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The Improvement of Service Quality of Service Quality in Prefabricated Steel Structure Construction Process

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Abstract

Purpose: The purpose of this study is to investigate customers' perceptions of service quality and present guidelines for improving services in prefabricated steel structure management. **Research design, data and methodology:** The researchers use qualitative research through in-depth interviews as a data collection method. Twenty customers in Bangkok who had used the service in the construction of prefabricated steel structures were the key informants. **Results:** The results showed that in developing the service quality of the steel building structure business, the management had to improve the entire process in three stages, which are as follows: The pre-service stage consists of providing a tender document and contract and design ability for prefabricated steel structures; The in-service stage consists of contract and design modifications, time management, resource management, ability to monitor the construction process, team management, and safety management; The post-service stage consists of success in service activities and success in financial and monitoring management. Construction companies must offer a guarantee for their work if an error occurs after delivery and provide manual production processes for their customers. **Conclusions:** This three-step process improvement increased customer satisfaction in the present and would persuade potential customers to choose to use the services.

Keywords: Service quality, prefabricated steel structure, customers' perceptions

JEL Classification Code: M31, L22, M10

1. Introduction

The current economic development situation is growing continuously. The Thai economy in 2022 is expected to grow by 2.5 - 3.5 percent, with key supporting factors including an improvement in domestic demand, a revival of the tourism sector, and the continued expansion of goods exports. Total investment is expected to rise by 3.5 percent in 2022, compared to 3.4 percent in 2021, a decrease from the previous projection of 4.0 percent growth. Private investment is expected to expand by 3.5 percent, up from 3.3 percent in 2021 but down from 3.8 percent in the previous projection, and government investment is expected to grow by 3.4 percent, compared to 3.8 percent in 2021 and down from 4.6% in the previous forecast (Office of National Economic and Social Development Council, Thailand,

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2022). All industrial sectors play an important role in the development of the country and contribute to its economic expansion, especially the industrial sector, which has improved quality in terms of technical development and technology to respond to the changes of globalization and help drive economic growth.

The construction industry is another key industry that is important to supporting the development of the Thai economy. The construction business in 2022 is likely to face risks from higher costs, both in terms of transportation costs and construction material prices, and from the Russo-Ukrainian war that pushed up the prices of oil and important building materials, especially steel and cement. For the years 2023-2024, the business is likely to grow in line with the overall construction investment, which is expected to grow by an average of 4.5–5.5 % per year. Revenues are expected to recover following the acceleration of government infrastructure investments. Revenue will continue to grow because it has the potential to manage large-scale construction projects, including ongoing government investment projects such as electric trains, dual-track railways, motorways, and large transport networks (Megaprojects). Private construction contractors' revenue is expected to gradually recover in 2023-2024 in the general housing sector, high-rise buildings, and large buildings (Krungsri Research, 2022).

Nowadays, entrepreneurs seek new construction technologies, such as buildings made of prefabricated steel structures, instead of traditional construction. It refers to manufacturing parts in off-site workshops or factories before on-site installation. Prefabrication plays an important role in the modern world of building. Prefabrication for construction has been used in Thailand for less than two decades, but it has grown very fast in the past five years. Thai developers see prefabrication as the future and are ready to invest more in this type of construction (Mordor Intelligence, 2022). Prefabricated steel structures are becoming increasingly popular because steel structure buildings are strong, durable, lightweight, quick to build, time-efficient, punctual, labor-saving, budget-controlled, easier to inspect quality control, and have a clean construction site. Therefore, residential buildings, commercial buildings, office buildings, residential condominiums and apartments, hotels, shopping centers, stadiums, restaurants, exhibition buildings, parking structures, and other structures are among the best options for using prefabricated steel to construct building structures. New technologies are not only assisting contractors and owners in completing projects faster and more economically, but they are also assisting in reducing construction waste and producing energy-efficient buildings, thus bringing long-term benefits to the project.

Thailand imposed a lockdown in mid-2020, but construction activities remained relatively flexible, and most work is proceeding smoothly without much disruption. However, because the pandemic has disrupted supply chains and caused labor shortages in the construction industry, some projects are expected to be delayed, resulting in cost overruns. The performance of the construction company has a significant impact on the construction process. The prefabricated steel structure industry continues to face challenges, particularly in terms of service quality. Sunindijo and Hadikusumo (2014) stated that in the context of the construction industry, client satisfaction is influenced by several factors, which include cost, time, quality, safety, and service quality. A construction company's success can be measured by its performance; the better the performance, the more successful and developed the company will be. Technological advancements and global competition require businesses to improve their quality in order to remain competitive. Competitiveness will be encouraged by good strategy, innovation, and activity planning. As a result, businesses must find ways to boost their competitiveness by cutting costs and managing their supply chains. This may lead to client satisfaction and significantly affect client behavioral intentions or client willingness to use the same service provider in future projects. Hence, the aims of this research are to investigate customers' perceptions of service quality and to present guidelines for improving services in prefabricated steel structure management.

2. Literature review

2.1 Service quality in construction business

In the construction industry, service quality is a critical factor that contributes to client satisfaction and success. Construction companies must therefore improve their service quality in order to retain clients and ensure their survival in today's competitive business environment. Service quality, on the other hand, is more complicated due to service characteristics. To begin with, most services are intangible because they are associated with "performances" rather than physical objects that can be counted, measured, inventoried, verified, and tested. Second, services are heterogeneous, particularly when they rely heavily on human performance, which can vary significantly on a daily basis. Because of this dependency, what a company intends to deliver may be completely different from what the client receives. Third, the production and consumption of many services are inextricably linked, which means that interactions between the client and the service provider influence the process (Sunindijo & Hadikusumo, 2014).

Parasuraman et al. (1985) developed the Gaps model of service quality, which is based on ten determinants:

reliability, responsiveness, credibility, competence, access, courtesy, security, communication, tangibles, and understanding or knowing the customer. Then, Parasuraman et al. (1988) scaled down their original model of ten determinants and reduced it to only five dimensions, which included tangibles, reliability, responsiveness, assurance, and empathy. Murugavarothayan et al. (2000) adapted the Parasuraman et al. (1988)'s service quality model to evaluate the following construction professional services, which are listed and ranked in an order of priority: reliability, assurance, empathy, time of project completion, responsiveness, function of completed project, quality of completed project, final cost, and tangibles. Giao (2018) researched service quality in construction projects. He classified the dimension of service quality into five factors: competency, effectiveness, credibility, commitment, and collaboration. He explained that PM staff have relevant experience, project filing systems are well organized, and they perform tasks as promised on time, listen attentively, respect client input, act accordingly, carry out tasks technically accurately, make no mistakes, are always available and prepared to respond to clients' requests, and keep clients informed by sending quality and time reports on a regular basis.

Karna (2004) investigated and analyzed customer satisfaction and construction quality. He stated that the components of service quality in the construction industry can be divided into five major categories. First, there is quality assurance and handover, which include contracted work quality, management and implementation of agreed-upon quality assurance procedures, workability of handover material and maintenance manual, quality of assignment material and maintenance manual, degree of completion at handover inspection; and repair of defects and deficiencies discovered during handover inspection. Second, environmental safety at work includes maintaining cleanliness and order on the job site, managing safety on the job site, managing environmental issues and related know-how on the job site, and attending to official obligations. Third, personnel, which includes supplier work supervisor skills, supplier work skills, and supplier employee commitment to setting goals. Fourth, cooperation included supplier personnel's capacity for cooperation, agreement about change, responding to notices of defect, access of supplier employees, information flow on site, and overall service level quality. Last but not least, site supervision and subcontracting were concerned with site supervision duties and making sure that supplier and subcontractor contract agreements were adhered to. Yang and Peng (2008) investigated the creation of a customer satisfaction evaluation model for construction project management. They classified service quality into three stages: pre-construction, construction, and post-construction. Construction companies should rely on the success of construction tendering during the pre-construction phase. They must prepare well for tender documents, tendering schedule control, tendering work completion, and contract signing schedule control. They should be able to manage change during the construction process by holding regular consultant meetings, coordinating and integrating interfaces, reviewing and recommending change orders, examining or auditing construction payments, and handling construction warrant interfaces. Additionally, service providers should be able to manage schedules, control project schedules, forecast project schedules, manage and coordinate schedules in different phases, manage and coordinate design schedules, examine and supervise construction schedules, investigate construction feasibility studies, and work on project acceptance and transfer. They should understand financial analysis and recommendations on financing sources, evaluate the source of required resources, formulate a preliminary budget, examine construction budgets, assess tender documents, assist with tendering works, and recommend the selection of providers for professional and technical services, as well as the formulation of related documents for resource management. In addition, service providers should develop and control a system for service quality assurance by providing the chart of duty and authority of various providers for professional services and technical services, examining environmental impact assessment reports, investigating design; specifications, drawings; examining the payment of providers for professional services and technical services, analyzing resource prices, examining construction project budgets, and so on. They should also evaluate contract disputes and claims, as well as encourage project team members. Finally, the examination of construction plans, the completion of payment, and the provision of a report for project completion should all be scheduled by construction businesses.

2.2 Quality management (QM) in construction business

In terms of construction services, the responsibility for construction performance is actually shared by all parties involved in the construction process, not just the company manager. Every employee in the organization is accountable for their performance (Nugroho et al., 2021). Contractors, often known as construction service providers, are businesses that provide construction work based on previously established technical planning and specifications.

Quality management (QM) is widely acknowledged as Quality management (QM) is widely acknowledged as an effective means of assisting construction activities,

ensuring continuous improvement in construction performance, and ultimately leading to higher levels of customer satisfaction. In this definition, supply chain quality management (SCQM) is defined as the coordination and integration of SC business processes to measure, analyze, and continuously improve products, services, and processes with the goals of creating value and satisfying intermediate and ultimate customers in the business and market (Zeng et al., 2018). The supply chain can be viewed as a network of organizations that are involved in the various processes and activities that produce value in the form of products and services in the hands of the ultimate consumer via upstream and downstream linkages (Bagchi & Paik, 2001). In order to match materials, services, and information to customer demand, it affects both a company's processes with its suppliers and those with its customers (Krajewski et al., 2015).

2.3 Project management

A project is a brief endeavor with a clear start and finish that aims to provide a special good, service, or outcome (PMI, 2021). A project's life cycle is the sequence of stages it goes through from the beginning to the end (PMI, 2017). It would be easier to track project information and continuously improve project management if project management was studied and understood from the perspective of the project life cycle.

A building project is made up of a number of activities that must be completed sequentially over time. By segmenting construction projects into distinct phases, we may aid in conceptualizing the procedure of bringing project ideas to life (Gilliland, 2019). The continued management of generating goods or services after the handover generally falls beyond the purview of construction project management and is the responsibility of operation management (PMI, 2017).

The performance of the construction sector has been evaluated and improved through numerous research studies. The industry has always evaluated its performance using the three key metrics of time, cost, and quality. Soewin and Chinda (2018) conducted an exploratory factor analysis (EFA) to study the factors affecting construction process performance. They found ten key performance factors (KPIs), namely; 1) time, 2) cost, 3) quality, 4) safety and health, 5) internal stakeholder, 6) external stakeholder, 7) client satisfaction, 8) financial performance, 9) environment, and 10) information, technology and innovation. While Bitamba and An (2020) identified and evaluated the most significant key performance indicators that affect construction projects in the Congo and found that design, client management, contractor productivity, timing, and the contract were the main elements influencing Congolese building projects. The design-related elements were shown to be influenced by the design team's experience and expertise, whereas the client/owner-related aspects were found to be most significantly impacted by payment delays and the delivery of the construction site to the contractor.

Applying a construction project life cycle to this study, the stage of construction project management divided into three stages including Pre-construction process, In-construction process, and Post-construction process (Charter school facility financing, n.d.; Gabrieyel, 2021; Gilliland, 2019).

3. Methodology

Qualitative research was used in this study. Twenty customers in Bangkok (the capital of Thailand) who had used the service in the construction of prefabricated steel structures were the key informants. According to Green and Thorogood (2009), the number of interviewees started to be saturated at 20 onwards. The process of data collection came to an end when interview 20 produced no new information, signifying the theoretical saturation of the interviews.

Table 1 shows the key informants' profiles. From here on, the interviewees are described as "the Managing Director or their representatives – engineers (M)" for brevity.

Table 1: the key informants' profiles

Code	Position	Work experience (Years)	Type of companies	Company registration (Year)
M1	Managing Director	35	Building construction	1990
M2	Managing Director	10	Building construction	2011
M3	Managing Director	15	Building construction	2009
M4	Managing Director	18	Operations for drilling piles and construction	2007
M5	Managing Director	27	House construction	1997
M6	Managing Director	13	Building construction	2008
M7	Project Engineer	10	Building construction	1992
M8	Managing Director	7	Production and distribution of ready-mixed concrete and concrete products	2013
M9	Managing Director	31	Building construction	1992
M10	Managing Director	25	Building construction	1994
M11	Project Engineer	5	Building construction	2017
M12	Managing Director	10	Building construction	2004

Code	Position	Work experience (Years)	Type of companies	Company registration (Year)
M13	Project Engineer	8	Building construction	2005
M14	Project Engineer	6	Building construction	2015
M15	Managing Director	8	Building construction	1990
M16	Project Engineer	6	Building construction	1983
M17	Project Engineer	5	Building construction	1990
M18	Project Engineer	9	Building construction	1999
M19	Managing Director	6	Building construction	1997
M20	Managing Director	12	Building construction	1996

Remark: Some interviewees have years of work experience in another organization prior to working for their current company.

The researchers collected the data through an in-depth interview. Before starting the interview, the researchers asked for permission to take notes and make recordings. During the interview, the researchers interacted face-to-face with the interviewee in a friendly and comfortable manner to encourage interviewees to express their opinions freely. The interview takes approximately 60 - 90 minutes, depending on the cooperation of the interviewees. The researchers conducted interviews until no doubt or new information arose (called data saturation), at which point the interview was discontinued. The researcher used note-taking, briefly summarizing only the important issues and recording them. The researchers immediately recorded other information such as posture, tone of voice, thoughts and feelings of the interviewee, or problems that arose with the researchers while collecting information as a matter of fact without interpretation. The researchers used the recorded data for daily transcription and checked for unclear or incomplete information for further study in the next interview. The researchers transcribed the recording word by word, sentence by sentence, and checked by listening to the recording tape again.

The in-depth interview questions are open-ended and passed through a process of expert IOC validity checking and ethics consideration. The interview guide had two general sections. The first one focused on the interviewees' personal profiles. The second section related to their opinions and recommendations for improving service in the pre-construction, in-construction, and post-construction processes. The trustworthiness of the data collection process depends on whether the researchers have a good relationship with the interviewee in order to gain their trust, which will affect the accuracy and truthfulness of the information. The researcher confirmed the accuracy of the data (member checking) by taking the data obtained from the interview with detailed notes and bringing them back to the interviewee to confirm the accuracy of the information personal's details. The second section related to their opinions and recommendations for improving service in the pre-construction, in-construction, and post-construction processes. The trustworthiness of the data collection process depends on whether the researchers have a good relationship with the interviewee in order to gain their trust, which will affect the accuracy and truthfulness of the information. The researcher confirmed the accuracy of the data (member checking) by taking the data obtained from the interview with detailed notes and bringing them back to the interviewee to confirm the accuracy of the information. The researchers confirmed the findings by keeping various documents that were relevant to the research and making them ready for verification (an audit trial) to confirm that the information obtained was from the interviewees. The transcripts were examined through thematic analysis to identify, analyze, and report patterns or themes that emerged from the data (Braun & Clarke, 2006). Before we begin analyzing individual items, researchers obtain a comprehensive overview of all the data we have gathered. It entailed transcribing audio, reading through the text and taking preliminary notes, and generally looking over the data to become acquainted with it. After that, we did coding by highlighting sections of our text. We organize all of the data into code-identified groups. These codes provide us with a concise overview of the key points and common meanings that appear throughout the data. Following that, we examine the codes we've generated, look for patterns, and begin developing themes. In the event that we run into any problems with our themes, we create new ones to make them more useful and accurate. The process of naming themes entails coming up with a concise and easily understandable name for each theme. Each theme was usually addressed in turn in the results or findings section. We explained the themes and what they mean, using quotations as evidence.

4. Results and discussion

4.1 Pre-construction process

4.1.1 Providing tender document and contract (Theme 1)

customers by the deadline specified by them. It can boost customers' trust in the company. M13 stated that when a bid is received, the first thing a company will look at is the accuracy and completeness of the documentation. The document must include information such as material quantities, labor costs, and contract terms. When deciding whether to use the service, the price, construction period, and warranty period will be taken into account. M6 agreed, saying, "The first thing to decide was credibility for the auction, the experience of the contractor, and work-related competencies." Then we looked at the budget and construction timeline. Hence, preparation prior to bidding is critical in order for the contractor company to win the auction. As a result, in order for the contractor company to win the auction, preparation prior to bidding is critical. This statement was supported by Gevender et al. (2022). They stated that the quality of a tender document can be evaluated by six key quality indicators, namely: accuracy, clarity, completeness, standardization, relevance, and certainty. Contractors seek to acquire construction projects, typically through the tender process. This process is critical for entrepreneurs in the construction service industry because the success or failure of this process determines the viability of their business. Tender documents such as tender drawings, technical specifications, work plans, and requirements, as well as the addendum document, are used as the basis for the contractor's budget plan bid. The tender documentation must be precise, detailed, and easy to read. Special conditions, the payment method, the type of contract used, the use of bid security, and performance security, and the duration of construction, technical requirements with material specifications, the type and items of work to be done, the working methods used, and the brand used must all be disclosed to the clients (Yuni et al., 2017).

Service providers are required to promptly and accurately prepare tender documents. Customers must receive it by the date they've requested. In this case, M5 recommended that the company have a delivery plan. Customers must have financial documents to ensure that the service providers will not accept more jobs than their potential ability, which is the cause of leaving jobs in the future. In addition, M2 also informed companies that "companies should have information to compare prefabricated steel and concrete structures." Both the bidding team and the construction team must be ready after winning the auction. When signing a contract, the details in the contract must be tight and cover the benefits that both parties will receive.

The importance of financial planning for a construction project cannot be overstated. A budget that was not planned may cause the project to be delayed, and the contractor may leave the job. As a result, the steel structure contractor must ensure that the project's internal finance or funding sources will complete the work on time. Every company should have billing documents and hire a competent accounting officer who understands the overall work directly of the audit of financial documents. M8 said that to complete project management, the contractor must be prepared in terms of working capital for investment and financial discipline. The budget must include a verifiable financial plan, a clear disbursement plan, payment accuracy, payment deadlines, payment documentation completeness, and work delivery on time. One more important thing is risk analysis and management. The risk is the possibility of financial loss, damage, or physical injury, as well as the delay caused by uncertainty. Risks in the construction project will have an impact on the project's objectives, costs, timeline, and quality. To reduce the risk of project failure, project implementation always refers to the estimate made during planning (Yuni et al., 2017).

4.1.2 Design ability for prefabricated steel structures (Theme 2)

Steel structure building contractor companies must be knowledgeable about steel structure building and concrete design. There should be a clear and verifiable quotation with labor and material costs, and it must have a specific plan, construction period, scope of work, and bid within the specified time period, as well as a foreign consulting firm with experience in steel structures to ensure more valuable projects in the future. M3 stated that there should be a team of engineers to design concrete structures as well, to build customer confidence and reduce errors. The company must be ready to manage and be able to deliver the work in a timely manner and have an experienced team that can meet the customer's needs. According to Abdulwahed and Hasna (2017), contemporary engineers are expected to be technically proficient in addition to having a broad range of interpersonal, cognitive, and management competencies to function effectively in the workplace.

4.2 In-construction process (Theme 3)

4.2.1 Contract and design modifications (Sub-theme 1)

There will be numerous contract and design modifications that could be caused by the failure of the contractor to postpone the construction period due to internal and external factors such as weather. As a result, the change document must clearly explain the reasons for the change as well as the solution, timetable, and revision

budget in order to reduce disputes for both parties. Furthermore, it must be clear who is responsible for the change and the damage. M7 mentioned that every time there is a change, there must be documents or a meeting explaining why the change was made, budget, and time, and mutual approval of two or more parties is required to minimize future disputes. And M20 stated, "The client wanted an alternative approach to the transformation to minimize the impact on cost and time of project delays. Whenever there is a change, there must be a meeting to consider it, find out the cause of the change, and summarize the budget, time, impact of the change, advantages, and disadvantages. After that, documents confirming the change and the person responsible must be in the document and require written approval from the customer prior to alteration." As Ibbs et al. (2001) mentioned, project management teams must have the ability to respond to change effectively in order to minimize the impact on the project. Changes in projects can cause substantial adjustments to the contract duration, total direct and indirect costs, or both. If the change is a high priority, the management team should determine the funding source for interim approval as soon as possible, because any delay will almost certainly increase the cost of the change. However, if the change is not time-sensitive, management should carefully consider the proposal to determine whether the change is necessary. The reason for this reconsideration is that the team's function is to maximize project profit while minimizing the negative effects of change. The team must stop making any changes that are unnecessary or do not contribute to the project's stated goals and return on investment if they are to maximize revenues.

4.2.2 Time management (Sub-theme 2)

Construction project delays are regarded as one of the most common issues in the construction industry. Construction delays can also have an impact on project quality because the construction team usually devotes less time to quality control when the main concern is completing the project on time. The company must have a plan for time management and must follow up on reports. On a weekly basis, the progress of the work and problems should be reported to the customers. If the project has any delays, companies should provide guidelines for adjusting the work plan in order to deliver the work on time, and they should have a person in charge of direct planning. Sometimes the project is delayed due to errors and changes made by the designer, as well as the ability of the installation team, because the installation process requires a high level of experience and skills. Also, different building types necessitate different skills and abilities. An experienced team and careful planning are required. The job must be watched over, and the customer must be regularly updated on the status of the work. M13 said that knowledge and competence in management are used for planning. To achieve these objectives, operations should be well coordinated. They have to supervise the work, evaluate the results for improvements, create better plans, and have the ability to deliver the work that all the customers desire. In order to avoid any negative effects from delays, project managers should implement the schedule change control system, which defines the procedures for changing the project's schedule. It includes the paperwork, tracking systems, and approval levels required for change authorization. Another activity is tracking the progress of scheduled activities in order to obtain the data needed to calculate project schedule performance and to report progress and current schedule status, including actual start and finish dates, remaining durations for unfinished schedule activities, and percent complete of in-progress schedule activities (Solís-Carcaño et al., 2015). C5 suggested that there should be a plan for natural disasters. Overcapacity results in a shortage of labor, and a shortage of personnel should be addressed to manage the project successfully. And they should introduce new innovations such as production machines, installations, and software to manage project management and project planning. Hence, when project schedule delays are severe, a new target schedule with revised target start and finish dates is created in order to provide realistic data for directing the work and for measuring performance and progress (Solís-Carcaño et al., 2015).

4.2.3 Resources management (Sub-theme 3)

The core of multi-project management is resource allocation and balance, and it is also the most difficult task. To begin with, the critical chain method assumes that resource constraints between projects occur primarily in the critical chain of multiple projects. After analyzing the resource requirements of all work packages on the critical chain of each project, the company can use a resource Gantt chart or a resource constraint graph to identify existing resource conflicts and bottlenecks. Bottleneck resources should be redistributed based on the importance of each project. The starting time and serial or parallel relationships of conflicted work packages should be adjusted, and all resources should be rebalanced. Double-check for resource conflicts between work packages and projects by putting all resource requirements into the same resource schedule. To avoid bottlenecks in multi-project schedules, special attention should be paid to identifying potential resource conflicts in non-critical chains. Finally, compile the schedule for each project and determine whether the completion time of each project meets the requirements of its research mandate or contract, as well as whether the plan is in accordance with the priority of each project. If the plan

does not meet the requirement, the company must iteratively optimize resource allocation and planning arrangements or increase resources if possible. Multi-project managers must collect data on resource consumption, such as task completion rates, the types and quantities of scarce resources, and the remaining resources. To meet the requirements, it is critical to properly coordinate and allocate resources. If our resources are insufficient, we should seek additional resources or use outside resources (Le et al., 2017). M4 gave recommendations that companies need to be able to use resources economically and have alternatives to the use of resources in the future, giving customers options such as using robots in production, using software for design and inspection, and computer system accuracy.

In addition, the company must oversee the project's human resource, including designers, supervisors, and workers. It needs to allocate the right amount of work so that it can function efficiently and achieve its goals.

According to M7, the budget section's resource allocation must plan and control the use of materials and hire employees to maximize job benefits. As for M10, he said that the person who provides resources must be knowledgeable about planning techniques so that they do not disrupt the overall project and can achieve the desired results.

4.2.4 Ability to monitor the construction process (Sub-theme 4)

Every time, the company should have an engineer check and sign off on the project and ensure that the documents used are up-to-date. Customers are concerned about audit capabilities because they lack experience and do not understand steel structures. Only documents from the steel structure building contractor are available for inspection by customers. Srewil and Scherer (2013) stated that the entire construction project is described by a set of construction processes or activities; each process must be completed within a specific time frame. These processes can be extracted using the project's Work Breakdown Structure (WBS). The updated resources within a specific process window containing the current processes and their next direct successors will be detected to identify the processes affected by a triggered event. The corresponding processes can then be identified by using the existing relationships between processes and resources. As a result, steel structure building contractors must be honest and have high standards in order to gain the trust of their clients. In order to provide the customer with sufficient information, they should provide as much information and expertise as they can, and audit procedures should be clearly defined. M7 informed us that clients demand verification that is accurate and consistent. Companies must have documents that can be inspected, such as standardized materials, work plans, and progress reports. Moreover, the company should have knowledgeable personnel or an outside company to inspect the building to prevent corruption in the audit and build confidence with customers. The company should encourage employees to learn and develop skills in monitoring and adoption of new technologies in auditing and provide post-audit analysis software to prevent errors as M1's suggestion.

4.2.5 Team management (Sub-theme 5)

The literature emphasizes the importance of regular communication and interaction as the foundation for effective collaboration, with successful team interactions leading to increased project success. Organizing frequent formal and informal meetings among the various parties in a collaborative project can help to strengthen ties and trust while also improving information flow within the project network (Matinheikki et al., 2016), with trust identified as a critical factor for project success (Lohr et al., 2018; To, 2016). The company must build a strong and efficient team. In the installation process, the company should send field engineers to inspect the construction site more often to solve on-site problems, and it must be an engineer with knowledge of concrete buildings to help coordinate between customers. The team must also have good communication and problem-solving skills. The company should train the team before starting work because it will make the work go in the same direction. The recruiting staff should look at the abilities of the employees and their human relations skills. The team should have the same goal. The work should be discussed or coordinated at that destination to achieve the goals. There should be shared responsibility for mistakes, and they must communicate and work together to resolve problems. As M10 said, the team must understand the work process. When starting a new project, there should be a meeting within the team to share responsibilities according to individual abilities. They must talk, listen to each other's opinions and work for the same purpose. M15 also shared the opinion that teamwork efficiency should be measured at the level of supervisors and subordinates within the same team. Supervisors should be responsible for the work they are doing and keep telling and teaching staff who may not understand what to do or not to do. As for the subordinates in the team, there should be respect and dignity for the supervisor. If some of the workers have doubts or thoughts, if it is correct or not? They should consult each other for accuracy before working. Working like this makes the team more efficient and able to work with quality. In addition, there should be development of team leaders and training of new teams and reserve teams to support more jobs in the future. Employees should be trained by institutes that provide knowledge on the efficiency of the team so that the team has more teamwork skills. This is an important

consideration because large-scale projects typically involve multiple stakeholders and a level of uncertainty that grows with project size and complexity. Despite these obstacles, the benefits of building trust are worth the effort. Project managers who take a more flexible approach based on trust are able to embrace and manage changes rather than attempt to avoid them, resulting in time savings over the course of the project (Eriksson et al., 2017).

4.2.6 Safety management (Sub-theme 6)

The construction process has distinct characteristics such as complex operation procedures, a challenging manufacturing environment, and interactive multi-type processing. When employees are engaged in work activities, the presence of these characteristics may put them at risk (Xie et al., 2020). The "4M" accident-causing theory explains that the four factors of human, material, management, and environment are taken as safety evaluation indexes. From the study by Chen and Wang (2021), they found that the human factor index score of item 2 is 90, the material factor index score is 85, the management factor index score is 86, and the environmental factor index score is 88, respectively. Therefore, in the construction area, workers should have personal protective equipment, which they must wear it while working. Scaffolding equipment and machinery used in the installation of the company should have a certificate to verify that such equipment and machinery are safe for operators and construction sites. M10 said that employees are important at work. Employees must have complete consciousness at work, not be intoxicated. The work should have a supervisor to monitor the wearing of security equipment. The placement of workpieces must be neat and safe. As for the personal health checkup, the doctor must make a diagnosis to be healthy and qualified before entering the job every time and must have a first aid agency and emergency units within the construction unit to help the injured first if an accident occurs. There must be security measures that will apply to outsiders and adjacent buildings. Therefore, the company must have a clearly fenced work area and a noticeable sign warning of critical danger points that can be clearly seen. M17 stated that it must have a fence boundary line to prevent unrelated people from entering the construction area. Warning signals must be provided, and the correct equipment and machinery must be selected for the right kind of work.

4.3.3 Post-construction process (Theme 3)

Companies must be able to deliver work on time while also meeting the standards and quality that customers expect. Developing an understanding of individual client expectations and experiences allows for improved client communication, which leads to improved success in site closure projects (Urton & Murray, 2021). The company must be able to audit and guarantee the results with confidence. Companies must communicate honestly, create a positive working environment, adhere to the agreement, and foster trust. The services maintain the same level of accuracy. According to M9, "a contracting business is a service business in which the recipient maintains close contact with the service provider for months or years. Sincere communication and agreement compliance are required for good customer service, and mutual trust must be maintained in the future with good service throughout the construction period. Companies must follow set objectives, complete projects on schedule, and be validated using engineering standards. Furthermore, companies must comply with the terms of the contract, the scope of the work, and check before the delivery of the work whether they meet the customer's requirements or not, and there must be a period of receipt. They must provide a guarantee for their work if an error occurs after delivery. M19 stated that the success of the customer project has many aspects, such as timely delivery success, quality success, and success within the construction budget. There should be no disputes between construction companies and customers. In addition, there should be a call center for complaints, advantages, and disadvantages of the company in order to analyze and improve the information that is still in poor service and to bring advantages to the forefront. For financial documents, the company has billed according to the delivery documents with inspection and signing of customer assignments. Billing documents should be submitted with clear details of the check acceptance period and tax invoice receipts every time a bill is placed. Customers also ask the company to develop standards for manual production processes for steel structures and installation techniques so they may learn more about steel structure buildings.

5. Implementation and suggestions

Guidelines for improving service quality: companies must improve the pre-construction, during construction, and after construction phases of the three-step process.

The pre-construction process

The completeness of the tender document is very important. It requires an experienced team with the ability to do the job. The price includes the scope of work that must be checked before submitting a quotation to the customer. The document must be clear in all terms: price (including labor cost and machine cost), work plan, scope of work, and working conditions. The companies have to demonstrate their potential to be competent in the preliminary stages of construction work. The reputation of the company has a direct effect on whether customers choose its services. The

details in the terms of the contract are what many customers consider when deciding to use construction cost services. It is the thing that affects the customer's decision to use the service the most.

The construction process

In the construction process changes in design or contracts must be clearly documented, for example, a document summarizing the causes and solutions and a clearly documented approval sign before the start of the amendment or change of the contract. To obtain approval to amend the budget, it is important for the customer to know before deciding to approve the amendment and changes in the contract. If there are any changes, the timing of the changes must be summarized for the customer.

In terms of time management, work planning and progress reports are required. To summarize the progress of a construction project, it is important to examine the overall picture of the project to show whether the companies will be able to manage the time, resources, and work schedule. To work successfully, there must be coordination and communication between people within and outside the organization in order for the operation to be carried out in accordance with the established procedures and patterns. If the companies understand the details of the construction process, it will allow the construction project to proceed smoothly in terms of work control. Controlling work standards is necessary to follow the procedures and finish the project by the deadline. In addition, budget allocation is very important to the success of project planning. Customers must receive a progress report as part of the process of monitoring budget and resource allocation in order to explain how the project is progressing in accordance with the allotted time frame, inform them of any problems that may arise, and give them instructions for resolving those problems.

For team management, it requires a team that has good working skills, good communication skills, and coordination. Working in a team, staff need to listen to the opinions of colleagues in order to work in the same way with common goals and share responsibility. As a result, the work of the team will be more efficient in terms of having a good relationship with each other. In order not to make mistakes, immediate problem-solving skills are essential for staff.

Workplace safety requires complete equipment to protect the personal safety of outsiders and neighboring buildings. People involved in the workplace must wear safety equipment during their work in order to comply with the rules and regulations of the equipment’s operating conditions. Prior to usage, safety protective equipment must be examined and ensured to be in excellent working order.

The post-construction process

In the post-construction process, for the delivery of work according to schedule, the service delivery should finish on time. The companies should demonstrate good and efficient management of the team and build confidence in the eyes of the customer for the future. The completeness of documents is another thing that gives customers confidence that the service is standardized and guarantees good project performance.

6. Conclusion

Another important industry that contributes to Thailand's economic development is the construction industry. Instead of traditional construction, entrepreneurs are looking for new construction technologies, such as buildings made of prefabricated steel structures. New technologies not only help contractors and owners complete projects faster and more cost-effectively, but they also help reduce construction waste and produce energy-efficient buildings, bringing long-term benefits to the project. The industry of prefabricated steel structures faces new challenges, particularly in terms of service quality. Several factors influence client satisfaction, including cost, time, quality, safety, and service quality. The success of a construction company can be measured by its performance; the better the performance, the more successful the company will be. Quality management (QM) is widely acknowledged as an effective means of assisting SCM activities, ensuring continuous improvement in SCM performance, and ultimately leading to higher levels of customer satisfaction. Construction should focus on controlling work performance and service quality throughout the entire process, including pre-construction, construction, and post-construction. The thoroughness of the construction process ensures effective project completion, giving customers confidence that the service is standardized

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