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Effects of Competence, Competitiveness and Innovation on Project Success

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ABSTRACT

Facing the pressure of competition, innovation is a must for construction companies. Construction companies must be able to innovate and have advantages so that they can compete with other construction companies. Poor construction company performance is a reflection of how the project manager manages his project, therefore a reliable project manager who knows what his job as a project leader and has the required competency requirements, so he is able to innovate and be able to compete with other construction companies. The purpose of this study is to examine how significant the influence of competence, competitiveness and innovation on project success. This study uses an explanatory research method with a quantitative approach. The results of the data obtained were analyzed with the partial least-squares structural equation Model (PLS-SEM).The analysis shows that of 80.2% the influence can be explained by competence, competitiveness and innovation. The path coefficients are 0.566 between competence for Project Success, 0.181 between competitiveness for Project Success and 0.213 between innovation and Project Success. The equation shows that the role of competence is greater than the other two variables.

Keyword: *Competence, Competitiveness, Innovation, Success Project, Project Manager*

1. INTRODUCTION

The State Budget in the infrastructure development sector is quite large, based on data from the Central Statistics Agency, the budget for infrastructure development from 2017 State Budget funds is recorded at 437 Trillion, then in 2018 an increase of 3% to 451 Trillion. The size of the budget for infrastructure development makes business in the construction sector more promising, this has an impact on increasing the number of companies implementing national construction services. With the increasing number of construction service companies, competition in this sector is getting heavier. Every company must be able to innovate and have advantages so that it can compete with other construction company companies. The tight competition in the construction business forces contractors who are not strong enough to switch professions by pursuing other businesses. At least, in the last three years there were around 1,500 contractors who were initially members of the Association of Construction Entrepreneurs (GAPENSI) who were no longer active and turned to other businesses (Amin, 2016).Facing increasing competition pressure in recent years puts innovation as a must for an organization. Innovation is inseparable from the knowledge itself as one of the main resources that must be owned by at least human resources. Innovation is one of eight factors driving the success of an organization (Dive, 2004). The poor performance of a construction company is a reflection of how the project manager manages his project, therefore a reliable project manager is needed who knows what his job is as a project leader and has the required competency requirements so as to be able to innovate and be able to compete with other construction companies.

2. LITERATURE STUDY

2.1 Project Success

Successful projects are projects that have far better than expected results that are usually observed in terms of cost, schedule, quality, safety and satisfaction of the parties involved (Ashley, et al. 1987). From contractors' perspectives, success can be measured based on profit from the project, completion on time, safety, number of claims, and commercial performance (Sanvido et al., 1992; Williams, 2016). There are several indicators that can be assessed in the success of design and build project, namely budget variance, schedule variance, conformance to expectations, administrative burden, and overall user satisfaction (Molenaar and Songer, 1998). Meanwhile, in Project Management Body Of Knowledge PMBOK (2018) also explained the criteria for the success of a project, which was measured from the suitability of product quality, timeliness, suitability of the budget and the level of customer satisfaction.

2.2 Project Manager

Gido, Jack et al. (2015) argues that project manager provides leadership to the project team to accomplish the project objective. The responsibility of the project manager to make sure that the customer is satisfied that the work scope is completed in a quality manner, within budget, and on time. The project manager leads the project team to meet the project's objectives and stakeholders' expectations. The project manager works to balance the competing constraints on the project with the resources available(PMBOK 2018).

2.3 Project Manager Competency

Project manager competency can be measured in several ways, namely knowledge, skills and attitude.

1) Knowledge Required by Project Manager

A project manager will manage the project by covering ten knowledge areas, namely: Integration Management, Scope Management, Time Management, Cost Management, Quality Management, Human Resource Management, Communication Management, Risk Management, Procurement Management, and Stakeholder Management (PMBOK 2018).

2) Skills Required by Project Manager

Expertise or skills means developing the knowledge gained through training and experience by carrying out several tasks (Dunette, 1976). Skills are divided into 4 categories namely, Basic Literacy Skills, Technical Skills, Interpersonal Skills and Problem Solving. The skill / skill of a project manager in practicing his knowledge (Robbins, 2000). Skills possessed by a project manager include: people skill, leadership, listening, Integrity, ethical behavior, consistency, Strength at building trust, Verbal communication, Strength at building teams, Conflict resolution, conflict management, Critical thinking, problem solving, Understanding and balancing of priorities (Schwalbe, 2016).

3) Attitude Required by Project Manager

The attitude that must be possessed by a project manager is: willing to work hard on the project, take the initiative to complete the work even in the face of problems, believe in one's own ability to complete the work well, have a great self motivation for project success, have high morale for project success, has full responsibility, understands project goals and is able to motivate project teams (Prianto, 2012).

2.4 Competitiveness of construction companies

Competitiveness for a company is very important because competitiveness is the core of the success or failure of the company (Porter, 2004). Competition determines activities in a company that can contribute to its performance, such as innovation, cohesive culture and good implementation. Competitive strategy is an effort to find competitive positions in the industry, which is the basis for competition aimed at forming profitable and sustainable positions. The concept of competitiveness refers to the ability to achieve dominance and stability in competition between

individual companies and competitors at the micro level (companies) and between economies at the macroeconomic level (Markus, 2008).

2.5 Innovation

Innovation is one of eight factors driving the success of an organization (Dive, 2004). In the face of increasingly high competitive pressures in recent years placing innovation as a must for an organization. Innovation is the first split into administrative and technological innovation. (Kim et. al 2012). Administrative innovation refers to the application of new ideas to improve organizational structures and systems, and processes pertaining to the social structure of an organization. In contrast, technological innovation is defined as the adoption of new technologies that are integrated into products or processes. Innovations are classified into several types, including: administrative innovation, technical innovation, product / service innovation, process innovation, radical innovation, incremental innovation (Damanpour, 1991).

2.6 Temporary Hypothesis

Based on the results of previous studies, it can be understood that there is an influence relationship between the factors of project manager competency, competitiveness and innovation on the success and overall implementation of the project. The influencing factors can vary according to the context and relevance of each research. Considering the results of the previous research and paying attention to the theory on which the research is based, the formulation of the research hypothesis is as follows:

H1: There is an influence between competency on project success.

H2: There is an influence between competitiveness on project success.

H3: There is an influence between innovation on project success.

H4: There is an influence between competency, competitiveness and innovation simultaneously on the success of the project.

H5: There is an influence between competency on competitiveness.

H6: There is an influence between competitiveness on innovation.

H7: There is an influence between competitiveness through innovation on project success.

H8: There is an influence between competency through competitiveness on project success.

3. RESEARCH METHODOLOGY

3.1 Research Type

Based on the method and measurement and data analysis, this research is classified as a survey research, because it uses a questionnaire as its main source, and also as quantitative research, because it allows the researcher to collect quantitative and qualitative data on many types of research questions (Sekaran2017, 97).

3.2 Variable Variables

Variables in this study are influence of competence, competitiveness and innovation on project success, so what is used as the independent variable (X) in this study is as follows:

1) Competence (X-1), which is measured based on indicators: skill, knowledge and attitude.
2) Competitiveness (X-2), as measured by indicators: price quality, similar experience, availability of tools and financial capability.
3) Innovation (X-3), measured by indicators: administrative innovation, technical innovation and process innovation.

The dependent variable determined in this study is the success of the project (Y), which consists of the following parameters: achievement of time, achievement of quality, achievement of costs, Safety, stakeholder satisfaction.

3.3 Samples and Populations

To determine the population of this research study, the author uses the basis of the data from the Central Bureau of Statistics of the Republic of Indonesia, which obtained

information that the number of construction companies/businesses in Indonesia were 164,052 companies in 2018, with the following details:

1) East Java: 21,013.
2) DKI Jakarta: 10,590.
3) West Java: 11,063.
4) Central Java: 11,095.
5) South Sulawesi: 10,565.

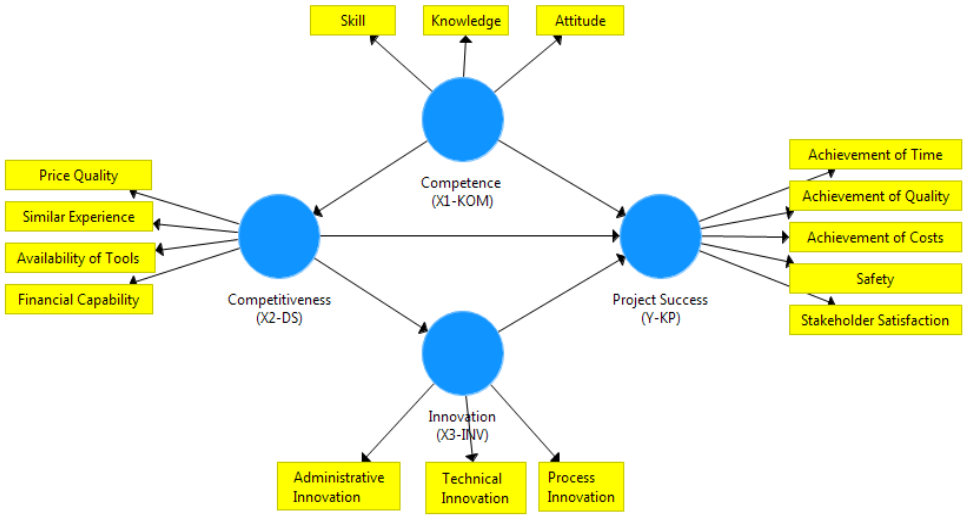
From the data above, it illustrates the highest competition among construction companies in East Java. To determine the population of this research, the authors used the Central Bureau of Statistics data, namely class B construction companies with a total population of 102 construction companies.

3.4 Data Analysis Technique

This research will use Partial Least Square (PLS) as a supporting tool of its analysis. The Software applied in this research uses SmartPLS 3.0. The measurements are often obtained from surveys or observations that are used to collect primary data, but they may also be obtained from databases consisting of secondary data. In PLS, all standards of variance can be assumed as variance which is useful to explain. The most important measurement model metrics for PLS-SEM are reliability, convergent validity, and discriminant validity (Hair, Joseph F, et al. 2017).

3.5 Research Framework

In this research, the authors wish to see and analyze the effect of competence, competitiveness and innovation on the success of existing projects in Indonesia by using quantitative research methods and in the non-experimental types arranged as in the research design and framework of thinking below.



4. FINDING & DISCUSSION

4.1 Description of the Research Object

This research takes the population of construction companies that are focused on the province that has the highest number of contractors, namely in East Java Province, the population is calculated based on the number of class B contractors. The total questionnaire distributed in this study is 102 copies. Sampling was carried out proportional stratified techniques in accordance with the distribution of the population of each stakeholder that was recorded using the Slovin formula to determine the number of research samples needed, with a confidence level of 95% or a margin of error of 5%.

4.2 Validity and Reliability Test

The initial stage of this research was to test the validity and reliability of the results of the questionnaire that was given by the respondents using the SPSS version 23.0 program.

1) Validity Test

By using the SPSS program, the initial testing of the questionnaire data for the number of research samples was 82 respondents, the smallest r-count value

obtained was 0.403 (KOM2) and the highest was 0.829 (KP4). With the r table value according to the above calculation of 0.219, the results of the validity test using SPSS on each question have a value of r arithmetic greater than r table, so it is concluded that all questions in the questionnaire answered by the respondents were Valid. The questions with the lowest r-counts are for KOM2 questions, and the highest r-counts are for KP4 questions.

2) Reliability Test

Testing reliability with this SPSS, will compare the Cronbach's Alpha value of each variable from the results of the SPSS data processing with its critical point value, which required the Cronbach's Alpha value must have a value greater than 0.7. The results are displayed in a table 1.

Table 1. Reliability test

Variable	Cronbach's Alpha	Critical Point	Conclusion
Competency	0.904	0.7	Reliable
Competitiveness	0.749	0.7	Reliable
Innovation	0.883	0.7	Reliable
Project Success	0.875	0.7	Reliable

From the results of questionnaire data processing with SPSS, it is known based on the table above, the Cronbach's Alpha value for all variables is greater than 0.7, so it can be concluded that all of these variables are reliable or have consistency if the measurements made with the measuring instrument are repeated.

4.3 Evaluate the Outer Model

1) Loading Factor

From the estimation of this mode, there are indicators that have a loading factor value of less than 0.7, namely DS3. These indicators do not contribute to explaining the construct measurement variables.After eliminating the indicators that have a loading factor less than 0.7, then the equation model is re-estimated, the results are obtained that all indicators in the test sample, have a loading factor value greater than 0.7, so it is concluded that the remaining indicators meet the validity requirements as shown in table 2.

Table 2. Loading factor

	Competence (X1-KOM)	Competitiveness (X2-DS)	Innovation (X3-INV)	Project Success (Y-KP)
DS1		0.792		
DS2		0.742		
DS4		0.869		
INV1			0.898	
INV2			0.910	
INV3			0.819	
KOM1	0.823			
KOM2	0.887			
KOM3	0.927			
KP1				0.892
KP2				0.770
KP3				0.848
KP4				0.742
KP5				0.831

2) Convergent Validity

Table 3. Average Variance Extracted (AVE) Value

Variable	AVE
KOM	0.775
DS	0.645
INV	0.769
KP	0.670

The results from table 3. Average Variance Extracted (AVE) Value show all the research variables in the sample, are above 0.5, it can be concluded that the convergent validity of all the variables is good, ie one latent variable is able to explain more than half the variants of the indicators in the average.

3) Discriminant Validity

Strengthen the conclusion of discriminant validity, it is used by comparing the AVE root value to the correlation between latent

constructs based on the estimation results of the model known as the "Fornell-Locker criteria". Result of the calculation above, is displayed in the table 4.

Table 4. Fornell-Locker Criteria Values

	INV	KP	KOM	DS
INV	0.887			
KP	0.786	0.818		
KOM	0.768	0.870	0.880	
DS	0.762	0.781	0.772	0.803

4) Composite Reliability and Cronbach's Alpha

The construct reliability test on the model is performed using a composite reliability and Cronbach's Alpha measurement instrument. From the estimation results of the model as show in table 5, obtained composite reliability values above 0.7 and Cronbach's Alpha above 0.7, so that all constructs have good reliability.

Table 5. Value of Test Results of Reliability and Cronbach's Alpha

	Composite Reliability	Cronbach's Alpha
INV	0.909	0.849
KP	0.910	0.876
KOM	0.911	0.954
DS	0.844	0.723

4.4 Measure of Influence f2

Values (f2) equal to 0.02, 0.15 and 0.35 can be interpreted that the latent variable predictor has a small, medium and large influence on the structural level, here are the results in table 6:

Table 6. Value of influence f2

Relation	f sq.	Concslusion
INV → KP	0.078	Small
KOM→ KP	0.528	Large
KOM → DS	1.476	Large
DS → INV	1.382	Large
DS → KP	0.055	Small

4.5 Q2 Predictive Relevance

The following table 7 is the result of calculating Q-square for the test region model.

Table 7. R^2 and Q^2 Predictive Relevance

Variabel	R Square	1-R Square	Q^2
INV	0.580	0.420	0.966
KP	0.802	0.198	
DS	0.596	0.404	

According to the estimation results of the model, as shown in the table above, the Q2 (Q-square predictive relevance) value obtained in the test sample area is 0.966, which means the value is greater than 0 (zero), so the measurement model is concluded to have a predictive relevance value.

4.6 Evaluation of the Inner Model

The results of the analysis of this measurement model with PLS are shown in the figure 2 below, which can explain the results of the R square value and t-statistics.

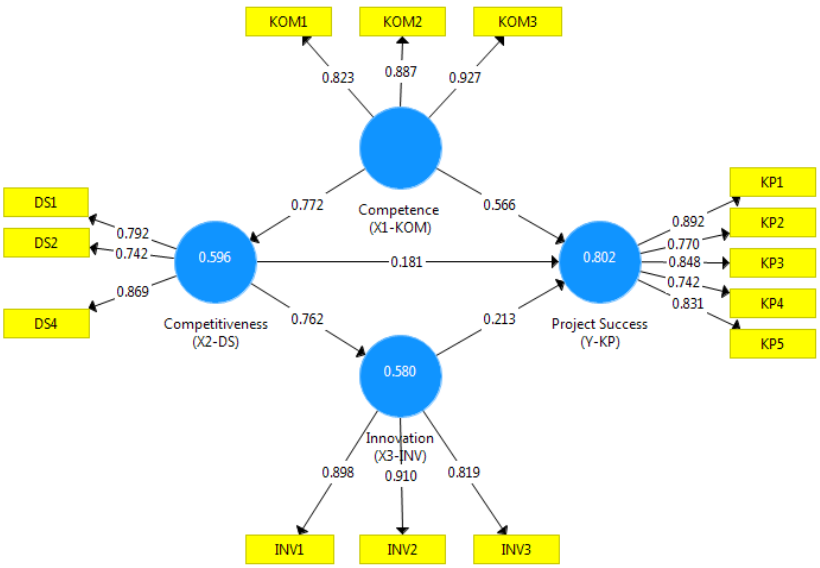


Fig 2. Standard Measurement Model for Test Samples.

From the figure of the measurement model above, the equation obtained from this measurement model is as follows:

KP = 0.566 KOM + 0.181 DS + 0.213 INV, R^2 = 0.802

DS = 0.772 KOM, R^2 = 0.596

INV = 0.762 DS, R^2 = 0.580

Based on these equations, it can be concluded that Competence, Competitiveness and Innovation have an effect of 80.2% on Project Success. While the remaining 19.8% is influenced by other factors not included in this study. Competence gives the greatest effect according to this equation with a coefficient of 0.566 with a positive and unidirectional direction. Meanwhile, innovation has a positive contribution of 0.213 and competitiveness contributes to Project Success of 0.181.

In the competitiveness equation, competence gives an effect of 59.6%, while the rest is influenced by other factors not examined. Competence contributes an influence of 0.772 with a positive direction.

Another equation is the effect of competitiveness on innovation which has an R2 of 0.580, meaning that INV is influenced by DS of 58.0% while the rest is influenced by other factors not examined. Competitiveness has a path coefficient of 0.762 with a positive direction that proves there is a direct relationship.

4.7 Hypothesis Test

1) Partial Hypothesis Test

Testing the significance of the partial or individual relationship of each predictor variable to the criterion variable is intended to test the hypothesis that has been formulated previously. Testing this hypothesis uses a comparison between the t-statistic value with t-table and its significance value of this model measurement is presented in table.8

Table 8 Path Coefficient, t-Statistics and Partial Hypotheses

Relation	Path Coefficient	t-stat.	Significance	Conclusion
KOM → KP	0.566	5.503	0.000	H1 Accepted
DS → KP	0.181	1.888	0.060	H2 Rejected
INV→ KP	0.213	2.241	0.025	H3 Accpeted

From the estimation of the model, in the sample measurement area, it can be concluded that the hypothesis which states that there is a significant relationship between competence on Project Success (H1) and innovation on Project Success (H3) can be proven. While the significant influence between Competitiveness on Project Success (H2) cannot be proven in this study.

However, in addition to information, that in this measurement model, there is a direct relationship between variables that show a significant effect. Significant influence of these other variables is expected to be used as a reference in making final conclusions as shown in table 9.

Table 9. Path Coefficient, t-Statistics Other Variables

Relation	Path Coefficient	t-stat.	Significance	Conclusion
KOM → DS	0.772	14.918	0.000	H5 accepted
DS → INV	0.762	12.856	0.000	H6 accepted

2) Mediation Hypothesis Test

In addition to testing the significance of the partial or individual relationship of each predictor variable to its criterion variable, a hypothesis test was also carried out on the significance of the effect of the mediating variable. Testing this hypothesis uses a comparison between the t-statistic value with t-table and its significance value. Estimation of this measurement model is able to prove the significant influence of Innovation as a mediating variable between Competitiveness with Project Success (H7) and Innovation and Competitiveness as a mediating variable between Competence and Project Success (H4). But not able to prove the significant influence of competitiveness as a mediating variable between competence and Project Success (H8). The results are shown in Table 10:

Table 10. Mediation Variable Hypotheses

Relation	Path Coefficient	t-stat.	Significance	Conclusion
DS → INV → KP	0.162	2.102	0.036	H7 accepted
KOM → DS → INV → KP	0.125	2.017	0.044	H4 accepted
KOM → DS → KP	0.140	1.772	0.077	H8 rejected

3) Simultaneous Hypothesis Test

By using the formula above, F statistics and F tables for each construct relationship are calculated, the following results are displayed in table 11:

Table 11. Simultaneous Hypothesis Testing Models

Relation	F stat.	F table	Conclusion
KOM, DS and INV → KP	105.313	2.72	H7 accepted

Based on the table above, the hypothesis can be arranged with the conclusion that, simultaneously or together, the predictor variables in the test sample, have a significant effect on the criterion variable. The three variables of Competency, Competitiveness and Innovation are proven to jointly have a significant influence on Project Success in the test sample area. Thus, all test sample models prove that H4 is acceptable.

4.8 Discussion and Implication

Based on the results of testing the hypothesis on the interaction model for sample data, it can be seen that the H1 hypothesis which states a significant relationship between Competence and Project Success can be proven. Likewise, the H3 hypothesis states that there is a significant influence between innovation on project success. In contrast to the H1 and H3 hypotheses, the measurement model for the sample area rejects any significant influence between Competitiveness and Project Success. In general, this measurement model, assesses the influence of competence is still quite strong role in project success while competitiveness does not have a direct effect on project success. When viewed from the mediation test, the role of innovation significantly influences the relationship between Competence and Project Success (H7 accepted). This indicates that the right innovation can contribute to the success of the project if it is supported by the competencies possessed. Meanwhile, competitiveness is not able to exert influence between Competence and Project Success (H8 rejected). However, competitiveness as a mediating variable is able to explain well and provide a significant influence between Competence with Innovation and Project Success (H4 accepted). Simultaneously, Competence, Competitiveness and Innovation have a significant influence on Project Success. This conclusion shows that the H4 hypothesis can be proven in the estimation of this measurement model. From the explanation of the above evidentiary hypothesis, when viewed in detail shows that of 80.2% the influence can be explained by competence, competitiveness and innovation. The path coefficients are 0.566 between competence for Project Success, 0.181 between Competitiveness for Project Success and 0.213 between innovation and Project Success. The equation shows that the role of competence is greater than the other two variables. The indicators with the greatest contribution in explaining the variables in this study are as in table 12:

Table 12. Contribution Value of the Highest Indicator

Variable	Indicator	*Loading Factor*
Competency (X-1)	Attitude (KOM3)	0.927
	Knowledge (KOM2)	0.887
	Expertise (KOM1)	0.823
Competitiveness (X-2)	Financial Capability (DS4)	0.869
Innovation (X-3)	Technological Innovation (INV2)	0.910
	Administrative Innovation (INV1)	0.898
	Process Innovation (INV3)	0.819
Project Success (Y)	Time Achievement of Time (KP1)	0.892
	Cost Achievement (KP3)	0.848
	Stakeholder Satisfaction (KP5)	0.831

5. CONCLUSION AND SUGGESTION

5.1 Conclusion

The results of this study provide an overview of the success of construction projects in the East Java region as measured by the variables of Competence, Competitiveness and Innovation for the Success of Construction Projects. From all the samples processed in this study, conclusions can be drawn as follows:

1) Competence consistently has a significant influence on Project Success. Either measured in a model with a composition of KOM-KP, or KOM-DS-INV-KP, showed a significant effect on Project Success. Thus, the greater the competence possessed, able to contribute positively to the success of the Project directly or simultaneously through competitiveness and innovation. Competence is one of the parameters that is still taken into account in the success of projects in Indonesia. Meanwhile, when measured in a model with the composition of KOM-DS-KP, competence has an insignificant influence on the success of the project if through competitiveness.
2) In the DS-KP model, Competitiveness does not directly influence Project Success, except in the DS-INV-KP composition model it illustrates that Competitiveness through innovation will have a significant effect on project success.
3) While innovation has a significant effect on project success. From all measurement models, it shows that innovation is the only variable that consistently gives an influence on the success of the project in all the composition of the modeling.

5.2 Suggestion

Based on the results of research on the influence of competence, competitiveness and innovation on the success of this construction project in East Java, obtained benefits and suggestions that can be used and considered in similar studies in the future, as follows:

1) This study only takes samples from the East Java region, so it is necessary to conduct similar studies by taking more diverse samples such as the central and eastern parts of Indonesia which have very much different cultures, so it is very possible that there are differences in patterns that occur that will influence the final conclusions about the conditions of success of construction projects in Indonesia.
2) This research focuses on large-scale construction companies in East Java, while based on data in BPS there are 20,753 construction companies in East Java. So that further research needs to be done on companies towards small and medium classes on the application of competencies, competitiveness and innovation to project success.

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