Analysis Of The Relevance Of Meeting Activities To The Number Of Scientific Publications Using Invitation Management System Data

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Abstract. The invitation management system is one of the applications of the Smart Information System. One invitation management system developed by the Faculty of Engineering Gadjah Mada University (FT UGM) is the SIMADANG application. SIMADANG manages data from all meeting activities (meetings and FGDs) at FT UGM, which can be processed to determine the relevance of the meeting activities to performance achievements, one of which is the number of scientific publications. The invitation management system data is processed using panel data regression and produces several findings. From data processing it was found that the frequency and number of meeting participants had a significant effect on the effectiveness of the meeting indicated by the number of scientific publications.

Keywords: smart information system, invitation management system, panel data regression.

1 Introduction

An Information systems are systems within an organization that combine people, technology, media, facilities, procedures and controls to obtain important lines of communication, process routine transactions, provide information to management, and serve as the basis for information in decision making [1]. Information systems can also be interpreted as organized systems that function to process information for specific purposes and can be conveyed and received by recipients so that these goals can be achieved. [2]. The author defines an information system as an application of technology in managing data, where the data can be utilized and processed to serve as a basis for decision making.

One of the application of information systems carried out by the Faculty of Engineering, Gadjah Mada University (FT UGM) is SIMADANG. SIMADANG is an acronym for “Sistem Manajemen Undangan”, invitation management system. SIMADANG has been developed by FT UGM since 2019. SIMADANG manages invitations for activities to be carried out within FT UGM. With SIMADANG, meeting activities (meetings and FGDs) can be properly managed and recorded systemically. SIMADANG has also been synchronized with the meeting consumption ordering system, making it easier for managers to prepare financial reports related to meeting consumption.

SIMADANG can be used to see whether the meeting activities held at FT UGM have a significant impact on organizational performance. SIMADANG as an information system, is able to provide data that can be processed into relevant, accurate, and strategic information for decision making. [3]. Decision making in this case is to see the effectiveness of the meeting activities that have been carried out.
This study aims to analyze the relevance of meeting and FGD activities to the number of publications at FT UGM using invitation management system data. Publication is very important for a university and becomes one of the performance targets [4]. By analyzing SIMADANG data, it is hoped that it will be able to generate new insights about the relevance of meetings to the number of scientific publications. With this research, it is hoped that it will be able to provide new insights about effective meetings and be able to provide an overview of an invitation management system that is able to provide data that can be used for decision making.

2 Method

2.1 Research Data

SIMADANG provides data on meeting and FGD activities which include the title of the meeting/FGD activities held, the department that held the meeting, the number of guests invited, the names of the invited guests, the duration of the meeting and the theme of the meeting. This study uses data on the number or frequency of meetings for each department, number of invitations and duration of meetings as independent variables. Furthermore, as the dependent variable is the number of scientific publications issued by each department. The scientific publications used in this research are scientific publications indexed by Scopus. The research variables are presented in Table 1.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Symbol</th>
<th>Definition</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency of meetings and FGDs (X1)</td>
<td>FR</td>
<td>The total number of meeting and FGD activities in each department at FT UGM within one year</td>
<td>$FR = (\sum\text{meetings} + \sum\text{FGDs})$</td>
</tr>
<tr>
<td>Number of meeting and FGD participants (X2)</td>
<td>RJU</td>
<td>Average number of invitees or number of meeting and FGD participants in each department at FT UGM within one year</td>
<td>$\left(\frac{\sum\text{number of meetings invitations} + \sum\text{number of FGDs invitations}}{FR}\right)$</td>
</tr>
<tr>
<td>Duration of meetings and FGDs (X3)</td>
<td>RDR</td>
<td>The average duration of holding meetings and FGDs in each department at FT UGM within one year</td>
<td>$\left(\frac{\sum\text{meetings duration} + \sum\text{FGD duration}}{FR}\right)$</td>
</tr>
</tbody>
</table>
The research data used is meeting data (meetings and FGDs) as well as data on the number of scientific publications from 8 departments at the Faculty of Engineering, Gadjah Mada University, from 2019 to 2022. The eight departments are DTAP, DTETI, DTGD, DTGL, DTK, DTMI, DTNTF, and DTSL.

### 2.2 Data Analysis

#### 2.2.1 Regression Equation

The equation of panel data regression:

\[
JPI_{it} = \alpha + \beta_1 FR_{it} + \beta_2 RJU_{it} + \beta_n RDR_{it} + \epsilon_{it} \quad (1)
\]

Where:
- \( \alpha \): constant
- \( \beta \): regression coefficient
- \( i \): entity \( i \)
- \( t \): period \( t \)
- \( \epsilon_{it} \): error component

#### 2.2.2 Selection of Regression Models

There are three methods that can be used to estimate panel data, namely the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM) [5]. The Chow Test, Hausman Test and Lagrange Multiplier (LM) Test are used to determine the most appropriate estimator or method for processing panel data [8].

The Chow test is used to compare CEM and FEM, as a panel data estimator method [9]. The next two test are the Hausman test and LM test, the first test is used to compare the best model for estimating panel data, between FEM and REM, and the second one is used to compare CEM and REM [9,10].

#### 2.2.3 Classic Assumption Test

To ensure that the regression equation has estimation accuracy, is not biased and is consistent, it is necessary to test the classical assumption. [11]. There are five types of...
classical assumption tests in linear regression with the Ordinary Least Squared (OLS) approach, namely Linearity, Autocorrelation, Heteroscedasticity, Multicollinearity and Normality tests. However, in panel data regression not all classical assumption tests are used, only two types of classical assumption tests are needed, namely multicollinearity and heteroscedasticity [12]. Even in the Random Effect Model (REM) model, the classic assumption test is not necessary because it is irrelevant [13].

If in the classical assumption test there is a violation, then to overcome this problem there are several methods that can be used, two of which are the robust method and the General Least Square (GLS) [14]. In this study, the authors used a robust method to overcome the classical assumption test problem [15].

2.2.4 Hypothesis Test

The hypothesis test serves to test the significance of the regression coefficient obtained. There are two types of testing, namely the F test and the t test [16]. The F test (Simultaneous Significance Test) is used to test the simultaneous effect of all the independent variables on the dependent variable. The F test compares the probability value (F_{statistics}) with F_{table}, with the provision that if F_{statistics} > F_{table} then Ho is rejected and Ha is accepted, meaning that the independent variables simultaneously have a significant effect on the dependent variable [16]. Determination of the value of F_{table} is done with the Excel program using the F.INV.RT formula (probability; deg_freedom1; deg_freedom2) [17]. Where Probability = 0.05; deg_freedom1 = number of variables – 1; and deg_freedom2 = number of samples – number of variables.

The second hypothesis test is the t test. The t test is used to test the regression coefficient partially. Tests were carried out on the population regression coefficient. If the value of the regression coefficient is equal to zero, it means that the independent variable has no significant effect on the dependent variable. And conversely, if the regression coefficient value is not equal to zero, then the independent variable has a significant effect on the dependent variable [16]. The t test is carried out by comparing statistical values with t_{table}. The t_{table} value is obtained using the Excel TINV formula (probability; deg_freedom) [18]. Probability = 0.05; deg_freedom = number of samples – 2.

In addition to using the F test and t test, to inform that the estimated regression model is good or not, the Goodness of Fit is also used which is denoted by R-squares (R^2). Goodness of Fit, also known as the coefficient of determination, is used to measure the model's ability to explain the variation in the coefficient of the dependent variable. The coefficient of determination is between 0 and 1. A small R^2 value indicates that the ability of the independent variable to explain the variation in the dependent variable is very limited and vice versa.

3 Results and Analysis

3.1 Research Data

This study used meeting and FGD data from 8 departments at the Faculty of Engineering, Gadjah Mada University, namely DTAP, DTETI, DTGD, DTGL, DTK, DTM, DTNF, and DTS. Meeting and FGD data, consisting of frequency, number of participants and meeting
duration as independent variables, and the number of scientific publications as the dependent variable. Then the data is processed using the Stata/MP 17.0 application for Windows (64-bit x86-64) and Microsoft Excel 2019.

3.2 Regression Model Selection

In selecting the regression model, there are standard rules used. These rules are presented in Table 3 below.

<table>
<thead>
<tr>
<th>Test</th>
<th>Result</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chow Test</td>
<td>Prob. &gt; 0.05</td>
<td>CEM (PLS/OLS)</td>
</tr>
<tr>
<td></td>
<td>Prob. &lt; 0.05</td>
<td>FEM</td>
</tr>
<tr>
<td>Hausman Test</td>
<td>Prob. &gt; 0.05</td>
<td>REM</td>
</tr>
<tr>
<td></td>
<td>Prob. &lt; 0.05</td>
<td>FEM</td>
</tr>
<tr>
<td>Lagrange Multiplier Test</td>
<td>Prob. &gt; 0.05</td>
<td>CEM (PLS/OLS)</td>
</tr>
<tr>
<td></td>
<td>Prob. &lt; 0.05</td>
<td>REM</td>
</tr>
</tbody>
</table>

The first test is the Chow test, to select the ideal model between CEM and FEM. Chow test results shown in Fig. 1 below indicates that the Prob value is 0.0199. This value is smaller than 0.05, according to the rules in Table 2, it is decided that FEM is more suitable for processing datasets compared to CEM.

![Fig. 1. Chow Test Result](image1)

Because the temporarily selected model is FEM, the second test uses the Hausman Test, to select the ideal model, between REM and FEM. Hausman test results are shown in Fig. 2 in the following. From Fig. 2 it can be seen that the value of Prob. is equal to 0.0021, this value is smaller than 0.05, according to the rules in Table 2, it was decided that FEM is more ideal to use compared to REM. On the basis of these two tests, the Chow Test and the Hausman Test, it is concluded that the ideal model for processing the dataset is the Fixed Effect Model (FEM).

![Fig. 2. Hausman Test Result](image2)

3.3 Classic Assumption Test
3.3.1 Multicollinearity Test

The first classic assumption test is the Multicollinearity Test. Multicollinearity test results in Fig. 3 shows that the relationship between the FR variable and the RJU variable is worth 0.2868, then the correlation value between the FR variable and the RDR is 0.3874 (the minus sign is ignored). Meanwhile, the correlation value between RJU and RDR is 0.1898. All correlation values between independent variables are all worth less than 0.85, so it can be concluded that there are no symptoms of multicollinearity between all independent variables [20].

3.3.2 Heteroscedasticity Test

The second classic assumption test is the heteroscedasticity test. The results of the heteroscedasticity test presented in Fig. 4 shows a Prob value of 0.0182, or less than 0.05, this indicates that there are symptoms of heteroscedasticity between the regression variables. To overcome these problems, a robust method is used on the selected model regression.

3.4 FEM Regression Using Robust Methods

Because there are symptoms of heteroscedasticity, in the FEM regression, as the selected model, a robust method is added so that the syntax used is xtreg JPI FR RJU RDR, fe ro. The addition of the ro syntax indicates that the regression model uses an additional robust method. The regression results are shown in Fig. 5. In Fig. 5 it can be seen that the calculated F and t calculated values are the basis for testing the hypothesis. The interpretation of the results of hypothesis testing is explained in step number 5.
3.5 Hypothesis Testing

After the model is determined and meets the BLUE rules (free from symptoms of multicollinearity, heteroscedasticity) then the selected model can be interpreted using 2 statistical tools, namely the F test and t test. From Fig. 5 it can be seen that the calculated F value is 13.77, this value is greater than the F table which is 2.95 and the sig. (Prob.) ie 0.0025 <0.05 then H0 is rejected and Ha is accepted, meaning that the FR RJU and RDR variables simultaneously affect JPI.

Furthermore, still using Fig. 5, from the t test it can be seen that on the FR variable, the value of t count is 2.05 > t table 2.04 and is negative, so that it can be interpreted that the frequency of meetings has a negative effect on the number of scientific publications. In the RJU variable, the t count is 3.92 > t table 2.04 and is positive, so it can be interpreted that the average number of meeting participants has a positive effect on the number of scientific publications. In the RDR variable, the value of t count is 0.90 <t table 2.04, so it can be interpreted that the duration of the meeting does not affect the effectiveness of the meeting as indicated by the number of scientific publications.

Fig. 6. Value of \( r^2 \) Calculation Results
The adjusted R square value in Fig. 6. is 0.40018025 or 40.02%. The coefficient of determination shows that the independent variables consisting of FR, RJU and RDR are able to explain the JPI variable by 40.02%, while the remaining 59.98% is explained by other variables not included in this research model.

4 Conclusion

In general, this study aims to utilize the invitation management system to determine the relevance of meeting activities (meetings and FGDs) to performance outcomes in the form of the number of scientific publications at the Faculty of Engineering, Gadjah Mada University. This shows that the invitation management system is able to provide data which, if properly processed, will generate new insights that are relevant and accurate, which can be used to make decisions [3]. Decision making in this case is to review the effectiveness of meetings held in an organization.

Furthermore, this study found that, statistically, it can be seen that meetings (meetings and FGDs) have an influence on the number of scientific publications. The frequency of meetings has a negative effect on the number of scientific publications, the fewer or the more effective the meetings, the greater the number of publications. Furthermore, the number of meeting participants has a positive effect on the number of scientific publications, the greater the number of participants, the more effective the meeting is indicated by the greater number of scientific publications. This study also found that the duration of the meeting did not affect the effectiveness of the meeting as indicated by the number of scientific publications.

From this research several conclusions can be drawn, namely:

- The invitation management system is able to provide data that can be used to see the relevance of meeting activities (meetings and FGDs) to performance achievements, in this study indicated by the number of publications.
- The large number of meetings (meetings and FGDs) does not always have the positive impact, effective meetings required by the organization.
- The number of meeting participants has a positive impact on an effective meeting, this is in contrast to what was found in previous studies [21].

This research certainly has limitations, including the data used only comes from invitation management system data from the Faculty of Engineering, Gadjah Mada University, this certainly limits the generalizability of these findings. Further research can be carried out at other faculties or from other universities.

References


