

Project Management: Model Research in Success Rate of A Digital Start-Up Project

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Abstract—Recently, there is a rapidly growth of digital startup companies in Indonesia, but at the same time many of which are not successful. One of the main factors is the implementation of the project management related for product and services. This paper discusses how project management as a model able to increase success rate of digital startup project. The research data was obtained from a questionnaire with the criteria of the company in the sector of digital content providers. In this study, researchers conducted a test model of project management combined 10 knowledge areas of Project Management with the Triple Constraints using smartPLS approach Start Equation Model (SEM) to determine the model tested is significant with the data available today can improve a project's success digital start-up company.

Keywords: *Project Management, smartPLS, Structural Equation Model, 10 Knowledge Area, Triple Constraint*

I. INTRODUCTION

Indonesia ranks number 4 worldwide in terms of population; right behind China, India and United States, and has more than 250 million people spread across the archipelago. The country is currently deemed as the most attractive market in Southeast Asia and its not only because it's the most populated nation in the region but because it has the most widespread internet users. According to studies, Indonesian internet users amounted to 102.8 million in 2016. Not surprisingly, those numbers have resulted in the fast development of startup company across the country.

Growth of startup companies in Indonesia is lacking and left behind from the other Asian countries. Therefore, to many factors which are still not ready for startup ecosystem in Indonesia. In ASEAN countries such as Singapore, the government built a startup agency supervise in every field like NRF, SPRING Singapore, ACE, Comcare, NPVC, EWI and Singapore government invest on local startup help them to growth [13].

Number of digital startup companies in Indonesia has registered on www.startupranking.com with amount 875 company and will further in upcoming year. In Indonesia, growth of digital device usage and the internet also affected growth of digital startup companies. Based on projected results in 2015

estimated business value of e-commerce is 15 billion US\$, and in 2020 Indonesia government targeting the estimated business value of e-commerce is 130 billion US\$. At the same time, rapidly growth digital startup companies in Indonesia, has many digital startup companies fail. Many factors affect the failure of digital startup companies, e.g. the selection of team members until the pitching stage on investor. One of the main factors is the implementation of the project management in digital startup related for product and services.

In the course of development digital startup project, founder should map out all the planning product that will be built until get funding from investors, but there are some digital startup companies developed through bootstrapping, using a limited budget in developing products that are divided into several parts of the project in order to achieve the desired quality founder must pay attention to the triple constraints. Triple constraints include scope, time and cost. In order to achieve triple constraints in digital startup project, founder should manage and ensure the team who joined have skill sufficient in developing digital startup project in accordance with the predetermined targets. In order to increase the success rate of a project, there are a lot of project management system that has adaptabilities depending on the project that will be developed. Project management system started with traditional system until using system with high flexibilities. Therefore, selection of model project management system or framework precisely can increase success rate and fulfill triple constraints from digital startup project.

The aims of this research study are to develop basic model of project management using 10 knowledge are project management and to find the final model using empirical data that will improve the success rate of digital startup project in Indonesia.

II. LITERATURE REVIEW

So many approach framework and theory for project management such as 10 knowledge area project management, PMBOK, CMMI, PRINCE2, RUP and MSF. But in this research used 10 knowledge area project management combine with triple constraints as basic model because on 10 knowledge area project management have complete section of management and integration each section not like other approach framework or theory^[1].

A. 10 Knowledge Area Project Management

10 knowledge area project management consist of^{[1], [2]} :

1. Project scope management involves defining and managing all the work required to complete the project successfully. Six main processes are involved in project scope management: Planning scope management, collecting requirements, defining scope, creating the WBS, validating scope and controlling scope.
2. Project time management include estimating how long it will take to complete the work. Developing an acceptable project schedule, and ensuring timely completion of the project. Five main processes are involved in project time management: define activities, sequence activities, estimate activity resources & duration, develop schedule, control schedule.
3. Project cost management consists of preparing and managing the budget for the project. Three main processes are involved in project cost management: estimate cost, determine cost, and control cost.
4. Project quality management ensures that the project will satisfy the stated or implied needs for which it was undertaken. Three main processes are involved in project quality management: plan quality management, perform quality assurance, perform quality control
5. Project human resources management is concerned with making effective use of the people involved with the project. Four main processes are involved in project human resource management: develop human resource plan, acquire project team, develop project team and manage project team.
6. Project communication management involves generating, collecting disseminating, and storing project information. Five main processes are involved in project communication management: identify stakeholders, plan communication, distribute information, manage stakeholder's expectations, monitoring and controlling.
7. Project risk management includes identifying, analyzing, and responding to risks related to the project. Five main processes are involved in project risk management: plan risk management, identify risks, perform qualitative & quantitative risk analysis, plan risk responses and control risks
8. Project procurement management involves acquiring or procuring goods and services for a project from outside the performing organization. Four main processes are involved in project procurement management: plan procurements, conduct procurements, administer procurements, closing

9. Project stakeholder management includes identifying and analyzing stakeholder needs while managing and controlling their engagement throughout the life of the project. Four main processes are involved in procurement management : identify stakeholders, plan stakeholders management, management stakeholders engagement and control stakeholders engagement
10. Project integration management is an overarching function that affects and is affected by all of the other knowledge area. Five main processes are involved in project integration management: develop project charter & project management plan, direct and manage project execution, monitor and control project work, perform integrated change control and close project or phase

B. Triple Constraints

Every project has different limitation on scope, time and cost. Those limitations in project management called triple constraints. To achieve objective of project, project manager should consider the scope, time, and cost and the third section should be balanced. Project manager should consider^{[3][4]}:

1. Scope: which part on project must be completed? Which uniqueness of product and service are expected by customer or project sponsor? How scope can be verified?
2. Time: how long it will take to complete the project? How can track team actual performance schedule?
3. Cost: how much of the budget is needed? How costs are tracked? Who can authorize to change the budget?

C. Structural Equation Model

Structural equation modeling (SEM) is first applied by Bollen (1989) and Joreskog (1973) in social sciences which is the academic advisor for Herman Wold on 1973 and 1975, the one who establish LISREL CB-SEM software package. Then, PLS-SEM were develop much better by Ringle, Wende and Will on 2005. Explain CB-SEM is used to evaluate focuses on goodness of fit which is focusing on covariance matrix. It is application is suggested appropriate to testing and confirmation where prior theory is strong or have a good reason to do so. However, the researchers or practitioners should achieve the assumption when conducting CB-SEM. The first one is the sample of data should be large which is more than 200. The minimum sample size depending on the model complexity and basic measurement model characteristic. Sample size should not be used as a main reason for employing PLS-SEM because it doesn't have adequate statistical power at small sample size. They recommend PLS is a powerful method when a small size should be carry on compare CB-SEM. The statistical software package for CB-SEM can be obtained in AMOS, LISREL, MPLUS and EQS while PLS-SEM in SMARTPLS and PLS Graph^{[5][6][7]}.

PLS is a soft modelling approach to SEM with no assumptions about data distribution[8]. Thus, PLS-SEM become good alternative to CB-SEM when the following situations are encountered:

- Sample size is small.
- Application have little available theory.
- Predictive accuracy is paramount.
- Correct model specifications cannot be ensured.

PLS – SEM have 2 test[9][10][11][12]:

1. Outer model (Measurement Model)

The assessment of PLS-SEM models, with reflective scale and multiple items, must be submitted for confirmation for their validity and reliability, as well as the predictive ability of the model to predict behavior of endogenous constructs from the constructed exogenous. However, it is important to distinguish between reflective and formative models when evaluating measurement. Reflective models should be evaluated base on the reliability and validity of the constructs. For these purposes, composite reliability is used as an estimate of the internal consistency and of the construct. The measured values must be greater than 0.7 (exploratory research on the values of 0.6 to 0.7 are acceptable). The indicator of the measurement model also show reliability, to validate the fact that their standardized load greater than 0.7. The assessment of validity of reflective measurement model focuses on the convergent validity and discriminant validity. For convergent validity, the value of the average variance extracted (AVE) should be greater than 0.5 for all constructs.

2. Inner model (Structural Model)

The primary criteria for evaluating the structural model are the measurements of the r-square and the significance level of path coefficients. Considering that the objective of PLS-SEM is to predict or explain the variance of the endogenous variables, it is necessary that r-square values of the constructs are high, or set high depending on discipline of the research question. R-square of value 0.75, 0.5 or 0.25 for endogenous latent variables in structural model considered substantial, moderate and weak respectively.

Figure 1 shows the relation between variables indirectly. In this research, the topic that will be examined in the indirect effect between variables, where the 10-knowledge area project management can influence triple constraints. Then, the triple constraints influenced quality of project

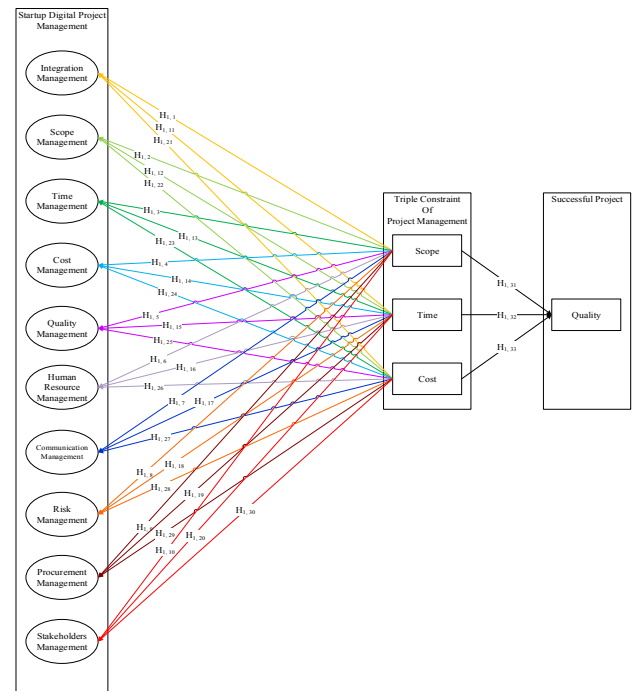


Fig. 1 Framework Model using 10 knowledge project management with triple constraints

III. METHODOLOGY

A. Population and Sample

The populations included in this study is the startup companies in digital creative industry in Indonesia especially Jabodetabek. Then based on stratified random sampling, samples that are used in this study are startup companies, which listed on venture capital company and non-listed. The number of population base on these preliminary studies is 100 digital companies. From April – June 2016, the number of sample become participant is 30 digital companies.

B. Data Collection

The data collection technique that is used in this study is questionnaire. Each question of indicator from variables of project management, which assessed by respondents, classified into four alternative answers using ordinal scale that describes the respondents' opinion. The answers of each indicator is given a score between 1 and 4.

C. Operational Variable

There are two kind of variables, which are independent variables and the dependent variable. Independent variables is a variable that is intentionally changed to observe its effect on the dependent variable. While, dependent variable is the observed variable in an experiment or study whose changes are determined by the presence or degree of one or more independent variables.

This study consists of ten independent variables, which came from 10 knowledge area project management (integration management, scope management, time management, cost management, quality management, human resource management, risk management, communication management, procurement management, stakeholder's management) and

dependent variable is Quality of Project, while the intervening variable is triple constraints (scope, time, cost).

TABLE I. OPERATING INDEPENDENT VARIABLES [2]

Dimension	Variable	Indicator	Scale
10 knowledge area project management	Integration Management	Develop project charter & project management plan	Ordinal
		Direct and manage project execution	
		Monitor and control project work	
		Perform integrated change control	
		Close project or phase	
	Scope Management	Collecting requirements	Ordinal
		Define scope	
		Create WBS	
		Verify scope	
		Controlling scope	
	Time Management	Define activities	Ordinal
		Sequence activities	
		Estimate activity resources & duration	
		Develop schedule	
		Control schedule	
	Cost Management	Estimate cost	Ordinal
		Determine budget	
		Control cost	
	Quality Management	Plan quality management	Ordinal
		Perform quality assurance	
		Perform quality control	
	Human Resource Management	Develop human resource plan	Ordinal
		Acquire project team	
		Develop project team	
		Manage project team	
	Communication Management	Identify stakeholders	Ordinal
		Plan communication	
		Distribute information	
		Manage stakeholders expectations	
		Monitoring and controlling	
	Risk Management	Plan risk management	Ordinal
		Identify risks	
		Perform qualitative & quantitative risk analysis	
		Plan risk responses	
		Control risks	
	Procurement Management	Plan procurements	Ordinal
		Conduct procurements	
		Administer procurements	
		Closing	
	Stakeholders Management	Identify stakeholders	Ordinal
		Plan stakeholders management	
		Management stakeholders engagement	
		Control stakeholders engagement	

TABLE II. OPERATING DEPENDENT VARIABLES [2]

Dimension	Variable	Scale
Triple Constraints	Scope	Ordinal
	Time	
	Cost	
Quality of Projects	Quality of Projects	Ordinal

D. Model Analysis

The model of analysis that is used in this study is PLS-SEM. PLS stands for Partial Least Square – Structural Equation Model. Model in this study run by smartPLS software application to analyze measurement model and structural model.

Measurement model test in this study required Composite Reliability (CR) and Average Variance Extract (AVE). While, structural model test required r-square.

IV. RESULTS

Based on the existing data, it could be conducted the structural equation model to test relationship between 10 knowledge area project management (integration management, scope management, time management, cost management, quality management, human resource management, risk management, communication management, procurement management, stakeholder's management) and dependent variable is Quality of Project, while the intervening variable is triple constraints (scope, time, cost).

The variable of quality of project considered to be dependent variables. 10 knowledge area project management as independent variables. Path diagram model in this study run test by smartPLS software, 2 types of testing such as:

1) Outer Model (Measurement Model)

TABLE III. AVE AND RELIABILITY TEST

No	Variable	AVE	CR	Condition
1	Communication Management	0,809	0,927	Reliable
2	Cost Management	0,713	0,881	Reliable
3	Human Resource Management	0,770	0,870	Reliable
4	Procurement Management	0,620	0,867	Reliable
5	Quality Management	0,797	0,887	Reliable
6	Risk Management	0,699	0,874	Reliable

Table 3 is used to determine the reliability indicator on each independent variable. The criteria can be determined by Average Variance Extract (AVE) and Composite Reliability (CR). If $AVE > 0.5$ and $CR > 0.7$, then the indicator is reliable and ideal on independent variable. According to the table, all value is bigger than the criteria. Thus, path diagram model is reliable and ideal or it can be said that diagram model is considered to meet criteria

TABLE IV. VALIDITY TEST

	X1	X2	X3	X4	X5	X6
Comm1	0,928	0	0	0	0	0
Comm2	0,942	0	0	0	0	0
Comm 3	0,823	0	0	0	0	0
Cost 1	0	0,789	0	0	0	0
Cost 2	0	0,904	0	0	0	0
Cost 3	0	0,836	0	0	0	0
HR 3	0	0	0,806	0	0	0
HR 4	0	0	0,944	0	0	0
Procure 1	0	0	0	0,764	0	0
Procure 2	0	0	0	0,788	0	0
Procure 3	0	0	0	0,814	0	0
Procure 4	0	0	0	0,781	0	0
Quality 1	0	0	0	0	0,842	0
Quality 2	0	0	0	0	0,941	0
Risk 1	0	0	0	0	0	0,871
Risk 3	0	0	0	0	0	0,890
Risk 5	0	0	0	0	0	0,739

Note:

X1 = Communication Management

X2 = Cost Management

X3 = Humana Resource Management

X4 = Procurement Management

X5 = Quality Management

X6 = Risk Management

Table 4 informs loading factor score on path diagram. If loading factor > 0.7, then indicator is valid to independent variable. According to the table, all value is bigger than the criteria. Thus, path diagram model is valid or it can be said that diagram model is considered to meet criteria.

After outer model test, the initial model will be reduced to as follows:

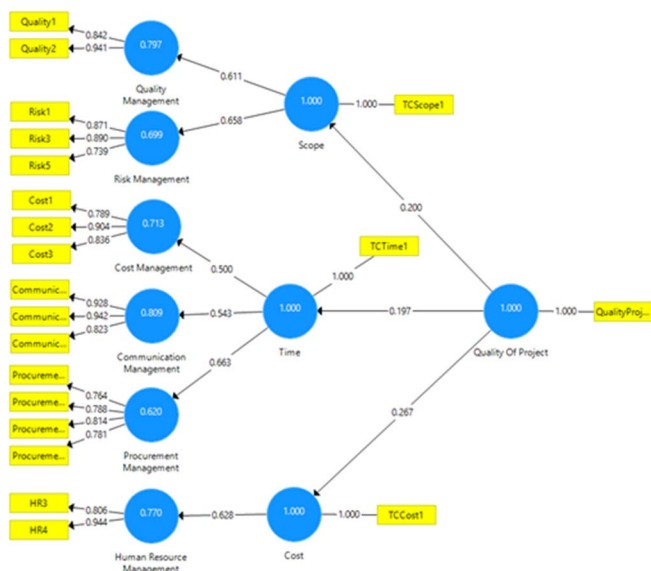


Fig. 2 Final model project management

2) Inner Model (Structural Model)

TABLE V. R-SQUARE TEST

	R-Square
Communication Management	0,295
Cost Management	0,250
Human Resource Management	0,394
Procurement Management	0,440
Quality Management	0,373
Risk Management	0,443

Table 5 informs r-square score obtained by PLS algorithm test. The greater r-square, have larger ability of independent variables to explain the dependent variable. In this study, r-square testing only run on 10 knowledge area project management. While, triple constraints is mediator to quality of project.

TABLE VI. HYPOTHESIS TEST (T-STATISTIC TEST / T-VALUE TEST)

	Original Sample	Sample Mean	Std Dev	T-Stat	P-value
Cost->HRM	0,628	0,648	0,099	6,340	0
Scope->QM	0,611	0,592	0,149	4,095	0
Scope->RM	0,658	0,657	0,090	7,347	0
Time->COM	0,543	0,545	0,111	4,872	0
Time->CM	0,5	0,523	0,080	6,219	0
Time->PM	0,663	0,667	0,081	8,151	0

Table 6 informs hypothesis test/t-statistic test. If t-statistic (t-value) > 1.699 (one tailed test, 95% accuracy rate and 5% error rate), dependent variable affected the independent variables. In this study, t-statistic affected only on independent variables (10 knowledge area project management) but didn't affected to dependent variable (triple constraints).

Results of hypothesis test (t-statistic test) on table 6:

- Human resource management affected on Cost is accepted
- Quality management affected on Scope is accepted
- Risk management affected on Scope is accepted
- Communication management affected on Time is accepted
- Cost management affected on Time is accepted
- Procurement affected on Time is accepted

V. CONCLUSION AND RECOMMENDATION

A. Conclusion

The basic model of this study compiled by 10 knowledge area project management and triple constraints. This model using SMARTPLS with PLS-SEM approach to run analysis test with data collected by questionnaire. After running PLS – SEM,

independent variables and indicator from the basic model is reduced to 6 as final model. The 6 variables of final model are Quality Management, Risk Management, Cost Management, Communication Management, Procurement Management and Human Resource Management. While, the Triple constraints has positive relation and affect Quality of Project.

Procurement management has a dominant influence on time of triple constraints. In the second place, there is cost management, and then it followed by the communication management. Risk management has a dominant influence on scope of triple constraints. And, quality management as other influence factor. Human Resource management has a dominant influence on cost of triple constraints.

Triple constraints has considerable effect on the project quality of digital startup companies in Indonesia.

B. Recommendations

This research is expected to contribute to the management of startup companies in digital creative industry in Indonesia. By knowing the factors that influenced the quality project of digital startup companies, the development of the project will be more focused and effective.

For further research of this study, one's need to expand not only on digital startup companies but also in other field of startup and to use bigger sample size.

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