

# AN EVALUATION OF ELECTRICITY CONSTRUCTION SERVICE INDUSTRIAL NEEDS-BASED ELECTRICAL INSTALLER

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**ABSTRACT:** Competent performances by professional electrical installers are expected in the community. However, proper evaluation tools to assess competent performance on professional electrical installations that meet industrial needs of electrical construction service industry are scarce. This research studies the evaluation tools on electrical installation that are based on competent design, construction, commissioning, operation and maintenance of electrical installations. Using responses collected from 210 respondents, we found statistically significant relationships on those studied variables. The analysis technique used to validate research data is Confirmatory Factor Analysis (CFA). The finding an evaluation tools on electrical installation fitting with the value of chi-square  $< 2$  df ( $206.06 < 356.0$ ), P-value = 0.07350 ( $> 0.05$ ), and RMSEA = 0.026 ( $< 0.05$ ). These results have significant policy implications to improve the performance evaluation process of the electrical construction service industry in Province of Sumatera Barat, Indonesia. It also further enriches the body of knowledge on performance evaluation and its impacts on the performance of electrical construction service industry in Indonesia as a developing nation.

*Keywords: evaluation instruments, confirmatory factor analysis, electrical installers*

## 1. INTRODUCTION

The efforts of developing an electrical system in Indonesia recently was in the stage of improvement and increase toward the easiness in terms of accessing new telephone network. In Indonesia in 2011 the utility PT. PLN (Persero) set up a call center enabling customers to request a new electricity connection by phone. It further simplified the application process by eliminating the requirement to bring in a copy of a neighbor's bill to help determine the exact address of the new customer's business [1]. The simplicity of application process in attaining a new network line also demanded well-qualified electrician performance. Stated that the employees' performance effectiveness and efficiency would be attained if the individuals or the employees were evaluated continuously. Evaluation or evaluation include all of the techniques implemented for evaluating the individual performance (focus to individual) [2], [3]. Organizational performance and its resultant efficiency and effectiveness can only be achieved when individuals are continuously appraised and evaluated. The inability to implement the strategy of effective and efficient performance evaluation would impede the company's capability to achieve the competitive edge.

Evaluation is the practice of collecting information about person progress. Evaluation was a practice of collecting information regarding

the progress of a person or an individual [4]. Evaluation is composed of three steps (1) goals (may also be called outcome or objectives), (2) information (may be called measures or evidence), and action (using the information may be called closing the loop) [5]. The evaluation might be implemented in three stages namely deciding the results attained in the evaluation activities, the evidence of the evaluation activities and the follow-up of the evaluation activities.

Evaluation is one of the most emotive words in the education lexicon. It has a variety of connotations for different people anxiety, competition, success, feedback, to mention but a few depending on the nature of their participation in the evaluation process [6]. Evaluation had multiple connotations; some of the connotations were regarded as pressure, competition, success, feedback, standard and boredom. The situation depended on the characteristic and the participation of such connotations within an evaluation.

The research revealed that competence, evaluation and development affected employee performance to a moderate extent as indicated by 56.9% of the respondents [7]. There were also a number of statements on competence, evaluation and development that enhanced employee performance as indicated by the respondents. The comprehensive evaluation toward the the employee performance provided by the experienced practitioners found that such

evaluation was more convincing and tended to be more credible for the communication with the needs of organizational development. The advantages of using rank source were different because the assessors frequently had different views on the employees' performance. The reports on the employee performance might become a good source of information for learning the type of employee performance information.

Evaluation was defined as a set of procedures implemented for attaining information regarding an individual's performance or achievement and the results would be made as a matter of evaluation. The electrician evaluation in the research was an activity of assessing the electrician performance in the industry of electricity construction service [8]. The research revealed that competence, evaluation and development affected employee performance to a moderate extent as indicated by 56.9% of the respondents. There were also a number of number of statements on competence, evaluation and development that enhanced employee performance as indicated by the respondents [9]. The influence of continuous performance evaluation toward the employee was very huge and it was very important for the company performance. The evaluation toward the employee performance should be performed continuously in order to develop the motivation of continuously achieving successful work and beneficial competitive level.

The evaluation activities toward the electricians performed by the technical officials and the director of electricity service industry continuously might assure the availability of well-qualified electric power. The reason was that the evaluation was able to improve the electrician's performance quality [10], [11], [12], [13]. They had investigated the performance evaluation of employer. The results of these researches stated that the implementation of the performance of employer which had been performed continuously in the company was able to improve the employees' and the companies' performance. The overall results of these researches stated that the implementation of performance evaluation performed in a company or in an industry positively improved the employee performance and had a direct impact to the customer satisfaction as well as to the performance improvement and the industrial or company development. The recommendations from several relevant researches above showed that the assesment of electrical installer by the technical officials and the directors of electricity service industry was very urgent to be implemented in the industry of electricity construction service.

In exploring performance management, one must start with an explanation of the process of managing individual employee performance. The process of managing individual performance is similar to the models used to manage performance at the organization level [14], [15]. The performance management was centered on the employee individual. The models of performance management that had been centered on the employee individual were similar to the performance managers in the level of organization. The process of performance management and development for the employee individual usually started from the superiors or the managerial boards. An electrical system that serves to provide the electricity for the electricity-user communities in general consists of generator installation, channel installation and distribution installation that runs to the electricity customers [16]. In other words, electrical installation was an act of installing, binding, constructing and arranging an electrical system. Then, an electrical system was a person who worked or who had been an expert in the installation of electrical equipment in the customers' houses.

Installation electrician is a person who has been registered as an installation electrician in terms of regulation for the verification and certification of the construction, testing and inspection of any electrical installation, excluding specialist electrical installations. The job of electrical installation consisted of: (a) modification or repairment of electrical installation; (b) machine connection in the terminal of machine supply itself; and (c) inspection, testing and verification of electrical installation according to the governing standards [17]. Electricians install, alter, repair and maintain electrical systems that are designed to provide heat, light, power, control, signals or fire alarms for all types of buildings, structures and premises [18]. Electrical installation work-the design, construction, maintenance, verification and inspection and testing of one or more of the work categories a separate and self-contained premises constructed or adapted to use for residential purposes and forming part of a building from some other part of which it is divided horizontally [19].

The labors of electrical constructions should have a certificate of job skills that had fulfilled the governing requirements based on the discipline of electricity science. The explanation had been supported by the Regulation of Republic of Indonesia Number 14 Year 2012 in order to realize a safe, reliable and eco-friendly electrical power provision; therefore, the electrical installation should have been in accordance with the governing standards and the electricians

should have a certificate of competence [20]. The requirements for attaining the certificate of job skills in the discipline of electricity was the graduates of Vocational High School majoring in Electricity Installation Techniques or similar degree. After the electricians who worked in an industry of certified electricity construction service had been capable, the electricians had been competent in performing the tasks of designing, constructing, testing, operating and maintaining the electrical installation in the customers' house [21].

Electrical energy has a very vital and strategic role. Therefore, there should be reliable, safe and eco-friendly electrical quality and this characteristic should be the main requirement in an effort of providing the availability of electrical power. The form of reliable, safe and eco-friendly electricity might be attained if the installation had been pursued by a competent electrician [22], [23]. The data of electrical installation in 444 user buildings that had been done by the bureau of installation; from the number, there were 3 user buildings (0.45%) that belonged to the Direct Operation (LLO), 437 user buildings (98.42%) that belonged to the Direct Operation with Note (LOC) and 4 user buildings (0.91%) that belonged to Negative Operation (TLO)[24], [25]. That from 62 samples of electrician product there were only 6 samples (9.67%) that met the requirements of Direct Operation (Laik Operasi (LO)). The rest 56 samples (90.33%) belonged to the Negative Operasi (TLO). The data showed the researchers concern toward the a more scientific curiosity in the competence gap among the electricians [26]. A construction business is a business done by a group of people in order to gain several benefits by means of construction service in the constructional work." The Law Number 30 Year 2010 explained that the business of construction supporting service included the architectural, mechanical, electrical and environmental design work.

The national construction service still had several weaknesses in the management of technological mastery and capital and several limitations in the expert and skillful human resources. If the matter were analyzed further toward the jobs of the electricians, there would be more weaknesses in the domain of discipline, honesty, integrity, planning, electrical construction implementation, testing, operation and maintenance [28].

These matter would be the keywords for the research: "Electrical Construction Service Industrial Needs-Based Electrician Performance Evaluation. The factors that designed topic consisted of: (1) the design of electrical installation; (2) the construction of electrical

installation; (3) the commissioning of electrical installation; (4) the operation of electrical installation; and (5) the maintenance of electrical installation. Theoretically, the factors might be approached by means of in which in order to confirm or to inspect a relationship between several sets of measuring variable established several smaller sets of factors, the researchers might implement the confirmatory factor analysis (CFA) model [29]. Confirmatory factor analysis (CFA) model is used to examine the relationships between a set of measured variables and a smaller set of factors that might account for them.

A research was done in the Province of West Sumatera from August to December 2014 and the research subjects were the technical officials and the director of industry or of electricity construction service company. The research subjects for the expanded experiment consisted of 210 respondents from the technical caretakers and the directors of electricity construction service company.

The validator instrument of the experts and the users was implemented according to the governing criteria. The aspect of content quality for the instrument; the aspect of quality for the instrument consisted of: (1) clarity in the direction of instrument completion; (2) the range flexibility in the aspect of instrument construct; (3) the clarity between the indicator and the item; (4) the clarity of item formulation; (5) the fitness between the indicator and the item; (6) the proportion and the sufficiency of the item number; (7) the simplicity of item formulation; (8) the easiness in interpreting/understanding the item; (9) the readability/the easiness in reviewing item; (10) the standard of layout and letter notation/format; (11) the easiness in completing the instrument; (12) the efficiency of time/effort for finishing the item; (13) the implementation of standard *bahasa Indonesia*; (14) the avoidance of respondents from the covert direction, the distress and the shame in completing the instrument; and (15) the creativity of instrument design in order to attain objectivity upon the respondents' answer so that the respondents might avoid themselves from the bias in the research [30], [31]. The instrument of expanded experiment included the aspects of construction variables, construction, commission, operation and maintenance of 21 electrical installation along with 20 indicators and 55 question items.

The data analysis technique of research implemented the descriptive qualitative and the descriptive quantitative analysis. The qualitative analysis included the data on the results of content validity in the form of the experts validator [32]. In order to validate the evaluation, the researchers implemented the empirical data attained from the

results of quantitative data gathering by means of research instrument. For the analysis of expanded experiment data the researchers implemented the approach of confirmatory factor analysis (CFA). The analysis of quantitative data was done by the assistance of LISREL 8.80 for Windows software designed [33].

## 2. THE EVALUATION TOOLS ON ELECTRICAL INSTALLATION

The Electricity Construction Service Industrial-Based Electrician Performance Evaluation was developed in three sequences namely: initial experiment, limited experiment

and expanded experiment. For each of the experiments, the respondents were asked to provide their comments on the evaluation tools on electrical installation. Based on the three sequences of development, the researchers found the following results.

The content validation of the Electricity Construction Service Industrial-Based Electrician Performance Evaluation instrument was done by submitting the experts' validation evaluation sheet to the 7 validators. The content validation evaluation employed the Likert scale which had 5 interval option of answer namely: 1 = very bad; 2 = bad; 3 = moderate; 4 = good; and 5 = very good.

Table 1 The Data of Expert Validation toward the Quality of Evaluation Tools on Electrical Installation Content (done by 7 expert validators)

No.	Aspect of Instrument Content Quality	Number	Score Mean	Classification
1.	Clarity in the instrument's direction.	34	4,9	Very Good
2.	Width of the instrument's construct aspect	34	4,9	Very Good
3.	Clarity of indicators for each aspect	28	4,0	Good
4.	Clarity of item formulation	33	4,0	Good
5.	Fitness between the indicators and the items.	28	4,0	Good
6.	Proportion and sufficiency of the item numbers.	29	4,2	Good
7.	Simplicity of item formulation.	28	4,0	Good
8.	Easiness in reasoning/understanding the item.	28	4,0	Good
9.	Readability/eligibility in the reading process.	35	5,0	Very Good
10.	Standard of notation/letter and layout.	28	4,0	Good
11.	Easiness in completing the instrument.	28	4,0	Good
12.	Efficiency of time/effort in the working process.	35	5,0	Very Good
13.	Implementation of standardized <i>bahasa Indonesia</i> .	28	4,0	Good
14.	Avoidance of respondents from the direction in-disguise, pressure and shame in answer provision.	35	4,1	Good
15.	Creativity in arranging the instrument in order to attain the objectivity of the respondents' answers for avoiding the bias and for motivating the respondents to completing the instrument.	29	4,1	Good
<b>Total Mean Score</b>			<b>4,3</b>	<b>Very Good</b>

The results of quality validation for the content of the instrument (the expert validation) was written in Table 1. The validity of quality aspect for the content of evaluation tools on electrical installation by the seven expert validators was between the score of mean interval > 3.4 to 4.2 (classification = good) and the score

of mean interval > 4.2 to 5.0 (classification = very good).

The interpretation of qualitative classification toward the mean of expert validation score might refer to the explanation of Widoyoko (2013, p.123) in Table 1. The "very worse" qualitative classification of score mean was in the interval (1.0 to 1.8) and the "worse" qualitative classification of score mean was in the interval of (> 1.8 to .26). The "moderate" qualitative classification was in the interval between (> 2.6 to 3.4), the "good" qualitative classification was in the interval between (> 3.4 to 4.2) and the "very

good” qualitative classification was in the interval between (> 4.2 to 5.0).

Table 2 The Data of User Validation toward the Quality of Evaluation Tools On Electrical InstallationContent (done by 35 user validators)

No.	Aspect of Instrument Content Quality	Number	Score Mean	Classification
1.	Clarity in the instrument’s direction.	173	4,0	Good
2.	Width of the instrument’s construct aspect	172	4,9	Very Good
3.	Clarity of indicators for each aspect	140	4,0	Good
4.	Clarity of item formulation	140	4,7	Very Good
5.	Fitness between the indicators and the items.	140	4,0	Good
6.	Proportion and sufficiency of the item numbers.	146	4,1	Good
7.	Simplicity of item formulation.	140	4,0	Good
8.	Easiness in reasoning/understanding the item.	140	4,0	Good
9.	Readability/eligibility in the reading process.	175	5,0	Very Good
10.	Standard of notation/letter and layout.	140	4,0	Good
11.	Easiness in completing the instrument.	141	4,0	Good
12.	Efficiency of time/effort in the working process.	175	5,0	Very Good
13.	Implementation of standardized <i>bahasa Indonesia</i> .	141	4,0	Good
14.	Avoidance of respondents from the direction in-disguise, pressure and shame in answer provision.	144	5,0	Very Good
15.	Creativity in arranging the instrument in order to attain the objectivity of the respondents’ answers for avoiding the bias and for motivating the respondents to completing the instrument.	142	4,1	Good
<b>Total Mean Score</b>			<b>4,3</b>	<b>Very Good</b>

Performance Evaluation by the users was done by submitting the user validation evaluation instrument sheet to the 35 (thirty five) validators. The user validators were the directors and the technical officials of the electricity construction service company.

The results of quality validation to the instrument content of the Electricity Construction Service Industrial-Based Electrician Performance Evaluation were written in Table 2. Each of the aspects in the content quality of evaluation tools on electrical installation research instrument was evaluated by thirty five respondents (the users). The content of the third column (the number) was the total evaluation from the seven validators (the respondents or the users). The fourth column was the mean score of each of the quality aspect for the instrument content from the seven validators (the respondents or the users) and the fifth column was the classification of the score mean. The “very worse” qualitative classification was the range in the interval (1.0 to 1.8) , the “worse”

qualitative classification was the range in the interval (> 1.8 to 2.6), the “moderate” qualitative

classification was the range in the interval (> 2.6 to 3.4), the “good” qualitative classification was the range in the interval (> 3.4 to 4.2) and the “very good” qualitative classification was the range in the interval (> 4.2 to 5.0).

The results of analysis to the research instrument validity for the Electricity Construction Service Industrial-Based Electrician Performance Evaluation by using Aiken’s V expert content validity coefficient Aiken’s V user content validity coefficient was presented in Table 3. The coefficient of Aiken’s V expert and Aiken’s V user was 0.929 and 0.976; these figures showed that the research instrument of evaluation tools on electrical installation had been valid.

In other words, the research instrument of evaluation tools on electrical installation had been valid for the implementation done by the technical officials and the directors of electricity construction service industry. From the results of research instrument reliability analysis for the Electricity Construction Service Industrial-Based Electrician Performance Evaluation by using inter-rater (ICC) technique reliability, the research found that the expert’s ICC coefficient of reliability was 0.811. Then, the researchers also found the the user’s ICC coefficient of reliability was 0.847. Both findings showed that the inter-

rate agreement consistency was high. In other words, the research instrument of evaluation tools on electrical installation had been reliable for the implementation done by the technical officials and the directors of electricity construction service industry.

Table 3 The Recapitulation Results of the Expert's Aiken's V Coefficient of Validity Content and of the User's Aiken's V Coefficient of Validity Content toward the Quality Of Evaluation Tools On Electrical Installation Content

No.	Validator	Coefficient of Aiken's V	Classification
1.	Expert Judgment	0,929	Valid
2.	User Judgment	0,976	Valid

Table 4 The Recapitulation Results of the Expert's Inter-Rater Reliability Coefficient Analysis and of the User's Inter-Rater Reliability Coefficient toward the Content Quality of Evaluation Tools on Electrical Installation

No.	Validator	Coefficient of Reliability ICC	Classification
1.	Expert Judgment	0,811	Reliable
2.	User Judgment	0,847	Reliable

The latent variables of the design of electrical installation ( $\xi_1$ ) were correlated to the manifest of its measuring variables namely designing the three-phase high and low power electrical system device ( $R_1$ ), modifying the system and tools of electrical installation wiring ( $R_2$ ), designing the electrical installation and lighting system ( $R_2$ ), designing the system of electrical protection ( $R_2$ ) and designing the electrical installation for dangerous site and renewable resources ( $R_5$ ).

The latent variables of electrical installation constructing ( $\xi_2$ ) were correlated to the manifest of its measuring variables namely implementing the job preparation in the job site ( $P_1$ ), implementing the technical maintenance in the job site ( $P_2$ ), installing the electrical and electronic device ( $P_3$ ) and installing the electrical installation of dangerous site ( $P_4$ ). The latent

variables of electrical commissioning ( $\xi_3$ ) were correlated to the manifest of its measuring variables namely the commissioning of functional tools and basic circuit ( $K_1$ ), the commissioning of complex circuit and electrical installation tools ( $K_2$ ), the commissioning of potentially-explosive electrical installation ( $K_3$ ) and the commissioning of electrical installation for the renewable resources ( $K_4$ ).

The latent variables of electrical installation operation ( $\xi_4$ ) were correlated to the manifest of its measuring variables namely operating the electrical-transfer device according to the voltage ( $O_1$ ), operating the generator set ( $O_2$ ), operating the production machines ( $O_3$ ) and operating the heater and the cooler unit ( $O_4$ ). The latent variables of the electrical installation maintenance ( $\xi_5$ ) were correlated to the manifest of its measuring variables namely the maintenance of household electrical device ( $H_1$ ), the maintenance of electrical panel and protecting device ( $H_2$ ), the maintenance of lighting and circuit installation sets ( $H_3$ ) and the maintenance of electrical machines and safety tools ( $H_4$ ).

Based on the Table 1, 2 and 3, the researchers still found the validity of content quality aspect in the instrument of Electricity Construction Service Industrial-Based Electrician Performance Evaluation with the mean score of interval > 3.4 to 4.2 ("good" classification). The results implied that not all of the fifteen aspects of content quality in the instrument of the Electricity Construction Service Industrial-Based Electrician Performance Evaluation had the interval of validity mean score > 4.2 to 5.0 ("very good" classification). Therefore, there should be revisions in the aspects of content quality so that the instrument of evaluation tools on electrical installation would turn from the "good" classification into the "very good" classification based on the suggestions provided by the expert validators and the user validators; as a result, the revisions might be continued to the limited experiment.

Based on the suggestions for revisions provided by the expert validators in the domain of regarding the sentence writing rules in the instrument of evaluation tools on electrical installation research, the revisions in terms of clarity and in terms of instrument indicators were the direction of form completion and the content of the instrument. The data provided by the directors or the technical officials for the industry of electrical construction service in the Province of West Sumatra within the research instrument was kept in secret. The directors or the technical officials of the company of electrical construction service were not allowed to mention their name and the company's name in specific; whereas, the

researchers demanded heavily the respondents' honesty and willingness to provide the evaluation toward the company's electricians objectively. The directors or the technical officials were demanded to provide any statement in accordance with the actual condition within the company.

The results of the revision toward the aspect of evaluation tools on electrical installation content quality were based on the suggestions of the expert validator and the user validator regarding: 1) the factors of indicator clarity, indicator formulation, indicator fitness and numbers of instrument item sufficiency; 2) the formulation simplicity, the significance easiness, the notation standard or the format of letter and layout in the instrument item; 3) the easiness in answering the item and the use of standardized; 4) the ability of the item to avoid the respondents from direction in disguise, pressure and shame in the answering process; and 5) the creativity in designing an instrument in order to attain the objectivity of the respondents' answer for avoiding the bias and for motivating the respondent to answer the item. Then, the evaluation tools on electrical installation research instrument might be proceeded to the limited experiment in order to attain the appropriate level of instrument reliability and validity.

Based on the results of inter-rater analysis in the form of coefficient of inter-rater consistency or the intraclass correlation coefficient (ICC) provided by the expert validator or the user validator toward the aspect of evaluation tools on electrical installation instrument content quality, the expert validator ICC and the user validator ICC, respectively, were 0.811 and 0.847. The coefficient of Aiken's V expert validator was 0.929 and the coefficient of Aiken's V user validator was 0.976. Such results of the coefficient of inter-rater reliability and the coefficient of Aiken's V implied that there had been significant inter-rater consistency toward the quality of evaluation tools on electrical installation research instrument content. The evaluation tools on electrical installation had been stated as reliable and might be implemented further by the directors and the technical officials in the industry of electrical construction service.

Based on the results of reliability test and the instrument item validity toward the Electricity Construction Service Industrial-Based Electrician Performance Evaluation with the rate of trust 95%, the researcher found that the coefficient of Aiken's V was 0.976 or, in other words, the item had been valid. The coefficient implied a significant reliability and validity value. Thereby, the evaluation tools on electrical installation research instrument had been reliable and valid

for the implementation by the directors or the technical officials in the industry or the company of electrical installation service.

The fitness value of the Electricity Construction Service Industrial-Based Electrician Performance Evaluation was as follows: 1) Chi-Square < 2 df (206,06 < 356,00) in which the degree of freedom (df = 178,00); 2) P-value = 0,0735 > 0,05; and 3) Root Mean Square Error of Approximation (RMSEA) = 0,026 < 0,05. The results of the analysis showed that based on the expanded experiment toward the 21 instrument indicators of the Electricity Construction Service Industrial-Based Electrician Performance Evaluation, 55 instrument item in the Electricity Construction Service Industrial-Based Electrician Performance Evaluation had fulfilled the criteria of goodness of fit models (Fig.1), (Fig.2).

All of the evaluation tools on electrical installation indicators in the Electricity Construction Service Industrial-Based Electrician Performance Evaluation had been valid because the value of factor loading ( $\lambda$ ) was bigger than 0.3. Since all of the requirements as a fit evaluation had been fulfilled, the Electricity Construction Service Industrial-Based Electrician Performance Evaluation might be implemented as an appropriate evaluation tools on electrical installation for gathering the data regarding the performance of electricians.

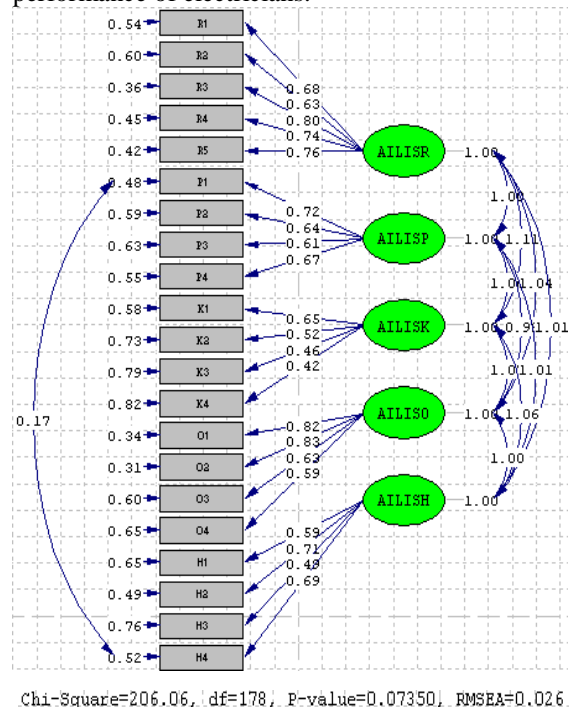


Fig. 1 The Results of AILIS Experiment (Standardized Position)

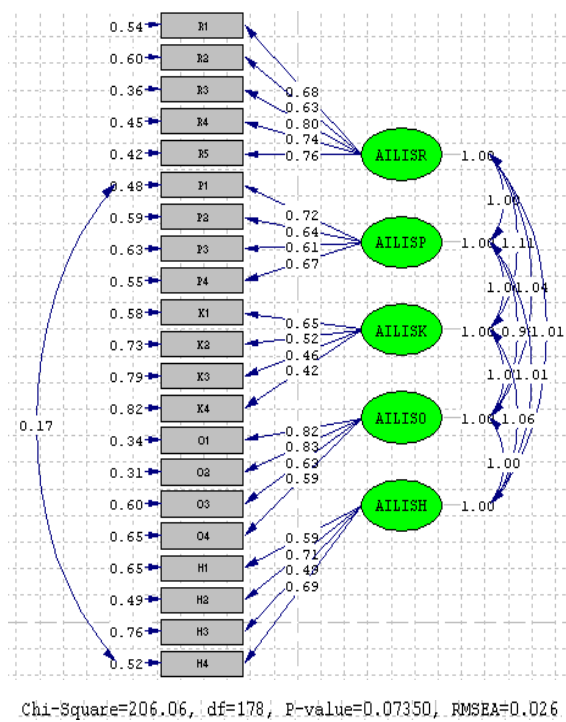


Fig. 2 The Results of AILIS Experiment (T-Values Position)

### 3. CONCLUSION

The Electricity Construction Service Industrial-Based Electrician Performance Evaluation was developed by means of three phases, namely: initial experiment, limited experiment and expanded experiment. Based on the results of data analysis, the research of the Electricity Construction Service Industrial-Based Electrician Performance Evaluation might be concluded as follows:

First, based on the results of experts and practitioners evaluation, the instrument guidelines and the evaluation rubric in the Electricity Construction Service Industrial-Based Electrician Performance Evaluation were clear, simple, very easily understood, communicative, efficient and easily implemented.

Second, based on the results of the experts and the users as well as the statistical test, the developed instruments in the research of the Electricity Construction Service Industrial-Based Electrician Performance Evaluation was the one that had been able to provide more valid and reliable measurement results.

Third, the evaluation tools on electrical installation had been regarded as a very good evaluation for accessing the performance of electrician in the industry of electrical

construction service because there had been fitness between the Electricity Construction Service Industrial-Based Electrician Performance Evaluation and the field data, with the value of Chi-Square < 2 dfor (206,06 < 356), (df = 178) P-value = 0,073 > 0,05 and RMSEA = 0,026 < 0,05; as a result, these figure showed that the evaluation tools on electrical installation had been fit.

The suggestion of further product manipulation, product dissemination and product development would cover the following statements. First, the evaluation tools on electrical installation should be made as the first alternative for the directors and the technical officials in accessing the electricians in the environment of electrical construction service company. Second, the evaluation tools on electrical installation might be developed further in the form of softwares and of applications operated by means of computer instruction so that the accessors might analyze the available data quickly and accurately. Third, the evaluation tools on electrical installation might be developed by using the information and technology (IT) system with communication network in order that the data of the electrician evaluation results in the job site might be accessed by the company's IT operators.

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