The potential for globalisation of the Japanese construction industry observed in Osaka Expo 2025.

Case study of Official Participant’s Pavilion project

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＜Abstract＞

This paper aims to examine the potential for globalization of Japan's construction industry through a case study of the official; participant’s pavilion project at the 2025 Osaka Expo, and to discuss the current issues and future directions. The case study of the official participants’ pavilion highlights the challenges of Japan's construction processes: the unique characteristics of building permit process and the expected roles and responsibilities of professionals. The paper concludes with the future directions for the globalization of Japan's construction industry as the reconsideration of the permit process, roles and responsibilities raking into account participants with different cultural backgrounds and practices.

Key Word(s): Osaka Expo 2025, Official participant's pavilion, Globalisation of the Japanese construction industry

1. Overview

This paper aims to examine the potential for globalisation of the Japanese construction industry through a case study of the Official participant’s pavilion project at the Osaka Expo 2025 and discuss current issues and future directions.

Chapter 2 describes the background to the Osaka Expo, including the delays in the overall process, the construction market situation in Japan and the construction site conditions of the Expo site. Chapter 3 gives examples of challenges that were particularly evident in Official participant’s pavilion projects, such as the lack of willingness of construction contractors to participate and the lack of clarity of Japanese laws and procedures. Chapter 4 presents the case of the A Pavilion as a case study of an Official participant’s pavilion and highlights the peculiarities and challenges of the Japanese construction process.

Chapter 5 provides a summary and examines the future direction of the Japanese construction industry towards globalisation.

2. Challenges of the Osaka Expo project

2.1 Impact of the Dubai Expo 2020

The 2025 Osaka Expo, which opened in April 2025, had a preparation period of 2.5 years, 1.5 years shorter than previous years' Expos. This is because the previous Dubai Expo, which was scheduled to open on 1 October 2021, was postponed by one year due to the coronavirus.

Where Expos in previous years had a four-year preparation period, i.e. one year for business planning and three years for design, procurement and construction, the completion by the Expo opening means a need of compressing some processes.

Although business planning is an easier period to compress, it is required for budget planning using national taxpayers' money and organizational structure, which is significant to develop the original concepts for the country.

For the Osaka Expo, more than 100 countries have declared their participation as Type A, B or C pavilions. Type A pavilions, also known as the site-deliverable pavilions, are constructed on a site allocated to each country by the organisers, the Expo Association, and each participating country constructs a building of its own design and construction on that site. The other types B, C and X pavilions were box-shaped pavilions built by the Expo Association.

Initially, 153 countries and regions had announced their participation in the Osaka Expo, of which 56 would build their own Type A pavilions. As Type A pavilions require a certain amount of time for design and construction, the impact of this compression of the Osaka Expo preparation period was significant. As a result, as of September 2024, the number of countries participating in Type A pavilions was 42, with five countries moving to Type X pavilions, a reduction of 14 countries from the original number of Type A pavilions.

2.2 Construction market conditions in Japan and the Expo Yumeshima site

Between 2022 and 2023, the construction market in Japan suffered a sharp rise in labour and material costs due to a labour shortage caused by an ageing population and the impact of Russia's invasion of Ukraine among other factors. Furthermore, from April 2024, overtime regulations came into effect as part of the reform of working practices, which overlapped with the Expo's construction period. Under these circumstances, the condition that construction must be completed and handed over by April 2025, the opening date of the Expo, was a major constraint on construction companies.

The Yumeshima site for Expo 2025 Osaka was selected in anticipation of a post-Expo Integrated Resort (IR), but as a construction site, access was very poor and infrastructure was underdeveloped. Parking spaces were limited and commuting by bus was problematic due to time restrictions. All of these factors added to the additional labour costs and the unpredictable site conditions made it difficult for the construction company to participate in the project.

At the time, planning and design of the domestic pavilions other than the Official participant's pavilions was progressing faster than the Official participant's pavilions, however, there were a series of bidding failures. The Expo project itself did not appear attractive to construction companies.

3 Challenges and responses to Official participant's pavilion projects

3.1 Selection of contractors

(1) Issue: lack of willingness to participate in Official participant's pavilions

In addition to the reluctance of Japanese contractors to participate in Expo projects in general for the reasons given in 2.2, there were many construction companies that declined to participate in Official participant's pavilions in particular when asked to do so for several reasons. These reasons included the fact that in many cases there were already delays from the planning stage, the possibility that the responsibility for designing the building in accordance with Japanese regulations would fall on the contractor, the possibility of miscommunication due to differences in culture and practices, and the potential difficulties in negotiating the contracts.

Between autumn 2022 and autumn 2024, the Expo Association organized matching events to bring participating countries and construction companies together, but these did not lead to the expected results. Many construction companies withdrew from the participation because they could not find MEP sub-contractors. This is thought to be due to the fact that, with demand for semiconductor plants and data centres in Japan under pressure, there is no prospect of profit from maintenance during a six-month operation period for Expo projects, and the construction period is likely to be forced to respond with a compressed construction period due to delays in design and construction.

(2) Solution: procurement method and contractor selection

While the participant countries took seriously the severe construction market conditions in Japan and the poor bidding conditions in other Expo projects, Japanese construction companies confirmed that the usual lump-sum design-build methods are not possible due to a lack of internal design resource in construction companies. On the other hand, there were participating countries that proceeded with the turnkey method, whereby planning, design, construction, operation and demolition were all in the single contractual package together. This is thought to be due to the limited timeframe of the Expo (six months) and the limited budget, as well as the fact that separate orders for each stage of the project would have been considered too risky for the client. However, there were cases where turnkey contractor, a consortium, was not able to find construction companies available in Japan, and in such cases, the countries and consortium lead companies had to scramble to find a construction company. Conversely, some pavilions adopted a separate design/construction method because they wanted to use the design of their own country's design team. The more packages, the higher the risk for the client and the higher level of coordination is required.

The above-mentioned procurement system resulted in a diverse range of construction companies participating in Official participant's pavilions. These included overseas construction companies specialising in pavilion construction, event companies, construction equipment rental companies and system building companies in Japan.

The participating countries selected various procurement methods and construction companies as described above, and proceeded with the design and construction process in their own way, addressing their own challenges.

3.2 Design and construction procedures

(1) Problem: Unclear legal and application procedures

Overseas-led pavilion construction companies have experience in global events such as Olympics and Expos around the world and have strengths in flexibility, contracts with participant countries and communication with them. On the other hand, they found it difficult to understand the application procedures in Japan. The Expo guidelines was not easy to understand because the guideline attempted to incorporate various stakeholders' interests equally, which prevented it from being simplified. Also, the Type A design and construction guidelines in particular was hard to understand without the knowledge and understanding of the Japanese Building Code and other laws.

The application procedures, inspections and other processes in the design and construction of Type A were complex and difficult for other countries to understand. A Temporary Building Application to Osaka City, Building Permit Application to Osaka City or a private certifier, Application to the Expo Association and Application to the Fire Department had to be made in a timely manner. In some cases, the Building Permit Application was to be made at the completion of the base building and the fire inspection was made twice, once at the completion of the base building and the other at the completion of the exhibition, while in other cases, the fire inspection was made once after the exhibition had been completed. It was extremely confusing for the participating countries to have such a difference in the application and timing.

In addition, restrictions in Japan's Construction

Industry Law require a Japanese construction licence for most types of work. The need for visas and other administrative processes to welcome overseas workers was a major barrier. Even when overseas subcontractors who have business relationships with Japan want to participate as subcontractors in order to carry out construction work within the committed contract value, they cannot work on site because they do not have a construction industry licence, and have to settle for a supervisory position. Language, business customs and other issues made it difficult for overseas construction companies to deal with Japanese subcontractors and Japanese workers on site. Some Japanese subcontractors declined to participate due to differences in contracts and other business practices, while in other cases the contracting process was very lengthy and affected the construction schedule.

(2) Solution: Expo Association's assistance

The International Bureau, the contact point for each country in the Expo Association, worked with the Construction Bureau, who was responsible for the construction of the entire Expo site, to support the participation of each country. Several times a year, the International Bureau organised online sessions and face-to-face briefings called IPMs (International Participant Programme) for participating countries. During these briefings, information was shared in English and French such as the application procedures for Japanese construction projects and the transport infrastructure at the Expo site.

Frustration for each participating country was the inability of the Japanese staff to explain why it is the way it is, and the lack of flexibility to respond to situations as they arose. The Expo Association's inability to answer questions from each country on the spot and their general response that Japanese designers and builders should be involved to solve the problem was not commensurate with the actual situation in each country, where many Japanese construction companies had in fact refused to participate in their projects. The International Bureau of the Expo Association corresponded with each country individually and worked together to find a solution.

Some projects involved project management companies or designers who were fluent in Japanese and the participating country's language in order to find solutions, while others decided that they left the design and construction procedures to a certain extent to entities with Japanese qualifications.

4.Case study of Country A pavilion

While the challenges in **3.2** exist in common with Official participant's pavilions, specific challenges were identified during the actual process of the Expo Official participant's pavilion project case study. This chapter focuses on the challenges highlighted by the different perspectives of the project participants from Country A and Japan and describes how they were addressed.

4.1. Project overview

The client of the Country A pavilion was of the view that both the Country A and Japanese perspectives were necessary for the implementation of the project. Therefore, a proposal was adopted in which both the project management company (hereafter PM) and the design company consisted of teams from both countries.

The PM initially recommended the design-build method, in which the constructor participates from the detailed design to shorten the construction period, but interviews with Japanese construction companies in 2023 revealed that there is a shortage of design resource for the construction contractors, and they will not participate unless the design-bid-build method is used. Therefore, the project was switched to the traditional design-bid-build method and construction companies were invited to bid for the construction scope. Several construction companies expressed their willingness to participate in the tender, and tender documents were distributed at the end of April 2023. As a result, all the Japanese construction companies declined and one overseas construction company, which has been implementing pavilion construction work worldwide, submitted a bid. The team included the ones from Country A and Japan.

As the tender return value received was significantly above the budget, value engineering (VE) was carried out at the client's discretion. In addition, the contractor's own structural system was used for the structure.

In this project, where the PM, designer and builder contributed to the project in their own capacities, instead of placing a lump-sum order in a turnkey system, the different perspectives from both countries in each role highlighted the challenges.

4.2.A. Challenges due to different perspectives of the country and Japan

(1) Differences in application procedures

The first difference was in the way permit applications are done. Japanese applications for approval, particularly for structures, are less flexible than those of other countries in that it takes time to get approval once the application has been submitted before construction begins, and once accepted, changes cannot easily be made during the construction period. This was a critical difference, especially in projects such as the Expo pavilion, where design and construction had to be carried out in a short period of time.

In this project, this led to a situation where the detailed design was carried out separately in two locations. In Japan, the private certifier checked the detailed structural calculations and held repeated question-and-answer sessions with the designer after the permit documents had been submitted. In the midst of this process, a detailed model was being produced overseas for ordering newly manufactured components from a fabrication plant, which developed into something different from the permit application drawings as the design coordination process continued. Ultimately, the model of the actual building was at odds with the drawings submitted at the time of application.

(2) Differences in expected roles

The second point was the difference in the expected roles of the designer and contractor: in Country A, the designer also prepares the detailed floor plans and coordinated drawings. In Japan, on the other hand, it is customary for the contractor to prepare the drawings and for the designer/supervisor to review them, as the contractor is at risk of the construction period and construction costs. At the same time, there were differences in the approach of the contractor. In Japan, it is expected that the construction contractor, who is the main contractor, prepares detailed construction plans and construction drawings in advance and discusses them with the designer in order to mitigate the risk of construction period and construction cost in advance. However, in this project, the contractor was reluctant to allocate staff to the project in advance, especially as they were involved in temporary building construction, and the response was to consider solutions after the fact when a problem arose.

In the end, many of the detailed level general and construction drawings were not presented by either the designer or the contractor, resulting in many coordination and re-work on site.

4.2 Solutions to challenges

The involvement of participants from both countries in the project highlighted challenges arising from differences in assumptions and practices between the two sides. The solution took the form of a concession by someone else, with a view to the common goal of a completion date before the Expo opening in April 2025. The structural design was arranged to superimpose the completed model with the application drawings and submit modification permits for changes in such a way that minor changes could be accommodated. The client decided to give top priority to the three rooms for the coordinated drawings, and any rework due to the lack of coordinated drawings was absorbed by the contractor. The private certifier had some understanding of the pavilion's six-month use compared to a permanent building.

5. Globalization of Japanese construction industry

The Japanese construction industry will have to deal with a certain degree of globalisation in the future. Population decline, an ageing workforce and real estate investment in foreign currency; none of these issues can be resolved solely within Japan.

The Expo Osaka Official participant’s pavilion project had a global team structure rarely seen in Japan due to market conditions. In a short-term project with a deadline of the completion date of the opening day, and in the special environment of being composed of teams from different cultures, it was impossible to plan and anticipate all of each other's expectations and behaviour, which forced us to seek solutions through consultations and concessions from time to time. All of the pavilions faced a series of challenges towards which the participating countries, PMs, designers, constructors and other teams worked as one across national barriers to solve each issue that they encountered in the project, and many participating countries were able to start operations on the day of the event.

The case study shows that Japanese authorities need to take the initiative in making application procedures easier to understand in anticipation of an increase in the number of participants from various cultural backgrounds in the future. It is also necessary to reconsider the expected role of each participant in the construction industry on the assumption that they do not all have the same common assumption, as has been the case in the Japanese construction industry. There is room to consider whether the role of designers in Japan should be defined as a national qualification, whether constructors should continue to take on the current risks, what role project managers should play, etc., in comparison with other countries. Thorough the further case studies of other Official participant’s pavilions and examining how Japan's processes differ from those of other foreign countries, it is hoped that the findings will provide a useful reference for the globalisation of Japan's construction industry in the future.