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Original Article

The Relationship between the Development of Sub-district Areas and the Rate of Conversion of Agricultural Land and the Rate of Business Investment in Pacitan Regency

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ABSTRACT
The regional development of Pacitan Regency is significantly influenced by land-use conversion dynamics and business investment activities based on the KKPR (Conformity of Spatial Utilization Activities), particularly following the construction of strategic infrastructure such as the South Coast Route (JLS). This study aims to analyze the relationship between regional development, the rate of agricultural land conversion, and the rate of KKPR-based investment across 12 subdistricts using a quantitative approach. Data were collected from infrastructure availability, land conversion requests, and KKPR permits, then analyzed using the scalogram method, centrality index, and multiple linear regression via SPSS. The results indicate that Pacitan Subdistrict functions as the primary service center with the highest score (455.59), also recording the highest land conversion rate. The correlation between regional development and land conversion is very strong, whereas the relationship with investment rate is statistically insignificant. Regression analysis shows land-use conversion as the dominant influencing factor (R^2 = 0.967). This study highlights the urgency of land conversion control and spatially equitable investment strategies to support sustainable and balanced regional development.

KEYWORDS:
Regional Development; Land-Use Conversion; KKPR Investment; Pacitan Regency; Multiple Linear Regression.

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INTRODUCTION

The development of a region is inseparable from the role of infrastructure as a public facility that supports the smooth flow of social and economic activities and basic public services. Urban infrastructure is a fundamental factor in shaping the direction of sustainable regional growth and development. According to Jayadinata, (2006) Urban infrastructure is the primary means of supporting various activities within a city, ultimately influencing the dynamics and structure of regional development. Without adequate infrastructure, optimal development is difficult due to a lack of support for connectivity, accessibility, and public services.

Development itself is understood as a coordinated process to expand citizens' choices and opportunities to achieve a better quality of life. According to perspective Dahuri and Rokhmin's (2004) Dauwole et al. (2017), development aims to create a just, prosperous, and equitable society. Indicators of development success include Gross National Product (GNP) growth, increased per capita income, job creation, poverty control, and environmental preservation. In the context of regional development, this process is referred to as regional growth. Sumodiningrat (2017) Through *the resource endowment theory* , it explains that regional development is highly dependent on the resources available and the demand for commodities produced from those resources.

Wonogiri Regency, which directly borders Pacitan Regency, is a concrete example of the shift in agricultural land use to the non-agricultural sector due to the demands of space needs and infrastructure growth Hadipitoyo et al. (2013). And Kusuma & Muta'ali (2019) emphasizes that the development of economic infrastructure, such as roads, transportation facilities, and basic utilities, significantly impacts regional growth. This infrastructure drives increased accessibility and economic activity, ultimately accelerating land conversion and spatial transformation, particularly in developing regions.

Regional development by the government and private sector are driving factors in land use change Pratama (2015). The conversion of agricultural land to non-agricultural uses, particularly from rice paddies to residential areas, is an ongoing process that continues to occur in various regions Ariyanto et al. (2015). Rapid development, coupled with population growth and increased socio-economic activity, has contributed to an increasingly rapid rate of land-use change in the region Adipka et al. (2018).

Meanwhile, Pacitan Regency is currently experiencing accelerated development, particularly with the presence of the Southern Cross Route (JLS) connecting Central Java and East Java provinces Puri (2018). Land use in coastal areas often gives rise to conflicts between communities and overlapping use, so that regional planning and land suitability analysis play an important role in coastal area development planning.Padungo et al. (2024) The construction of the JLS, as well as the planned construction of the Yogyakarta-Lumajang toll road, which is expected to have a toll exit in the Pacitan area, are the main factors driving the potential for agricultural land conversion due to the increasing attractiveness of the region to investors and industrial development. Regional planning based on local potential and sustainability is very important in anticipating development pressures, especially in coastal areas that are vulnerable to land conversion (Permana et al. 2024).

As investment activity increases, spatial utilization control has become a critical need, facilitated through a risk-based licensing system. One key instrument in this regard is the Conformity of Spatial Utilization Activities (KKPR), issued based on the Detailed Spatial Plan (RDTR) or Regional Spatial Plan (RTRW) if the RDTR is not yet available. According to Susanti (2021)Adiningsih et al. (2023), the KKPR is currently implemented through the Online Single Submission Risk-Based Approach (OSS-RBA) system to expedite the business and spatial utilization licensing process.

Data from 2022–2023 shows that Pacitan Regency has issued 116 KKPR permits, with revenue from KKPR services amounting to Rp188,820,416, and revenue from land technical consideration services (PTP) amounting to Rp121,563,445. Throughout this period, 67 applications for land conversion from agricultural to non-agricultural certificates were also approved. The data was obtained through direct surveys, official data requests from the Pacitan Regency Land Office (ATR/BPN), and interviews with an employee handling the KKPR application process. This evidence demonstrates a strong correlation between infrastructure development, investment intensity, and increased land conversion in the region.

Gomes et al. (2024)showed that the success of land use change management is highly dependent on the integration of spatial planning and spatial utilization policies. Irbah et al. (2025)used linear regression to model land values and concluded that spatial factors and

policies play an important role in determining land use intensity . Li et al. (2017)examined land use change in rapidly developing tourist areas, such as Lijiang in China, and concluded that pressure on land is often rooted in economic growth and investment.

This study attempts to fill this gap by combining a scalogram approach, centrality index, and multiple linear regression to analyze the extent to which land conversion dynamics and investment rates influence regional development at the sub-district level. This approach is expected to provide a more comprehensive understanding of the factors driving regional growth and its implications for sustainable spatial governance.

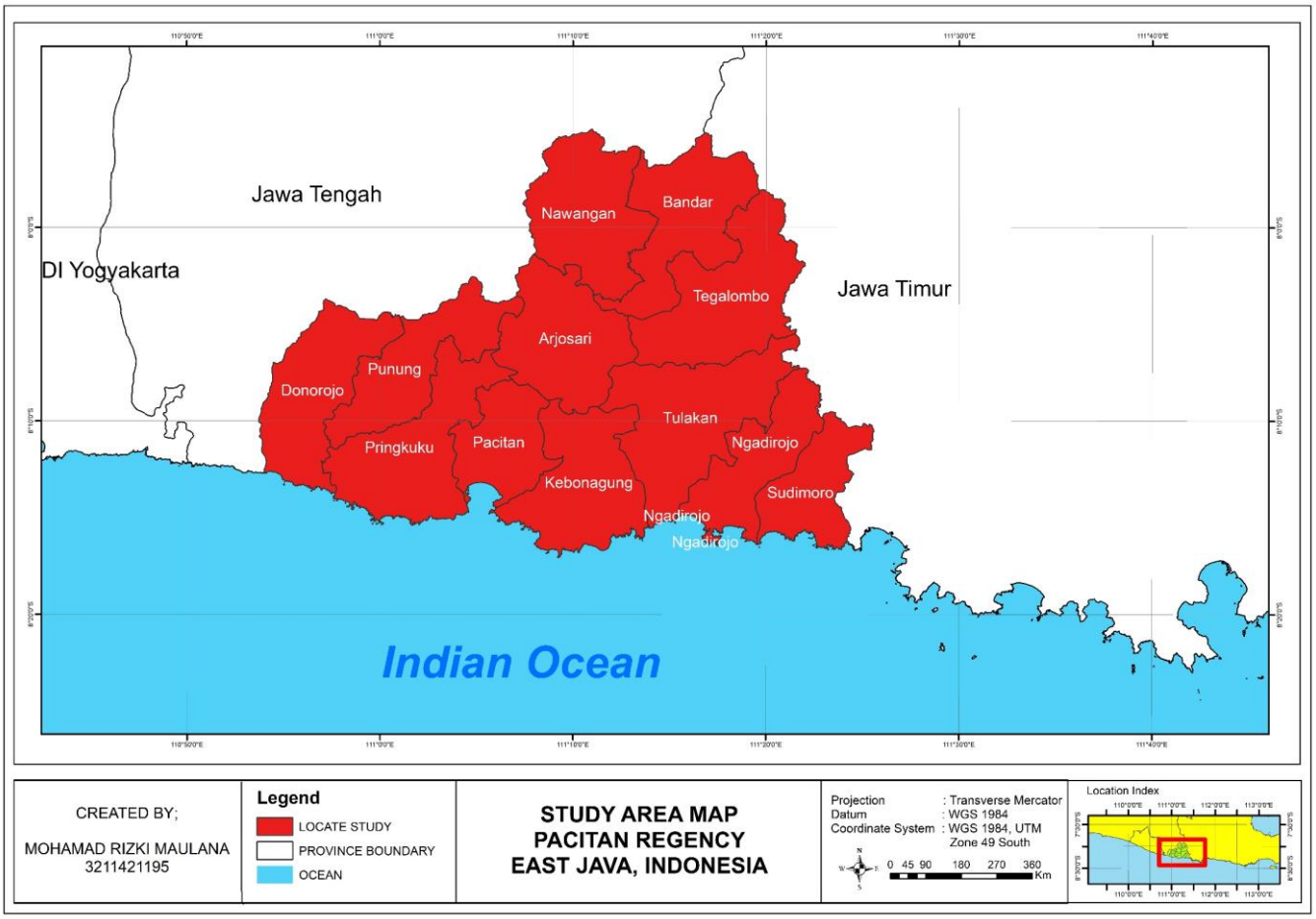


Figure 1. Research Location Map
Source: Geodatabase of the PUPR Service of Pacitan Regency 2025

METHOD

This research is located in Pacitan Regency, based on administrative area data and its geographical position. Pacitan Regency is located in the Southwest of East Java Province and directly borders Central Java Province. Astronomically, Pacitan is between 7º 92 '- 8º 29' South Latitude and 110º 90' - 111º 43' East Longitude. The area of Pacitan reaches 1,389.87 km^2, which consists of 12 sub-districts. This research uses a quantitative method, with data collection in the form of numbers or qualitative data that are converted into numerical forms, such as measurement scales Abubakar (2021). There are three methods in this research: the scalogram analysis method for sub-district development, the analysis method for the rate of land use change and investment rate based on permits (KKPR), and the multiple linear regression method. The following is an explanation of the methods:

1. Scalogram analysis of sub-district development

A feasibility test is used to ensure the scalogram method can be applied. The Coefficient of Reproducibility (COR) value serves as the primary reference in assessing feasibility; if the value is in the

range of 0.9 to 1, the method is considered feasible. The scalogram is used to identify the roles and functions of sub-districts based on the completeness of their facilities. This method demonstrates the contribution of facilities to regional development. Feasibility assessment is carried out by calculating the COR value, which is formulated as follows:

$$COR = 1 - \frac{\sum EROR}{Nw.K}$$

Source: : Fajri (2023)Click or tap here to enter text.
Where:

- Σ error: The number of errors or inconsistencies in facility observations or data.
- Nw: Number of subjects in the area studied (e.g., sub-districts).
- K: Number of facilities observed.

The number of facility units in an area indicates the service capacity of that area. This service capacity is calculated using the centrality index. The centrality index value can be obtained from the sum of the C values or function weights generated by each infrastructure variable in a sub-district. The formula for the centrality index is:

$$C = \frac{t}{T}$$

Source : SFajri (2023)
Information :

- C = Function Weight (100)
- t = Centrality Value
- T = Total Number of Functions

This calculation is performed to measure the centrality of a region (for example, a sub-district) in relation to the facilities and functions within that region. The next step is to apply the results of the **centrality index calculation** to each related variable, with the aim of obtaining a weight for each variable in each sub-district. This is done to determine the level of importance or centrality of each facility within each sub-district. To determine the number of orders in the frequency distribution analysis, the following formula is used:

$$K=1+3.3 \log n$$

Source: Sturges (1926)in :Fajri (2023)

After the number of classes K is determined, the next step is to calculate the class interval (P) using the formula

$$P=\frac{K}{R}$$

Source: Sturges (1926) in :Fajri (2023)

Information:

- P is the length or width of the class interval.
- R is the range of the data (maximum value minus minimum value of the data).
- K is the number of classes that have been calculated previously.

2. Analysis of Land Conversion Rate and Business Investment Rate

The analysis uses data from land technical consideration applications for non-business KKPR issuances in the ATR/BPN database, previously known as land use change permits. The data covers applications from 2023 to 2024, with the variable being the number of applications without considering land area.
The obtained conversion rates and investment rates were then analyzed using multiple linear regression with regional development variables, based on spatial utilization permit data for the same period. To group the conversion data, an interval calculation was used by dividing the value range into three classes:

3. Multiple linear regression between sub-district area development, conversion rate and business investment rate.

This study uses a quantitative approach with a multiple linear regression analysis method to determine the simultaneous influence between the rate of agricultural land conversion (X_1) and the rate of business investment through KKPR (X_2) on the development of sub-district areas (Y) in Pacitan Regency. Data processing was carried out using SPSS software version 25. The multiple linear regression model is used because it is able to measure the influence of more than one independent variable on one dependent variable simultaneously, so it can provide a comprehensive picture of the relationship between variables in the spatial context and regional development. The general equation of multiple linear regression used in this study

refers to Gujarati & Porter (2009), namely:

Y b_n= b_1a +X_n

Information :

- Y=Development of sub-district area
- X_1= Rate of conversion of agricultural land
- X_2 = KKPR business investment rate
- a = Constant
- b_1, b_2 = Regression coefficient of each independent variable
- e = Error (residual)

To interpret the strength of the relationship and contribution of the independent variables to the dependent variable, the coefficient of determination (R^2) value is used and the regression results are classified based on the interpretation Guilford (1956), namely:

1. r < 0.20: very weak relationship
2. 0.20 ≤ r < 0.40 : weak relationship
3. 0.40 ≤ r < 0.70 : sufficient relationship
4. 0.70 ≤ r < 0.90 : close relationship
5. 0.90 ≤ r ≤ 1.00 : very close relationship
6. r > 1.00 : perfect relationship

Using the Guilford classification, the regression results not only show the quantitative influence of X_1 and X_2 on Y but also provide an understanding of the statistical strength of the relationship. This approach is relevant for explaining regional development dynamics more comprehensively, especially in the context of land conversion and increasing investment flows in areas such as Pacitan Regency.

RESULTS AND DISCUSSION

This study uses infrastructure data sourced from the Central Statistics Agency (2024), specifically from the publication of Indonesian Infrastructure Statistics in Figures 2022-2024 published by the Central Statistics Agency (BPS) of Pacitan Regency. This data source contains detailed information on various infrastructure facilities spread across all sub-districts in Pacitan Regency. Furthermore, facility data used in this study was also obtained from the official BPS website and the Pacitan Regency Statistics Portal Application. The data covers various infrastructure categories, such as education, banking, trade, and health. To see the distribution and number of education and health facilities, and others in each sub-district, please refer to Tables 1 and 2, which present data in numerical form by sub-district in Pacitan Regency.

Table 1. Availability of Education, Health and Banking Facilities

No	District Name	EDUCATION					HEALTH							BANKING
		A	B	C	D	E	F	G	H	I	J	K	L	
1	Donorojo	26	38	7	3	0	0	0	3	1	1	68	4	24
2	Punung	36	37	5	3	0	0	0	0	2	0	52	3	33
3	My nails	23	33	9	3	0	0	0	1	0	2	53	1	11
4	Pacitan	44	48	13	15	3	3	2	4	0	2	112	11	71
5	Kebonagung	43	45	10	4	0	0	0	0	1	1	68	3	33
6	Arjosari	30	46	13	7	2	0	0	1	1	1	93	1	28
7	Nawangan	21	38	11	4	0	0	0	0	2	0	55	4	15
8	port	25	36	11	5	0	0	0	0	1	1	49	1	18
9	Tegalombo	28	52	13	7	0	0	0	0	2	0	58	3	19
10	Tulakan	75	75	16	8	0	0	0	0	2	0	111	3	42
11	Ngadirojo	38	49	9	5	0	0	0	0	1	1	66	4	37
12	Sudimoro	21	28	9	3	0	0	0	1	2	0	55	2	17

Description: a) Kindergarten/RA; b) Elementary School/MI; c) Junior High School/Mts; d) Senior High School/Vocational High School/Madrasah; e) College; f) Community Health Center; g) Hospital; h) Maternity Hospital; i) Polyclinic; j) Doctor's Practice; k) Integrated Health Post; l) Pharmacy;
Source :Badan Pusat Statistika (2023)

Table 2. Availability of Trade and Service Facilities and Religious Facilities

No	District Name	TRADE AND SERVICES						RELIGIOUS					GOVERNMENT
		A	B	C	D	E	F	G	H	I	J	K	
1	Donorojo	4	4	4	1	31	0	141	2	0	0	0	**27**
2	Punung	3	9	7	11	3	1	146	1	0	0	0	**26**
3	My nails	1	7	7	0	27	0	113	0	0	0	0	**21**
4	Pacitan	22	40	9	83	26	25	173	4	0	0	0	**67**
5	Kebonagung	3	10	6	1	0	0	188	0	0	0	0	**19**
6	Arjosari	9	6	8	2	0	0	129	0	0	0	0	**30**
7	Nawangan	6	8	15	0	0	1	205	1	0	0	0	**21**
8	port	4	0	9	0	0	0	146	0	0	0	0	**16**
9	Tegalombo	7	2	14	1	1	0	157	1	0	0	0	**22**
10	Tulakan	4	12	29	11	0	0	278	0	0	0	0	**17**
11	Ngadirojo	10	4	8	2	3	1	152	1	0	0	0	**28**
12	Sudimoro	3	4	7	0	0	0	72	0	0	0	0	**18**

Description: a) Shops; b) Shopping; c) Markets; d) Restaurants/Eating Places; e) Lodging; f) Hotels; g) Mosques; h) Churches; i) Temples; j) Viharas; k) Chinese Temples. Source: BPS (2023)

The distribution of trade, service, religious, and government facilities in Pacitan Regency shows variation between sub-districts. Pacitan District stands out with the largest number of facilities, such as restaurants (83 units), lodging (26 units), and hotels (25 units), confirming its role as an economic and tourism center. In contrast, sub-districts such as Kebonagung, Arjosari, and Nawangan have no lodging or hotels, indicating limitations in the accommodation sector. In terms of religious aspects, most sub-districts have a large number of mosques, with Tulakan District having the highest number (278 units), while non-Muslim places of worship are very limited. In terms of government facilities, Pacitan District again leads (67 units), followed by Ngadirojo (28 units) and Donorojo (27 units), while Bandar District recorded the fewest (16 units). For education, health, and banking facilities, Pacitan remains dominant. Tulakan District has the most elementary schools (29 units), while inpatient health centers and polyclinics are spread across the main sub-districts.

Further analysis using centrality index calculations (in the next table) to identify strategic sub-districts in providing public and economic services in Pacitan Regency.

Table 3. Calculation of the Centrality Index for Education, Health and Banking Facilities

No	District Name	EDUCATION						HEALTH						BANKING
		A	B	C	D	E	F	G	H	I	J	K	L	
1	Donorojo	1	1	1	1	0	0	0	1	1	1	1	1	1
2	Punung	1	1	1	1	0	0	0	0	1	0	1	1	1
3	My nails	1	1	1	1	0	0	0	1	0	1	1	1	1
4	Pacitan	1	1	1	1	1	1	1	1	0	1	1	1	1
5	Kebonagung	1	1	1	1	0	0	0	0	1	1	1	1	1
6	Arjosari	1	1	1	1	1	0	0	1	1	1	1	1	1
7	Nawangan	1	1	1	1	0	0	0	0	1	0	1	1	1
8	port	1	1	1	1	0	0	0	0	1	1	1	1	1
9	Tegalombo	1	1	1	1	0	0	0	0	1	0	1	1	1
10	Tulakan	1	1	1	1	0	0	0	0	1	0	1	1	1
11	Ngadirojo	1	1	1	1	0	0	0	0	1	1	1	1	1

No	District Name	EDUCATION				HEALTH								BANKING
		A	B	C	D	E	F	G	H	I	J	K	L	
12	Sudimoro	1	1	1	1	0	0	0	1	1	0	1	1	1
	Total (T)	12	12	12	12	2	1	1	5	10	7	12	12	12
	Centrality (t)	100	100	100	100	100	100	100	100	100	100	100	100	100
	Weight (C)	8,33333	8,33333	8,33333	8,33333	50	100	100	20	10	14,28571	8,33333	8,33333	8,33333

Description: a) Kindergarten/RA; b) Elementary School/MI; c) Junior High School/Mts; d) Senior High School/Vocational High School/Madrasah; e) College; f) Community Health Center; g) Hospital; h) Maternity Hospital; i) Polyclinic; j) Doctor's Practice; k) Integrated Health Post; l) Pharmacy. Source: Data Processing Results for the Year (2025)

Table 4. Calculation of the Centrality Index for Trade and Services, Government and Religious Facilities

	District Name	TRADE AND SERVICES				RELIGIOUS							GOVERNMENT
		A	B	C	D	E	F	G	H	I	J	K	
1	Donorojo	1	1	1	1	1	0	1	1	0	0	0	1
2	Punung	1	1	1	1	1	1	1	1	0	0	0	1
3	My nails	1	1	1	0	1	0	1	0	0	0	0	1
4	Pacitan	1	1	1	1	1	1	1	1	0	0	0	1
5	Kebonagung	1	1	1	1	0	0	1	0	0	0	0	1
6	Arjosari	1	1	1	1	0	0	1	0	0	0	0	1
7	Nawangan	1	1	1	0	0	1	1	1	0	0	0	1
8	port	1	0	1	0	0	0	1	0	0	0	0	1
9	Tegalombo	1	1	1	1	1	0	1	1	0	0	0	1
10	Tulakan	1	1	1	1	0	0	1	0	0	0	0	1
11	Ngadirojo	1	1	1	1	1	1	1	1	0	0	0	1
12	Sudimoro	1	1	1	0	0	0	1	0	0	0	0	1
	Total (T)	12	11	12	8	6	4	12	6	0	0	0	12
	Centrality (t)	100	100	100	100	100	100	100	100	100	100	100	100
	Weight (C)	8,333333	9,090909	8,33333	12.5	16,6667	25	8,33333	16,6667	0	0	0	8,33333

Description: a) Shops; b) Shopping; c) Markets; d) Restaurants/Eating Places; e) Lodging; f) Hotels; g) Mosques; h) Churches; i) Temples; j) Viharas; k) Chinese Temples. Source: Data Processing Results for the Year (2025)

Based on the centrality index calculations in Tables 3 and 4, an analysis of the sub-district functions in Pacitan Regency was conducted by summing the scores for each sector. The table illustrates the distribution of infrastructure, including education, health, banking, trade, religion, and government, which serves as the basis for determining the centrality level of each sub-district.

The results of these calculations are then used to classify the development levels of sub-districts, as shown in Tables 5 and 6. The order of regional development is divided into three main categories or hierarchies based on the level of accessibility and availability of facilities. Through scalogram analysis and Marshall centrality index of infrastructure in each sub-district, areas that play a central role in supporting overall regional growth can be identified. The classifications in Tables 5 and 6 are based on the results of Tables 3 and 4, which reflect the distribution patterns of infrastructure.

Table 5. Range of Regional Development Analysis Orders

Order	Weight Interval		Category
Order 1	387.59 – 455.59	to	**City Service Center**
Order 2	319.59 – 387.59	to	**City Service Sub Center**
Order 3	251.59 – 319.59	to	**Activity Service Center**
Order 4	183.59 – 251.59	to	**Local Service Center**
Order 5	115.59 – 183.59	to	**Limited Service**

Source: Data Processing Results (2025)

Table 6. Order of Sub-district Area Development

No	Subdistrict	Total Weight	Order
1	Pacitan	455,59	Orde 1
2	Arjosari	207,19	Orde 4
3	Ngadirojo	195,59	Orde 4
4	Donorojo	190,59	Orde 4
5	Punung	181,3	Orde 5
6	Nawangan	152,1	Orde 5
7	Pringkuku	151,39	Orde 5
8	Tegalombo	156,3	Orde 5
9	Kebonagung	137,19	Orde 5
10	Sudimoro	130,4	Orde 5
11	Tulakan	122,9	Orde 5
12	Bandar	115,59	Orde 5

Source: Results of Data Processing for the Year (2025)

The results of the analysis using the scalogram method show that Pacitan District has the highest level of regional development with a weight of 455.59. This district functions as a city service center due to the availability of complete infrastructure, such as government facilities, banking, education, and trade, making it the center of social and economic activities in Pacitan Regency. According to Gomareuzzaman (2009)regional development can be measured through a Composite Index analysis that includes economic scale, education, health, and demographics. Pacitan also plays a role as an administrative and economic center, with the dominance of trade and service activities that encourage migration flows from other districts.

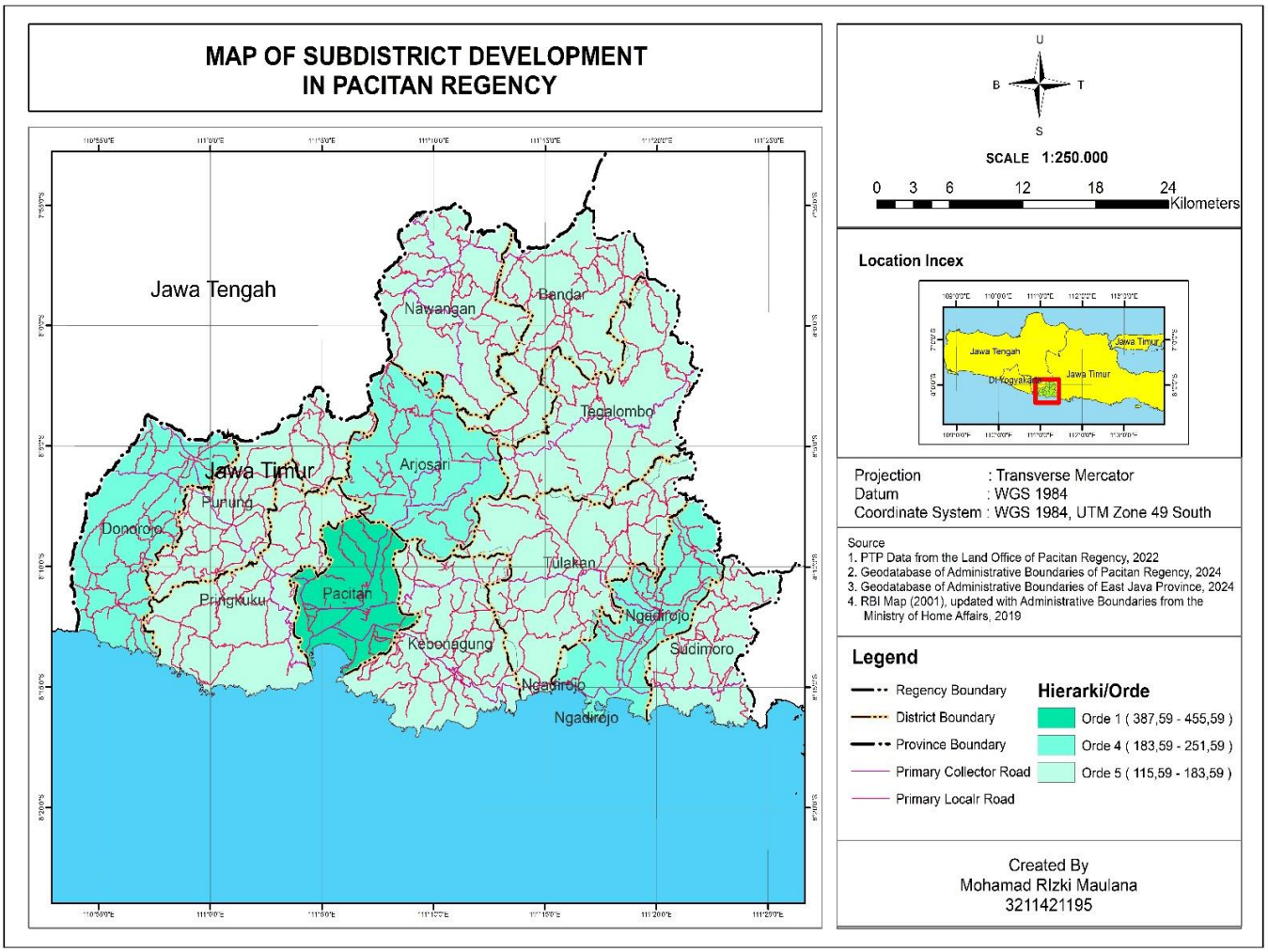


Figure 2. Map of Sub-district Development in Pacitan Regency
Source: Results of Data Processing by BPS Pacitan Regency 2025

Arjosari District ranks second, or as a sub-center of city services, with a score of 207.19. Its development is supported by its strategic location as a connecting route to Ponorogo and Wonogiri. According to Muliana et al. (2018), scalogram analysis groups settlement centers based on the availability of facilities and their functional role. Arjosari's strategic location, coupled with adequate educational and healthcare facilities, makes it a growth center in the northern Pacitan region.

Ngadirojo and Donorojo sub-districts, which are considered third-order or activity service centers, have scores of 195.59 and 190.59, respectively. Ngadirojo develops through the agricultural and fisheries sectors, while Donorojo relies on tourism potential, such as Klayar Beach. The presence of these tourist attractions also drives growth in the service and trade sectors. Blakely & Leigh (2013)stated that centers of economic activity based on tourism and agriculture can boost regional growth through increased investment and population mobility. Therefore, infrastructure development in these two sub-districts needs to be improved to support the local economy.

Nawangan, Pringkuku, and Punung sub-districts, which are included in the fourth order or local service centers, have weights of 152.1, 151.39, and 181.3, respectively. Infrastructure in these areas is still developing, but has economic potential such as agriculture in Nawangan and Pringkuku and ecotourism in Punung. Ermawati (2011) emphasizes that scalogram analysis is useful for identifying service centers based on the number and type of facilities.

Districts such as Bandar, Tulakan, Sudimoro, Kebonagung, and Tegalombo are included in the fifth order or limited service centers, with a weight below 140. Limited infrastructure causes low accessibility and public services compared to other districts. Sabri & Ibrahim (2024) stated that infrastructure affordability and accessibility can improve connectivity and upportequitable development. However, these areas still have economic potential that can be developed, such as agriculture and forestry in Kebonagung and mining in Sudimoro.

The next step is to analyze the rate of land conversion based on data on land technical consideration requests that have been obtained from the ATR/BPN of Pacitan Regency, the data will be processed and analyzed before being presented in the table below to provide a clearer and more structured picture. The following table shows the land technical consideration data:

Table 7. Number of PTP Applications for Transfer of Functions

Subdistrict	PTP Change of Function
Pacitan	31
Nawangan	5
Donorojo	2
Kebonagung	2
My nails	2
Punung	1
Arjosari	0
port	0
Tegalombo	0
Tulakan	0
Ngadirojo	0
Sudimoro	0

Source: Secondary Data from the Pacitan Regency Land Office, 2023

Table 8. Classification of PTP Change of Function

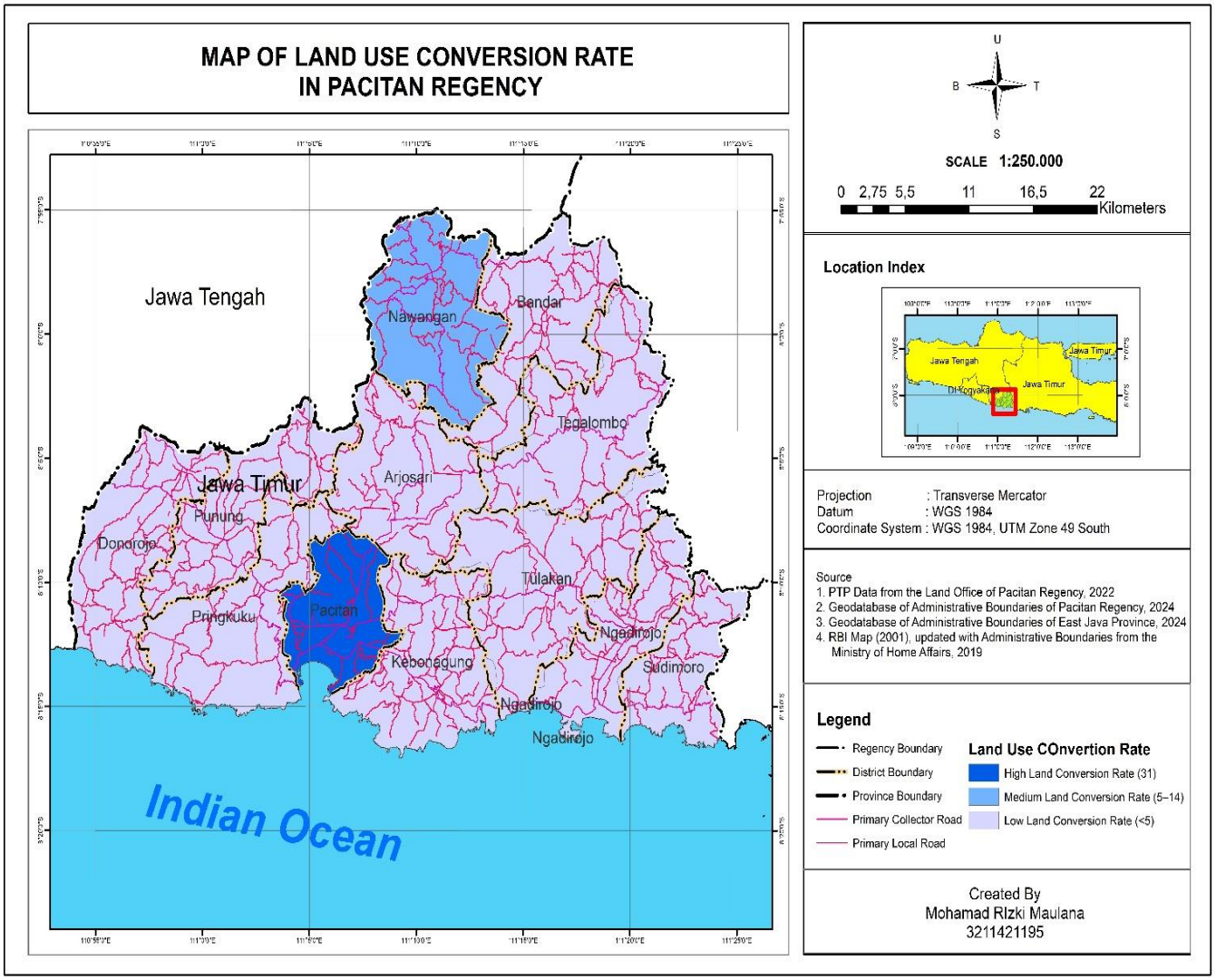
Subdistrict	Conversion Class
Pacitan	A
Nawangan	B
Donorojo	C
Kebonagung	C
My nails	C
Punung	C
Arjosari	C
port	C
Tegalombo	C
Tulakan	C
Ngadirojo	C
Sudimoro	C

Source: Data Processing Results for the Year (2025)

Based on Table 8, the highest rate of land conversion in 2022–2023 occurred in Pacitan District, which is included in Category A or one-third of the districts with the highest number of applications. This reflects Pacitan's role as a hub for land-use change, driven by economic growth, non-agricultural needs, and spatial planning policies that support legal conversion. Nawangan District falls into Category B, with moderate land conversion pressure. Meanwhile, districts like Donorojo, Kebonagung, Pringkuku, Punung, Arjosari,

Bandar, Tegalombo, Tulakan, Ngadirojo, and Sudimoro fall into Category C, with the lowest demand, likely due to limited regional development or stricter regulations.

Land conversion is generally influenced by population growth, infrastructure needs, and expansion of the industrial and service sectors. Irawan (2005)stated that the conversion of agricultural land to non-agricultural use is a result of increased economic activity and urbanization. This is in line with BPS data (2020), which shows the dominance of the trade and service sectors in the regional economic structure. Furthermore, spatial planning policies, such as the RDTR (Regional Spatial Plan) play a significant role in directing land use patterns to maintain alignment with the principles of sustainable development. Hasanah et al. (2021)The high number of land use conversion applications in Pacitan District reflects increasing pressure on land, particularly for housing, commerce, and infrastructure. Without proper management, this condition can threaten food security and ecological balance. Therefore, controlling land use conversion in accordance with spatial planning is absolutely necessary to ensure sustainability.



Picture 3. Map of Land Conversion Rates by Sub-district in Pacitan Regency (Source: Results of Data Processing of PTP Kantah Pacitan Regency, 2025)

Next is analyzing the Rate of Business Investment, Based on the Suitability of Spatial Utilization Activities and the Synchronization of Spatial Utilization Activities, every spatial utilization activity is required to have a KKPR permit. This regulation is an improvement on the Regulation of the Minister of ATR /BPN Number 17 of 2019

concerning Location Permits, and is the result of collaboration between the Ministry of ATR/BPN, the Ministry of Home Affairs, and the Ministry of Investment in the context of implementing spatial-based development Regulation of the Minister of ATR/BPN No. 13 of 2021 , where the KKPR application data is obtained from GISTARU(https://tataruang.atrbpn.go.id/oss_kkpr2/).

Table 9. Amount of Investment Based on KKPR Business in Pacitan Regency

	Company name	Subdistrict	PKKPR PNBP Value	Investment Value (Rp)
1	BPR Artha Mandiri Sejahtera	Pacitan	654218	6300000000.00
2	INDOMOBIL	Pacitan	921465	2500000000.00
3	PT. BENTONIT	Punung	90158781	500000000.00
4	PT. BENTONIT	My nails	90158781	1250000000.00
5	PT PLN Nusantara Power (PLN NP)	My nails		25000000.00
6	PT PLN Nusantara Power (PLN NP)	Kebonagung		25000000.00
7	Andesite Mine	Pacitan	6927171	12000000000.00

Source: Secondary Data from Pacitan Regency Land Office 2023

Table 10. Classification of PTP Change of Function

Subdistrict	Investment	Class
Donorojo	0	3
Punung	500000000.00	3
My nails	1275000000.00	1
Pacitan	20800000000.00	1
Kebonagung	25000000.00	2
Arjosari	0	3
Nawangan	0	3
port	0	3
Tegalombo	0	3
Tulakan	0	3
Ngadirojo	0	3
Sudimoro	0	3

Source: Analysis of Pacitan Regency Business Investment Data 2023

Investment will be the main driver of regional economic growth in 2022. Influenced by economic, infrastructure, institutional, and socio-cultural factors. In Pacitan Regency, the highest investment is in Pacitan and Pringkuku Districts due to the presence of the financial, automotive, energy, and mining sectors. Increasing land

values encourage ease of licensing through KKPR in accordance with ATR/BPN Ministerial Regulation No. 13/2021. Pacitan has become an investment center, followed by Pringkuku and Kebonagung, while Punung is classified as low. Infrastructure, especially accessibility, strengthens investment attractiveness. This classification is important as a basis for sustainable economic planning and spatial planning.

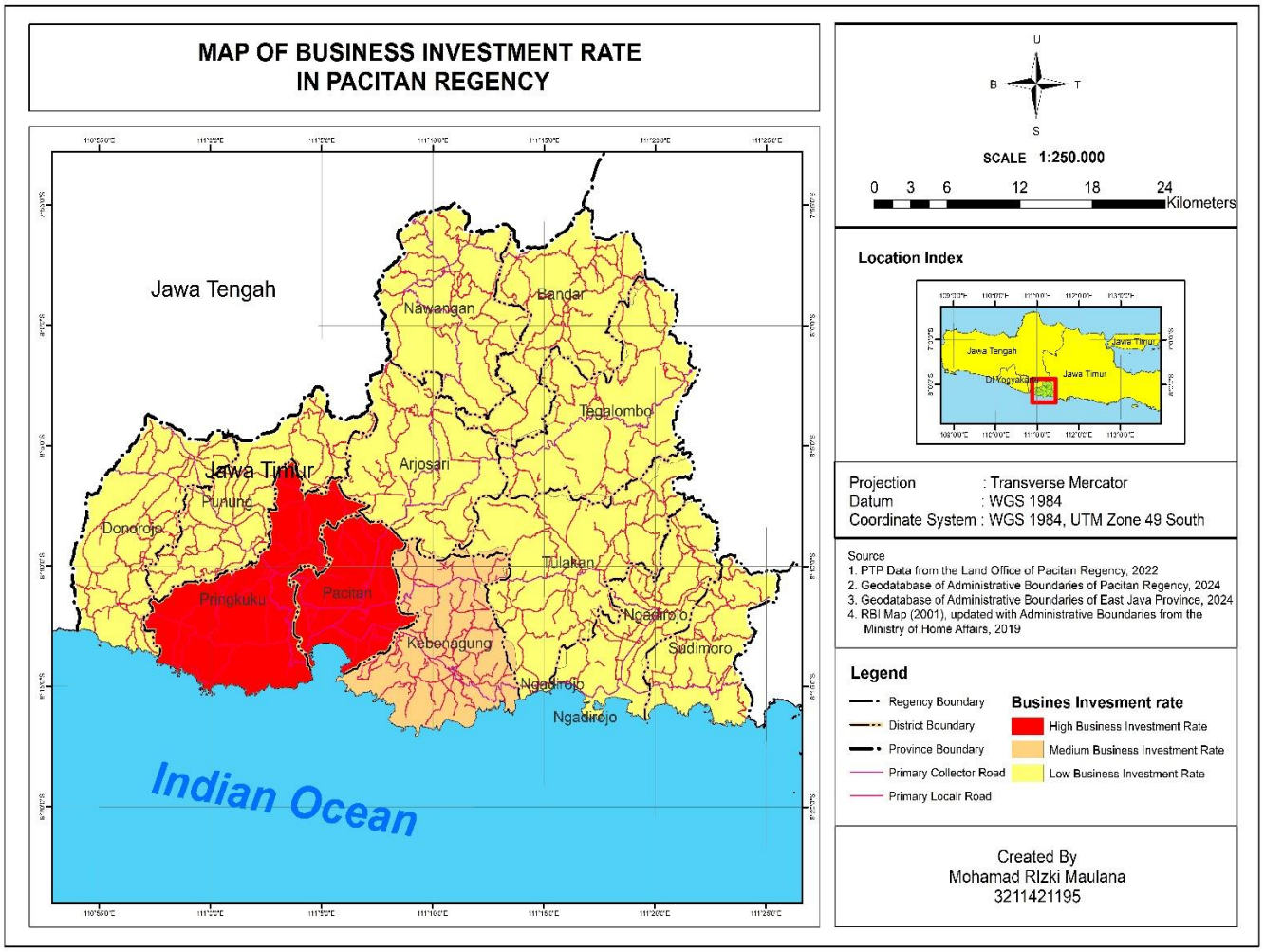


Figure 4. Map of Business Investment Rate in Pacitan Regency
(Source: Results of Pacitan Regency Business Investment Data Processing 2025)

Table 11 . Multiple Linear Regression Test Calculation

Model	R	R Square	Adjusted R Square	Standard Error of the Estimate
1	.983 [a]	.967	.960	18.26979

Source: SPSS Data Processing Results for the Year (2025)

After the data was analyzed, a multiple linear regression test was conducted to examine the simultaneous relationship between the independent variables, namely the rate of agricultural land conversion and the rate of business investment through KKPR, against the dependent variable of sub-district regional development in Pacitan Regency. The results of the analysis conducted using SPSS version 25 showed a

multiple correlation coefficient (R) value of 0.983 with an R Square value of 0.967 and an Adjusted R Square of 0.960. This means that 96.7% of the variation in regional development can be explained simultaneously by the two independent variables. According to the classification Guilford, (1956), the R value of that size is included in the category of a very close relationship, which indicates a significant contribution of both variables to spatial change and regional development.

These findings indicate that the rate of agricultural land conversion is the most dominant variable influencing regional development, while business investment through KKPR contributes to strengthening development dynamics, although its individual impact is lower. These results support and extend the findings of Fajri (2023), whose research used the Pearson correlation approach. Pearson (1895)to assess the relationship between similar variables. However, Fajri's approach does not simultaneously test the contribution of each variable in a single predictive model. Therefore, the use of multiple linear regression in this study not only strengthens the existing methodology but also provides empirical clarity regarding the strength of the interaction between the two variables in explaining regional development dynamics more comprehensively.

This finding is also supported by research Widiarsa & Suartika (2018), which shows that the conversion of agricultural land in urban areas encourages massive expansion of built-up space, which has a direct impact on the spatial structure and capacity of productive land.

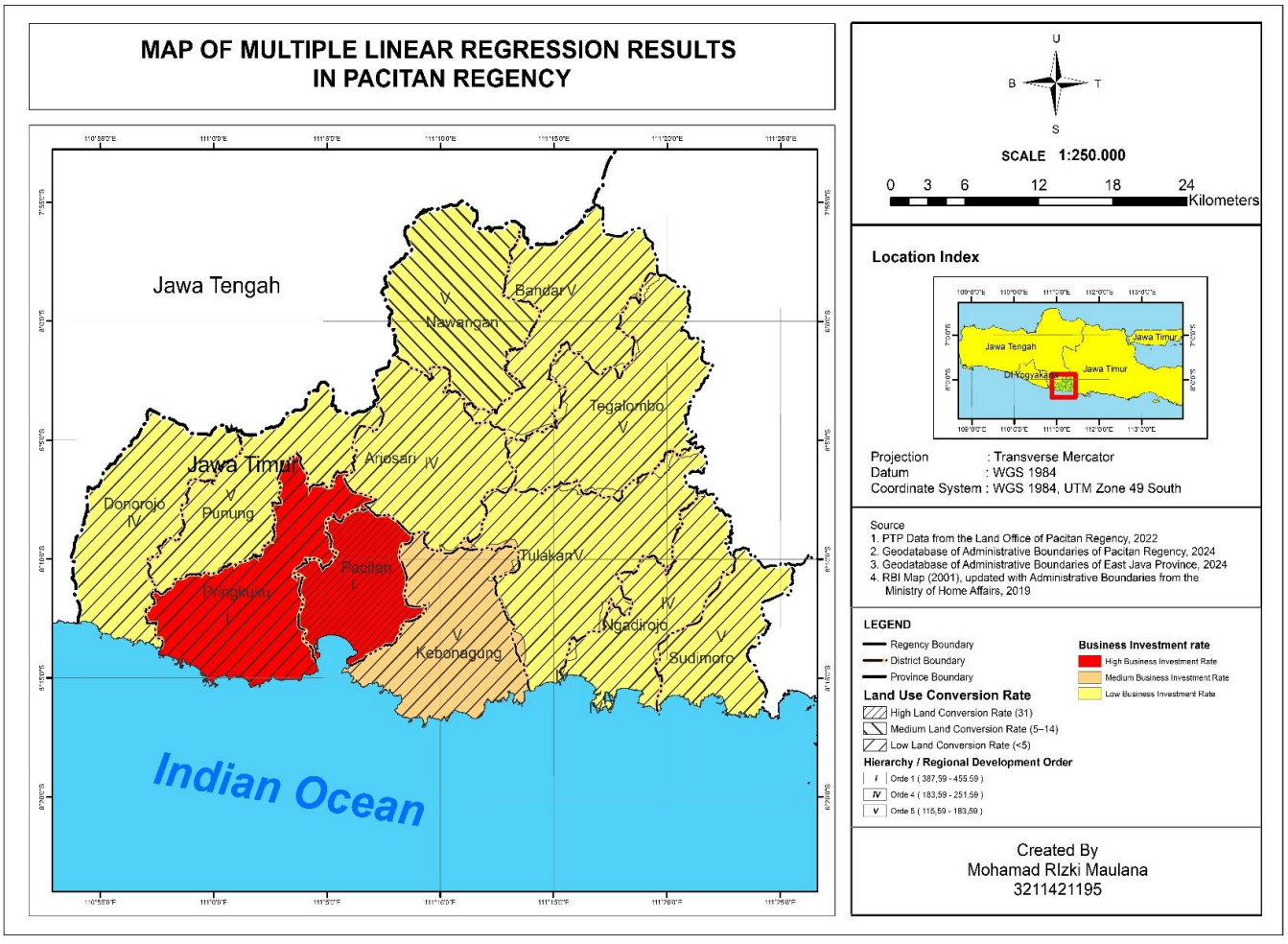


Figure 5. Map of Multiple Linear Regression Results for Pacitan Regency
(Source: Analysis of Business Investment Data in Pacitan Regency 2025)

This research is also in line with the results of the study Gomes et al. (2024), which emphasized the importance of integration between spatial use policies and spatial planning to manage land use changes . Irbah

et al. (2025)also demonstrated the effectiveness of linear regression in assessing the contribution of spatial factors and policies to land use intensity. Li et al. (2017) confirmed that economic growth and investment pressure, especially in coastal areas such as Lijiang in China, are the main factors in accelerating agricultural land conversion. This study strengthens all these findings in the local context of Pacitan Regency, particularly in Pacitan District which shows a high rate of investment and land conversion.

Spatially, this phenomenon demonstrates that regional development in Pacitan is inextricably linked to increased economic activity, infrastructure development, and the growth of the service sector. The availability of dominant socio-economic facilities, such as education, health care, and trade in Pacitan District, reinforces its status as a regional growth center. This view aligns Friedman & Alonso (1965)with Prasetyo & Helma (2022)which emphasizes that investment is one of the main determinants in regional development because of its ability to drive economic growth and improve community welfare.

However, the dynamics of land conversion and investment also pose unique challenges, particularly in managing limited space and maintaining environmental sustainability. Uncontrolled acceleration of land conversion can reduce food security and trigger spatial inequality between regions. Zuhri (2018)emphasized that weak supervision of spatial planning implementation in coastal areas causes uncontrolled land conversion and risks widening the gap between regions with different levels of development. Therefore, strong and adaptive control policies are needed . Regulation of the Minister of ATR/BPN Number 13 of 2021 concerning the Conformity of Spatial Utilization Activities and the Synchronization of Spatial Utilization Programs is an important regulatory instrument to direct the development process to comply with the principles of sustainable and spatially equitable spatial planning.

Thus, the multiple linear regression model used in this study not only provides strong statistical evidence on the relationship between land use change, business investment, and regional development, but also provides a conceptual contribution to the spatial planning literature. This research empirically fills the gap in integrative studies that combine spatial and economic indicators in a single predictive model, which can serve as the basis for data-driven development policymaking for developing coastal areas such as Pacitan Regency.

CONCLUSION

This study found that regional development in Pacitan Regency shows significant variation between sub-districts. Pacitan District occupies the highest position as a city service center (order 1) due to the completeness of infrastructure facilities and concentration of economic activities, while most other sub-districts are still in the limited service order. The results of multiple linear regression analysis indicate that the rate of agricultural land conversion and the rate of business investment through KKPR influence regional development, with a coefficient of determination (R^2) of 0.967. This means that 96.7% of the variation in regional development can be explained by these two variables. However, individually, only the rate of land conversion has a significant influence on regional development, while the rate of investment has not shown a significant influence, due to its uneven distribution.

These findings indicate that the conversion of agricultural land to non-agricultural land has become a major factor driving spatial dynamics in Pacitan Regency, especially in areas with rapidly developing infrastructure. Therefore, a more selective and equitable spatial planning policy is needed, which is able to control land conversion in a sustainable manner, while simultaneously encouraging equitable investment to improve welfare and inclusive regional development.

This study's limitations lie in its data coverage, which only covers the 2022–2023 period, and its failure to utilize a satellite imagery-based spatial approach to visually confirm physical land use changes. Furthermore, the approach used is quantitative and does not integrate social or institutional perspectives that may influence land use conversion decisions. Therefore, future research is recommended to combine quantitative and qualitative approaches and expand the data coverage temporally and spatially. This approach is expected to provide a more comprehensive picture of land use dynamics, the effectiveness of spatial planning policies, and their impact on sustainable regional development .

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Conflict of Interest The author has no competing interests to declare that are relevant to the content of this article.

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