

## An Application of Spatial Dispersion Industrialization Model Towards In-come Distribution, Employment Opportunity, and Economy

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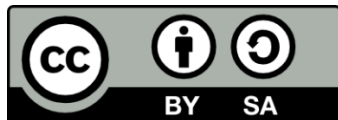
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### Abstract

Industrialization is expected to bring positive impacts for the indigenous people which is the emergence of social change process from the industrialization process. The occurred social change is expected to present sufficient room availability especially on the social income, employment opportunity, and economy. Industrialization consequences lead to the spatial dispersion problems which are not expected by the policy makers. The appeared impacts are the emergence of the new social class structure change, the high urbanization flow, and life necessity fulfillment competition, and also the emerged new social gap. This study is expected to discover and develop spatial dispersion model to focus on the three cities which are in the process of industrialization process in terms of income, economy, and employment opportunity (Stranas Dikti, 2014). To see the compatibility among the three spatial dispersion indicators (income distribution, employment opportunity, and economy) compared to industrialization, the researchers applied Structural Equation Modeling (SEM) approach to test the hypotheses and analyze the empirical data retrieved through the covariance matrices. The re-search findings showed the correlation among the three variables by analyzing the retrieved CR values and the probabilities. It can be concluded that income distribution, employment opportunity, and economy showed significant influence on industrialization in Pamekasan Regency, Pademawu Sub-district, Bunder Village. Future research is suggested to be conducted to cover other variables or other areas to broaden the insight of how these variables on industrialization.

**Keywords:** Economy; Employment Opportunity; Industrialization; Income Distribution; Spatial Disper-sion

## **INTRODUCTION**

Industrialization also causes the emergence of social change and value shift in the indigenous community of certain city. One of the value shifts happens in the indigenous community is the change of family ties value among the families of the community members. Family ties value is no stronger compared to the past time. The family value shift in the community is also seen from the competition in seizing the area (Smith.J.H 1962). The fight among the city people to the others is about the competition to protect their own territory. As the result of this competition and fight, the family value among the community members shifts and the community loses the care for one to another. Consequently, the kinship system is also getting blurry. Indifference among the community members are getting formed (Pandya 2003).

The appearance of industrial area in a region such as in Bunder Village, Pademawu Sub-district, Pamekasan Regency is regarded as bringing positive and negative factors for the indigenous community's life such as for the positive impacts are: (1) industry emergence can provide job opportunities for the surrounding people; (2) opening the employment opportunity in informal sector field; (3) adding the regional original income for the area. Meanwhile, the negative impacts are: (1) causing industrial noise, pollution, and waste which are hazardous for the environment; and (2) cultural contact which can lead to various social problems.

There are four impacts which are the most tangible from the emergence of industrialization in the community's life, they are: (1) industrialization influences on the employment pattern; (2) industrialization influences on the family's life style; and (3) industrialization influences on the human resources development pattern and the industrialization impacts on the family's psychology (Afifah et al. 2018). Industrialization process can be understood through development concept as the meaning of development and industrialization is often considered as the same. Development concept is dynamic because the concept can change according to the scope. If the development is correlated to every effort of world development, then the development will become the world development effort (Khorev 1974). The reality about industrialization as the process and development of industry which are in one activity track functions as improving the people's life quality and prosperity.

The urgency to conduct this research lies on the small number of previous research which focus on the application of spatial dispersion industrialization model towards income distribution, employment opportunity, and economy. The most notified gap among the previous studies and the current research is that the setting of this study was in the industrial spot in Indonesia, particularly in Pamekasan Regency, Pademawu Sub-district, Bunder Village. As similar research has not been conducted in the certain place, it is the originality and novelty of this research so that the findings will be significant.

## **LITERATURE REVIEW**

Industrialization cannot be separated from the effort of improving the quality of human resources and the utilization of the natural resources. In general, the correlation between development and industrialization is explained by (Hollifield et al. 2009) as follow: (1) the materials for industrialization process and industrial development are in one activity track to

improve the people's prosperity; (2) industrial development is an effort to upgrade the quality of human resources and the capability to make use of the natural resources; (3) industrial development will encourage and influence other sectors which can broaden the employment opportunity which is expected to increase the community's income and purchasing power; and (4) there will be harmful gap in industrial development in economical and non-economic matters. Industrialization is a long-term strategy to guarantee the economy growth (Dwyer et al. 2007).

Urbanization in Indonesia significantly increases so that the tendency of the bigger social economy problems in a lot of cities in Indonesia can cause national problem and become the social problem for Indonesia. By considering the potential impacts, the management of the high urbanization problem in big cities in Indonesia should become a part of the national policy. This is caused by the rapid population increase such as in the big cities of Java Island which leads to particular problems related to the supply of various facilities and life environment quality.

Urbanization actually refers to a process where there is an increase of proportion from all population living in urban areas. Based on the related history, urbanization has an intimate correlation to industrialization process. It happens when all the available natural resources are utilized to increase human productivity (industrialization), so there is an increase or surplus either in agriculture sector or in industrial sector (Ashley and Maxwell 2001). As the result, the population proportion living in urban areas is increasing more and more. The increase of the population who stays in urban areas should be pushed because the developing economy powers make urban areas become the ideal place to locate factories and employees (Danta 1987).

Three big problems faced by urban areas are: (1) the tendency of over-concentration on particular areas; (2) the development of mixed-use of the land; and (3) the emergence of land conversion from the open space, conservation land, or green open space to the intensively developed area (housing, industry, office, infrastructure). Meanwhile, the big problems faced by sub-urban areas are: (1) the land conversion from water infiltration area to constructed area; (2) urban sprawl areas' physical development; and (3) a lot of unused land in sub-urban areas and transitional areas (Campolina Diniz and Vieira 2016).

There is a tendency that economy activities will be focused to an area which has a relatively high population concentration level. The positive correlation between this population concentration and economy activities will lead to the broadening population concentration area so that it can form what we call as urban area. It can be seen that there is a mutual correlation between economy activities and population concentration. The economy actors tend to put investment in the areas which have high population concentration and complete facilities and infrastructures. It is because they can save various costs such as the costs for goods and services distribution. Meanwhile, population will tend to come to the center of economy activities because generally they will get opportunities to get a job more easily. Therefore, urbanization is a common change process as an effort to increase the people or community's prosperity.

If urbanization is a common change process, then why urbanization process still has to be controlled or guided? There are two reasons of why urbanization needs to be controlled. First, the government wants to increase the population proportion living in the urban areas as soon as possible. This is related to the fact that the increasing urban population will be greatly correlated to the increasing nation's economy growth. Data show that a country or region with higher

economy level will also have higher urbanization level and vice versa. Industrial countries generally have urbanization level above 75 percent (Khorev 1974). Compared to the developing countries, the urbanization level is still around 35 percent to 40 percent. Second, the urbanization level which is over or uncontrolled can cause various problems for the population itself. The measurement of the controlled or the uncontrolled urbanization process is usually known as the primacy rate which can be defined as the attraction force of the biggest city of a country or region to the surrounding cities. The bigger the primacy rate is, the worse the situation of the city's urbanization process is. Unfortunately, the most recent data regarding primacy rate in Indonesia is unavailable (Afifah et al. 2018).

So far, the urbanization phenomenon in urban areas is examined from various science disciplines such as demography, economy, and sociology. From demography's angle, urbanization is a process of population spread change in an area. The problems related to population density in urban areas generally lead to population residential problem, labor surplus, and, at the end, they can hinder development (Treiman 1970). From the perspective of economy, urbanization is a structural change in the sector of population livelihood. This can be seen from the huge number of people from rural area who leave their job in the agriculture field and shift to work and become a laborer or manual laborer which is non-agrarian in urban areas (Ding and Zhao 2011).

From the perspective of sociology, urbanization is often correlated to the population's life attitude in the rural environment which is then influenced from the urban life. To this, the community faces the doubt whether they can survive onto the rural life style or they follow the urban life style which is still unfamiliar so that it can lead to new sociological problems. Sociologically, urbanization can cause a new social layer and becomes the urban's burden because most of them who do not succeed to live prosperously in the urban area will become unemployed or homeless which later form slums or illegal residential area (Khorev 1974).

The importance of employee factor in economy development. Solow criticized the formulation of Harold-Domar from Keynesian group who only used capital accumulation approach towards economy development. It was mentioned that Solow's economy development theory broke Harold-Domar's formulation based on the diminishing return to individual factor of production approach (Samuelson 1989). With the assumption of employee development is determined exogenously in the economy development, Solow described that when the capital stock grew with the more rapid development level compared to the employee development, then the number of capital growth made by each employee would increase. Since this capital growth is used by each employee, the marginal product of capital will decrease (Gundlach 2005).

This postulation can be explained by using production function approach which describes the output per capita towards the input per capita. As shown from Figure 1, it seems that when the capital per capital increases, the output ratio towards the capital will decrease because of the relatively decreasing employees. Therefore, when the output of each person is increasing (while employee is relatively decreasing), the output ratio towards the capital use in production will decrease (Evans, Partidário, and Lambert 2007).

The gap between previous research and this current study is the variables focused on. This study highlights the application of spatial dispersion industrialization model on income

distribution, employment opportunity, and economy in Pamekasan. Meanwhile, a study conducted by Prananta et al. (2022) focused on tourism industrialization model and the effects on the income, employment opportunity, and economy in another area which was Sumenep City, Beach 9, Gili District. Therefore, it is important to discover the other variables for this similar research and present the original and novel data which can be impactful for the industrialization of small cities such as Pamekasan and Sumenep.

## RESEARCH METHOD

The setting of this study is Pamekasan Regency, Pademawu Sub-district, Bunder Village which is considered as a small city which is in the process of industrialization. This study applied quantitative method in the data collection. This study applied *structural equation modelling* (SEM) approach to see how the correlation among the hypotheses and the social reality of three spatial dispersion problems (income distribution, employment opportunity, and economy). Nevertheless, it seems that SEM becomes a more powerful analysis technique because it considers the modelling of interaction, non-linearity, correlated independent variables, measurement error, correlated error terms, *multiple latent independents* where each of them is measured by using many indicators and one or two variables depend on the latent which is also measured using some indicators. Therefore, according to this definition, SEM can be used as another alternative which is more powerful compared to using multiple regression, path analysis, factor analysis, time series analysis, and covariant analysis. From the definition above, it can be concluded that SEM has the characteristic as an analysis technique to confirm instead of to explain (Marsh et al. 2019). It means that research tends to use SEM to determine whether particular model is valid or not instead of using it to discover whether particular model is suitable or not even though the SEM analysis often covers the elements used to explain. Generally, people use SEM to focus more on the latent constructs – abstract psychological variables such as intelligence or attitude towards brand – compared to the manifest variables (indicator) which is used to measure the constructs. The measurement is considered as hard and susceptible towards error. With the error of modelling measurement which can happen explicitly, the users of SEM try to decrease the non-bias estimates for the correlation among the latent constructs (Marsh et al. 2019).

At the end, SEM allows plural measurements are correlated to singular latent construct. SEM covers the measurement of covariance matrix structure or we can also call it as covariance structure analysis. One the parameters model has been estimated, the model created by covariance matrix can be compared to the covariance matrix originated from the empirical data. If the two matrices are consistent one to another, the structural equation model can be considered as the accepted explanation for the correlations among those measurements or tests (Chung et al. 2009). What is actually the *structural equation modelling* (SEM)? There are several definitions of SEM, some of them are as follow: *Structural equation modelling*, which is then called as SEM, is a statistical modelling technique which is cross-sectional, linear, and common. *Factor analysis*, *path analysis*, and *regression* are included in this SEM. Another definition mentions that *structural equation modelling* (SEM) is a multivariate analysis technique which is common and

very beneficial including specific versions in other analysis methods number as special cases. The next definition states that *structural equation modelling (SEM)* is a statistical technique which is used to construct and test the statistical model which is usually in the form of cause-effect models (Chung et al. 2009). SEM is actually a hybrid technique which includes confirmatory aspects of factor analysis, path analysis, and regression which can be considered as special case in SEM. A model with less indicators for each factor will have high likelihood appearance compared to a model with more indicators for each of the factor (Botonaki, Natos, and Mattas 2009). The *maximum likelihood function* is not the likelihood test itself but it is used as one component of the others. This function reflects the difference between covariant matrix and the matrix predicted using the model (Jung et al. 2017). The function is as follows:

- *Baseline log likelihood* is the likelihood when there is no independent variable and there are only two constants in the equation.
- *Model log likelihood* is a log likelihood when the independent variable is also included in the model. The bigger the difference of the basic LL minus model LL, the more convincing the researchers that all independent variables really give contribution towards the model more than just the random number.

#### *Goodness-of-fit tests based on predicted vs. observed covariances*

The test of a series of this likelihood was based on the model compatibility towards sample moments which means to compare the observed covariant matrix to the estimated matrix with the assumption that the tested model was right. These tests, therefore, used what we call as *conventional discrepancy function*) (Smith et al. 2001).

## **RESULTS AND DISCUSSION**

Descriptive data analysis was used to explain the condition of the respondents' answers for each variable. The main data analysis applied in this study was *Structural Equation Modeling (SEM)* by conducting the dimensions testing previously using *confirmatory factor analysis*. After the result was retrieved and conducted a discussion, the next step was making a conclusion based on the result of the analysis.

### **Structural Equation Modeling (Income)**

Stranas research was conducted to examine the correlation among industrialization construct and income distribution, economy, and employment opportunity in industrial area.

**Table 1**

*Standardized Regression Weights: (Group Number 1 – Default Model)*

Groups	Estimate
IND1 < --- INDUSTRIALISASI	.543
IND2 < --- INDUSTRIALISASI	.852
IND3 < --- INDUSTRIALISASI	.812
IND3 < --- INDUSTRIALISASI	.765

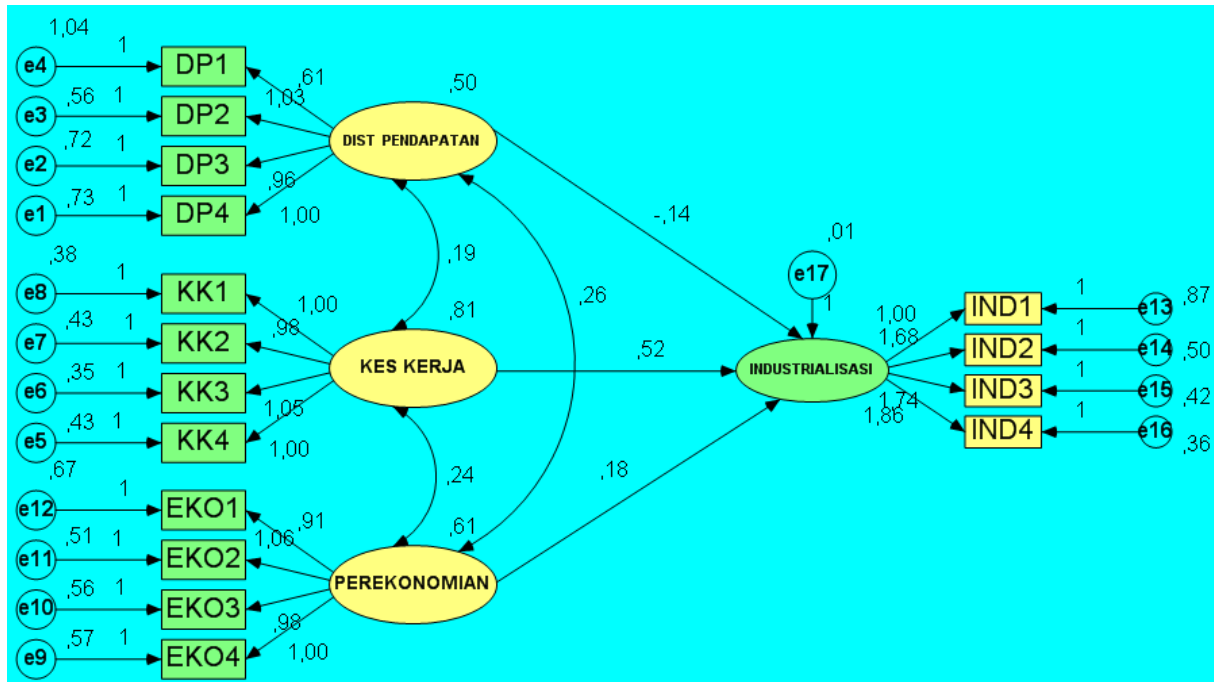
Source: Authors' estimation.

## Model Equation Estimate

After conducting the confirmatory analysis, the next stage was conducting full structural model estimate which only included the indicators which had been tested using confirmatory analysis.

**Figure 1**

*Full Structural Model (Unstandardized estimates)*



Source: Authors' estimation.

From the data processing above, it could also be shown that each indicator or the dimension forming each latent variable indicated good results from the CR value above 1.96. All of the loading factor value (std. estimate) for each indicator was below 0.05. With this result, it can be said that the indicators forming the construct latent variables had shown as the strong indicator in latent variable measurement.

**Table 2**

*The Result of SEM Model Qualification Testing*

Goodness of Fit Index	Cut-off value	Analysis result	Model evaluation
Chi-square	< 792.92	183.109	Good
Probability	≥ 0.05	0.00	Marginal
GFI	≥ 0.90	0.827	Marginal
CMIN/DF	≤ 2.00	1.686	Good
CFI	≥ 0.90	0.948	Good
AGFI	≥ 0.90	0.761	Marginal
TLI	≥ 0.90	0.935	Good
RMSEA	≤ 0.08	0.089	Marginal

Source: Authors' estimation.

Next, according to this confirmatory factor analysis, this research model could be used for the next analysis with modification or adaptations. Then, a statistical test needed to be conducted towards the correlation among the variables which would be used as the basis to answer the proposed research hypotheses. The statistical test of the processing result with SEM was done through the probability (P) value and the Critical Ratio (CR) of each correlation among variables. However, to find a good model, the researchers conducted the deviation problem testing on SEM assumption.

#### H1: Income distribution affected industrialization

The estimate parameter to test the influence of income distribution towards industrialization showed that the CR value was -1.972 with the probability of 0.05 which was below (or equal to) 0.05. Those values had fulfilled the requirement of accepting the H1 which was the probability should be below (or equal to) 0.05. Thus, it can be concluded that income distribution affected industrialization in Pamekasan Regency, Pademawu Sub-district, Bunder Village.

#### H2: Employment opportunity affected industrialization

The estimate parameter to test the influence of employment opportunity towards industrialization showed that the CR value was 5.015 with the probability of 0.000 which was below 0.05. Those values had fulfilled the requirement of accepting the H1 which was the probability should be below 0.05 and the CR value should be above 1.96. Thus, it can be concluded that employment opportunity affected industrialization in Pamekasan Regency, Pademawu Sub-district, Bunder Village.

#### H3: Economy affected industrialization

The estimate parameter to test the influence of economy towards industrialization showed that the CR value was 2.745 with the probability of 0.006 which was below 0.05. Those values had fulfilled the requirement of accepting the H1 which was the probability should be below 0.05 and the CR value should be above 1.96. Thus, it can be concluded that economy affected industrialization in Pamekasan Regency, Pademawu Sub-district, Bunder Village.

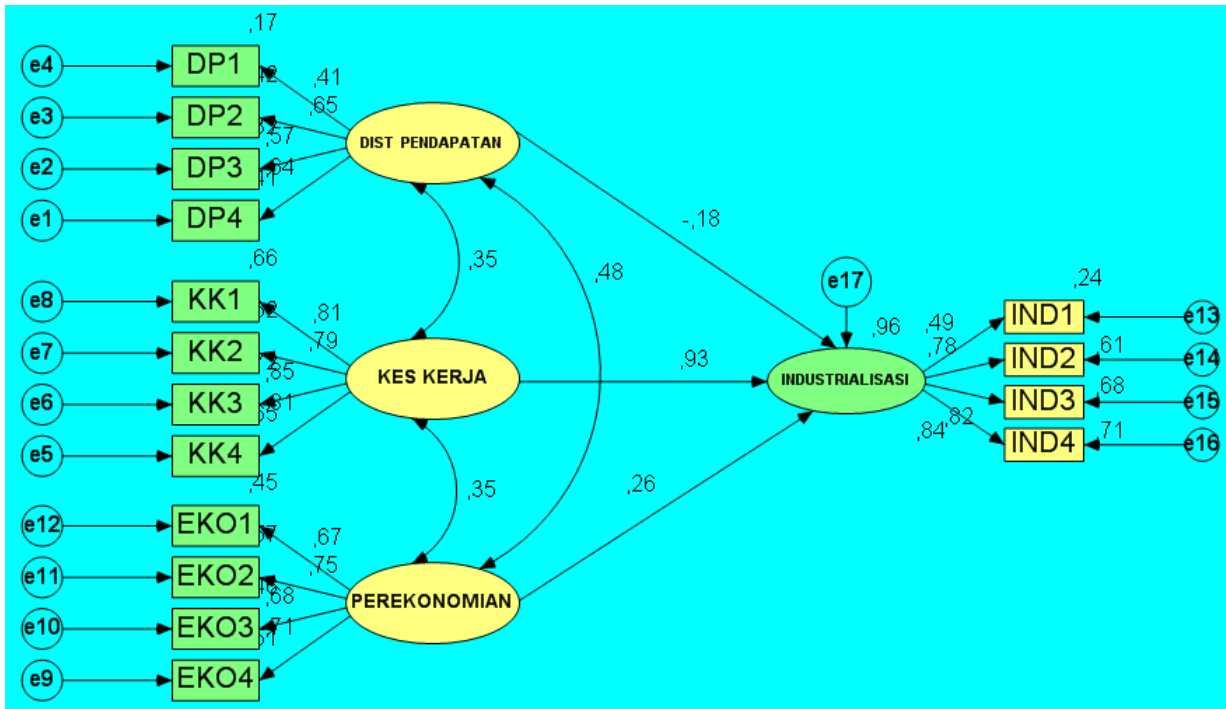
### **Structural Equation Model (Economy)**

Stranas research was conducted to examine the correlation among the construct of industrialization, income distribution, economy, and employment opportunity in economy areas. Based on the review of the available literature, the research proposed correlation model among the constructs as shown in Figure 2.



**Figure 2**

Full Structural Model (Standardized estimates)



Source: Authors' estimation.

**Table 3**

The Result of SEM Model Qualification Testing

Goodness of Fit Index	Cut-off value	Analysis result	Model evaluation
Chi-square	< 792.92	161	Good
Probability	≥ 0.05	0.00	Marginal
GFI	≥ 0.90	0.849	Marginal
CMIN/DF	≤ 2.00	2	Good
CFI	≥ 0.90	0.923	Good
AGFI	≥ 0.90	0.791	Marginal
TLI	≥ 0.90	0.905	Good
RMSEA	≤ 0.08	0.077	Good

Source: Authors' estimation.

Next, according to this confirmatory factor analysis, this research model could be used for the next analysis with modification or adaptations. Then, a statistical test needed to be conducted towards the correlation among the variables which would be used as the basis to answer the proposed research hypotheses. The statistical test of the processing result with SEM was done through the probability (P) value and the Critical Ratio (CR) of each correlation among variables. However, to find a good model, the researchers conducted the deviation problem testing on SEM assumption.

H1: Income distribution affected industrialization

The estimate parameter to test the influence of income distribution towards industrialization showed that the CR value was -1.128 with the probability of 0.259 which above 0.05. Those

values had not fulfilled the requirement of accepting the H1 which was the probability should be below (or equal to) 0.05. Thus, it can be concluded that the income distribution did not affect industrialization in Pamekasan Regency, Pademawu Sub-district, Bunder Village.

**H2: Employment opportunity affected industrialization**

The estimate parameter to test the influence of employment opportunity towards industrialization showed that the CR value was 1.176 with the probability of 0.240 which above 0.05. Those values had not fulfilled the requirement of accepting the H1 which was the probability should be below 0.05 and the CR value should be above 1.96. Thus, it can be concluded that the employment opportunity did not affect industrialization in Pamekasan Regency, Pademawu Sub-district, Bunder Village.

**H3: Economy affected industrialization**

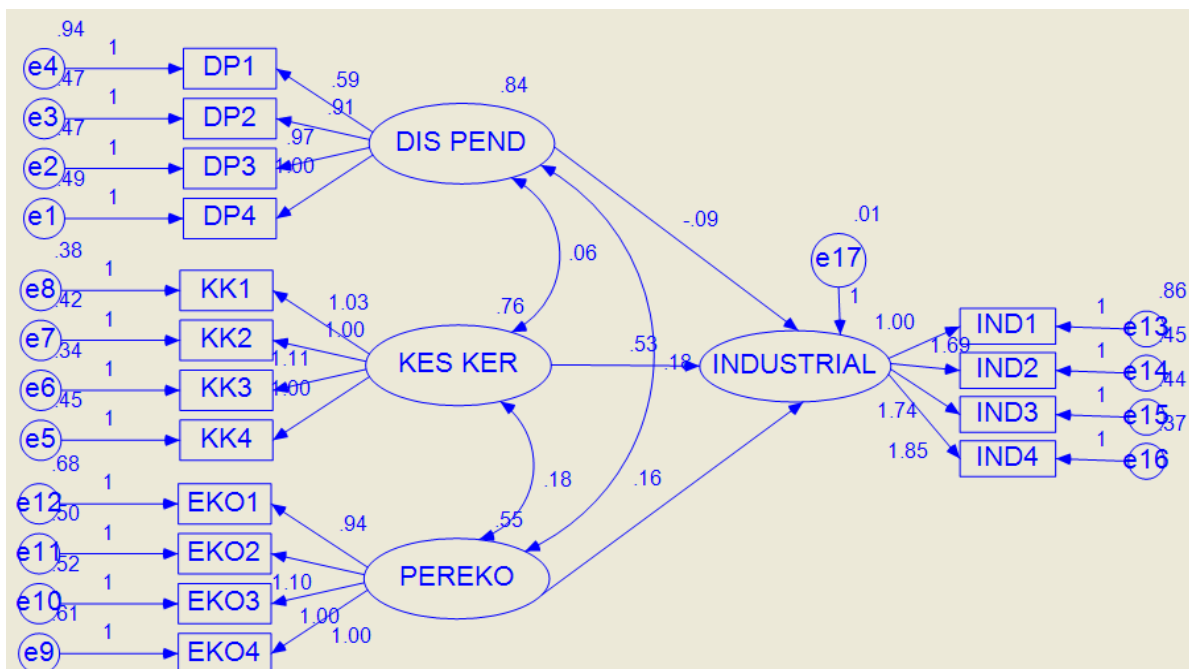
The estimate parameter to test the influence of economy towards industrialization showed that the CR value was 3.239 with the probability of 0.001 which below 0.05. Those values had fulfilled the requirement of accepting the H1 which was the probability should be below 0.05 and the CR value should be above 1.96. Thus, it can be concluded that economy affected industrialization in Pamekasan Regency, Pademawu Sub-district, Bunder Village.

**Structural Equation Model (Employment Opportunity)**

Stranas research was conducted to examine the correlation among the constructs of industrialization, income distribution, economy, and employment opportunity in employment opportunity areas. Based on the review of the available literature, the research proposed correlation model among the constructs as shown in the following Figure 3.

**Figure 3**

*The research proposed correlation model among the constructs*



Source: Authors' estimation.

The model qualification testing can be seen by comparing the analysis result with the requirements of the cut off value. The cut off value can be seen in Table 4.

**Table 3**

*The Result of SEM Model Qualification Testing*

Goodness of Fit Index	Cut-off value	Analysis result	Model evaluation
Chi-square	< 792.92	163	Good
Probability	≥ 0.05	0.00	Marginal
GFI	≥ 0.90	0.846	Marginal
CMIN/DF	≤ 2.00	1.67	Good
CFI	≥ 0.90	0.926	Good
AGFI	≥ 0.90	0.786	Marginal
TLI	≥ 0.90	0.910	Good
RMSEA	≤ 0.08	0.078	Good

Source: Authors' estimation.

Next, according to this confirmatory factor analysis, this research model could be used for the next analysis with modification or adaptations. Then, a statistical test needed to be conducted towards the correlation among the variables which would be used as the basis to answer the proposed research hypotheses. The statistical test of the processing result with SEM was done through the probability (P) value and the Critical Ratio (CR) of each correlation among variables. However, to find a good model, the researchers conducted the deviation problem testing on SEM assumption.

### **The Analysis of Data Normality SEM Assumption**

Normality evaluation was conducted using *critical ratio skewness value* criteria of  $\pm 2.58$ . Data can be considered as normally distributed if the *critical ratio skewness value* was below 2.58. The result of data normality output is presented in the following Table.

#### **H1: Income Distribution Affected Towards *Industrialization***

The estimate parameter to test the influence of Income Distribution towards *Industrialization* showed that the CR value was -2.163 with the probability of 0.031 which was below (or equal to) 0.05. Those values fulfilled the requirement to accept H1 which was probability should be below (or equal to) 0.05. Thus, it can be concluded that Income Distribution affected towards *Industrialization* in Pamekasan Regency, Pademawu Sub-district, Bunder Village.

#### **H2: Employment Opportunity Affected Towards *Industrialization***

The estimate parameter to test the influence of Employment Opportunity towards *Industrialization* showed that the CR value was 5.030 with the probability of 0.00000 which was below 0.05. Those values fulfilled the requirement to accept H1 which was probability should be below 0.05 and the CR value should be above 1.96. Thus, it can be concluded that Employment Opportunity variable affected towards *Industrialization* in Pamekasan Regency, Pademawu Sub-district, Bunder Village.

#### **H3: Economy Affected Towards *Industrialization***

The estimate parameter to test the influence of Economy towards *Industrialization* showed that the CR value was 2.574 with the probability of 0.010 which was below 0.05. Those values fulfilled the requirement to accept H1 which was probability should be below 0.05 and the CR value should be above 1.96. Thus, it can be concluded that Economy affected towards *Industrialization* in Pamekasan Regency, Pademawu Sub-district, Bunder Village.

The findings of this study reflect the government policy that will be taken to accommodate the industrialization process in the city. As the setting of this research is dominated by Moslem environment, the policies established might be greatly influenced by Islamic values. This is in line with Edbiz (2019) who argues that the implication of economic strategies and policies cannot be separated from Islamic values such as strategies to improve the political sector, regulation making, economy, and improvement of the Islamic economic ecosystem in Indonesia.

## CONCLUSION

The hypotheses testing among the variables of income distribution, economy, and employment opportunity in Pamekasan Regency, Pademawu Sub-district, Bunder Village shows significant results. As the income distribution, economy, and employment opportunity variables showed significant influence on industrialization in particular are of Pamekasan Regency, Pademawu Sub-district, Bunder Village, future research is suggested to be conducted to cover other variables or other areas to broaden the insight of how these variables on industrialization.

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