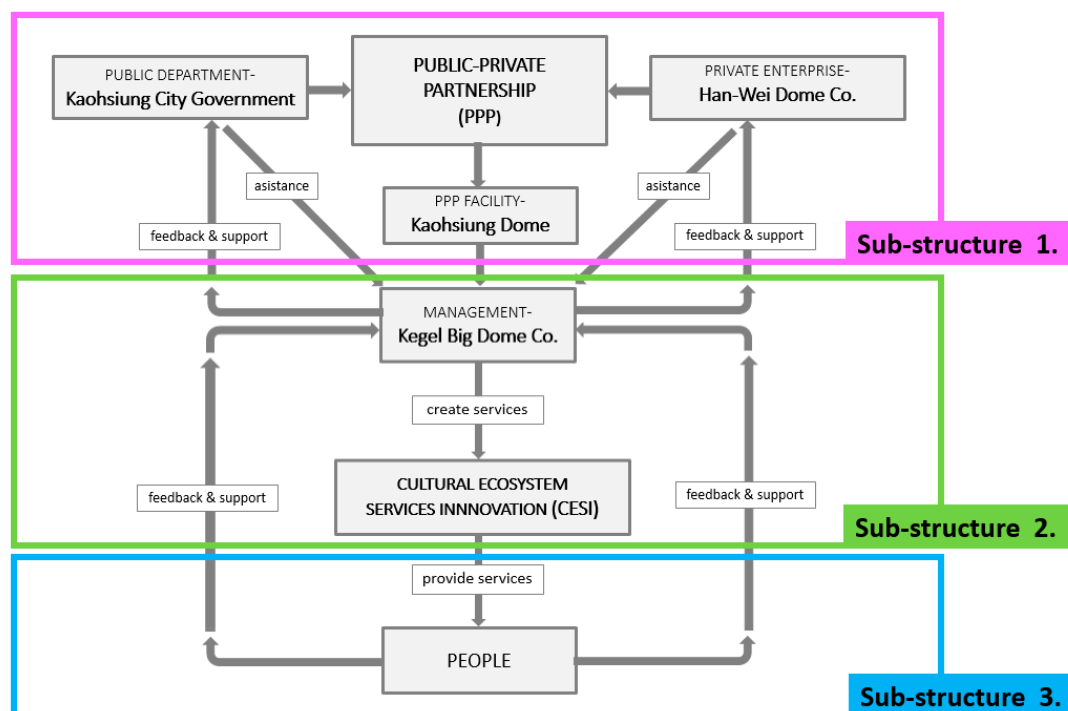


Figure 7. Kaohsiung Dome PPP-CESI Research Structure.

1. Sub-structure 1: Kaohsiung Dome's PPP model structure, Kaohsiung City Government commissioned Han-Wei Dome Company to build Kaohsiung Dome in PPP mode.
2. Sub-structure 2: After the completion of the Kaohsiung Dome, Han-Wei Dome Company commissioned the professional management team of the Dome, the Kegel Big Dome Company, to manage the Kaohsiung Dome with CESI framework.
3. Sub-structure 3: Kegel Big Dome Company applies the CESI framework to provide the overall cultural services of the general public. When people enjoy the facilities and activities, they will give relatively equal feedback to the operators so that the government departments, private enterprises, and the general public can benefit each other.

3.4. Research Data

The steps for collecting data in this study include:

- (1) Collecting relevant documents and archives records of the overall operation of the Kaohsiung Dome over the years;
- (2) Reference Kaohsiung Dome official website information;
- (3) Practical interviews between relevant personnel and participating groups in Kaohsiung Dome;
- (4) Actual observations of participants.

Interviews with executive managers and practitioners were conducted to understand how the private sector uses the CESI framework to analyze the operational strategy of a domed stadium in an international city with the PPP model. This is important to the sports and leisure industry, commercial economic activities, social and cultural customs, people's livability and urban internationalization. For enterprises, the PPP-CESI integrated model is the most important development trend for the future of business development and management strategy. The PPP-CESI model can not only significantly reduce investment costs but the largest proportion is the cost of land purchase, which enables companies to have sufficient capital to cope with market changes and create a cultural and ecological environment that enterprises must respond to, so they can have competitive advantages and become sustainable.

The five business strategy indicators of the Kaohsiung Dome's PPP-CESI model (Figure 8) include the development of sports and leisure industries, the strengthening of commercial economic activities, the shaping of social and cultural customs, the promotion of people's livable life, and the accelerating of urban internationalization.

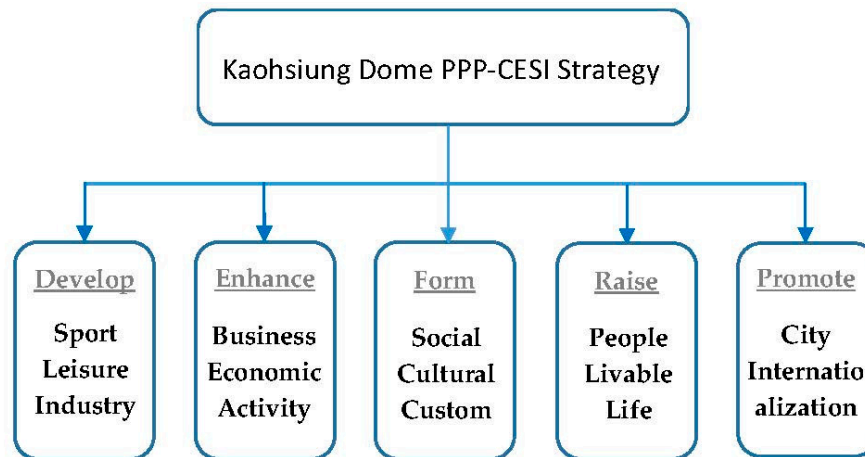


Figure 8. Kaohsiung Dome PPP-CESI Strategy.

4. Case Study of Kaohsiung Dome and Cultural Ecosystem Service Innovation

CESI framework has been used to explore how the domed stadium move towards a city-based ecosystem, to achieve commercial and urban development for the domed stadium through conceptualized cultural ecological assessment, to fully assess cultural ecosystem decision-making and management direction, to clarify the objects of interest in the cultural ecosystem, and to realize multiple benefits of the environmental spaces and cultural practices created by the interaction between humans and ecosystems. Thereby to establish the public's support for the protection of the cultural ecosystem of the domed stadium, to achieve a cultural and ecological balance, and to motivate the government's public sector, private enterprises and the overall public and other stakeholders form a win-win-win situation. That is, the dome stadium is a product of the PPP model, and the private sector can use CESI framework to define and revise major business strategies and operational guidelines for the dome stadium. The use of PPP-CESI's business philosophy has enabled the government's public sector, private companies, and the general public to benefit from each other's positive feedbacks and has made the city an international sports tourism city with an index of fashion and sports trends.

Kaohsiung City must develop a domed stadium by actively pursuing the holding of international events to enhance the quality of the city and establish a foundation for international publicity for uses of sports, leisure arts, and cultural activities. The following is a description of how Kaohsiung's Dome is moving towards a city-based cultural ecosystem service innovation to achieve business and urban development (Figure 9).

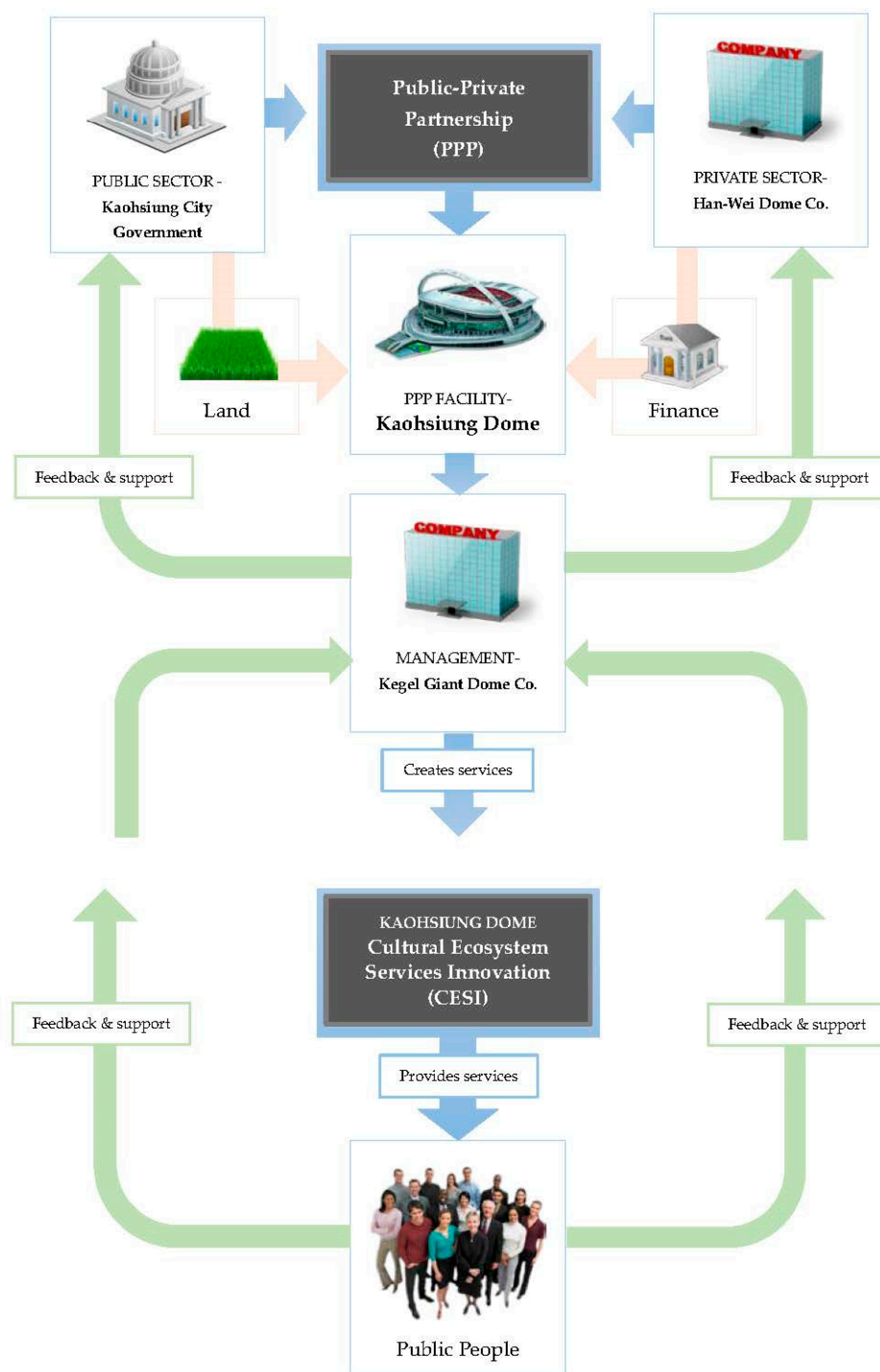


Figure 9. Public-private partnership—cultural ecosystem services innovation model (PPP-CESI model) of Kaohsiung Dome.

Figure 9 illustrates PPP-CESI model framework of the Kaohsiung Dome. The Kaohsiung City Government commissioned Han-Wei Dome Company to build the Kaohsiung Dome in PPP mode. The Kaohsiung City Government provided public land as the Kaohsiung Dome Site. Han-Wei Dome Company provides its own and financing funds to build a Kaohsiung Dome. The manager Kegel Big Dome Company uses CESI framework to operate and manage Kaohsiung Dome to provide cultural services such as sports and leisure, art performances, and exhibitions. At the same time, Kegel Big Dome Company is responsible to the builder Han-Wei Dome Company and the Kaohsiung City Government,

and regularly reports the feedback to them. The municipal government and the builders provide the operator—the Kegel Big Dome Company—with the necessary assistance. This positive feedback mechanism forms the ecological balance and development of the Kaohsiung Dome and ultimately promotes the symbiosis and mutual benefit sharing of government agencies, private enterprises, and the general public. The following is a description of the Kaohsiung Dome PPP and CESI.

4.1. PPP of Kaohsiung Dome

The government's use of PPP model to encourage civil participation in sports and leisure public construction has three points: (1) sports facilities and equipment, (2) sports and leisure industry development, and (3) urban international development. The ultimate goal of the PPP in this case is to create a win-win-win situation for Kaohsiung City Government (public sector), Kaohsiung Dome (private enterprise), and the general public.

Figure 10 representing the implementation of the Kaohsiung Dome PPP Strategy, which targets multiple benefits as follows:

- (1) Kaohsiung City Government (public sector) benefits:
 - A. Improve the efficiency and effectiveness of public facilities services;
 - B. Avoid over-investment in public infrastructure projects;
 - C. Improve the quality of public construction;
 - D. Improve resource efficiency;
 - E. Avoid delays in public works;
 - F. Improve the quality of public construction services;
 - G. Reduce government burden;
 - H. Increase government revenue;
 - I. Improve international visibility;
 - J. Sustainable development.
- (2) Kaohsiung Dome (private sector) benefits:
 - A. Reduce operating costs;
 - B. Expand the scale of the company;
 - C. Improve corporate image;
 - D. Multi-angle management;
 - E. Demonstrate social responsibility.
- (3) Public (community organizations) benefits:
 - A. Increased sports events and art performances;
 - B. Leisure sightseeing and shopping attractions;
 - C. Formed the largest business district in North Kaohsiung City;
 - D. Drive the prosperity of nearby business districts;
 - E. Promoting the development of surrounding real estate;
 - F. Increase the number of tourists and economic benefits;
 - G. Create career opportunities.

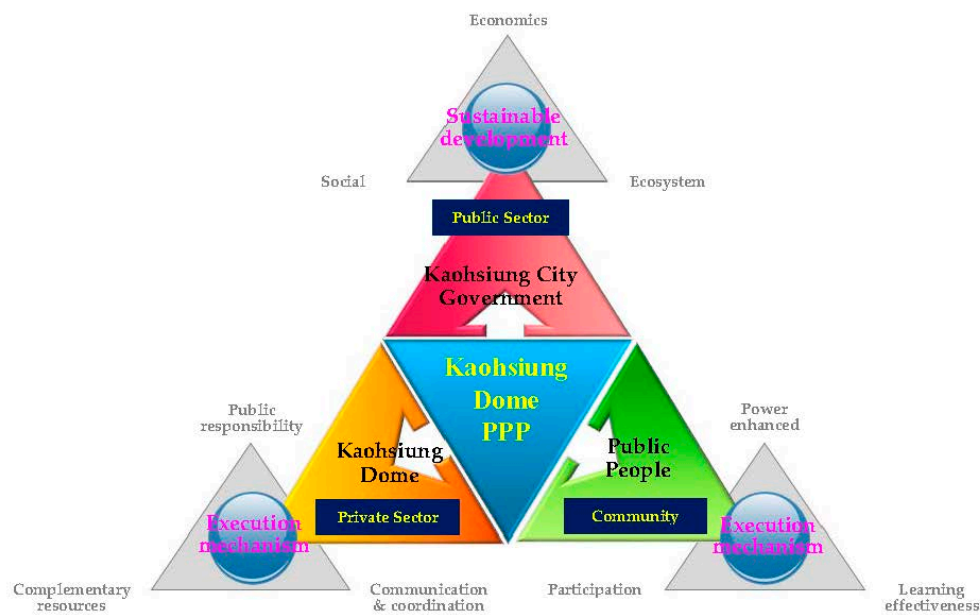


Figure 10. Win-win-win PPP strategy of Kaohsiung Dome.

4.2. Cultural Ecosystem Service Innovation of Kaohsiung Dome

The CESI of Kaohsiung Dome (Figure 11) has a great influence on the Dome business product project and form, as well as the mode of dome management. In contrast, the latter's model of service innovation in the culture of the domed stadium will also play a role in feedback influence, which in turn will affect the connotation of the formation factors of the service innovation of the domed stadium culture ecosystem. The result of positive feedback from each other makes the cultural ecosystem of the entire Kaohsiung Dome reach a dynamic equilibrium, and eventually, the ecosystem circle will gradually prosper and prosper.

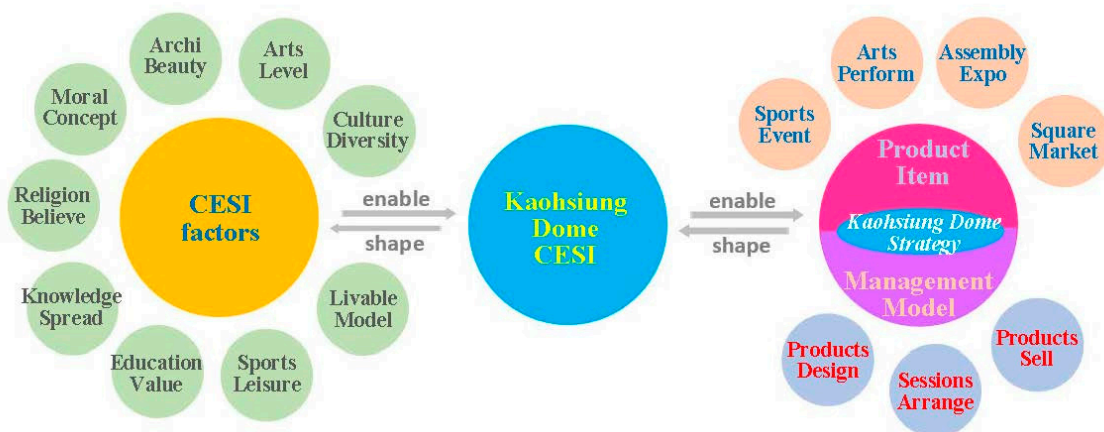


Figure 11. Concept of Kaohsiung Dome Cultural Ecosystem Service Innovation.

Figure 12 represents the CESI framework of Kaohsiung Dome and services. The services provided by this symbiotic relationship not only affect the survival and development of society and economy but also affect the generation and formation of culture and develop into different cultural types and models.

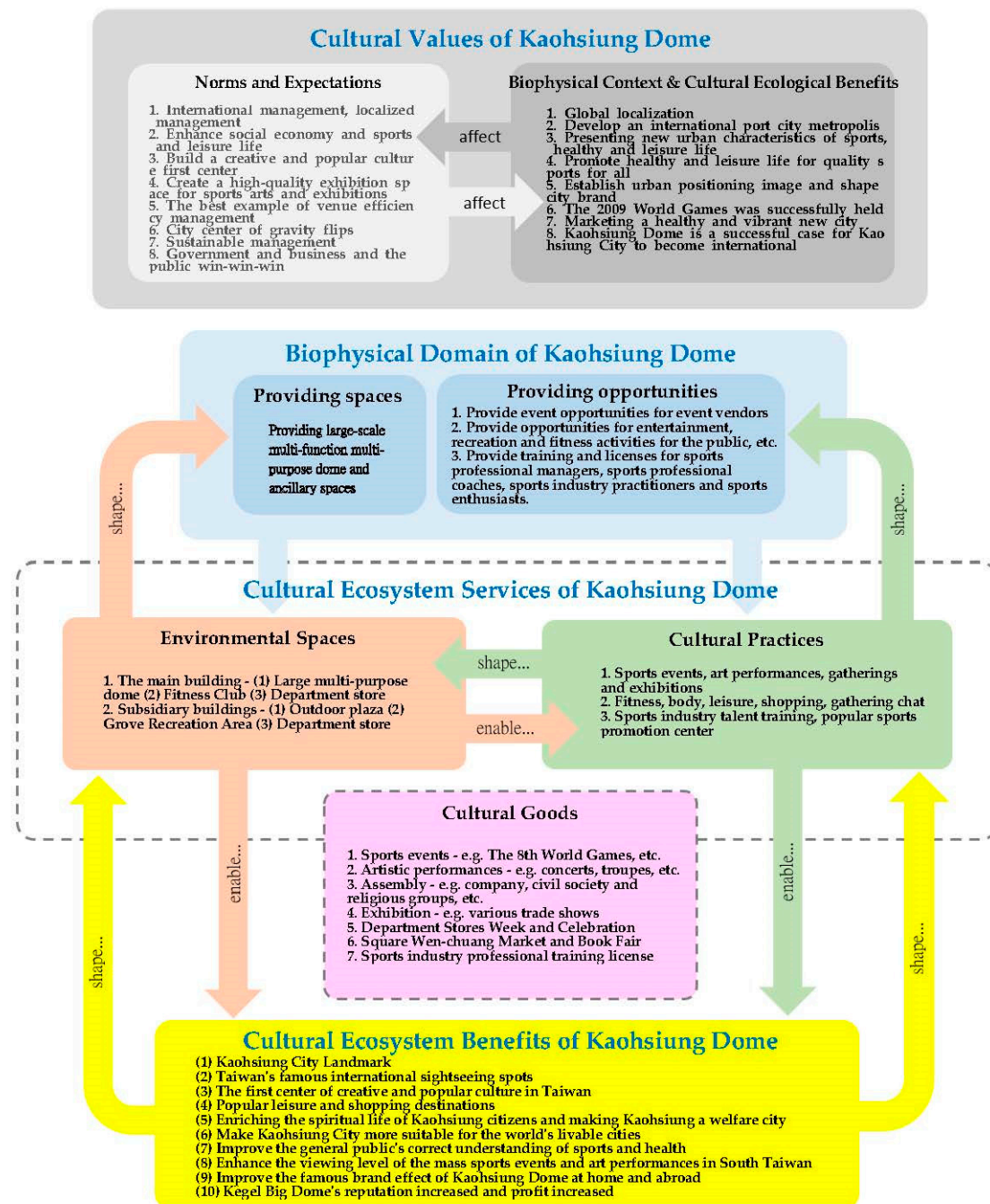


Figure 12. The Cultural Ecosystem Service Innovation Framework of Kaohsiung Dome.

The norms and expectations of cultural values affect their biophysical, cultural, and ecosystem services, and cultural ecosystem benefits. In contrast, domains, services, and benefits also affect norms and expectations. The cultural value chain is a cultural ecological feedback chain, and the continuous feedback mechanism promotes the development of the ecological circle.

For the Kaohsiung Dome CESI framework, the norms and expectations of the cultural value of Kaohsiung Dome are ideal targets for achieving international management, sustainable business strategies and becoming a popular cultural center. In the actual biophysical field and cultural ecological benefits, Kaohsiung Dome achieves the vision of internationalization of urban marketing, hosting international large-scale events, and promoting quality and healthy living. The norms and expectations of the Kaohsiung Dome affect projects and outcomes in the field of biophysics and cultural eco-efficiency.

In contrast, the projects and achievements of the Kaohsiung Dome's biophysical field and cultural eco-efficiency also cause fine-tuning or revision of norms and expectations.

The biophysical field of Kaohsiung Dome provides space and opportunities for cultural ecosystems to form the environmental space and cultural customs of the Kaohsiung Dome. This gives the ecosystem services of Kaohsiung Dome, such as sports events, art performances, trade shows, group gatherings and other projects. In contrast, the ecosystem services can also return feedback results and shape the biophysical field.

The ecosystem services provided by Kaohsiung Dome give the benefits of cultural ecosystems, to achieve the goal of developing the sports and leisure industry, strengthening commercial economic activities, shaping social and cultural customs, improving people's livability, and promoting urban internationalization. In contrast, the emergence of cultural ecosystem benefits will also return feedback on the project shaping ecosystem services.

The Kaohsiung Dome Cultural Ecosystem Service is a way to raise awareness of the importance of Kaohsiung's Dome in Kaohsiung City and even the country's social, economic, cultural, and life leisure. The Kaohsiung Dome's Cultural Ecosystem Service is the material or non-material benefit that people, society, cities, and countries can derive from the cultural and ecological management strategies of Kaohsiung Dome. In terms of material interests, it includes the growth of tourist numbers, prosperity, boosting consumption, increasing economic power, increasing taxes, building municipal construction, and increasing international visibility in Kaohsiung City. The impact of non-material interests on urban life is mostly intangible, including recreation, sports and fitness, cultural aesthetic enjoyment, physical and mental health benefits, spiritual experience, formation of local emotions, and promotion of social cohesion.

This paper explains how the CESI Framework provides a pipeline to raise awareness of the wide range of ecosystem services provided by Kaohsiung Dome and the services provided by these Kaohsiung Dome to the health of people and the quality of urban life. The importance of social and economic growth and international visibility. The following is an example of the Kaohsiung Dome ecosystem service to illustrate the values of the Kaohsiung Dome.

4.3. Business Performance Evaluation of Kaohsiung Dome

From the cumulative graph of the activities of the Kaohsiung Dome (Figures 13 and 14), it can be seen that the accumulated graphs show positive values. It can be seen that the Kaohsiung Dome constructed in the PPP mode is in the application of cultural ecosystem service. With the CESI framework, all the feedback and results could be connected for positive development, indicating that the Kaohsiung Dome's operations over the years have done produced significant outcomes and will continuous to promote cultural and economic prosperity, tremendous progress, and long-term positive impact for the nearby communities, surrounding areas, Kaohsiung City, South Taiwan, and even Taiwan's society.

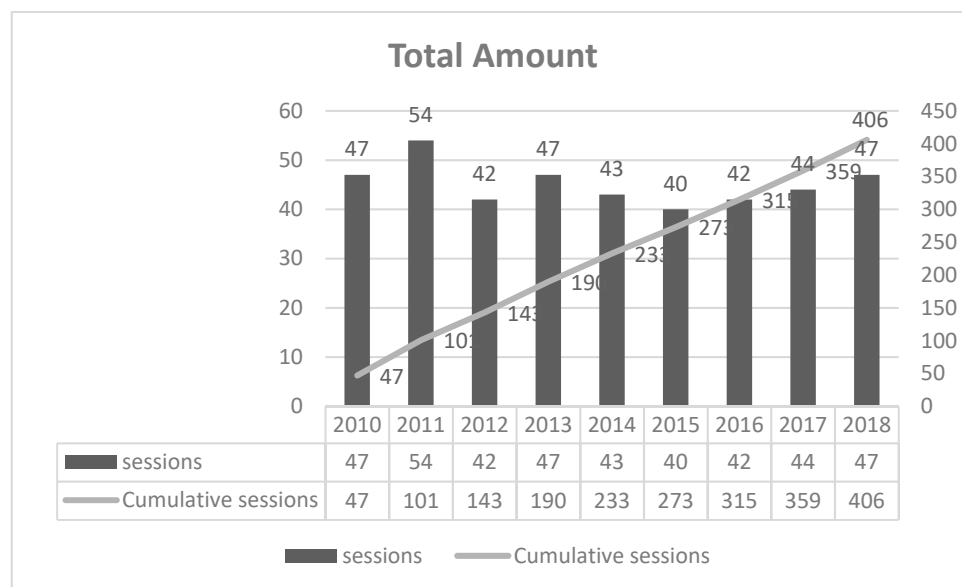


Figure 13. Cumulative sessions table of the number of activities of Kaohsiung Dome in 2000–2018.

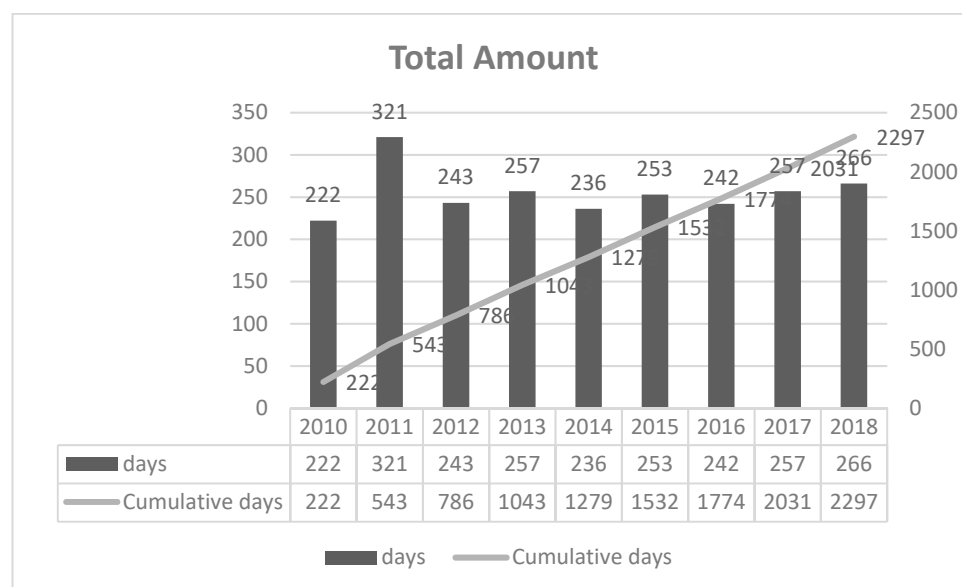


Figure 14. Cumulative days table of the number of activities of Kaohsiung Dome in 2000–2018.

5. Conclusions

While PPPs mode is popular to accelerate city infrastructure and urban developments, one of the critical success factors is the operations management strategy that recognizes the service system of built facilities and city-based cultural ecosystem service innovations. By taking the case study of Kaohsiung Dome, this paper explains the operations management strategy as a whole, instead of merely focusing on the stage of construction and engineering. The concept of Cultural Ecosystem Service Innovation (CESI) is an important category of knowledge in managing PPP projects. In general, environmental spaces and cultural practices should be seen as mutually reinforcing cultural ecosystem services, while providing adequate space and opportunities. The derived cultural products can be used to generate cultural benefits through these services connected to the public. PPP mode domed stadium can make good use of these services to provide analysis and quantitative processing. With the concept of international management and localized operations, it will assist the operation of the Dome Sports Stadium and the development of its customers, enhance social values and sports and

leisure life. Kaohsiung Dome has established itself as a high-quality exhibition space for creative pop culture centers and large-scale sports arts and cultural activities and become the benchmarked model for the efficiency and effectiveness of the domed stadium. One of the major benefits of PPP projects is to strengthen the development and competition of the city's internationalization, to promote the health and leisure life with national quality sports, to establish urban positioning, and to enhance the city's image and shape the city brand. By taking Kaohsiung Dome as an example, the strategic management with CESI framework makes a leading case for successful PPP model and relevant developments.

PPP model domed stadium applies the theory of CESI to re-explore the cultural value of the domed stadium, to reinterpret the role of the domed stadium in the cultural ecosystem services, and to improve sustainable management decisions of the domed stadium. Use the PPP-CESI model to deliver sustainable services. It is not only the domed stadium itself, the city and the citizens, but even the whole country, which can benefit from each other in the new framework of domed stadium PPP-CESI model. It is inspired by the management experience of Kaohsiung Dome, that is, applying the concept of CESI to the business strategy of the PPP model domed stadium and explaining how Kaohsiung Dome management philosophy of urban-based CESI is to achieve a PPP model—the sustainable development of the domed stadium. The proposed CESI model provides an improved PPP model for future applications in international cities to build facilities and manage better the system for service innovations.

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