



# Typology Study of Human Development Index of Selected Cities in Bali, Indonesia during 2010-2021

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## **Authors' contributions**

*This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.*

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## **ABSTRACT**

According to the United Nations Development Programme (UNDP), the Human Development Index (HDI) is a process of empowerment that enhances the basic capabilities of individuals to participate in the development process. As a tourist city, Bali has the potential to develop this area. The HDI can be used to evaluate the success of improving the community's quality of life. According to the Central Statistics Agency (BPS), Bali ranks among Indonesia's top 5 provinces with the highest HDI. This study aims to identify the typology of the HDI of districts/cities in Bali from 2010 to 2021 and analyze the influence of credit distribution growth, tourism sector gross regional domestic product (GRDP), minimum wage, and economic development on the HDI of districts/cities in Bali from 2010 to 2021. BPS and the Financial Services Authority (OJK) data were analyzed using panel data regression methods. The study results show one district/city with a high HDI and credit distribution growth and four districts/cities with a high HDI and minimum wage. The study also found that credit distribution growth and economic growth had no significant effect on the HDI of districts/cities in Bali from 2010 to 2021, while the tourism sector GRDP and minimum wage had a significant effect on the HDI of districts/cities in Bali from 2010 to 2021.

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**Keywords:** *HDI typology; growth of credit distribution; tourism GRDP; minimum wage; economic growth.*

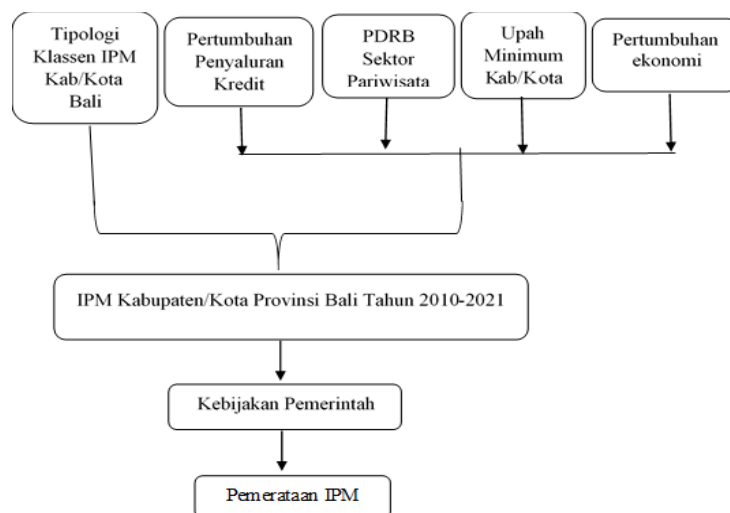
## 1. INTRODUCTION

Improving the quality of human resources in the regions is vital in the era of regional autonomy. The Human Development Index (HDI) is used as a parameter to measure the success of human development in Bali, with a focus on people's access to income, health, and education. HDI helps measure success in efforts to build the quality of human life. The BPS data shows an imbalance in the HDI level between Regencies/Cities in the Province of Bali from 2010-2021 because the tourist attractions in Bali that tourists often visit are mostly well-known destinations, so only certain areas become economic centers and cause inequality. Certain regions are called growth poles, where the region is socially and economically more advanced than others [1].

Quality of human life can be seen from proper living standards. This can be described as the fulfillment of the needs of everyday life. High income allows a person to meet more basic needs. Thus, high income can increase total household consumption. In other words, an increase in the regional minimum wage will increase the fulfillment of decent living needs so that a decent standard of living will also increase. The existence of a minimum wage is one of the considerations if investors are going to invest in an area [2]. Public consumption is also influenced by credit distribution. When the Bank gets higher in distributing credit to the public, it can increase economic growth [3]. With the

condition that credit is used productively to do business in creating income, with this increase in sources of income, it is hoped that it can reduce unemployment due to more productive economic activity so that it can improve people's decent living standards [4,5].

The reason for choosing the title of this research is the need to evaluate the factors that influence human development in districts/cities in Bali Province, especially in the context of the tourism sector as an important economic sector for the region. In addition, to find out whether the government's credit distribution is appropriate for the purpose of improving human quality. Typology identification, according to HDI in Bali, was carried out to provide policy recommendations that could improve the welfare of the people in the region, primarily through the tourism sector, which has excellent potential to create jobs and increase income. Dependence on the tourism sector makes Bali's economic growth prone to fluctuations if there is a decrease in the number of tourists; this affects the condition of the people who find it challenging to escape dependence on the tourism sector [6-8]. Therefore, to encourage a sustainable economy, it is necessary to make efforts to support improving the quality of human development so that it does not depend on the tourism sector alone or can develop existing tourism potential. Development not only enhances the quality of human resources but also equalizes the quality of human resources and the economy.



**Fig. 1. Conceptual thinking framework**

This study aims to identify the Klassen Typology of Regency/City Human Development Index (IPM) in Bali Province for 2010-2021. It also analyzes the effect of lending growth, GRDP in the tourism sector, minimum wages, and economic development on District/City HDI in the Province of Bali in 2010-2021.

## 2. METHODOLOGY

### 2.1 Data

The data used in this research is secondary data in the form of panel data. Sources of data in this study were obtained from the Regency/City Central Bureau of Statistics (BPS) [9] Bali Province and the Financial Services Authority (OJK). The independent variables in this study are the growth of credit distribution, tourism sector GRDP, minimum wages, and economic development in nine districts/cities in Bali Province. At the same time, the time series data (time series) used are HDI data, consumer credit interest rates, GRDP in the tourism sector, and the minimum wage for 2010-2021. There are two analytical tools used in this study, namely the Klassen Typology, which is used to identify the structure and pattern of the Regency/City Human Development Index (IPM) in the Province of Bali in 2010-2021 and panel data regression to determine the factors that influence HDI. To identify the HDI Klassen Typology in Bali can be modified, namely by calculating the average HDI for each Regency/City in the Province of Bali in 2010-2021 as the y-axis and calculating the average growth in lending, tourism GRDP, minimum wages, and economic growth each Districts/Cities in Bali Province in 2010-2021 as the x-axis.

- 1) Quadrant I (Fast Forward and Fast Growing Areas)  
Regions belonging to Quadrant I are regions with HDI, growth in lending, tourism GRDP, minimum wages, and economic growth above the average for the Province of Bali.
- 2) Quadrant II (Fast Developing Areas)  
Regions belonging to Quadrant II are areas with an HDI above the average for the Province of Bali but growth in lending, GRDP for tourism, minimum wages, and economic growth below the average for the Province of Bali.
- 3) Quadrant III (Advanced but Depressed Areas)  
Regions belonging to Quadrant III are areas with an HDI below the average for

the Province of Bali but growth in lending, GRDP for tourism, minimum wages, and economic growth above the average for the Province of Bali.

- 4) Quadrant IV (Relatively Underdeveloped Areas)  
Regions belonging to quadrant IV are regions with HDI, growth in lending, tourism GRDP, minimum wages, and economic growth.

### 2.2 Methods

Panel data regression analysis is used to find out whether there is an influence between the independent variables (growth in lending, GRDP in the tourism sector, minimum wages, and economic development) and the dependent variable HDI and to find out how significant the effect is. In the model equation in this study, there are unit differences between the dependent variable and the independent variable. Transformation of the model into a log form (LOG) is used. The purpose of transforming the model into this form is to make it easier to read the data results after being analyzed so that the difference between variable data is not too significant.

The panel data regression model in this study is:

$$\text{LOG(IPM)} = f [\text{PPK}, \text{LOG(GRDP)}, \text{LOG(UMK)}, \text{PE}]$$

$$\text{logipm}_{it} = \alpha_0 + \alpha_1 \text{PPK}_{it} + \alpha_2 \text{LogPDRB}_{it} + \alpha_3 \text{LogUMK}_{it} + \alpha_4 \text{ON}_{it} + \varepsilon$$

Information:

IPM = Human Development Index  
 PPK = Credit Disbursement Growth  
 GRDP = Gross Regional Domestic Product  
 UMK = Regency/City Minimum Wage  
 ON = Economic Growth  
 i = number of districts/cities  
 t = period (2010-2021)  
 $\alpha_0$  = constant  
 $\alpha_1$  = coefficient of independent variable alpha I  
 $\alpha_2$  = coefficient of independent variable alpha II  
 $\alpha_3$  = coefficient of independent variable alpha III  
 $\alpha_4$  = coefficient of independent variable alpha IV  
 $\varepsilon$  = disturbance variable (terms of error)

### 3. RESULTS AND DISCUSSION

#### 3.1 Typology

The following is an average table for each Regency/City in the Province of Bali for 2010-2021. From this average calculation, it can be seen that the HDI typology is in accordance with each region.

Typology of Regencies/Cities in Bali Province Based on the HDI and growth in lending in 2010-2021, it is known that the regions belonging to Quadrant I are Badung Regency, Quadrant II are Gianyar Regency, Tabanan Regency, and Denpasar City. Areas belonging to Quadrant III include Karangasem Regency and Buleleng Regency. The areas belonging to Quadrant IV are the Jembrana Regency, Bangli Regency, and Klungkung Regency. The following is a typology of districts/cities in the province of Bali based on HDI and growth in lending in 2010-2021.

Typology of Regencies/Cities in Bali Province Based on HDI and GRDP of the Tourism Sector for 2010-2021, namely that there are no regencies/cities that belong to Quadrant I and Quadrant III. This means the district/city tourism GRDP is lower than Bali Province's. Even so, there are still district/city HDIs above Bali Province. So even though the tourism GRDP of each district/city is not bigger than Bali Province, the HDI can still grow. In other words, factors other than tourism increase the HDI in Bali. Regions belonging to Quadrant II include Denpasar City, Gianyar Regency, Badung Regency, and Tabanan Regency. The areas belonging to Quadrant IV are Buleleng Regency,

Karangasem Regency, Bangli Regency, Klungkung Regency, and Jembrana Regency. The following is a typology of districts/cities in the province of Bali based on tourism HDI and GRDP for 2010-2021.

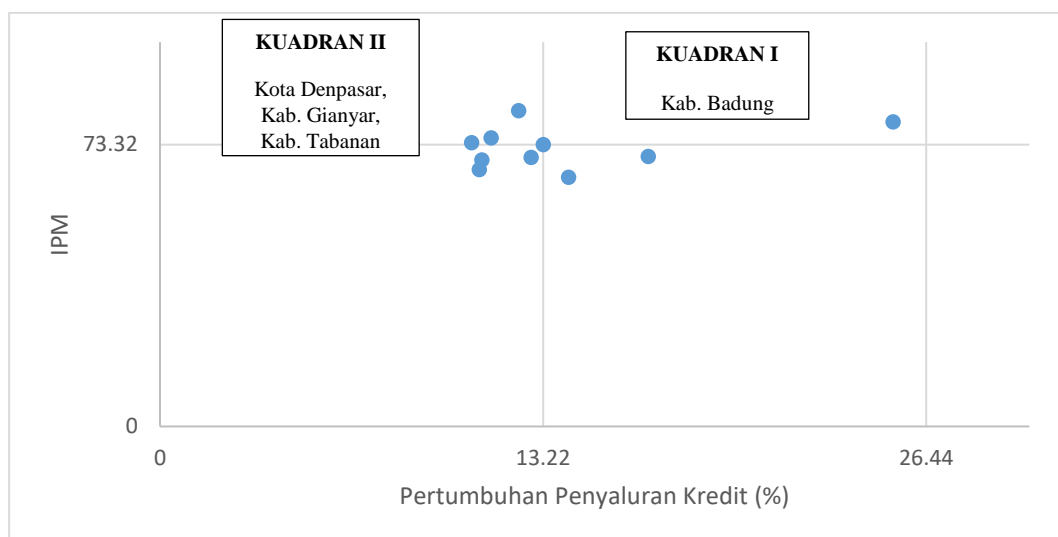
Typology of Regencies/Cities in Bali Province Based on HDI and Minimum Wage for 2010-2021, namely that regions belonging to Quadrant I include Denpasar City, Gianyar Regency, Badung Regency, and Tabanan Regency. At the same time, the areas belonging to Quadrant III are Buleleng Regency, Karangasem Regency, Bangli Regency, Klungkung Regency, and Jembrana Regency. However, there are no areas belonging to Quadrants II and Quadrant IV. This happened because the minimum wage for each district/city was already above the minimum wage for the Province of Bali. So, the minimum wage determined by the province has been implemented in every district/city in Bali. The following is a typology of districts/cities in the province of Bali based on HDI and Minimum Wage for 2010-2021.

Typology of Regencies/Cities in Bali Province Based on HDI and economic growth for 2010-2021, areas belonging to Quadrant I include Denpasar City, Gianyar Regency, and Tabanan Regency. Quadrant II, Bandung Regency. The areas belonging to Quadrant III are Buleleng Regency, Karangasem Regency, Bangli Regency, Klungkung Regency, and Jembrana Regency. However, there are no areas classified as Quadrant IV. This happens because no areas with HDI and economic growth are below Bali Province. Therefore, it can be said that the economic development of each region is quite

**Table 1. Average HDI, Credit Distribution Growth, Tourism GRDP, Minimum Wage, and District/City Economic Growth in the Province of Bali**

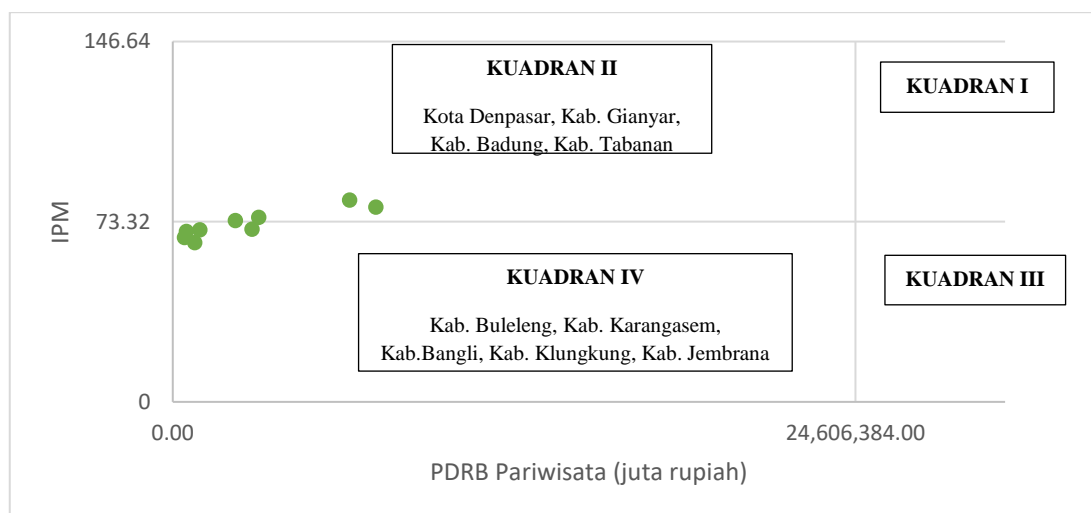
Regency/City	Average HDI	Average Credit Disbursement Growth (%)	Average GRDP of the tourism sector (million rupiah)	Average Minimum Wage (rupiah)	Rate-rate Economic growth (%)
Regency. Jembrana	69.96	6,54	973.791,35	1.723.873	4,27
Regency. Tabanan	73.77	5,98	2.259.877,12	1.761.750	4,31
Regency. Badung	79.23	9,15	7.324.614,91	2.011.538	3,61
Regency. Gianyar	75.06	3,23	3.098.524,04	1.782.876	4,50
Kab. Klungkung	69.3	3,43	491.935,95	1.712.826	4,32
Regency. Bangli	66.81	14,01	427.192,52	1.685.199	4,44
Kab. Karangasem	64.77	22,38	792.688,38	1.741.610	4,29
Regency. Buleleng	70.18	24,40	2.857.531,23	1.708.644	4,56
Denpasar city	82.12	26,06	6.373.521,01	1.916.833	4,65
Bali province	73.32	24,03	24.606.384,15	1.684.007	4,24

Source: BPS and OJK data, 2023 processed



**Fig. 2. Typology of Regencies/Cities in Bali Province Based on HDI and Credit Distribution Growth in 2010-2021**

Source: BPS and OJK data, 2023 processed



**Fig. 3. Typology of Regencies/Cities in Bali Province Based on Tourism Sector HDI and GRDP for 2010-2021**

Source: BPS data, 2023 processed

good. The following is a typology of districts/cities in the province of Bali based on HDI and economic growth for 2010-2021.

### 3.2 Panel Data Regression

Several tests were conducted to select the best model, namely, as follows.

a. Chow Test

This test is used to select the best model between Common Effect Model (CEM) or Fixed Effect Model (FEMS). From the

Chow Test test, probabilities are obtained chi-square of 0.0000 < 0.05 (smaller than alpha 5%), then H0 is rejected, and H1 is accepted so that the best model in the Chow Test, ie Fixed Effect Model (FIVE).

b. Hausman test

From the results of the Hausman test, the probability value obtained cross-section random is smaller than 0.05 (alpha: 5%). It can be concluded that the data fit the model's fixed effect. Because the value in this test is 0.0010, the best model is Random Effect Model.

After testing to select the best model, the classical assumption test is continued.

a. Normality test

The results of the normality test show that the probability is 0.134957 (probability > alpha 0.05), so it can be concluded that the data is normally distributed.

b. Multicollinearity Test

The following is the result of the classical assumption test to test whether there is a multicollinearity problem in the model.

There is no multicollinearity problem because the values between the independent variables are below 0.8.

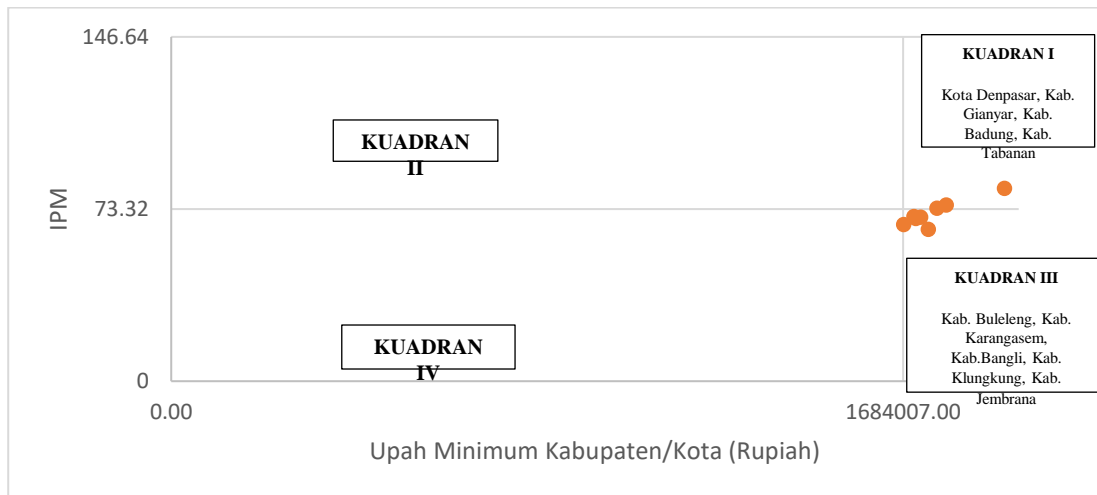
c. Heteroscedasticity Test

From the results of the heteroscedasticity test, it can be seen that the probability of each independent variable after being given the dependent variable resabs is greater than alpha 0.05, which means that the regression model has no problem with the assumption of heteroscedasticity.

d. Autocorrelation Test

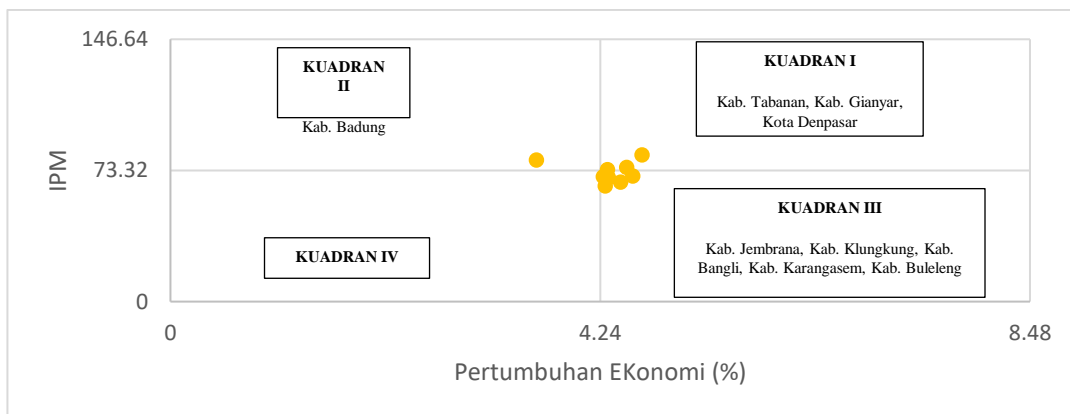
From the known limits, the Durbin-Watson value of 1.993721 lies in an area where there is no autocorrelation. So, this model is free from autocorrelation problems.

The following is the result of panel data regression with FEM as the best model



**Fig. 4. Typology of Regencies/Cities in Bali Province Based on HDI and Minimum Wage for 2010-2021**

Source: BPS data, 2023 processed



**Fig. 5. Typology of Regencies/Cities in Bali Province Based on HDI and Economic Growth for 2010-2021**

Source: BPS data, 2023 processed

**Table 2. Multicollinearity test estimation results**

	PPK	LOGPDRB	LOGIC	ON
PPK	1.000000	0.141252	-0.490169	0.437312
LOGPDRB	0.141252	1.000000	0.270466	-0.005991
LOGIC	-0.490169	0.270466	1.000000	-0.523754
ON	0.437312	-0.005991	-0.523754	1.000000

Source: BPS and OJK data, 2023, processed by Eviews

**Table 3. Panel data regression results with the fixed effect model**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.366025	0.027372	49.90558	0.0000
PPK	7.70E-06	3.46E-05	0.222872	0.8241
LOGPDRB	0.015569	0.007792	1.998015	0.0486
LOGUMK	0.063608	0.004534	14.02908	0.0000
PE	-0.000198	0.000121	-1.641217	0.1041
R-squared	0.994124			
Durbin-Watson stat	1.993721			
Prob(F-statistic)	0.000000			

Source: BPS and OJK data, 2023, processed by Eviews

From the results of the panel data regression in this study with *the fixed Effect Model*, we get the following equation.

$$\text{LOG(IPM)} = 1.366025 + 7.70\text{E-}06\text{PPK} + [0.015569\text{LOG}(\text{GRDP})] + [0.063608\text{LOG}(\text{UMK})] - 0.000198\text{PE}$$

- a. Based on the results of the panel data regression output using a *Fixed-Effect Model*, it can be seen that when the growth in lending, GRDP in the tourism sector, UMK, and economic growth is constant, the Regency/City HDI in Bali Province is 1.366025.
- b. Based on the results of the regression output using *the Effect Model*, it can be seen that the growth variable in lending has no effect on the Regency/City HDI in the Province of Bali. So, the results are not based on the hypothesis that has been determined. This can happen because the distribution of credit has not been on target; in other words, credit made by the community is not used responsibly for the development of activities that can generate income. This is supported by the specific work visit report of Commission XI DPR, which states that in November 2017, the largest credit disbursement was to the banking sector in the Province of Bali, namely the non-business credit recipient sector, which was 38.55%. A result of unproductive credit can be indicated by the amount of *the Performing Loan* (NPL),

- namely, problems in the process of credit payments made. From 2014 to 2017, the Province of Bali showed an increase in NPLs. In December 2016, it was 2.42% and increased in November 2017 by 3.79%. The wholesale and retail trade sector has the largest NPL contributor. In the fourth quarter of 2021, the Bali Province's NPL experienced an increase of 4% compared to the previous quarter, which was 3.88%. This increase in credit payment problems occurred in investment credit, where the NPL, previously at 4.99%, increased to 5.86%. The contribution of the construction sector was 9.55%, the accommodation and food and beverage provision sector was 9.26%, and the manufacturing industry sector was 3.26%; these three sectors pushed up the NPL of investment credit. Therefore, this is what makes credit payments non-standard because the loans made are not used for business development that can improve human quality. Meanwhile, if it is used for business, the business does not run smoothly, primarily due to the aftermath of the COVID-19 pandemic.
- c. Based on the results of the regression output using *the Effect Model*, it can be seen that the regression coefficient of the GRDP variable in the tourism sector shows that this variable has an effect on the Regency/City HDI in the Province of Bali. These results are in accordance with the hypothesis that has been determined. The

coefficient value is 0.015569, meaning that when the GRDP of the tourism sector increases by 1%, the HDI will increase by 0.015569%.

- d. Based on the results of the regression output using *the Effect Model*, it can be seen that the regression coefficient of the Regency/City Minimum Wage (UMK) variable has an effect on the District/City HDI in the Province of Bali. This is following the hypothesis that has been determined. The coefficient value is 0.063608, meaning that when the District/City Minimum Wage (UMK) increases by 1%, the HDI will increase by 0.063608%. These results follow previous research that was carried out by Megantara and Budhi in [10].
- e. Based on the results of the regression output using *the Effect Model*, it can be seen that the variable economic growth shows that this variable has no effect on the Regency/City HDI in the Province of Bali. So, the results are not in accordance with the hypotheses that have been determined, but the results of this study are the same as the research conducted by Lora Ekana Naingolan et al. in 2021. This can happen because economic growth only shows how much of an increase in income is created or generated in an area. However, it is unknown whether the increase in income occurred in the community as a whole or only in part of the community in that area. Meanwhile, in this study, income inequality is found in each district/city in the province of Bali. According to BPS data, over the past three years, the gap in per capita income in Bali has been quite high. In 2019, Bangli Regency had the lowest per capita income, which was Rp. 30,722.11, while Badung Regency had the highest per capita income, which was Rp. 92,561.50. This continues to happen; similarly, in 2020, Bangli Regency received the lowest income per capita, IDR 26,036.28, while Badung Regency had the highest income per capita, IDR 89,290.46. Economic growth can increase income, but high-income inequality in the Regencies/Cities of Bali Province can hinder the increase in HDI. If the benefits of economic growth, namely income, are not distributed evenly, then only a small portion of the entire community will experience the benefits.

#### 4. CONCLUSION

1. From the results of the identification of the Regency/City Typology in the Province of Bali, it can be seen that the HDI typology is based on the growth in lending, sector GRDP, minimum wages, and economic growth for 2010-2021.
2. The results of the panel data regression study show that the growth in lending has no effect on the Regency/City HDI in the Province of Bali. The results of this test are not in accordance with the hypothesis because lending to the public increases when interest rates are low. However, the high growth in lending cannot be ascertained whether the credit provided by the Bank is used for responsible activities or activities that can improve the community's quality of life. The community misuses credit; for example, if the credit is used to finance unproductive consumption, then the community will not get long-term benefits from the credit and will fall into debt. This can be proven by the fact that the value of the Non-Performing Loan (NPL) is increasing.
3. The results of the panel data regression study show that the GRDP of the tourism sector has a significant effect on the Regency/City HDI in the Province of Bali.
4. The results of the panel data regression study show that the district/city minimum wage (UMK) has a significant effect on district/city HDI in the province of Bali. These results follow previous research conducted by Megantara and Budhi in 2020.
5. The results of the panel data regression study show that the variable economic growth has no effect on the district/city HDI in the Province of Bali. The results do not follow the hypotheses that have been determined, but the results of this study are the same as the research that was carried out by Lora Ekana Naingolan et al. in 2021. This can occur due to income inequality in each Regency/City in the Province of Bali. Economic growth can increase income, but high-income inequality can hinder the increase in HDI. If the benefits of economic growth are not distributed evenly, only a small proportion of the population will benefit.



Based on the research that has been done and the conclusions above, the authors provide the following suggestions:

After identifying the HDI Klassen Typology in the Province of Bali, the local government can determine appropriate policies to address human development inequalities in each district/city. In particular, areas that are still in Quadrants III and Quadrant IV, namely Jembrana Regency, Klungkung Regency, Bangli Regency, Karangasem Regency, and Buleleng Regency, where the HDI for these areas is still below the average for the Province of Bali. Thus, the area should be a priority for improving human development. These policies can be in the form of:

- 1) Improving equitable health services and easy access for the community, both in villages and cities.
- 2) We are improving educational facilities by providing adequate learning facilities in schools, especially schools located in rural areas. In relation to Defending the State, improving the quality of education can also be done by instilling awareness of the importance of obeying school rules.
- 3) The promotion of tourism in areas that have not been visited much is essential because in Bali, there are many suitable tours, but only a few are offered. The perpetrators of economic activity only offer well-known tourist attractions, thus causing disparities between regions.
- 4) Providing alternative solutions to the community when job opportunities are small, namely by providing job training to create their own jobs and become entrepreneurs and providing education on the importance of financial literacy. This financial literacy can be applied when people make loans at banks. The money from the credit must be used for businesses to make money back; in other words, people can make useful loans.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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