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# ECONOMIC STUDENT SCIENTIFIC PUBLICATION MODEL EXPLORATION FACTOR ANALYSIS (EFA) APPROACH

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## *Abstract*

***Background:*** *Our research reveals factor measures, which are generated to encourage economics students to engage in scientific publication and research processes.*
***Research purposes:*** *Availability of motivational models for scientific publications, as a form of developing economics students in the future.*
***Research methods:*** *Estimation using Exploratory Factor Analysis (EFA) approach, with statistical tools Jeffreys's Amazing Statistics Program (JASP) version 0.16.0.0.*
***Research results:*** *This study shows the accuracy of the model, including the calculated value of McDonald's and Cronbach's > 0.700, for the MSA value of 0.762, and the value of Bartlett's test < .001. For the correlation relationship, it is strengthened by the RMSEA number which is between 0.05-0.08. This study forms a 3 factor model for scientific publications of economics students.*
***Conclusion:*** *This study estimates the factors that can encourage the scientific publication model of economics students. Several factors in this research model are in line with the findings of previous researchers. This study shows that the accuracy of the model includes the McDonald's and Cronbach's > 0.700, for the MSA value of 0.762, and the Bartlett's test value < .001. For the correlation relationship, it is strengthened by the RMSEA number which is between 0.05-0.08. Thus, there are 3 factors in this model, namely the role of lecturers and families, students' basic abilities, and academic achievement goals. We realize that there are several theoretical challenges and measurement models, therefore further research is carried out using statistical test instruments and tools such as AMOS, PLS, and LISREL.*
***Keywords:*** ***Exploratory Factor Analysis (EFA), JASP, Scientific Publications***

## Abstrak

**Latar belakang:** Penelitian kami mengungkapkan pengukuran faktor, yang dihasilkan untuk mendorong mahasiswa ekonomi terlibat dalam proses penelitian dan publikasi imiah.
**Tujuan penelitian:** Tersedianya model motivasi publikasi ilmiah, sebagai bentuk pengembangan mahasiswa ekonomi dimasa yang akan datang.
**Metode penelitian:** Estimasi menggunakan pendekatan Exploratory Factor Analysis (EFA), dengan alat bantu statistik Jeffreys's Amazing Statistics Program (JASP) versi 0.16.0.0.
**Hasil penelitian:** Studi ini menunjukkan nilai keakuratan model antara lain nilai hiung McDonald's ω dan Cronbach's α > 0,700, untuk perolehan nilai MSA sebesar 0.762, dan nilai Bartlett's test < .001. Untuk hubungan korelasi, diperkuat dengan angka RMSEA yang berada diantara 0,05-0,08. Studi ini membentuk 3 faktor model publikasi ilmiah mahasiswa ekonomi.
**Kesimpulan:** Penelitian ini mengestimasi faktor yang mampu mendorong model publikasi ilmiah mahasiswa ekonomi. Beberapa faktor dalam model penelitian ini sejalan dengan temuan peneliti sebelumnya. Studi ini menunjukkan nilai keakuratan model antara lain nilai hiung McDonald's ω dan Cronbach's α > 0,700, untuk perolehan nilai MSA sebesar 0.762, dan nilai Bartlett's test < .001. Untuk hubungan korelasi, diperkuat dengan angka RMSEA yang berada diantara 0,05-0,08. Sehingga, terdapat 3 faktor dalam model ini yaitu peranan dosen dan keluarga, kemampuan dasar mahasiswa, dan tujuan prestasi akademik. Kami menyadari, terdapat beberapa tantangan teoritis

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dan model pengukuran, oleh karena itu penelitian lebih lanjut dalam menggunakan instrumen dan alat uji statistik seperti AMOS, PLS, dan LISREL.
**Kata kunci:** **Exploratory Factor Analysis (EFA), JASP, Publikasi Ilmiah**

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## INTRODUCTION

All universities in Indonesia are competing to strengthen the personal quality of lecturers and students (Meo & Pramitharesthi, 2021). The situation of scientific publications in the Faculty of Economics and Business at Cenderawasih University is quite good for the lecturer category, in contrast to the case with students (Amalia & von Korflesch, 2021). In fact, students have a great opportunity, to contribute to improving the quality of scientific publications for higher education institutions (Stinson, 2021). This condition underlies our collective obligation, to map what challenges are currently happening to students (Scardamalia & Bereiter, 2021), so that they have not optimally participated in scientific publications. It is realized that this research is the first, carried out independently and in collaboration between lecturers and students in three majors (accounting, management, and economics) (Junevicius et al., 2021). It should be realized that this challenge does not only occur in the faculty of economics (Coyne et al., 2021) and business at the Cenderawasih University, findings (Sonny and Zulidyana, 2021), that the lack of participation in scientific publications, is driven by a lack of adjustment (Odame et al., 2021), when welcoming changes to regulations on scientific publications. facing the challenges of scientific publications for students, limited research support facilities (Stinson, 2021), students lack confidence to be involved in scientific publications (Asimidou et al., 2021).

Scientific research is the power of the academic world, as a strategy to find the truth for the prosperity of society (Micewski, 2021). Meanwhile, scientific publications are a form of disseminating academic wealth. Students are an opportunity for higher education to be able to maximize the dissemination of scientific truth. For this reason, it is necessary to improve the quality of knowledge, students of the Faculty of Economics and Business at Cenderawasih University in the future. This is a knowledge investment for students, a form of the current higher education learning scheme. In addition, it is also able to improve the quality of higher education institutions, where according to the performance indicators, students are expected to have the opportunity to carry out learning outside the classroom. Good practices that have been carried out by several universities, in order to strengthen knowledge of research and scientific publications, (Darmalaksana, 2021) through training in writing scientific articles, are able to encourage student motivation and enthusiasm, it is hoped that this learning will encourage research based on scientific publications. The Writing Sprints learning scheme through Outcome Based Education, succeeded in having student outcomes that have published scientific research results. Referring to the actual conditions regarding barriers to student scientific publications, and also considering changes in the current learning scheme. So the formulation of the problem in the research is how to measure the motivational factor model for student scientific publications, while the general goal of this research is the existence of a publication motivation model, which can be improved for students in the future.

Considering the description above, this research has several conceptual frameworks that underlie the research on the motivational model of student scientific publications. Motivation Theory, motivation is interpreted as the strength of a person/individual, to perform a certain behavior. Extrinsic motivation can arise in a person due to stimulation

from outside himself. A person needs an interaction (basic motivations) to be able to achieve the ideals needs (need). Achievement motivation can make a person positive, this is indicated by an open attitude to criticism/advice, mentoring, coaching from others. Self-confidence theory, is an internal ability of the individual, the main thing is to see the position of others and not compare with himself, this is called a positive ability that is embedded in him. Believe in yourself, be independent, and dare to make decisions. Self-actualization, self-understanding is born from an attitude of confidence. Lack of self-confidence will have an impact on the weak development of self-potential. Interest theory, there is a person's tendency to focus attention or interest in the focus of a particular field. A certain situation of a person, and consciously an object is seen as having a role for him. Theory of Knowledge, through the process of habituation of the analysis of scientific articles, is able to improve the ability of students' scientific thinking processes, scientific articles are science that has been proven true through the scientific method. The view of positivism, requires humans to try to find symptoms or a series of relationships between these symptoms, so that they can be used in predicting what will happen in the future. Exploratory method of data and information in this research called the Exploratory Factor Analysis (EFA) approach (Larasati & Handayeni, 2021). While Confirmatory Factor Analysis (CFA) for the process of testing variables and indicators that have been determined based on the theoretical framework of the researcher (Purwanto & Sudargini, 2021).

## RESEARCH METHODS

This research has a locus at the Faculty of Economics and Business, Cenderawasih University, Jayapura. Referring to the purpose of this research, this analytical approach applies quantitative concepts, the research focus is building theories from scientific fact information obtained (Eva Dwi Jayanti, 2021). The research data source is primary, where this study applies a questionnaire or questionnaire as a data collection vessel (Putri & Putra, 2021). The method of collecting data here is through the process of distributing questionnaires, through google forms to students of three majors (accounting, management, and economics) as many as 144 respondents. In this study there are 24 factors, as factor loadings which indicate a relationship between factor items and dimensions. The data analysis method applied is Exploratory Factor Analysis (CFA), the process of estimating each indicator in each dimension using the statistical tool Jeffreys's Amazing Statistics Program (JASP) version 0.16.0.0.

## RESULT AND DISCUSSION

To test the reliability of a scientific publication model, one indicator that has the ability to show this is Cronbach's . It is known that the higher the Cronbach's arithmetic value, the higher the accuracy of a research instrument. In table 1 below, the results of Cronbach's test are 0.820, which is higher than the standard 0.700. This study also assesses the accuracy of the instrument through the value of McDonald's , it is realized that Cronbach's has measurement accuracy, at the level of a unidimensional scale. The results of the measurement of the McDonald's total item research score of 0.834. With a measuring value greater than 0.700, it can be indicated that this research instrument is proportionately able to explain the measuring construct.

Table 1. Frequentist Scale Reliability Statistics.

| *Estimate* | *McDonald's ω* | *Cronbach's α* |
|---|---|---|
| *Point estimate* | 0.834 | 0.820 |

| *Estimate* | *McDonald's ω* | *Cronbach's α* |
|---|---|---|
| *90% CI lower bound* | 0.801 | 0.784 |
| *90% CI upper bound* | 0.867 | 0.851 |

Source: Processed data, JASP application output, 2021.

The results of the McDonald's and Cronbach's tests in table 2 below, provide information on the measurement accuracy of each research indicator. It is clear that 24 indicators have a calculated value of McDonald's and Cronbach's above 0.700. There are only 2 indicators that are relatively small, but are still at the tolerance level, namely: Interest Indicator 3 and Scientific Research 2. Based on the facts above, the instrument of scientific publication model for economics students can be continued to be analyzed using the CFA approach.

Tabel 2. Frequentist Scale Reliability Statistics.

| *Item* | *If item dropped* | | *Item-rest correlation* |
|---|---|---|---|
| | *McDonald's ω* | *Cronbach's α* | |
| Motivation 1 | 0.840 | 0.825 | 0.073 |
| Motivation 2 | 0.838 | 0.822 | 0.123 |
| Motivation 3 | 0.841 | 0.827 | 0.111 |
| Motivation 4 | 0.834 | 0.821 | 0.118 |
| Motivation 5 | 0.834 | 0.820 | 0.159 |
| Confident 1 | 0.821 | 0.805 | 0.516 |
| Confident 2 | 0.829 | 0.814 | 0.343 |
| Confident 3 | 0.822 | 0.806 | 0.492 |
| Confident 4 | 0.837 | 0.821 | 0.179 |
| Confident 5 | 0.830 | 0.814 | 0.332 |
| Interest 1 | 0.827 | 0.811 | 0.404 |
| Interest 2 | 0.817 | 0.802 | 0.597 |
| Interest 3 | 0.814 | 0.799 | 0.619 |
| Interest 4 | 0.820 | 0.806 | 0.508 |
| Scientific Research 1 | 0.816 | 0.801 | 0.596 |
| Scientific Research 2 | 0.811 | 0.798 | 0.645 |
| Scientific Research 3 | 0.828 | 0.812 | 0.382 |
| Scientific Research 4 | 0.818 | 0.803 | 0.560 |
| Economic Issue 1 | 0.830 | 0.814 | 0.335 |
| Economic Issue 2 | 0.833 | 0.819 | 0.209 |
| Economic Issues 3 | 0.828 | 0.812 | 0.391 |
| Economic Issue 4 | 0.831 | 0.815 | 0.309 |
| 5 Economic Issues | 0.836 | 0.821 | 0.183 |

Source: Processed data, JASP application output, 2021.

Table 3. Kaiser-Meyer-Olkin test.

| | *MSA* |
|---|---|
| ***Overall MSA*** | **0.762** |

Source: Processed data, JASP application output, 2021.

Table 3 above, provides information about the ability of each research indicator, relevant for use in Exploratory Factor Analysis (CFA) analysis. Rizq T.B Razendrya

(2021) in his research, said that the standard MSA value was 0.50. The results of the Measure of Sampling Adequacy (MSA) test are 0.762, so that the total indicator items have met the MSA standard and are feasible for factor calculations.

Tabel 4. *Bartlett's test.*

| $X^2$ | *df* | *p* |
|---|---|---|
| 819.849 | 253.000 | < .001 |

Source: Processed data, JASP application output, 2021.

Bartlett's Test in principle provides an overview of the multi-variable interdependence of research, which is reflected through factor indicators. In table 4 above, it shows the arithmetic value of the Bartlett's test assumption test, the ideal indicator is to have a correlation relationship. The calculated probability value is shown at < .001, this indicates that the assumption of factor testing can be continued.

Table 5. Additional fit indices.

| *RMSEA* | *RMSEA 90%* |
|---|---|
| 0.065 | 0.057 |

Source: Processed data, JASP application output, 2021.

Table 5 shows the Root Mean Square Error of Approximation (RMSEA). With a total of 24 indicators and a research sample of 144 respondents, the smaller the RMSEA, the better. In this study, the RMSEA value was 0.065 and the 90% probability RMSEA value was 0.057. The results of these two calculated values are between the goodness-of-fit values of 0.05 and 0.08. So it is relevant to be used in Exploratory Factor Analysis (CFA) analysis.

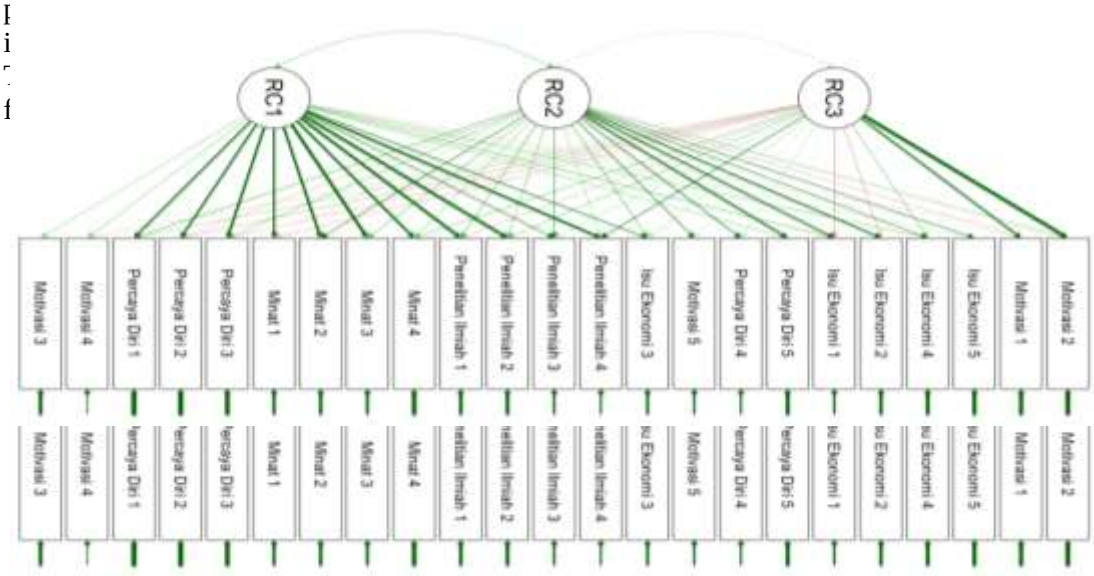
Table 6. *Factor Loadings.*

| | *Factor 1* | *Factor 2* | *Factor 3* | *Uniqueness* |
|---|---|---|---|---|
| Interest 3 | 0.685 | | | 0.496 |
| Scientific Research 2 | 0.665 | | | 0.494 |
| Scientific Research 1 | 0.649 | | | 0.521 |
| Scientific Research 4 | 0.595 | | 0.318 | 0.533 |
| Interest 2 | 0.592 | 0.303 | | 0.556 |
| Confident 3 | 0.576 | | | 0.622 |
| Interest 4 | 0.572 | | | 0.616 |
| Confident 2 | 0.520 | | | 0.705 |
| Confident 1 | 0.499 | | | 0.669 |
| Interest 1 | 0.498 | | | 0.736 |
| Economic Issues 3 | 0.347 | | | 0.816 |
| Scientific Research 3 | 0.322 | | | 0.807 |
| Confident 5 | | 0.502 | | 0.724 |
| Economic Issue 1 | | 0.463 | | 0.709 |
| Economic Issue 2 | | 0.453 | | 0.779 |
| Confident 4 | | 0.340 | | 0.879 |
| Motivation 5 | | 0.316 | | 0.897 |
| 5 Economic Issues | | 0.304 | | 0.903 |
| Economic Issue 4 | | 0.304 | | 0.843 |

| | | |
|---|---|---|
| Motivation 2 | 0.773 | 0.369 |
| Motivation 1 | 0.488 | 0.751 |
| Motivation 3 | | 0.979 |
| Motivation 4 | | 0.972 |

Note: Applied rotation method is varimax. Source: Processed data, JASP application output, 2021.

Table 6 above provides information based on the estimation results, each indicator through the Exploratory Factor Analysis (CFA) approach. The results of this study




Picture 1. Path Diagram
Source: Processed data, JASP application output, 2021.

Factor 1, to understand the value of factor loadings can be seen in table 6. For information in Figure 1 the path diagram of this research model, the thicker the indicator line, the stronger the relationship between the factors and the forming indicators. Through the formulation of the path diagram relationship, factor 1 is labeled the role of the lecturer and family. The role of lecturers has a very strong impact, for economic students to be involved in research and also able to publish in national and international journals. In addition, the role of the family is very important to shape the character of economics students, who are able to compete in the scope of research and scientific publications (Kekry, 2021).

Factor 2, according to Figure 1 above, relates to the path diagram of the economics student scientific publication model. There are 7 indicators that provide the magnitude of the relationship, which has been marked by the value of factor loadings. Factor 2 is labeled with the basic ability of students, students have academic abilities regarding research and publications, but this ability is not maximized given the actualization space. This factor is very important, in conducting research and scientific publications related to economic issues. So students need to be equipped with comprehensive knowledge.

Theoretical and factual issues regarding the economy at the local, national, and international levels, need to be given continuously both during the classroom learning process or outside the learning process (Kekry & Fahmi, 2021).

Factor 3, based on Figure 1 of the path diagram above, factor 3 has 2 indicators, namely regarding awards for academic achievement and satisfaction for students. Factor 3 is labeled the goal of academic achievement, this condition will have an impact on academic achievement, not limited to the value of the learning process. However, it is more about the goals that students aspire to, building students' perceptions of student participation in writing scientific articles and publications. It is part of the self-development process for students, lecturers, and higher education organizations (Tursynay et al., 2021).

## CONCLUSION

This study estimates the factors that can encourage the scientific publication model of economics students. Several factors in this research model are in line with the findings of previous researchers. This study shows that the accuracy of the model includes the McDonald's and Cronbach's > 0.700, for the MSA value of 0.762, and the Bartlett's test value < .001. For the correlation relationship, it is strengthened by the RMSEA number which is between 0.05-0.08. Thus, there are 3 factors in this model, namely the role of lecturers and families, students' basic abilities, and academic achievement goals. We realize that there are several theoretical challenges and measurement models, therefore further research is carried out using statistical test instruments and tools such as AMOS and LISREL.

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