

## MULTIDIMENSIONAL SCALING (MDS): SUSTAINABILITY ASSESSMENT MODEL OF COMMUNITY ECONOMIC EMPOWERMENT

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**Abstract:** The purpose of this research is to determine a sustainability assessment model of community economic empowerment program using Multidimensional Scaling (MDS). Multidimensional scaling is a multivariate statistical analysis used as a variable to determine the position of the object based on the similarity/dissimilarity. The research method used is descriptive research. Data collection techniques used are observation questionnaires, depth interview; and documentation. The population of this research are 573 beneficiaries of zakat and 236 samples (Slovin formula). Respondents are members of the BAZNAS (Badan Amil Zakat Nasional) business group in West Java Province. The results show that all Zakat Community Development's (ZCD) have sufficient sustainability values from an economic perspective. The Squared Correlation (RSQ) value is 91.85 percent, and therefore, it suggests that the results of the Multidimensional Scaling analysis on the Zakat Community Development from an economic perspective can be explained as very good. The factor of income level becomes a decisive factor that is the most influential in the increase of economic sustainability.

**Key words:** Community, Economic Empowerment, Multidimensional Scaling.

DOI: 10.17512/pjms.2021.24.2.08

*Article history:*

*Received* October 11, 2021; *Revised* November 23, 2021; *Accepted* December 04, 2021

### Introduction

The economic potential in West Java province is very high. However, West Java has economic and social problems, namely unemployment and poverty that must be resolved. Therefore, the government of West Java, along with its stakeholders, including West Java BAZNAS solve the problems in West Java and reach its SDG's. West Java BAZNAS is the government's partner in achieving the SDG's goal. The basic idea of this research is that BAZNAS West Java has a community development zakat program that has been initiated for three years and has already been at the stage of starting and developing a business. Its effectiveness will decrease if the program's performance is not carried out. There are many devices to measure the performance

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of zakat programs, one of which is multidimensional scaling (MDS) analysis. The reason for using MDS analysis is because it assesses the performance of zakat programs with many dimensions to make them more comprehensive. Government support is significant to support zakat institutions through regulatory and policy support so that the goals of zakat institutions can be achieved. The government will enforce well-structured policies and regulations to supervise private and public institutions (Hussain et al.,2021).

West Java BAZNAS, as a government-based charity institution with its intermediary role of zakat, has designed a variety of utilization programs for solving the problems occurring in West Java and reaching SDG's through empowerment program that focuses on community economic development. BAZNAS and other charity organizations are considered effective as the performance indicator based on their beneficiaries in their distribution role. It is different from the role of zakat utilization where community empowerment is still considered low because the level of performance achievement is between 20% and 30%. West Java BAZNAS also has a program of individual and groups or community based retail approaches. West Java BAZNAS has conducted ZCD program since 2016. The ZCD program is a zakat institution's program related to community-based zakat empowerment with the aim of increasing the capacity of the community to be more economically and socially empowered (Fadilah, Maemunah and Hernawati, 2019). Each target area has placed a volunteer program to supervise, initiate, develop, monitor and evaluate the program based on the area advantages. West Java BAZNAS, through a community empowerment program, is committed to the development potential and area advantages. ZCD is a program aimed to empower the community based on the area advantages.

Monitoring is necessary to prevent any ineffective development activities of ZCD. One of the monitoring tools is multidimensional intercept (MDS). MDS is a multivariate statistical tools that can be used as a variable to determine the position of an object based on similarity/inequality (Kholil and Dewi, 2014). To determine the level of sustainability of the ZCD program, research is needed to avoid losses after the termination of zakat funds. Evaluation of the sustainability of *Community Development* is conducted to become a recommendation of decision making for further program improvement. The research formulation is how to construct a model of society economic empowerment based on area advantages using multidimensional scaling.

### **Literature Review**

An agency relationship is a contract between one or more persons (the principal) who employ others (agent) to provide a service and later delegate decision-making authority to the agent. Due to the asymmetry of information between the principal and the agent, it is essential to have a third party supervising the agent so that the agent can carry out their duties and assign responsibilities properly to the principal. This is in accordance with what was suggested (Bourlès and Cozarenco, 2018). Agency theory implies the existence of asymmetric information between principal

and agent. This theory is used to explain the duties and authority of the staff/amil of zakat institutions in order to maximize their zakat program so that the economic and social value of zakat can be achieved. Moreover, the role of zakat in nation development is to set out in BAZNAS Strategic Plan 2016-2020 mentioned as follows: the role of community economic awakening. In the context of the zakat utilization program, according to Machmud, Yulianto and Sunarti(2017), zakat funds can be distributed in the form of mustahik empowerment so that it has a broad impact on economic welfare, health and education. Zakat institutions have carried out community development in many regions in Indonesia. The most important social factor that shaped the quality of the business environment was the influence of the media and how the public was informed about the business environment (Belas et al., 2019).

The main objective of the ZCD program is the realization of a prosperous and independent society. The objectives and indicators of the ZCD program, in particular, can be explained as follows: (1) Growing social and economic networks with indicators: involvement of parties in program implementation; addition of people who own businesses; reducing the number of unemployed and (2) Creating sustainable empowerment programs in realizing welfare and community independence. In principle, one of the focuses of ZCD is economic empowerment with its classification of small to medium-sized enterprises medium enterprises (SMEs). Riach (2002) and Dwiyanto and Jemadi (2013) suggested that sustainability is one of the principles of development that is difficult to achieve. One of the ways to achieve this is through assistance in the field. The assistance aims to encourage an increase in beneficiary income individually and in groups.

#### ***Zakat Program and Multidimensional Scaling (MDS)***

Multidimensional scaling is a multivariate statistical analysis used as a variable to determine the position of the object based on the similarity/dissimilarity (Kholil and Dewi, 2014). The use of the MDS scale is generally used in respondent assessments of the level of similarity of stimuli or choices that describe stimuli to be measured through indicators/attributes. The purpose of using a scale is to display the similarities between objects/object preferences in groups that represent a collection of objects.

Furthermore, in the context of the economic aspect, zakat program is always identified with poverty. In Indonesia, the issues related to the concept of implementing zakat both as a religious obligation and zakat as a component of public finance are prevalent (Feroz, Goel and Raab, 2008). This happened after the government issued Law number 23, the Year 2011 on the Management of Zakat. Zakat institutions are obliged to manage zakat funds from muzaki to be empowered according to their designation (Pailis, Burhan and Ashar, 2016; Fadilah et al., 2019). In designing the utilization programs, a lot of which is taken as a basis for the performance of the program will be associated with the utilization of the economic value of zakat, that is, the level of effectiveness of use and a charity that fits philanthropic religious funds (Fadilah et al., 2019).

The MDS approach is considered relatively stable compared to other multivariate methods (Widiatmaka et al., 2015). To determine the economic impact of the program, the later measurement is usually performed after one year of the empowerment process as evaluation material (Munizu, 2010). The assessment of economic activities by previous researchers was carried out using the Sustainability Index (Kholil and Dewi, 2014; Hakim and Bahri, 2017; Nandini et al., 2017). Even the use of total Software Expert Choice has been used to assess the level of performance of sustainable business SMEs. The index can be used to judge dimensions, where the index is given a value of 0-9 (Expert Choice) or 0-100 (Rapfish). A value close to zero is considered the worst, and the higher the value, the better. Furthermore, the principle of assessing the impact of zakat on sustainability can be carried out using these indexes. The accumulation of each indicator in the dimension is combined to describe the level of sustainability. The results of the research analysis in the form of status are used as a policy consideration for the exit strategy process. It is expected that the use of a sustainability assessment model of community economic empowerment with Multidimensional Scaling is expected to achieve the goal of the economic value of zakat so that it can achieve the mission of utilizing zakat funds, namely achieving the Key Performance Indicator.

#### ***Multidimensional Assessment and Indicators***

Multidimensional scaling (MDS) is a multivariate statistical analysis (correlation and regression) that can be used as a variable to determine the position of the object based on the similarity or dissimilarity (Kholil and Dewi, 2014). The use of a multidimensional scale is generally used in the respondents' assessment of the similarity of stimuli or the choice to describe stimuli as measured by indicators/attributes. The purpose of using a scale in multidimensional is to display the similarities between objects or preferences of objects in groups that represent a collection of objects. Assessment is measured as a variable metrically (interval or scale ratio) or non-metrically (scale). The multidimensional scale is characterized by the respondent's assessment of (1) one of the levels of stimulation similarity, or (2) the existence of choice for the stimulus measured on the indicator/attribute that describes the stimulus (Nunes et al., 2012). The initial purpose of zakat utilization (maqoshid syariah zakat) is the distribution, which aims to increase the welfare of mustahik that is relevant to the goals of Sustainable Development Goals (SDGs). Even the SDGs only cover 4 dimensions, namely: social, economy, environmental and legal management and governance (Sardjunani,2017). Therefore, to build it, it is necessary to have a human resource assistant who will assist and supervise the program. According to Bilan et al. (2020), organizational capabilities significantly enhance the firm's sustainability. However, in this study, what is meant is MSMEs that are fostered by the zakat program.

On the other hand, in order to assess the development of beneficiaries in terms of sustainability. Sustainability can be measured by the triple bottom line of sustainability through three dimensions: economy, social and environmental (Hakim and Bahri, 2017). The same opinion, that three main sustainability dimensions were addressed during the assessment: economic, social and environmental (Asmantaite et al., 2021). The opinion of Paul(2008) suggested that the sustainable development

triangle has elements and main links (corners, sides and centers). The purpose of poverty alleviation can be boiled down to a discussion of economic growth, social empowerment and socially resilience/biodiversity (Paul, 2008). In this article, only the economic dimension is described as an indicator that will be processed by multidimensional scaling. According to Sudiarta, Kirya and Cipta (2014) and Rokhayati (2015), the acceleration of economic growth is viewed from various factors that affect the performance of small to medium-sized enterprises. Measures based on local research, according to the opinion of Rokhayati (2015), can be used as indicators in measuring microbusinesses in this research.

#### ***Research Framework***

Poverty is one of the big problems that must be solved. The Covid-19 pandemic has obviously worsened the poverty in Indonesia. Pandemic has caused many businesses to become bankrupt, stop the business, reduce their business scale, lay off their employees, increase unemployment, MSME businesses are out of business, and many other problems (Haviernikova et al., 2019). A higher and worsened poverty has impacted the national economy (Bernardelli et al., 2021). The zakat institution is an institution that carries out the role of zakat intermediation, namely collecting and distributing zakat funds. The collected funds must be immediately distributed in accordance with maqashid sharia. Distribution of zakat funds is done through the zakat distribution and utilization program. The economic empowerment program is carried out with various approaches, including the community approach, regional advantages, developed products, regional and many other approaches. Then for organization/zakat institutions, perceived spatial organization and architectonic details are two features in the physical work environment that play a significant role in the emergence of organizational creativity (Lin & Chang, 2020).

In general, community economic empowerment programs develop Micro, Small and Medium Enterprises of the poor. This is in accordance with the results of the study (Hussain et al., 2020) that the MFIs had been operating on a relatively optimal scale. In addition, the level of financial efficiency in MFIs was found to be significantly higher than social efficiency. The Micro, Small and Medium Enterprise fields include production, trade, services, agriculture, animal husbandry and other business (Cepel et al., 2020). Great effort is needed in developing community economic empowerment programs. On the other hand, the same as the research results (Tabeikyna et al., 2021) that the intensive post-industrial development of society and the economy as a knowledge society requires the creation of the necessary institutional prerequisites or the activation of resources for the modernization of the scientific, technical, innovative system and the development of intellectual potential. It is in accordance with the opinion (Kramoliš et al., 2020) that the companies truly realize this fact, and the research outcome is a statement that the majority of companies are confident that design will play a more important part in the future. This is following the research results that connect the relationship between Industrial Development and Innovative Efficiency of Russian Regions (Doroshenko et al., 2021).

The development of community economic empowerment includes several stages (Fadilah et al., 2019). Building community groups, providing various general knowledge and training, Grouping based on business interests, are given capital for training/trial business, providing capital initiation for business, providing business assistance to MSME actors, monitoring and evaluation, and assessing the performance of community economic empowerment. Then, the stock of human capital, the promotion of innovation and the degree of technological innovation act as catalysts for the productive efficiency of the regions (Rico & Cabrer-Borrás, 2019). Many means are used to assess the performance of community economic empowerment from zakat funds. Financial statements can be used as a means to assess the financial performance of community economic empowerment by looking at financial trends and financial ratios. On the other hand, several tools assess community economic empowerment, including the Multidimensional scaling (MDS) model. Multidimensional Scaling (MDS) is a multivariate statistical analysis that can be used as a variable to determine the position of objects based on similarity or inequality (Kholil and Dewi, 2014). The purpose of multidimensional scaling is to display similarities between objects or preferences of objects in groups representing a collection of objects. This analysis also included variables identified in the financial literature as relevant for company performance because of their potential role in the aforementioned relationship (Lassala et al., 2021). Also, innovation and media activity are the most significant variables for anti-crisis sustainability (Derevyanko, 2019). For this study, the initiation of zakat funds, used effectively, will impact the sustainability of the MSME business.

The dimensions assessed in the MDS are social, economic and environmental aspects. Through these three aspects assessed in the MDS, we will measure sustainability. MDS is considered effective in measuring the performance of community economic empowerment.

### **Research Method**

The research method used is descriptive research. Besides, the qualitative method is used to produce grounded theory, the theory made based on the data, not from hypotheses as in quantitative methods. The operational variable of this research explains that the variable of economic sustainability is based on the opinion of 5 indicators as follows: (1) The rate of sales growth/sales turnover increases; (2) an increasing level of capital/financial growth; (3) a high level of manpower growth; (4) The growth rate of profit/profit continues to increase; (5) Broad market growth rates.

The data collection techniques used for this research are the Observation Questionnaire, depth interview; and documentation. The population of this research is the beneficiaries of zakat as many as 573 people. Respondents are members of the BAZNAS business group in West Java. The determination of the research sample used the Slovin formula. The number of samples obtained using the Slovin formula was 236 respondents. Questionnaires were distributed to 236 respondents. The data was processed based on 236 questionnaires. The total sample of 236 respondents was

divided according to the contribution percentage of each target area in the target group. The research data was taken using a questionnaire distributed to 236 respondents (number of samples). Data collection was carried out from January until March 2020. It is followed by validity test and reliability test. The (r) value is the reliability coefficient of the calculated results. In which the minimum requirements to be called reliable is if the value of (r count > r table.). The value of r is calculated with an error rate of 5%. The reliability test uses product-moment correlation formula from Pearson. The method of data analysis on the assessment of the sustainability status of a community development charity with multidisciplinary rapid appraisal with RAPFISH method uses Multidimensional Scaling (MDS) analysis. MDS is a rapid assessment technique that allows for multi-disciplinary assessments.

### **Results and Discussion**

To test the validity and reliability, data were taken from a questionnaire consisting of 10 questionnaires that represented the research indicators. The research results can be explained as follows:

1. All questions are valid; the calculation of the previous validity level also shows that there are no numbers under table r or all questions are declared valid.
2. The reliability test in the economic sector will determine if Cronbach alpha > 0.60 is high reliability. From the calculation of the reliability level in the economic sector, this study shows that all dimensions are declared reliable because they are above (0.60). Therefore, it can be concluded that the questions in the questionnaire in this study show reliability as an instrument.

The results of the analysis of the value of zakat community development from an economic perspective are shown in Table 1.

**Table 1. Analysis Results of Economic Zakat Community Development STRESS and RSQ**

STRESS =	0.236842439	Iteration	Stress	Delta
Squared Correlation (RSQ) =	0.918541133	1	0.291484	9E+20
Number of iterations =	2	2	0.290536	0.000948
Memory needed (words) =	4334			
Return value (error if > 0)	0			
Rotation angle (degrees) =	107.4823151			

STRESS is a measure of a lack of fit measurement between the data and the MDS measurement. The smaller STRESS value indicates that the monotonic relationship formed between inequality and disparities is getting better and the criteria for the configuration map formed are more perfect. The STRESS value on the Economic ZCD is below 25 percent, which is around 23.6 percent. Therefore, the error rate is still below the fair value. R square (RSQ) is the square of the correlation coefficient,

which shows the proportion of variance from the optimization of data scaling contributed by the multidimensional scaling procedure that is a measure of fit/accuracy (goodness of fit measure). This shows how large a multidimensional scaling procedure is in explaining the variance of the data that will be carried out by multidimensional scaling. In the RSQ value, the value is 91.85 percent. It is suggested that the results of the MDS analysis on the ZCD from an economic perspective can be well explained. Based on the results of the analysis obtained, the sustainability value from an economic perspective is an overview of the sustainability level of community development based on an economic perspective, see Table 2.

**Table 2. Value of Economic Zakat Community Development (ZCD) Sustainability**

Districts/City	2 D MDS Results		Flipped & Scaled		Interpretation
District Bandung Barat	0.01	-0.03	<b>54.58</b>	0.63	Sufficient Sustainable
District Bekasi	-0.09	0.20	61.80	1.56	Sufficient Sustainable
District Garut	-0.15	0.41	68.03	1.34	Sufficient Sustainable
District Bogor	-0.15	0.29	64.66	2.52	Sufficient Sustainable
District Subang	-0.12	0.28	64.07	1.65	Sufficient Sustainable
District/City Bogor	-0.08	0.11	59.28	2.06	Sufficient Sustainable

Based on the above analysis results, all ZCD have sufficient sustainability values from an economic perspective. This can happen due to the economic value of ZCD (MDS and Flipped and scaled) being in a fairly sustainable range. To clarify this description, RAPFISH Ordination is illustrated in Figure 1.



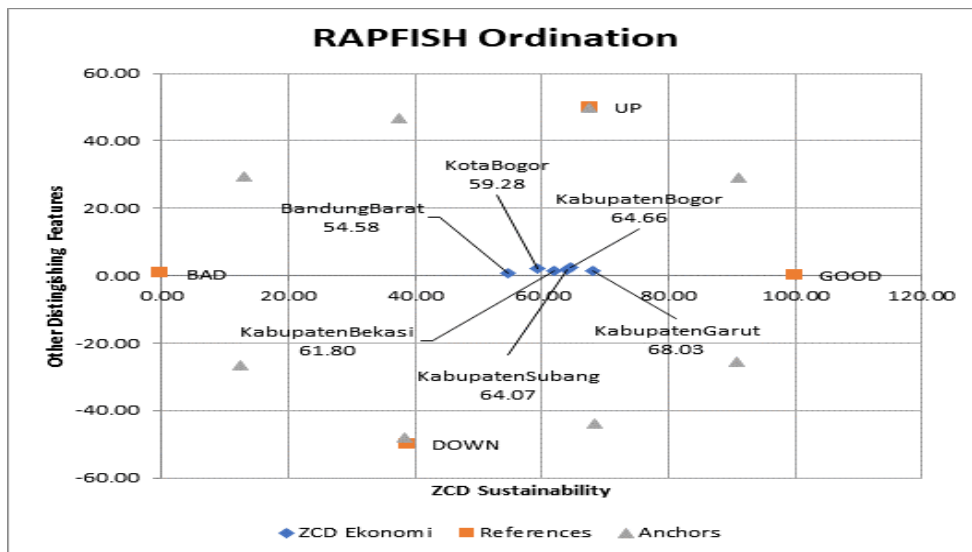


Figure 1: ZCD of Economic Sustainability

Based on Figure 1, the RAPFISH coordinates for the six ZCD locations are quite close. These conditions indicate that the six ZCD locations have sufficient sustainability.

**Leveraging Factor of Economic ZCD**

Based on the results of the analysis, the following results are obtained, as shown in Figure 2.

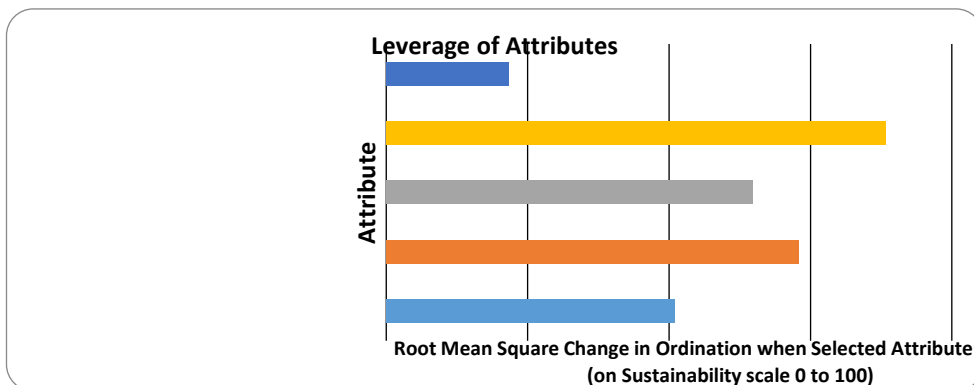


Figure 2: ZCD of Economic Sustainability

Based on the image, the income level factor becomes the decisive and most influential factor in the sustainability of economic increase. It is shown in the graph, of the six attributes that are used as the basis for the assessment, the income level attribute has the highest value. However, other attributes also have a fairly good leverage value.

### *Montecarlo Analysis*

The Montecarlo analysis is a repetition of the algorithm. The repetition is intended to assess whether the MDS output is sustainable. If it is described as a lever, this leverage determines the length of the lever. The longer the leverage, the easier it will be to increase the index value. Meanwhile, Montecarlo illustrates the strength level of the lever. The difference between Montecarlo and MDS reflects the status of sustainability. The difference value  $< 1$  indicates that the value of the status of the sustainability index in the confidence interval according to the RSQ value shows that there is not much difference. The small sustainability index between the two methods indicates that: (1) the error in scoring each attribute is relatively small; (2) the variety of scoring for each attribute is relatively small; (3) the analysis process carried out repeatedly is stable; and (4) data entry errors of missing data can be avoided. The Montecarlo analysis based on an economic perspective is illustrated in Table 3.

**Table 3. Value of Stability of Sustainability of Zakat Community Development Economic**

<b>I</b>	<b>District Bandung Barat</b>	<b>District Bekasi</b>	<b>District Garut</b>	<b>District Bogor</b>	<b>District Subang</b>	<b>City of Bogor</b>
1	55.07	60.61	72.61	65.64	66.94	57.05
2	52.79	60.45	64.75	61.56	60.28	61.59
3	56.54	61.59	65.26	63.10	61.83	57.17
4	53.22	60.91	66.17	65.78	61.81	60.37
5	55.16	60.51	63.91	62.35	66.63	57.79
6	56.35	63.11	70.00	65.95	61.07	59.71
7	54.14	63.58	65.18	66.51	65.99	57.85
8	54.06	61.11	66.37	65.40	61.86	59.41
9	54.17	61.76	63.82	62.96	62.34	57.43
10	54.91	60.92	71.44	65.06	62.52	61.91
11	54.52	61.55	63.32	64.88	62.18	60.39
12	54.16	63.00	62.59	63.22	62.63	60.31
13	53.55	62.18	72.75	66.14	62.18	59.90
14	52.12	61.05	65.70	68.03	62.84	58.48
15	55.07	61.74	68.23	64.60	64.91	60.06
16	55.44	58.38	68.49	68.06	67.51	61.80
17	55.15	60.87	64.89	69.03	68.48	58.46
18	55.66	61.81	71.28	69.20	62.37	60.84
19	53.06	61.31	67.76	63.22	61.94	58.21
20	53.99	62.19	71.49	69.64	62.34	58.04
21	55.75	62.70	72.16	67.03	67.08	57.94
22	54.06	63.47	65.57	64.75	65.92	58.58
23	54.53	61.43	75.06	64.21	63.78	57.67
24	53.30	62.24	65.39	68.72	64.76	55.62
25	54.41	59.54	66.84	64.71	66.31	59.66
<b>Average</b>	<b>54.45</b>	<b>61.52</b>	<b>67.64</b>	<b>65.59</b>	<b>63.86</b>	<b>59.05</b>
<b>MDS</b>	<b>54.58</b>	<b>61.80</b>	<b>68.03</b>	<b>64.66</b>	<b>64.07</b>	<b>59.28</b>

I	District Bandung Barat	District Bekasi	District Garut	District Bogor	District Subang	City of Bogor
Delta MC	0.13	0.28	0.39	0.94	0.21	0.23

Table 3 shows that based on the average value, the value of multidimensional scaling and delta MC of the six ZCD locations are in a fairly sustainable range. Furthermore, the Montecarlo analysis from an economic perspective will be presented in a RAPFISH graph, as shown in Figure 3.

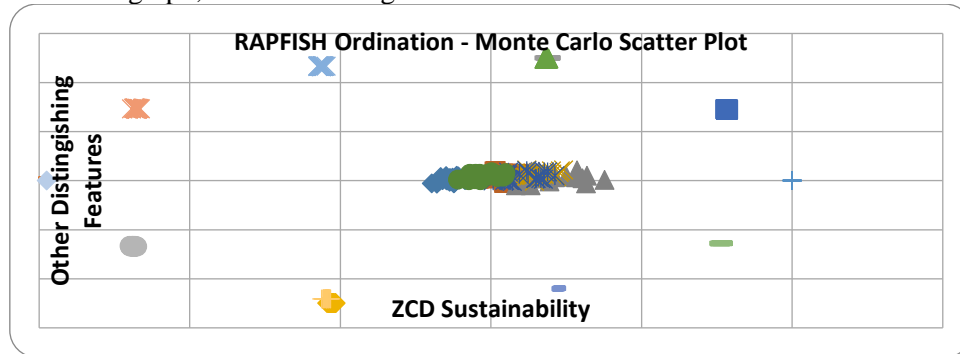


Figure 3: Analysis Montecarlo ZCD Economic

In Montecarlo analysis, it turns out that the RAPFISH ordinate values for the six ZCD locations nearly coincide. This shows that the sustainability of all ZCD sites is considered quite sustainable. The STRESS value is the degree of ability to explain the results of the Multidimensional Scaling analysis. The STRESS value on the economic ZCD is below 25 percent, which is around 23.70 percent, meaning that the error rate is still below the fair value. In the RSQ value, the value is 91.85 percent, which means that the results of the MDS analysis on the ZCD from an economic perspective can be well explained. With almost the same results between the multidimensional analysis and the Montecarlo analysis, it suggested that the results of the sustainability level of all ZCD sites are nearly the same; sustainable. According to the results of the analysis of the value of sustainability, all the ZCD studied are in a fairly sustainable category range based on economic perceptions, meaning that sustainability of District Bandung Barat, District Bekasi, District Garut, District Bogor, District Subang and Bogor city is potential in terms of community empowerment based on zakat funds. This can be seen from the value, which is generally above 25%. Furthermore, District Bandung Barat has the lowest sustainability value with a value of 55.84 and District Garut sustainability value in economic perception with 68.03. The key factor in the value of economic sustainability is the level of income of each region. The other areas' ZCD are in the moderate range at a fairly continuous interval. Community development will be more developed in the future when the calculation results of leveraging factors are

equal. In this case, from an economic perspective, the policy of the market level can trigger an increase in the development of the zakat community. This market level of zakat is in line with the spiritual level of the community regarding the obligation to give zakat not only zakat al-Fitr but also another compulsory zakat, such as income zakat, maal zakat, professional zakat and agricultural zakat.

The key factors defined as the pillars of the sustainability of the ZCD economic perception are market level, income level, the number of workers increases, increased capital, and sales level. Of the 5 pillars of the sustainability of economic perceptions, the key factor in the value of economic sustainability is the provision of the largest income level with a value of 1.77, while the other supports are below this value and vary. This is certainly not said to be ideal and optimal because the conditions are ideal and optimal if the leveraging factor value is uniformly close to or equal to one (having the same value) for all the supporting factors of sustainability, including circular program (Skvarciany et al., 2021). In the policy on economic perceptions, in this case, the market level will trigger a larger market share and impact the increasing level of sales (Sugiyanto, Karima and F.Yogananti, 2017; Fatoki, 2018). The sales level is the main door in a business to reach the maximum level of income. Many policies have been taken to increase the level of sales, such as implementing a *marketing mix* that optimizes resources related to *product, price, place* and *promotion*. Furthermore, since the level of income is a major contributing factor in the economic perspective, the market rate should be the second policy, which has a direct impact on income levels. To achieve the maximum level of income, it must be supported by effective internal policies related to human resources (Riach, 2002; Tjarve and Zemīte, 2016). Human resource policies related to quantitative and qualitative. The amount of human resources will be able to help increase production in accordance with market expectations (Rokhayati, 2015; Islami, Rais and Handayani, 2019).

With these various policies, the expectation is that the support for the sustainability of all the supporting factors will be able to promote sustainability and will be optimal for success. The success does not only belong to District Garut ZCD, which SMEs have the potential to be sustainable, but also to all other cities and districts with the same opportunities and potential for the sustainability of their business (Herman, 2010; Latief, 2017). Then, the performance and sustainability of the ZCD program are also influenced by the internationalized guidance in all activities by the program facilitator. This supports the research results (Rosário et al., 2021) where SME capability for internationalization has been collectively analyzed and approved by the group.

In addition to the stress analysis and the *Leveraging Factor*, it also needs to be validated with a Montecarlo analysis to see the degree of stability of the MDS results that have been obtained from the stress analysis and the Leveraging Factor value. Montecarlo analysis is also used to see the consistency of the results of the level of sustainability for a certain period. The Montecarlo analysis by looking at the Montecarlo delta shows that almost all ZCD Montecarlo delta value is low. The lowest value belongs to District Bandung Barat ZCD, and the highest value is District Bogor. In the other areas, ZCD values vary and are moderate. This shows

that overall they still have sufficient potential for sustainability (Chen and Buja, 2006; Nunes *et al.*, 2012; Fadilah *et al.*, 2020). This is consistent with Montecarlo economic perspective and will be presented in a unified Rapfish graph. After the analysis with STRESS value, Leveraging Factor and Montecarlo analysis were performed. In general, the six areas of ZCD that become the research analysis unit are moderately potential for sustainability, although there is the existence of the highest and lowest value of its potential sustainability. To have a comprehensive overview of whether Multidimensional Scaling can be used as a model to assess the continuity of society economic empowerment, the analysis unit can be increased from 6 ZCD areas to 27 ZCD areas presenting cities/District West Java province.

### **Conclusion**

Based on the discussion of the research, RSQ value can be interpreted as the results of MDS analysis on ZCD economic perspective and can be well explained. From the analysis results on the entire ZCD, it has a sufficient value of sustainability from the economic perspective, with income as the decisive and most influential factor in the improvement of economic sustainability. Furthermore, the District of Bandung Barat has the lowest value of sustainability, while the District of Garut has the highest value of sustainability. Meanwhile, the other districts in ZCD areas have a moderate value of sustainability. Based on Montecarlo analysis through the delta Montecarlo, nearly all ZCD delta Montecarlo value is under 1. The area with the lowest ZCD is District Bandung Barat, and the highest ZCD is District Bogor. The other ZCD areas values vary. This means that, in general, they have the potential for sustainability. With these policies, it is expected that all supporting factors will increase sustainability and give optimum results. All ZCD areas are expected to have the potential sustainability of their small and medium business units. To describe the Model of Multidimensional Scaling as a tool that assesses community economic empowerment sustainability, there is an addition of analysis units representing the West Java area having as many as 27 ZCD areas. The research results in the form of a multidimensional scaling model are expected to be a model or means for zakat institutions to assess the performance of community economic empowerment programs by considering many dimensions. The continuation of this research is to construct a model for the development of community economic empowerment with MACTOR analysis. The limitations of this research are data collection activities because this research was conducted during the Covid 19 pandemic.

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## **SKALOWANIE WIELOWYMIAROWE (MDS):MODEL OCENY ZRÓWNOWAŻONEGO ROZWOJU WSPÓLNOTY GOSPODARCZEJ**

**Streszczenie:** Celem tego badania jest określenie modelu oceny zrównoważenia programu wzmocnienia ekonomicznego społeczności przy użyciu skalowania wielowymiarowego (MDS). Skalowanie wielowymiarowe to wielowymiarowa analiza statystyczna wykorzystywana jako zmienna do określenia położenia obiektu na podstawie podobieństwa/niepodobieństwa. Zastosowaną metodą badawczą są badania opisowe. Stosowane techniki zbierania danych to kwestionariusze obserwacyjne, wywiad pogłębiony; i dokumentacja. Populacja tego badania to 573 beneficjentów zakatu i 236 próbek (formuła Slovina). Respondenci są członkami grupy biznesowej BAZNAS (Badan Amil Zakat Nasional) w prowincji Jawa Zachodnia. Wyniki pokazują, że wszystkie projekty Zakat Community Development (ZCD) mają wystarczające wartości zrównoważenia w perspektywie ekonomicznej. Wartość korelacji kwadratów (RSQ) wynosi 91,85 procent, a zatem sugeruje, że wyniki analizy wielowymiarowego skalowania rozwoju społeczności Zakat w perspektywie ekonomicznej można uznać za bardzo dobre. Czynnikiem poziomu dochodów staje się decydującym czynnikiem, który ma największy wpływ na wzrost zrównoważenia gospodarczego.

**Słowa kluczowe:** społeczność, wzmocnienie pozycji gospodarczej, skalowanie wielowymiarowe.



### 多维缩放 (MDS) : 社区经济赋能的可持续性评估模型

**摘要** : 本研究的目的是确定使用多维尺度 (MDS) 的社区经济赋权计划的可持续性评估模型。多维标度是一种多元统计分析, 用作变量, 根据相似性/不相似性来确定对象的位置。所使用的研究方法是描述性研究。使用的数据收集技术有观察问卷、深度访谈; 和文档。本研究的人口为天课的 573 名受益者和 236 个样本 (斯洛文公式)。受访者是西爪哇省 BAZNAS (Badan Amil Zakat Nasional) 商业集团的成员。结果表明, 从经济角度来看, 所有 Zakat Community Development (ZCD) 都具有足够的可持续性价值。平方相关 (RSQ) 值为 91.85%, 因此表明从经济角度对 Zakat 社区发展的多维尺度分析的结果可以很好地解释。收入水平因素成为对提高经济可持续性影响最大的决定性因素。

**关键词**: 社区, 经济赋权, 多维扩展。