International Journal of Research in Engineering and Science (IJRES)
ISSN (Online): 2320-9364, ISSN (Print): 2320-9356
www.ijres.org Volume 12 Issue 7 ǁ July 2024 ǁ PP. 165-174

Factors Influencing the Success of E-Tendering Implementation (Case Study in Parigi Moutong Regency, Central Sulawesi Province)

Devhi, Fahirah F., I Wayan Sutapa

Abstract
The selection of goods and services providers through electronic tendering (e-tendering) in government projects has been carried out in Indonesia for a long time. Parigi Moutong Regency is one of the regencies that extensively uses the e-tendering system to select goods and services providers. To achieve the successful implementation of e-tendering, there are factors that influence its implementation. This descriptive research was conducted by collecting data from 55 contractor respondents who participated in the e-tendering process in Parigi Moutong Regency and processing data use factor analysis. The readiness of technology and human resource competence in e-tendering, the evaluation and managerial support in e-tendering implementation, and the enhancement of technology and managerial competence in e-tendering are three factors those influence of implementation of e-tendering.

Keywords: *e-tendering, success, factor analysis.*

Date of Submission: 08-07-2024 Date of acceptance: 21-07-2024

I. INTRODUCTION

The selection of goods and services providers (tender) for government projects is an activity that began to be used in Indonesia since 2003. The use of the e-tendering system then became increasingly widespread in line with government efforts to improve transparency and efficiency in the procurement process of goods and services [14].

Since 2012, all types of government procurement of goods and services in Indonesia have officially used the electronic procurement system (e-tendering). This was implemented with the aim of making the selection process of goods and services providers faster and easier for public oversight [13].

In its implementation, electronic tendering can be considered successful if both the service user and the service provider have agreed on the price offered by the service provider to perform the work for the service user. The success of the electronic tendering process in Parigi Moutong Regency is influenced by several factors [22].

II. LITERATURE REVIEW

This section presents a review of relevant literature pertaining to the research topic.

2.1 Definition Of E-tendering

Government procurement of goods/services, hereinafter referred to as procurement of goods/services, is an activity to obtain goods/services by Ministries/Institutions/Regional Work Units/Institutions, with a process that begins from needs planning until the completion of all activities to acquire the goods/services [18]. E-tendering is an electronic system for procuring goods and services that aims to enhance transparency and accountability, improve market access and fair business competition, increase the efficiency of the procurement process, support monitoring and audit processes, and meet the need for real-time information access [1].

2.2 Success Factors of E-Tendering Implementation

According to [10], there are three factors that influence the success of e-tendering implementation, which are:

1. Management and organizational

Generally, the success of e-tendering relies heavily on organizational and managerial issues. It is seen that the mere introduction of technology does not make e-tendering succeed, organizational and supportive managerial mechanisms/elements play a determinative role. Effective implementation requires a comprehensive strategy that considers organizational, managerial, and technical variables in tandem [22].

2. Technological and Information System

The driving factors behind the implementation of e-tendering Technology and information issues are basic to a successful implementation and roll-out plan. The entire e-tendering is technology oriented and hence

the efficiency of that will be determined by how good or suitable it can function with respect to a particular location. It is crucial to consider the implementation of e-tendering for its potential success factors that are mostly connected with technological and informational elements allowing a system dependability, safety, while it provides ease-of-use [8].

3. Human Resources

The effectiveness of the electronic procurement system is not only in its existing technology and infrastructure but also in terms of capacity and quality for individuals involved. Skilled human resources in the procurement of goods and services denote ideal human resources to perform well with required skills, attitudes, and knowledge for this purpose [21].

2.3 Factor Analysis

Factor analysis is a multivariate static analysis technique to reduce the number of data or variables to a smaller amount. Data reduction is done by reviewing the independence of several variables or factors that can be combined into a new variable, so that from a few variables, the dominant or most important variables can be obtained for further analysis [9]. To describe the research data on the factors influencing the success of e-tendering implementation used the SPSS (Statistical Package for the Social Sciences) program application. The stages of factor analysis are as follows:

1. Selection Factors

The purpose of choosing this analysis factor is to find the relation a group of factors or to calculate the magnitude of the correlation between factors. In this research, the Bartlett test of sphericity, the Kaiser-Meyer-Olkin (KMO) measure of sample adequacy, and the Measure of sample Adequacy (MSA) are used. According to [20] Data can be further tested if the KMO test result obtains a value > 0.5 and Bartlett's test significance value < 0.05. To determine if the variables are sufficient for additional analysis, a Measure of Sampling Adequacy (MSA) value must be performed. The variable is suitable for additional investigation if the MSA value is higher than 0.5 [15]. If there is an MSA value from the initial variables that is less than 0.5, the variable must be removed one by one from the analysis and sorted from the variable with the smallest MSA value until all the variables are higher than 0.5 [6].

2. Determining Number of Factors

There are three criteria will be combined to create the number of factors, which will be the most appropriate amount based on the research findings. The first criterion applied is the eigenvalue. Factors with an eigenvalue > 1.0 will be kept, while those with an eigenvalue < 1 will be excluded. When a factor has an eigenvalue < 1.0, it explains less variance than a single variable, making it potentially less meaningful in the overall factor structure [2]. According to [23] Finding the percentage of the total variation that the number of components produced can explain is the second criterion. Factor extraction can be terminated once the cumulative percentage of variance is either greater than half of the total variance of the beginning factor or sufficient. And third criterion based on the Scree plot. Scree plot is a graph that show the extraction of number of factors against eigenvalues.

3. Rotation of Factors

Rotation of factors is a process that use for increasing interpretation capabilities and simplifying the factors. There are two main types of factor rotation, those are orthogonal rotation and oblique rotation. In this research using orthogonal rotation method, which is this method is a rotation that can be enable the factors to correlate with each other [6]. The result of this method is reduction of the number of variables without considering how significant the extracted components are. Because the axes are perpendicular to each other, each factor is independent of the other factors.

According to [12] orthogonal rotation is divided into 3 types, Quartimax, Varimax, and Equimax methods. The varimax method focuses more on simplifying the column structure of the factor analysis result matrix. As a result, this method tends to produce several factor loadings with values close to -1 or +1 and several factor loadings with values close to 0 [15] which are used in this research.

4. Interpretation The Result of Factor Analysis

After step of rotation factor is to determine the significant of the loading factor value. This step is used in figuring out how to organize variables into relevant aspects. Grouping the variables in this research was carried out by including the variables with the highest loading factor values into the new factor where those variables belong [7].

5. Factor Naming

Determining factors involves identifying the main factor and assigning a generic name to each component [17].

III. RESEARCH METHODS

The background information on the variables influencing the implementation of e-tendering opens this section. To verify that the measurement results are consistent, validity and reliability tests are conducted. Factor analysis was used to determine the most important and affecting factors in this study.

3.1 Techniques For Collecting Data

A survey using questionnaires was conducted to the construction implementation companies registered with the Parigi Moutong Regency's procurement service unit in period 2020 - 2022. The questionnaire survey was created with a 6-point Likert scale to collect information on twenty variables influencing the implementation of e-tendering in Parigi Moutong Regency. The researcher had to overcome a few challenges to gather the data for this research, which made the process take a while.

3.2 Data analysis Technique

Data analysis is the following phase of the research process. Research methodologies and research kind have a significant impact on the data analysis approach. In this research, making use of SPSS software version 27 to do the validity test, reliability tests, and factor analysis were the methods used to analyze the data.

IV. RESULT AND DISCUSSION

Respondents in this research are construction implementation service providers (contractors), in this case contractors with e experience following e-tendering were implemented in Parigi Moutong Regency between 2020 and 2022. 55 respondents in total who completed and returned the questionnaire were included in this study.

4.1 Respondent Characteristics

The following lists a few characteristics of respondents who have generally completed the questionnaire, separated out by experience, the average budget amount of the work, and their most recent educational attainment.

Table 1. Respondent Characteristics Based on Experience

Experience	Number	Percentage
< 3 Years	19	34,5%
3 – 5 Years	31	56,4%
5 – 7 Years	4	7,3%
> 7 Years	1	1,8%
Total	55	100%

Table 2. Respondent Characteristics Based on The Average Budget

Budget	Number	Percentage
1 – 2 billion	29	52,7%
2 – 5 billion	26	47,3%
Total	55	100%

Table 3. Respondent Characteristics Based on Education Level

Experience	Number	Percentage
SMA and equivalent	9	16,4%
Diploma/Bachelor	45	81,8%
Magister/Doctor	1	1,8%
Total	55	100%

4.2 Validity Test

Validity test is a process of determining the extent to which a measurement instrument (such as a questionnaire, test, or other measuring tool) accurately measures what it is supposed to measure. Stated differently, the purpose of the validity test is to ascertain whether the instrument truly measures the variable or construct which it is meant to measure [9]. This research is used Pearson Correlation Technique. If the table r value is smaller than calculated r value, then data is valid and vice versa. The table r value for 55 respondents is 0,261 with confident interval amount 95% and level of significance is 0,05.

Table 4. Validity test

Variables	Calculated r	Table r	Description
Top Management Support (MO1)	0,537	0,261	Valid
Evaluation of Management Performance (MO2)	0,574	0,261	Valid
Work Environment and Culture (MO3)	0,293	0,261	Valid
Allocation of Appropriate Resource (MO4)	0,269	0,261	Valid
Organizational Management System (MO5)	0,564	0,261	Valid
Loyalty Employee to the Organization (MO6)	0,285	0,261	Valid
Speed of Internet Service Usage	0,671	0,261	Valid

(STI1)			
Improvement of Hardware System (STI2)	0,570	0,261	Valid
Website Security System (STI3)	0,645	0,261	Valid
Entire Work Information (STI4)	0,366	0,261	Valid

Table 4. Validity test (continue)

Variables	Calculated r	Table r	Description
Authentication and Authorization Data (STI5)	0,684	0,261	Valid
Website Maintenance Routine (STI6)	0,580	0,261	Valid
Adequate Power Supply (STI7)	0,442	0,261	Valid
Understanding of E-tendering Rules & Standards (SDM1)	0,483	0,261	Valid
Understanding of E-tendering Procedures (SDM2)	0,539	0,261	Valid
Understanding of ICT Systems (SDM3)	0,519	0,261	Valid
Experience in E-tendering Implementation (SDM4)	0,565	0,261	Valid
Training of E-tendering Implementation (SDM5)	0,554	0,261	Valid
Understanding of E-tendering Functions and Objectives (SDM6)	0,589	0,261	Valid
Ability to Use E-tendering Applications & Websites (SDM7)	0,718	0,261	Valid

From Table 4 shows that each variable has a measured r-value that is higher than the table r-value. This confirms the validity of each variable.

4.3 Reability Test

According [15] Reability Test is a test used to determine the degree of consistency in measured data is called a reliability test. Finding the measurement instrument's consistency or reliability. When used consistently under the same circumstances at several periods, a trustworthy instrument will yield consistent findings. In this research, the Cronbach's Alpha formula was applied to figure out the data's reliability.

The commonly used technique to measure an instrument's internal consistency reliability formed up of various components is Cronbach's Alpha. The range of values for Cronbach's Alpha is 0 to 1 [5].

Table 5. Reability Test

Variables	Alpha Cronbach	Description
Top Management Support (MO1)	0,850	Reliable
Evaluation of Management Performance (MO2)	0,849	Reliable
Work Environment and Culture (MO3)	0,861	Reliable
Allocation of Appropriate Resource (MO4)	0,861	Reliable
Organizational Management System (MO5)	0,849	Reliable
Loyalty Employee to the Organization (MO6)	0,860	Reliable
Speed of Internet Service Usage (STI1)	0,845	Reliable
Improvement of Hardware System (STI2)	0,849	Reliable
Website Security System (STI3)	0,847	Reliable
Entire Work Information (STI4)	0,857	Reliable
Authentication and Authorization Data (STI5)	0,844	Reliable
Website Maintenance Routine (STI6)	0,849	Reliable
Adequate Power Supply (STI7)	0,856	Reliable
Understanding of E-tendering Rules & Standards (SDM1)	0,853	Reliable
Understanding of E-tendering Procedures (SDM2)	0,850	Reliable
Understanding of ICT Systems (SDM3)	0,851	Reliable
Experience in E-tendering Implementation (SDM4)	0,850	Reliable
Training of E-tendering Implementation (SDM5)	0,850	Reliable
Understanding of E-tendering Functions and Objectives (SDM6)	0,848	Reliable
Ability to Use E-tendering Applications & Websites (SDM7)	0,843	Reliable

From Table 5 shows each variable's reliability by displaying all values based on Cronbach's Alpha values higher than 0,60 that means all the variables is reliable.

4.4 Keiser Meyer Olkin (KMO) and Bartlett's test

According to [20], Keiser Meyer Olkin (KMO) and Bartlett's test are tests used to determine the suitability of a variable before using factor analysis. This test is important to ensure that the data used meets the requirements and can be analyzed further using factor analysis. Data can be further tested if the KMO test results obtain a value > 0.5 and Bartlet's significant value < 0.05.

Table 6 KMO (Keiser Meyer Olkin) and uji Bartlett's Test

Kaise-Mayer-Olkin Measure of Sampling Adequacy		0,718
Bartlett's Test of Sphericity	Approx. Chi. Square	553.410
	Df.	136
	Sig	0.000

Based on table 6, known that result of KMO (Keiser Meyer Olkin) test is 0.718 and uji Bartlett's Test of Sphericity is 553.410 at significance of 0.000, and then the factors can be process to the next step of factor analysis.

4.5 Measure of Sampling Adequacy (MSA) test

The Measure of Sampling Adequacy (MSA) analysis aims to determine whether the factors or variables resulting from the research are suitable for further analysis or not. This Measure of Sampling Adequacy (MSA) value is related to the results of the relationship between existing factors [15]. According to [6] through the SPSS program application, the Measure of Sampling Adequacy (MSA) value of each factor can be seen diagonally in the anti-image correlation matrix.

Table 7 First Measure of Sampling Adequacy (MSA) Test

Instrument	Factors	MSA
MO1	Top Management Support	0,621
MO2	Evaluation of Management Performance	0,594
MO3	Work Environment and Culture	0,347
MO4	Allocation of Appropriate Resource	0,348
MO5	Organizational Management System	0,716
MO6	Loyalty Employee to the Organization	0,370
STI1	Speed of Internet Service Usage	0,703
STI2	Improvement of Hardware System	0,652
STI3	Website Security System	0,784
STI4	Entire Work Information	0,502
STI5	Authentication and Authorization Data	0,797
STI6	Website Maintenance Routine	0,676
STI7	Adequate Power Supply	0,605
SDM1	Understanding of E-tendering Rules & Standards	0,595
SDM2	Understanding of E-tendering Procedures	0,859
SDM3	Understanding of ICT Systems	0,677
SDM4	Experience in E-tendering Implementation	0,692
SDM5	Training of E-tendering Implementation	0,571
SDM6	Understanding of E-tendering Functions and Objectives	0,732
SDM7	Ability to Use E-tendering Applications & Websites	0,759

From Table 7, indicates there are three variables have an MSA value <0.5, according to [6] if the results from the MSA test there is one or more of the research factors in the initial conditions has an MSA value of <0.5, then these factors cannot be used or are excluded from the analysis process. The variables must be removed one by one from the smallest, until all the variables have MSA value >0.5. Furthermore, for initial condition factors that meet the requirements, namely those with an MSA value of 0.5 or more, further testing can be carried out.

In this research, MSA test run four times and the result is overall MSA value is 0.718 and MSA value of each variable are >0.5. The result of Individual MSA test of each variable is show in following Table 8.

Table 8 Fourth MSA Test Result of Variables

Instrument	Factors	MSA
MO1	Top Management Support	0,661
MO2	Evaluation of Management Performance	0,667
MO5	Organizational Management System	0,753
STI1	Speed of Internet Service Usage	0,679
STI2	Improvement of Hardware System	0,768
STI3	Website Security System	0,756
STI4	Entire Work Information	0,500
STI5	Authentication and Authorization Data	0,791
STI6	Website Maintenance Routine	0,714
STI7	Adequate Power Supply	0,727
SDM1	Understanding of E-tendering Rules & Standards	0,592
SDM2	Understanding of E-tendering Procedures	0,879
SDM3	Understanding of ICT Systems	0,732
SDM4	Experience in E-tendering Implementation	0,686
SDM5	Training of E-tendering Implementation	0,674
SDM6	Understanding of E-tendering Functions and Objectives	0,803
SDM7	Ability to Use E-tendering Applications & Websites	0,768

4.6 Determining Number Of Factors

After the MSA test stage, to determine the number of factors formed by looking at the eigenvalues in the Total variance cumulative table. According to [19] the formed factors should have the total initial eigenvalue >1.0 and the total cumulative percentage variance should be >60% [7]. By setting a threshold of 60%, researchers ensure that the resulting factor model includes most of the information contained in the original variables.

In this research, there are 17 factors that will be studied with the hope of providing a Cumulative Percentage Variance > 60%. where this percentage value is expected to represent and explain most of the variability in the original data. For more detail, see the Table 9 below:

Table 9. Total Variance Explained

Compo-nent	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.800	34.118	34.118	5.800	34.118	34.118
2	2.754	16.199	50.317	2.754	16.199	50.317
3	1.881	11.062	61.379	1.881	11.062	61.379
4	0.983	5.784	67.162			
5	0.943	5.544	72.707			
6	0.792	4.657	77.364			
7	0.718	4.222	81.585			
8	0.617	3.630	85.215			
9	0.537	3.159	88.374			
10	0.531	3.126	91.500			
11	0.374	2.202	93.702			
12	0.358	2.105	95.806			
13	0.240	1.415	97.221			
14	0.190	1.115	98.336			
15	0.138	0.809	99.145			
16	0.112	0.660	99.804			
17	0.033	0.196	100.000			

From Table 9, that show there are 3 factors formed which represent 17 success factors of e-tendering implementation in Parigi Moutong regency. A scree plot was then generated based on the newly formed components. A graph known as a scree plot indicates the relationship between components and their eigenvalues. Figure 1's Scree Plot a representation looks like this:

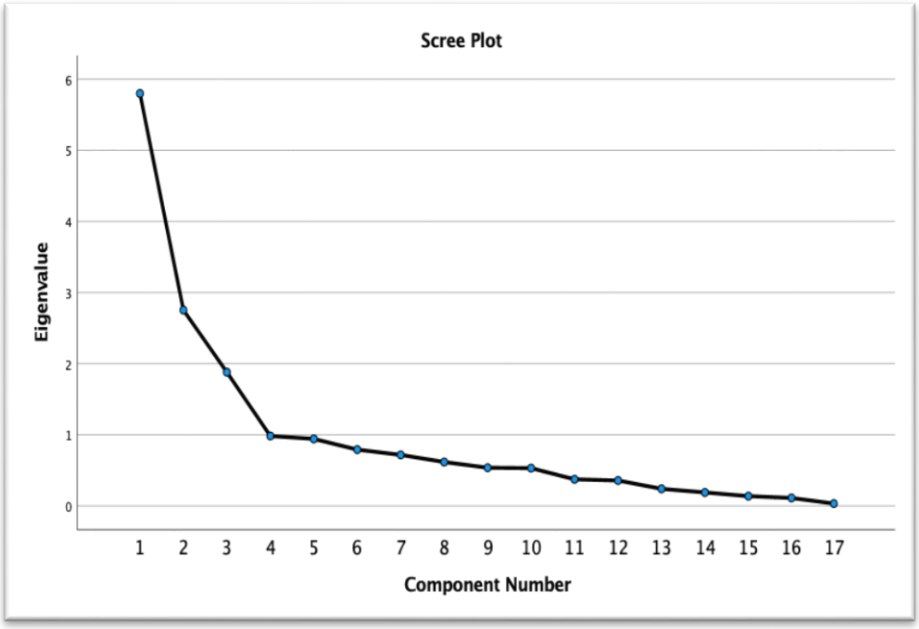

Figure 1: Scree Plot Curve

4.7 Extraction and Rotation Of Factors

Factor extraction is carried out when the number of generated factors has been determined. The initial process in factor analysis is called factor extraction, and its purpose is to split up many variables into several new variable sets or numerous factors with smaller values. Principal Component Analysis is a frequently utilized technique in factor extraction (PCA) [17]. The Component Matrix value was obtained from the three extracted components using the Principal Component Analysis (PCA) method. The resulting value is shown in Table 10 below:

Table 10. Rotated Component Matrix[a]

Component Matrix[a]	Component 1	2	3
MO1	0.119	0.760	0.103
MO2	0.113	0.766	0.174
MO5	0.077	0.215	0.768
STI1	0.959	0.110	0.042
STI2	0.565	0.043	0.348
STI3	0.892	0.067	0.093
STI4	0.048	0.609	-0.101
STI5	0.437	0.475	0.310
STI6	0.425	0.117	0.448
STI7	0.624	-0.191	0.316
SDM1	0.129	0.014	0.783
SDM2	0.073	0.764	0.126
SDM3	0.747	0.261	-0.208
SDM4	0.085	0.675	0.261
SDM5	0.043	0.244	0.823
SDM6	0.035	0.539	0.468
SDM7	0.891	0.275	0.073

Table 10 of the Rotated Component Matrix above presents the component analysis results, which indicate that the loading factor values of the three created factors range from 0.4 to 1.0 which means that all variables that have been analyzed have an influence on the success of e-tendering implementation in Parigi Moutong Regency based on the contractor's perception.

In this research, the variable with the highest loading factor value was entered into the new factor where the variable was located to determine the factor group [6]. Component rotation is used to find out which elements are included in the new factor, as shown in table 11:

Table 11. Grouping Factors

Factors	New Factor		
	1	2	3
STI	0.959	0.110	0.042
STI3	0.892	0.067	0.093
SDM7	0.891	0.275	0.073
SDM3	0.747	0.261	-0.208
STI7	0.624	-0.191	0.316
STI2	0.565	0.043	0.348
STI5	0.437	0.475	0.310
STI6	0.425	0.117	0.448
SDM1	0.129	0.014	0.783
MO1	0.119	0.760	0.103
MO2	0.113	0.766	0.174
SDM4	0.085	0.675	0.261
MO5	0.077	0.215	0.768
SDM2	0.073	0.764	0.126
STI4	0.048	0.609	-0.101
SDM5	0.043	0.244	0.823
SDM6	0.035	0.539	0.468

4.8 Naming Factors

Based on the results of factor grouping in table 11, it is known that the results of factor analysis from this research produced 3 (three) new factors which will be named by researchers based on characteristics that match the factors. The names of the new factors include:

1. New Factor 1

The first new factor is a factor formed from 6 (six) factors, namely STI1 " Speed of Internet Service Usage" SDM7 "Ability of Human Resources to Use e-tendering Applications and Websites, STI3 "Website Security Systems", SDM3 "Human Resource Understanding of Technology and Information Systems", STI7 "Adequate Electricity Supply" and STI2 " Improvement of Hardware System". So based on these factors, researchers named the first new factor, namely Readiness of Technology and Human Resources Competence in e-Tendering.

2. New Factor 2

The second new factor is formed from 7 (seven) variables, namely STI5 "Authentication and Authorization of Data", MO1 "Support from Top Management", MO2 "Evaluation of Management Performance", SDM4 "Experience in Participating in the Implementation of e-tendering", SDM2 "Understanding of Resources Human Related to e-tendering Procedures", STI4 "Complete Information about Work" and SDM6 "Human Resources' Understanding of the Function and Purpose of e-tendering. Based on these factors, the researcher named the second new factor, namely Evaluation and Managerial Support in the Implementation of e-Tendering.

3. New Factor 3

The third new factor is formed from 4 (four) variables, namely STI6 "Routine Website Maintenance", SDM1 "Understanding of Human Resources Regarding e-tendering Rules and Standards", MO5 "Organizational Management System" and SDM5 "Implementation of e-tendering Training". Based on these factors, the researcher named the third new factor, namely the Enhancement of Technology and Managerial Competence In E-Tendering

4.9 Discussion

Three New aspects or factors that influence the success of e-tendering implementation in Parigi Moutong Regency based on contractor perceptions were identified by the study based on the results of factor analysis using The SPPS version 27 application. The following variables are present in these new factors or aspects:

a. Readiness of Technology and Human Resources Competence in e-Tendering.

Speed of Using Internet Services, Ability of Human Resources to Use e-tendering Applications and Websites, Website Security Systems, Human Resource Understanding of Technology and Information Systems, Adequate Power Supply and Improvement of Hardware System. With a value of 0.959, the variable with the highest loading value is Speed of Internet Service Usage. According to [4] Because effective technological readiness offers a dependable, quick, and secure website system, technological readiness and HR competency have a major impact on the success of e-tendering deployment. Aside from that, it's critical to have skilled human

resources using technology to manage the e-Tendering system to guarantee seamless operation devoid of technological hiccups. The readiness of Technology and Human Resources Competence influence the implementation of e-Tendering in process efficiency, The right technology and competent human resources can speed up the tender process, reduce administrative costs, and increase accuracy in data processing [13]. Table 11 displays the components of Readiness of Technology and Human Resources Competence in e-Tendering factor.

Table 12. Readiness of Technology and Human Resources Competence in e-Tendering factor

	Factors	Loading Factor
STI1	Speed of Internet Service Usage	0,959
STI3	Website Security System	0,892
SDM7	Ability to Use E-tendering Applications & Websites	0,891
SDM3	Understanding of ICT Systems	0,747
STI7	Adequate Power Supply	0.624
STI2	Improvement of Hardware System	0.565

b. Evaluation and Managerial Support in the Implementation of e-Tendering.

Aspects of Evaluation and Managerial Support in the Implementation of e-Tendering which are new factors that have been formed consisting of Evaluation of management performance, top management support, experience in e-tendering implementation, HR understanding of e-tendering procedures, understanding of e-tendering functions and objectives, entire work information and authentication and authorization data. the variable that has the highest factor loading value is the evaluation of management performance factor with a value of 0.766.

According to [22] Evaluation and Managerial Support have a significant influence on the success of e-tendering implementation, which having a routine evaluation throughout e-tendering implementation supports the identification of areas in which the e-tendering system needs to be improved, therefore promoting continual improvement.

Routine evaluation helps identify potential risks, while managerial support facilitates effective risk mitigation [3]. Factors included in the Evaluation and Managerial Support aspects in implementing e-tendering can be seen in Table 13.

Table 13. Evaluation and Managerial Support in the Implementation of e-Tendering Tendering factor

	Factors	Loading Factor
MO2	Evaluation of Management Performance	0.766
SDM2	Understanding of E-tendering Procedures	0.764
MO1	Top Management Support	0760
SDM4	Experience in E-tendering Implementation	0.675
STI4	Entire Work Information	0.609
SDM6	Understanding of E-tendering Functions and Objectives	0.539
STI5	Authentication and Authorization Data	0.475

c. The Enhancement of Technology and Managerial Competence in e-Tendering

the Enhancement of Technology and Managerial Competence in e-Tendering are a new factor or aspect that have been formed consist of 4 (four), training of e-tendering implementation, understanding of e-tendering rules & standards, organizational management system and website maintenance routine. Training of e-tendering implementation has the highest factor loading value is 0.823. According to [19] Technological enhancement automate processes, reducing time and costs, while managerial competence ensures optimal use of technology. Managerial competencies facilitate effective communication with stakeholders about technological changes and their benefits. Factors included in the Enhancement of Technology and Managerial Competence in e-Tendering can be seen in Table 14.

Table 14. The Enhancement of Technology and Managerial Competence in e-Tendering factor

	Factors	Loading Factor
SDM5	Training of E-tendering Implementation	0.823
SDM1	Understanding of E-tendering Rules & Standards	0.783
MO5	Organizational Management System	0.768
STI6	Website Maintenance Routine	0.448

V. CONCLUSION

There are three new factors or aspects that affect the success of e-tendering implementation in Parigi Moutong Regency were used to produce the factor analysis results using the factor analysis method. The readiness of technology and human resource competence in e-tendering, the evaluation and managerial support in e-tendering implementation, and the enhancement of technology and managerial competence in e-tendering are three factors those influence of implementation of e-tendering.

REFERENCES

[1]. Airlangga, U. (2010). Presidential Regulation of the Republic of Indonesia Number 54 of 2010. Surabaya: Pusat Penerbitan dan Percetakan Unair.

[2]. Auerswald, M., & Moshagen, M. (2019). How to determine the number of factors to retain in exploratory factor analysis: A comparison of extraction methods under realistic conditions. Psychological Methods, 24(4), 468-491. https://doi.org/10.1037/met0000200

[3]. Croom, S., & Brandon-Jones, A. (2007). Impact of e-procurement: Experiences from implementation in the UK public sector. Journal of Purchasing and Supply Management, 13(4), 294-303.

[4]. Damayanti, A. I., Susilaningsih, & Sumaryati, S. (2013). The Influence of Infrastructure, Information Technology Readiness and Human Resource Competency on E-Government Implementation in the Context of Realizing Good Governance. Journal of Economic Education UNS, 2(1), 1-13.

[5]. Ghozali, I. 2011. "Application of Multivariate Analysis Using the SPSS Program". Semarang: Diponegoro University Publishing Agency.

[6]. Hair, et al (2010). Multivariate Data Analysis (7th ed.). Pearson Prentice Hall.

[7]. Hair, et al (2019). Multivariate Data Analysis (8th ed.). Cengage Learning.

[8]. Kassim, E. S., & Hussin, H. (2013). A success model for the Malaysian government e-procurement system: The buyer perspective. International Journal of Electronic Government Research, 9(1), 1-18.

[9]. Kimberlin, C. L., & Winterstein, A. G. (2008). Validity and reliability of measurement instruments used in research. American Journal of Health-System Pharmacy, 65(23), 2276-2284. https://doi.org/10.2146/ajhp070364

[10]. Mangitung, D. et all (2022). Important factors influencing the successful implementation of electronic tenders based on the perceptions of consultants, contractors and project owners in Palu. IOP Conference Series: Earth and Environmental Science. doi:10.1088/1755-1315/1075/1/012036

[11]. Nugroho, R., Wibowo, A., & Wibowo, H. K. (2017). Factors Determining E-Procurement Adoption in Indonesia: A Business-to-Government Perspective. International Journal of Economics and Financial Issues, 7(4), 330-337.

[12]. Nugroho, S. (2008). Statistika Multivariat Terapan. Bengkulu: UNIB PRESS.

[13]. Nugroho, R. S., & Sukhotu, V. (2016). The Effects of ICT Readiness on the Adoption of E-Procurement in the Public Sector. Journal of US-China Public Administration, 13(5), 311-323.

[14]. Nurmandi, A., & Kim, S. (2015). Making e-procurement work in a decentralized procurement system: A comparison of three Indonesian cities. Internasional.

[15]. Pangeran, Imac. 2021. "Analysis of Delay Factors in Government Building Work in Tolitoli Regency." Thesis in Tadulako University.

[16]. Paryono, Petru. (1996). Processing Data with SPSS/PC+. Yogyakarta: Andi Offset.

[17]. Pett, M. A., Lackey, N. R., & Sullivan, J. J. (2003). Making Sense of Factor Analysis: The Use of Factor Analysis for Instrument Development in Health Care Research. SAGE Publications.

[18]. Presidential Regulation Number 12 of 2021 concerning Amendments to Presidential Regulation Number 16 of 2018 concerning Procurement of Government Goods/Services.

[19]. Rotchanakitumnuai, S. (2013). The governance evidence of e-government procurement. Transforming Government: People, Process and Policy, 7(3), 309-321.

[20]. Santoso, S (2012). SPSS Analysis on Parametric Statistics. Jakarta: PT. Elex Media Komputindo.

[21]. Utami, Dwi. 2020. The Effect of Implementing E-Procurement and Integrity on Preventing Fraud in Procurement of Goods/Services with Intention as a Moderating Variable in the Makassar City Government. Hasanuddin University.

[22]. Vaidya, K. Sajeev, A.S.M. dan Callender, G. 2006. Critical Factors that Influence E-Procurement Implementation Success in the Public Sector. Journal of Public Procurement Volume 6 Number 1/2 pp.70-99. https://doi.org/10.1108/JOPP-06-01-02-2006-B004

[23]. Yasa, P. A., Suciptawati, N. L. P., & Susilawati, M. "Implementation of Factor Analysis in Analyzing Customer Satisfaction Towards Service Quality" (Case Study: Lpd Sidakarya). E-Journal of Mathematics, 6(2), 152–160. 2017.