

# Structural Equation Model to Measure the Leveraging Factors of Research Productivity in Private Universities: Lecturers' Perceptions

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## Abstract

Lecturers play an important role in carrying out tasks that are neatly packaged in the Tri Dharma Perguruan Tinggi which consists of conducting research, writing, and publishing the results of their research in reputable journals and providing service to the surrounding community according to the subject specialization of individuals. The purpose of this study is to determine. Structural Equation Model to Measure the Leveraging Factors of Research Productivity in Private Universities: Lecturers' Perceptions This study was conducted to test the proposed hypothesis using quantitative research methods and was designed according to the variables to be studied. as well as data analysis techniques using SEM with IBM AMOS 2 software. Based on the results of the analysis, it can be concluded that a new model was found on the positive direct effect of the reward system, transformational leadership style, communication, and motivation on productivity.

**Keywords:** Lecturer, Structural Equation Modeling (SEM), Reward System, Transformational Leadership Style, Communication, Motivation, Productivity.

## 1. Introduction

Higher education institutions, universities have the goal of not only providing quality student-centered education but must also be involved in the creation of new knowledge, namely developing good infrastructure for teaching and learning by designing a curriculum that focuses on industry-oriented skills, applying innovative pedagogy and effective (Ahmadein in Implementing the 2030 Agenda at Higher Education Institutions: Challenges and Responses, 2019: 18). According to Law No.12 of 2012 concerning Higher Education it is stated that as part of the national education system higher education has a strategic role in educating the nation's life and advancing science and technology. As human assets and human capital, lecturers play an important role in carrying out tasks that are neatly packaged in the Tri Dharma Perguruan Tinggi in accordance with individual subject specialties (Law No. 14 of 2005). Lecturers as employees of an organization, college / university make a major contribution in the form of skills, knowledge or values (Pelinescu, 2015). On the other hand, lecturers play a very strategic role in achieving higher education goals (Nazari et.al.,2012) in order to create competent university graduates (Agustini et.al.,2014).

In this context, apart from teaching a lecturer, he also guides students, conducts research, writes, and publishes the results of his research in a reputable journal and performs community service. These research and publication activities are important activities of higher education institutions or universities as efforts directed at broadening knowledge and opening new avenues of science and technology. Through research, universities or higher education institutions make an important contribution to the growth and development of the vital sectors of a country to promote national and global development (Ifijeh et.al.,2018). Then, the main task of the lecturer is based on the opinions of experts, regulations and pre-surveys conducted by researchers that in addition to teaching, lecturers are also required to conduct research, research is a very important and strategic activity and the goal is to develop teaching materials, support community service (Ghabban et. al, 2019: 28) and enhancing the reputation of higher education institutions both nationally and

internationally. Furthermore, research and publications complement each other because research efforts and findings can be communicated (Okonedo, 2015), and in the Tri Dharma of Higher Education this activity is an inseparable obligation, PAN-RB Regulation No. 17 of 2013. As academics in higher education, lecturers have the responsibility to conduct research, teaching, and scientific development (Khazragui & Hudson, 2014) and lecturers as scientists must conduct scientific reasoning and research and disseminate it through scientific publications (Law No. 12 of 2012).

In line with experts in Nasser-Abu Alhija & Majdob (2017: 34) stated that the importance of research in higher education institutions is associated with two main factors, first, is the idea that research improves teaching and contributes to sustainable professional development and advances research capabilities as a way Strengthening the teacher education community is seen as a key factor in improving the quality of student and lecturer learning, and second, research productivity (RP) has become an iconic indicator of institutional prestige as one of the vital resources needed by higher education institutions. However, in reality at this time, the productivity of lecturers in Indonesia as researchers tends to be less productive when compared to researchers from Malaysia and Thailand. This condition is a general reality that occurs in various universities, both state universities (PTN) and private universities (PTS) in Indonesia, which is a research gap in this study.

Based on the opinion of experts, regulations, and the results of the initial survey conducted by researchers, it is suspected that there are several factors that tend to influence lecturer productivity in the form of an award system which functions as an incentive that has not been effectively given by the leader, his leadership style is correlated with productivity / work results that can bring change, innovation, growing and increasing work motivation within the work organization has not been effectively implemented ,, organizational communication has not been effectively implemented to be able to influence the bottom-line, the lecturers. These factors are thought to influence motivation in order to increase the productivity of lecturers in producing international scientific works positively. This is a research gap in this research which is related to the main duties of lecturers, conducting scientific reasoning and research and disseminating them through scientific publications (Law No. 12 of 2012) when compared to actual facts related to the number of publications in a number of universities in Indonesia.

Then, the unit of analysis in this study is permanent lecturers at private universities who have A accreditation and are included in the Top 50 Strengths of Indonesian Scientific Institutions: Scopus Indexed Scientific Publication Profile by the Ministry of Research, Technology and Higher Education (2016) because if judging from the first publication year, Universtas Tarumanegara is a Pioneering private universities in producing international scientific works, 1973. Then in succession followed by Atmajaya University, 1977; Trisakti University, 1990. Thus, the researcher's consideration that becomes a critical issue and as a research gap, "Is there direct effect of the reward system, transformational leadership style, communication, and motivation on the research productivity of lecturers in private universities?". Therefore, Structural Equation Model to Measure the Leveraging Factors of Research Productivity in Private Universities: Lecturers' Perceptions

## **2. Research Gap**

The number of Indonesian scientific publications indexed by Scopus as of April 2016 states that Indonesia's ranking is still below Malaysia, as of April 6 2018 (Director General of Research and Development Strengthening of the Ministry of Research and Technology for Higher Education or Kemristekdikti of the Republic of Indonesia), According to the Ministry of Research, Technology and Higher Education in 2016, out of 5,216 professors ) in Indonesia, as many as 1,132 people have published Scopus indexed - a library database containing abstracts and citations for academic journal articles (Nasir, 2019).

## **3. Literature Review**

According to (Leblebici, 2012), increased performance can be interpreted as functional and organizational productivity including: quality, namely the ratio to measure how well an organization (or individual, industry, country) changes its input resources in the form of labor, materials, machines, and others become goods and services. According to Mustapa & Mahmood (2016), job performance is a key term applied to describe how well a worker is performing in relation to his duties, and must be seen as behavior rather than results by considering quality as well as improving functional and organizational performance, including quality (Agustini et al., 2014). According to Kim & Ployhart (2014), performance is operationalized in terms

of employee productivity in the form of organizational / company workforce efficiency to produce outputs. Aderibigbe (2017: 76-77) describes that employee productivity is related to the extent to which organizational members contribute to achieving organizational goals such as: creative, innovative, and committed employees (Al Doghan & Albar, 2015).

Research performance in academia usually refers to scientific progress, mostly published in academic journals (Cadez et al., 2016). Higher education outputs are in the form of journal articles, published books, chapters in books, technical reports, conference papers, seminar papers, edited works, workshop papers, theses and other types of publications (Ifijeh et al., 2018). Outputs are closely related to human resource activities as well as performance measures that include efficiency and effectiveness (Upev et al., 2015). Productivity in the education sector can be taken as a measure of the successful operation of activities that will lead to the realization of sector goals and objectives in the economy just as it applies to other forms of business or corporate organizations (Adu, 2015), and the effectiveness of higher education institutions must be measured based on research productivity. institutions, the ability to generate new knowledge in the form of publications using their active resources as a result of the institution (Aithal, 2016) . According to experts in Okonedo (2015), publication productivity is expressed by the number or quantity of papers published by the selected unit in a certain time, and quantity indicators for research, for example: the number of publications, citations, and grants (Cadez et al., 2016).

According to Iqbal and Mahmood (2011: 189), publication productivity is a paper published and produced by a selected unit within a certain time in the form of tangible results from research and published in professional journals, conference processes, writing books or chapters in books, working with postgraduate students. scholars in dissertations, and class projects, carry out editorial assignments, obtain patents and licenses, write monographs, develop experimental designs, produce works of an artistic or creative nature and engage in public debate and commentary. While the notion of research can be interpreted as a process that is rigorous, systematic, validates, verifiable, empirical, critical, analyzes and interprets information to answer questions by collecting, verifying and analyzing information (Ifijeh et al., 2018) and research is an ongoing process. , namely seeking the truth or trying to approach reality (Iqbal & Mahmood, 2011: 189). Therefore, the importance of productivity for the success of higher education requires that lecturers / teachers as academic staff can have high-level capacity, commitment, integrity and responsibility to achieve predetermined teaching and learning goals (Adu, 2015).

From the various descriptions of these experts, it can be synthesized that the definition of lecturer productivity is the aggregate performance of lecturers to produce international scientific work which is influenced by the reward system, leadership style, communication and motivation.

Employees are the main source for achieving organizational goals, so organizations need to ensure that the reward system is fair and ensure that the implementation is not biased, only given to the right people to make employees feel that the company values their performance (Eshak et al., 2016). Ibrar & Khan, (2015). The reward system is financial and non-financial incentives, intrinsic rewards / rewards (Wasiu & Adebajo, 2014) are a strategic issue and recognition / recognition is a key parameter of current motivation programs and most organizations define it as a success factor for employee performance (Danish & Usman , 2010). Then, when viewed from the main purpose of the reward system, (Ndungu, 2017) states that the reward system has the main objective of getting good work performance and maintaining commitment to the organization. herefore, Yamoah (2013) establishes a reward system as part of the company's integrated policies, processes, procedures and practices to reward employees according to their contribution, skills, competencies and market value. (Ibrar & Khan, 2015) and motivates to achieve high levels of performance (Bayissa & Zewdie, 2014: 23).

According to Mansor et.al (2014) that there is a measure that has a positive relationship between the two reward systems, namely intrinsic and extrinsic rewards for employee motivation levels and improving job performance. According to (Ibrar & Khan, 2015), there is a measure that can be the relationship between the reward system, motivation, and employee job satisfaction which has many important meanings for the success of the public and private sectors. According to Akafo & Boateng (2015); and Eshak et al., (2016), the types of awards in the form of prizes that can be classified into extrinsic / external and intrinsic / internal; extrinsic rewards, a number of external (real) things that can be given by a leader that can serve as an incentive for employees to increase their productivity, such as: monetary incentives (salary, bonus,

commission, stock options, etc.), benefits, flexible schedules, promotions, job responsibilities, status changes, praise and feedback, good leaders, fostering organizational culture, giving challenging assignments, being involved in the decision-making process and others.

From the various descriptions of these experts, it can be synthesized that the notion of a rewards system is a reward given in accordance with contributions, skills and competencies as an encouragement to have a positive attitude at work in order to increase lecturer motivation and productivity to produce international scientific work. With several indicators adopted from (Ibrar & Khan, 2015); (Upev et al., 2015); (Akafo & Boateng, 2015); and (Eshak et al., 2016) as follows: (1) financial and non-financial incentives, (2) flexible schedule, (3) promotion, (4) job responsibilities, (5) change of status, (6) praise, (7) Feedback, (8) Good leaders, (9) Fostering organizational culture, (10) Challenging tasks.

Transformational leadership style can be interpreted as leader behavior that changes and inspires followers to do work beyond self-interest for the good of the organization by promoting intellectual development, self-confidence, team spirit and enthusiasm among followers, thus encouraging / motivating followers to focus more on welfare collective to achieve organizational goals ((Velu et al., 2017; Aydin et.al, 2013) to achieve common goals (Voon et.al., 2011; GO, 2015; and Iqbal et al., 2015) and communicate effectively to achieve these goals (Luthra & Dahiya, 2015; Velu et al., 2017) so that the success of the organization depends on the leader and his leadership style (Iqbal et al., 2015).

Ahmad et al., (2014); and Aydin et al., (2013) stated that the notion of transformational leadership style has four dimensions consisting of: Idealized Influence, Individual Consideration, Intellectual Stimulation and Inspirational Motivation. described as follows: (1). Idealized Influence - They feel proud and dignified by having leaders who are brave and influence employee motivation in a positive way, leaders who have charismatic abilities, consistency and determination in dealing with problems, are brave enough to take risks, have ethics and determination who are high in their behavior and in this way.; (2). Individual Consideration - The quality of this leader is able to inspire, train subordinates and stimulate them to gain experience to achieve the goals and objectives of the company through policies such as: providing recommendations or recognition and rewards in the form of money and nominal wages for employees who excel optimally, the leader gives employees the authority to meet their job needs and act accordingly, so that employees dedicate more time and employees are stimulated to achieve high levels of motivation; (3). Intellectual Stimulation - Transformational leaders motivate followers in new ways, make employees creative, and they become good decision makers and always direct employees to find solutions to problems logically so that they influence their subordinates to be more creative, critical and logical; (4). Inspirational Motivation - Leaders motivate followers by accepting challenges and also acting as models for them, inspiring them to achieve goals effectively by explaining the meaning of challenges to be faced about future goals and the true organizational vision and commitment to goals so that This leader becomes a symbol of courage and a model to stimulate subordinates to work and encourage them to get more than they want for their own benefit and encourage employees to express some new ideas then they can freely describe their internal feelings and unique ideas because they feel that their ideas will be supported by the leaders.

From the various descriptions of these experts, it can be synthesized that the notion of transformational leadership style is the behavior of a leader as an agent of change, inspires and increases the motivation and productivity of lecturers to produce the productivity of international scientific work. Then, quality human resources (HR), communication in an organization has an important and very strategic role in achieving organizational goals. Furthermore, the notion of communication according to Femi (2014) includes all activities that a person does when he wants to make a transformation in the minds of others.

According to (Luthra & Dahiya, 2015), communication is transferring information or messages from one person to another or to a group and effective leadership communication, transferring messages keeping in mind the understanding and abilities of the recipient and ensuring that the recipient will be able to find the exact meaning of messages or information that are passed on to them based on organizational relationships (Ruck & Welch, 2012; Muda et al., (2014). Therefore, good organization can be achieved if there is a climate of communication (Luthfie et.al., 2017), shows that there is a harmonization of communication between leaders and members, between superiors and subordinates, between leaders, or among members so that communication satisfaction is created in the organization / company and affects employee performance (Gusfa et al., 2017). According to Ahsanul (2013), climate Communication of an organization is important



because its purpose is to relate the organizational context to concepts, feelings and expectations, helping to explain The behavior of organizational members and serves as a liaison between individual employees and the organization (Nordin et al., 2014).

Then, Ahsanul (2013) states that the effect of communication through the interactive process of organizational members is that organizational members can determine and confirm the reality of existence within the organization (Ajala, 2012), the reality that exists in many organizations, is that employees do not know what mission is, vision, object, while on the one hand employees are an integral part of the organization can be an effective way to get the most out of the talents or competencies brought to the organization by each employee (Caliendo & Rossi-Hansberg 2012; Sageer et.al., 2012 The role of the leader in communicating effectively is to translate and operationalize the mission, vision, objects, and provide accurate and adequate information about the organization (Redding, 1972 in Ahsanul, 2013) so as to gain followers' trust, which in turn helps in satisfying communication between leaders. and followers.

According to (Gusfa et al., 2017), organizational communication plays a major role in the company's growth, both financially and the competence of the people in it. According to (Ajala, 2012), the role of effective communication in the work environment of the organization is to avoid and solve various problems that may occur so as to produce stronger morale and a more positive attitude towards work. Some experts, according to (Ajala, 2012), state that the importance of communicating effectively (Luthra & Dahiya, 2015) with each other so that employee productivity will increase because effective communication means less complaining and more work is done and makes the workplace more pleasant, more less anxiety among coworkers which in turn means a positive attitude towards work and increased productivity. From the various descriptions of these experts, it can be synthesized that the notion of communication is the transfer of information or messages containing relational (affective) and task (content) components from one person to another or to a group effectively in order to increase the motivation and productivity of lecturers to produce work. international scientific.

Furthermore, the results of research by Chi & Lin (2011) state that employee motivation is a practice of human resources (HR) that must be created to get a higher level of work motivation so that the organization becomes more productive and is the most strategic element (Alami, 2015). achieve the mission, vision and goals of the organization (Olusadum & Anulika, 2018) because there is a relationship between motivation and performance (Robescu & Iancu, 2016). In this case, motivation is defined as all internal and external driving forces (Robescu & Iancu, 2016) through means such as incentives, rewards, leadership, etc. (Osabiya, 2015) as well as a key contributor to maximizing worker productivity (Mohamud, Ibrahim, & Hussein, 2017); and (Al Doghan & Albar, 2015) which allows individuals to carry out work activities to achieve a high and sustainable level of performance and as an encouragement given to employees for higher output (Maduka & Okafor, 2014: 139).

According to Osabiya (2015), motivation is a necessary contributor to job performance, it is not the only one, but along with ability is also a combination of skill levels; knowledge of how to complete tasks; feelings and emotions; facilitate and inhibit conditions that are not under individual control and improve employee abilities which can lead to organizational success (Ahmad et.al., 2014) so that it positively affects employee productivity / performance (Mohamud et al., 2017; Shahzadi et. al., 2014; Zameer et al., 2014) .. Meanwhile (Vitai, 2016), states that motivation theory considers people to be fully rational because they can judge their priorities, the consequences of their actions and they know what makes them happy. According to (Weldeyohannes, 2015) states that the motivation process theory provides a description and analysis of how behavior is energized, directed, sustained and stopped. Furthermore, (Al Doghan & Albar, 2015) stated that work motivation is the first step in the process to achieve goals and improve performance because motivation creates mental efforts that encourage people's knowledge and skills to be able to work smartly to face various challenges in work and seek and find the solution.

From the various descriptions of these experts, it can be synthesized that the notion of motivation is a measure that positively influences the strength and weakness of the work mentality on the productivity of lecturers to produce international scientific works. With several indicators adopted from (Olusadum & Anulika, 2018) as follows: (1) Mission, vision, and organizational goals, (2) Skill level, (3) Knowledge completes tasks, (4) Feelings and emotions, (4) Facilitating, (5) Leadership behavior, (6) Quality of work life, (7) Recognition / recognition, (8) Employee involvement, (9) Service conditions.

#### 4. The Following research objectives were developed to guide the study

Based on the formulation of the problem described, the purpose of this study is to determine the Structural Equation Model to Measure the Direct Effect of Leveraging Factors on Research Productivity: Perceptions of Lecturers in Private Universities as follows:

##### a.. Hypotheses of the Study

- 1) Reward system has a direct positive effect on productivity,
- 2) Transformational leadership style has a direct positive effect on productivity,
- 3) Communication has a direct positive effect on productivity,
- 4) Motivation has a direct positive effect on productivity.

##### b. Research Model/Theoretical Framework of the Study

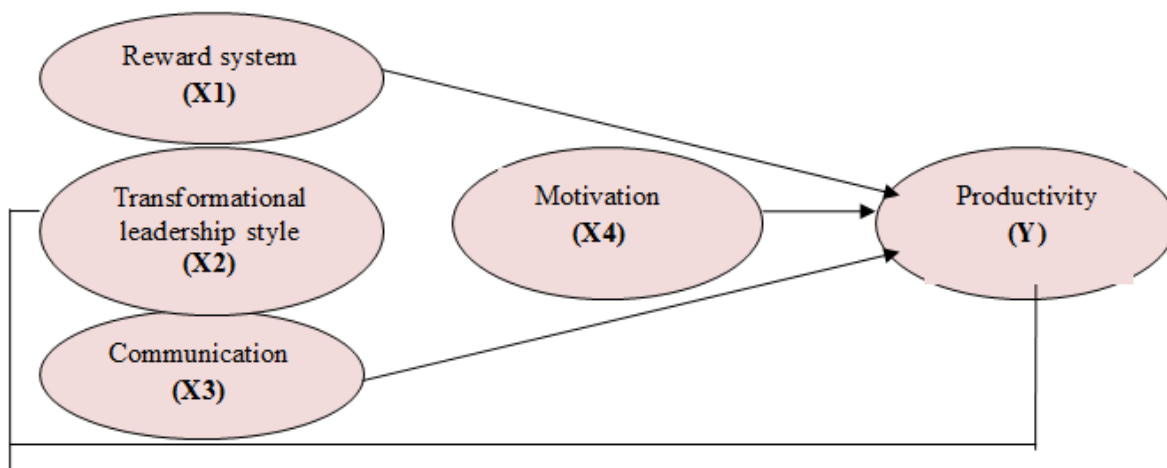


Figure 1: Research Model/Theoretical Framework of the Study

#### 5. Methodology

Based on its objectives, this study analyzes the influence of several exogenous variables, namely the reward system, transformational leadership style, communication, and motivation on lecturer productivity. Therefore, this study is a descriptive survey, with an explanatory and quantitative approach, namely an approach to testing objective theory by examining the relationship between variables (Cresswell, 2014). The unit of analysis in this research is permanent lecturers at private universities who have A accreditation and are included in the Top 50 Strengths of Indonesian Scientific Institutions: Profile of Scopus Indexed Scientific Publications by the Ministry of Research, Technology and Higher Education (2016). This research was conducted to test the proposed hypothesis using a research method that has been designed according to the variables to be studied, and the data analysis technique used Structural Equation Modeling (SEM) with IBM AMOS 23 software because SEM has the capacity to handle the specified measurement models. formally without limitations or being able to handle complex models, emphasizing prediction and exploration, and simultaneously relaxing demands on data and relationship specifications (Ringle et.al, 2018: 8, & Richter et.al., 2016: 378).

Researchers collaborate with the University for three months (September, October, and December 2019). Data Collections and Sample Population - A total of 500 questionnaires were distributed proportionally to Trisakti University, Bina Nusantara University and Tarumanagara University Of the 500 sets of questionnaires distributed, around 360 questionnaires were returned and only 310 sets of questionnaires can be used and analyzed further.

#### 6. Discussions and Results

##### a. Measurement

##### 1). Validity test

The validity test was carried out to determine whether the statement on the construct variables of the 5 variables, namely (a) Productivity, (b) Reward System, (c) Transformational Leadership Style, (d)

Communication, and (e) Motivation, was able to represent all variable values. the. A construct variable is declared valid if the value of the standard loading factor (SLF) is  $\geq 0.50$  and the value of construct reliability (CR) is  $\geq 0.70$ . Based on the value of Standardized Loading Factor (SLF) and Construct Reliability (CR), it was found that 25 statements out of 5 (five) indicators of construct variables for latent variables Productivity were only 10 (ten) valid construct variables ( $SLF \geq 0.50$  and  $CR \geq 0.70$ ), of the 17 statements of 10 (ten) indicators of the latent variable construct variables of the Reward System, there were only 8 (eight) valid construct variables ( $SLF \geq 0.50$  and  $CR \geq 0.70$ ), 16 statements from 4 (four) indicators There are only 7 (seven) valid constructs for the latent variable of Transformational Leadership Style ( $SLF \geq 0.50$  and  $CR \geq 0.70$ ), 16 out of 10 (ten) indicators of the latent variable construct variables Motivation, there are 8 (eight) construct variables validity ( $SLF \geq 0.50$  and  $CR \geq 0.70$  and will then be used in the measurement model respecification.

## 2). Reliability test

Reliability test was conducted to measure the consistency of respondents' answers. Respondents' consistent answers will produce better data. The measuring instrument used to assess the reliability of the research latent variables is Construct reliability (CR) and Average Variance Extracted (AVE). A latent variable is declared reliable if the CR value is  $\geq 0.70$  and  $AVE \geq 0.50$ . The following table 4:12 presents the results of the reliability test.

**Table 1: Reliability Test Results**

Variable	Construct Reliability (CR)	Average Variance Extracted (AVE)	Number of	Description
1. Productivity	0,954	0,677	10	Reliable
2. Rewards System	0,922	0,596	8	Reliable
3. Transformational Leadership Style	0,906	0,581	7	Reliable
4. Communication	0,901	0,535	7	Reliable
5. Motivation	0,919	0,587	7	Reliable

*Source: Processed from research results*

From Table 1 above, it can be seen that the results of the reliability test of all variables in this study are reliable because the overall CR and AVE values have been above 0.70 and 0.50.

### b. Descriptive Analysis of Research Variables

Descriptive analysis of research variables was carried out to determine respondents' responses to statements or research instruments. The steps in this analysis are as follows:

1). This response is presented based on the minimum value, maximum value, average (mean), mode (mode), and standard deviation. In addition, the frequency of answers will also be explained based on the criteria of strongly disagree (1), disagree (2), doubt / neutral (3), agree (4), strongly agree (5); and

2). To measure the answer description, class intervals and class scale ranges are required. These variables were assessed based on the arithmetic mean of the answers from 310 respondents. The respondent's perception assessment was given a score of 1 for very low answers and a score of 4 for very high answers. The interval limits used are as follows:

$$\frac{\text{Highest score} - \text{Lowest score}}{\text{Number of classes}} = \frac{5-1}{5} = 0.81$$

In this study, the researcher analyzed the respondents' perceptions of endogenous and exogenous variables and found that:

1) The respondent's perception of productivity shows that around 47.52% of respondents agree and strongly agree that the productivity of lecturers in producing international scientific work is included in the relatively high and very high category, which is around 38.77% giving hesitant responses and only about 13,71% who stated low and very low as in table 4 as follows:

**Table 4: Respondents' Perceptions of Productivity (Y)**

Construct	≤ 4		5-7		8-10		11-13		≥13	
Y_P1	7	2,26%	24	7,74%	123	39,68%	98	31,61%	58	18,71%
Y_P5	8	2,58%	34	10,97%	132	42,58%	80	25,81%	56	18,06%
Y_P10	8	2,58%	36	11,61%	117	37,74%	84	27,10%	65	20,97%
Y_P11	7	2,26%	35	11,29%	121	39,03%	90	29,03%	57	18,39%
Y_P12	7	2,26%	39	12,58%	118	38,06%	96	30,97%	50	16,13%
Y_P14	8	2,58%	32	10,32%	116	37,42%	96	30,97%	58	18,71%
Y_P16	8	2,58%	32	10,32%	113	36,45%	104	33,55%	53	17,10%
Y_P17	8	2,58%	34	10,97%	116	37,42%	96	30,97%	56	18,06%
Y_P21	8	2,58%	37	11,94%	128	41,29%	89	28,71%	48	15,48%
Y_P23	8	2,58%	45	14,52%	118	38,06%	95	30,65%	44	14,19%

*Source: Processed from research results*

**Description:** ≤ 4 = very low; 5-7 = low; 8-10 = Moderate; 11-13 = high; ≥ 13 = very high

2). Respondents' perceptions of the reward system showed that around 41.61% of respondents agreed and strongly agreed that the reward system had been implemented relatively well, namely 31.61% often applied it and around 10% always applied it. The construct variable that is most often and always applied is X1\_P1, which is getting research and publication funding assistance from the institution. Furthermore, the respondent's perception that the application of the reward system in the unfavorable category was around 20.68%, that is, 18.06% was rarely applied and only 2.62% was never applied. The construct variable that is rarely applied is X1\_P13, where the appreciation of the work is given to the lecturer so that they are enthusiastic about doing research and publishing the results in a Scopus indexed journal; and X1\_P16, as lecturers who are motivated to do research and publish the results in Scopus indexed journals for technical advice related to work as shown in table 5 as follows:

**Table 5: Respondents' Perceptions of the Rewards System (X1)**

Indikator	Tidak Pernah		Jarang		Kadang-kadang		Sering		Selalu	
X1_P1	7	2,26%	47	15,16%	105	33,87%	110	35,48%	41	13,23%
X1_P3	8	2,58%	45	14,52%	123	39,68%	99	31,94%	35	11,29%
X1_P4	9	2,90%	63	20,32%	104	33,55%	105	33,87%	29	9,35%
X1_P7	9	2,90%	57	18,39%	122	39,35%	95	30,65%	27	8,71%
X1_P8	6	1,94%	55	17,74%	124	40,00%	97	31,29%	28	9,03%
X1_P13	11	3,55%	67	21,61%	110	35,48%	89	28,71%	33	10,65%
X1_P14	8	2,58%	47	15,16%	128	41,29%	100	32,26%	27	8,71%
X1_P16	7	2,26%	67	21,61%	119	38,39%	89	28,71%	28	9,03%

Sumber: Diolah dari hasil penelitian

**Source:** Processed from research results

**Description:** Never = Very bad; rarely = Bad; Sometimes = Moderate; Often = Good; Always = Very Good

2). Perceptions of respondents who show that the application of Transformational Leadership Style (X2) in the bad category is around 21.43%, that is, 19.49% is rarely applied and around 1.94% is never applied. The construct variable that is rarely applied is X2\_P3, the Head of Study Program can make a sense of calm in facing difficulties in research and publish scientific papers in Scopus indexed journals. Whereas what has



never been implemented is X2\_P7, namely the Head of Study Program always puts forward a good attitude to encourage lecturers to be active in research and to publish scientific papers in scopus indexed journals as shown in table 6 as follows:

**Table 6: Respondents' Perceptions of Transformational Leadership Style (X2) Responden Terhadap Gaya**

Indikator	Tidak Pernah		Jarang		Kadang-kadang		Sering		Selalu	
X2_P3	5	1,61%	75	24,19%	134	43,23%	65	20,97%	31	10,00%
X2_P7	8	2,58%	45	14,52%	123	39,68%	99	31,94%	35	11,29%
X2_P10	4	1,29%	57	18,39%	150	48,39%	74	23,87%	25	8,06%
X2_P11	7	2,26%	60	19,35%	134	43,23%	84	27,10%	25	8,06%
X2_P12	4	1,29%	65	20,97%	151	48,71%	66	21,29%	24	7,74%
X2_P13	7	2,26%	62	20,00%	132	42,58%	80	25,81%	29	9,35%
X2_P14	7	2,26%	59	19,03%	144	46,45%	73	23,55%	27	8,71%
Sumber: Diolah dari hasil penelitian										

**Source:** Processed from research results

**Description:** Never = Very bad; Rarely = Bad; Sometimes = Moderate; Often = Good; Always = Very Good

3). The respondent's perception that the application of Communication (X3) is in the poor category is around 21.43%, that is, 14.38% is rarely applied and only about 2.17% is never applied. The construct variable that is rarely and never applied is X3\_P6, the Head of Study Program can make a sense of calm in facing difficulties in research and publish scientific papers in Scopus indexed journals as shown in table 7 as follows

**Table 7: Respondents' Perceptions of Communication (X3)**

Indicator	Never		Rarely		Sometimes		Often		Always	
X3_P1	5	1,61%	57	18,39%	117	37,74%	97	31,29%	34	10,97%
X3_P3	6	1,94%	34	10,97%	123	39,68%	118	38,06%	29	9,35%
X3_P5	5	1,61%	49	15,81%	129	41,61%	92	29,68%	35	11,29%
X3_P6	10	3,23%	63	20,32%	110	35,48%	91	29,35%	36	11,61%
X3_P8	7	2,26%	30	9,68%	134	43,23%	107	34,52%	32	10,32%
X3_12	7	2,26%	46	14,84%	122	39,35%	99	31,94%	36	11,61%
X3_P13	7	2,26%	33	10,65%	132	42,58%	102	32,90%	36	11,61%
X3_P15	7	2,26%	40	0,12903	118	0,38065	105	0,33871	40	0,12903

**Source:** Processed from research results

**Description:** Never = Very bad; Rarely = Bad; Sometimes = Moderate; Often = Good; Always = Very Good

4). The perception of respondents who indicated that the application of Motivation (X4) in the relatively unfavorable category was around 21.43%, that is, 19.49% was rarely applied and only about 1.94% which was never applied. The construct variable that is rarely applied is X4\_P7, the Head of Study Program can create a sense of calm in facing difficulties in research and publication of scientific papers in Scopus indexed journals. Whereas what has never been implemented is X4\_P3, namely I am compelled to do research and publish the results in a Scopus indexed journal because there is clarity of organizational goals; and X4\_P6, As a lecturer I emphasize the usefulness of intelligence in facing obstacles in research / publication of reputable scientific papers such as table 8 as follows

**Table 8: Respondents' Perceptions of Motivation (X4)**

Indicator	Never	Rarely	Sometimes	Often	Always
X4_P1	5 1,61%	60 19,35%	118 38,06%	92 29,68%	35 11,29%
X4_P2	8 2,58%	62 20,00%	132 42,58%	81 26,13%	27 8,71%
X4_P3	10 3,23%	60 19,35%	142 45,81%	76 24,52%	22 7,10%
X4_P5	6 1,94%	50 16,13%	138 44,52%	90 29,03%	26 8,39%
X4_P6	10 3,23%	48 15,48%	152 49,03%	83 26,77%	17 5,48%
X4_P7	6 1,94%	64 20,65%	130 41,94%	86 27,74%	24 7,74%
X4_P9	6 1,94%	54 17,42%	130 41,94%	89 28,71%	31 10,00%
X4_P12	8 2,58%	54 17,42%	134 43,23%	80 25,81%	34 10,97%

*Source: Processed from research results*

**Description:** Never = Very bad; Rarely = Bad; Sometimes = Moderate; Often = Good; Always = Very Good

**c. Data Analysis**

Then, the results of the CFA model fit test for the good test of fit CFA Model, it can be concluded that the results of the CFA model fit test are as follows:

1). The results of testing the measurement model for the reward system latent variables (X1) show that all the observed / construct variables meet the validity requirements to be used as measuring / forming variables for latent variables because they have a standard loading value of  $\geq 0.50$ . Likewise, the results of the reliability test on the latent variable of the Reward System (X1) also showed quite good results, where the Construct Reliability (CR) and Average Variance Extracted (AVE) values were above the minimum value requirements, namely Construct Reliability ( $0.922 \geq 0.70$ ) and Average Variance Extracted ( $0.596 \geq 0.50$ ). The CFA goodness of fit test for the Reward System Latent variable model (X1) can be accepted, in other words there is no significant difference between the covariance matrices of the observed variable data (construct) and the covariance matrices of the specified model. This shows that the measurement equation generated by the research model can be used to explain the measured variables as in Table 9 as follows.

**Table 9: Fit Test of CFA Model Variable Latent Rewards System (X1)**

<b>Absolut Fit Measure</b>			
<i>Goodness-of-Fit</i>	<i>Cut-off Value</i>	<i>Result</i>	<i>Fit</i>
<i>p-value (Sig.)</i>	$> 0,05$	0,088	<i>Good fit</i>
<i>Chi-Square/df</i>	$\leq 3$	1,450	<i>Good fit</i>
<i>GFI(Goodness of Fit)</i>	$\geq 0,90$	0,978	<i>Good Fit</i>
<i>RMSEA(Root Mean square Error of Approximation)</i>	$\leq 0,08$	0,038	<i>Good Fit</i>
<i>RMR(Root Mean Square Residual)</i>	$\leq 0,05$	0,018	<i>Good Fit</i>
<b>Incremental Fit Measure</b>			
<i>Goodness-of-Fit</i>	<i>Cut-off Value</i>	<i>Result</i>	<i>Fit</i>
<i>AGFI(Adjusted Goodness of Fit Index)</i>	$\geq 0,90$	0,961	<i>Good Fit t</i>
<i>CFI (Comparative Fit Index)</i>	$\geq 0,90$	0,994	<i>Good Fit</i>
<i>Incremental Fit Index (IFI)</i>	$\geq 0,90$	0,994	<i>Good Fit</i>
<i>Relative Fit Index (RFI)</i>	$\geq 0,95$	0,973	<i>Good Fit</i>
<b>Parsimonious Fit Measure</b>			
<i>Goodness-of-Fit</i>	<i>Cut-off Value</i>	<i>Result</i>	<i>Fit</i>
<i>PNFI (Parsimonious Normed Fit Index)</i>	Harus kecil	0,700	<i>Good Fit</i>
<i>PGFI (Parsimonious Goodness Of Fit Index)</i>	Mendekati 1	0,544	<i>Good fit</i>
<i>AIC (Akaike Information Criterion)</i>	$< 72,000$	61,004	<i>Good Fit</i>
<i>CAIC (Consistent Akaike Information Criterion)</i>	$< 242,517$	136,789	<i>Good Fit</i>

**Source: Processed from research results**

2). The results of the measurement model testing on the Latent Variables of Transformational Leadership Style (X2) show that all the observed / construct variables meet the validity requirements to be used as the measuring / shaping variable for latent variables because they have a standard loading value of  $\geq 0.50$ . Likewise, the results of the reliability test showed quite good results, where the Construct Reliability (CR) and Average Variance Extracted (AVE) values were above the minimum value requirements, namely Construct Reliability ( $0.906 \geq 0.70$ ) and Average Variance Extracted ( $0.581 \geq 0,50$ ). The CFA goodness of fit test The Latent variable model of Transformational Leadership Style (X2) has met the validity requirements and has a fairly good reliability. The results of the model fit test on the CFA model were carried out to measure the suitability of the research data with the research model, resulting in a good fit criterion. The results of the CFA model suitability test for the Latent Variable Transformational Leadership Style can be seen in table 10 as follows:

**Table 10: Fit Test Results for CFA Model Latent Variable Transformational Leadership Style (X2)**

<b>Absolut Fit Measure</b>			
<i>Goodness-of-Fit</i>	<i>Cut-off Value</i>	<i>Result</i>	<i>Fit</i>
<i>p-value (Sig.)</i>	> 0,05	0,251	<i>Good fit</i>
<i>Chi-Square/df</i>	≤ 3	1,222	<i>Good fit</i>
<i>GFI(Goodness of Fit)</i>	≥ 0,90	0,985	<i>Good Fit</i>
<i>RMSEA(Root Mean square Error of Approximation)</i>	≤ 0,08	0,027	<i>Good Fit</i>
<i>RMR(Root Mean Square Residual)</i>	≤ 0,05	0,017	<i>Good Fit</i>
<b>Incremental Fit Measure</b>			
<i>Goodness-of-Fit</i>	<i>Cut-off Value</i>	<i>Result</i>	<i>Fit</i>
<i>AGFI(Adjusted Goodness of Fit Index)</i>	≥ 0,90	0,969	<i>Good Fit</i>
<i>CFI (Comparative Fit Index)</i>	≥ 0,90	0,977	<i>Good Fit</i>
<i>Incremental Fit Index (IFI)</i>	≥ 0,90	0,977	<i>Good Fit</i>
<i>Relative Fit Index (RFI)</i>	≥ 0,95	0,978	<i>Good Fit</i>
<b>Parsimonious Fit Measure</b>			
<i>PNFI (Parsimonious Normed Fit Index)</i>	Must be small	0,657	<i>Good Fit</i>
<i>PGFI (Parsimonious Goodness Of Fit Index)</i>	Approaching 1	0,492	<i>Good fit</i>
<i>AIC (Akaike Information Criterion)</i>	<56,000	45,107	<i>Good Fit</i>
<i>CAIC (Consistent Akaike Information Criterion)</i>	< 188,624	111,419	<i>Good Fit</i>

**Source: Processed from research results**

3). The results of testing the measurement model for Latent Communication Variables (X3) in the table above show that all the observed / construct variables meet the validity requirements to be used as measuring / forming variables for latent variables because they have a standard loading value of  $\geq 0.50$ . Likewise, the results of the reliability test show quite good results, where the values of Construct reliability (CR) and Average Variance Extracted (AVE) are above the minimum value requirements, namely Construct Reliability ( $0.901 \geq 0.70$ ) and Average Variance Extracted ( $0.535 \geq 0,50$ ). The results of this calculation indicate that all the observed variables / constructs that measure / form the Communication Latent Variable (X3) have met the validity requirements and have fairly good reliability. The results of the model fit test on the CFA model were carried out to measure the suitability of the research data with the research model, resulting in a good fit criterion. The results of the compatibility test for the CFA model for Latent Communication Variables (X3) can be seen in table 11 as follows:



**Table 11: Fit Test of CFA Model for Latent Variable Communication (X3)**

<b>Absolut Fit Measure</b>			
<i>Goodness-of-Fit</i>	<i>Cut-off Value</i>	<i>Result</i>	<i>Fit</i>
<i>p-value (Sig.)</i>	> 0,05	0,157	<i>Good fit</i>
<i>Chi-Square/df</i>	≤ 3	1,313	<i>Good fit</i>
<i>GFI(Goodness of Fit)</i>	≥ 0,90	0,978	<i>Good Fit</i>
<i>RMSEA(Root Mean square Error of Approximation)</i>	≤ 0,08	0,032	<i>Good Fit</i>
<i>RMR(Root Mean Square Residual)</i>	≤ 0,05	0,018	<i>Good Fit</i>
<b>Incremental Fit Measure</b>			
<i>Goodness-of-Fit</i>	<i>Cut-off Value</i>	<i>Result</i>	<i>Fit</i>
<i>AGFI(Adjusted Goodness of Fit Index)</i>	≥ 0,90	0,961	<i>Good Fit t</i>
<i>CFI (Comparative Fit Index)</i>	≥ 0,90	0,995	<i>Good Fit</i>
<i>Incremental Fit Index (IFI)</i>	≥ 0,90	0,995	<i>Good Fit</i>
<i>Relative Fit Index (RFI)</i>	≥ 0,95	0,970	<i>Good Fit</i>
<b>Parsimonious Fit Measure</b>			
<i>Goodness-of-Fit</i>	<i>Cut-off Value</i>	<i>Result</i>	<i>Fit</i>
<i>PNFI (Parsimonious Normed Fit Index)</i>	Must be small	0,699	<i>Good Fit</i>
<i>PGFI (Parsimonious Goodness Of Fit Index)</i>	Approaching 1	0,544	<i>Good fit</i>
<i>AIC (Akaike Information Criterion)</i>	<72,000	58,257	<i>Good Fit</i>
<i>CAIC (Consistent Akaike Information Criterion)</i>	< 242,517	134,042	<i>Good Fit</i>

**Source: Processed from research results**

The results of testing the measurement model of the Latent Motivation Variable (X4) show that all the observed / construct variables meet the validity requirements to be used as the measuring / forming variable of latent variables because they have a standard loading value of  $\geq 0.50$ . Likewise, the reliability test results show fairly good results, where the values of Construct reliability (CR) and Average Variance Extracted (AVE) are above the minimum value requirements, namely Construct Reliability ( $0.919 \geq 0.70$ ) and Average Variance Extracted ( $0.587 \geq 0,50$ ). The results of this calculation indicate that all the observed variables / constructs that measure / form the Latent Motivation Variable (X4) have met the validity requirements and have fairly good reliability. Likewise, the results of the model fit test on the CFA model were carried out to measure the suitability of the research data with the research model, resulting in a good fit criterion. The results of the CFA model suitability test for the Latent Motivation Variable (X4) can be seen in table 12 as follows:

**Table 12: Fit Test of CFA Model Latent Variable Motivation (X4)**

<b>Absolut Fit Measure</b>			
<i>Goodness-of-Fit</i>	<i>Cut-off Value</i>	<i>Result</i>	<i>Fit</i>
<i>p-value (Sig.)</i>	> 0,05	0,455	<i>Good fit</i>
<i>Chi-Square/df</i>	≤ 3	1,002	<i>Good fit</i>
<i>GFI(Goodness of Fit)</i>	≥ 0,90	0,984	<i>Good Fit</i>
<i>RMSEA(Root Mean square Error of Approximation)</i>	≤ 0,08	0,003	<i>Good Fit</i>
<i>RMR(Root Mean Square Residual)</i>	≤ 0,05	0,015	<i>Good Fit</i>
<b>Incremental Fit Measure</b>			
<i>Goodness-of-Fit</i>	<i>Cut-off Value</i>	<i>Result</i>	<i>Fit</i>
<i>AGFI(Adjusted Goodness of Fit Index)</i>	≥ 0,90	0,971	<i>Good Fit t</i>
<i>CFI (Comparative Fit Index)</i>	≥ 0,90	1,000	<i>Good Fit</i>
<i>Incremental Fit Index (IFI)</i>	≥ 0,90	1,000	<i>Good Fit</i>
<i>Relative Fit Index (RFI)</i>	≥ 0,95	0,981	<i>Good Fit</i>
<b>Parsimonious Fit Measure</b>			
<i>PNFI (Parsimonious Normed Fit Index)</i>	Must be small	0,704	<i>Good Fit</i>
<i>PGFI (Parsimonious Goodness Of Fit Index)</i>	Approaching 1	0,547	<i>Good fit</i>
<i>AIC (Akaike Information Criterion)</i>	<72,000	52,047	<i>Good Fit</i>
<i>CAIC (Consistent Akaike Information Criterion)</i>	< 242,517	127,832	<i>Good Fit</i>

**Source: Processed from research results**

Furthermore, the results of the complete test (Full) Complete Structural Model (SEM), namely the significance test of the direct effect path coefficient can be seen in Table 13. Below as follows:

**Table 13: Path Coefficient and C.R (t-count)**

<b>Variabel Laten Endogen</b>		<b>Variabel Eksogen Laten</b>	<b>Std Estimate</b>	<b>Unstd Estimate</b>	<b>S.E.</b>	<b>C.R.</b>	<b>P</b>
Productivity_Y	<---	Rewards_System_X <sub>1</sub>	0,209	0,214	0,054	3,981	***
Productivity_Y	<---	Transformational_LS_X <sub>2</sub>	0,201	0,206	0,056	3,715	***
Productivity_Y	<---	Communication_X <sub>3</sub>	0,302	0,415	0,081	5,132	***
Productivity_Y	<---	Motivation_X <sub>4</sub>	0,280	0,298	0,064	4,663	***

**Source: Processed from research results**

Based on the output of the Research Model above, all observed / construct variables have a significant loading factor value in measuring or forming latent variables because the loading factor value is  $\geq 0.5$  and the path coefficient value of the direct effect of exogenous variables on endogenous variables is statistically significant because  $CR_{(t-count)} > 1.96$ . Analysis of structural equation modeling in the full model must meet the evaluation criteria of a model, including discriminant validity, multivariate normality, data outliers, multicollinearity and singularity, and the goodness of fit model.

**d. Hypothesis Testing Results**

Hypothesis testing using the Structural Equation Modeling (SEM) technique aims to determine whether there is a direct or indirect effect. The direct effect is the effect of the independent variable (exogenous) on the dependent variable (endogenous), while the indirect effect is the effect of the free variable (exogenous) on the dependent variable (exogenous) through other variables or moderating variables. Testing the direct effect (direct effect) on the research model was carried out by looking at the path coefficient value in each pathway of the research hypothesis and continued with the t test (Critical Ratio or CR) to determine the path

coefficient value or effect value in the significant category. The following describes the results of testing the first hypothesis to the fourth hypothesis:

1). Positive direct effect of reward system (X1) on productivity (Y) - The estimation parameter for testing the effect of reward system (X1) on productivity (Y) shows that the value of  $CR_{(tcount)}$  is 3.981 with a probability of  $\leq 0.05$ . Both of these values have met the requirements to accept H1 where the  $CR_{(tcount)}$  is  $3.981 \geq 1.96$ . These results conclude that there is a positive direct effect of reward system (X1) on productivity (Y).

2). Positive direct effect of Transformational Leadership Style (X2) on Productivity (Y) - The estimation parameter for testing the effect of transformational leadership style (X2) on Productivity (Y) shows the value of  $CR_{(tcount)}$  of 3.715 and with a probability of 0.000. Both of these values have met the requirements to receive H2 where the value of  $CR_{(tcount)}$  is  $3,715 \geq 1.96$ . These results conclude that there is a positive direct effect of Transformational Leadership Style (X2) on Productivity (Y).

3). Positive direct effect of Communication (X3) on Productivity (Y) - The estimated parameter for testing the direct effect of Communication (X3) on Productivity (Y) shows the  $CR_{(tcount)}$  of 5.132 with a probability of 0.000. Both values have met the requirements to receive H1 where the  $CR_{(tcount)}$  is  $3,715 \geq 1.96$ . These results conclude that there is a positive direct effect of Communication (X3) on Productivity (Y).

4). Positive direct effect of Motivation (X4) on Productivity (Y) - The estimation parameter for testing the effect of Motivation (X4) on Productivity (Y) shows the  $CR_{(tcount)}$  of 4.663 with a probability of 0.000. Both of these values have met the requirements to receive H1 where the  $CR_{(tcount)}$  is  $(4.663) \geq 1.96$ . These results conclude that there is a positive direct effect of motivation (X4) on productivity (Y).

## **7. Research Novelty**

The novelty (State of The Art) of this study can be seen from the research variables and the unit of analysis because previous studies on productivity were mostly carried out only in companies. In addition, the model in this study is a replication of several journals using variables related to the problems of lecturers as scientists, and the analytical techniques used are not exactly the same as other studies.

## **8. Conclusions & Recommendations**

The results of research related to respondents' perceptions of productivity show that respondents agree and strongly agree that the productivity of lecturers in producing international scientific work is in the relatively high and very high category, and respondents' perceptions of the reward system, respondents agree and strongly agree that the reward system has been implemented relatively good. Meanwhile, respondents' perceptions related to the application of transformational leadership styles in the unfavorable category were rarely applied and never applied, and respondents' perceptions regarding the application of communication in the categories that were lacking and even never applied. Then, respondents' perceptions regarding the application of motivation are relatively poor, rarely applied and never applied. Furthermore, the data analysis technique using SEM shows that the eligibility criteria of the model have been met, and the results of the analysis can be concluded that a new model is found for the positive direct effect of the reward system, transformational leadership style, communication, and motivation on productivity.

Thus, the findings of this study are recommended to contribute to the Top Management of Private Universities as a reference to encourage and increase the productivity of lecturers to produce international scientific work and to be followed up by further researchers using several other factors that can affect the productivity of lecturers to produce international scientific article.

## **9. Acknowledgement**

The author would like to thank all the academic staff of Trisakti University, Bina Nusantara University, and Tarumanagara University, which are included in the Top 50 Strengths of Indonesian Scientific Institutions: Scopus Indexed Scientific Publication Profile, showing a description of scientific publications based on: 1) number and growth of publications, 2) author productivity; 3) field of science; 4) research collaboration and place. They have contributed greatly to the completion of this research. Furthermore, I would also like to thank the various authors whose works have been used as sources of reference and inspiration for completing this research.

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