

## Correlation between the Number of MSMEs and the Growth of the Workforce with the Regression Analysis Model

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### Abstract

Unemployment at a young age is influenced by the Labor Force Participation Rate (TPAK). In addition, the Labor Force Participation Rate is also very influential on the economy in Indonesia. The thing that affects this TPAK is the ability of the region to create or produce jobs. Expansion of employment opportunities is also expected from the government to overcome this low Labor Force Participation Rate. Expansion of employment opportunities can be done by creating/developing programs that can support the *hard skills* and *soft skills* of the work force. The government can provide certified skills training that is recognized by companies. The government should encourage more young entrepreneurs to establish MSMEs (Micro, Small and Medium Enterprises) so that new job opportunities are also more open. The Covid-19 pandemic has made MSMEs play an important role in Indonesia's GDP with a contribution that reaches 61% and is able to absorb 97% of the workforce from the total absorption of the national workforce. Specifically for the City of Padang, based on the results of simple linear regression analysis, it was found that there is a strong relationship between the variable number of labor force and the number of MSMEs in Padang City where the conclusion of the regression statistics for multiple R is 0.82 which indicates that the independent variable (number of labor force) has a strong relationship with the dependent variable (number of SMEs). Based on the results of this simple linear regression test, it was found that R Square was worth 0.67. This shows that the resulting regression equation can be said to represent the existing conditions where  $y = 334333.21 - (0.67 * \text{number of labor force})$ . This can be seen from the R square value which is greater than 0.5 and close to 1.

Keywords: Analysis, Regression, Linear, Statistics, Variables

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### 1. Introduction

The government is committed to empowering Indonesian MSMEs (Micro, Small and Medium Enterprises) in the post-COVID-19 pandemic era, which is realized by preparing programs that support the survival of these MSMEs. One of the programs that has been prepared by the government is the National Economic Recovery Program (PEN) Support for MSMEs, namely Interest Subsidy (KUR and Non-KUR), Placement of Government Funds in Partner Commercial Banks to support expansion of working capital loans and restructuring of MSME loans, Guarantee of MSME Working Capital Credit, Productive Presidential Assistance for Micro Enterprises (BPUM), Cash Assistance for Street Vendors and Stalls, and Government-borne MSME Final PPh incentives (DTP). In addition, the government also provides a MSME protection scheme for MSMEs during the COVID-19 pandemic, namely: (a) providing social assistance to poor and vulnerable MSME actors (b) tax incentives for MSMEs (c) relaxation and credit restructuring for MSMEs (d) Expansion MSME Working Model Financing (e) Provision of Product Support [1].

The Covid-19 pandemic has made MSMEs play an important role in Indonesia's GDP with a contribution that reaches 61% and is able to absorb 97% of the

workforce from the total absorption of the national workforce. As one example, the Micro, Small and Medium Enterprises (MSMEs) sector in Pontianak City plays a role in absorbing a workforce of 36.33% of the entire workforce [2]. In 2019, the Labor Force Participation Rate in West Java Province was 65.07, an increase of 2.15 from 2018 [3].

Labor Force Participation Rate (TPAK) has a negative effect on unemployment at a young age and a significant influence in Indonesia. This shows that the ability of a region to generate employment makes a significant contribution to reducing youth unemployment. Therefore, it is hoped that the government will be able to increase employment opportunities for people at a young age, especially in provinces that have a low TPAK, such as: Aceh, Kep. Bangka Belitung, West Java, Banten, North Sulawesi, South Sulawesi, Gorontalo, Maluku and North Maluku.

Apart from that, serious efforts are also needed for the government to expand employment opportunities, for example by providing and expanding access and space for job seekers to be able to develop *hard skills* and *soft skills* through verified training that is recognized by companies. The government through the Ministry of Manpower also needs to optimize the Independent Workers Program (TKM) so that job seekers can

independently create job opportunities and business opportunities in the informal sector [4] .

Research related to the use of linear regression related to MSMEs has also been carried out by many researchers, including: the effect of capital on production costs on MSMEs [5], the effect of halal labeling and product quality on purchasing decisions for MSME products [6], analysis of the level of readiness MSME technology during a pandemic [7], MSME analysis and its influence on economic growth [8], analysis of factors affecting MSME income [9], government policies as a solution to increase MSME development during a pandemic [10], the influence of MSME on growth economy in South Sumatra [11], The effect of market orientation, entrepreneurial orientation on the marketing performance of batik MSMEs in Jombang Regency [12], the influence of entrepreneurial characteristics and marketing strategies on the development of MSMEs in Buleleng district [13]. Increasing MSME income from the production and marketing side can use the batch production method and is optimized with the branch and bound method [14, 15, 16, 17].

MSME research also has a lot to do with the problem of optimizing and forecasting production. Optimization of MSMEs is associated with the costs incurred and the benefits obtained. While forecasting is more related to the number of requests and production to be done.

Hansen and Mowen (2009) classify quality costs into 4 (four) groups, including:

1. Prevention costs ( *preventing costs* ), are costs incurred to prevent poor quality of products or services produced. Examples of prevention costs are the costs of quality engineering, quality training programs, quality planning, quality reporting, supplier selection and evaluation, quality audits, quality cycles, field tests, and design reviews.
2. Appraisal costs *are* costs incurred to determine whether products and services meet customer requirements or needs. Examples of these costs include the costs of inspecting and testing raw materials, packaging inspection, supervision of grading activities, product acceptance, process acceptance, measuring equipment (inspection and testing), and outside approvals.
3. Internal failure costs are costs incurred because the products and services produced do not meet the specifications or customer requirements. Examples of internal failure costs are scrap, rework, downtime (because of a defective product), re-inspection, re-testing, and design changes. These costs do not occur if there are no defective products.
4. External failure costs are costs incurred because the products and services produced fail to meet requirements or do not satisfy customer needs

after the product is delivered to the customer. Examples of external failure costs include the cost of taking a product from the market, the cost of lost sales due to poor product performance, sales returns and allowances due to poor quality, warranty costs, repairs, legal liability incurred, customer dissatisfaction, lost market share, and costs to resolve customer complaints.

The classification of marketing areas can also be referred to using the C4.5 algorithm [18, 19, 20, 21, 22, 23, 24].

The development of MSMEs is very relevant for regions in Indonesia, bearing in mind that the business structure that has developed so far has been based on the existence of small, household and medium industries, although the conditions are apprehensive, both in terms of added value and the benefits obtained related to business development. The city of Padang is a strategic area in terms of its geography, especially in relation to tourism and culinary.

The business world is increasingly developing and more and more competitors are unavoidable. The existence of business pressure from strong competitors indirectly affects the marketing performance experienced by MSMEs. MSMEs are currently the largest segment for national economic actors. Small industry plays an important role as a tool to help the community as a solution to survive the economic crisis.

This study aims to see the relationship between the number of MSMEs in Padang City and the number of the workforce through a simple linear regression approach.

## 2. Research methodology

This study uses the linear regression method where this method is used to determine whether the independent variables studied have a significant correlation with the dependent variable. In addition, this analysis can also be used to find out which variables have a significant effect on the dependent variable.

Regression analysis is one of the existing methods in statistics, and is still widely used today. The main purpose of this regression analysis is to see the causal relationship that occurs between one variable and another.

The causative variable of a regression is also known as the X variable, explanatory variable, explanatory variable, or independent variable. Meanwhile, the affected variable is known as the Y variable, the affected variable, the dependent variable, or the dependent variable.

This analysis is included in the *Machine Learning section* , specifically in the *Supervised Learning section* because the existing Y variables will be used as labels in the machine learning process. This regression

analysis can also be used to make predictions or predictions about the conditions that will occur next.

Simple Linear Regression Analysis is one part of the regression analysis method. In this analysis there is only one variable X and one variable Y.

Simple Linear Regression Analysis is used because it has its own advantages, including:

1. Ease of use because this method is quite simple and easy to understand, but still produces good analysis .
2. Can identify how strong the influence exerted by the independent variable on the dependent variable .
3. Can predict future trends . \_ \_ \_ \_ \_ This is in line with the function of the regression analysis which can be used for forecasting and prediction

Linear regression method is a statistical method that makes predictions using development of mathematical relationships between variables, namely the dependent variable (Y) with variables independent (X).

Prediction of the value of the dependent variable can be done if the variable independence is known [25, 26] .

The formula for simple linear regression uses the equation below:

$$a = \frac{(\sum y)(\sum x^2) - (\sum x)(\sum xy)}{n(\sum x^2) - (\sum x)^2}$$

$$b = \frac{n(\sum xy) - (\sum x)(\sum y)}{n(\sum x^2) - (\sum x)^2}$$

so that,

$$y = a + bx$$

Where:

a, b = constants

x = independent variable / free

y = variable dependent / bound

n = amount of data

The following is a flowchart of this research methodology (Figure 1):

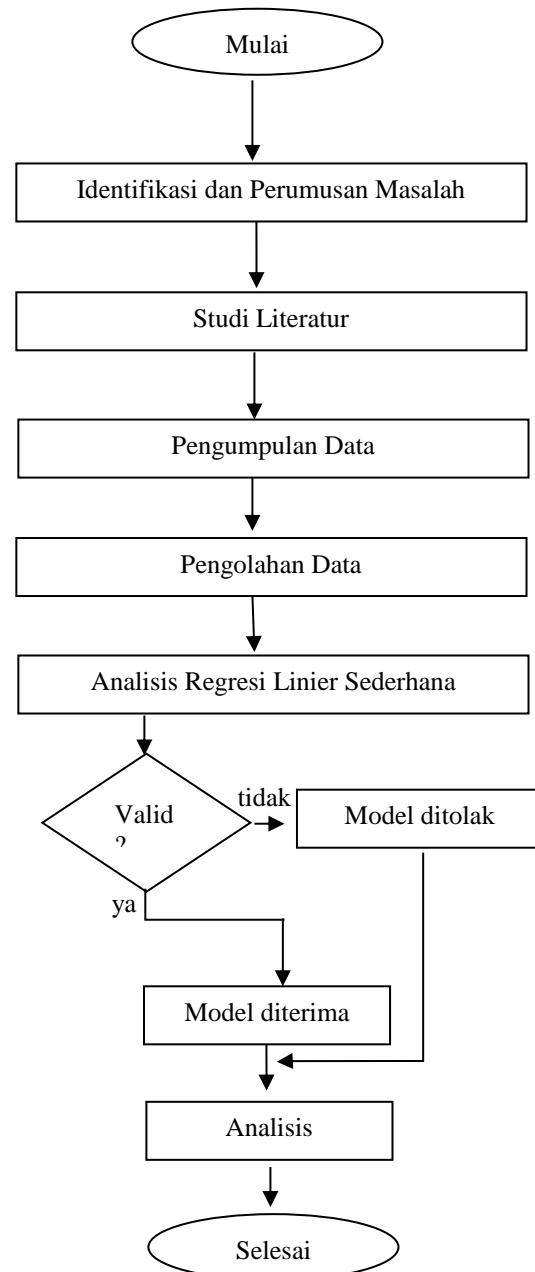


Figure 1. Research Flowchart

### 3. Results and Discussion

The data collected is data for the last eight years from the Padang City Cooperative and UMKM Service (processed by researchers) and can be seen in Table 1 below.

Table 1. Table of Data on the Number of MSMEs in Padang City 2014-2021

Year	Number of MSMEs
2014	74,062
2015	76,173
2016	78,229
2017	81,182
2018	10,211
2019	11.365
2020	11,723
2021	30,702

Source: Padang City Office of Cooperatives and SMEs (Data processed)

While the data on the number of Padang city workforce (processed by researchers) were taken from the Padang City BPS and can be seen in Table 2.

Table 2. Table of Data on the Total Workforce of the City of Padang 2014-2021

Year	Workforce
2014	365,758
2015	394,092
2016	402,430
2017	422,196
2018	450,467
2019	452,048
2020	476,663
2021	480,324

Source: BPS City of Padang (Data processed)

The variable x or the independent variable here is the number of the workforce and the variable y or the dependent variable is the number of MSMEs. For the presentation of data can be seen in Table 3 below.

Table 3. Table of Determination of x and y variables

Year	Labor Force (x)	Number of MSMEs (y)
2014	365,758	74,062
2015	394,092	76,173
2016	402,430	78,229
2017	422,196	81,182
2018	450,467	10,211
2019	452,048	11.365
2020	476,663	11,723
2021	480,324	30,702

After the variables x and y are determined, then the calculation of the coefficients a and b is continued for the equation  $y = a + bx$

The calculation for total x can be seen in Table 4 below.

Table 4. Total Calculation Table x

Year	x
2014	365,758
2015	394,092
2016	402,430
2017	422,196
2018	450,467
2019	452,048
2020	476,663
2021	480,324
Total ( $\sum x$ )	3,443,978

The calculation for the total y can be seen in Table 5 below.

Table 5. Total Calculation Table y

Year	y
2014	74,062
2015	76,173
2016	78,229
2017	81,182
2018	10,211
2019	11.365
2020	11,723
2021	30,702
Total ( $\sum y$ )	373,647

The calculation for total xy can be seen in Table 6 below.

Table 6. Total xy calculation table

Year	xy
2014	27,088,768,996
2015	30,019,169,916
2016	31,481,730,508
2017	34,274,715,672
2018	4,599,718,537
2019	5,137,525,520
2020	5,587,920,349
2021	14,746,907,448
Total ( $\sum xy$ )	152,936,456,946

The calculation for the total  $x^2$  can be seen in Table 7 so that, below.

Table 7. Total Calculation Table  $x^2$ 

Year	$x^2$
2014	4,056,196
2015	4,060,225
2016	4,064,256
2017	4,068,289
2018	4,072,324
2019	4,076,361
2020	4,080,400
2021	4,084,441
Total ( $\sum x^2$ )	32,562,492

The calculation for the total  $y^2$  can be seen in Table 8 below.

Table 8. Total Calculation Table  $y^2$ 

Year	$y^2$
2014	5,485,179,844
2015	5,802,325,929
2016	6,119,776,441
2017	6,590,517,124
2018	104,264,521
2019	129,163,225
2020	137,428,729
2021	942,612,804
Total ( $\sum y^2$ )	25,311,268,617

If the data is put in the form of a linear regression equation, then we get:

$$\begin{aligned}
 a &= \frac{(\sum y)(\sum x^2) - (\sum x)(\sum xy)}{n(\sum x^2) - (\sum x)^2} \\
 &= \frac{((373.647)(32.562.492) - (3.443.978) (152.936.456.946) )}{(8(32.562.492) - (3.443.978)^2)} \\
 &= 334.333,21 \\
 b &= \frac{n(\sum xy) - (\sum x)(\sum y)}{n(\sum x^2) - (\sum x)^2} \\
 &= \frac{8(152.936.456.946) - (3.443.978)(373.647)}{8(32.562.492) - (3.443.978)^2} \\
 &= -0,67
 \end{aligned}$$

$$y = a + bx$$

$$y = 334.333,21 + -(0,67)x$$

$$y = 334.333,21 - 0,67x$$

For analysis of the regression model using the *Data Analysis feature* from *Ms. Excel* and the results are obtained in Table 9 below.

Regression Statistics Table

Regression Statistics	
multiple R	0.820391579
R Square	0.673042343
Adjusted R Square	0.6185494
Standard Error	20695,44328
Observations	8

#### 4. Conclusion

After processing the data and putting it into the simple linear regression equation, it was found that there was a strong relationship between the variable number of labor force and the number of MSMEs in Padang City where the conclusion of the regression statistics for multiple R was the number 0.82 which indicated that the independent variable (number of labor force ) has a strong relationship with the dependent variable (number of SMEs).

Based on the results of the linear regression test, it was found that R Square was worth 0.67. This shows that the resulting regression equation can be said to represent the existing conditions where  $y = 334333.21 - (0.67 * \text{number of labor force})$ . This can be seen from the R square value which is greater than 0.5.

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