

Performance and Capabilities of Small Qualification Contractors on the Sustainable Construction Regulations Implementation

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Abstract

The construction sector is important in Indonesia's economic and social development. With the increasing awareness of the importance of sustainability, implementing sustainable construction principles has become necessary. On the other hand, construction service businesses with small qualifications face various challenges in meeting strict regulations and adapting to sustainable practices. This study aims to analyze the performance and capabilities of sustainable construction services businesses in small qualification contractors in East Java on implementing sustainable construction services business regulations. The research method used is mixed methods, as well as qualitative and quantitative methods. As many as 100 respondents are members of the Gapeksindo East Java association with small qualifications. The results showed that construction service businesses with good management (high managerial ability) tend to be more able to comply with sustainable construction regulations. In addition, the descriptive analysis results show recommendations and strategies to improve the implementation of construction services regulations among small businesses, such as training and education, financial support, Simplification of Regulations, technology and innovation, Increased Market Awareness, and technical assistance. With these strategies, it is expected that small construction service businesses in East Java can be more effective in implementing sustainable construction regulations to improve their performance and contribution to sustainable development.

Keywords: Capabilities, construction service, sustainable construction regulation, performance, small qualification

1. Introduction

The construction sector is vital to Indonesia's economic and social development. With increasing awareness of the importance of sustainability, implementing sustainable construction principles has become necessary. On the other hand, construction services businesses with minor qualifications face various challenges in meeting strict regulations and adapting to sustainable practices. Construction is a sector that plays a vital role in the country's development and significantly impacts the environment, so structured efforts are needed to reduce its harmful effects, such as sustainable construction practices. Implementing these practices must consider the environmental, social, and economic aspects of the development stages. The government has issued the Construction Services Law and its derivatives to support the implementation of the Indonesian Green Taxonomy in the construction sector, hopefully making it easier for construction service businesses to perform well. Figure 1 shows the Circular Economy Performance of the Construction Sector.

The performance of a construction services business is said to be excellent and successful if it can complete the project at the correct cost, on time, with the right quality, and with adequate resources by applicable laws. However,

implementing the law regarding construction services to increase sustainable construction services businesses is not as expected. Because there has been a decline in the number of small qualified construction service business actors in East Java. According to the Gapeksindo DPD East Java Construction Services Association, members complained and had difficulty complying with regulations so that their businesses could survive and get through difficult times when the law was implemented. The number of small-scale entrepreneur members in 2018 was recorded at 850 bodies, becoming 340 bodies in 2023.

So, this research aims to analyze the performance factors and capabilities of sustainable construction services businesses of small qualified contractors in East

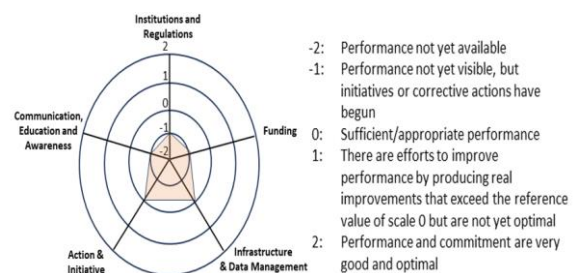


Figure 1. Circular Economy Performance of the Construction Sector [1]

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Java regarding the implementation of sustainable construction services business regulations.

2. Theoretical Basis

2.1. Construction project

The construction project is a series of activities that are only carried out once and have a generally short duration. In this series of activities, a process processes project resources into an activity that results in the building. The method in this series of activities certainly involves related parties, both directly and indirectly [2]. Construction projects occur in ever-changing and complex environments, often with high-risk levels. Buildings, roads, residential units, healthcare facilities, utility infrastructure, oil and gas, and other industrial facilities may seem typical, but each project presents challenges and risks. Construction projects are not always built at the performing organisation's primary place of business. Still, they can be built in remote environments, sometimes across the open sea, beneath the earth's surface, and soaring high into the sky [3].

2.2. Sustainable construction

In Presidential Regulation of the Republic of Indonesia no. 111 of 2022, the Sustainable Development Goals are implemented by setting national Sustainable Development Goals [4], which are prepared referring to the global goals and targets of the 2030 Sustainable Development Goals and the national targets of the national medium-term development plan for the current period [5].

The General Concept of Sustainable Construction is developed to explain the construction industry's responsibility in realising sustainable development. Sustainable development focuses on three main pillars: environmental friendliness, social life and economic prosperity [6]. Sustainable construction is a series of development processes that improve the quality of life and provide satisfaction to project customers, give the possibility and potential for future changes in the function of buildings, and provide a social environment that maximises the use of resources [5].

2.3. Elements of sustainable construction

Elements of Sustainable Construction The definition of sustainable first appeared in 1987 in the "Brutland Report" Sustainable development is development to meet the needs of the present generation without sacrificing future generations in meeting their future needs [7]. In the context of future development, sustainable development includes three things, as in Fig. 2.

2.4. Construction service

According to the National Construction Services Development Institute Regulation No. 10 of 2013 [8], a construction services business is a type of construction services business that provides construction work implementation services, which are differentiated according to the form of business, classification, and



Figure 2. Three elements of sustainable development

qualifications of the construction services business [6]. Construction service qualifications are as follows:

a. Minor Qualifications

Minor Qualifications (K1, K2, and K3) are the qualifications of a company, construction service business entity, or contractor capable of efficiently carrying out work—risk small, simple, high technology, or at a small cost.

b. Intermediate Qualification

Intermediate Qualifications (M1 and M2) are the qualifications of a company, construction services business entity, or contractor capable of carrying out work with high risks, technology, and high costs.

c. Big Qualifier

Significant Qualifications (B1 and B2) are the qualifications of a company or construction services business entity or contractor capable of carrying out work with high risks, technology and significant costs.

2.5. Regulation of sustainable construction services businesses in Indonesia

Fulfilment of green criteria for the construction services sector includes appropriate land use, energy conservation, water conservation, use of environmentally friendly materials, maintaining air and noise quality, waste management, disaster adaptation, community empowerment, gender-responsive development, supporting community interaction and local businesses and protection of protected areas and cultural heritage [8], [9] called the Indonesian green taxonomy (THI) of the construction sector.

With the preparation of the THI for the construction sector, it is hoped that it can support the holistic implementation of sustainable construction in the construction sector nationally. This is in line with PP Number 14 of 2021 concerning Amendments to Government Regulation Number 22 of 2020 [10] Concerning Implementing Regulations of Law Number 2 of 2017 concerning Construction Services, which mandates that the provision of construction services for constructing buildings and civil structures must comply with sustainable principles. Across the resource and life cycle of the building [11].

3. Research Methods

This research method uses descriptive analysis. Descriptive research attempts to describe phenomena that

occur realistically, naturally and contemporarily because this research consists of making systematic, factual and precise descriptions, drawings or paintings regarding the facts, characteristics and relationships between the phenomena being studied [12]. This research is expected to reveal the experiences of informants to understand views regarding the performance of sustainable construction service businesses from the perceptions of association members (Gapeksindo in East Java) with low qualifications, association DPD administrators, experts in the field of sustainable construction management and academics regarding their influence on the implementation of service business regulations. Applicable construction. Viewpoints are also taken from the perspective of sustainable construction experts and academics to look for discoveries and information that will contribute to science.

The research process is explained in Fig. 3.

Based on information from Gapeksindo, there are approximately 500 members with small qualifications, so using the purposive sampling method, it was found that the minimum number of respondents was 100. The survey was carried out by distributing questionnaires offline, and the link was sent to selected respondents (Gapeksindo East Java members) using a Likert scale of 1 to 5. Then, this research will be analyzed using descriptive analysis.

Research variables are anything in any form that the researcher determines to be studied so that information about it can be obtained and conclusions drawn. Meanwhile, indicators are concrete measurement tools closely related to research variables. The variables in this study are shown in Table 1, and Table 2 shows sub-variables and research indicators.

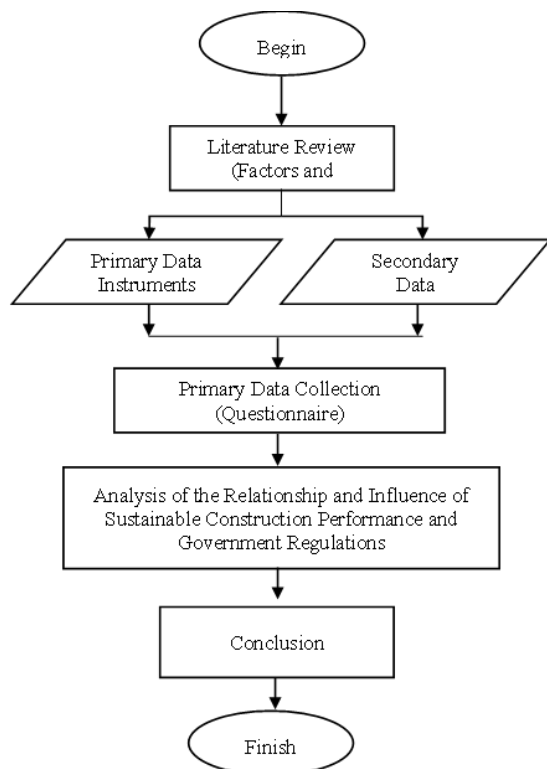


Figure 3. Research flow diagram

Table 1. Research variables

Variable	Symbol
Construction Services Business Performance	X1
Construction Services Business Capabilities	X2
Regulatory Compliance	Y

Table 2. Subvariables and research indicators

Construction Services Business Performance (X1)
Construction Services Productivity (X1.1)
Number of projects in the last one year (X1.1.1);
Number of projects completed on time (X1.1.2);
Labor productivity ratio (X1.1.3);.
Project Quality (X1.2)
Client satisfaction (X1.2.1);
Number of complaints after project completion (X1.2.2);
Periodic evaluation to maintain the quality of construction projects (X1.2.3);
Finance (X1.3)
Annual income growth (X1.3.1);
Net profit margin (X1.3.2);
Current cash ratio (X1.3.3);
Project capital capability (X1.3.4);
Work Security and Safety (X1.4)
Frequency of work accidents (X1.4.1);
Labor compliance with safety SOPs (X1.4.2);
Availability of accident insurance (X1.4.3);
Implementation of reward and punishment related to the implementation of safety first(X1.4.4);
Sustainability (X1.5)
Use of environmentally friendly materials (X1.5.1);
Implementation of zero waste (X1.5.2);
Implementation of projects related to water efficiency (X1.5.3);
Implementation of projects related to energy efficiency (X1.5.4);
The work environment prioritises the health and comfort of the work environment (X1.5.5).
Construction Services Business Capabilities (X2)
Managerial Ability (X2.1)
Implementation of continuous project management (X2.1.1);
Manager's education level related to sustainable construction services businesses (X2.1.2);
Project leaders can integrate project constraints, manage time, manage costs, manage human resources, and handle stakeholders (X2.1.3).
Technology Capability (X2.2)
Application of the latest technology to the project (X2.2.1);
Number of technologies applied (X2.2.2);
Nominal investment in the latest equipment (X2.2.3);
Human Resources (X2.3)
Workforce education level (X2.3.1);
Certified labor ratio(X2.3.2);
Level of worker satisfaction (X2.3.3);
Financial Capability (X2.4)
Debt to Equity Ratio (X2.4.1);
Stability Cash flow on the company (X2.4.2);
Accuracy of payment of wages to the workforce (X2.4.3);.
Regulatory Compliance (Y)
Compliance with company regulations (Y1);
Renewal of legality requirements for construction services businesses in each period (Y2);
Certification owned by the company (Y3);

4. Results and Discussion

4.1. Sustainable construction

Descriptive statistical analysis based on respondent characteristics :

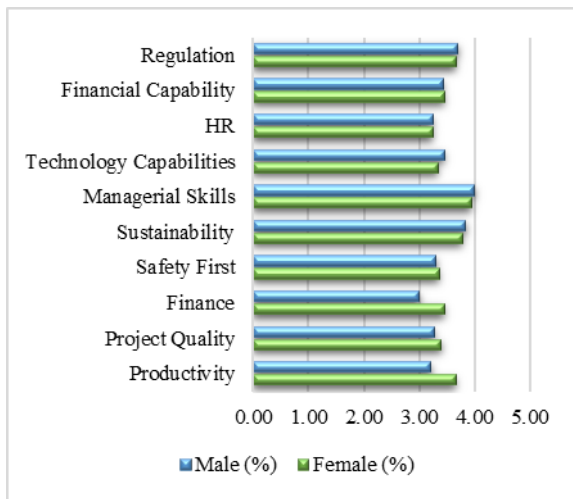


Figure 4. Graph of gender characteristics

Table 3. Gender characteristics

Variable	Mean	
	Woman	Man
Construction Services Business Performance		
Productivity	3.67	3.21
Project Quality	3.40	3.27
Finance	3.45	3.00
Safety First	3.36	3.30
Sustainability	3.78	3.84
Construction Services Business Capabilities		
Managerial Ability	3.94	4.00
Technology Capability	3.33	3.46
HR	3.25	3.24
Financial Capability	3.46	3.43
Regulations	3.67	3.70

a. Gender

Figure 4 and Table 3 show no significant differences in the perceptions of female and male respondents regarding all research indicators. In the construction service business performance variable, all genders have the highest mean value on the sustainability indicator.

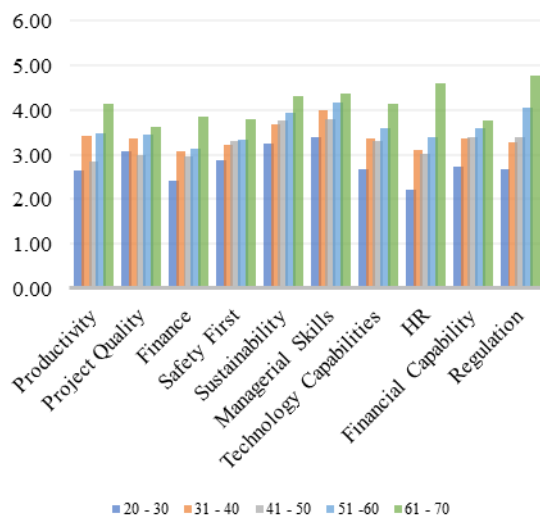


Figure 5. Graph of respondent age characteristics

Table 4. Age characteristics of respondents

Variable	Age				
	20 - 30	31 - 40	41 - 50	51 - 60	61 - 70
Construction Services Business Performance					
Productivity	2.63	3.42	2.86	3.47	4.15
Project Quality	3.07	3.36	2.99	3.44	3.63
Finance	2.43	3.08	2.96	3.13	3.86
Safety First	2.88	3.22	3.31	3.34	3.81
Sustainability	3.24	3.69	3.77	3.95	4.31
Construction Services Business Capabilities					
Managerial Ability	3.40	4.00	3.81	4.16	4.37
Technology Capability	2.67	3.36	3.29	3.59	4.15
HR	2.20	3.11	3.03	3.39	4.59
Financial Capability	2.73	3.38	3.40	3.58	3.78
Implementation of Regulations					
Regulations	2.67	3.27	3.40	4.07	4.78

b. Respondent's Age

Based on Fig. 5 and Table 4, the age characteristics of respondents show that perception is highest with a mean value of 4.31 on the Sustainability performance variable, age range 61-70. Meanwhile, the highest mean value was 4.59 for the construction services business capability variable, with an age range of 61-70. This condition shows that length of experience is important in determining the performance and ability of construction service businesses to implement sustainable construction regulations.

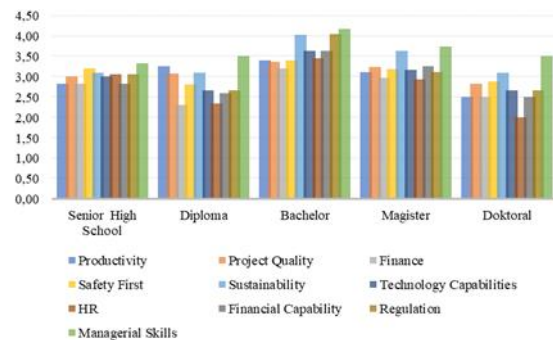


Figure 6. Variable characteristics and respondents' education level

Table 5. Variable characteristics and educational level of respondents

Variable	Level of education				
	SMA/SMK	D3	S1	S2	S3
Construction Services Business Performance					
Productivity	2.83	3.25	3.40	3.11	2.50
Project Quality	3.00	3.08	3.36	3.24	2.83
Finance	2.83	2.31	3.20	2.97	2.50
Safety First	3.21	2.81	3.40	3.18	2.88
Sustainability	3.10	3.10	4.02	3.64	3.10
Construction Services Business Capabilities					
Managerial Ability	3.33	3.50	4.17	3.74	3.50
Technology Capability	3.00	2.67	3.64	3.17	2.67
HR	3.06	2.33	3.45	2.94	2.00
Financial Capability	2.83	2.58	3.63	3.26	2.50
Implementation of Regulations					
Regulations	3.06	2.67	4.05	3.11	2.67

c. Level of education

Characteristics of Educational Level respondents whose last education was at Bachelor/S1 level showed the highest perception of the construction service business performance variable, with the highest mean value of 4.02 on the Sustainability indicator in Fig. 6 and Table 5. This shows that the majority of respondents have a high level of understanding and expertise in the field of sustainable construction. High perception is also demonstrated in the construction services business capability variable in the managerial capability indicator, amounting to 4.17. This condition illustrates that a minimum education level of a Bachelor's degree requires good basic organizational skills to implement sustainable construction regulations.

4.2 Descriptive analysis based on research variables

a. Construction Services Productivity Variables

Regarding construction services productivity indicators, as shown in Fig. 7, respondents' perceptions were highest in the productivity ratio sub-indicator, with a 70-80% range. This condition illustrates that most contractors have a relatively high level of productivity.

b. Project Quality Variables

Figure 8 illustrates that the project quality of the majority of respondents is a crucial factor in determining the performance of their construction services business. The results are excellent. As many as 88% of respondents stated that all their clients were satisfied, even very satisfied, with the company's performance on completed projects and the lack of complaints received. Additionally, 86% of respondents stated that they carry out periodic evaluations to maintain the quality of their work.

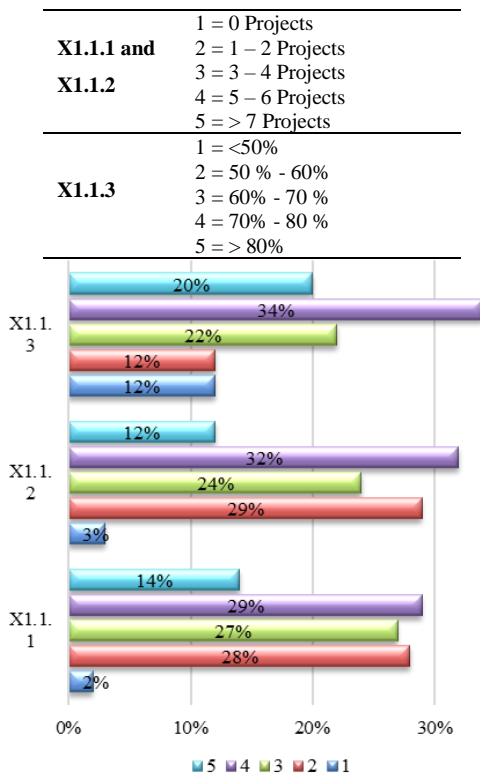


Figure 7. Descriptive graph of construction services productivity

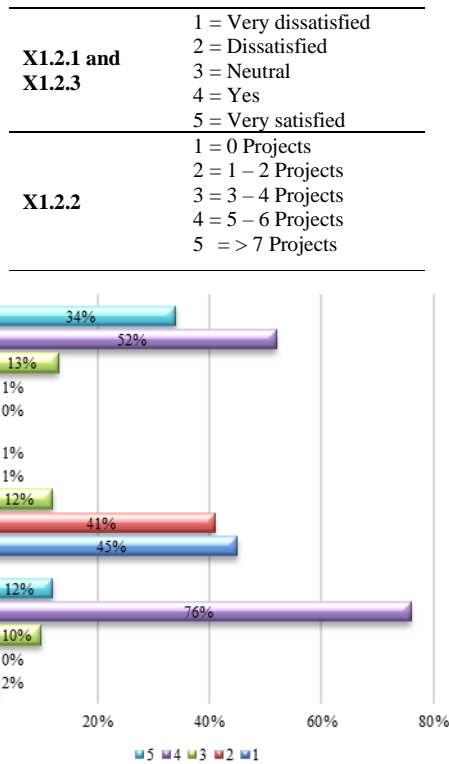


Figure 8. Project quality variable

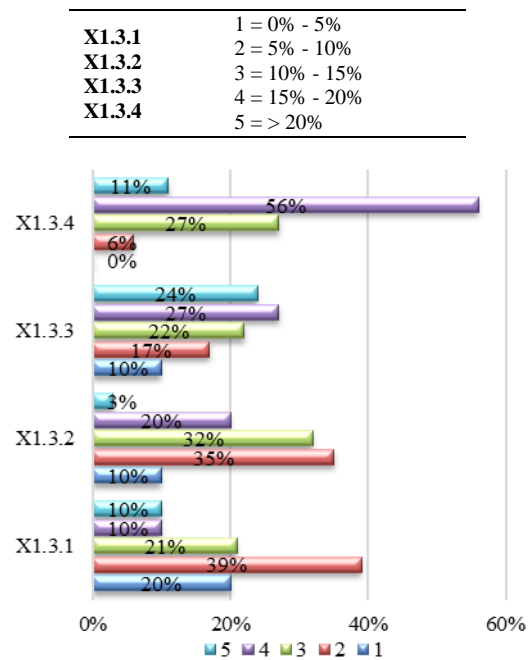


Figure 9. Descriptive graph of financial variables

c. Financial Variables

Based on Fig. 9, descriptive results of financial indicators show that most respondents have income growth of up to 10% every year with a margin or profit of 5-20% from each completed project. Apart from that, the current cash ratio is also around more than 10% each year, and the majority of respondents, 67%, stated that they have good and very good capital capabilities. However, around 27% did not respond to the condition of the project's capital capabilities.

X1.4.1	1 = 0% - 5%
	2 = 5% - 10%
	3 = 10% - 15%
	4 = 15% - 20%
	5 = > 20%
X1.4.2	1 = Very bad
X1.4.3	2 = Not good
X1.4.4	3 = Neutral
	4 = Good
	5 = Very good

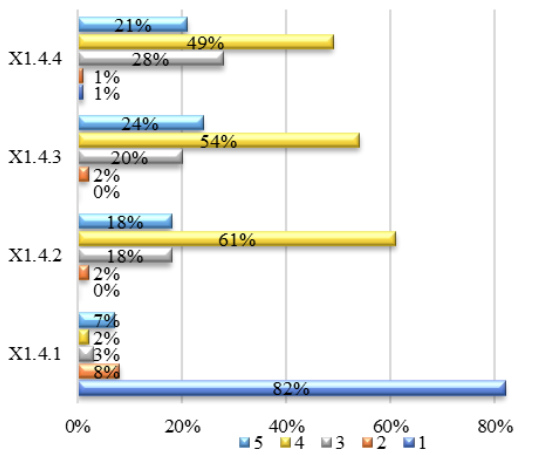


Figure 10. Descriptive graph of work safety and security

d. Work Safety and Security Variables

Construction service business performance variables are also shown by implementing safety first in each project. The respondent's perception positively responded to this indicator, as illustrated in Fig. 10. More than 90% of the total respondents had no work accidents because the workforce complied with the safety first SOPs implemented. In addition, the Company guarantees the safety and health of workers by providing insurance and *rewards and punishments* for workers when implementing safety first. The informal construction workers must be better organised and activated, and social change attempts to force the government to protect society better [13]. Management that considers humans, processes and places in the organisation's context include an efficient physical environment, technology, safety, comfort and occupational health to achieve optimal work productivity [14].

e. Sustainability Variables

Most respondents have implemented the concept of sustainability in their businesses. More than 70% of respondents have used environmentally friendly materials, which comprise more than 10% of the total project implementation needs. In addition, more than 60% of contractors stated they had implemented sustainable construction concepts such as *zero waste*, carrying out water and energy efficiency projects, and strictly implementing safety first. Conditions The description of respondents regarding sustainable construction is shown in Fig. 11.

X1.5.1	1 = 0% - 5%
	2 = 5% - 10%
	3 = 10% - 15%
	4 = 15% - 20%
	5 = > 20%
X1.5.2	1 = Strongly disagree
X1.5.3	2 = Disagree
X1.5.4	3 = Neutral
X1.5.4	4 = Agree
X1.5.4	5 = Strongly agree

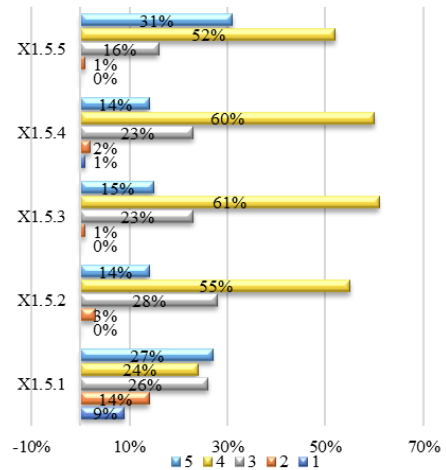


Figure 11. Descriptive graph of sustainability variables

f. Managerial Ability Variable

The majority's perception of the contractor's managerial ability states agree and strongly agree, as shown in Fig. 12; the manager's education level influences the ability of a sustainable construction services business; as much as 71% answered in the affirmative. The highest agreement and strongly agreed statements were 85% of respondents on the indicator that project leaders can integrate project boundaries, manage time, manage costs, manage human resources, and handle stakeholders. These results show that the leader's ability is critical to support the contractor's ability to implement and follow sustainable construction services regulations. Many experts have complexly defined social capital.

X2.1.1	1 = Strongly disagree
	2 = Disagree
-	3 = Neutral
X2.1.3	4 = Agree
	5 = Strongly agree

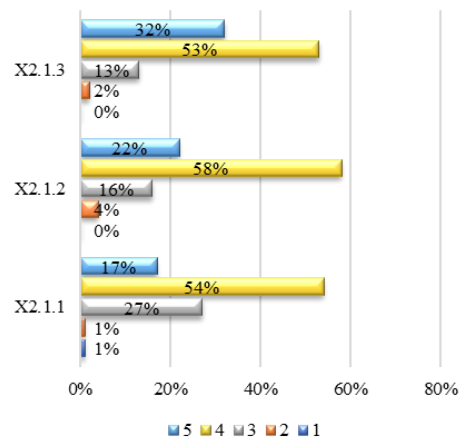


Figure 12. Descriptive graph of managerial ability variable

X2.2.1	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree
X2.2.2	1 = 0 technology 2 = 1 – 2 technologies 3 = 3 – 4 technologies 4 = 5 – 6 technologies 5 = > 7 technologies
X2.2.3	1 = 0 2 = 0 – 5 million 3 = 5 – 10 million 4 = 10 – 15 million 5 = > 15 million

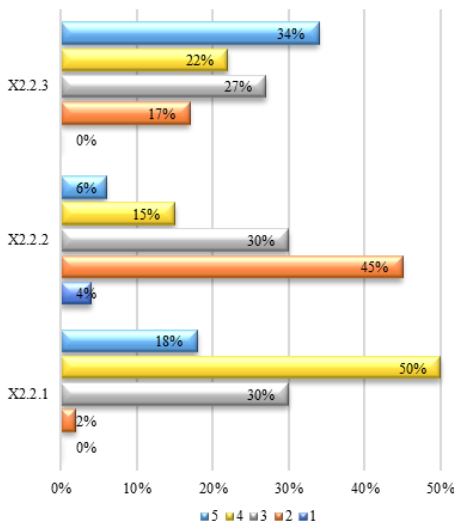


Figure 13. Descriptive graph of technological capability variable

g. Technology Capability Variable

Figure 13 shows that most respondents highly perceive the ability of construction service businesses to apply the latest technology in the projects they undertake and invest in purchasing and using the latest technology. More than 50% of respondents stated that they had invested more than 15 million rupiahs each year to purchase tools to help implement construction projects. One of the technologies that can be utilised to implement sustainable construction is Building Information Modeling (BIM). BIM is one of the promising developments in the field of AEC (Architecture, Engineering and Construction). The successful use of BIM in the construction sector illustrates that BIM can handle the development process through digitisation, with the use of an integrated BIM system that can assist and provide these management needs [12].

h. Human Resources Variables

Respondents gave a high perception regarding the qualifications of their human resources; more than 90% of respondents stated that their human resources consisted of at least two people with a Bachelor's degree, and more than 70% of respondents had more than 60% of the total number of human resources who had certified competency according to the field of work they were engaged in. In addition, as many as 74% of respondents stated that staff and employees felt satisfied joining their business, as shown in Fig. 14.

X2.3.1	1 = 0 workforce 2 = 1 – 2 Workforce 3 = 3 – 4 Workforce 4 = 5 – 6 Workforce 5 = > 7 Workforce
X2.3.2	1 = < 50% 2 = 50% - 60% 3 = 60% - 70% 4 = 70% - 80% 5 = > 80%
X2.3.3	1 = Very dissatisfied 2 = Dissatisfied 3 = Neutral 4 = Yes 5 = Very satisfied

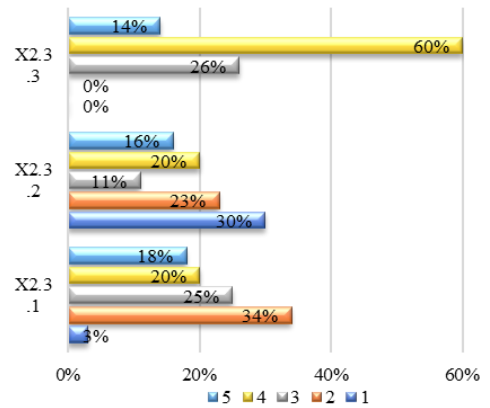


Figure 14. Descriptive graph of human resources variable

i. Financial Capability Variable

Financial capability is also an important factor in measuring the capability of a construction services business. The analysis results in Fig. 15 show that most respondents, more than 50%, have a debt ratio below 10%, and as many as 64% have stable cash flow. In addition, almost 80% of respondents stated that they were never late in paying their obligations to pay workers' wages.

X2.4.1	1 = 0% - 5% 2 = 5% - 10% 3 = 10% - 15% 4 = 15% - 20% 5 = > 20%
X2.4.2 and X2.4.1	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree

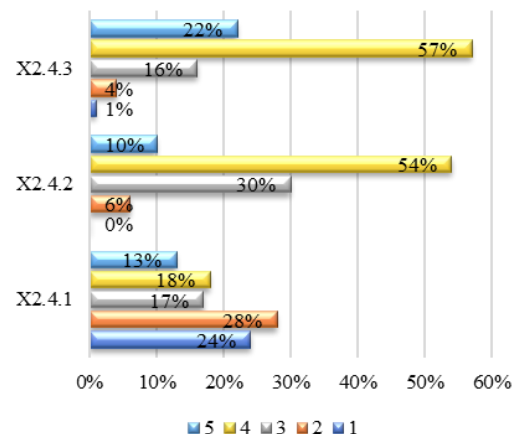


Figure 15. Descriptive graph of financial capability variable

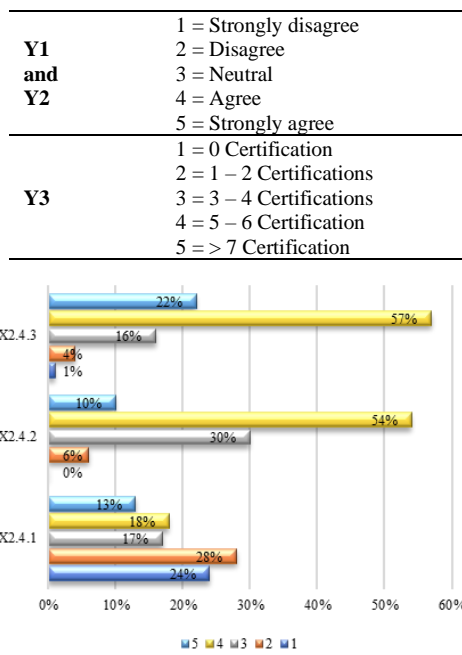


Figure 16. Descriptive graph of compliance with regulations variable

j. Variable Compliance with Regulations

Referring to the results of the presentation of respondents' statements as in Fig. 16, as many as 70% of respondents stated that they had adopted and implemented the regulatory rules for sustainable construction services businesses. Apart from that, as many as 84% of contractors also gave the same perception that they constantly update the Company's terms and legality according to the latest construction services business regulations. On average, respondents have 3-4 competency certifications as required by construction services regulations.

5. Conclusion

The research found that construction service businesses with good management (high managerial ability) tend to be more able to comply with sustainable construction regulations (positive correlation). The construction sector plays an important role in Indonesia's economic and social development. With increasing awareness of the importance of sustainability, implementing sustainable construction principles has become necessary. On the other hand, construction services businesses with small qualifications face various challenges in meeting strict regulations and adapting to sustainable practices. Based on the survey results, evaluate

the extent to which construction services regulations are implemented.

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