Analysis of E-Procurement Implementation in Effectiveness Procurement of Goods and Services
(Case Study at PT. KERETA API INDONESIA (PERSERO))

Ratih Hendayani [1,] Putri Aulia Fariha Fauzi[2]

[1,2,] Telecommunication and Informatics Business Management, Faculty of Economics and Business, Telkom University

[1] ratihhendayani@telkomuniversity.ac.id; [2] Putriauliaf@student.telkomuniversity.ac.id

ABSTRACT

The use of technology in the business industry in Indonesia provides opportunities for encouraging the industry to optimize technological developments that are getting better. The industry releases new technology to compete with its competitors. One of the strategies that can be implemented to optimize the supply chain is through the procurement of goods and services (PGS). This technology support allows companies to carry out PGS processes electronically. The research objective of this study is to determine how the relationship system specification, implementation management, governance structure, total acquisition cost, and organization characteristics to e-procurement effectiveness in implementation at PT. Kereta Api Indonesia (Persero). The analysis technique used is descriptive analysis with a quantitative method of multivariate analysis using SEM (Structural Equation Modeling), namely Partial Least Square (PLS) with SmartPLS software. The result of this study shows that the variables which have no effect are system specifications with implementation management, implementation management with changes in government structures, changes in government structures with e-procurement effectiveness, organizational characteristics, implementation management can mediate specification system with governance structure, implementation management can mediate specification system with total acquisition cost, implementation management can mediate specification system with organizational characteristics, government structure can mediate implementation management, and organizational characteristics can mediate implementation management with e-procurement effectiveness at PT. Kereta Api Indonesia (Persero). This research recommends PT. Kereta Api Indonesia (Persero) to continue to improve and maintain the e-procurement system so that it can continue to improve systems that facilitate relationships between companies and vendors.

INTRODUCTION

Transportation is one of the supports for the community in their daily activities. The development of transportation slowly continues to evolve from time to time starting from the form of transportation, features, and use of fuel. The development of transportation is running fast because it is entering the era of industrialization with increasing transportation innovations starting from the application of transportation using a steam engine for rail and ship transportation, then followed by the invention of engines using fuel and electricity transportation (Probowo, 2020).

The development of transportation which continues to grow can encourage economic activity and development. Users of the land, sea and air transportation from 2015 to 2019 continue to increase. The number of motor vehicle users has increased quite significantly, namely 6.13 percent per year (2019 Land Transportation Statistics, 2020). Departures using airplane transportation for overseas destinations have increased in 2019 by 4.53 percent compared to 2018 (Air Transportation Statistics 2019, 2020). In addition, the use of sea transportation experienced an increase in departures in 2019 by 15.89 percent compared to 2018 (Sea Transportation Statistics 2019, 2020).

The cause of the rapid use of transportation is that people need mobility that is efficient, practical, and inexpensive. Public transportation is a way that people use to get appropriate transportation needs. One of the public transportation used by the community is the train. Railway transportation is one of the most effective forms of mass transportation, consisting of locomotives and carriages. Several countries are trying to make maximum use of the means of transportation with the main transportation, namely land transportation both within cities, between cities, and between countries.

Currently, transportation is experiencing developments that support in terms of effectiveness and efficiency by using technology, where one of the land transportation companies continues to grow both infrastructure and facilities are trains. The development of railroad companies was followed by the application of electronic systems such as *e-ticketing*, *e-boarding*, *e-kiosk*, *e-library*, *e-procurement*, *e-recuirement,* and others. The existence of this electronic system can facilitate internal and external mobility of companies, especially train users (KAI Company Profile, 2021).

In the growth of technology, it is not only individuals who want to fulfill the need for the technology but companies, both private and government, also need technology in the company's operations. Currently, technology is an incline in the progress of a company because the technology that combines computers with telecommunications has become one of the revolutions in the field of information systems (Ervina, 2019). One of the information systems that is starting to evolve and be used by companies is the procurement system for goods and services (Hartono, 2012).

A good system of procurement of goods and services is the most important thing to give birth to the principles and objectives of the procurement of goods and services that are effective, efficient, transparent, open, competitive, fair, and accountable (Putera, 2015). There are problems when carrying out the process of procurement of goods and services such as problems in the process of preparing for the procurement of goods and services starting from the Provisional Estimated Price (PEP) which is not following market prices, there is no clear documentation, incomplete document filling, and there are additions costs which can become legal issues (Administrator, 2016). According to Daryaatmaka (2019), the Goods and Services Procurement System can be more effective in terms of time and company efforts by implementing an e-procurement system. In addition, electronic systems in the Procurement of Goods and Services can also facilitate the management of information technology services such as facilitating the analysis of reports on the procurement of goods and services, saving company operational costs, simplifying the procurement process, orderly administration, and easier coordination (Yudhistira, 2021). Therefore, it is appropriate for state and private companies to encourage the use of e-procurement in the procurement of goods and services (Kurniawan, 2022).

Companies in the transportation sector such as PT. Kereta Api Indonesia has implemented e-procurement to support company operations in meeting the need for goods or services (SOP for Procurement of Goods and Services, 2016). The system for the procurement of goods and services at this company has been implemented since August 2009 (e-Procurement Management System PT Kereta Api Indonesia, n.d.). The implementation of effective e-procurement has an impact on the company, namely by reducing procurement operational costs, increasing control over various irregularities, creating relationships between users and service providers, as well as facilitating and accelerating community needs. Companies must ensure that the specifications of the procurement system for goods and services are safe to use.

Information and communication development activities in companies affect business transaction Information and communication development activities in companies affect business

transaction activities that occur, one of which is activities between one company and another company or commonly referred to as B2B. One of the activities of B2B is the Procurement of Goods and Services. The development of technology makes organizational needs for systems that can facilitate the procurement of goods and services increase. Information and communication innovation is urgently needed, namely with electronic procurement or commonly known as e-procurement (Nani, 2020). The implementation of the procurement of goods and services is a crucial problem because there are cases of irregularities in the procurement of goods and services. The application of electronic systems in the procurement of goods and services is also not following regulations, companies must continue to make changes by testing Trial and Error on the system that has been implemented. PT. Kereta Api Indonesia has utilized the electronic system in the procurement of goods and services by giving announcements regarding the procurement of goods and services that are currently open, and information provided by the company via the PT.KAI e-procurement page. However, the applied system transformation has not run optimally. Therefore, the implementation of e-procurement in companies must create effective solutions in improving quality in the system of procurement of goods and services.

Information and communication development activities in companies affect business transaction activities that occur, one of which is activities between one company and another company or commonly referred to as B2B. One of the activities of B2B is the Procurement of Goods and Services. The development of technology makes organizational needs for systems that can facilitate the procurement of goods and services increase. Information and communication innovation is urgently needed, namely with electronic procurement or commonly known as e-procurement (Nani, 2020). The implementation of the procurement of goods and services is a crucial problem because there are cases of irregularities in the procurement of goods and services. The application of electronic systems in the procurement of goods and services is also not following regulations, companies must continue to make changes by testing Trial and Error on the system that has been implemented. PT. Kereta Api Indonesia has utilized the electronic system in the procurement of goods and services by giving announcements regarding the procurement of goods and services that are currently open and information provided by the company via the PT.KAI e-procurement page. However, the applied system transformation has not run optimally. Therefore, the implementation of e-procurement in companies must create effective solutions in improving quality in the system of procurement of goods and services. This research is a replication which adopts from research (Hakim et al., 2020) entitled "Factors Affecting The Effectiveness of E-procurement Application in the Bank Indonesia Office Jakarta". The difference between this study with previous research lies in the research object. The object of this research is PT. Kereta Api Indonesia (Persero) at the Bandung Head Office with non-probability sampling and purposive sampling rules. Meanwhile, the object of research by Hakim et al. (2020) is Bank Indonesia in Jakarta. This study uses a statistical test to determine whether the distribution is normal or not with the Kolmogorov-Smirnov test (Sarstedt & Mooi, 2014; Hair et al., 2017). The data processing technique used in this study is SEM using the SmartPLS application because this research is a multivariate analysis and the results of the questionnaires are not normally distributed. Tests using SEM can predict variables accurately and more efficiently than regression (Byrne, 1998; Wingdes, 2019). So this study uses SmartPLS because the study has limitations in samples that are not normally distributed.

LITERATURE REVIEW
A. Operations Management
According to (Heizer et al., 2017), OM or commonly referred to as Operations Management is a set of activities that create value in the form of goods and services by transforming results from inputs to outputs. Various organizations in this activity create goods and services.

B. Supply Chain Management
According to (Heizer et al., 2017a), SCM describes the coordination of supply chain activities, starting with raw materials and ending with the aim of satisfying customers. With a supply chain that includes suppliers, manufacturers and service providers, distributors, wholesalers, and retailers who deliver products and services to end customers.

C. E-Procurement

According Sutedi, (2008) *e-procurement* is a website with features provided such as an electronic auction system to produce based technology, information, and communication facilities. According to the Kementerian Keuangan Sekertariat Jendral, e-procurement has the goal of creating transparency, efficiency, effectiveness, and accountability in the Procurement of Goods and Services through electronic media between work programs and service providers.

D. Top Management Support
Top Management Support is an important factor in an effective information system. Strategic leadership theory emphasizes the important impact of top management on business because of the decisions made (Vera & Crossan, 2004).

E. System Specification
According to (Croom, 2007), system specifications are a critical problem in the use of e-procurement. The slow adoption of e-procurement systems emphasizes several issues that hinder implementation, including software integration.

F. Effectiveness
According to (Gibson, 2000), effectiveness is an achievement that has been agreed with the effort. The level of target achievement can indicate a level of effectiveness. Employee work effectiveness can be determined by comparing the working time that has been set with the time needed by the employee, and can also be compared between the results or quality achieved with the quality that has been set (Machmud, 2013).

G. Framework Thinking
This study will explain the effect of e-procurement on the effectiveness of the procurement of goods and services. As explained by Hakim et al. (2020), "The preparation of a project plan aims to increase the effectiveness and efficiency of work programs and the implementation of investment plans, improve coordination between work units in the framework of establishing strategies and implementing investment plans and strengthening good governance good in terms of planning, implementing and controlling the investment plan as well as optimizing the implementation and realization of the investment plan budget". Therefore, if e-procurement is optimal and of good quality, the company will be more effective. Fulfillment of systems that can increase the effectiveness of the process of procurement of goods and services.

The most influential aspects in increasing the effectiveness of the goods and services procurement system are system specifications, implementation management, government structure, the total cost of acquisition, and organizational character (Hakim et al., 2020). Therefore, this study aims to determine the effectiveness of implementing e-procurement at PT. Indonesian Railroad (PERSERO). This research is expected to provide benefits for company managers to maintain the effectiveness of goods and services procurement activities.
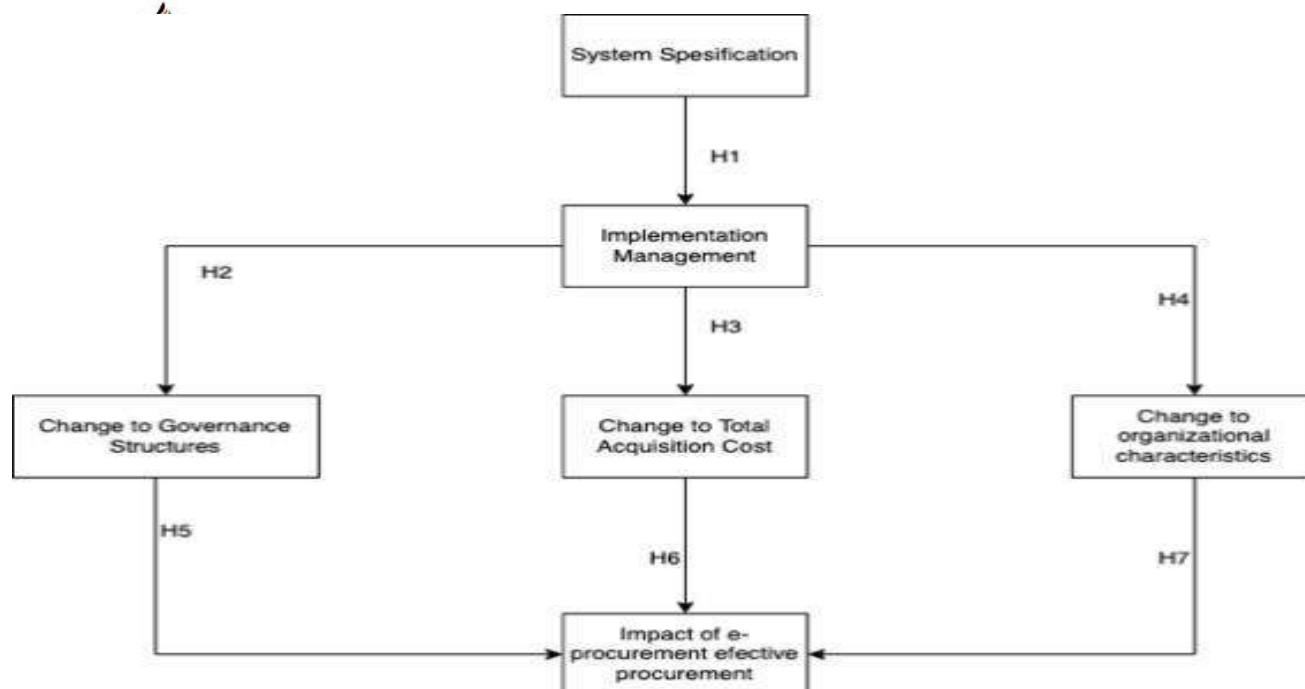
figure 1. Framework of Thought
Source: Croom, 2007 in (Judge et al., 2020)

Based on the theory and framework, the hypotheses in the study are as follows:

H1: There is a relationship between system specifications and implementation management

H2: There is a relationship between implementation management and changes in the government structure.

H3: There is a relationship between implementation management and the total cost of acquisition

H4: There is a relationship between implementation management and organizational characteristics

H5: There is a relationship between government structure and the effectiveness of *e-procurement*

H6: There is a relationship between the total cost of acquisition and the effectiveness of *e-procurement*

H7: There is a relationship between organizational characteristics and the effectiveness of *e-procurement*.

METHOD

Please clearly how to handle the data and processing,

The method used in the research is quantitative. This is because the data obtained comes from primary data sources, namely questionnaires. The purpose of the research, namely as a causal study to find out, see, find problems, and the effect of the implementation of *e-procurement* on the effectiveness of the company based on the results of questionnaires distributed to 55 employees of PT. Kereta Api Indonesia (Persero) Logistics Division. Survey research using questionnaires in the form of Google Forms which will be distributed online to respondents through field supervisors. The research used a cross-sectional method. The instrument scale used in this study is the Likert scale. To test the hypothesis, data processing was carried out using the SEM-PLS method on the SmartPLS v software. 3.2.9.

RESULTS   **AND**
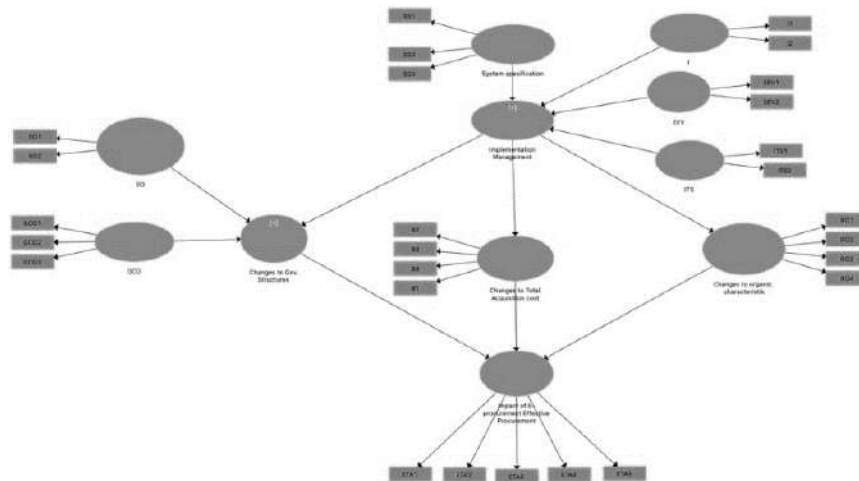
DISCUSSION

Respondents in this study were employees at the Head Office of PT. Kereta Api Indonesia (Persero) in the Logistics Division. The research sample is 55 employees.

1. Testing the Measurement Model (Outer Mode)

According to Ghazali (2014:37), the measurement model is a measurement that describes the relationship between each block indicator and its latent variables. Latent variables are divided into two, namely exogenous and endogenous latent variables. There are two stages in this test, namely the validity test and the reliability test. The Outer Model diagram in this study can be seen below:
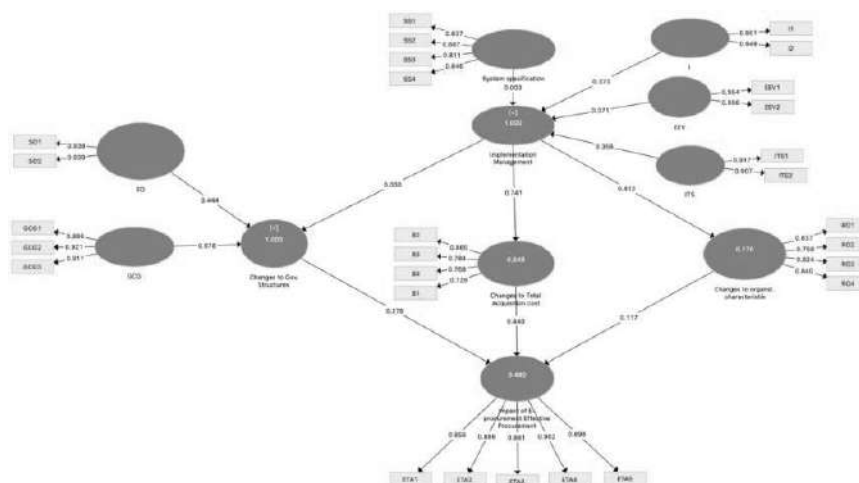

figure 2. *Outer*   *Model*
after
modification
Source:

Processed Data, 2022

figure 3. *Outer Model* after modification
Source: Processed Data, 2022

1.1 Convergent Validity

Convergent validity is used to measure the accuracy of an item or a group of items. The indicator value required to fulfill the AVE validity test is mandatory > 0.5 (Indrawati, 2017:70). Convergent validity can be seen in table 1 below:

Table 1. Convergent Validity

Variable	*Average Variance Extracted* (AVE)	Criteria (AVE > 0.5)
Government Structure	0.664	VALID
Total Acquisition Cost	0.621	VALID
Organization Character	0.666	VALID
Vendor Management Effectiveness and Efficiency	0.912	VALID
Good Cooperate Governance	0.810	VALID
Information	0.902	VALID
Information Technology System	0.832	VALID
Effect of E-procurement Effectiveness	0.783	VALID
Implementation Management	0.725	VALID
Organizational structure	0.882	VALID

Source: Data Obtained (2022)

Based on the table above, it is known that the AVE value on the variable Government Structure, The Total of Acquisition Cost, Organizational Character, Influence of E-Procurement Effectiveness, and Implementation Management is greater than 0.5. Information sub-variables, Vendor Management Effectiveness and Efficiency, Information Technology Systems, Organizational Structure, and Good Cooperate Governance are greater than 0.5. This indicates that the indicators that form latent constructs can be said to have good convergent validity.

159

1.2 Discriminant Validity

In testing discriminant validity, it is necessary to look at the *loading factor value* > 0.7 or by comparing the *Average Variance Extracted* (AVE) value with the correlation value between latent constructs (Ghozali, 2021). Discriminant validity can be seen in table 2 below:

Table 2. *Cross Loading*

	Government structure	The Total cost of acquisition	Characteristics organization	Effect of effectiveness e-procurement	Implementation management	Organizational structure	System specifications
B1	0.366	**0.729**	0.169	0.417	0.435	0.281	0.344
B2	0.539	**0.865**	0.279	0.594	0.668	0.477	0.495

	Government structure	The Total cost of acquisition	Characteristics organization	Effect of effectiveness e-procurement	Implementation management	Organizational structure	System specifications
B3	0,454	**0,784**	0,205	0,422	0,644	0,416	0,375
B4	0,449	**0,768**	0,172	0,540	0,555	0,480	0,454
EEV1	0,528	0,635	0,374	0,633	**0,836**	0,568	0,469
EEV1	0,528	0,635	0,374	0,633	**0,836**	0,568	0,469
EEV2	0,567	0,638	0,343	0,599	0,857	0,605	0,370
EEV2	0,567	0,638	0,343	0,599	0,857	0,605	0,370
ETA1	0,532	0,575	0,388	**0,856**	0,586	0,472	0,519
ETA2	0,500	0,485	0,229	**0,886**	0,586	0,415	0,351
ETA3	0,489	0,519	0,223	**0,881**	0,649	0,387	0,399
ETA4	0,506	0,516	0,298	**0,902**	0,585	0,433	0,390
ETA5	0,532	0,673	0,361	**0,898**	0,700	0,473	0,557
GCG1	0,826	0,486	0,304	0,502	0,568	0,534	0,530
GCG1	0,826	0,486	0,304	0,502	0,568	0,534	0,530
GCG2	0,823	0,411	0,328	0,507	0,515	0,445	0,392
GCG3	**0,863**	0,468	0,232	0,422	0,577	0,555	0,478
I1	0,658	0,622	0,204	0,655	**0,888**	0,480	0,394
I1	0,658	0,622	0,204	0,655	**0,888**	0,480	0,394
I2	0,540	0,661	0,376	0,645	**0,869**	0,452	0,442

I2	0,540	0,661	0,376	0,645	**0,869**	0,452	0,442
ITS1	0,677	0,700	0,439	0,531	**0,851**	0,664	0,598
ITS1	0,677	0,700	0,439	0,531	**0,851**	0,664	0,598
ITS2	0,597	0,513	0,365	0,542	**0,804**	0,470	0,341
ITS2	0,597	0,513	0,365	0,542	**0,804**	0,470	0,341
RO1	0,426	0,255	**0,837**	0,323	0,443	0,404	0,420
RO2	0,218	0,237	**0,759**	0,227	0,210	0,288	0,420
RO3	0,280	0,199	**0,824**	0,212	0,252	0,369	0,467
RO4	0,320	0,179	**0,840**	0,323	0,361	0,270	0,434

	Government structure	The Total cost of acquisition	Characteristics organization	Effect of effectiveness e-procurement	Implementation management	Organizational structure	System specifications
SO1	0,779	0,485	0,459	0,456	0,562	**0,939**	0,539
SO1	0,779	0,485	0,459	0,456	0,562	**0,939**	0,539
SO2	0,779	0,518	0,311	0,475	0,633	**0,939**	0,478
SO2	0,779	0,518	0,311	0,475	0,633	**0,939**	0,478
SS1	0,569	0,553	0,420	0,485	0,516	0,612	**0,858**
SS3	0,424	0,433	0,435	0,419	0,395	0,325	**0,858**
SS4	0,527	0,376	0,523	0,404	0,404	0,425	**0,880**

Source: Processed Data (2022)

The results of cross-loading in the table above, have met the requirements of convergent validity, namely having a value for each indicator,> 0.7. It can be concluded that regarding this study the value of discriminant validity is good at cross-loading. Good discriminant validity is shown by the AVE quadrant roots for each construct that are larger between the constructs in the model (Fornell and Lacker, 1981 in Ghozali 2021).

2. Structural Model Testing (Inner Model)

The next stage is the Inner Model which tests the structural model by looking at the R-Squares for each endogenous variable to predict the strength of the structural model (Ghozali, 2021). The inner model can be seen in table 3 below:

Table 3. Inner Model

	R Square	R Square Adjusted
Government Structure	1,000	1,000
The total cost of acquisition	0.548	0.540
Organizational Characteristics	0.170	0.154
The influence of the effectiveness of e-procurement	0.480	0.449
Implementation Management	1,000	1,000

Source: Processed Data (2022)

According to Hair et al. (2011) in Ghozali (2021:75), R-square shows strong results if the value is 0.75, 0.50 indicates a moderate model, and 0.25 indicates a weak model. Based on the table

above, it can be stated that the average research value is not good or weak. The percentage of the r-square value on the government structure variable on implementation management and the effect of e-procurement effectiveness is entirely on the government structure variable because the r-square result of the government structure is 100%. The percentage of the total value of acquisition costs has an effect of 54.8% on implementation management and the influence of e-procurement effectiveness so the remainder can be a factor of implementation management and the effect of e-procurement effectiveness. The percentage value of organizational characteristics has an effect of 17% so it is known that the remainder influences implementation management and influences e-procurement effectiveness. The percentage value of organizational influence is 48% so other factors can influence it. The percentage of implementation management is 100% so that it affects the whole.

3. Q2 Predictive Relevance

According to Ghazali (2021:74), apart from looking at *the* r-square, evaluation of the PLS model can be done with Q2 predictive relevance to represent the synthesis of cross-validation and the fitting function with predictions from observed variables and estimates from construct parameters. Table *Q2* predictive relevance can be seen in Table 4 below:

Table 4. Q2 Predictive Relevance

	Q^2 (=1-SSE/SSO)	Conclusion
Government Structure	0.638	Strong
The Total cost of acquisition	0.320	Strong
Organizational Characteristics	0.093	Weak
Effect *of* e-procurement effectiveness	0.356	Strong
Implementation Management	0.696	Strong

Source: Processed Data (2022)

4. *Effect Size* Value (f- *squares*)

According to Ghozali (2021: 75), in testing f-squares, if you get a value of 0.02 is included in the small structural level, 0.15 is included in the middle, and 0.35 is included in the large structural level. The results of processing with the help of SmartPLS software obtained results as Table 5 below:

Table 5. F-squares

Path Diagrams	Effect Size	Rating
System specifications for implementation management	0.143	Small
Implementation management of changes in government structure	0.000	Small
Implementation management of changes in total costs	0.214	Intermediate
Implementation management of change organizational characteristics	0.205	Intermediate

Changes in the structure of government to e-procurement effectiveness	0.089	Small
The Total cost of acquisition to the effectiveness of e-procurement	0.246	Intermediate
Organizational characteristics of e-procurement effectiveness	0.022	Small

Source: Processed Data (2022)

5. Path Coefficient

The Path Coefficient is a value that shows the value of the variable direction and has a positive or negative direction. The value range from 0 to 1 has positive values, while 0 to -1 has negative values. The Path Coefficient can be seen in table 6 below:

Table 6. Path Coefficient

Variable	Path coefficient
Government Structure on the Influence of e-procurement effectiveness	0.278
Total Acquisition Cost on The Effect of E-Procurement Effectiveness	0.440
Organizational Characteristics on the Influence of e-procurement effectiveness	0.117
The effectiveness and efficiency of vendor management toward implementation management	0.370
Good Corporate Governance on government structures	0.678
Information on implementation management	0.373
Information Technology Systems on implementation management	0.358
Management implementation of government structures	0.000
Management implementation of the total acquisition cost	0.741
Management implementation of organizational characteristics	0.412
Organizational structure on government structures	0.444

Source: Processed Data (2022)

Path coefficient value of Government Structure variable on the Effect of E-Procurement Effectiveness, Total Acquisition Cost on The Effect of E-Procurement Effectiveness, Organizational Characteristics on the Influence of E-Procurement Effectiveness, The Effectiveness and Efficiency of Vendor Management Toward Implementation Management, Good Cooperate Governance on Government Structures, Information on Implementation Management, Information Technology Systems on Implementation Management, Management Implementation on Government Structures, Management Implementation on The Total Acquisition Cost, Management Implementation of Organizational Characteristics, Organizational Structure on Government Structures. It can be concluded that the value of the path coefficient of the research results is positive.

6. Hypothesis testing

In testing the hypothesis, two criteria must be followed, namely when the t-statistic value is 1.65 for one-tailed because it tests the hypothesis based on the effect of x on y and the effect test uses direct effect, as well as looking at the p-values. The t-statistic value test is used to see the significant effect between variables in the study and their significance and the p-values are used to determine whether the hypothesis in the study is accepted or rejected. Hypothesis testing can be seen in the following table:

Table 7. Hypothesis Testing

Variables	Original sample	Sample mean	*Standard deviation*	t-statistics	p-values	Results
System specification to implementation management	0.003	0.003	0.003	1,060	0.145	Rejected
Implementation management of change government structure	0.000	0.001	0.002	0.044	0.482	Rejected
Implementation management of change total cost	0.741	0.746	0.051	14,550	0.000	Accepted
Implementation management of change organizational characteristics	0.412	0.446	0.115	3,589	0.000	Accepted
Changes in the government structure on the effectiveness of *e-procurement*	0.278	0.307	0.175	1,594	0.056	Rejected
The total cost of acquisition on the effectiveness of *e-procurement*	0.440	0.405	0.180	2,438	0.008	Accepted
Organizational characteristics of *e-* effectiveness *procurement*	0.117	0.131	0.114	1.024	0.153	Rejected

Source: Processed Data (2022)

Based on table 7, the following conclusions are obtained:

a) The results of hypothesis 1, the relationship between system specification variables and implementation management has a negative and insignificant impact. This result is evidenced by the p-value of 0.415 > 0.05 meaning that they are not mutually influential and the t-statistic of 1.060 <1.65 means that the variable value is not significant. According to Sirait

and Tricahyono (2019), a proactive and automatic, and efficient system agreed upon by all informants has an influence on the implementation of procurement transformation, an automatic system means not doing manual processes, especially in monotonous processes and a proactive system means a system that can provide advice on the best course of action to take. This finding is said to be negative and not significantly strengthened by the results of the descriptive analysis of the respondents' answers that system development is required to continue to develop while implementation is adjusted to the capacity and needs of each company. In its application to the evolution protocol system specifications, it always updates systems that have been used for a long time and updates data as well as updating versions or improving systems and implementing new e-procurement launches based on a small group of suppliers/goods providers and users/users, then gradually the number of suppliers and users who will implement the new e-procurement system will be added. This result is contrary to previous research by Rajkumar (2001) in Hakim et al. (2020), namely system specifications which are critical success factors for implementation in e-procurement, both with customer information infrastructure and relationships with suppliers.

b) The results of hypothesis 2 between the implementation management variable and the government structure have a negative and insignificant impact. Judging from the p-values $0.482 > 0.05$ and the t-statistic value $0.044 < 1.65$. The results of the rejection can be seen from the f-square calculation into relationships with small categories. This finding is said to be negative and insignificant, reinforced by the results of descriptive analysis of respondents' answers that implementation in the company is not influenced by changes in government structures that want to continue to make changes and system updates because the implementation of the e-procurement system is carried out in stages due to the constraints of too many commodity variations. . In its application to system renewal following the government's desire to quickly implement e-procurement but in reality, an implementation must be carried out in stages to produce maximum changes and users understand the usefulness of changes from the old system to the new system. Therefore, in implementing e-procurement at PT. Kereta Api Indonesia must be carried out in stages. This result contradicts the research of Hakim et al. (2020), good implementation management must consider aspects of government SOPs.

c) The result of testing hypothesis 3 is known that the p-values are $0.000 < 0.05$, which means that they are mutually influential. The t-statistic value of $14,550 > 1.65$ means that the variable value is significant. Therefore, it can be concluded that the implementation management variable on the total cost of acquisition has a positive and significant effect. This finding is reinforced by the results of descriptive analysis of respondents' answers to the two variables, namely 83% and 88% which fall into the good and very good categories. Implementing e-procurement can have an impact on reducing or saving operational costs in the procurement process such as meeting costs, transportation, accommodation, etc. In addition, it provides easy access to information for vendors in the market and vice versa and companies do not need to pay for printing documents, advertisements, surveys, and communication costs. Implementation of reducing operational costs, easy access to information, reducing costs during the procurement request process, and increasing compliance with procurement procedures/regulations that have been set at PT. KAI (Persero) has been good at influencing the implementation of the e-procurement system. The results of

this study are in line with previous research according to Heijboer (2003) in Hakim et al. (2020), namely the effect of e-procurement in government is influenced by the dynamics of launching e-procurement applications (roll-out), and proposes a model based on overhead costs or internal process costs and ROI resulting from the launch of e-procurement.

d) The results of the analysis of testing hypothesis 4 can be concluded that implementation management has a significant and positive influence on changes in characteristics. This can be proven by the results of calculating p-values which are 0.000 <0.05, so the hypotheses are mutually influential. The t-statistic value is 3,589 > 1.65, meaning that the variable value is significant. In carrying out the implementation of e-procurement which is carried out in stages affecting the characteristics of the organization that employees in the company are required to focus on the current system. So that there are not many changes in the system, but employees still follow and understand the implementation changes made to the goods and services procurement system. The results of the study are in line with previous research according to Hakim et al. (2020), that changes in behavior and the relationship between the organization and the supply chain will change as the impact is taken on the implementation of e-procurement. Organizational characteristics and relationships with organizations have changed as a result of the influence of adoption on e-procurement implementation (Hakim *et al.*, 2020). Therefore, companies implementing e-procurement must compare the implementation carried out with the different characters of each organization in terms of priorities.

e) The results of hypothesis 5 state that government structure has a negative and insignificant effect on e-procurement effectiveness as seen from the p-values which are 0.056 > 0.05 and the t-statistic values are 1.594 <1.65. This finding is reinforced by the results of the descriptive analysis of respondents' answers regarding the variables of government structure with the effectiveness of e-procurement that the government demands to make changes but if the company has not been able to implement e-procurement then it will not work well. Effectiveness will show that the implementation of e-procurement is already going well or in accordance with the purpose of making the system so that it can provide benefits such as transparency, accountability and ease of access for vendors and companies. According to Croom & Brandon-Jones (2007) in Hakim et al. (2020), changes in government structure discuss the relationship between sellers and buyers who have their interests. Ease of search and transparency are advantages for buyers but can be a disadvantage for sellers, further strengthening market-based relationships under e-procurement (Hakim et al., 2020). Therefore, this research is not in line with previous studies.

f) The results of the analysis of hypothesis testing 6 can be concluded that the variable Total Cost of Acquisition on the Effectiveness of E-procurement has a significant value and has a positive effect because it is seen from the p-values of 0.008 < 0.05 and the t-statistic value of 2.438 > 1.65. This finding is reinforced by the results of descriptive analysis of respondents' answers regarding the total acquisition cost variable on the effectiveness of e-procurement, namely 88% and 83% which have very good and good scores. In implementing acquisition costs, it can have an impact on reducing or saving operational costs in the procurement process such as meeting costs, transportation, accommodation, etc. In addition, it provides easy access to information for vendors in the market and vice versa and companies do not need to pay for printing documents, advertisements, surveys, and communication costs. This study is in line with previous research on Hakim et al. (2020), namely changes in the total costs incurred when procuring goods and services from beginning to end may change. The

benefit of implementing e-procurement is to reduce the total purchase cost. Cost reductions arise with the implementation of electronic systems or digitization. In the transmission, inventory reduction and minimizing supplier marketing costs will be fewer errors. Buyers and suppliers will benefit each other in terms of costs, both directly and indirectly (Hakim et al., 2020). Research on cost variables with the application of e-procurement has a mutual effect because when costs decrease, there will be an increase in company effectiveness. Therefore, the effect of costs at PT. Kereta Api Indonesia when implementing significant e-procurement.

g) Based on hypothesis 7, namely organizational characteristics have a negative and insignificant effect on e-procurement effectiveness. Seen from the p-values is 0.153 > 0.05 and the t-statistic value is 1.024 which is smaller than 1.65. This finding is reinforced by the results of a descriptive analysis of respondents' answers regarding the variable organizational characteristics that require workers to focus on one currently implemented system so that the e-procurement system in determining its effectiveness is not influenced by the character of the organization. An example can be given when a company uses a goods and service procurement system that does not entirely use an electronic system, so it will not have an effective effect on the implementation of e-procurement. This research is not in line with previous research by Hakim et al. (2020), namely changes in behavior and the relationship between the organization and the supply chain will change as the impact is taken on the implementation of e-procurement. According to Norman & Deeter-Schmelz (2001) in Hakim et al. (2020), organizational characteristics and organizational influence are significantly related because the development of digitalization in the procurement of goods and services is influenced by overall organizational regulations.

CONCLUSION

The research aims to determine the effect of implementing e-procurement on the effectiveness of procurement of goods and services with five variables in it, namely system specifications, implementation management, government structure, the total cost of acquisition, and organizational characteristics. Data processing to help analyze the relationship between variables using *Partial Least Square* (PLS) because the resulting data is not normally distributed. Based on the results of the analysis and hypothesis testing, the system specification variables do not have a positive and insignificant impact on implementation management variables Based on the results of the analysis and hypothesis testing between implementation management variables, it does not have a positive and insignificant impact on government structure variables Based on the results of the analysis and hypothesis testing, the implementation management variable has a positive and significant impact on the total acquisition cost the variable. Based on the results of the analysis and hypothesis testing the implementation management variables have a positive and significant impact on the characteristics change variable. Based on the results of the analysis and hypothesis testing between the government structure variables, there is no positive and insignificant impact on the e-procurement effectiveness variable. Total acquisition costs have a positive and significant impact on the effectiveness of e-procurement variables. The organizational characteristics variables do not have a positive and insignificant impact on the e-procurement effectiveness variable. It is recommended for future researchers to conduct research with different research objects, namely in the field of services or other services to get new and different results and insights, and examine the effectiveness of e-procurement for companies with other variables such as mediation variables and also differentiated e-procurement

with the presence of a vendor and researching the factors or strategies carried out by the company in using the digitalization system.

References

Administrator. (2016). *Potensi Permasalahan Hukum Dalam Pelaksanaan Pengadaan Barang / Jasa*. Https://Www.bppt.go.id. https://www.bppt.go.id/berita-bppt/potensipermasalahn-hukum-dalam-pelaksanaan-pengadaan-barang-jasa

Daryaatmaka, G. (2019, September 18). *Procurement Adalah? - Pembahasan Terlengkap di Internet!* Promise | Procurement Management Information System for Enterprise. https://promise.co.id/en/procurement-adalah-e-procurement-adalah-pembahasanterlengkap-di-internet/

Ervina. (2019, November 20). *Peran Penting Teknologi bagi Perkembangan Perusahaan*. Talenta.co. https://www.talenta.co/blog/insight-talenta/peran-penting-teknologi/

Ghozali, I. (2021). *Partial least squares: Konsep, teknik dan aplikasi smartpls 3.2.9* (3rd ed., pp. 65±85). Badan Penerbit Universitas Dipenogoro.

Ghozali, I., & Latan, H. (2012). *Partial Least Squares: Konsep, Teknik dan Aplikasi SmartPLS 2.0 M3*. Badan Penerbit Universitas Diponegoro.

Hakim, L., Hubeis, M., & Mulyati, H. (2020). Factors Affecting The Effectiveness of Eprocurement Application in the Bank Indonesia Office Jakarta. *American Journal of Humanities and Social Sciences Research*, *4*(9), 103±112. http://www.ajhssr.com/wpcontent/uploads/2020/09/N2049103112.pdf

Hartono, T. (2012). *Sistem Informasi Pengadaan Suku Cadang Kereta Pada PT. Kereta Api Indonesia (Persero) Daerah Operasi II Bandung*, 2, 1. https://doi.org/https://doi.org/10.34010/jamika.v2i1.678

Indrawanti. (2015). *Metode Penelitian Manajemen dan Bisnis : Konvigurasi Teknologi Komunikasi dan Informasi*. PT. Refika Aditama.

Kurniawan, A. (2022). *Sebarluaskan Nilai Positif e-Procurement | INAPROC*. Inaproc.id. https://inaproc.id/berita/Berita/Sebarluaskan-Nilai-Positif-e-Procurement

Prabowo, G. (2020, December 21). *Perkembangan Teknologi Transportasi di Indonesia*. Kompas. https://www.kompas.com/skola/read/2020/12/21/152002869/perkembanganteknologi-transportasi-di-indonesia

Statistik Transportasi Darat 2019. (2020, November 20). Www.bps.go.id. https://www.bps.go.id/publication/2020/11/20/ddce434c92536777bf07605d/statistik-transportasi-darat-2019.html

Statistik Transportasi Laut 2019. (2020, November 20). Bps.go.id. https://www.bps.go.id/publication/2020/11/20/a13c82a0a9f343720404cf45/statistiktransportasi-laut-2019.html

Statistik Transportasi Udara 2019. (2020, November 20). Www.bps.go.id. https://www.bps.go.id/publication/2020/11/20/231373341461207b51910a4a/statistik-transportasi-udara-2019.html

SOP Pengadaan Barang dan Jasa. (2016, March 29). Ppid.kai.id. https://ppid.kai.id/media/konten/118_sop_pengadaan_barang_dan_jasa.pdf

Sutedi, A. (2008). Aspek-aspek Hukum Pengadaan Barang dan Jasa Dan Berbagai Permasalahannya. Sinar Grafika

Situs Resmi PT Kereta Api Indonesia (Persero). (n.d.). Www.kai.id. Retrieved October 2, 2021, from https://www.kai.id/corporate/about_kai/

Putera, I. G. A. A. (2015). Kendala Pelaksanaan Sistem Pengadaan Barang/Jasa Pemerintah untuk Mewujudkan Pengadaan yang Efektif dan Efisien. *Prosiding Konferensi Nasional Teknik Sipil*.

Yudhistira. (2021, August 7). *Pengertian e-Procurement dan Kelebihannya untuk Usaha Anda*. Blog Bhinneka. https://www.bhinneka.com/blog/pengertian-e-procurement/