JCEP - UIB

Contents list available at the journal.uib.ac.id

Journal of Civil Engineering and Planning

Journal homepage:https://journal.uib.ac.id/index.php/jce

Research Journal

Analysis Of Factors In Tenders For Procurement Of Construction Goods/Services Using The E-Catalogue System

Krisna Rendi Awalludin[1], I Nyoman Dita Pahang Putra[2],

[1,2]Civil Engineering, Faculty of Engineering, University of Pembangunan Nasional Veteran Jawa Timur

Correspondence email: krisnarendi15@gmail.com

ARTICLE INFO

Keywords:

Procurement of Goods / Services
E-catalogue
Construction Company

ABSTRACT

The government is updating regulations for procuring goods and services by introducing an e-catalogue system in the auction/tender process. Construction companies need to study the factors in tenders for the Procurement of construction goods/services using the e-catalogue system to ensure that the tender process using the e-catalogue system runs well and optimally. This research aims to analyze the factors in tenders for the Procurement of construction goods/services using the e-catalogue system. The method used was distributing questionnaires to small construction companies in Jombang Regency to collect data for further analysis. Based on data analysis, four factors were obtained, namely human resource factors (X1), principles of Procurement of goods and services (X2), infrastructure condition factors and e-catalogue support system arrangements (X3), and benefits factors for implementing e-catalogues (X4). The results were then tested for validity and reliability to ensure the validity and reliability of the data. Further analysis was carried out using descriptive analysis methods and Pearson correlation analysis. The results of the descriptive analysis show that the highest factor in tenders for the Procurement of construction goods/services using the e-catalogue system is the human resources factor (X1), with a mean value of 3.620 and a standard deviation value of 0.047. According to the research outcomes regarding Pearson correlations the relationship between factors that has the highest correlation value is (X1) with (X3) both have a strong correlation with a correlation value of 0.771. The relationship between factors and indicators that have the highest correlation value is (X1) with the indicator of (X1.4), both of which have a solid correlation relationship with a correlation value of 0.913. The relationship between indicators that have the highest correlation value is the indicator (X1.3) and the indicator of (X1.4) both have a strong relationship with a correlation value of 0.759.

Received 15 June 2024
Available online 25 June 2024
Published by UIB Civil Engineering Undergraduate Study Program

1. Introduction

The progress of the era of globalization goes hand in hand with advances in digital technology. In the increasingly rapid development of the digital era, data, information, and knowledge can be quickly created and disseminated to all levels of society. This technology has many things to make human work and tasks easier in various fields. The critical role of this technology is bringing human civilization into the digital era.

To foster good governance, combat corruption, and embrace technological advancements, the government has revamped regulations, specifically concerning the procurement of goods and services, encompassing auctions/tenders. Auctions/tenders were originally conducted through conventional methods. However, many things could be improved regarding the implementation of procurement principles and provisions. So many deviations above from the e-catalogue are enforced in the current auction/tender process. It is hoped that the e-catalogue can overcome these problems and keep up with technological developments in the digital era[1].

The enforcement of Presidential Regulation Number 12 of 2021, which revises Presidential Regulation Number 16 of 2018 regarding Government Procurement of Goods/Services, involves altering the guidelines for Product Selection in the catalog. This means the transfer of Catalog Management responsibility provisions from the Ministry/Institution/Regional Government or LKPP. This led to removing the product selection process outlined in the catalog via negotiation or tender. Instead, the Verifier Team employed a verification approach. The team's primary role is to validate the sufficiency and thoroughness of documents/proposals, ensuring they align with the qualification criteria for business actors and the technical specifications for goods/services, as specified in the e-catalogueue requirements. Additionally, the prices/services featured in the e-catalogue are determined by the Catalog Provider as the Highest Unit Price [2].

In construction work, selecting a construction company, especially in procuring government goods/services, always goes through an auction/tender process. In order to remain competitive across diverse regions, construction companies must elevate productivity, improve quality, and optimize resource allocation. Additionally, they should embrace digital innovations such as updating auction/tender processes using e-catalogues, all while ensuring adherence to evolving regulatory requirements.

The auction/tender process is a construction company's first step in building a construction project. In this case, small, medium, and large construction companies must use e-catalogues in the auction/tender process. Construction companies should thoroughly understand the factors involved in tenders for procuring construction goods and services through the e-catalogue system to ensure the auction or tender process operates smoothly and efficiently.

Based on the background described above, the researcher took the research title " Analysis Of Factors In Tenders For Procurement Of Construction Goods/Services Using The E-Catalogue System." This study aims to determine the factors in the tender for the procurement of goods/construction services with the e-catalog system and determine the relationship between factors, between factors and indicators, and between indicators in the tender for the procurement of goods/construction services with the e-catalog system.

2. Literature review

2.1 Construction Projects

A construction project is work with special implementation requirements and a clear end goal. Implementation requirements, including costs, quality, and completion time, must be met from the start [3].

Projects have a temporary, unique, and progressive nature with the aim of producing something concrete. Projects involve a series of interrelated tasks, which must be completed within a specified time and meet various requirements and constraints such as cost, quality, and performance according to a predetermined plan. Each project is a temporary and gradual effort, and each result is unique. Starting a project requires careful planning, including the stages of the construction goods/services procurement process, project work with scheduling, which includes a time frame from the start of implementation to the completion stage, and effective resource management [4].

The Construction Services Development Institute Regulation Number 2 of 2013 states that registration of a construction services business involves two main stages: classification and qualification. The classifications are as follows:

a. K1 Qualification: Rp—50 million to 300 million net worth.
b. K2 Qualifications: Have a net worth of between Rp. 100 million to 800 million.
c. K3 Qualifications: Have a net worth of between Rp. 400 million to 1 billion.
d. M1 Qualification: A net worth of Rp. 1 billion to 10 billion.
e. Qualification B1: Possess a net worth ranging from Rp. 3 billion to Rp. 25 billion.
f. Qualification B2: Have a net worth exceeding Rp. 10 billion.

2.2 Procurement of goods and services

To enhance the quality of human resources in Indonesia, the government partners with various institutions to procure goods and services. Additionally, the government is committed to fostering a just society. Fulfilling this responsibility ensures the provision of essential goods, services, and infrastructure. As the overseer, the government must manage the procurement process and implement policies to maintain stability [5].

Government procurement of goods and services is crucial for development. Indonesia's advancement in multiple sectors is closely linked to this process. Economically, government procurement often enables infrastructure projects that stimulate growth. In the social realm, it significantly improves health facilities, education, and poverty alleviation, thereby tackling various social issues. With the rapid economic expansion and increasing regional autonomy in Indonesia, the government's administrative requirements are growing, both in material and non-material aspects, as reflected in the procurement activities [6]. Presidential Regulation 54 of 2010 concerning the Government Procurement of Goods/Services in Indonesia stipulates that procurement must adhere to the principles of efficiency, effectiveness, transparency, openness, competitiveness, fairness/non-discrimination, and accountability.

2.2.1 History of Procurement of Goods and Services

At the outset, procuring goods and services followed a conventional approach, where users or the relevant committee bore direct responsibility. However, in practice, deviations from the principles and regulations outlined in Presidential Decree 80 of 2003 regarding government procurement of goods and services were common. These deviations can be administrative violations or corruption detrimental to state finances. In 2005, media sources reported that the sector of goods/services procurement saw the

highest incidence of corruption, with 66 cases identified. This was followed by corruption in the council budget sector, which had 58 cases, and the infrastructure sector, with 22 cases [7].

The Government Goods/Services Procurement Policy Institute points to several reasons for this problem, including non-transparent auction announcements, manipulation in the bidding process, breaches of procurement procedures, committee interference, preparation of specifications or procurement documents that advantage specific parties, and the committee being distracted by extra duties. These irregularities are usually related to administration and budgeting, such as corruption, collusion, and budget increases detrimental to state or regional finances [8].

Conventional procurement processes are characterized by extended timelines and are seen as inefficient regarding both time and financial resources. They often lack adequate information dissemination and foster limited competition, compromising procurement quality. Furthermore, such practices may exclude potential suppliers while granting undue privileges to select ones. The numerous issues encountered in the conventional procurement of goods/services can be categorized as follows: insufficient oversight, power abuses, contract irregularities, collusion between public officials and suppliers, manipulation and opacity, and deficiencies in human resources [8]. Considering the various deviations above and keeping them in line with advances in science and technology, procuring goods/services can be carried out via the internet (electronically), called e-catalogue.

Procurement of goods and services, also known as a tender or auction, is conducted through various methods, such as selecting the top construction services for a development project. These tenders or auctions play a crucial role in the procurement of goods, services, and infrastructure and in updating policies to enforce good governance.

2.3 E-catalogue

As per Presidential Regulation Number 12 of 2021, revising Presidential Regulation Number 16 of 2018 on Government Procurement of Goods/Services, an e-catalogue refers to an electronic platform containing detailed lists, types, technical specifications, and prices of specific goods/services offered by various providers, including government services. In line with Regulation Number 9 of 2021 issued by the Government Procurement Agency (LKPP) regarding Online Shops and Electronic Catalogs in Government Procurement of Goods/Services, e-catalogues are integral components of the electronic procurement system administered and overseen by the Directorate of Electronic Procurement System Development (LPSE) within the Government Goods/Services Procurement Policy Institute (LKPP). This e-catalogue aims to facilitate electronic procurement services for goods and services across all government bodies, encompassing ministries, institutions, and regional agencies [9].

3.6.1 Type E-catalogue

Within the procurement process for goods and services, electronic catalogues are categorized into three distinct types [9] among others:

1. The National Electronic Catalog is a catalog compiled and managed by LKPP. LKPP is responsible for managing and maintaining this catalog at the national level. This electronic catalog covers all the interests of the Indonesian state.
2. Each ministry and institution compiles and manages sectoral electronic catalogs. Compared to national sectoral e-catalogues' the scope is more limited than more limited.

3. The Regional Government manages the Local Electronic Catalog and has compiled an electronic information catalog. The criteria for goods in the local E-catalogue tend to be repetitive and standard.

The Electronic Catalog contains goods/services required by several Ministries/Institutions/Regional Apparatus, is standard or can be used as a standard, and is repetitive. LKPP provides details, including lists, brands, types, technical specifications, prices, and quantities of goods/services accessible in the National Electronic Catalogue via an application they've developed on https://e-katalog.lkpp.go.id Within the procurement process for goods and services, electronic catalogues are categorized into three distinct types [10].

3.6.2 Benefits of E-catalogue

Despite potential challenges, e-procurement highlights the potential of technology to address and resolve issues in the government's acquisition of products and services[11]. Some of the many advantages of electronic procurement include:

1. Electronic purchasing enhances consumers' ability to shop and fosters competitive pricing through improved transparency, better prices, and more effective interaction patterns.
2. E-procurement offers significant advantages, including convenience and security. It also provides reassurance that the winning supplier is selected through a transparent and accountable bidding process.
3. E-procurement encourages business actors to adopt a culture of continuous skill improvement.
4. Additionally, e-procurement offers unexpected benefits. It documents every step of the procurement process, from the initial bid call to the final selection.
5. With increasing emphasis on IT infrastructure, e-procurement enables tracking and evaluation of performance metrics for government procurement of goods/services from various perspectives.
6. E-procurement also allows stakeholders to become more familiar and comfortable with modern information technologies.

3.6.3 E – Purchasing

The government can procure goods/services electronically via e-tendering or e-purchasing via E-catalogue[1].

1. E-purchasing entails acquiring goods/services via an e-catalogue platform. Presidential Regulation 54 of 2010 mandates that every government agency must conduct procurement through e-purchasing. This method is overseen by the Procurement Officer/PPK or an official designated by the Head of the Agency/Institution [12].

The E-Purchasing system in Indonesia is accessible either through the website https://e-katalog.lkpp.go.id or through local catalogues available in various regions. Although Presidential Regulation Number 54 of 2010 mandates E-purchasing implementation, its adoption remains optional, and the range of commodities listed in the Catalog is still limited. As a result, its use is still not well realized in the procurement of goods/services in Indonesia.

3. Method

3.1 Method of collecting data

This research was conducted by distributing questionnaires to small construction companies in Jombang Regency. Data collection aims to identify and analyze factors in tenders for procuring construction goods/services using the e-catalogue system. This research uses data from literature

studies and interviews/discussions with questionnaires with small-scale contractors in Jombang Regency.

3.2 Research variable

This study determined research variables by identifying factors in tenders for procuring construction goods/services using the e-catalogue system and using literature studies from various related journals. The table below displays 4 factors and 19 indicators:

Table 3.1 Identification of variable factors in tenders for Procurement of construction goods/services using the e-catalogue system

Factor	Variable No	Indicator
Human Resources (X1)	X1.1	Level of IT personnel capability to carry out the E-catalogue process
	X1.2	Personnel forgot username and password on the E-catalogue system.
	X1.3	The level of personnel ability to know the purchasing flow in the E-Purchasing Goods and Services Procurement on the E-catalogue menu
	X1.4	The level of personnel's ability to know the E-catalogue features
Principles of Procurement of Goods and Services (X2)	X2.1	The implementation of e-catalogue applies the principles of efficient Procurement of goods and services.
	X2.2	The implementation of e-catalogue applies the principle of Procurement of goods and services effectiveness.
	X2.3	The implementation of e-catalogue applies the principle of transparent Procurement of goods and services.
	X2.4	The implementation of e-catalogue applies the principle of open Procurement of goods and services.
	X2.5	The implementation of e-catalogue applies the principle of competitive Procurement of goods and services.
	X2.6	The implementation of e-catalogue applies the principles of fair Procurement of goods and services.
	X2.7	The implementation of e-catalogue applies the principle of accountable Procurement of goods and services.
Infrastructure Conditions and E-catalogue Support System Arrangements (X3)	X3.1	Capacity and supporting information still need to explain the E-catalogue.
	X3.2	E-catalogue bandwidth, which creates obstacles in the upload process
	X3.3	Socialization of the Use of E-catalogues in Construction Services
	X3.4	Use of E-catalogue for data and payment security during tenders
	X3.5	The process of negotiating government prices with service providers
Benefits of Implementing E-catalogue (X4)	X4.1	The use of E-catalogue for KKN that occurs during conventional tender selection
	X4.2	The use of E-catalogue is compared with conventional systems in terms of time.
	X4.3	Use of E-catalogue on Contractor Profits

Source: Data Processing, 2024

3.3 Data processing

Completing the questionnaire by respondents produces data, which is then processed and analyzed. In this research, the data processing methods used include validity tests, reliability tests, descriptive analysis, ranking analysis, and Pearson correlation analysis.

3.4 Validity test

Validity testing is a method for determining the validity of a measuring instrument, such as a questionnaire. A questionnaire is deemed valid if its questions accurately represent what it is intended to measure [13]. The validity test criteria are as follows: if the computed r-value (r count) surpasses the critical r-value (r table), the question in the examination is regarded as valid. Conversely, if the r count falls below the r table, the question is deemed invalid.

3.5 Reliability Test

Reliability testing tests the consistency of a measuring device, ensuring consistent results under the same conditions. A tool is considered reliable if it produces constant and accurate values. In research, reliability is tested using Cronbach's Alpha (α) value to assess the consistency of items or questions[14]. In this test, researchers used a reference from Cronbach's Alpha of 0,70. A Cronbach's Alpha value exceeding 0.70 signifies a high level of reliability.

3.6 Descriptive Analysis and Ranking Analysis

This research used descriptive analysis to process questionnaire data using the average value (mean) and standard deviation method. This analysis is then continued with ranking analysis. Ranking analysis is a method used to determine the factors in tenders for the Procurement of construction goods/services using the e-catalogue system that has the highest value based on the average value (mean), which is used to determine the order or ranking of the factor values.

3.7 Pearson Correlation Analysis

Pearson correlation assesses the relationship between two variables with a normally distributed interval or ratio scale. The correlation coefficient can be between -1, 0, and 1, indicating negative, no, or positive correlation[15]. The essential decision of this test The fundamental decision of the test is shown that if the significance value is <0.05, then the two variables are correlated. The two variables are not correlated if the significance value is >0.05 [16]. The criteria for the degree of correlation are as follows: value 0.00 - 0.19: Very weak relationship, 0.20 - 0.39: Weak relationship, 0.40 - 0.59: Moderate relationship, 0.60 - 0.79: Strong relationship, and 0.80 - 1.00: Very strong relationship.

4. Results and Discussion

4.1 Respondent Description

This research distributed questionnaires directly to small-scale contractors who are members of two Jombang Regency associations, ASKOSNAS and GAPENSI. ASKONAS Jombang Regency has 22 member construction companies, while GAPENSI Jombang Regency has 28 member construction companies. Overall, 50 construction companies from the two associations are involved. The number of respondents collected was 27 respondents.

4.2 Validity test

Validity testing is a technique used to evaluate the accuracy of a measuring instrument, such as a questionnaire. To ensure it effectively captures the intended information. In this study, 27 respondents

from construction companies in Jombang Regency participated. The r table value used was 0.3809. The validity test outcomes are depicted in the image provided below:

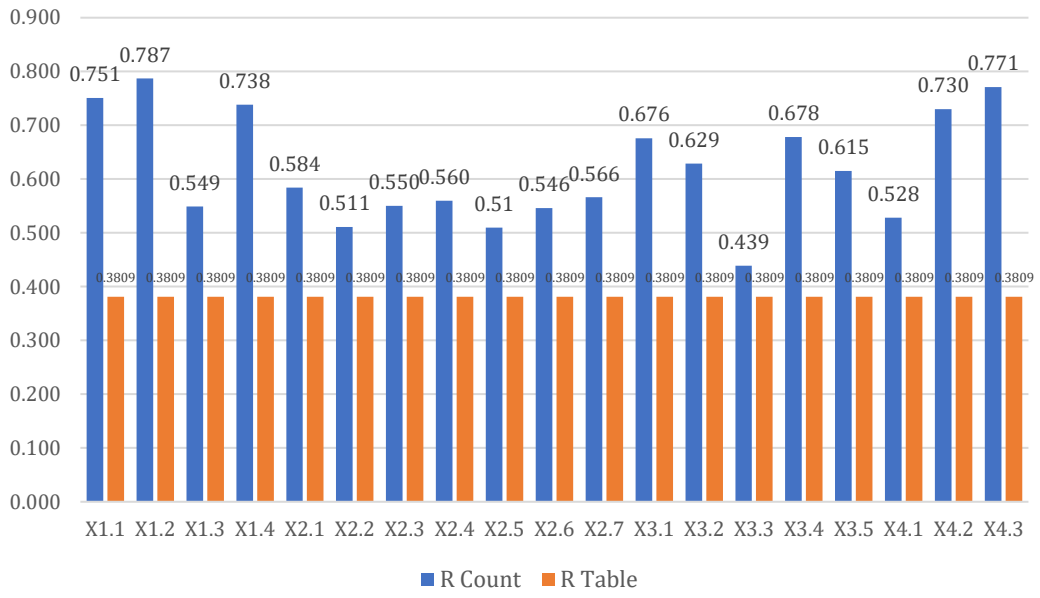

Figure 1 Validity Test Results
Source: Data Processing, 2024

From the picture above, it can be concluded that 19 indicators with 4 factors are the focus of the research. Each item in this variable shows a calculated r-value higher than the table r-value, indicating that the data used in this study are valid.

4.3 Reliability Test

In this research, the reference standard used was a Cronbach's Alpha of 0.70. Testing was performed to assess all factors and indicators by comparing their reliability coefficients with Cronbach's Alpha value. The reliability test outcomes are presented in the table provided below:

Table 4.1 Reliability Test Results

Reliability Test		
Reference Value	**Cronbach's Alpha value**	**Information**
0.70	0.906	Reliable

Source: Data Processing, 2024

From the data in the table above, Cronbach's alpha value is 0.906, which means 0.906 > 0.70. Thus, the questionnaire for factors in tenders for the Procurement of construction goods/services using the e-catalogue system is declared reliable.

4.4 Descriptive Analysis and Ranking Analysis

The descriptive analysis conducted in this study seeks to ascertain the average and standard deviation for each factor associated with the procurement of construction goods and services utilizing the e-catalogue system. Mean value serves as an indicator of the highest ranking for each factor in this procurement process. The outcomes of the descriptive analysis for factors in the procurement of construction goods and services via the e-catalogue system are displayed in the table below:

Table 4.2 Results of Descriptive Analysis and Ranking Analysis of Factors in Procurement of Construction Goods/Services with the E-catalogue System

Factors in Procurement of Construction Goods / Services Using the E-catalogue System				
No	**Indicator**	**Mean**	**elementary school**	**Rank**
X1	Human Resources	3,620	0.047	1
X2	Principles of Procurement of Goods and Services	3,413	0.161	3
X3	Infrastructure Conditions and E-catalogue Support System Arrangements	3,533	0.145	2
X4	Benefits of Implementing E-catalogue	3,111	0.417	4
$\bar{X}$ *Mean*			3,419	
$\bar{X}$ *Standar Deviasi*			0.192	

Source: Data Processing, 2024

According to the table provided, human resources are the primary factor in procuring construction goods and services through the e-catalogue system, as practised by construction companies in Jombang Regency. This factor obtained the highest ranking, with a mean value of 3.620 and a standard deviation of 0.047.

Based on the questionnaires filled out by respondents, according to the majority of respondents, the use of a new system in tenders for the Procurement of construction goods/services using e-catalogues makes human resources the most influential factor. To continue to exist, construction companies must follow policy updates and developments in the construction world, including updates in the tender process. Therefore, human resources in every construction company play an essential role. They must quickly understand and follow updates to the tender process so that construction companies continue to procure construction goods and services.

4.5 Analysis of Pearson Correlation Between Factors

Analysis of the Pearson correlation between factors contains 4 factors. The table below displays the outcomes of the Pearson correlation testing conducted between factors.

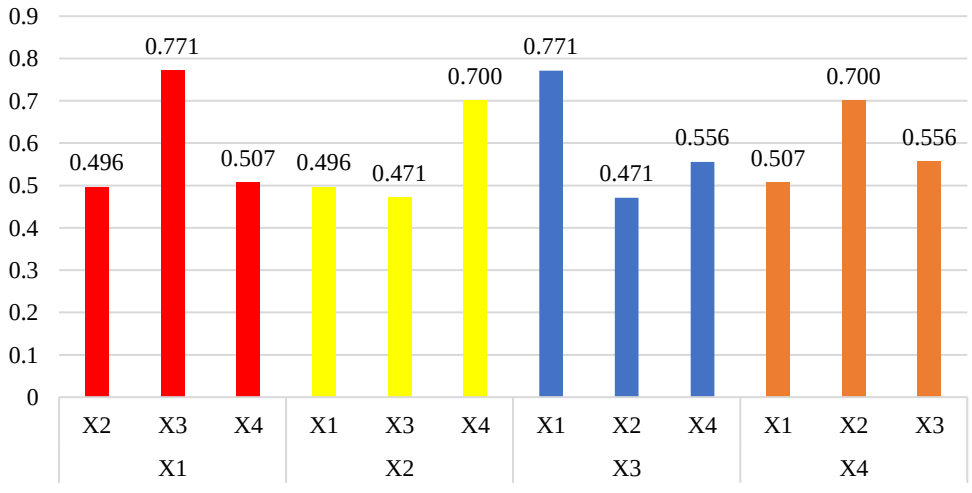

Figure 2 Results of Pearson Correlation Testing Between Factors
Source: Data Processing, 2024

According to the table provided, it can be inferred that the results of the Pearson correlation test among factors suggest the highest correlation between factors X1 (Human Resources Factor) and X3 Infrastructure Conditions and E-catalogue Support System Arrangements), which exhibits a strong correlation value of 0.771.

Based on the aforementioned research outcomes, it can be deduced that there exists a substantial association between factors such as human resources, infrastructure conditions and E-catalogue Support System Arrangements. Both factors are interrelated as the introduction of the e-catalogue represents a novel system in the tender process for the procurement of construction goods and services. This encourages human resources in construction companies to immediately adapt to the new system so that the company remains competitive in tender activities. So that human resources can adapt quickly, it is essential to ensure that the infrastructure and e-catalogue support systems function well. This includes socializing the use of e-catalogues in construction companies, providing information about e-catalogues, and ensuring that e-catalogue bandwidth is adequate so that construction companies' uploading process to the storefront runs smoothly and does not hamper human resources in carrying out their activities.

4.6 Analysis of Pearson Correlation Between Factors and Between Indicators

Analysis of the Pearson correlation between factors and indicators: 4 factors and 19 indicators. The results of testing the Pearson correlation between factors and indicators are shown as follows:

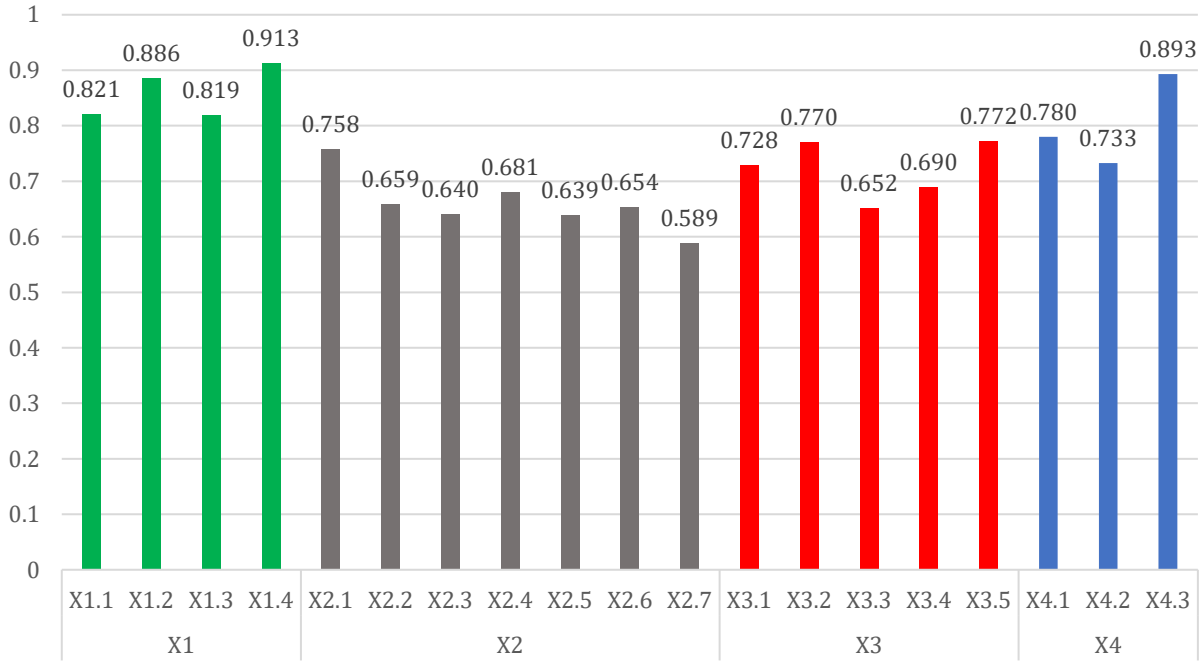

Figure 3 Results of Pearson Correlation Testing Between Factors and Indicators
Source: Data Processing, 2024

The image provided shows that the Pearson correlation test results between factors and indicators demonstrate the highest correlation value, namely between factor X1 (Human Resources Factor) and indicator powerful with a correlation value of 0.913. This is due to the critical role of human resources in implementing the Procurement of construction goods/services via e-catalogue. Construction companies need expert human resources to upload or log into an e-catalogue account. The essential capability required by human resources is to understand the e-catalogue features so that human

resources can carry out tenders using the e-catalogue system effectively. Thus, it can be concluded that the principle factors for procuring goods and services and indicators of the level of personnel ability to know the features of the E-catalogue have a solid relationship.

4.7 Analysis of Pearson Correlation Between Indicators

Analysis of the Pearson correlation between indicators contains 4 factors and 19 indicators. The results of testing the Pearson correlation between indicators are shown in the picture below:

4.7.1 Analysis of Pearson Correlation Between Human Resource Factor Indicators (X1)

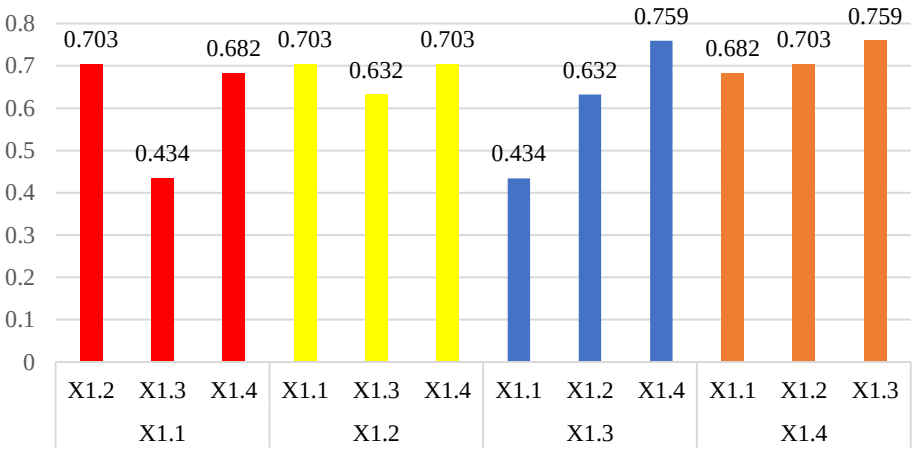

Figure 4 Results of Pearson Correlation Testing Between Human Resource Factor Indicators (X1)
Source: Data Processing, 2024

The image provided shows that the Pearson correlation test results among indicators concerning human resource factors demonstrate the highest correlation value between indicators X1.3 and X1.4. Both indicators display a strong relationship, with a correlation value of 0.759.

4.7.2 Analysis of Pearson Correlation Between Principle Factor Indicators for Procurement of Goods and Services (X2)

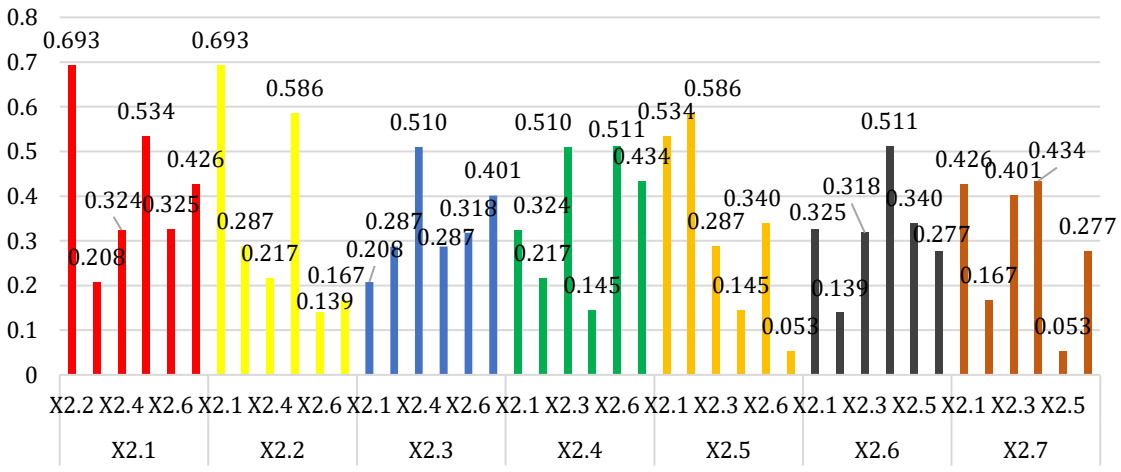

Figure 5 Pearson Correlation Test Results Between Principle Factor Indicators for Procurement of Goods and Services (X2)
Source: Data Processing, 2024

Based on the picture above, it can be stated that the results of the Pearson correlation test between indicators on the principles of goods and services procurement show the highest correlation value, namely between indicator X2.1 and indicator X2.2 both have a strong relationship with a correlation value of 0.693.

4.7.3 Analysis of Pearson Correlation Between Indicators of Infrastructure Condition Factors and E-catalogue Support System Arrangements (X3)

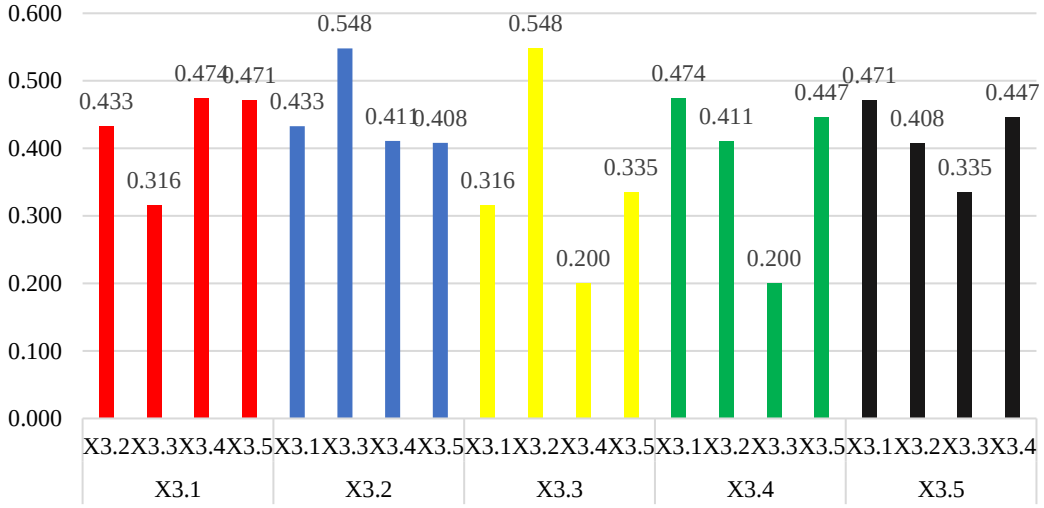

Figure 6 Results of Pearson Correlation Testing Between Indicators of Infrastructure Condition Factors and E-catalogue Support System Settings (X3)

Source: Data Processing, 2024

From the image above, it can be inferred that the results of Pearson correlation testing among indicators on infrastructure condition factors and e-catalogue support system settings show the highest correlation relationship value, namely between the X3.2 indicator (E-catalogue bandwidth, which creates obstacles in the upload process) and the indicator X3.3 (socialization of the use of E-catalogue in construction services) both have a moderate relationship with a correlation value of 0.548.

4.7.4 Analysis of Pearson Correlation Between Factor Indicators Benefits of Implementing E-catalogue (X4)

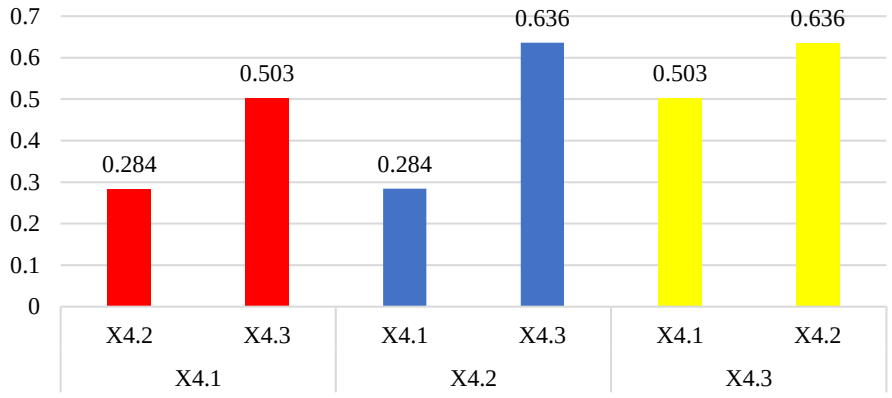

Figure 7 Results of Pearson Correlation Testing Between Benefit Factor Indicators of E-catalogue Implementation (X4)

Source: Data Processing, 2024

Based on the picture above, the results of the Pearson correlation test between indicators on the benefits factor of implementing e-catalogues show the highest correlation value, namely between indicator X4.2 (use of E-catalogues compared to conventional systems in terms of time) and indicator X4.3 (Use of E-catalogue on contractor profits), which both have a strong relationship with a correlation value of 0.636.

5. Conclusions and recommendations

5.1 Conclusion

The examination of factors in the procurement process for construction goods and services through the e-catalogue system leads to several conclusions, as follows:

1. Based on the research findings and descriptive analysis, 4 factors were obtained in tenders for the Procurement of construction goods/services using the e-catalogue system, namely: human resource factors (X1), principle factors for Procurement of goods and services (X2), infrastructure condition factors and supporting system arrangements e-catalogue (X3), and the benefit factor of implementing e-catalogue (X4). The factor with the highest value is the human resources factor (X1), with a mean value of 3.620 and a standard deviation value of 0.047.
2. According to the research outcomes regarding Pearson correlations between factors, between factors and indicators, and between indicators, the following results were obtained: the relationship between factors that has the highest correlation value is the human resources factor (X1) with the infrastructure condition factor and e-catalogue support system settings (X3) both have a strong correlation with a correlation value of 0.771. The relationship between factors and indicators that have the highest correlation value is the human resources factor (X1) with the indicator of the level of personnel ability to know the E-catalogue features (X1.4), both of which have a solid correlation relationship with a correlation value of 0.913. The relationship between indicators that have the highest correlation value is the indicator of the level of personnel's ability to know the purchasing flow in e-purchasing goods and services on the e-catalogue menu (X1.3) and the indicator of the level of personnel's ability to know the e-catalogue features (X1.4) both have a strong relationship with a correlation value of 0.759

5.2 Suggestion

Derived from the conducted research, researchers put forward several suggestions as follows:

1. Further research is needed on medium and large construction companies.
2. Further research is needed to categorize construction work, such as building work, roads, and water resources.

Thank-you note

The author would like to thank the Civil Engineering Lecturer at the National Development University "Veteran" East Java.

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