

COMBINING MULTILEVEL MODELLING AND DATA ENVELOPMENT ANALYSIS IN LEARNING ORGANIZATION RESEARCH AT PRIVATE UNIVERSITIES IN INDONESIA

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Abstract: *The objectives of this research is to measure the role of Higher Education as a Learning Organization in improving the performance of lecturers. Assumed, this research which is related to Learning Organization is a form of Organizational Behavior research which studies about individuals, group, and organization at different level. This assumption makes recent research different with the previous one where the correlation between Learning Organization variables is analyzed by using OLS Regression, because it was assumed as having one level with other variables. So the details of this research aims to explore the use Multilevel Modelling as a tool to measure variations in the level of perception of the implementation of the Learning Organization lecturers between universities and analyze whether the level of perception of the learning organization in individu and perceptual learning organization at the level of universities can predict the performance of lecturers. In addition to that, this study wanted to measure the efficiency of Higher Education as a Learning Organization Lecturer in improving performance by using Data Envelopment Analysis. The survey was conducted by distributing questionnaire to 187 lecturers from 13 universities in Jakarta and surrounding areas. Results of multilevel modeling showed that between one university with another have different performance levels of different lecturers and faculty perceptions of the learning organization in each university is able to explain the influence of most of the variations in the performance of lecturers of the one university with others. Results of quantitative calculations with Data Envelopment Analysis shows that of the 18 sample from Private University, the University of Trisakti University is most efficient as a learning organization both on the level of management and individuals in improving the performance of lecturers. Followed by Unika Atma Jaya as the most efficient university as a Learning Organization Lecturer in driving performance.*

INTRODUCTION

Universities in Indonesia are ones of the educational instruments which provide and develop higher education where knowledge can be found. With such knowledge developmental task university must face difficult challenge. Besides preparing well-qualified graduates a university is expected to develop an image

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as an educational institution which must be adaptive to available change and development. This is in accordance to what has been mentioned by Watkins (2005:414) and Ali (2012:61) that a university should give more attention to the efforts to develop quality, either individually or structurally-organizationally so it may adapt and compete as well as face the challenge.

Besides having good performance, a private university (PTS) must be able to adapt, develop, and perform continuous learning or in other words being a learning organization (Ali, 2012:59; Watkins, 2005:414 and Al-Qhatani, 2013:515). By being a learning organization, a PTS will have positive impact towards performance, in accordance with the result of research conducted by Thomas and Allen (2006:124-6), Watkins and Marsick (1993, 1994, 2003, 2004, 2005) and Weldy and Gillis (2009:456), Kotoghiorges (2005:189), Kumar (2005:28) show that the impact of learning *organization towards* university performance can be perceived from *knowledge performance* and reflected from the ability of its lecturers to make scientific works, either published or unpublished. According to Veisi, et.al (2010:22) university is a unique organization where individuals or members may determine whether a higher educational institution may develop into a learning organization or not. So it is necessary that we distinguish between learning organization in individual and managerial levels. Although individual, team, and organization must develop into an '*embedded*' system (Rose and Kumar, 2006:70). Being a learning organization will not only be linked to the performance of its lecturer and university. Learning organization performed by university will create good performance from all of its members, which in the end may also increase its success (Malik, Qiser and Munir, 2012:117)., Wang and Lo (2004:172), Singh dan Garg (2008 : 310). Other research performed by Rose (2009:56), Wang (2011:175), and Yan Hui (2006:192) show that learning organization have positive impact towards performance improvement.

Measuring a university as learning organization towards individual performance has been frequently conducted, like what has already been mentioned before. But a research which measure the effectiveness of Learning Organization implementation in improving lecturer performance at Private Universities is rarely conducted notwithstanding its importance, because a university as an organization is determined by its members, either lecturer as individual and group and in her or his position as either a leader or member. Learning Organization is a study/a part of Organizational Behavior which studies about individuals and groups in an organization. Based on that fact, it has been clear that a research which involves variables in the levels of groups and organization, besides individuals, is needed to explain individual behavior in an organization. For such organizational research which is multilevel in nature, Heck and Thomas (2010) state that normal OLS regression estimation is not healthy-adequate for specification error of the levels

of data which are hierarchically structured, thus a multilevel modelling (MLM) of which result and value are detailed more specifically in accordance with the levels of sample is needed.

It has been added that a Private University needs a design of effective and efficient performance measurement method which is universal in nature and may perceive organization from every single angle. With such result of measurement, every Private University may determine a managerial strategy to fix and develop its organization in the future time. To measure efficiency this research uses *Data Envelopment Analysis (DEA)* which tries to maximize efficiency by considering its input and output. This is a programming mathematics technique which calculates relative efficiency from some units of decision makers in this research or sample Private Universities /*Decision Making Units (DMUs)* based on perceived inputs and outputs, which may be expressed by using various metrical unit. (Seyyed Asghar, et al. 2009).

Thus the goals of this research are:

1. By using multilevel modelling, we intend to observe whether lecturer level of perception towards the implementation of Learning Organization in his or her PTS is varied between PTSs and whether perception toward learning organization in individual level and PTS level may predict lecturer performance.
2. By using Data Envelopment Analysis, we intend to observe the efficiency of Private University as a Learning Organization to improve Lecturer Performance.

REVIEW OF LITERATURE

Learning Organization

Based on the result of literature studies from Lyle (2012:216) Learning Organization is one of the concepts of organizational development which appeared for the first time in 1980s, it refers to learning process in an organization which aims to develop a company, but the term was then popularized by Peter Senge (1990) in his book *Fifth Disciplines*. Learning Organization according to Peter Senge (1990) and Ali (2012:55-7) is an organization of which members continuously develop their capacity to meet the need, develop thinking pattern, freely give aspiration, and always perform collaborative learning. Then, Yang, et.al (2004: 32) states that Learning Organization is a process to adjust the capacity one has while at the same time also add the ability of the company to create a change in the future time.

Some definitions below relate integrated *learning* in individual level with *learning* in the level of managerial or organization. The first definition is given by Watkins and Marsick (1992) and Grievies (2006:466), that for a learning organization to continuously transform itself must be reflected from the totality of its employees which are collectively governed by the leader of organization. Thus, there is a learning process from individual which is integrated to learning in organizational level. Second, it has been stated by Garvin (1993) as quoted by Yen (2011:2), that Learning Organization is an organizational skill which creates, needs, and shares knowledge and then modifies attitude after gaining new knowledge and insight which is conducted from employees side as individuals and managerial side which represents organizational structure. Third, definition from Murray (2002) of which result is the same as what has been stated by Braham (1996), Learning Organization is a process where share and give and gain knowledge take place or the way to transfer knowledge through an organization which aims to achieve strategical objective either for individuals or group (Yeo: 2005:371).

By reviewing the definitions of *Learning Organization* above, some conclusion or "*new perspective*" can be made, as stated by Watkins and Marsick (2004:32-35), Ji et.al (2009:42045), and Weldy et.al (2010:456), that definition of Learning Organization from all studies can be classified into four main groups, namely:

1. *System Thinking Perspective*, the perspective of Senge (1990) which defines learning organization as an organization which does not only have the ability to adapt but also to develop, i.e. the ability to create some alternatives for the future.
2. *Learning Perspective*. Pedler, burgonye and Biydell (1991), define learning organization as an organization which facilitates learning for all of its members continuously to achieve the aims of organization.
3. *Strategic Perspective*. Garvin (1993) defines learning organization as organizational ability to create and transfer knowledge and modify old knowledge with such new knowledge. In this *strategic perspective*, managerial skill is needed by an organization to develop into a learning organization.
4. *Integrative Perspective*. Marsick and Watkins (1993, 2003, 2004) classify organizations into a principle with three main components, which are: (1) *system level, continuous learning* (2) *create and manage knowledge outcomes* (3) *lead to improvements in the organization's performance*. This Marsick and Watkins' principle integrates to important components, *people* and *structure*, which are believed as interactive component of change and development of an organization. Then Marsick dan Watkins develops seven dimensions of learning organization, namely: *Continuous Learning*, which represents

organizational effort to create continuous learning and opportunity for all of its members to perform learning. The second is *inquiry and dialogue*, which reflects effort of organization to create a tradition to ask question, give feedback and perform experiment. The third dimension *team learning*, reflect the passion to cooperate and ability to cooperate so an effective work team will be established. Fourth dimension, *empowerment*, shows organizational process to create and share vision together and get feedback from all members of organization about the deviation between old vision with new vision that will be developed. Fifth dimension, *embedded system*, indicates the availability of effort to build a system which covers all and every learning process. Sixth dimension, *system connection*, reflects global thinking and action which connect between internal organization and its external environment. And the last dimension is *strategic leadership*, shows the condition where leaders can perform strategic thinking and can use learning to create change and change into a new organization with new direction.

Learning Organization in Universities

Watkins (2005:515), Ali (2012:61) and Veisi (2010:28) have the same opinion that educational institution or universities in particular is a Learning Organization. But the character of Learning Organization in universities is different from other organizations, where in universities there are some characters: *determined, teaching and sponsoring leadership, participatory strategy, team based structure, rigorous strategy, administrative staff empowerment, access to information* (Hawamdeh, et al; 2011:690). In line with previous definition and perception, the character of Learning Organization in educational institution is in line with what has been stated by Watkins, Marsick and Garvin, that there is learning in individual level, team and organization (Alkhatani and Ghoneim; 2012:515). This has been empirically evidenced by Chang and Lee (2007:156), in accordance with the result of their research in higher educational institutions which was resulted that "*Learning Organization means that the Learning Organization covers individual, grouping and organizational learning with the simultaneous proceeding effort for organizational and individual learning*". Where Learning Organization covers learning in individuals, groups and organization levels which simultaneously perform continuous effort, either individually or organizationally.

But it does not mean that universities do not have constraints as a Learning Organization. The most common phenomenon is academic staffs or lecturers who have structural position in a university do not perform learning organization anymore (Watkins, 2005:415). Besides, White and Wheaders by (2005: 292-3) state that university as a learning organization will face constraint in learning in

individual level because the characteristics of the member of organization, which most of them are lecturers, who most of the time assume that they have already known and stop learning.

Education and Lecturer Performance

Watkins and Marsick (2004:71) state that performance of a company comprises of financial and non-financial performances, which function as the indicators to measure whether the result achieved has been in accordance with the goals targeted by the company. Education performance in an article written by Trisnaningsih (2009:86), quoted from Blazey, et.al (2001:31) aims to improve performance, capability, and educational output; facilitate communication and information exchange about best educational practices for several types of educational institutions and as a tool to understand and increase performance of educational institution and guidance in strategic planning. According to Sudiro (2009:2) Lecturer Performance is the result of work, either qualitatively or quantitatively which is performed by a lecturer in performing three main tasks of higher education (*Tri Darma Perguruan Tinggi*). Lecturer achievement related to *Tri Darma Perguruan Tinggi* shall be measured from Learning, Research and Scientific Work and Contribution to People.

Moreover Sri Trisnaningsih (2009:85-87) in her article states that lecturer performance has been governed in the Law No. 14 of 2005 on Lecturers and Teachers, and Government Regulation of the Republic of Indonesia Number 37 of 2009 on Lecturers. Whereas in accordance with the definition from the Ministry of National Education (Kemendiknas d/h: Depdiknas) stated that lecturer performance is the ability to perform work or task as a lecturer. It has been added, in the Decree of the Coordinating Minister of Developmental Monitoring and State Apparatus Empowerment No. 30/KEP/MK-WASPAN/8/1999, on lecturer functional position and its credit score that the main task of a lecturer is to perform education in universities, research, and contribution to society. Then, main element of lecturer performance are cited in Chapter II article 4 section (2), namely “performing research and development and produce scientific work, technological work, monumental art work, stage performance and literature work”, which include:

1. Produce scientific work
2. Translate/edit scientific books
3. Edit scientific works
4. Preparing technological design and work
5. Prepare art design and work

Contribution to society, includes:

1. Running leadership position in the government and must be released from its organic position
2. Develop the result of education and research which can be used by people
3. Provide training/counseling/administration for people
4. Provide service to society or other activity that may support the implementation of government and development common task
5. Produce/write scientific work as contribution to people

The Relation between Learning Organization and Lecturer Performance

What is the correlation between learning organization and good knowledge performance as well as financial performance as stated by Watkins dan Marsick (1992, 94, 2003, 2005) which was collaborated by the findings from Yang (2004). Research from Watkins and Marsick is in accordance with the findings from Kholi (1998) which states that an organization which actively performs learning will have better performance than a company which inactively performs learning. The findings from Watkins and Marsick were developed by Yeo (2005), and concluded the same findings, Learning Organization increase individual and company performance. This findings is also supported by the research of Konidari & Abernot (2006) which states that all dimensions of learning organization will give impact towards the improvement of company performance either financial or knowledge.

The relation between learning organization and performance of educational institution was performed by Kumar (2006) of which finding shows that *learning organization will improve* performance and quality of an educational institution. More to that, a research from Moilanen (2005) compares how learning organization affects performance of non educational industry and educational industry. The finding shows that learning organization in educational industry brings greater impact than other industries.

Furthermore, Revilla and Parkis (2003), Abbot & Doucouliagos (2003), Deokro Lee, (2006), and Hanrin (2010) do not only observe the influence of higher education as a learning organization but also measure on how efficient learning organization can improve the performance of an educational institution by using *Data Envelopment Analysis*, where all get high level of effectiveness.

Previous Research

Previous researches measuring the level of effectiveness and efficiency university performance measurement were conducted by:

1. Baysal, Mehmet Emin. Toklu, Bilal. Conducted in 2010, measuring Performance Efficiency at Universities in Turki and Lebanon where Input and Output are University Human Resources, Number of Articles and Researches performed by lecturers and amount of financial spending.
2. Paul Lau Ngee Kiong, et al. Year 2009 measures school performance efficiency of which input are Human Resources, Principles adopted by the school, student potential and its output is the achievement of the students.
3. Kongar, Elif et al. In 2010 perform a research to Technique Study Program in the United Kingdom, where the measurement of performance efficiency use input from financial side, business process, customer and growth. And the output are student enrollment, number of published journals, mean of graduates GPA and number of new subjects offered per semester.

Applied Method (Research Design and Plan)

This research uses management science approach, or more specifically the discipline related to *Learning Organization*, either from *People Level*, until *Structural Level*, *Work Engagement*, *Competency and Performance* in Higher Education industry and research location at Private Universities in Kopertis area III.

This research uses descriptive method for the first aim of its research, where researcher wants to know the value of a single variable in terms of the level of innovation acceptance and observe its category based on data distribution from respondents answer. Then, this research is also verificative to support the second to the forth aims of the research, the second, third and fourth aims of the research are to observe the correlation between variables in accordance with established research paradigm namely the correlation between learning organization in people and structure levels and lecturers *work engagement*, competence and performance. Finally, the fifth aim of the research is descriptive analysis by using operational research technique, linear programming, observing PTSs relative efficiency as learning organization towards lecturer performance.

The method applied in this research is survey, where data are gathered from the samples which are the member of population, conducted by using questionnaire as instrument to observe and measure variabel through respondent answer. Observation unit in this research are permanent lecturers at PTSs who are already active in joining research activities and contribution to people and have been certified. *Time horizon for this research is cross sectional* where data are gathered in *one-shot* or once for every respondent.

Based on above mentioned research design, this research design has been adjusted with its hypothesis and statement of the problem. The first plan is by

performing confirmatory or verification towards the correlation between variables in accordance with preliminary research that we have mentioned before which applies Multi level Modelling because in this research learning organization is assumed as level – 2 unit analysis (organization). The next step is making further analysis by using Data Envelopment Analysis technique which is based on linear programming, to see how far the relative efficiency of a PTS as a learning organization in improving lecturer performance in research, contribution to society, and scientific publication.

Population

Population is a group of individuals or research object which has determined criteria and similar characteristics. (Cooper, 2005). Population in this research is lecturers which have *Home Base* at Private Universities within the area of Kopertis III and have actively been involved in research activities since 2010, and have earned or passed Lecturer Certification (until 2011).

Where lecturer selected are lecturers from 13 PTSs of whom researches are funded by Ditlitabmas DIKTI through Kopertis III. The members of population are known as much as 866 lecturers and leaders of Universities pimpinan Perguruan tinggi, and work as Permanent Lecturers at those 13 PTSs.

Sample

This research applies multilevel modeling which need the amount of sample between 180-350 so the result of analysis will be adequate (Raudenbush and Bryk, 2002 : 281-282). To get representative sample, the first step is by inventarizing the number of private universities which are joined in Kopertis Area III, which actively conduct research, contribution to people in these last three years. Then the second step is determining the amount of lecturers who have earned certification at those PTSs, and select them proportionally. After knowing the number of required respondents so the respondents or unit analysis are permanent lecturers of PTS kopertis III, determined by using *Purposive Sampling*, or choosing samples who have certain criteria namely:

1. Permanent lecturer of the PTS whom during the last 3 year has a research funded by Litabmas DIKTI
2. Permanent lecturer who has received certification fee or has completed lecturer's role (*beban kerja dosen*) minimal 2 semester
3. Permanent lecturer who has performed research activity and contribution to people minimal 1 (once) in one last year
4. Permanent lecturer who does not perform study task

Sample will be taken proportionally so the sample of 250 lecturers will be gained.

Multilevel Modelling

In this study, the researchers predict lecturer perception towards Learning Organization, and the regression equation will be as follows:

$$Y_i = \beta_0 + B_i (LO) + \varepsilon_i$$

β_0 is intercept, and β_i is parameter slope. Parameter interceptis performance expected value for a lecturer and has perception value towards Learning Organization as much as 0. In this research, LO is standardized with factor score so has mean of 0 and standard deviation of 1. This standardization will simplify interpretation so the score 0 in LO structure level shows LO structure level of the lecturer is similar with average perception of Lostructure level of the lecturer in the sampel. Coefficient of skewness shows expected change of lecturer performance for one unit of Standard of deviation in perception change towards Learning Organization. Normal regression can produce similar intercept value and slope for all levels within the sample, whereas multilevel modeling can be detailed based on the levels of the sample.

Multilevel modeling comprises of three components namely (Heck, Thomas dan Tabata, 2010) : 1. Null specification, or there is prediction model from dependend variable, 2. 1 level model specification, 3. 2 level model specification. First step in the model, id null model specification to see or help researchers determine how much performance distinction between lecturers in the sample. In this research, multilevel modeling can be observed from the following equation:

$$\begin{aligned} Y_{ij} &= \beta_{0j} + r_{ij} \\ \beta_{0j} &= \gamma_{00} + \gamma_{01}LO_j + u_{0j} \\ Y_{ij} &= [\gamma_{00} + \gamma_{01}LO_j] + [u_{0j} + r_{ij}] \end{aligned}$$

Two terms in the first bracket is the *fixed factors* which consist of two estimation value. Two second brackets are random factor which consist of random factors μ_{0j} (intercept variation between PTSs) and r_{ij} (variation in the PTS).

Data Envelopment Analysis (DEA)

Other technique for performance measurement is *Data Envelopment Analysis* (DEA) which tries to maximize efficiency by using in put dan output decision. DEA is a mathematics programming method which calculates relative efficiency from some *Decision Making Units*(DMUs)based on observed input and output,which may be expressed in various kind of metrical unit. DEA is very useful in evaluating

multi-criteria system and provide target recovery system as expressed in a lot of reported applications. (Ebnerasoul et al., 2009)

DEA is an approach which compare similar entity, like DMU, towards the best virtual of DMU. DEA is usually displayed as linear programming (LP) model which gives relative efficiency score for every DMU. The benefit of DEA is not a parametric approach like *regression analysis* (RA), that DEA optimizes every individual observation and does not need single function which is most appropriate with all observation. (Kongar, Pallis, & Sobh, 2010)

Parametric approach assumes functional form for production limitation. Efficiency score in parametric approach is absolute efficiency because parametric production limitation is a real limitation. There will always be possibility for specification error from a functional form in parametric production limitation. The researchers assume it as one of the weakness of parametric approach, whereas non-parametric approach is related to mathematical programming, not functional. To calculate efficiency, data points are compared to each other. As a result, non parametric approach will be resulted on relative efficiency. (Cooper et al, 2007).

According to Achirulloh (2006), like other concept, DEA method has various strengths and weaknesses like what has been quoted from Darwis (2004) who has summarized strengths and weaknesses of DEA method as follows.

DEA strengths among others:

- Does not need basic assumption about functional form which relates input and output variables of a production function.
- Flexible in selecting data that will be used.
- DEA can use small sample.
- Free in determining input and output that will be used including the amount of variables that will be used. DEA allow analyst to select input and output based on managerial focus.
- Input and output can have different measurement unit, can be continue, ordinal or categorial variable.
- DEA can be used to assess efficiency, effectivity, quality, and its combination.

Whereas the weaknesses of the usage of DEA are as follows:

- Data assumption must be free from measurement error because such error may be fatal because DEA is an *extreme point technique*.
- is *sample specific in nature*, where the result of measurement will be affected by which sample is used. Besides, DEA is also sensitive to data in availability in the sample.

- DEA only measures relative efficiency from DMU not absolute efficiency because efficiency of a DMU is only measured from its group.
- No statistical indicator to measure error because DEA is deterministic in nature. Besides, statistical hypothesis test to DEA will be difficult to do.
- Manual calculation will be difficult to perform let alone the one which involves several number of DMUs because different linear programming formula is used for each DMU.

DMU sample selection must also consider the number of the respective DMU. There are some rules that serve as the guidance in determining the amount of samples used. According to Rachmat Achirulloh (2006) who quotes Dyson et al,(1998) the amount of DMU must be higher than the multiplication of the number of input and output variables used in the model, whereas other literature mentions smaller number of samples, i.e. minimum three DMUs. Principally, the selection of the amount of DMUs that will be used must consider the amount of input and output variables used so the result will be quite discriminative and can be used to compare the efficiency of each DMU and also to investigate *production surface* of production function used in the model. In Cooper et al. (2007, p. 284) it has been mentioned that to select the amount of DMU the following formula shall be used:

$$n \geq \max \{ m \times s, 3(m+s) \}$$

where: n = amount of DMU ; m = amount of input ; s = amount of output

RESULT OF ANALYSIS AND DISCUSSION

Result of Multilevel Modelling

Before relating performance with other variable, a non conditional model must be established. This design will test the role of some PTSs as Learning Organization towards lecturer performance. Because PTS is involved so PTS will be grouped into random factors, and not to fixed factor.

Estimates of Fixed Effects^a

Parameter	Estimate	Std. Error	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Intercept	2,247197	,052870	84,017	42,505	,000	2,142060	2,352334

a. Dependent Variable: Individual Performance.

The first question in this part is whether lecturer perception towards Learning Organization structure Level in his or her PTS will be varied between PTS? The result of analysis shows that between one PTS and other PTS has different level of lecturer performance ($\gamma_{00} = 1,598$; $p < 0.05$).

Estimates of Covariance Parameters^a

Parameter	Estimate	Std. Error	Wald Z	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Residual	1,597620	,054456	10,974	,000	,499876	,714478
DMU [subject = DMU] Variance	,330113	,000119	,952	,041	1,444958E-5	,000887

a. Dependent Variable: Individual Performance.

On the other hand between one lecturer and another at one PTS has shown significant performance difference ($\delta^2 = 0,33$; $p < 0.05$). It can be noticed that component variance in a PTS is more than five times component variance between PTSs.

Before proceeding to the next analysis it must be checked whether the correlation between *Learning Organization* towards lecturer performance is a multilevel relation, so it needs multimodel modeling to analyze. To test the case, Inter-class Correlation or ICC calculation is conducted, the value will be ranged $0 \leq ICC \leq 1$. If ICC value < 0.05 , so there will be no variation in group and if $ICC > 0.05$ so there will be variation in group (level 2).

$$ICC = \frac{\tau_{00}}{\tau_{00} + \sigma^2}$$

$$ICC = \frac{0,330}{0,330 + 1,597} = 0,172$$

The result of ICC value calculated is $0,172 > 0,05$ this value shows that Learning Organization is in level 2, and the correlation between Learning organization and performance should be conducted with multilevel modeling, not the common OLS regression.

Next question is: is there any correlation between lecturer perception towards learning organization and the respective lecturer's performance? Can perception level towards learning organization Structure Level in individuals and learning organization perception in the level of PTS predict lecturer performance?

To answer the above mentioned question a conditional model with 2 levels predictor is established. In this design, mean of factor score towards Learning

Organization perception in Structure Level in each PTS is inputted. Lecturer perception towards the implementation of Learning Organization will be grouped into Fixed Factors, because the main goal is to test the role of PTS as a learning Organization.

The result for the model with two level conditional is as follows:

Table 3

Estimates of Fixed Effects^a

Parameter	Estimate	Std. Error	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Intercept	1,442561	,082627	183,685	29,561	,000	2,279540	2,605582
DMU	1,020164	,006495	37,115	3,105	,004	-,033324	-,007005

a. Dependent Variable: Individual Performance.

Result shows that when the result of mean of perception of Learning Organization is 0, maka the mean of lecturer performance is 1,442 ($p < 0.05$). On the other hand, the role of perception towards Learning Organization can also be observed from its significant estimation value (1.020, $p < 0.05$). From significance value can be concluded that the role of learning organization variable and PTS as research subjects are equally significant.

Estimates of Covariance Parameters^a

Parameter	Estimate	Std. Error	Wald Z	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Residual	1,436690	,013284	2,762	,006	,018045	,074601
LOS [subject = DMU] Variance	,070421	,056842	9,859	,000	,459387	,683675

a. Dependent Variable: Individual Performance.

Value of estimates of covariance parameter which represents random aspect in this research design shows variance within PTS. Residual value calculated is amounted to 1,436, of which ratio is relatively small compared to the first design analysis which has residual value of 1,597. Intercept value of 0.07 shows the amount of variance for lecturer performance between PTS as explained by Learning Organization Structure Level by considering the variable between PTSs. Compared to design 1 which has intercept value of 0.33, intercept value in design 2 is smaller. It means that learning organization can absorb variance lecturer performance between PTSs, or in other words Learning organization explains most variance of lecturer performance between a PTS and others.

Analysis Data Envelopment (DEA)

This part will answer the last problem, observing the level of effectiveness and efficiency of a PTS as Learning Organization in improving lecturer performance in terms of research, contribution to people, and scientific publication. We are going to discuss about data processing and its analysis which consist of relative efficiency value from each PTS and PTS Category which becomes the object of the research (DMU). DMU rank can also be observed from this discussion. Analysis Model LO-DEA will also be explained in this chapter. Strategic analysis based on Learning Organization perspective Watkins and Marsick is the major discussion of this part.

From the result of optimization of LO Watkins Marsick-DEA integration model for each University (DMU) by using *software Efficiency Measurement System* version 1.3, the following results are gained:

- Relative efficiency value of each PTS (DMU) based on Learning Organization perspective.
- Intensity value and *benchmark* for inefficient PTS based on Learning Organization perspective.

Efficiency Value Analysis

Major result gained from LO-DEA integration model is relative efficiency value for each PTS (DMU) based on Learning Organization perspective. Efficiency value depicts the level of efficiency of each DMU which score ranges between 0% – 100%. DMU with 100% level of efficiency can be interpreted from two perspectives which represent two orientations applied, i.e. input orientation and output orientation. Perceived from input orientation, DMU with 100% efficiency means that there is no DMU or whatever DMU combination that can produce higher output level by using similar input level. It is similar to output orientation. Thus, DMU with 100% efficiency means that there is no DMU or whatever DMU combination that can reach lower input level by using similar output level.

For DMU which has efficiency value under 100% or inefficient can also be interpreted in two orientations like the above. Perceived from input orientation, inefficient DMU can be interpreted that there is other DMU or other DMU combination that is able to produce similar output level or more output level by using similar input level. It is similar to output orientation. Inefficient DMU can be interpreted that there is other DMU or other DMU combination that is able to produce similar output level or less input level by using similar output level.

In this part, DMUs are PTSs in Major and Middle category, which consists of 13 (thirteen) PTSs. Output of the calculation is the value of lecturer performance who works as Permanent Lecturer at the DMUs in terms of research, contribution

to people, and scientific publication. Input is divided into three, Input Learning Organization, Learning Organization People Level dan Learning Organization Structure Level. Efficiency value depicts the level of efficiency of each DMU of which score ranges between 0% – 100%.

Table 5
Efficiency Value of LO-DEA Model

No.	DMU (PTS)	Efficiency of Learning Organization Implementation	Efficiency LO People Level	Efficiency LO Structure Level
1	Binus University	95,93%	99,58%	93,14%
2	Universitas Gunadarma	99,60%	100,00%	100,00%
3	Universitas Trisakti	100,00%	100,00%	100,00%
4	Universitas Al Azhar	67,44%	77,47%	68,96%
5	Universitas Esa Unggul	92,23%	93,10%	93,80%
6	Universitas Mercu Buana	78,12%	86,05%	73,40%
7	Universitas Tarumanegara	92,90%	95,26%	93,91%
8	UHAMKA	56,98%	60,47%	57,20%
9	UNIKA Atma Jaya	100,00%	100,00%	95,51%
10	Universitas Pancasila	77,75%	80,88%	77,17%
11	YAI	94,90%	100,00%	99,07%
12	Universitas Indraprasta PGRI	80,00%	80,27%	79,16%
13	UNSADA	87,98%	89,34%	94,03%

Source: Software EMS.3.1 Recapitulation

From table 4 above we may observe that the highest rank in terms of PTS implementation efficiency as a Learning Organization in improving lecturer performance is gained by Universitas Trisakti, universitas Trisakti is efficient in people Level and Structure Level, also efficient Learning Organization as an integrated system in people and Structure levels. In the second rank as an effective PTS in Learning Organization in improving lecturer performance there is Universitas Gunadarma, in People Level and Structure Level, of which efficiency

level reaches 100%. But in terms of running learning organization as a whole the level of its efficiency has not reached 100%, or only 99.6%. Universitas trisakti and Universitas Gunadarma are PTSs which belong to Major PTS classification.

In the next level there is PTS from middle category which show 100% level of efficiency, i.e. UNIKA Atma Jaya and Universitas YAI. Unika Atmajayais efficient as a wholly integrated learning Organization and learning organization in people level in improving lecturer performance. But in performing learning organization in structure level, its level of efficiency is relatively lower than other PTSs like Trisakti, Gunadarma, and YAI. Other DMU that has 100% efficiency is Universitas YAI, which implements Learning Organization in people level relatively efficient compared to other PTSs which belong to the same group but less efficient in implementing integrated Learning Organization and Learning Organization in structure level, where the level of its efficiency does not reach 100%. By observing that UNIKA Atmajaya and Universitas YAI have the level of efficiency relative which reaches 100% compared to PTSs or DMUs that belong to Middle group we can say that those two PTSs have potential to be grouped into Major group if they are consistent to be a Learning Organization.

Benchmark Analysis

DMUs which are used as benchmarks are DMUs with 100% efficiency value. Those DMUs will be used as benchmarks that must be followed by inefficient DMUs.

Table 4 PTS Benchmark

**Table 6
Benchmark PTS**

No.	DMU (PTS)	Benchmark Learning Organization Implementation	Benchmark LO People Level	Bechmark Structure Level
1	Binus University	3 (0,43) 9 (0,68)	3 (0,89) 9 (0,22)	3 (1,09)
2	Universitas Gunadarma	3 (0,91) 9 (0,05)	5	5
3	Universitas Trisakti	11	8	9
4	Universitas Al Azhar	3 (0,71) 9 (0,07)	3 (0,21) 11 (0,66)	3 (0,77)
5	Universitas Esa Unggul	3 (0,91)	3 (0,67) 11 (0,27)	2 (0,95)
6	Universitas Mercu Buana	3 (0,02) 9 (0,89)	3 (0,88) 11 (0,01)	2 (0,19) 3 (0,71)

7	Universitas Tarumanegara	3 (0,91)	2 (0,53) 3 (0,40)	3 (0,91)
8	UHAMKA	3 (0,35) 9 (0,29)	2 (0,06) 3 (0,58)	2 (0,67)
9	UNIKA Atma Jaya	7	3	2 (0,75) 3 (0,26)
10	Universitas Pancasila	3 (0,66) 9 (0,21)	2 (0,36) 3 (0,42) 9 (0,09)	3 (0,86)
11	YAI	3 (0,86)	3	3 (0,86)
12	Universitas Indraprasta PGRI	3 (0,45) 9 (0,34)	2 (0,09) 3 (0,37) 9 (0,33)	3 (0,78)
13	UNSADA	3 (0,83)	2 (0,87)	2 (0,06) 3 (0,78)

Source: Software EMS.3.1 Recapitulation Result

As an example in the table above, dealing with the efficiency of its implementation as an integrated Learning Organization, Binus University is an inefficient DMU, so we need to refer to DMU no. 3 or Universitas Trisakti and DMU no. 9 or UNIKA Atmajaya as its benchmark, with intensity value of which are 0,43 and 0,68. By using calculation made by Cooper dan William (2007:54), input and output value from binus University can be measured as follows:

*Output Lecturer Performance

$$\begin{aligned}
 \text{Output DMU 1} &= (0,43 \times \text{Output DMU 3}) + (0,68 \times \text{Output DMU 9}) \\
 2,65 &= (0,43 \times 2,424) + (0,68 \times 2,365) \\
 2,65 &= 2,65
 \end{aligned}$$

* Input LO People Level

* Input LO Structure Level

CLOSING

Conclusion

From the above analysis it can be concluded that it is necessary that multilevel modeling be established if we want to correlate Learning Organization variables with other variables. The result of Interclass Correlation calculation, or ICC is amounted to 0.1720.05, it depicts that Learning Organization and lecturer performance are two variables with different level, where Learning Organization is in level 2 and Lecturer Performance in Level 1, so the research which correlates those two variables should apply multilevel modelling.

The result of analysis shows that between one PTS and other PTSs has different level of lecturer performance ($\gamma_{00} = 1,598$; $p < 0.05$). On the other hand, between a lecturer and others within one PTS also has significantly different performance ($\delta^2 = 0,33$; $p < 0.05$). It is observed that variance component (between) PTSs is almost five times higher than variance within PTS.

Perception towards Learning Organization can be observed from its significant estimated value (1.020, $p < 0.05$). From significance value can be concluded that the role of learning organization and PTS variable as observed subjects are equally significant. The amount of lecturer performance between PTS variance is explained by Learning Organization Structure Level by observing variables between PTSs. It means that learning organization can absorb lecturer performance between PTS variance or in other words Learning organization Structure Level explains most variance of lecturer performance between one PTS and others.

Then, the result of analysis which measures the level of efficiency of university as a learning organization that may affect lecturer performance by using data envelopment analysis is as follows the highest rank in terms of efficiency of PTS implementation as Learning Organization in improving lecturer performance is achieved by Universitas Trisakti, universitas Trisakti is efficient in people Level and Structure Level, it is also efficient Learning Organization as a system which is integrated to people and Structure level. In the next rank there are PTSs which belong to Middle category which show level of efficiency of 100%, i.e. UNIKA Atma Jaya and Universitas YAI. Unika Atmajaya is efficient as a wholly integrated Learning Organization and learning organization in people level in improving lecturer performance. But in performing learning organization in structure level, its efficiency level is relatively lower than other PTSs like Trisakti, Gunadarma, and YAI.

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