

**THE DOMINANT FACTOR OF LECTURERS' RESEARCH
PRODUCTIVITY USING THE AHP: CASE STUDY OF
CATHOLIC UNIVERSITY OF DE LA SALLE MANADO-
INDONESIA**

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¹ The authors wish to thank Father Benansio Salombre, the head of Yayasan Perguruan Tinggi Universitas De La Salle, for his support on this research.

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ABSTRACT

Higher education places a great emphasis on research. In order to remain competitive, Catholic universities also place a great focus on research. The quality and quantity of lecturer research is one of the determining factors in the ranking of a tertiary institution. An evaluation of lecturer research productivity requires an instrument to measure lecturer research activities and understand determinants. Lecturer productivity involves many complex factors that are both objective and subjective, and is considered part of multi-criteria decision making. This study uses the AHP approach to determine the weights of the criteria and sub-criteria and their dominant factors. This method is used to evaluate the productivity of lecturers at Unika De La Salle Manado and has implications and applications for all universities.

Keywords: AHP; commitment; higher education; MCDM; productivity; Catholic

1. Introduction

Pope Francis, in his encyclical letter on Ecclesiastical Universities and Faculties, known as 'Veritatis Gaudium', wrote that research is the primary duty of Catholic universities to communicate doctrine to our contemporaries in various countries and cultures. (Pope Francis, 2017). Research is the basis for the development of a civilized society and is used for decision making by most institutions, organizations and companies and is also an integral part of R&D institutions (Pal & Sarkar, 2020). Research has received a great deal of attention and support from the Indonesian government in the form of funding which has resulted in a significant number of publications (Dirjen Dikti, 2019).

In higher education, research is one of the key determinates of a university's ranking. As a result, leaders of higher education institutions are always seeking to motivate their lecturers to conduct and publish research. An evaluation of lecturer research productivity is regularly conducted by higher education institutions to assess a lecturer's potential for career growth and meeting the challenges of the future. (Henry, Ghani, Hamid, & Bakar, 2020).

Many studies have been conducted to evaluate lecturers' research productivity. However, an evaluation of lecturer productivity is extremely difficult, and involves multiple variables that can be qualitative or quantitative, and can also be complex, sensitive and subject to imprecise measurement (Ates, Çevik, Kahraman, Gülbay, & Erdogan, 2006). Therefore, the quantitative approach is often used (Pal & Sarkar, 2020). Lecturer productivity has been measured by the number of publications, the acquisition of patents, citation of scientific work, or papers presented at the seminars (Abramo & D'Angelo, 2014). In general, publications are often viewed as the benchmark for assessing lecturers' research abilities and performance. Higher education institutions often assess research capabilities and scientific publications to recruit new lecturers and as criteria for promotion (Shin, Arimoto, Cummings, & Teichler, 2014).

The multi-criteria decision analysis approach model was used by Costa and Oliveira (2012) to evaluate lecturer productivity. The following criteria and sub criteria were used: teaching (pedagogical publications, student supervision, teaching materials), research (scientific publications, research projects), transfer of knowledge (patents,

laws, norms and technical publications; services, consultations and science and technology dissemination), and university (Costa & Oliveira, 2012). Jaramillo et al. also used a multi-criteria decision making approach to rank lecturers at the University of Ecuador by evaluating criteria such as administrative management, research, teaching and community service (Jaramillo, Pico, Marquez, & Plata, 2017). Karmaker et al. applied a combination of multi-criteria decision making models to evaluate the performance of lecturers at the Technical University of Bangladesh (Karmaker et al., 2018). They specifically used the Analytical Hierarchy Process method to determine the weight of performance indicators and the Preference Preparation Technique based on similarity and ideal solutions (TOPSIS). The TOPSIS application was combined with the AHP to determine the composition of lecturers in higher education institutions. They used 15 sub-criteria of the following five criteria: knowledge (teaching ability, understanding student psychology, ability to make decisions), ability to explain (ideas are clear, easy to find, proficient in explaining), discipline (fair, attitude, organized), cooperation (can be an example, dedicated, motivated), creative (encouraging positively, passionately, full of inspiration).

Do et al. (2019) used a novel multi-criteria hierarchy method in his evaluation of lecturer performance. There were four criteria, 13 sub-criteria and five alternatives assessed as follows: self-evaluation (scientific publication activities, supervising postgraduate students, journal preview process); manager-based evaluation (lecturing activities, language of instruction, lecturing attitude and spirit, evaluation and scoring system); peer-evaluation (cooperation in research projects, teamwork in scientific and lecturing activities, participating in school meetings and events); and student-based evaluation (the content of lessons, lecturer-student interaction, the relevance of the subjects). Their findings showed that the highest criterion was the manager's evaluation. The sub-criteria that received high ratings were lecturer activities, lecturer style and content of lessons.

Tuan et al. used the new integrated MCDM to evaluate five criteria including number of publications, quality of publications, number of books, supervising postgraduate students, and research grants secured as project leaders. The highest ranked criterion was research grants secured as project leaders, followed by the quality of publication and supervising postgraduate students. They also stated that the MCDM approach was appropriate in their study (Tuan et al., 2020).

Additional factors that affect researchers' productivity are as follows: the terminal degree held by the lecturer (Henry et al., 2020); lecturer's level of commitment (Batugal & Tindowen, 2019); the number of young lecturers (Do et al., 2020); the amount of internal research funding (Henry et al., 2020); the degree of researcher motivation; number of teaching hours (Abramo & D'Angelo, 2014); the extent of infrastructure and support facilities (Budiyono, 2019; Suhardi, Fuad, & Rosyidi, 2019); number of research publications (Do et al., 2020); degree of cooperation between government and private institutions (Suhardi et al., 2019); number of government research grants awarded (Suhardi et al., 2019); cooperation with foreign institutions (Abramo & D'Angelo, 2014); level and capability of network resources available to faculty and study programs (Abramo & D'Angelo, 2014); degree of regulations that affect lecturers' productivity (Suhardi et al., 2019); and the number of research grants available from international institutions (Auranen & Nieminen, 2010).

This study aims to examine what attributes influence the productivity of lecturer research at Unika De La Salle Manado and determine which are the dominant factors using the AHP method. An evaluation of lecturers' research productivity using the AHP method is appropriate precisely because of the complex, subjective and sensitive nature of the analysis. This research, among others, attempts to bridge the gap. The research is organized as follows: the first part is the introduction; the second part discusses the importance of research at Catholic universities; the third part states the methods; the fourth part is the results and discussion; and the fifth part provides the conclusions, limitations and recommendations.

2. Research at Catholic universities

Catholic universities were born from the heart of the church and gained their identity in close relationship with the church. Catholic universities carry out the task of the church to seek and find truth and enhance human dignity and cultural heritage for the good of all people. This is done through scientific research (John Paul II, 1990). Catholic universities and institutes serve as a primary source of scientific research (Paul VI, 1965). Through research, the church continues to reflect the growing treasury of human knowledge in the light of the Catholic faith (Garrett, 2006).

The church exists in contact with the world, and encounters various cultures, new realities and knowledge. The meeting of faith, culture and new knowledge gives rise to new categories. The category accepted by all parties then becomes a means of evangelization. This category is not only limited to new thinking but is further extended by data and scientific findings. This is called creative apologetics (Pope Francis, 2017). The arguments for the defense of the faith are not only in dogma, but in the data and findings of science. In this reality, the thoughts and teachings of the church are communicated, interpreted, modified, integrated and developed (Pope Francis, 2017). The blending of thought produces new approaches and arguments on the issue of faith. Church doctrine, as well as dogma and tradition are not static, but are developed, strengthened and deepened over time. The teachings of the Church are always reflected in the context of a certain period. Herein lies the importance of research.

Research allows the dogma and realm of faith to evolve and be reflected in accordance with the times. Research helps the church preach what is relevant for modern times (John Paul II, 1990). Research helps the Church respond to the problems and needs of the age and discovers the root causes of current serious problems. This is especially relevant in the current time, which is marked by rapid, constant and far-reaching changes in the fields of science and technology. We need a true evangelical hermeneutic to better understand life, the world and humanity, using research based on the truth of reason. (Pope Francis, 2017).

An example of research that helps the church understand modern problems is environmental damages as addressed by Pope Francis in his encyclical on Care of Our Common Home called *Laudato si*. Science does not have to conflict with faith (George, 2000). Research must pay attention to ethical issues. Research activities have to place ethics over the technical, the primacy of the person over things, and the superiority of spirit over matter (John Paul II, 1990).

The research activities that need to be addressed by Universities are problems currently related to the dignity of human life, the promotion of justice for all, the

qualities of personal and family life, the protection of nature, research for peace and political stability, the just sharing in the world's resources and investigation of new economic and political orders that will better serve the human community.

Catholic researchers should develop the social science technical and methodological expertise to be effective in the public sector. Simboli (2012) emphasized that a Catholic university must have the courage to speak uncomfortable truths, being both critical and constructive, which may not comport with public opinion, but which are necessary to safeguard the authentic good of society. The Catholic intellectual tradition has the resources to engage these issues, but what is needed now is the will to do so. The Catholic Congregation of Education invites us to generate new thinking across sciences by using intensive and extensive empirical studies (Grace, 2016).

Collaboration between academic disciplines is needed to solve the complex issues and different dimensions of human life and society. The interdisciplinary approach is positive and promising (Pope Francis, 2017) and generates the respect due to colleagues by recognizing their expertise (Iozzio, 2000). Quality research as outlined above will greatly influence all teaching. Scientists strive to do research which they consider important, but intrinsic satisfaction and interest are not the only reason to do research. Scientists want their work to not only be of personal interest but also important to others and the whole world (Warner & Caudill, 2013). Research also plays a decisive role in economic, social and cultural development (Pope Francis, 2017). In this way, scientists became apostles among the people of the modern world through productive scientific activities (Paul VI, 1965).

3. Methods

3.1. Research steps

This study was carried out using three steps. The first step was to identify the factors that influence the productivity of lecturers' research as discovered by previous studies and additional attributes or factors proposed by experts. These factors were arranged by experts based on internal influences (strengths and weaknesses) and external influences (opportunities and threats). Next, the researchers developed a questionnaire and distributed it to experts online. The experts were asked to add, subtract and determine the factors that they considered to significantly influence lecturers' productivity at the Universitas Katolik De La Salle. The experts were selected based on their knowledge and involvement in the measurement of lecturers' research productivity. The experts consisted of officials who are directly involved in evaluating the productivity of lecturers, namely the Vice Rector of Research, the Head of Research and Community Service, the Deans and the head of the study program at Unika De La Salle.

Fifty-eight respondents completed the questionnaire. Researchers identified the top seven factors from each criterion by computing the results of the surveys and using Pareto analysis techniques. According to Saaty (2016), seven is a powerful, almost magical number in reaching accurate decisions. He goes on to submit that the number of jurors should be seven, and classification of performance stimuli is nearly perfect when limited to the comparison of up to seven different stimuli. Additional examples include Maslow's hierarchy of needs which describes seven basic needs and the Bible that declares that God worked several days and rested on the seventh day (Saaty, 2016). Miller (1956) added that a person cannot simultaneously compare more than seven objects (plus or minus two) without becoming confused.

A Pareto chart is a tool that is useful for dividing data into categories and establishing the number of times each category occurs (Silungwe & Khatleli, 2018). With the Pareto chart technique, researchers take 80% of the most chosen attributes (Ivancic, 2014). The Pareto chart (Figure 1) consists of a bar graph combined with a line chart of the factors related to a variable arranged according to the magnitude of the impact of these factors. A Pareto chart is a histogram of data that sorts from the largest to the smallest frequencies and is also calculated cumulatively.

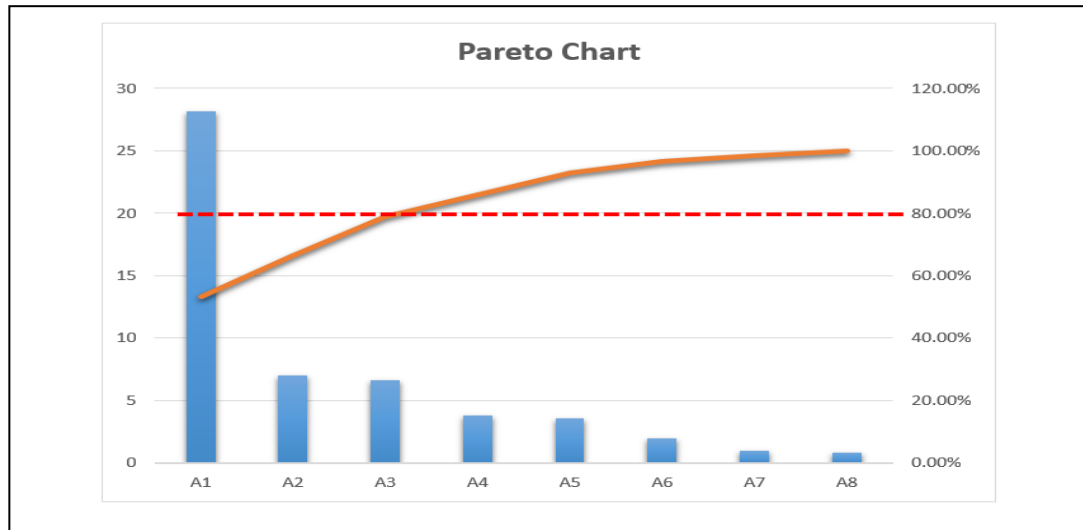


Figure 1 Pareto chart

The second step was the preparation of the Analytic Hierarchy Process questionnaire in the form of a paired comparison matrix, and the third step was the calculation and analysis of the results of the criteria and sub-criteria and the determination of the global weights. Global weight is obtained by multiplying the criteria and sub-criteria. The global weight with the highest value is the dominant or priority factor.

3.2. Analytic Hierarchy Process (AHP)

The Analytic Hierarchy Process (AHP) is a decision making method used in multi-criteria, multi-objective, and multi-factor environments (Do et al., 2020). This method is used to solve complex problems with subjective criteria (Gunduz & Mohammad, 2020). The AHP is very flexible and useful (Almodayan, 2018) in the analysis of qualitative data in a quantitative form (Lee, Lee, Lee, Kim, & Kim, 2020). This method is also easy to use and only asks respondents to choose from pairwise comparisons (Yang, Vargas, Jin, & Zhou, 2020). Numata et al. (2020) also state that this method is flexible. Also, the mathematical procedure used is simple (Ramírez-Rivera et al., 2020). The AHP method has been inspired by several previous discoveries and has been widely used by various interests in numerous fields (Ishizaka & Labib, 2011).

The AHP begins by setting up the goals, and then determines the criteria, sub-criteria and alternatives which are then arranged in the form of a hierarchy (Figure 1).

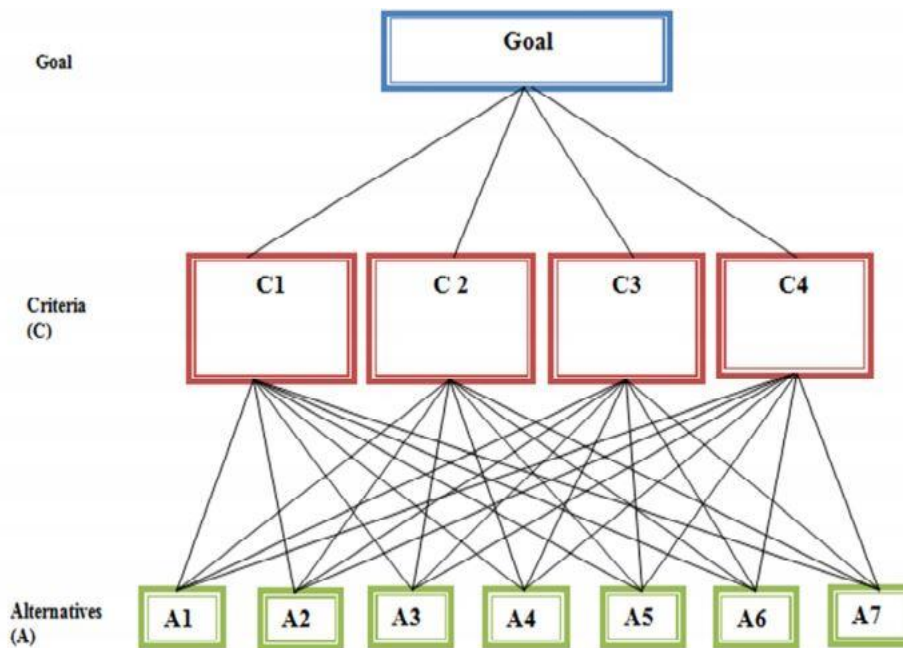


Figure 2 Structure of the AHP

By breaking down the problem in the form of a hierarchy, the researcher is able to unravel the complexity of the problem so that it is more easily solved. Next, researchers compile a questionnaire in the form of a pairwise comparison. Respondents only chose the criterion that is considered the most important of the two choices using a nominal scale between 1 to 9 determined by Thomas Saaty (Table 1), so that human thoughts and feelings and their choices can be quantified.

Table 1
Scale of preferences of AHP

| <i>Linguistic variables</i> | <i>AHP Scale</i> |
|------------------------------|------------------|
| Equal Importance | 1 |
| Intermediate | 2 |
| Moderately more important | 3 |
| Intermediate | 4 |
| Strongly more important | 5 |
| Intermediate | 6 |
| Very strongly more important | 7 |
| Intermediate | 8 |
| Extremely more important | 9 |

Making a choice from only two options is usually easier and more accurate (Ishizaka & Labib, 2011).

The results obtained are arranged by rank which also determines the priority of choice. Because humans are limited in their ability to make consistent choices, the AHP prepares a test of consistency for each choice. The calculation of consistency uses the following formula:

$$CR = \frac{CI}{RI} \quad (1)$$

where: CR stand for Consistency ratio; CI = consistency index; RI = random consistency index.

Table 2
Random Consistency Index

| Matrix Size | Random Consistency Index (RI) |
|-------------|-------------------------------|
| 1 | 0.00 |
| 2 | 0.00 |
| 3 | 0.58 |
| 4 | 0.90 |
| 5 | 1.12 |
| 6 | 1.24 |
| 7 | 1.32 |
| 8 | 1.41 |
| 9 | 1.45 |
| 10 | 1.49 |

The results are considered consistent if the CR does not exceed 0.1. The AHP produces weights of each criterion according to the pairwise comparison of the decision makers. The greater the weight, the more important the relationship with the criteria is. Comparisons are made between the criteria and each criterion with sub-criteria. Multiplication of the criteria and sub-criteria produces a global weight value.

The AHP is a flexible and powerful tool because the scores are based on a pairwise matrix of preferences for both criteria and sub-criteria. Researchers choose the questionnaire respondents by considering their experiences and comprehension of the issue.

4. Results and discussion

The results of the internal and external analysis performed by the experts are shown in a hierarchy structure in Figure 3.

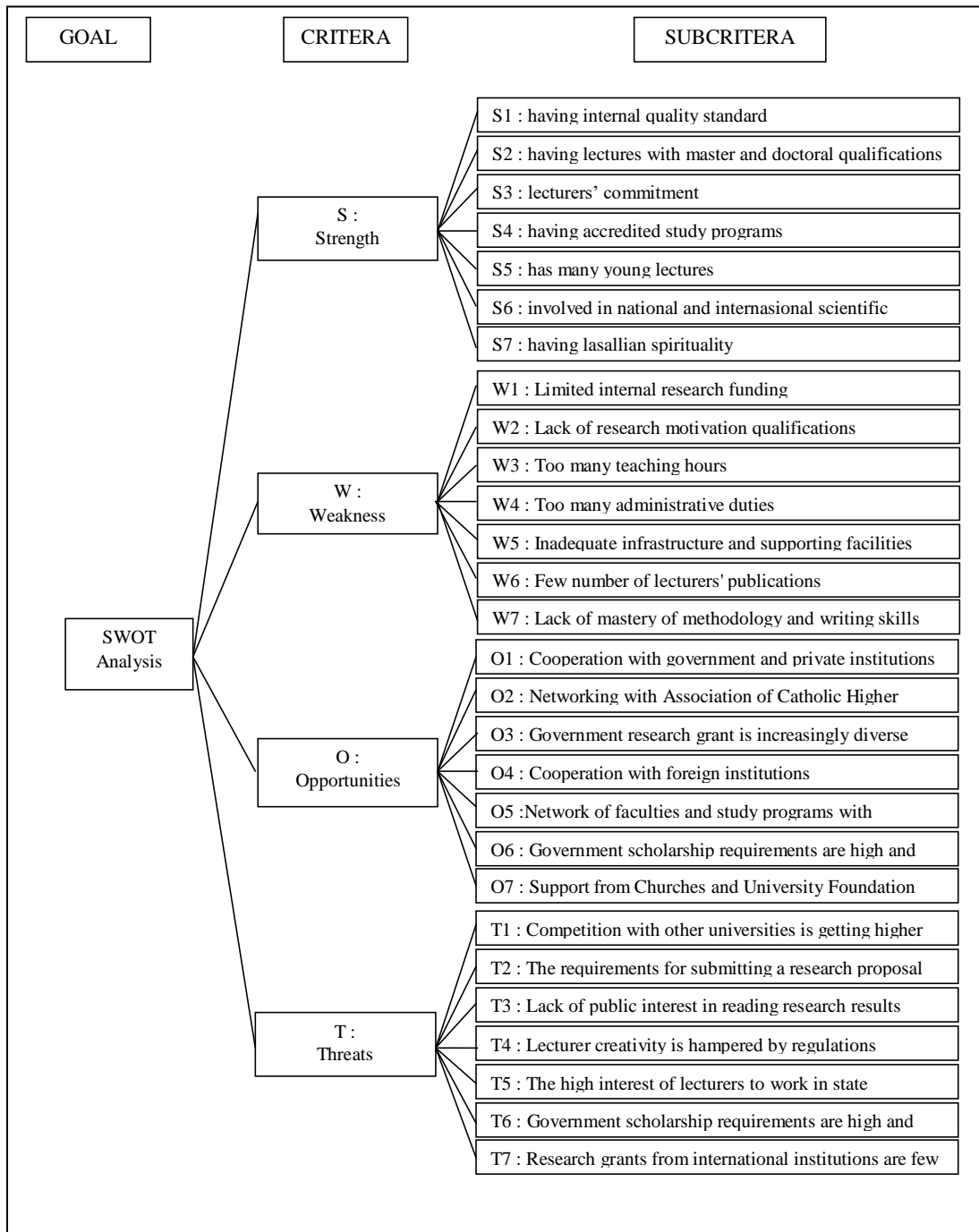


Figure 3 Hierarchical structure of AHP

The factors were acceptable because they fulfilled the validity and reliability calculations. The results of the validity test (Table 3) were carried out using SPSS 2.0 by comparing the r-test with the r-table. In this study, $N = 90$ since there were 90 questions in the AHP questionnaire. To obtain the r-table, $N = df-2$ or $N = 90-2 = 88$. ($r\text{-table} = 0.2039$ with 95% confidence level). If $r\text{-test} > r\text{-table}$, the research instrument or questionnaire is valid. The validity test for the questions was as follows: strength $0.624 > 0.2039$, weakness $0.647 > 0.2039$, opportunities $0.685 > 0.2039$ and threats $0.683 > 0.2039$. We concluded that all of the items for each of the sub-criteria

were valid. The pairwise comparison criteria was $0.549 > 0.2039$, therefore they were valid.

Questionnaire reliability testing was conducted to determine how reliable the instrument was at measuring the objectives. The test was carried out using SPSS 2.0 with the calculation of the Cronbach Alpha coefficient. The results of the Cronbach Alpha for the sub-criteria strength, weaknesses, opportunities and threats were 0.939, 0.945, 0.959, 0.974, respectively. The SWOT criteria comparison questionnaire was 0.785. These results show that all of the questionnaires were reliable or can consistently be used as a good measuring tool. The results of the consistency calculation showed that both of the the criteria and the sub-criteria are consistent because $CR < 0.1$ (Tables 3-7).

Table 3
Pairwise comparison matrix, priority weight and consistency ratio of criteria

| | S | W | O | T | Priority Weight |
|--|-------|-------|-------|-------|-----------------|
| S | 1.000 | 5.623 | 1.323 | 3.557 | 0.459 |
| W | 0.178 | 1.000 | 0.416 | 1.270 | 0.113 |
| O | 0.756 | 2.406 | 1.000 | 3.767 | 0.328 |
| T | 0.281 | 0.788 | 0.265 | 1.000 | 0.100 |
| $\lambda \max = 4,061, CI = 0,020, CR = 0,023$ | | | | | |

Table 4
Pairwise comparison matrix, priority weight and consistency ratio of strength sub-criterion

| | S1 | S2 | S3 | S4 | S5 | S6 | S7 | Local Priority Weight |
|--|-------|-------|-------|-------|-------|-------|-------|-----------------------|
| S1 | 1.000 | 1.082 | 1.178 | 1.764 | 4.207 | 1.622 | 0.912 | 0.188 |
| S2 | 0.924 | 1.000 | 0.499 | 1.689 | 2.928 | 0.601 | 0.673 | 0.128 |
| S3 | 0.849 | 2.005 | 1.000 | 2.922 | 4.491 | 1.513 | 1.443 | 0.223 |
| S4 | 0.567 | 0.592 | 0.342 | 1.000 | 4.870 | 0.866 | 0.944 | 0.120 |
| S5 | 0.238 | 0.342 | 0.223 | 0.205 | 1.000 | 0.318 | 0.337 | 0.043 |
| S6 | 0.617 | 1.665 | 0.661 | 1.154 | 3.150 | 1.000 | 1.074 | 0.147 |
| S7 | 1.096 | 1.486 | 0.693 | 1.059 | 2.967 | 0.931 | 1.000 | 0.152 |
| $\lambda \max = 7,204, CI = 0,034, CR = 0,026$ | | | | | | | | |

Explanation:

- S1: having internal quality standard,
- S2: having lecturers with master and doctoral qualifications,
- S3: lecturer's commitment,
- S4: having accredited study programs,
- S5: has many young lectures,
- S6: involved in national and international scientific activities,
- S7: having Lasallian spirituality;

Table 5
Pairwise comparison matrix, priority weight and consistency ratio of weakness sub-criterion

| | W1 | W2 | W3 | W4 | W5 | W6 | W7 | Local Priority Weight |
|--|-------|-------|-------|-------|-------|-------|-------|-----------------------|
| W1 | 1.000 | 2.434 | 1.344 | 1.131 | 1.400 | 1.949 | 0.995 | 0.194 |
| W2 | 0.411 | 1.000 | 0.713 | 0.607 | 1.174 | 1.075 | 1.374 | 0.123 |
| W3 | 0.744 | 1.403 | 1.000 | 1.099 | 0.746 | 1.430 | 0.967 | 0.142 |
| W4 | 0.884 | 1.649 | 0.910 | 1.000 | 0.916 | 1.052 | 0.634 | 0.136 |
| W5 | 0.714 | 0.852 | 1.340 | 1.091 | 1.000 | 1.037 | 0.669 | 0.131 |
| W6 | 0.513 | 0.930 | 0.699 | 0.950 | 0.964 | 1.000 | 0.774 | 0.112 |
| W7 | 1.005 | 0.728 | 1.034 | 1.578 | 1.496 | 1.292 | 1.000 | 0.161 |
| $\lambda \max = 7,179, CI = 0,030, CR = 0,023$ | | | | | | | | |

Explanation:

W1: limited internal research funding,

W2: lack of research motivation,

W3: too many teaching hours,

W4: too many administrative duties,

W5: inadequate infrastructure and supporting facilities,

W6: few number of lecturers' publications,

W7: lack of mastery of methodology and writing skills

Table 6
Pairwise comparison matrix, priority weight and consistency ratio of opportunity sub-criterion

| | O1 | O2 | O3 | O4 | O5 | O6 | O7 | Local Priority Weight |
|--|-------|-------|-------|-------|-------|-------|-------|-----------------------|
| O1 | 1.000 | 0.933 | 0.797 | 1.167 | 1.831 | 0.720 | 1.026 | 0.143 |
| O2 | 1.072 | 1.000 | 2.920 | 2.497 | 1.663 | 1.991 | 1.185 | 0.231 |
| O3 | 1.254 | 0.342 | 1.000 | 1.196 | 1.911 | 1.321 | 1.149 | 0.148 |
| O4 | 0.857 | 0.400 | 0.836 | 1.000 | 1.000 | 1.365 | 1.347 | 0.126 |
| O5 | 0.546 | 0.601 | 0.523 | 1.000 | 1.000 | 0.978 | 1.000 | 0.107 |
| O6 | 1.389 | 0.502 | 0.757 | 0.733 | 1.023 | 1.000 | 1.108 | 0.123 |
| O7 | 0.975 | 0.844 | 0.870 | 0.743 | 1.000 | 0.902 | 1.000 | 0.124 |
| $\lambda \max = 7,242, CI = 0,040, CR = 0,031$ | | | | | | | | |

Explanation:

O1: cooperation with government and private institutions,

O2: networking with Association of Catholic Higher Institution,

O3: government research grant is increasingly diverse,

O4: cooperation with foreign institutions,

O5: network of faculties and study programs with professional associations,

O6: research grant from international institutions,

O7: Support from Churches and University Foundation

Table 7
Pairwise comparison matrices, priority weights and consistency ratio of threats sub-criterion

| | T1 | T2 | T3 | T4 | T5 | T6 | T7 | Local Priority Weight |
|--|-------|-------|-------|-------|-------|-------|-------|-----------------------|
| T1 | 1.000 | 1.801 | 1.476 | 1.466 | 1.340 | 1.611 | 1.496 | 0.197 |
| T2 | 0.555 | 1.000 | 3.132 | 2.571 | 2.611 | 1.880 | 2.514 | 0.238 |
| T3 | 0.678 | 0.319 | 1.000 | 0.985 | 0.584 | 0.586 | 0.550 | 0.086 |
| T4 | 0.682 | 0.389 | 1.016 | 1.000 | 2.126 | 1.228 | 1.193 | 0.132 |
| T5 | 0.746 | 0.383 | 1.711 | 0.470 | 1.000 | 0.701 | 1.215 | 0.107 |
| T6 | 0.621 | 0.532 | 1.707 | 0.815 | 1.427 | 1.000 | 1.750 | 0.134 |
| T7 | 0.669 | 0.398 | 1.817 | 0.838 | 0.823 | 0.571 | 1.000 | 0.105 |
| $\lambda \max = 7,304, CI = 0,051, CR = 0,038$ | | | | | | | | |

Explanation:

- T1: competition with other universities is getting higher,
- T2: the requirements for submitting a research proposal are too complex,
- T3: lack of public interest in reading research results,
- T4: lecturer creativity is hampered by regulations,
- T5: the high interest of lecturers to work in a state university,
- T6: government scholarship requirements are high and competition increases,
- T7: research grants from international institutions are few

The results of the global weight calculation (Table 8) showed that strength (45.9%) is the most dominant factor. The second is opportunity (32.8%) and the third is weakness (11.3%) and the last is a threat (10%).

Table 8
Global weights of sub-criteria

| Weight of SWOT Factors | | Weight of SWOT_SubFactors | | |
|------------------------|-------|---------------------------|---------|--------------|
| A | | | Local B | Global C=A*B |
| Strengths | 0.459 | S1 | 0.188 | 0.086 |
| | | S2 | 0.128 | 0.059 |
| | | S3 | 0.223 | 0.102 |
| | | S4 | 0.120 | 0.055 |
| | | S5 | 0.043 | 0.020 |
| | | S6 | 0.147 | 0.067 |
| | | S7 | 0.152 | 0.070 |
| Weaknesses | 0.113 | W1 | 0.194 | 0.022 |
| | | W2 | 0.123 | 0.014 |
| | | W3 | 0.142 | 0.016 |
| | | W4 | 0.136 | 0.015 |
| | | W5 | 0.131 | 0.015 |
| | | W6 | 0.112 | 0.013 |
| | | W7 | 0.161 | 0.018 |
| A | | B | | |
| C=A*B | | | | |
| Opportunities | 0.328 | O1 | 0.143 | 0.047 |
| | | O2 | 0.231 | 0.076 |
| | | O3 | 0.148 | 0.048 |
| | | O4 | 0.126 | 0.041 |
| | | O5 | 0.107 | 0.035 |
| | | O6 | 0.123 | 0.040 |
| | | O7 | 0.124 | 0.041 |
| Threats | 0.100 | T1 | 0.197 | 0.020 |
| | | T2 | 0.238 | 0.024 |
| | | T3 | 0.086 | 0.009 |
| | | T4 | 0.132 | 0.013 |
| | | T5 | 0.107 | 0.011 |
| | | T6 | 0.134 | 0.013 |
| | | T7 | 0.105 | 0.010 |
| SUM | 1 | 1 | | |

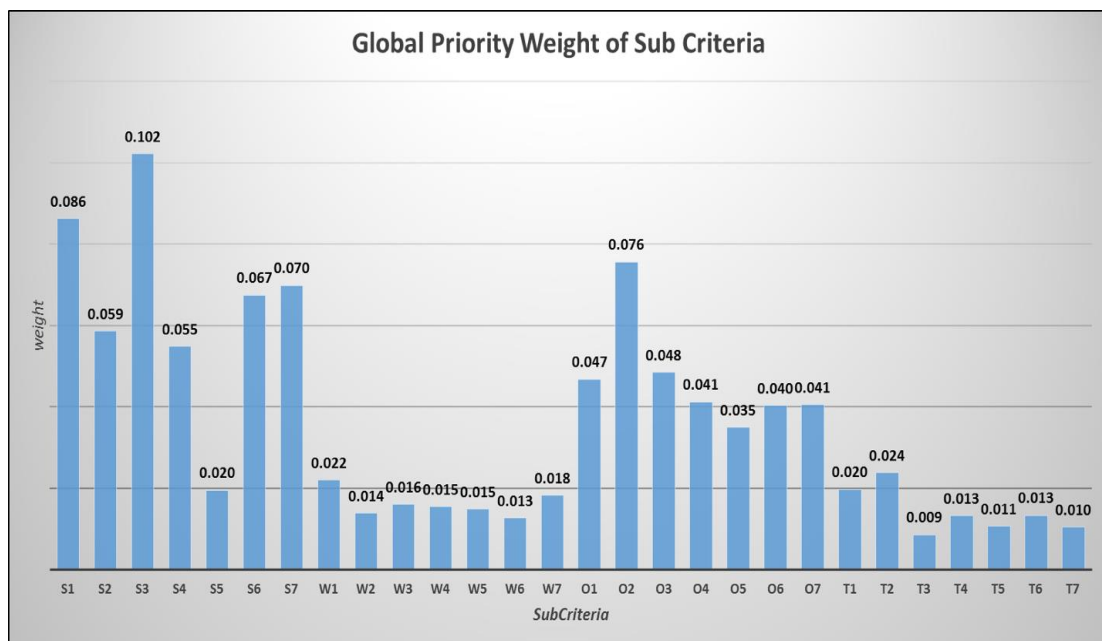


Figure 4 Global weight

The data above showed that commitment (S3) is the dominant factor of lecturers' research productivity (10.2%), followed by S1 (8.6%), O2 (7.6%), S7 (7%), S6 (6.7%). Although they have a small value, the analysis also shows that there are weaknesses at the University, namely W1 (2.2%), W7 (1.8%), W3 (1.6%).

The commitment of lecturers to their universities is in accordance with research conducted by Batugal et al. (2019). Their study showed that the lecturer's commitment was related to their belief in the values, vision and mission of the university. This commitment helps them survive and not desire to leave the university. This commitment also shows their willingness to continue pursuing their careers at their university. Madrigal et al. (2018) also confirmed the role of the lecturer's commitment to continue working at the Catholic university. The lecturer's compatibility with the vision and mission of the university keeps them committed. Also, they may think that it would be very expensive to leave the Catholic university and that there are no other institutions that are more suitable (Madrigal, Iracion, & Temporosa, 2018).

Selvanathan et al. (2019) confirmed the normative commitment factor which explains why lecturers continue to work and be productive for an organization because it is viewed as the right thing to do and as a moral norm. They distinguished between affective commitment, continuance and normative commitment (Selvanathan, Supramaniam, Shern, Suppramaniam, & Muhammad, 2019). Budiyo (2019) also confirmed the role of organizational commitment to lecturer productivity. These results highlight the importance of university management paying attention to human resources to maintain and increase the commitment of the lecturers (Budiyo, 2019).

The results of this study have an impact on management as they determine future programs. In order to maintain or increase the commitment of lecturers, management must focus on their commitment factor. The second goal should be the strengthening of the application of research quality standards. This internal strength will help the institution fortify cooperation with the Association of Catholic higher education and

other La Salle universities which could be the third goal. The fourth goal is to intensify the Lasallian spirituality. The dominant internal strength and opportunities possessed by the University become a strong basis for the development of the institution going forward.

5. Conclusions, limitations and recommendations

Research has received important attention at the Catholic University because through research, scientists have helped the church find the truth, communicate it within various cultural realities and discover new ways of evangelizing in the modern world. Research also plays an important role in determining the rank and performance of the University. Evaluating the research productivity of lecturers is important for the future development of the university and will improve the quality of teaching.

The purpose of this study was to find and determine the dominant factor of lecturer research productivity. Many objective and subjective factors were involved in determining the productivity of lecturers. Lecturer productivity is a sensitive issue in universities and includes multi-complex factors. Identifying internal and external factors is the first step to understanding the productivity of lecturers' research. The use of the Analytic Hierarchy Process method is very suitable for determining dominant factors in multi-complex decision making.

The results showed that lecturer commitment is the dominant factor, followed by research quality standards. Management must allocate internal funds to develop lecturer research productivity. This research reinforced the accuracy of the the AHP method, and succeeded in bridging the gap in determining the dominant factors and providing a framework for studying lecturers' research productivity. This research successfully solved the complex issue of lecturers' research productivity and will serve as a new reference in analyzing its multi-complex attributes. A limitation of this study is that the respondents were limited to a single university, Universitas Katolik De La Salle. The researchers recommend further research involving respondents from other De La Salle Universities in several countries and also expanding the research to public universities.

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