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# Road Maintenance Based on Community Participation in Minahasa Regency, North Sulawesi Province

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***Abstract:*** *The research took population at societal members Sample taking in the research by non random especially the purposive samples. In the research 230 respondents from 14 villages/wards.. Data analysis to know the influences of internal factor, external factor and local government policy toward the societal participation in the road maintenance in this analysis by using structural equation modeling (SEM).The result showed The road maintenance has participation choice at both, although there is tendency for higher selection at the societal participation at the road maintenance than road cooperative, good model is external factor, because give the highest contribution at the participation and the model than should be done such as the government with try to lower the road damage, decrease the difficulty in reaching the activity location and plan the effective road network that connected with other area.government policy, government with try to intensive to initiate community service initiated by government.For more significant road cooperative model implemented due to external factors, among others, the existence of damaged roads and difficult to place activities.*
***Keywords:*** *societal participation, cooperative road model, road maintenance.*

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## I. Introduction

Road maintenance is absolutely necessary to maintain road conditions (Prabowo and Mulyono, 2016). Road damage and limited road maintenance funding have led to a decrease in the level of road services. Limited funding for road maintenance is a classic problem faced, where in almost all regions of Indonesia there is a lack of budget for road maintenance (Gultom, et al 2015). Based on data from the Minahasa Statistics Agency (2013), it can be seen that road conditions in Minahasa Regency are 26% damaged.

The level of service conditions of a road service section greatly influences user comfort and safety. Unevenness*(irregular)* of road surface and road condition index are parameters that are often used to determine the level of road service conditions (Suherman, 2008). In recent years, a new tendency has emerged to carry out self-management / self-management of roads carried out in a self-managed manner by institutions that have a background and human resources in engineering such as the Department of Public Works and LLAJ. Although the state has a large role and responsibility, community participation is needed to guarantee the success of development (Kartasasmita, 1996). Community participation can basically be in the form of thinking, skills / expertise, energy, property or money.

Maintenance of rural roads using the method of road cooperatives, namely maintenance of rural road organizations, either by establishing a legal entity or without a legal entity, where the road is managed by the local community itself is an alternative budget solution in road maintenance (Isotalo, 1992). North Sulawesi is one of the provinces in Indonesia consisting of various ethnicities, religions and races, so that customs, traditions and culture are different but have high social capital, namely mutual cooperation. Communities as government partners in carrying out development, maintenance, require involvement in every project run by the government. Research (Muskin, et al 2011), shows how the factors that determine the success or failure, the size of the change depends on the involvement of the community as partners.

## II. Method of Research design

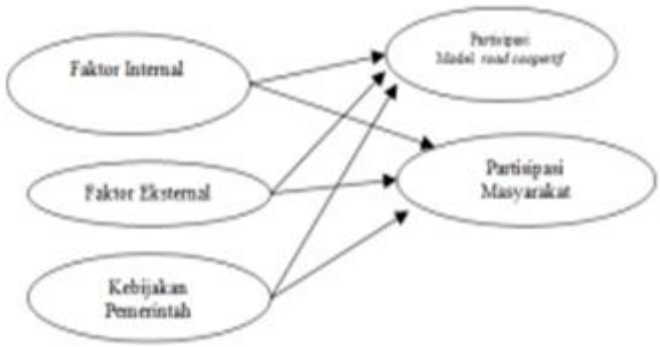
The design of this study took a quantitative approach as a goal to test the theory of hypotheses based on the results of the questionnaire distribution instrument. The questionnaire instrument consisted of a number of structured questions and was distributed to respondents. The type of closed-ended question structure in which the respondent must choose from the answers already available on the questionnaire list. SEM (Structural Equation Modelling)requires data that is normally distributed or can be considered normally distributed. The sample size should not be too small, for SEM models with the number of latent variables (constructs) of up to five and each construct is explained by three or more indicators, the number of samples> 100 data is considered sufficient. Samples below 100 will not produce good results if using SEM (Sarwono, 2010).

**Method of Data analysis**

To find out the factors that influence community participation data analysis in this study uses Structural Equation Modeling (SEM) analysis with the help of AMOS Version 23. The model developed is a recursive path analysis model that aims to test the regression equation involving several exogenous variables (community participation in the road maintenance process, Community participation in the cooperative road model in the road maintenance process) and endogenous (internal factors, external factors, local government policies).

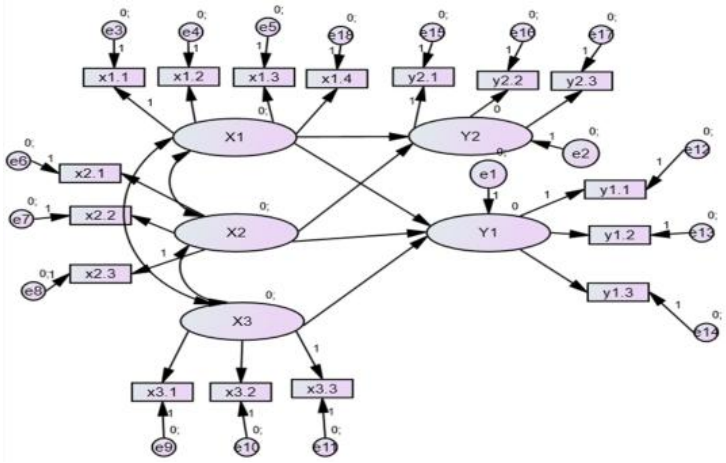
Internal Factor Indicators (X1), namely Education (X1.1), Income (X1.2), Family Composition (X1.3), Length of Stay (X1.4). External Factor Indicators (X2), namely Road Damage (X2.1), Difficulty to Place of Activity (X2.2), Road Disconnection (X2.3). Local Government Policy Indicators (X3), namely Giving Extension (X3.1), Submitting Assistance (X3.2), Making Bhakti Work (X3.3), Indicators of Community Participation Self-Help Method (Y1), namely Fund Collection (Y1.1) , Employment Services (Y1.2), Reporting to the Government (Y1.3) and Participatory Road Model (Y2) Participatory Indicators namely Business Ownership (Y2.1), Property Ownership (Y2.2), Ownership of Heavy Vehicles (Y2 .3)

**Figure 1 Path Diagram Model of SEM Analysis**




The diagram used in SEM can be seen in Figure 2 (Solimun, 2014)

**Figure 2 SEM Analysis Diagram (Diagram Analisis SEM)**




## III. Results and Discussion

**Model of SEM Analysis Measurement**

The measurement model is measured from the value of the standardize coefficient on each indicator to the latent variable. This value shows the weight of each indicator as a measure of each variable. The indicator with the largest value is the strongest (dominant) indicator.

**Table 1. Testing Results of Measurement Models**

| Indikator | Minahasa | |
|---|---|---|
| | S | P-Value |
| X1.1 Pendidikan | 0,507 | 0.000 |
| X1.2 Pendapatan | 0,557 | **0.000** |
| X1.3 Keluarga | 0,635 | 0.000 |

| | | |
|---|---|---|
| X1.4 Lama tinggal | 0,530 | **0.000** |
| X2.1 Kerusakan jalan | 0,557 | 0.000 |
| X2.2 Sulit ke Tpt Keg | 0,588 | 0.000 |
| X2.3 Keterputusan jalan | 0,561 | **0.000** |
| X3.1 Penyuluhan | 0,563 | 0.000 |
| X3.2 Bantuan | 0,824 | 0.000 |
| X3.3 Kerja bakti pem | 0,780 | 0.000 |
| Y1.1 Pengumpulan dana | 0,594 | 0.000 |
| Y1.2 Kerja bakti masy | 0,694 | 0.000 |
| Y1.3 Lapor ke Pemerin | 0,628 | **0.000** |
| Y2.1 Usaha | 0,546 | **0.000** |
| Y2.2 Properti | 0,604 | 0.000 |
| Y2.3 Kendaraan berat | 0,603 | **0.000** |

Based on table 1, it can be seen that with α (real level) of 5% (0.05), all indicators have a standardize coefficient or loading factor with the indicator declared to be fixed and have a p-value <0.05, so it can be concluded that all significant indicators measure the Model variables .

**Testing Model**

**Table 2. Fit Model Results**

| Kriteria | *Cut-of value* | Hasil Model | Keterangan |
|---|---|---|---|
| Chi Square (CMIN) | | 113.503 | |
| DF | | 95 | |
| Chi Square/DF | ≤ 2.00 | 1.195 | Model Baik |
| GFI | ≥ 0.90 | 0.946 | Model Baik |
| AGFI | ≥ 0.90 | 0.923 | Model Baik |
| CFI | ≥ 0.95 | 0.975 | Model Baik |
| RMSEA | ≤ 0.08 | 0.029 | Model Baik |
| TLI | ≥ 0.95 | 0.968 | Model Baik |
| Probabilitas (P) | ≥ 0.05 | 0.095 | Model Baik |

The results of the Goodness of Fit Overall test based on table 2 show that all of the model's eligibility criteria are met, meaning that the structural equation modeling (SEM) model in the study is feasible and can be used further for hypothesis testing

**Table 3.Data *Outliner* Examination**

| Obs.number | Mahalanobis $d^2$ | p1 | p2 |
|---|---|---|---|
| 138 | 34,764 | 0,004 | 0,627 |
| 149 | 34,637 | 0,004 | 0,273 |
| 136 | 34,474 | 0,005 | 0,095 |
| 43 | 31,282 | 0,012 | 0,319 |
| 10 | 30,790 | 0,014 | 0,235 |
| 140 | 30,342 | 0,016 | 0,176 |
| 58 | 30,337 | 0,016 | 0,085 |
| 42 | 30,168 | 0,017 | 0,046 |
| 95 | 30,144 | 0,017 | 0,020 |
| 197 | 28,746 | 0,026 | 0,075 |
| 108 | 28,078 | 0,031 | 0,104 |
| 194 | 27,366 | 0,038 | 0,160 |
| 224 | 27,321 | 0,038 | 0,103 |
| 114 | 26,959 | 0,042 | 0,106 |

The results of checking outlier data based on table 3 above shows that there are no data with values of both p1 and p2 values below 0.05 so that the data used are not outliers and can be used for analysis

**Table 4. Normal Mulvariate Distribution**

| Variable | min | max | skew | c.r. | kurtosis | c.r. |
|---|---|---|---|---|---|---|
| Y2.3 | 1,000 | 5,000 | -,489 | -3,030 | -,952 | -2,946 |
| Y2.2 | 1,000 | 5,000 | -,625 | -3,871 | -,378 | -1,171 |
| Y2.1 | 1,000 | 5,000 | -,803 | -4,972 | ,376 | 1,163 |
| Y1.3 | 1,000 | 5,000 | -,380 | -2,352 | -,782 | -2,420 |
| Y1.2 | 1,000 | 5,000 | -,721 | -4,464 | -,004 | -,011 |
| Y1.1 | 1,000 | 5,000 | -,627 | -3,880 | -,185 | -,572 |
| X3.1 | 1,000 | 5,000 | -,307 | -1,899 | -,713 | -2,207 |
| X3.2 | 2,000 | 5,000 | -,353 | -2,186 | -,468 | -1,449 |
| X3.3 | 2,000 | 5,000 | -,305 | -1,888 | -,469 | -1,452 |
| X2.1 | 1,000 | 5,000 | -,252 | -1,558 | -,942 | -2,915 |
| X2.2 | 1,000 | 5,000 | -,437 | -2,708 | -,267 | -,827 |
| X2.3 | 1,000 | 5,000 | -,390 | -2,413 | -,440 | -1,362 |
| X1.4 | 1,000 | 5,000 | -,427 | -2,643 | -,489 | -1,515 |
| X1.3 | 1,000 | 5,000 | -,420 | -2,599 | -,831 | -2,573 |
| X1.2 | 1,000 | 5,000 | -,472 | -2,924 | -,659 | -2,039 |
| X1.1 | 1,000 | 5,000 | -,471 | -2,915 | -,666 | -2,062 |
| Multivariate | | | | | 7,721 | 2,440 |

From the analysis results, the multivariate c.r value of 2,440 is in the range of -2.58 and 2.58 so that it can be concluded that the normal multivariate distribution is fulfilled. In this structural model, six hypotheses of relationship between latent variables are tested

**Relationship Between Variables**

In this structural model, six hypotheses of relationship between latent variables are tested. As in table 5 below.

**Table 5. Relationships Between Variables**

| Hubungan Antar Variabel | Koefisien | CR | *p-value* | Keterangan |
|---|---|---|---|---|
| Faktor Internal (X1) → Partisipasi Masyarakat (Y1) | 0,059 | 0,578 | 0,563 | Tidak Signifikan |
| Faktor Eksternal (X2) → Partisipasi Masyarakat(Y1) | 0,553 | 3,142 | 0,002 | Signifikan |
| Kebijakan Pemerintah (X3)→ Partisipasi Masyarakat (Y1) | 0,266 | 2,061 | 0,039 | Signifikan |
| Faktor Internal (X1)→ Model *Road Cooperative* (Y2) | 0,269 | 2,229 | 0,026 | Signifikan |
| Faktor Eksternal (X2)→ Model *Road Cooperative* (Y2) | 0,432 | 2,452 | 0,014 | Signifikan |
| Kebijakan Pemerintah (X3)→ Model *Road Cooperative* (Y2) | 0,159 | 1,163 | 0,245 | Tidak Signifikan |

Explanation of the test results on each coefficient in the structural model is presented as follows:

The first test, the direct influence of internal factors (X1) on community participation (Y1) obtained a coefficient value of 0.059 and a critical ratio of 0.578 with p-value = 0.563. Because p-value > 0.05 indicates that there is no significant effect between internal factors (X1) on community participation (Y1). This influence is positive but not significant. This shows that in Minahasa District the higher the internal factor (X1), it will not always result in higher community participation in road maintenance (Y1).

The second test, the direct influence of external factors (X2) on Community Participation (Y1) obtained a coefficient value of 0.553 and a critical ratio of 3.142 with p-value = 0.002. Because the

p-value < 0.05 indicates that there is a significant influence between External Factors (X2) on Community Participation (Y1). This effect is positive (coefficient marked positive = 0.553). This shows that the higher the External Factor (Y1), the higher the Community Participation in road maintenance (Y1) will be higher.

The third test, the direct effect of Local Government Policy (X3) on Community Participation (Y1) obtained a coefficient value of 0.266 and a critical ratio of 2.061 with a p-value = 0.039. Because the p-value < 0.05 indicates that there is a significant influence between Local Government Policy (X3) on Community Participation in Road Maintenance. This effect is positive (coefficient marked positive = 0.266). This shows that the higher the Local Government Policy (X3), will increase Community Participation in road maintenance (Y1).

The fourth test, the direct influence of Internal Factors (X1) on the Participation of the Road Cooperative Model (Y2) obtained a coefficient value of 0.269 and a critical ratio of 2.222 with p-value = 0.026. Because the p-value < 0.05 indicates that there is a significant influence between internal factors on the participation of the Road Cooperative Model. This effect is positive (coefficient marked positive = 0.269). This shows that the higher internal factors will lead to the higher participation of the Cooperative Road Model.

The fifth test, the direct influence of external factors (X2) on the Participation of the Road Cooperative Model (Y2) obtained a coefficient value of 0.432 and a critical ratio of 2.452 with p-value = 0.014. Because the p-value < 0.05 indicates that there is a significant influence between external factors (X2) on the Participation of the Road Cooperative Model (Y2). This effect is positive (coefficient marked positive = 0.432). This shows that the higher the external factor (X2), the higher the Participation of the Road Cooperative Model (Y2) will be

The sixth test, the direct effect of Setemoat Government Policy (X3) on the Participation of the Road Cooperative Model (Y2) obtained a coefficient value of 0.159 and a critical ratio of 1.163 with p-value = 0.245. Because p-value > 0.05 indicates that there is no significant effect between Local Government Policy (X3) on the Participation of the Road Cooperative Model (Y2). This effect is positive (coefficient marked positive = 0.432). This shows that the better the Local Government Policy (X3), will not always directly lead to higher Road Cooperative Model Participation (Y2).

## IV. Conclusion

Based on the results of the analysis and discussion, it can be concluded several things:
Berdasarkan hasil analisis dan pembahasan, dapat disimpulkan beberapa hal :

1. The results of the analysis based on research data illustrate that the form of community participation in the self-help model is greater than the participation in the road cooperative model in which the results of the research are found to be a factor loading.
2. Community participation model, namely external factors by contributing highest to participation in road maintenance, the model undertaken among others is the government seeking a low level of road damage, reducing the level of difficulty in reaching the place of activity, and planning an effective road network connected to other regions. Government Policy Factors are more intensive to initiate community service programs initiated by the government. The road cooperative model is more significantly implemented due to external factors such as the existence of damaged roads and difficulty in getting to the place of activity.

**Recommendation**

In the framework of implementing district road maintenance management programs / strategies, it is recommended:

1. Stakeholders should always involve the community to participate in determining program policies / strategies for road maintenance management, by conducting community service activities, proposing funds, and reporting road damage.
2. The existence of damage to the road needs to be used as an incentive for community participation in road maintenance, taking into account the existence of such damage is the incentive for the community to participate.
3. People who have lived for a long time will feel a sense of ownership of the surrounding area and roads, so it needs to be encouraged to participate more in road maintenance.
4. Road Cooperative Model Participation needs to be implemented in a simple and applicable form for road maintenance, such as business ownership,property ownership and ownership of heavy equipment domiciled in the area have a social responsibility to repair and build facilities and infrastructure in the area where they live for the advancement of the area.

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