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Research paper

Competencies of Indonesian Architects with Sosio Cultural Ecology: Anatomy based on Architect Background

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Abstract

The architect's background becomes a key factor determining its success which is reflected through the competence of the architect itself. And the diversity of architectural backgrounds provided the basis for this research. The study aims to see if there are differences in the competence of Indonesian architects if distinguished based on demographic background and architectural work, and what architect's background is the most powerful in determining its competence. A neuroresearch method is a method applied in this research. The results showed that there are differences in the competence of Indonesian architects if differentiated based on demographic background and architectural works. The second research result is the number of projects handled by Architects is a very decisive variable to realize the Indonesian architects become more competent.

Keywords: *Competencies of Indonesian Architects, Sosio Cultural Ecology.*

1. Introduction

For architects, designing a corporate project is a milestone capable of raising the name of the architectural consulting firm or lifting the name of the architect himself. Because corporate projects are usually of high value on a large scale and involve multiple stakeholders with different goals and needs. And this field continues to evolve as it requires an increase in professionalism and transformation from the architect itself [1, 2]. The scheme of globalization used in the field of architecture refers to a series of rich and complex interpretations that highlight the importance of architecture, institutions and the work itself [3]

In the project, there is usually a conflict of interest between the architect and in the company who provided the project. The difference of interest is usually from the aspect that the project owner always has corporate goals, while the architect has professional goals. In the Czech Republic, a study attempts to illustrate the role of enterprise architect with a broad spectrum of knowledge and skills that leads to the importance of educating these experts with the necessary requirements to perform the role of the architect [4].

This is where the architect's background becomes a key factor in determining its success which is illustrated through the competence of the architect itself, especially in developing the architect of Jakarta Socio-Cultural Ecology, the architectural concept that collaborates between social life, culture and ecology [5]. Competence is the ability to implement a set of knowledge, skills, and ability to do the work so that it can be completed properly [6]. This can arise because of many reasons, among others: (1) the architect does not understand the interests of the owner, (2) the architect does not succeed in presenting the design concept that can be understood by the owner, and (3) the architect is weak in terms of project supervision. Some experience in the field says that often the knowledge of the architect is not easily manifested in practice [7].

For the owner, using the services of an architect in the execution of a project can provide added-value to the built works. Architects have the ability to compose space programs, needs, and problems into high-value architectural works. The general problem solving, and complexity of management strategies becomes one of the most important competencies an architect should possess [8].

Therefore, it is very important for the architect to study the client's interest from the beginning of the design so that the design made not only answers the architect's vision in person but answers the owner's objectives as closely as possible. Because client satisfaction evaluation becomes one of the successes in architectural projects [9]. The key factor is on the architect's own background. The problems studied are: (1) is there any difference in the competence of Indonesian architects, if distinguished based on demographic background and architectural work?, and (2) what architect background determines the most competence?

2. Research Method

This research uses one type of mixed method developed in Indonesia that is Neuroresearch method. This method begins with a stage called exploratory research in which the researcher will conduct explorative studies on various related studies so as to find theoretical constructs that fit the concept of research [10]. The next two stages are called explanatory research and confirmatory research which are more quantitative in order to arrive at instrument validity and hypothesis verification. This qualitative and

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quantitative incorporation makes this research included in research mixed methods [11, 12, 13].

The research instrument has a demographic picture of gender, age, educational background, certification participation, college status, educational origin, work experience abroad, ownership of consulting firm, experience as architect, number of projects handled, type of building designation, building ownership, and the number of storeys of the building.

3. Result

3.1. Result of First Hypothesis

To find out whether there are differences in the competence of Indonesian architects, if differentiated based on the architect's background, include: Analysis of differences in the Competence of Indonesian Architects (Y) if differentiated by Sex (Sex_X1).

The homogeneity test with Levene produced F of 0.425 with a significance value of 0.516 is non-significance at α> 0.05. That is, variance male architects with women proved homogeneous (equal variances assumed). Based on homogeneity test resulted t value equal to 1,733 with significance value equal to 0,087 is non-significance at α> 0,05. Thus, there is no difference in the Competence of Indonesian Architects (Y) if differentiated by sex (Sex-X1). That is, architects of male sex with women proved equally competent significantly at α <0.05.

Group Statistics

	Sex-X1	N	Mean	Std. Deviation	Std. Error Mean
Competence_Y	Male	81	349.7407	25.30108	2.81123
	Female	4	327.5000	17.17556	8.58778

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Competence_Y	Equal variances assumed	.425	.516	1.733	83	.087	22.24074	12.83224	-3.28207	47.76355
	Equal variances not assumed			2.461	3.676	.075	22.24074	9.03621	-3.74495	48.22643

Analysis of differences in Competence of Indonesian Architects (Y) if differentiated by Age (Age-X2). The proof is done by One Way of Anova which yields F of 2,373 with significance value of 0.076 is non-significant at α> 0,05. So, there is no difference in the Competence of Indonesian Architects (Y) if differentiated by Age (Age-X2). That is, Indonesian architects <30 years old or 30-40 years old or 41-50 years old or> 50 years are all equally competent significantly on α <0.05.

Descriptives

Competence_Y

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
<30 years	17	344.4706	27.98687	6.78781	330.0811	358.8601	253.00	385.00
30-40 years	37	348.4324	26.38343	4.33741	339.6358	357.2291	278.00	400.00
41-50 years	28	347.6786	20.46144	3.86685	339.7445	355.6127	300.00	393.00
>50 years	3	385.3333	19.03506	10.98989	338.0476	432.6190	367.00	405.00
Total	85	348.6941	25.35041	2.74964	343.2262	354.1621	253.00	405.00

ANOVA

Competence_Y

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4361.957	3	1453.986	2.373	.076
Within Groups	49620.090	81	612.594		
Total	53982.047	84			

Analysis of differences in Competence of Indonesian Architects (Y) if differentiated based on Background Education (S1, S2 and S3). The proof is done with One Way of Anova which yields F equal to 1,249 with significance value of 0.292 is non-significant at α> 0,05. So there is no difference Competence of Indonesian Architects (Y) if differentiated based on Background Education (S1, S2 and S3). That is, the architects of Indonesia who are aged educational background S1 or S2 or S3 are all equally competent significantly on α <0.05.

Descriptives

Competence_Y

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
S1	50	346.9200	28.13803	3.97932	338.9233	354.9167	253.00	405.00
S2	32	353.0313	20.28584	3.58606	345.7174	360.3451	300.00	393.00
S3	3	332.0000	20.42058	11.78983	281.2725	382.7275	316.00	355.00
Total	85	348.6941	25.35041	2.74964	343.2262	354.1621	253.00	405.00

ANOVA

Competence_Y

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1595.398	2	797.699	1.249	.292
Within Groups	52386.649	82	638.862		
Total	53982.047	84			

Analysis of differences in Competence of Indonesian Architects (Y) if differentiated by Certification Entry (Certificate_X4). Homogeneity test with Levene yielded F of 0.066 with significance value of 0.798 is non-significance at α> 0.05. That is, the variance of architects who have been certified as well as unproven homogeneous (equal variances assumed). Based on the homogeneity test resulted in t value equal to 2,887 with significance value equal to 0,005 the is significance at α <0,05. Thus, there is a difference in the Competence of Indonesian Architects (Y) if differentiated by Certification Entry (Certificate_X4). That is, architects who have been certified (Already) tend to be competent, while those that have not been certified are competent enough significantly at α <0.05.

Group Statistics

	Certification_X4	N	Mean	Std. Deviation	Std. Error Mean
Competence_Y	Already	68	352.5000	24.13117	2.92633
	Not Yet	17	333.4706	25.05274	6.07618

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Competence_Y	Equal variances assumed	.066	.798	2.887	83	.005	19.02941	6.59239	5.91741	32.14141
	Equal variances not assumed			2.822	23.975	.009	19.02941	6.74414	5.10942	32.94940

Analysis of differences in the Competence of Indonesian Architects (Y) if differentiated by the status of public or private universities (HE_X5). The homogeneity test with Levene yielded F of 20,921 with a significance value of 0,000 is very significance at α <0,01. That is, the variance of architects who come from public universities (public) and private (private) proved to be heterogeneous (equal variances not assumed). Based on homogeneity test resulted t value equal to 0,556 with significance value equal to 0,584 is non-significance at α> 0,05. Thus, there is no difference in the Competence of Indonesian Architects (Y) if differentiated by the Status of Higher Education (HE_X5). That is, the architects of state college graduates with private proved equally competent significantly on α <0.05.

Group Statistics

	HE_X5	N	Mean	Std. Deviation	Std. Error Mean
Competence_Y	Public	20	344.7000	40.69282	9.09919
	Private	65	349.9231	18.58369	2.30502

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Competence_Y	Equal variances assumed	20.921	.000	-.804	83	.424	-5.22308	6.49589	-18.14314	7.69698
	Equal variances not assumed			-.556	21.491	.584	-5.22308	9.38661	-24.71650	14.27035

Analysis of differences in the Competence of Indonesian Architects (Y) if differentiated by the origin of education both from foreign and domestic school (Educ_Country_X6). The homogeneity test with Levene produced F of 3,197 with significance value of 0.077 is non-significance at α> 0,05. This means that the variance of architects from overseas and domestic universities proves to be homogeneous (equal variances assumed). Based on homogeneity test resulted t value equal to 0,956 with significance value equal to 0,342 is non-significance at α> 0,05. So, there is no difference in the Competence of Indonesian Architects (Y) if differentiated based on the origin of colleges both abroad and within the country (Educ_Country_X6). That is, the architects of overseas and domestic graduates proved equally competent significantly on α <0.05.

Group Statistics

	Educ_Country_X6	N	Mean	Std. Deviation	Std. Error Mean
Competence_Y	Overseas	21	353.2857	16.75751	3.65679
	Domestic	64	347.1875	27.53865	3.44233

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Competence_Y	Equal variances assumed	3.197	.077	.956	83	.342	6.09821	6.37848	-6.58832	18.78475
	Equal variances not assumed			1.214	56.953	.230	6.09821	5.02213	-3.95860	16.15503

Analysis of differences in Competence of Indonesian Architects (Y) if differentiated by Ownership of Consultant Company (Company_X7). The proof is done by One Way of Anova which yields an F of 0.927 with the significance value of 0.400 is non-significant at α> 0.05. So, there is no difference in the Competence of Indonesian Architects (Y) if differentiated by Ownership of Consultant Company (Company_X7). That is, the architects of Indonesia whose status as the owner of the company or only staff companies or independent architects not under the company proved all equally competent significantly on α <0.05.

Descriptives

Competence_Y

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Owner	68	348.5735	22.22229	2.69485	343.1946	353.9525	278.00	400.00
Staff	13	344.5385	39.32899	10.90790	320.7722	368.3047	253.00	405.00
Independent	4	364.2500	19.50000	9.75000	333.2211	395.2789	338.00	384.00
Total	85	348.6941	25.35041	2.74964	343.2262	354.1621	253.00	405.00

ANOVA

Competence_Y

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1193.434	2	596.717	.927	.400
Within Groups	52788.613	82	643.764		
Total	53982.047	84			

Analysis of differences in the Competence of Indonesian Architects (Y) if differentiated by whether the architect has ever worked abroad (Working_X8). The homogeneity test with Levene produced F equal to 1.372 with the significance value of 0.245 is non-significance at α> 0,05. That is, the variance of architects who have worked abroad (ever) and who have never (never) proven homogeneous (equal variances assumed). Based on homogeneity test resulted t value equal to 1,408 with significance value equal to 0,163 is non-significance at α> 0,05. Thus, there is no difference in the Competence of Indonesian Architects (Y) if differentiated by whether or not the architect has ever worked abroad (Working_X8). That is architects who had worked abroad and who have never proved equally competent significantly on α <0.05.

Group Statistics

	Working_X8	N	Mean	Std. Deviation	Std. Error Mean
Competence_Y	Ever	16	356.6875	17.70016	4.42504
	Never	69	346.8406	26.57488	3.19924

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Competence_Y	Equal variances assumed	1.372	.245	1.408	83	.163	9.84692	6.99334	-4.06255	23.75639
	Equal variances not assumed			1.803	32.803	.081	9.84692	5.46041	-1.26492	20.95876

Analysis of differences in Competence of Indonesian Architects (Y) if differentiated by work experience to be an architect (Experience_X9). The proof is done by One Way of Anova which yields F of 0,503 with a significance value of 0.681 is non-significant at α> 0,05. So, there is no difference Indonesian Architects Competencies (Y) if distinguished by work experience to be an architect (Experience_X9). That is, Indonesian architects who have working experience <5 years or 5-10 years or 11-20 years or> 20 years proved all equally competent significantly on α <0.05.

Descriptives

Competence_Y

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
<5 years	12	346.5000	15.15676	4.37538	336.8699	356.1301	327.00	385.00
5-10 years	22	343.7273	27.66669	5.89856	331.4605	355.9940	253.00	376.00
11-20 years	36	350.8889	27.56994	4.59499	341.5606	360.2172	278.00	400.00
>20 years	15	352.4667	23.58833	6.09048	339.4039	365.5295	323.00	405.00
Total	85	348.6941	25.35041	2.74964	343.2262	354.1621	253.00	405.00

ANOVA

Competence_Y

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	987.395	3	329.132	.503	.681
Within Groups	52994.653	81	654.255		
Total	53982.047	84			

Analysis of differences in Competence of Indonesian Architects (Y) if differentiated based on number of projects ever handled (Project_X10). The proof is done with One Way of Anova which yields F of 5,370 with significance value of 0,002 is significant at α <0,05. So, there is a difference in Competence of Indonesian Architects (Y) if differentiated based on the number of projects ever handled (Project_X10). Architects who are considered competent if the person has handled <5 projects or above 11 projects significantly on α <0.05 than the architect who handles between 5-10 projects.

Descriptives

Competence_Y

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
<5 projects	4	347.7500	18.83923	9.41962	317.7726	377.7274	338.00	376.00
5-10 projects	3	299.0000	45.50824	26.27420	185.9513	412.0487	253.00	344.00
11-20 projects	18	357.9444	19.56429	4.61135	348.2154	367.6735	316.00	388.00
>20 projects	60	348.4667	23.76186	3.06764	342.3283	354.6050	278.00	405.00
Total	85	348.6941	25.35041	2.74964	343.2262	354.1621	253.00	405.00

ANOVA

Competence_Y

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	8955.419	3	2985.140	5.370	.002
Within Groups	45026.628	81	555.884		
Total	53982.047	84			

Multiple Comparisons

Dependent Variable: Competence_Y
LSD

(I) Project_X10	(J) Project_X10	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
<5 projects	5-10 projects	48.75000*	18.00738	.008	12.9210	84.5790
	11-20 projects	-10.19444	13.03279	.436	-36.1256	15.7367
	>20 projects	-.71667	12.17521	.953	-24.9415	23.5082
5-10 projects	<5 projects	-48.75000*	18.00738	.008	-84.5790	-12.9210
	11-20 projects	-58.94444*	14.70297	.000	-88.1987	-29.6902
	>20 projects	-49.46667*	13.94846	.001	-77.2197	-21.7136
11-20 projects	<5 projects	10.19444	13.03279	.436	-15.7367	36.1256
	5-10 projects	58.94444*	14.70297	.000	29.6902	88.1987
	>20 projects	9.47778	6.33618	.139	-3.1292	22.0848
>20 projects	<5 projects	.71667	12.17521	.953	-23.5082	24.9415
	5-10 projects	49.46667*	13.94846	.001	21.7136	77.2197
	11-20 projects	-9.47778	6.33618	.139	-22.0848	3.1292

*. The mean difference is significant at the 0.05 level.

Analysis of differences in Competence of Indonesian Architects (Y) if differentiated by type e of the designation of buildings (Building_X11). The proof is done with One Way of Anova which yields an F of 0.290 with the significance value of 0.749 is non-significant at α> 0.05. So there is no difference Indonesian Architects Competencies (Y) if differentiated by type of allotment of buildings (Building_X11). Architects who handle general or residential or health type or educational or governmental buildings or rituals or transport buildings have proved equally competent significantly at α <0.05.

Descriptives

Competence_Y

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Public	21	352.3810	21.67135	4.72908	342.5163	362.2456	320.00	405.00
Home	61	347.4918	27.10143	3.46998	340.5508	354.4328	253.00	400.00
Health	3	347.3333	8.38650	4.84195	326.5001	368.1665	342.00	357.00
Total	85	348.6941	25.35041	2.74964	343.2262	354.1621	253.00	405.00

ANOVA

Competence_Y

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	379.182	2	189.591	.290	.749
Within Groups	53602.865	82	653.693		
Total	53982.047	84			

Analysis of differences in Competence of Indonesian Architects (Y) if differentiated by building ownership (Owner_X12). The proof is done with One Way of Anova which yields F of 3,631 with significance value equal to 0,031 is significant at α <0,05. So there is difference Architects Indonesia Competencies (Y) if differentiated by building ownership (Owner_X12). That is, the Indonesian architects who handle the project of private (private) proved more competent than the architect who handles government projects (government) significantly on α <0.05.

Descriptives

Competence_Y

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Goverment	4	317.0000	42.66927	21.33464	249.1037	384.8963	253.00	339.00
Private	79	350.4937	23.78045	2.67551	345.1671	355.8202	278.00	405.00
Foreign	2	341.0000	4.24264	3.00000	302.8814	379.1186	338.00	344.00
Total	85	348.6941	25.35041	2.74964	343.2262	354.1621	253.00	405.00

ANOVA

Competence_Y

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4392.300	2	2196.150	3.631	.031
Within Groups	49589.747	82	604.753		
Total	53982.047	84			

Multiple Comparisons

Dependent Variable: Competence_Y
LSD

(I) Owner_X12	(J) Owner_X12	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Goverment	Private	-33.49367*	12.60331	.009	-58.5657	-8.4217
	Foreign	-24.00000	21.29706	.263	-66.3666	18.3666
Private	Goverment	33.49367*	12.60331	.009	8.4217	58.5657
	Foreign	9.49367	17.60771	.591	-25.5337	44.5210
Foreign	Goverment	24.00000	21.29706	.263	-18.3666	66.3666
	Private	-9.49367	17.60771	.591	-44.5210	25.5337

*. The mean difference is significant at the 0.05 level.

Analysis of differences in Competence of Indonesian Architects (Y) if differentiated based on the number of building floors (No_Floors_X13). The proof is done with One Way of Anova which yields F of 1,720 with a significance value of 0.186 is non-significant at α> 0,05. So, there is no difference in the Competence of Indonesian Architects (Y) if differentiated based on the number of building floors (No_Floors_X13). That is, Indonesian architects who handle buildings <8 floors or 8-20 floors or> 20 floors proved equally competent significantly at α <0.05.

Descriptives

Competence_Y

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
<8 floors	79	347.6329	24.28526	2.73231	342.1933	353.0725	253.00	400.00
8-20 floors	3	350.3333	44.41096	25.64068	240.0104	460.6563	300.00	384.00
>20 floors	3	375.0000	30.51229	17.61628	299.2033	450.7967	344.00	405.00
Total	85	348.6941	25.35041	2.74964	343.2262	354.1621	253.00	405.00

ANOVA

Competence_Y

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2173.026	2	1086.513	1.720	.186
Within Groups	51809.021	82	631.817		
Total	53982.047	84			

3.2. Result of Second Hypothesis

To find the architect's most decisive background in realizing the competence of Indonesian architects. The proof analyzed by this analytical approach is determined by Binary Segmentation called Classification and Regression Trees. In this analysis, the researchers set the Prunning of Depth by 2; Parent of 2; and Child of 1, with significance level α <0,05. The results of this analysis prove that the Number of Projects Handled Architects (Project_X10) is a

very decisive variable to realize the Indonesian architects into competence (Y). If architects focus on the number of projects handled, then the competence of Indonesian architects will increase 90.348 times from the current conditions. Increased ability to handle the number of projects is largely determined by experience (Experience_X9) which contributed 37,341 times and also due to the planned number of floors (No_Floors_X13) contributing 52.216 times from the current condition.

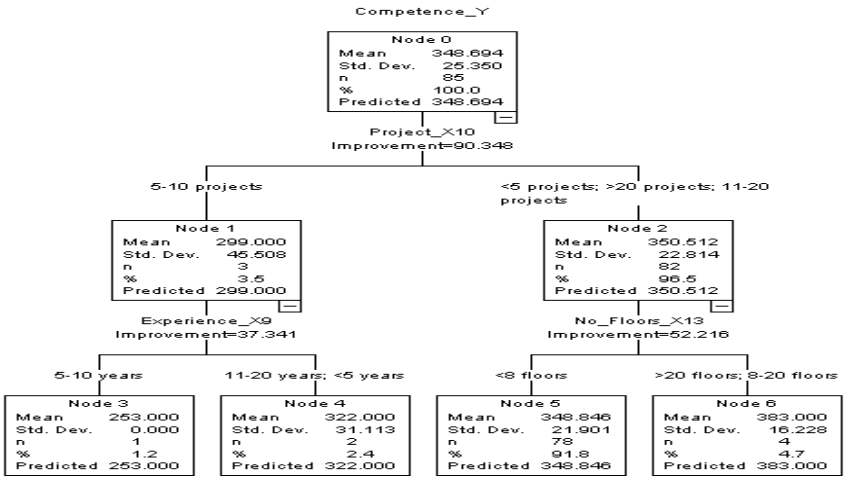


Fig. 1: Results Classification and Regression Trees against Background Architect Determinants (X1 to X13) against the Realization of Competence Architects Indonesia (Y)

4. Conclusion and Recommendations

Results of the study indicate the existence of various background conditions that determine the difference in the competence of the architect itself. A study even found a correlation between one's characteristics and personality to character design and architecture in general [14]. The results of the further research indicate that the number of projects handled by architects is also a factor determining the competence of Indonesian architects. For most organizations, competence has become a common thread connecting all practices and strategies together to achieve organizational performance [15]. So, building the competence for Indonesian architects becomes a very important thing to continue to be developed and cannot be delayed much longer.

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