
ANALYSIS OF FACTORS CAUSING VARIATION ORDER IN CONSTRUCTION PROJECTS OF PT. TATAMULIA NUSANTARA INDAH SURABAYA BRANCH OFFICE 2018-2022 PERIOD

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ABSTRACT

KEYWORDS

Consultant
Incompetence,
Material
Problems,
Variation orders

One of the significant problems that occur during the construction management process of a project is the scope change or variation orders. Based on this background, the research problem is regarding the factors causing the change in scope (variation order). The research objective was to analyze the partial influence of consultant incompetence and material problems on variation orders. The research was conducted at the Grand Mercure Malang Hotel and the research will be carried out in 2022. The measurement of the five research variables is a subjective measurement. Related to this research, 25 previous studies that are relevant to the 2016-2021 publication period are described. The theoretical basis presented is variation order, consultant incompetence, and material problems. The research hypothesis is that the two independent variables are partially thought to influence variation order. Quantitative research approach. The research location is at the Grand Mercure Malang Hotel in Malang – East Java. The time of the research is a one-time study, namely 2022. The research population is all employees who are directly related to construction projects. The sampling technique uses non-probability sampling, in this case incidental sampling. Data collection techniques through surveys. The research instrument was a questionnaire with a Likert scale of 1-6. Data analysis techniques include descriptive analysis techniques, and SEM-PLS. The results of the study show that the incompetence of consultants and material problems partially affect the Variation Order positively and significantly

INTRODUCTION

Project construction involve various activity details and lots stakeholders interests, so condition tend complex, and engenders various problem. one problem significant happened during the management process construction something project is change or variation room scope (variation orders). Change room scope has Becomes near phenomenon considered permanent in the sector construction around the world. Change or variation room scope interpreted as deletion, addition, or other amendments to the scope beginning an originating tender from adjustment duration contract beginning or cost given contract. Variation room scope could also interpreted as change scope as variance on what was designed and what actually was applied. Change scope is variation in every modifications to the guidelines

given contract to contractor by owner or representative owner (Ali & Majeed, 2020). Suggests that there is change or variation room the scope of what happened informally in the field, but also exists variation formal work. Variation room usually a formal nature use document officially used for change signed agreement after agreement previously accepted by clients or representative client. Document addition the Becomes part from document official project. (Memon et al., 2014) define order variation as agreement signed official between contracting parties which include addition, deletion, or evaluation to contract tender document, also identify deviation in duration and amount, volume, and nature profession in contract. (Arain & Pheng, 2005) as well (Halwatura & Ranasinghe, 2013) also defines same thing about variation scope job.

problem change room scope (variation order) is experienced many contractor, no with the exception of PT Tata Mulia Nusantara Indah or more known as PT. SYSTEM. is moving company in field contractor office general contractor headquartered in Jakarta and has office branches in Surabaya and Bali. Study this only focusing on projects handled by PT. Tata Mulia Nusantara Indah Surabaya branch office. as presented in the Appendix, there are 15 projects managed by PT. Tata Mulia Nusantara Indah Surabaya branch which is the location the project part big located in the city of Surabaya. Most project including category building tall or high-rise buildings.

Projects construction handled by PT. Office layout Surabaya branch on span processing from 2018 to 2022. Following the projects in question:

Extention Hospital, having its address at Jl. Crouch Industry, Surabaya. Completion: Ongoing (15 months).

Office & Warehouse PT Asian Bearindo Jaya, having its address at Jl. Tanjung Sari No. 19, Surabaya. Completion: Ongoing (15 months)

Garuda Project, address Buluklawang, Malang, East Java. Completion: Ongoing (13 months)

Grha DSN, having its address at Jl. island West Ayang, Industrial Area island Gadung, Jakarta. Completion: Ongoing (13 months).

Earth Raya City Mall, having its address at Jl. Artery Supandio, Pontianak, Completion: Ongoing (25 months).

School Ipeka Makassar II, having its address at Center Point of Indonesia, Citrland City, Makassar, South Sulawesi. Completion: Ongoing (11 months).

Factory Sugarcane Processing PT Muria Sumba Manis, having its address at Wanga Village, Waingapu, East Sumba, NTT. Completion: Ongoing (16 months).

Ciputra World Surabaya Phase 3, having its address at Jl. Major General Sungkono No. 87, Surabaya. Completion: Ongoing (46 months)

One Galaxy Mixed Used Development Surtabaya Phase 1, having its address at Jl. Dr. Ir. H. Soekarno No. 178, Surabaya. Completion status: May 2022

Hotel Grand Mercure Malang, having its address at Jl. R. Panji Soeroso, Malang, East Java. Completion status: February 2022

BCA KCU Bukit Darmo, having its address at Jl. Darmo Boulevard Hill, Surabaya. Completion: December 2021.

Corn Dryer Plant- Lamongan , having its address at Desa Tlogoretno , District Brondong , Lamongan , East Java . Completion: 2021

Spazio Tower 2, having its address at Jl. Major General Yono Soewoyo Kav 55, Surabaya. Completion: July 2019

Tong Tji factory, address at Jl. Padaharaja KM 4, Tegal. Completion: 2019.

Elyon Christian School Building, address at Jl. Raya Darmo Permai II No. 2A, Surabaya. CompletionL 2018.

Of the 15 projects the handled by the stakeholders relative importance professional, however problem construction, incl change room fixed scope (variation order). no can abolished same once. According to description some source trusted at PT. Tata Mulia Nusantara Indah office Surabaya branch, change room scope almost always there in every project handled construction.

There is change room scope (variation order) on each project the experienced by employees of PT. Tata Mulia Nusantara Indah office Surabaya branch. Though only is office branch, PT. Tata Mulia Nusantara Indah office Surabaya branch involve thousand employees spread over 15 projects the. Temporary that employee stay in office branch that's what the job is relate live with profession construction is 326 employees. Interesting for knowing more carry on about phenomenon happening room scope, and what cause, with do study to employees the.

Study earlier (Kanda et al., 2016) (Mohammed, 2016) (Choudhry et al., 2017); (Oladiran et al., 2018); (Ogunsanmi, 2018); (Adu et al., 2020); (Pokharel & Joshi, 2020) proved influence Incompetence Consultant to the occurrence of Variation Orders. Study previously (Desyardi et al., 2019) proved that Material issues matter to the occurrence of Variation Orders.

Based on background behind such, then done study this with title " Analysis Factor Causes of Variation Order in Projects Construction PT. Tata Mulia Nusantara Indah Surabaya Branch Office Period 2018-2022".

Formula Problem

Based on background behind such, then problem study is about factor reason happening change room scope (variation order). Refer to research before, then in between reason change room scope (variation order) is Incompetence Consultants, and Material issues. Study this want test is second variable independent the effect on change room scope (variation order) on projects construction PT. Tata Mulia Nusantara Indah Surabaya branch office 2018-2022 period.

Study Previously

There is a number study relevant past with study this, ie about change room scope (variation order). There is study earlier with range time between 2019 to 2020, with focus different research. There is study previously discussed about cause and effect of variation order such as study (Adu et al., 2020), (Pokharel & Joshi, 2020), (Ali & Majeed, 2020), (Abou Chakra, 2019), (Thani et al., 2018), (Oladiran et al., 2018), (Johnson & Babu, 2020).

Equality studies earlier the with study this is you're welcome about change room scope. Temporary difference study earlier with study this more located on site

research, Researches too late not yet someone does study with studies the case of PT TATA Surabaya Branch. Temporary that studies earlier take

Theoretical Study Variation Order

Variation order in project construction could form addition or reduction in the volume of work listed in contract, addition or subtraction type work and change specification technical in accordance with need field. Change this has resulted change in scheduling profession project and swelling cost. Variation orders are frequent thing happened to the project building and construction civil. Variation orders are practiced eccentricity in a number of scheme from agreement base or scope same task agreed upon duration contract. This is contract written between the parties symbolic construction profession extras, omissions, or consideration repeat to document agreement, identify change price and time and explained character the tasks involved. Change order increase for the source changed which is the reason certain could predicted and the left no predicted (Gobana & Thakur, 2017)

Agreement Among owner and contractor for confirm change plan and amount compensation cost to the contractor happened During construction, after signing profession Among owner and contractor. Meaning of Variation Orders, among others: 1. Changing plan contract with method payment special. 2. Change specification work, incl change payment and time contract from before. 3. Consent addition profession new, deep matter this including payments and changes contract. 4. Interests administrative in determine method payment profession addition or addition. 5. Following adjustment price unit contract if occur change specification. 6. Submission proposal subtraction incentive if there is change value engineering proposal. 7. Customize timetable project because change. 8. Avoid dispute Among contractors and owners

Consultant Planner

Consultant planner have connection tight with variation orders. Consultant role planner in relationship with variation order, among others related with change specific by the consultant (change in specification by consultant). Change design by consultant this can happens on stage construction going on (Hassan & Ali, (2020). Consultant can role in resulting in a variation order when occur discrepancy design with regulation government (non-compliance of design with government regulation) (Adu et al., 2020). Factor consultant planner could affecting variation order is also related with weakness communication Among consultant planner with contractor. Consultant planner role create site instructions (SI) for make plan in variation orders.

Factor acting consultant in the variation order occurs design made they too complex so that could raises error in implement final design need corrected and gives rise to a variation order. Another factor of the consultant who caused the variation order was lack of knowledge the knowledge you have consultant planner so it's wrong interpret the terms of reference (TOR) of project (Ali & Majeed, 2020).

Materials Problem

Lack of data can lead to misinterpretation of requirements actually from something project. otherwise there is enough data available for consultant so design more based on perception consultant that alone about requirements project. If perception this is wrong, then variation will happened. One of them is replacement materials.

Replacement ingredient or procedure work could cause change During Step construction. Replacement procedure work also involved change method work). Knowledge about available materials and equipment is factor urgent for develop comprehensive design. If consultant have bad knowledge about ingredient or available equipment that can used in the process of construction, variations more possible occur During Step construction.

Theme study this is regarding variation orders. Study this want test variables assumed independence affect variation orders. because that framework think study this is concerns how influence variables independent the against variation orders. Variables independent want tested influence against the variation order is Incompetence Consultation, and Material Issues. Remember framework think study this is concerns connection influence fourth variable independent the to one variable dependent, then study analyzed with multiple linear regression. Connection second variable independent the to the variation order appears from Figure 1 below:

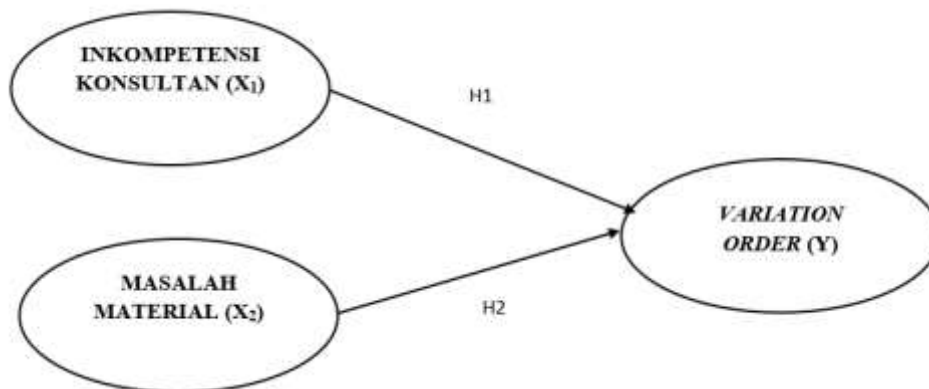


Figure 1
Framework Think

Based on formula problem, then arranged hypothesis as following:

Study earlier (Pokharel & Joshi, 2020) proved influence Incompetence Consultant to the occurrence of Variation Orders. because that arranged hypothesis first as following:

Hypothesis 1: Incompetence Consultant influential positive to the occurrence of a Variation Order on settlement projects construction building building.

Study previously (Desyardi et al., 2019) proved that Material issues matter to the occurrence of Variation Orders. because that arranged hypothesis second as following:

Hypothesis 2: Material Issues have an effect positive to the occurrence of a Variation Order on settlement projects construction building building.

RESEARCH METHOD

Method study this is quantitative. Approach quantitative (Creswell, 1998). Population in study this is whole related employees live with profession construction at PT. TATA Surabaya Branch Office, totaling 362 people. Amount the including good employee permanent nor employee contract. The research location of PT. TATA Surabaya Branch Office. The sampling technique is non-probability sampling, in matter this is purposive sampling (Cooper & Schindler, 2014). Sizes sample based on calculation Slovin is 190 respondents operational variable on three variable, detailed in Table 1

Table 1
operational Variable

No	Variable	Indicator	Measurement Scale
1.	Variation Order (Jibrin et al., 20-2020; Enhassi, 2010; Nasiru et al, 2015)	1. Quality change work, quantity work, or timetable work 2. Quality enhancement work, quantity work, or timetable work 3. Quality reduction work, quantity work, or timetable work	Ordinal Scale (Likert Scale 1-6) 1=Absolutely not agree 2= No agree 3 = Somewhat No Agree 4= Somewhat Agree 5 = Agree 6=Totally agree
2.	Incompetence Consultants (Hassan & Ali, 2020).	1. Complexity of design 2.Design change in the middle implementation project going on 3. Errors and omissions in design 4. Deadline stages design no fulfilled 5. Less consultants knowledge because negligence in the TORs 6. Detailed pictures are not adequate 7. Lack of coordination with other party inside Step design	Ordinal Scale (Likert Scale 1-6) 1=Absolutely not agree 2= No agree 3 = Somewhat No Agree 4= Somewhat Agree 5 = Agree 6=Totally agree

	8. Inconsistency between documents so that cause conflict between documents contract	
	9. Failure to run <i>terms of reference</i> (TOR)	
3. Material Problems (Desyadi et al., 2019).	1. Unavailability/ scarcity materials on the market 2. Delay in delivery materia 3. Too much change material specifications 4. Low quality material goods 5. Incompatibility between materials	Ordinal Scale (Likert Scale 1-6) 1=Absolutely not agree 2= No agree 3 = Somewhat No Agree 4= Somewhat Agree 5 = Agree 6= Totally agree

Instrument study this arranged based on operationalization variable from three variable in study this. Instrument study this use questionnaire with question closed (*close ended questionnaire*) (Cooper & Schindler, 2014) use scale odinal , namely a Likert Scale of 1-5 (1 = Very not Agree, 5=Strongly Agree). Instrument test through validity and reliability test.

Primary data collection techniques through survey, meanwhile technique secondary data collection through a study desk (Sugiyono, 2014) Data analysis techniques using technique analysis descriptive, and technique Structural Equation Modeling (SEM) analysis, in matter this is PLS-SEM.

RESULTS AND DISCUSSION

A. Research Results

1. PLS-SEM Test Results

a. Outer model test results

(1) Reliability indicator test

The results of the indicator reliability test, of the 17 indicators in the study this, three indicators among them omitted / removed, because no Fulfill test criteria for *indicator reliability*, then remaining 14 indicators.

(2) Discriminant validity test

The discriminant validity test results show that the cross-loading value of the 14 indicators to variable parent morebig than to cross-loading value against variable other. Discriminant validity test use Fornbell -Larcker pointed out that whole mark correlation variable Among construct variable already show number moretall than no the variables.

(3) Internal consistency test

Internal Consistency test results use *composite Reliability* and *Cronbach's Alpha*. third mark *Composite Reliability* and *Cronbach's Alpha* is in a position ≥ 0.60 , therefore that third variable study this has passed a significant *Internal Consistency* test supports *Internal Consistency* test.

(4) Convergent validity test

Average *Variance Extracted (AVE)* Value from third variable has Fulfill criteria testing *convergent validity*, ie have value above 0.5. So that third variable the stated has passed the *convergent validity* test.

b. Inner model test results

(1) Coefficient determination (R^2)

mark coefficient R square effect Incompetence Consultants and Material Issues simultaneous to the Variation Order is 0.364 or 36.4%. this show that the model is worth medium. Means second variable independent (Incompetent Consultants, and Material Issues) can explained variation orders of 36.4%. Another explanation is explained by variables other independent outside Incompetent Consultants and Material Issues.

(2) Hypothesis Test Results

Based on results research and with consider formula problem, and hypothesis research, then could concluded that:

1. Incompetence Consultant influence positive and significant against Variation Orders. The magnitude mark influence Incompetence Consultant to the Variation Order is 0.275 or 27.5%. Influential positive means when occur increase in incompetence Consultant as big one unit, then the Variation Order also increases, with enhancement of 27.5% of enhancement one unit on Incompetence Consultant. That influence Incompetence Consultant to the Variation Order is significant, because t value (3.593) morebig of the critical t (1.96), and the p value (0.000) is greater small than mark alpha 0.05. With thereby hypothesis first proven. hypothesis first reads " Incompetent Consultant influential positive to happening *Variation Order* on completion projects construction building building."
2. Materials Problem influential positive and significant to Variation. Means hypothesis second proven. The magnitude mark influence The Material Issue to the Variation Order is 0.371 or 37.1%. Influential positive means when occur increase in Material Issues by one unit, then the Variation Order also increases, with enhancement of 37.1% of enhancement one unit on Material Issues. That influence Material Problems with the Variation Order is significant, because t value (4.968) morebig of the critical t (1.96), and the p value (0.000) is greater small than mark alpha 0.05. With thereby hypothesis second proven. hypothesis second reads "Material problems have an effect positive to happening *Variation Order* on completion projects construction building building."

Discussion

Discussion results study this performed per hypothesis, which means there is two sub - discussions.

Influence Incompetence Consultant to *Variation Order*

Research results this show that Incompetence Consultant influential positive and significant against Variation Orders. Research results this support results study before, like results study Study earlier (Kanda et al., 2016) which proves influence Incompetence Consultant to the occurrence of Variation Orders.

Variable *Variation Order* have the mean value is 4.489. Based on Likert scale interval coefficient table, numbers the show that majority respondent agree with statements on Variation Order variables. The highest mean value on the variable Materials problem is VO2 indicator with value 4.99, which means respondent agree to indicator statement " Addition quality work, quantity work, or timetable work".

Remember Incompetence This consultant (Hassan & Ali, 2020). affect the Variation Order significant, then indicators on Incompetence Consultant (eg variable independent) should noticed by management. There is nine measuring indicator Materials Problem. Ninth indicator the are : (1) Complexity design, (2) Change design in the middle implementation project in progress, (3) Errors and omissions in design, (4) Stage deadline design no fulfilled, (5) Consultants not enough knowledge because negligence in TOR, (6) Details pictures that don't adequate, (7) Lack of coordination with other party inside Step design, (8) Inconsistency between documents so that cause conflict between documents contract, (9) Negligence operate *terms of reference* (TOR).

Based on results data processing, variables Incompetence Consultant have the mean value is 4.413. Based on table *coefficient* interval Likert scale, number the show that majority respondent rather agree with statements on variables incompetence consultant. The highest mean value on the variable incompetence consultant is on the IK7 indicator with value 4.83, which means respondent agree to indicator the statement "Lack of coordination with other party inside Step design".

Influence Material Issues against *Variation Order*

Research results this show that Material Issues effect positive and significant against Variation Orders. Research results this support results study before, like results study Study previously (Desyardi et al., 2019) proved that Material Issues effect to the occurrence of Variation Orders.

Variation Order variable is measured with three indicators (Jibrin et al., 2020) namely : (1) Changes quality work, quantity work, or timetable work, (2) Addition quality work, quantity work, or timetable work, (3) Reduction quality work , quantity work, or timetable work. Based on results research the third average value indicator the is 4,489. the figure show that majority respondent agree with statements on Variation Order variables. The highest mean value on the variable material issues is VO2 with value 4.99, which means respondent agree to indicator statement " Addition quality work, quantity work, or timetable work".

Temporary that variable Material problems have the average value is 4.432. Based on table *coefficient* interval Likert scale, numbers the show that majority respondent agree with statements on variables Materials Problem. The highest mean value on the variable The Material Problem is on the MM5 indicator with value

4.96, which means respondent agree to indicator statement “Incompatibility between materials” or there is incompatibility in materials.

Remember This material problem affect the Variation Order significant, then indicators on Material Issues (eg variable independent) should noticed by management. There is nine measuring indicator Materials Problem. Ninth indicator the are; (1) Complexity design, (2) Change design in the middle implementation project in progress, (3) Errors and omissions in design, (4) Stage deadline design no fulfilled, (5) Consultants not enough knowledge because negligence in TOR, (6) Details pictures that don't adequate, (7) Lack of coordination with other party inside Step design, (8) Inconsistency between documents so that cause conflict between documents contract, (9) Negligence operate *terms of reference* (TOR)

CONCLUSION

Based on results research, then could concluded as following:

Incompetence Consultant influential positive and significant to Variation Order. Amount mark influence Incompetence Consultant to the Variation Order is 0.275 or 27.5%.

Material Issues effect positive and significant against Variations. Means hypothesis second proven. The magnitude mark influence The Material Issue to the Variation Order is 0.371 or 37.1%.

Based on results research, got theoretical / academic advice, as well as practical advice.

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First publication right:

Devotion - Journal of Research and Community Service



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