Risk management information systems assessment at the television broadcasting company

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Abstract. Information systems are the basis used as support for the company's business strategy. In the application of information systems, information system risk management needs to be done. In carrying out information system risk management, assessment is needed. The IT department of Rajawali Citra Televisi Indonesia company has a target of completing 600 tickets every month. The number of tickets that exceed the target of the IT department, has a gap to be a factor that influences the risk of information systems. The research was conducted to find information system risk factors and build an information system risk management assessment model. The method used in this research is confirmatory factor analysis. The factor influencing information risk is the threat factor to infrastructure. The formed model that can be used for risk management information system assessment is P = 6,934 + 1,184 X4. System risk can be said to be ideal if the company can reduce the threat factor to infrastructure, so that the risk of information systems can be minimized.

1. Introduction

For the achievement of the company's business goals, information systems are the basis used as support for the company's business strategy, in order to improve the quality of services and business operations. An important part of the organization shows that it has experienced some difficulties when determining IT investments [1]. If the application of IT is not in accordance with the company's business direction, it will pose a risk [2]. The information system and its assets are vulnerable to the risk of physical and logical damage [3]. Previous studies have shown that companies will often face various risks when using, maintaining, and improving information systems at the post-implementation stage [4]. When information systems are used, it is necessary to improve risk management of information systems on a regular basis [5]. Risk management is something that needs attention. Information system risk management can reduce risks in the form of: suboptimal business processes, financial losses, loss of company reputation, or the destruction of a company's business [2]. It is therefore necessary to assess risk management to reduce the impact of damage to the information system. Rajawali Citra Televisi Indonesia company is a large company engaged in broadcasting. Rajawali Citra Televisi Indonesia company is a television station with a Customer Segment targeted for families. To support the business process in increasing value, promotion, strategy, marketing, communication and programs certainly uses information systems. However, the information system of Rajawali Citra Televisi Indonesia company there are risks that can hamper business processes.

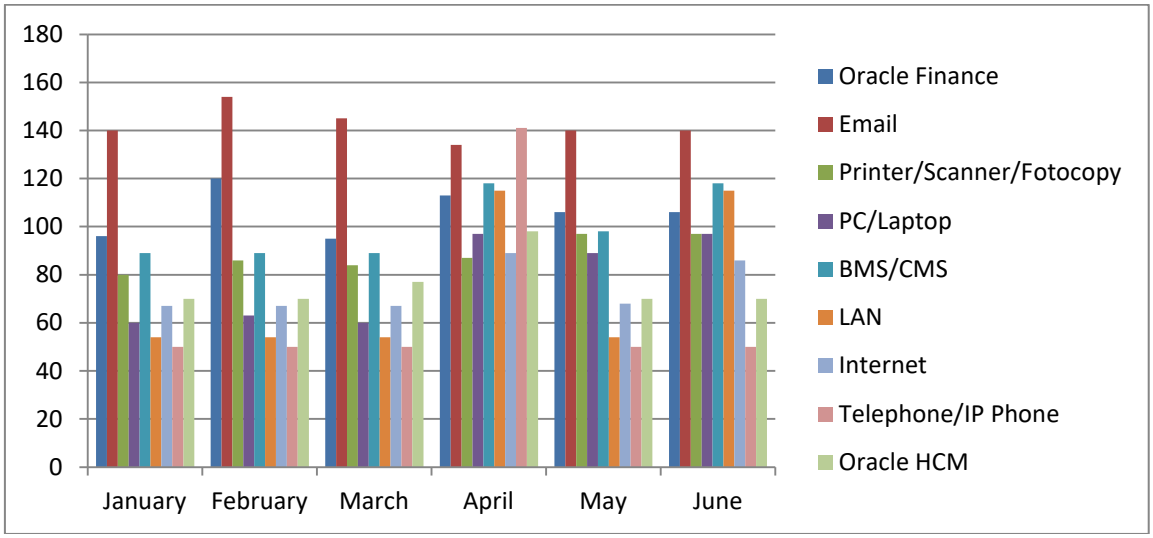

Figure 1. Performance ticketing january – june 2014

Figure 1. explains the problem of tickets that came in from January to June 2014 which are grouped according to the type of IT problems found in the company. Rajawali Citra Televisi Indonesia company has several applications that stand alone in each department / division (not integrated), so that many problems arise, both from the user side and from the application side. The problem with the information system is poured in the form of a ticket where the ticket is given to the IT department. The results of the entrance ticket compared to the ticket target determined by the IT Department each month, are shown in Figure 2.

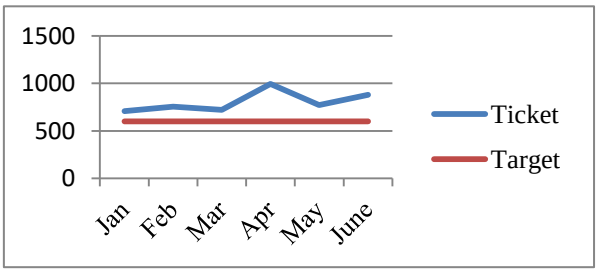

Figure 2. Ticketing data with achievement targets

The IT department has a target of completing 600 tickets every month, while the IT Helpdesk only has 10 employees. The number of tickets that exceed the IT department's target, causing gaps are considered as factors that influence information system risk. The larger the project, the greater the risk to the costs, staff, time and number of departments involved. There are five dimensions of risk factors for technological novelty, application size, lack of expertise, application complexity, and organizational environment [6]. Information system risk management has never been done in Rajawali Citra Televisi Indonesia company. This is what underlies the importance of conducting an information system risk management assessment at Rajawali Citra Televisi Indonesia company.

2. Methodology

2.1. Data Collection Techniques

In conducting research, there are 3 ways to collect data at Rajawali Citra Televisi Indonesia company.

a. Observation
   Observations were made for direct research on the research object to obtain data directly (primary data). In this observation, also collected documents relating to information systems in the Rajawali Citra Televisi Indonesia company.

b. Literature Study

In supporting the implementation of research, researchers conducted a literature study. The step taken is to look for journals and books that are relevant to the topics and cases raised. In short, the journal used as a reference is information system risk and risk factors: what is the most about information systems? By Susan A. Sherer and Steven Alter [7]. In the journal, there are factors and indicators that influence information system risk management. Factors and indicators become a reference in the preparation of the questionnaire. Factors and indicators that affect information system risk management are explained in Table 1.

Table 1. The relationship between concepts / theories, factors and indicators of information system risk management

Topik	Factors	Indicator	Source	Statement
IS RISK MANAGEMENT [Is Risks And Risk Factors By Susan A. Sherer]	Risks Related to Information	Project size	Information Technology Research Group, Inc. (2003). [8]	Project size has a large impact on the level of complexity and risk.
		Application Size	Wallace, Linda et al. (2004). [6]	The bigger the project, the greater the risk.
		External dependencies not met	Jones, C. G., Gray, G. L., & Miller, D. W. (2010). [9]	One risk beyond external dependencies is not met.
		Insufficient documentation of development environment	Rajavat, A., & Tokekar, V. (2014). [10]	One way is to reduce risk by measuring the risk component. Lack of documentation of the development environment is one component used to measure risk.
		Problematic interfaces	Worrell, J., & Bush, A. (2007). [11]	Problematic interface between systems is one risk factor
		System interdependence	La Porte, T. M. (2006). [12]	Critical infrastructure defense will not be guaranteed by companies for large interdependent systems.
		Information overload	Pennington, R., & Tuttle, B. (2007). [13]	System risk assessment provides support that information overload will reduce the effectiveness of information systems
		Poor information about project inputs and outcomes	Snyder, Rell. (2014). [14]	The many uncertainties of requirements and objectives in the early stages of a project make it difficult to identify criteria at the detailed level.
		Problematic data conversion	Schwartz, Eric et al. (2007). [15]	Converting data to information systems is very risky and usually underestimated. Data

			conversion projects are rarely done without errors.
Risks Related to Technology	New technology	Sargent, K et al. (2012) [16]	When implementing new technology, it is generally not ready to adopt the technology and employees refuse to be introduced.
	New software	Tullio, Di et al. (2013). [17]	Software development is often characterized by inadequate planning, poor understanding of the overall development process, and no clear management framework.
Risks Related to the Environment	Difficulty justifying benefits	Achmad Reza Viyanto et al. (2013). [18]	Information technology is expected to increase employee productivity, but information technology has a detrimental effect on users due to lack of understanding of the risk dimensions of information technology
	Lack of top management support and understanding	Tohidi, H. (2011). [19]	Operation of the program requires the support and participation of managers to reduce the risk of IT assessment.
	Change in ownership or senior management	Liu, S., & Wang, L. (2014). [20]	One measure of risk that exists in an intern IT outsourcing project is a change in ownership or senior management.
	Unstable corporate environment	Zavgorodniy, V., Lukyanov, P., & Nazarov, S. (2014). [5]	The instability of a company's environment, which is caused by factors such as competitive pressure, can change the company's project needs and sometimes can make the whole project not last long
	Unauthorized physical access	Eugene Schultz, E. (2007). [21]	The theft of many assets due to unauthorized physical security access, senior managers feel that physical security under supervision is very risky
	Theft	Jakaria, D. A et al .(2013). [3]	One physical risk is theft.
	Hackers	Nawaz, A., & Siddiqui, A.	The more systems there are the more hacking

			(2013). [22]	opportunities for hackers.
	Risks Related to the Infrastructure	ERP infrastructure problems	Pan, K., Nunes, M. B., & Peng, G. C. (2011). [4]	Companies will often face various risks when using, maintaining and improving ERP systems in the post-implementation stage.
		Poor help desk and support problems	Garg, R. K., Gera, M., & Das, J. K. (2006). [23]	Information systems cause large-scale transformation in an organization, if changes are not managed properly, it can be a threat to the information system and the problem will be compounded due to bad help desk and no system support.
		Limited telecommunications infrastructure	Apulu, I., & Ige, E. O. (2011). [24]	Lack of telecommunications infrastructure such as poor internet connectivity, is one of the obstacles that affects the effective use of ICT.
		Rigid hierarchical structures	Orman, L. V. (2011). [25]	Rigid hierarchical structures illustrate the role of organizations and simple work, so look boring.
		Organizational inflexibility	Stonebraker, P. W., & Liao, J. (2004). [26]	The lack of flexibility of the organization will bring up the associated risks
	Risks Related to Strategy	Organizational alignment	Maulana, M.M, Supangkat, S.H. 2006. [2]	The application of IT requires strategic planning so that its application can be aligned with its business objectives. If IT is not in line with the company's business direction, it will pose a risk.
		Lack of strategic vision	Love, Peter E.D. et al. 2004. [1]	Lack of strategic vision is a key factor hampering the organization's business processes.

c. Questionnaires
Questionnaires will be given to several parties related to information systems such as operators, IT Helpdesk, staff, managers and directors, to find out how important risk management assessments are carried out on information systems.

d. Conceptual Framework

The conceptual framework describes research in which the factors and indicators obtained are then processed to compile a questionnaire. Data from observations and questionnaires are then processed by confirmatory factor analysis. The results of the processed data will provide a new variable which is considered as a factor that influences the risk of information systems at Rajawali Citra Televisi Indonesia. Then build a model that can be used to assess the risk management of information systems at Rajawali Citra Televisi Indonesia.

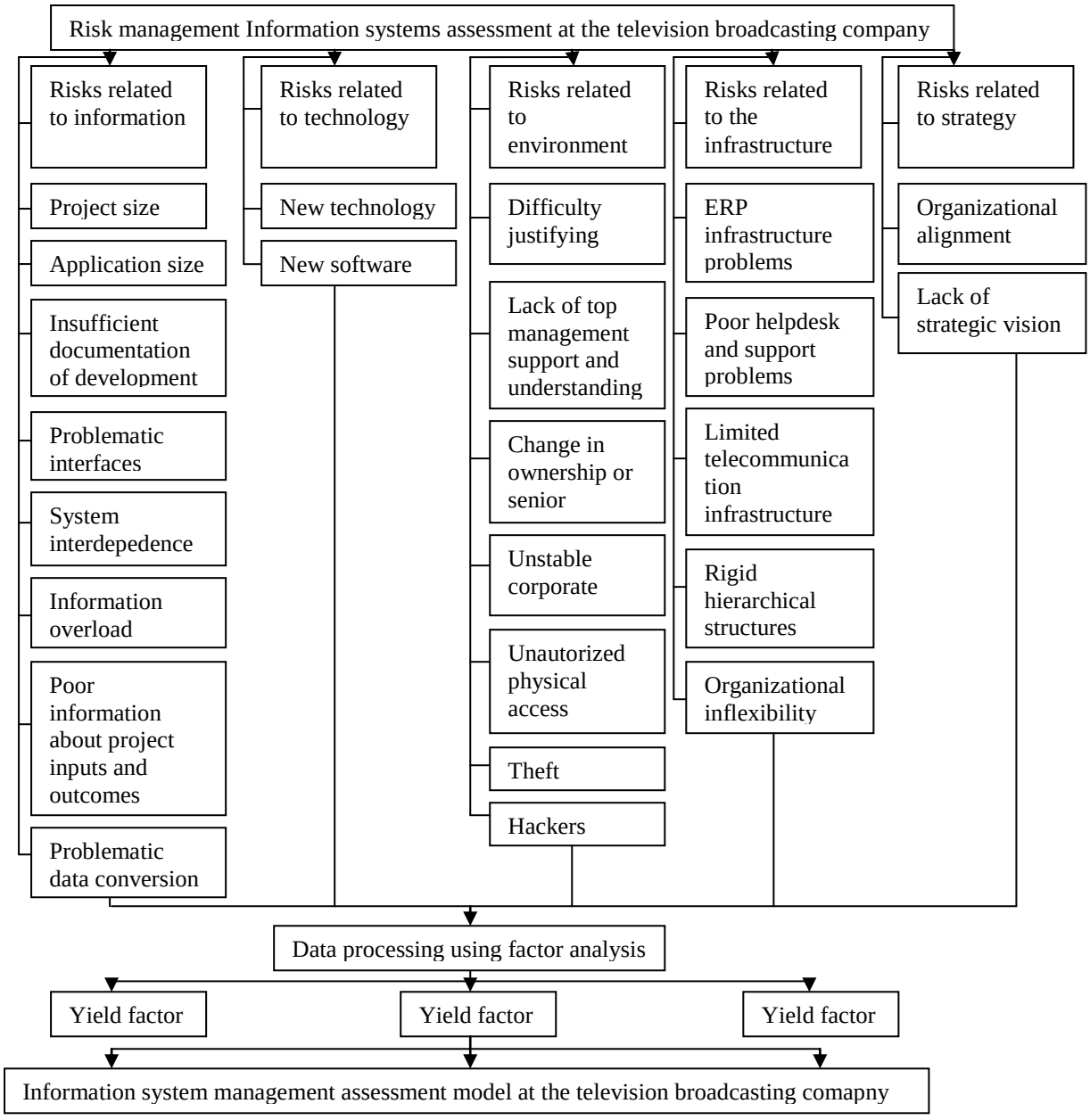

Figure 3. Conceptual framework

2.2 Population and Samples

Participants in this research are all employees who work at Rajawali Citra Televisi Indonesia. Samples were users of information systems at Rajawali Citra Televisi Indonesia, both operators, IT Helpdesks, staff, managers and directors.

2.3 Factor Hypotheses

Based on literature studies that have been carried out in previous studies, the formulation of hypotheses proposed in this study is:

H1: Risk factors for information have a positive effect on the risk of information systems.
H2: Risk factors for technology have a positive effect on the risk of information systems.
H3: Risk factors for the environment have a positive effect on the risk of information systems.
H4: Risk factors for infrastructure have a positive effect on the risk of information systems.
H5: Risk factors for strategy have a positive effect on the risk of information systems.

The factors described above can be described as follows:

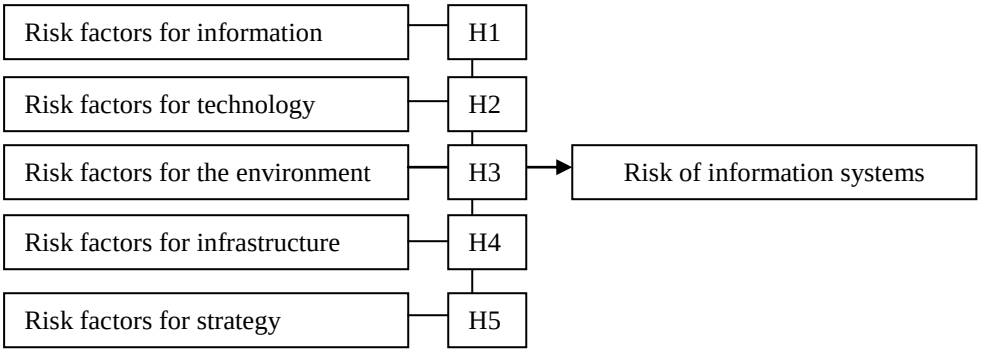

Figure 4. Factor hypothesis

2.4 Confirmatory Factor Analysis Methods

The research method used is confirmatory factor analysis and regression analysis. the stages of confirmatory factor analysis are:

a. Make correspondent demographics from the questionnaire results obtained. Correspondent demographics are based on; the name of the directorate / division, position / position in the company, the risk level of the information system in the company Rajawali Citra Televisi Indonesia, long using the information system.
b. Make the reliability test stage. The reliability test of the questionnaire was carried out by looking at the coefficient / alpha values resulting from calculations using the Cronbach Alpha method. Cronbach's Alpha value of 25 variables must have a value greater than 0.7.
c. Make the validity test stage. Validity test can be done by getting a value from the Kaiser Meyer Olkin Measure from Adequac Sampling. If the KMO value is more than 0.5, the available data can be declar valid and suitable for use when conducting a confirmation factor analysis.
d. Anti Correlation Image. In the Anti Correlation image search stage, what needs to be considered in the table is the number of Measures of Sampling Adequacy which is represented by the letter (a) at the top of the numbers. The range of MSA values is between 0 and 1. If the MSA number is <0.5, the related variable cannot be further analyzed or excluded from other variables.
e. Make confirmation factor analysis. The description of the confirmatory factor analysis model is:

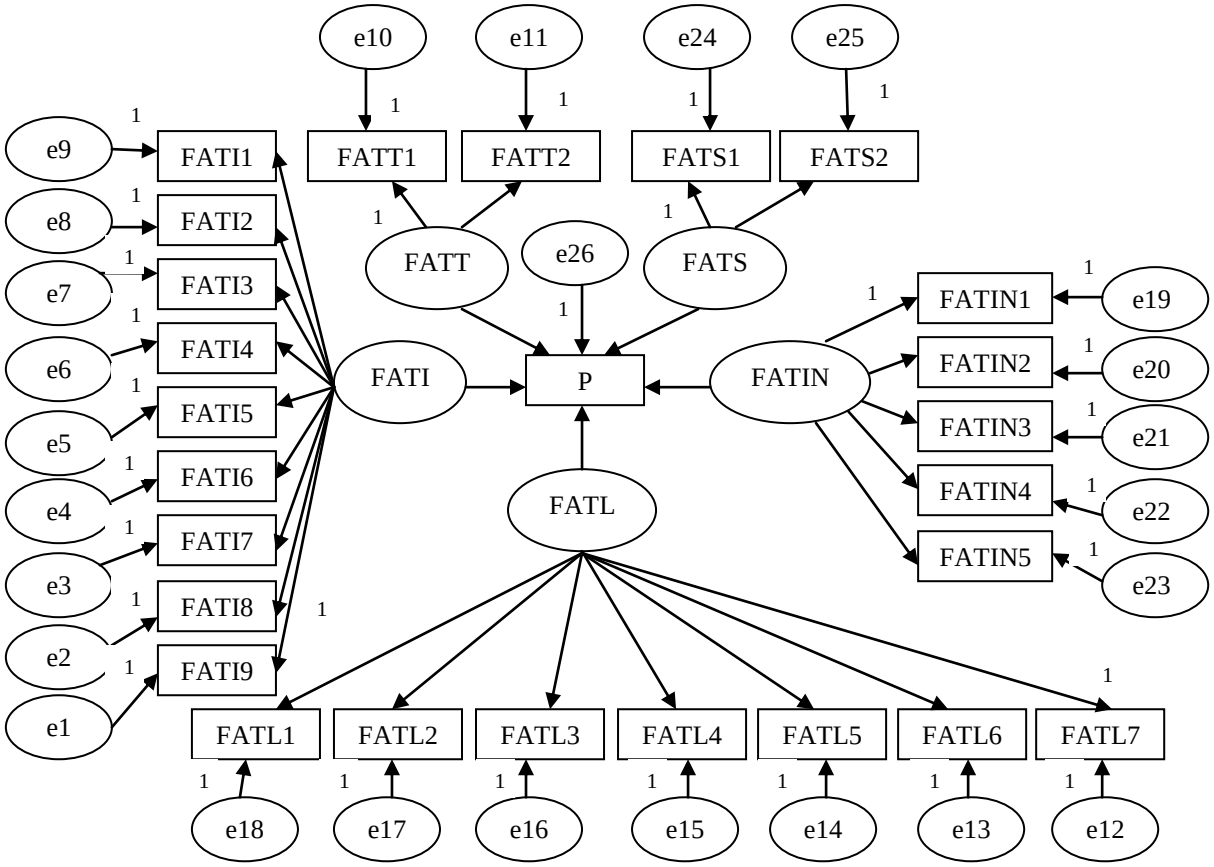

Figure 5. Confirmatory factor analysis

After conducting confirmatory factor analysis, the next step is to do multiple linear regression to model the relationships between several correlated variables. This relationship can be seen in the following equation model:

$$\boldsymbol{P = \beta_1 FATI + \beta_2 FATT + \beta_3 FATL + \beta_4 FATIN + \beta_5 FATS + e} \quad \textbf{(1)}$$

Where:
P = Information System Risk
FATI = Information Threat Factor
FATT = Technology Threat Factor
FATL = Environmental Threat Factor
FATIN = Infrastructure Threat Factor
FATS = Strategy Threat Factor
e = Disturbance Error
β1 , .. . , β6 = regression parameters

f. Make regression analysis with the value of the information system risk level obtained from the questionnaire data. Then obtained factors that influence the risk of Information Systems. This factor will be used to assess information systems in Rajawali Citra Televisi Indonesia.
g. Building a model of factors that influence information system risk in Rajawali Citra Televisi Indonesia company. This model can be used to assess risk management information systems in Rajawali Citra Televisi Indonesia
h. Information systems at Rajawali Citra Televisi Indonesia companies can be said to be ideal if they can reduce the factors that influence them, so that gaps that can affect the risk of

information systems can be minimized. On the other hand, the condition of information systems in Rajawali Citra Televisi Indonesia companies can be in an extreme position if the factors have increased so that the gaps that can affect the occurrence of information system risks become large

3. Results

3.1. Research Limitations

- The object of research is the information system of Rajawali Citra Televisi Indonesia company.
- Conduct an analysis of the risk of information systems at Rajawali Citra Televisi Indonesia company with an analysis of factors and indicators to improve company performance.
- Analyzing the risk of information systems at Rajawali Citra Televisi Indonesia company using Factor Analysis.
- Data sources in the study are related parties such as operators, IT Helpdesk, staff, managers and directors of Rajawali Citra Televisi Indonesia company.
- Research subjects were 76 respondents.

The 76 respondents filled out the questionnaire that had been distributed, there were several names of directorates / divisions as Technical and Facility 20% (15 respondents), IT 14% (11 respondents), Finance 13% (10 respondents), Studio and Outside Broadcasting 13 % (10 respondents), Budget and Control 8% (6 respondents), Purchasing 5% (4 respondents), Marketing Communication 5% (4 respondents), Production Operations 7% (5 respondents), News Production 8 % (6 respondents), HR and GE by 7% (5 respondents). This shows that many directorates as respondents are Technical and Facility.

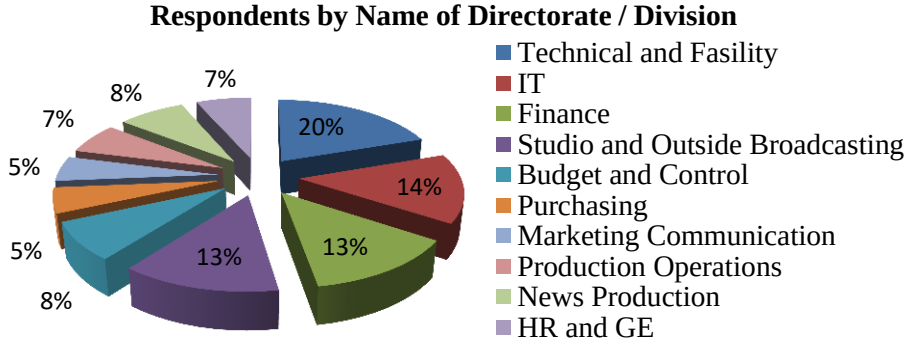

Figure 6. Respondents by name of directorate/division

The 76 respondents filled out the questionnaire that had been distributed, there were several positions / positions as Director as much as 1% (1 respondent), General Manager as much as 3% (2 respondents), Manager as much as 13% (10 respondents), Head Section as much as 18% (14 respondents), Assistant Head as much as 8% (6 respondents), Staff 57% (43 respondents). This shows that many positions as respondents are staff. 76 respondents filled out the questionnaire that had been distributed, there were several positions / positions as Director as much as 1% (1 respondent), General Manager as much as 3% (2 respondents), Manager as much as 13% (10 respondents), Head Section as much as 18% (14 respondents), Assistant Head as much as 8% (6 respondents), Staff 57% (43 respondents). This shows that many positions as respondents are staff.

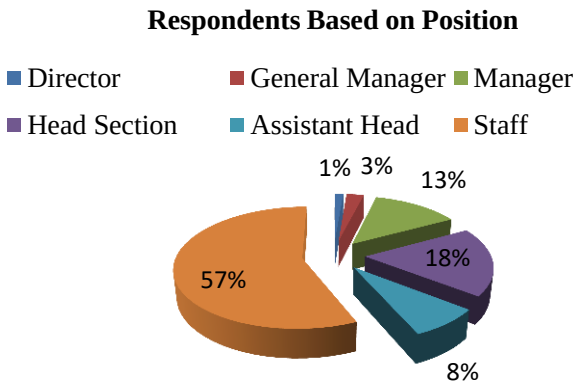

Figure 7. Respondents based on position

The 76 respondents filled out a questionnaire that had been distributed, there were several respondents saying the level of information system risk was high in PT. Rajawali Citra Televisi Indonesia as much as 89% (68 respondents) and respondents said the risk level of the information system is low at PT. Rajawali Citra Televisi Indonesia as much as 11% (8 respondents). This shows that more said the high level of risk in information systems at Rajawali Citra Television.

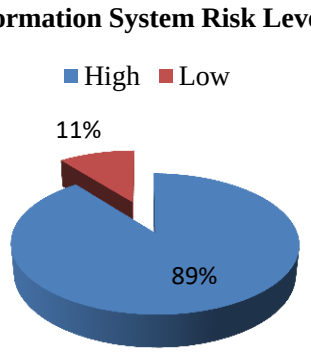

Figure 8. Respondent's response for information system risk level

The 76 respondents filled out the questionnaire that had been distributed, there were vulnerable times of use of SI, which < 1 year were 8% (6 respondents), 1-2 years were 30% (23 respondents), 2-3 years were 18% (14 respondents) , 3-4 Years 9% (7 respondents), > 4 Years 34% (26 respondents). This shows that more respondents used the Information System over a span of > 4 years.

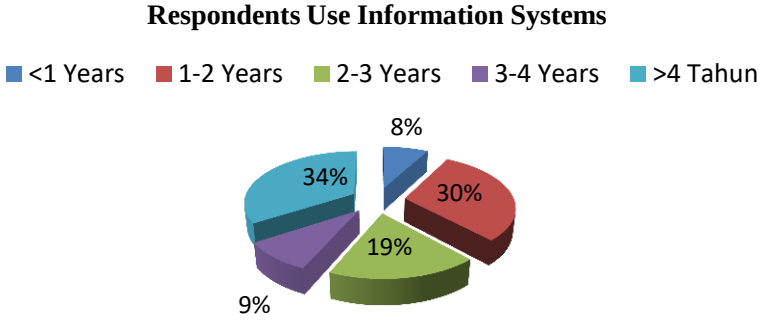

Figure 9. Respondents use information systems

3.2. Reliability Test

Reliability testing aims to see the consistency of research instruments and to find out whether the data obtain is feasible or not to be process to the next stage. By using IBM SPSS Statistics 22, the reliability testing of the questionnaire was carry out by looking at the coefficient / alpha values generat from calculations using the Cronbach Alpha method. Can be see in Table 2. that the results of a valid number of N (respondents) are 76 respondents receiv by researchers, case processing summary to determine the Chronbach Alpha value.

Table 2. Case processing summary

		N	%
Cases	**Valid**	76	100,0
	Excluded[a]	0	,0
	Total	76	100,0

It can be see from the reliability test results with IBM SPSS Statistics 22, Cronbach's Alpha value in Table 3. of 25 variables that have a value greater than 0.7, which is 0.900 so it can be said that the instruments use in the study can be said to be reliable.

Table 3. Reliability test results

Cronbach's Alpha	**N of items**
,900	25

3.3. Validity Test

In addition to conducting a reliability test, the questionnaire must also be tested for validity. Validity testing can be done by getting a value from the Kaiser Meyer Olkin Measure of Sampling Adequac. If the KMO value is more than 0.5, the available data can be declared valid and is suitable for use when conducting a factor analysis. Judging from Table 4. KMO and Bartlett's Test using IBM SPSS Statistics 22 can be known the value of KMO is 0.815. This value meets the requirements because it has a value above 0.5 so it is feasible to use for factor analysis.

Table 4. KMO and Bartlett's results

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,815
Bartlett's Test of Sphericity	Approx. Chi-Square	1353,074
	df	300
	Sig.	,000

3.4. Confirmatory Factor Analysis

Confirmatory factor analysis is used to examine patterns of relationships between latent constructs. This includes several constructs in the model measured through a number of indicators. Confirmatory factor analysis in the research needs to be done in order to obtain the appropriate loading factors for each of the factors studied before multiple regression analysis is performed. The results of the Confirmatory Factor Analysis calculation for 5 factors using the data analysis program AMOS version 22 can be seen in Figure 10. the following:

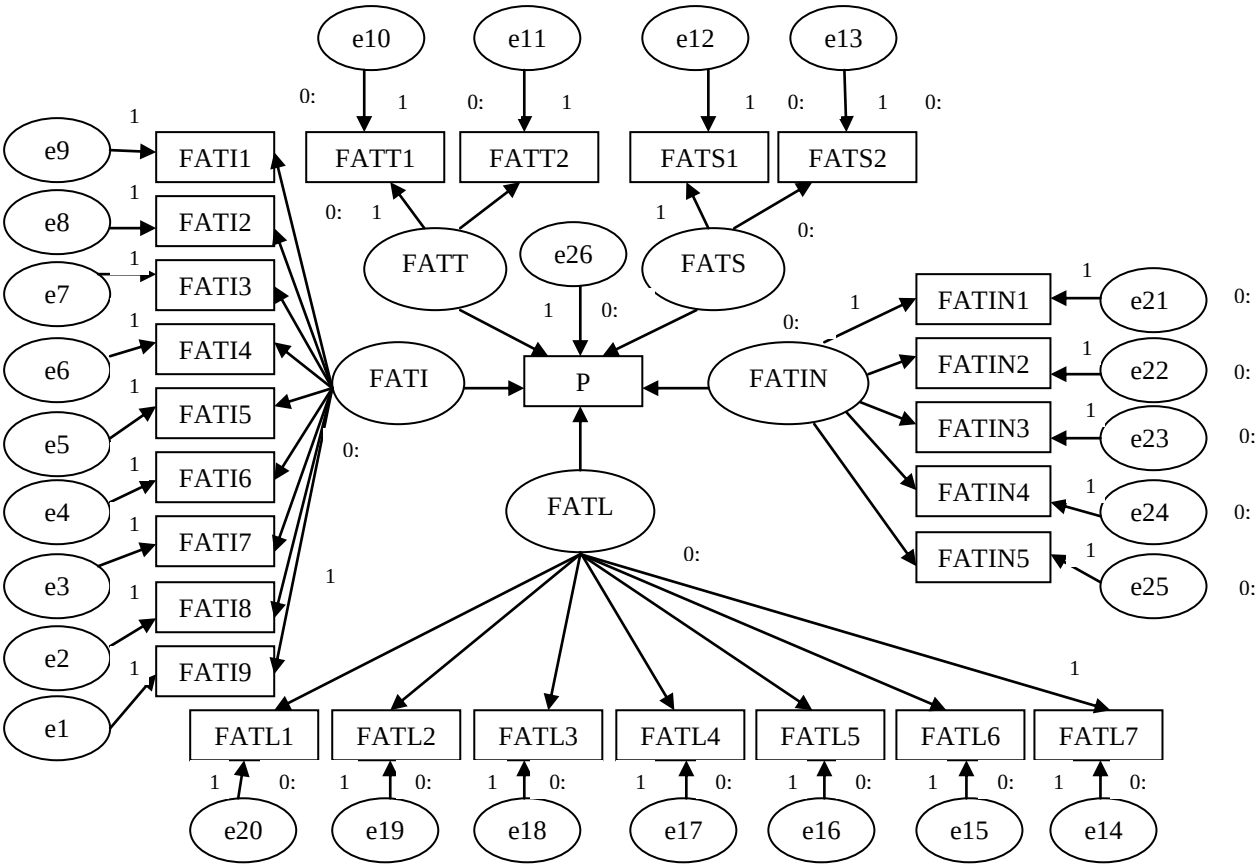

Figure 10. Confirmatory factor analysis 5 factors

3.5. Hypothesis Testing

Based on the results of the regression analysis in Table 5. using 5 factors, the significance value of each factor can be known, namely 0.328, 0.750, 0.957, 0.001 and 0.232. Significant value is said to be reliable for use as an information system risk management assessment model if it has a significance value below 0.5%.

a. Hypothesis Testing H1
   The H1 hypothesis in the study conducted states that threats to information affect the risk of information systems. From Table 5. the significant value of the p value is 0.328, which means that the significant value is above 0.5%. Therefore, the H1 hypothesis cannot be accepted or rejected.
b. Hypothesis Testing H2
   The H2 hypothesis in the research conducted states that threats to technology affect the risk of information systems. From Table 5. the significant value of the p value is 0.750, which means that the significant value is above 0.5%. Therefore, the H2 hypothesis cannot be accepted or rejected.
c. Hypothesis Testing H3
   The H3 hypothesis in the research conducted states that threats to the environment affect the risk of information systems. From Table 5. the significant value of the p value is 0.957, which means that the significant value is above 0.5%. Therefore, hypothesis H3 cannot be accepted or rejected.
d. Hypothesis Testing H4

The H4 hypothesis in the research conducted states that threats to infrastructure affect the risk of information systems. From Table 5. The significant value of p value is 0.001, which means that the significance value is below 0.5%. Therefore, the H4 hypothesis can be accepted.

e. Hypothesis Testing H5
The H5 hypothesis in the research conducted states that threats to the strategy affect the risk of information systems. From Table 5. the significant value of the p value is 0.232, which means that the significant value is above 0.5%. Therefore, hypothesis H5 cannot be accepted or rejected.

So of the five factors, there is one factor that can be said to be reliable, namely: factor (X4) with a significant value of 0.001 and has a value of 1.184.

Table 5. Regression using 5 factors

	Estimate	S.E.	C.R.	P	Label
FATI9 ← FATI	1,000				
FATI8 ← FATI	,293	,073	3,992	***	
FATI7 ← FATI	,400	,077	5,157	***	
FATI6 ← FATI	,838	,117	7,156	***	
FATI5 ← FATI	,476	,095	5,007	***	
FATI4 ← FATI	,217	,100	2,162	,031	
FATI3 ← FATI	,738	,097	7,616	***	
FATI2 ← FATI	,232	,087	2,675	,007	
FATI1 ← FATI	-,015	,095	-,162	,871	
FATT1 ← FATT	1,000				
FATT2 ← FATT	-,055	,184	-,296	,767	
FATL7 ← FATL	1,000				
FATL6 ← FATL	,640	,142	4,512	***	
FATL5 ← FATL	,123	,090	1,364	,172	
FATL4 ← FATL	,121	,094	1,283	,200	
FATL3 ← FATL	-,065	,098	-,666	,505	
FATL2 ← FATL	-,148	,093	-1,592	,111	
FATL1 ← FATL	,683	,146	4,682	***	
FATIN1 ← FATIN	1,000				
FATIN2 ← FATIN	,456	,144	3,170	,002	
FATIN3 ← FATIN	1,201	,247	4,864	***	
FATIN4 ← FATIN	,579	,148	3,906	***	
FATIN5 ← FATIN	,180	,126	1,431	,152	
FATS1 ← FATS	1,000				
FATS2 ← FATS	,033	,611	,055	,956	
P ← FATI	-,214	,219	-,977	,328	
P ← FATT	,579	1,819	,318	,750	
P ← FATS	-,034	,626	-,054	,957	
P ← FATIN	1,184	,364	3,252	,001	
P ← FATL	-,240	,201	-1,196	,232	

Table 6. Intercepts

	Estimate	S.E.	C.R.	P	Label
FATI9	3,605	,117	30,788	***	
FATI8	3,947	,062	63,844	***	
FATI7	3,974	,067	58,896	***	
FATI6	3,526	,108	32,538	***	
FATI5	3,566	,082	43,291	***	
FATI4	4,053	,081	49,772	***	
FATI3	3,553	,091	39,212	***	
FATI2	3,961	,071	55,639	***	
FATI1	3,987	,076	52,408	***	
FATT1	3,474	,112	31,136	***	
FATT2	4,118	,067	61,056	***	
FATL7	3,079	,114	27,109	***	
FATL6	3,079	,112	27,486	***	
FATL5	3,632	,079	45,898	***	
FATL4	3,461	,083	41,899	***	
FATL3	3,934	,087	45,470	***	
FATL2	3,947	,081	48,480	***	
FATL1	3,513	,113	31,047	***	
FATIN1	3,658	,097	37,897	***	
FATIN2	3,882	,075	51,858	***	
FATIN3	3,553	,105	33,849	***	
FATIN4	3,789	,076	50,084	***	
FATIN5	4,145	,067	62,080	***	
FATS1	4,158	,059	69,923	***	
FATS2	3,921	,059	66,992	***	
P	6,934	,208	33,344	***	

The following is a summary of the results of the factor hypothesis test:

Table 7. Factor Hypothesis Test Results

	Factor Hypothesis	Conclusion
H1	The threat factor to information has a positive influence on the risk of information systems.	Not accepted
H2	The threat factor to technology has a positive influence on the risk of information systems.	Not accepted
H3	The threat factor to the environment has a positive influence on the risk of information systems.	Not accepted
H4	The threat factor to infrastructure has a positive influence on the risk of information systems.	Accepted
H5	The threat factor to the strategy has a positive influence on the risk of the information system.	Not accepted

Models that can be used for Information Systems Risk Management Assessment from these values a model can be built as follows:

$$\mathbf{P = 6.934 + 1.184\,X4} \quad \textbf{(2)}$$

Where:
P = Information system risk
X4 = Infrastructure Threat Factor

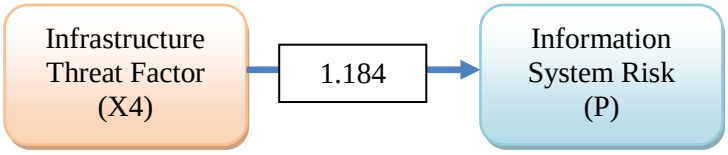

Figure 11. Factors and values used for information systems risk management assessment

Value (P) is obtained from the intercept table of 6.934. From the model in Figure 11., it can be seen that the fourth factor threat to infrastructure (X4) has a positive value of 1.184 which impacts the risk of information systems (P).

4. Discussion

4.1. Managerial Implications

Managerial implications that can be applied to the assessment of information systems risk management are: The fourth factor by increasing infrastructure support for information systems will reduce the impact of information system risks at Rajawali Citra Televisi Indonesia company and can minimize threats to existing infrastructure. Development and improvement of infrastructure support is carried out in order to increase user accessibility so as to minimize the risks that occur in information systems. Companies that already have a computerized data processing system, when going to develop the information system will face problems in physical and non-physical aspects. Physical aspects include (1) development costs, (2) hardware upgrading, and (3) creation of certain infrastructure. With good support for the creation of certain infrastructure, can overcome the existing problems [27].

5. Conclusion

Based on the results of research conducted, then obtained in accordance with the hypothesis: the existence of factors that influence the risk of information systems in Rajawali Citra Televisi Indonesia company. conduct literature studies to look for factors that are suspected of having an influence on information system risk. After finding the factors and indicators with the help of journals, 25 statements were formed which were processed into questionnaires. The questionnaire was processed using IBM SPSS Statistics 22 and IBM SPSS Amos 22, so as to produce factors that influence the risk of information systems in Rajawali Citra Televisi Indonesia. as for the factors that influence the risk of information on Rajawali Citra Televisi Indonesia companies: the threat factor to infrastructure. From this factor, a model that can be used to assess the risk management of information systems in Rajawali Citra Televisi Indonesia is formed, such as:

$$\mathbf{P = 6.934 + 1.184\,X4} \quad \textbf{(3)}$$

Information system risk in Rajawali Citra Television Indonesia companies can be said to be ideal if the company can reduce the threat factor to infrastructure. So that gaps that can affect the risk of information systems can be minimized. On the other hand, the condition of corporate information systems Rajawali Citra Televisi Indonesia can be in an extreme position if risk factors increase for infrastructure so that gaps can affect the risk of information systems becoming large.

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References

[1] Peter E.D. Love and Zahir Irani 2004 An exploratory study of information technology evaluation and benefits management practices of SMEs in the construction industry *Information & Management* **42** no 1 pp 227-242

[2] M. M. Maulana and S. H. Supangkat 2006 Modeling Information Technology Risk Management Framework for Companies in Developing Countries *Proceedings of the National Conference on Information & Communication Technology for Indonesia* pp 121-126

[3] D. A. Jakaria, Dirgahayu R. Teduh, and Hendrik 2013 Academic Information System Risk Management in Higher Education Using the Octave Allegro Method *National Seminar on Information Technology Applications (SNATI)* pp E 37-42

[4] K., Nunes, M. B. Pan and G. C. Peng 2011 Risks affecting ERP post-implementation: Insights from a large Chinese manufacturing group *Journal of Manufacturing Technology Management* **22** no 1 pp 107-130

[5] V. Zavgorodniy, P. Lukyanov, and S Nazarov 2014 The Selection Algorithm of Mechanisms for Management of Information Risks *Procedia Computer Science* **31** pp 440-448

[6] Linda Wallace, Mark Keil, and Arun Rai 2004 Understanding software project risk: a cluster analysis *Information & Management* **42** pp 115-125

[7] Susan A Sherer and Steven Alter 2004 Information System Risks And Risk Factors: Are They Mostly About Information Systems? *Communications of the Association for Information Systems* **14** pp 29-64

[8] Inc Information Technology Research Group 2003 When It Comes to Projects, Size Does Matter *Info - Tech Advisor Newsletter*

[9] C. G. Jones, G. L. Gray, and D. W Miller 2010 Strategies for improving systems development project success *management* **10** pp 41-43

[10] A. Rajavat and V Tokekar 2014 Investigation Of Quality And Functional Risk Issues In Reengineering Process Of Legacy Software System *International Journal Of Programming Languages & Applications* **4** no 1

[11] J. Worrell and A Bush 2007 Perceptions of Information Technology risk: a Delphi study

[12] T. M La Porte 2006 Organizational strategies for complex system resilience, reliability, and adaptation *Seeds of Disaster, Roots of Response: How Private Action Can Reduce Public Vulnerability* pp 135-153

[13] R. Pennington and B Tuttle 2007 The effects of information overload on software project risk assessment* *Decision Sciences* **38** no 3 pp 489-526

[14] Rell. Snyder 2014 Project Risk Management Within Information Systems in *Proceedings Of Asbbs* Las Vegas

[15] Eric Schwartz 2007 Making Data Conversions Less Painful DM Review: New York SourceMedia

[16] K Sargent 2012 Factors influencing the adoption of information technology in a construction business *Australasian Journal of Construction Economics and Building* **12** no 2 pp 72-86

[17] Di Tullio 2013 The impact of Software Process Maturity on Software Project Performance: The Contingent Role of Software Development Risk *Systèmesd'Informationet Management* pp 85-116

[18] Reza, Viyanto Achmad 2013 Manajemen Risiko Teknologi Informasi: Studi Kasus Pada Perusahaan Jasa *ComTech* **4** no 1 pp 43-54

[19] H. Tohidi 2011 The Role of Risk Management in IT systems of organizations *Procedia Computer Science* **3** pp 881-887

[20] S. Liu and L. Wang 2014 Understanding the impact of risks on performance in internal and outsourced information technology projects: The role of strategic importance *International*

Journal of Project Management

[21] E Eugene Schultz Risks due to convergence of physical security systems and information technology environments *Information Security Technical Report* **12** no 2 pp 80-84

[22] A. Nawaz and A Siddiqui 2013 Fraud Risk–The Role of Information Technology *Indus Journal of Management Sciences* **1** no 1

[23] R. K. Garg, M. Gera, and J. K Das 2006 A variable-based approach to the design, development, implementation and institutionalization of information systems in the forest sector *Forestry* **79** no 5 pp 515-533

[24] I. Apulu and E. O. Ige Are Nigeria SMEs Effectively Utilizing ICT? *International Journal of Business and Management* **6** no 6 p 207

[25] L. V Orman 2011The potential of virtual institutions *IEEE Technology and Society* **30** no 1 p 56

[26] P. W. Stonebraker and J Liao Environmental turbulence, strategic orientation: modeling supply chain integration *International Journal of Operations & Production Management* **24** no 10 pp 1037-1054

[27] Bambang Widarno 2008 Effectiveness of Planning and Development of Information Systems *Journal of Accounting and Information Technology Systems* **6** no 1 pp 1-13