Asian Journal of Economics and Business
Volume 6; Number 2; 2025 : pp. 143-173
https://DOI:10.47509/AJEB.2025.v06i02.03

ARF INDIA
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Is Economic Development Experiencing a Shift? A Comparative Estimate on the New IKN

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Article History
Received : 16 May 2025; Revised : 18 June 2025; Accepted : 26 June 2025; Published : 12 November 2025

Abstract: The originality from this study lies in the topic raised about Ibu Kota Nusantara (IKN) by dissecting nine indicators in economic development. The urgency of this study is to see comparisons in the economic development landscape based on two different data: (1) before IKN in 2019–2021 and (2) since IKN in 2022–2024. The nine parameters of economic development analyzed are gini ratio (GR), income per capita (IpC), poverty (Pov), open unemployment (OU), labor force participation (LFP), economic growth (EG), human development (HD), inflation (Inf), and investment (Inv). The analysis scenario uses different tests (independent sample, one sample, and paired sample). The results of data processing implemented using independent sample test show that the two variables (GR and OU) are significantly related in an unpaired way. On the other hand, the one sample test predicts that eight variables (GR, IpC, Pov, OU, LFP, HD, Inf, and Inv) have a single significant effect. Then, through a paired sample test, it is reported that only OU has a significant influence in pairs. Overall, there are similar findings through these three tests, where OU is the only indicator of economic development that is consistently significantly affected over both different time periods. The implications of the current study are of concern to stakeholders with understanding and rethinking economic policies made towards sustainability in the new IKN.

To cite this paper:
Fitriadi Fitriadi, Purwinahyu Purwinahyu, Dio Caisar Darma, Misna Ariani and Diana Lestari (2025). Is Economic Development Experiencing a Shift? A Comparative Estimate on the New IKN. *Asian Journal of Economics and Business*. 6(2), 143-173. *https://DOI:10.47509/AJEB.2025.v06i02.03*

Keywords: IKN, economic development indicators, difference test, sustainable prosperity

1. INTRODUCTION

Indonesia dared to take a long step by adopting a policy of moving the new Indonesian Capital City (IKN) from Jakarta to Sepaku which is located in Penajam Paser Utara (PPU). The selection of this area was inseparable from public pressure on long-standing polemics such as economic inequality, opening up residential space, social inequality, equal distribution of facilities and infrastructure, as well as monitoring resources to achieve equitable prosperity (Jiuhardi *et al.*, 2024). Regulations about the relocation of the IKN have been published. The decision to move the center of state government administration was designed based on Law Number 3 of 2022 concerning the relocation of the center of Indonesian government (Fitriadi *et al.*, 2023; Jiuhardi *et al.*, 2023). In an economic context, various challenges need to be overcome, especially encouraging small regional autonomy in a sustainable manner. In relation to PPU, which is part of the East Kalimantan Province area, it is known for its level of safety from natural disasters, friendly residents, strategic geographic factors, and a conducive environment (Priyagus *et al.*, 2024). However, PPU, which is classified as a district area, has some conditions that require resilience, including economic aspects. Apart from relocating IKN from Jakarta to PPU, the Indonesian government needs to concentrate on forming a new economic center. In this way, PPU facing more complex challenges across development, in particular ensuring that the economy can run ideally by the principle of equal distribution of prosperity.

According to Perwira *et al.* (2024), Syaban & Appiah-Opoku (2023), and Yusuf *et al.* (2023), the presence of IKN in 2024 is not only focused on moving central employees to the Sepaku area, but also brings the flow of urbanization of the population from surrounding villages and cities to migration across countries for reasons of earning a living, new experiences, beliefs and hopes towards happiness, improving the quality of life, and other motivations, so that it attracts investors to invest capital. High-intensity population movement has the potential to create opportunities as well as large economic opportunities. But, if the transition of population movement to the new IKN is not balanced with skills, competencies and education that are relevant to

the job market, it will trigger a crisis such as welfare inequality due to limited employment opportunities or difficulty in getting access to decent work. At the same time, when economic activity in IKN increases, it also stimulates lifestyle transformation. The behavior of residents in new places drives broader economic change (Cattaneo *et al*., 2022; Nijman & Wei, 2020; Turok & McGranahan, 2013). For example, the influx of large investment flows into IKN, which is able to create a multiplier effect in the economic sphere that allows business sectors to grow. The massive development of the new IKN economy is a positive signal through increasing the purchasing power of the population. With the increasing purchasing power of service commodities and goods, this indicates that there is an interaction between consumption, production and distribution in turn.

In substance, economic circulation is motivated by many industries opening new job opportunities (Ali *et al*., 2023). Growing industries also play a vital role for the workforce, such as increasing per capita income. Rosyadi *et al*. (2023) stated that residents who are in the workforce who are entering or are in their productive age will produce more goods and services according to the level of demand. Although this is considered an essential phase of macroeconomic growth, it is sometimes contemporary. The uncontrolled increase in prices of services and goods was also responded to by an increase in inflation (Yesikar *et al*., 2015). The emergence of inflation in certain service commodities and goods in the market in parallel will cause some industrial companies to reduce production inputs, even including reducing the workforce therein (Dekimpe & van Heerde, 2023). In this situation, there is uncertainty about the fate of the workers, where the company takes steps to lay off workers, so that they do not have a constant income. In the end, dismissal will give rise to classic socio-economic problems, *e.g* unemployment and poverty (Deakin *et al*., 2014; Ngubane *et al*., 2023).

Basically, income is one of the keys to quality development (Ariani *et al*., 2024). Apart from ensuring proper health and education, human development also talks about Purchasing Power Parity (PPP). If income is hampered, the food and non-food needs of households and individuals will not be channeled properly. In other words, the welfare of the population in terms of the three layers of human development is not being met optimally. What is more crucial is when there is social jealousy between residents with upper middle income

and residents with lower middle income (Van Doesum *et al.*, 2022). There are contradictory levels between the rich and the poor based on ownership of the social net and adequate savings (de Swaan, 1989; Zhang *et al.*, 2023). From this assumption, what is often debated is the gap in population income or what is often called the "gini ratio".

The main aim of this study is to compare nine variable components in economic development in the new IKN including: (1) gini ratio; (2) income per capita; (3) poverty; (4) open unemployment; (5) labor force participation; (6) economic growth; (7) human development; (8) inflation; and (9) investment. This economic development component was investigated using statistical calculations involving two different timelines, *i.e* before and after the IKN regulations were issued. The object of the study is the PPU district throughout 2019–2024. The study's contribution is useful for government decision makers. Implicitly, the originality of the study lies in the topic raised regarding IKN by dissecting nine indicators in economic development. Therefore, this study is also useful for academics as valuable novelty to increase insight in the future.

2. REVIEW OF LITERATURE

In the literature review chapter, two attributes are presented. First, theoretical background. The theoretical background highlights the history of capital relocation across countries based on the concept of economic development. Second, empirical basis. The empirical basis emphasizes the main reasons for moving the center of Indonesian government. This subchapter highlights IKN relocation as an alternative idea from the problem root and overlap. Also, identify relevant studies based on the perspective of Indonesian economic development, especially IKN. Through the limitations of previous empirical research, it is possible and opens up new opportunities by offering empirical studies in the scope of economic development performance.

2.1. Theoretical Background

Links to important dimensions of economic development in few countries that have relocated their capitals have been highlighted. In practice, seventeen countries have moved their capitals in order of year, such as Russia: St. Petersburg to Moscow in 1918, Turkey: Istanbul to Ankara in 1923, Australia: Melbourne to Canberra in 1927, China: Nanjing to Beijing in 1949, Mauritania: post-

independence to Nouakchott in 1957, Brazil: Rio de Janeiro to Brasília in 1960, Rwanda: Butare to Kigali in 1962, North Yemen: Ta'izz to Sana'a in 1962, Pakistan: Karachi to Islamabad in 1966, Malawi: Zomba to Lilongwe in 1974, Cote d'lvoire: Abidjan to Yamoussoukro in 1983, Chile: Santiago to Valparaiso in 1990, Nigeria: Lagos to Abuja in 1991, Tanzania: Dar-es-Salaam to Dodoma in 1996, Kazakhstan: Almaty to Astana in 1997, Malaysia: Kuala Lumpur to Putra Jaya in 1999, Myanmar: Yangon to Naypyidaw in 2005 (Rijanta *et al.*, 2022).

Several reasons that triggered the relocation of the capital in Russia, Turkey, Australia, China, Mauritania, Brazil, Rwanda, North Yemen, Pakistan, Malawi, Cote d'lvoire, Chile, Nigeria, Tanzania, Kazakhstan, Malaysia and Myanmar are recorded in various publications and manuscripts. For example, Gritsai & van der Wusten (2000) compare the evolution after the relocation of the capital, where the fate of St. Petersburg, which originates from the old capital, is closely related to the history of industrialization in the Russian economy, while Moscow is seen as representing the expansion of the Russian economy into Europe. The matter of relocating the capital in Türkiye cannot be separated from the desire to create a new growth center (Illmann, 2015). In Australia, the economic reasons behind the choice of Canberra as the new capital are affordable living costs, job opportunities for skilled workers, and high living standards (Southern Cross Personnel, 2023). Moreover, with improvements in the economy, it could be an attractive option for investors to invest in Canberra. Yuan *et al*. (2016) highlighted that the consideration for relocating the capital in China was Nanjing's commitment to creating a more competitive regional spatial plan in facing economic challenges. After independence, Mauritania took a priority step by making Nouakchott the capital of government (Bennoune, 1978). The main argument in this determination is the desire to fight for economic interests under new institutional arrangements. As with Mauritania, the reason the Brazilian constitution moved the location of the new country's interior from Rio de Janeiro to Brasília was due to various reasons. One of them is reducing the impact of negative externalities in the center of the old country due to economic inequality conflicts that are difficult to control (Kelly, 2020). The desire to overcome economic problems is a reasonable reason, so several countries offer a solution and one of them is relocating the capital. Twarabamenye & Nyandwi (2012) and Musahara (2011) explained that

economic development in Rwanda has stagnated since the mid-1960s. This anomaly is characterized by scarcity of natural resources, population pressure, and overlapping land ownership. At the same time, residents are encouraged to urbanize and migrate from villages to cities. As a result, the Rwandan government allocated large funds at that time by moving the capital from Butare to Kigali to look for new land, especially on the outskirts of the city.

Furthermore, in North Yemen, placing the capital of Ta'izz in a new place called Sana'a was a smart step taken by the government. The root of the problem in North Yemen is defense, where there is a rebellion due to political power that threatens national defense (Campante *et al*., 2019; Popa & Cocoş, 2015). By opening up isolated areas like Sana'a, economic access from inside to outside and vice versa will become more effective. Apart from that, community economic development has also recovered through real improvements in the quality of natural resources (biodiversity, land and water). The government's policy of resolving upheavals, especially changing living conditions, has been experienced by Pakistan. The creation of a new capital of Pakistan from Karachi to Islamabad became a case of more general importance (Doxiadis, 2005). In principle, this transfer is the best practice in bridging the rural-urban economy. With such a large dependency on an area, revitalization to a new city center is a logical reason. As an illustration in Malawi. The shift of the administrative center from Zomba to Lilongwe compared with other new capital cities in Africa was rapid (Connell, 1972). Although Lilongwe cost many times more than initial estimates, it was appropriate given Lilongwe's closer ties to its hinterland (Potts, 1984). Through innovative planning, migration to new capital cities can encourage job opportunities. As is the case with several countries in other parts of Africa, Cote d'lvoire (Abidjan to Yamoussoukro), Nigeria (Lagos to Abuja), or Tanzania (Dar-es-Salaam to Dodoma), the majority of reasons underlying relocation are the high level of spatial dependence. dominant. Therefore, by moving the capital city, economic connectivity will be created across regions (Armstrong, 1985; Obiadi *et al*., 2019; Ryakitimbo, 2017).

Finally, demands to reduce economic discrimination by relocating the capital were also made by Chile, Kazakhstan, Malaysia, Myanmar. So far, there has been regional decline, especially areas outside the capital city with weak economic competitiveness. This sparked the move of the capital from Santiago to Valparaiso (Borsdorf & Hidalgo, 2013), Almaty to Astana (Arslan, 2014),

Kuala Lumpur to Putra Jaya (Betria & Raju, 2018), and Yangon to Naypyidaw (Fan *et al.*, 2022). In its actualization, economic empowerment is not only centralized in one region, but allows other regions to develop as well. The flexibility of capital city revitalization can also lead to a more even distribution of authority.

2.2. Empirical Basis

Currently, Indonesia is trying to get out of the middle-income trap. One way to deal with this is to build a comprehensive economic system by accelerating the regional economy. In 2020, Indonesia's economic turnover will still be dominated by only a few regions, especially centered on the island of Java, reaching 58.75% of Indonesia's Gross Domestic Product/GDP (Febrianti *et al.*, 2021). Meanwhile, the remainder is divided into five other regions, *e.g* Sumatra Island (21.36%), Kalimantan Island (7.94%), Sulawesi Island (6.66%), Maluku and Papua Islands (2.35%), and Bali and Nusa Tenggara Islands (2.94%) to Indonesia's GDP. Many regions in Indonesia which are known for their abundant natural resources suffer from the distribution of economic results (Yeny *et al.*, 2022). This indicates that the areas in question experience discrimination and are called a "natural resource curse". In reality, Java Island is supported by a favorable geographical location, international and national trade routes, superior human resources, and complete infrastructure which have made Java a priority development corridor (Nihayah *et al.*, 2023; Pravitasari *et al.*, 2022; Sulistiyono, 2017; Sulistiyono & Rochwulaningsih, 2013). Thus, the government has the courage to develop a long-term plan to take real action through the IKN transfer program. IKN's position, before in Jakarta, has now shifted to PPU.

In the Klassen typology, there are four clusters to detect regional economic classification (Hutajulu *et al.*, 2018; Pravitasari *et al.*, 2024). These four clusters include: (1) Fast growing and advancing zones; (2) Advanced but depressed zone; (3) Rapidly developing zone; and (4) Relatively underdeveloped zones. The standard calculation is by comparing economic growth to Gross Regional Domestic Product (GRDP) per capita and vice versa at the city/district and provincial levels. Both economic growth and GDP per capita refer to Constant Price Basis (ADHK). From an examination of ten regions (Cities and Regencies) in East Kalimantan, Wijaya *et al.* (2020) found that seven

regions are grouped in the third cluster, including: Samarinda, Balikpapan, Mahakam Ulu, Berau, West Kutai, PPU, and Paser. Apart from that, only one area is in the first cluster, East Kutai. On the one hand, Kutai Kartanegara was reported to be in the second cluster and not a single area was found in the fourth cluster. Existing studies reveal that a fairly large population results in lower per capita income compared to comparison areas. The absorption of labor from population migration that is not accompanied by good skills has not had a positive impact on the economy collectively. Also, the proportion of GRDP growth still relies on capital-intensive primary economic structures (in this case agriculture and mining and quarrying).

Recently, many economic indicators can be considered to assess development performance. One thing that is often highlighted is economic development in developing markets such as Indonesia. In general, measures of economic development as a preference for the progress of a country or region include: (1) gini ratio; (2) population income; (3) poverty; (4) unemployment; (5) employment; (6) economic growth; (7) human development; (8) inflation rate; and (9) investment value. So far, there has been no similar study that discusses economic development patterns based on these nine indicators in the IKN case.

3. METHODOLOGY

This study is oriented towards comparative estimates of indicators in economic development. These indicators are organized into the following nine variables: (1) gini ratio; (2) income per capita; (3) poverty; (4) open unemployment; (5) labor force participation; (6) economic growth; (7) human development; (8) inflation; and (9) investment. Below is an explanation of each variable.

Table 1: Variable Composition

Variables (Lable)	*Concept (Unit)*	*Source*
Gini Ratio (GR)	Expenditure as a proxy for population income with a score range of 0–1, coefficient	BPS-East Kalimantan (2024a)
Income per Capita (IpC)	GRDP per capita at Current Prices (ADHB), Rp million	BPS-Penajam Paser Utara (2024a), BPS-East Kalimantan (2024b)
Poverty (Pov)	Poor population, %	Darmawan (2024)

Variables (Lable)	*Concept (Unit)*	*Source*
Open Unemployment (OU)	Number of unemployed to labor force, %	BPS-Penajam Paser Utara (2024b), BPS-East Kalimantan (2024b)
Labor Force Participation (LFP)	Ratio of labor force to population of productive working age, %	BPS-Penajam Paser Utara (2024c), BPS-East Kalimantan (2024b)
Economic Growth (EG)	GRDP growth rate at Constant Prices (ADHK) by business sector, %	BPS-Penajam Paser Utara (2024d), BPS-East Kalimantan (2024b)
Human Development (HD)	Shortfall reduction value from three pillars (PPP, average length of schooling, literacy rate, and life expectancy), index	BPS-Penajam Paser Utara (2024e), BPS-East Kalimantan (2024b)
Inflation (Inf)	Inflation year on year (y-on-y) or according to calendar year, %	BPS-East Kalimantan (2024b)
Investment (Inv)	Realization of Foreign Investment Capital (PMA), US$ thousand	BPS-East Kalimantan (2024b), BPS-East Kalimantan (2024c)

Table 1 summarizes the composition of the identified variables. The focus of the study is addressed to PPU. This district was determined as a research object considering that it would become the basis for a new economy in the IKN center. The period explored is 2019–2024. The period is divided into two-time schemes. First, 2019–2021 is the normal time before the PPU is selected. Second, the time after PPU is determined to become IKN starts in 2022–2024. Specifically, 2024 is temporary data referring to government statistical predictions. Input data is displayed in Table 2.

Table 2: List of Data Details

Variables (Unit)	*Before IKN*			*Since IKN*		
	2019	*2020*	*2021*	*2022*	*2023*	*2024**
Gini Ratio (coefficient)	.313	.322	.292	.263	.274	.299
Income per Capita (Rp million)	55.7	57.76	50.78	55.87	69.5	87.26
Poverty (%)	7.4	7.18	7.36	7.61	7.25	6.97
Open Unemployment (%)	4.62	6.03	6.22	2.95	2.12	2.07
Labor Force Participation (%)	64.53	64.33	69.04	66.85	68.4	66.25
Economic Growth (%)	1.28	2.61	-2.34	-1.69	14.49	29.85
Human Development (index)	71.64	71.13	71.41	72.01	72.55	73.3
Inflation (%)	3.13	2.06	2.73	3.6	3.06	3.54
Investment (US$ thousand)	18,053	20,904.1	9,383.6	18,765.6	5,870	1,602.8

The data material is of the time-series type. The database is compiled from official documents released by the government under the auspices of BPS-Penajam Paser Utara and BPS-East Kalimantan. After the data is collected, time-series data related to the variables are tabulated using a quantitative approach. Instruments in the quantitative approach apply different tests through three methods, namely: (1) independent sample t-test, (2) one sample t-test, and (3) paired sample t-test. Gerald (2018) and Kim (2015) explained that the three methods fall into the category of parametric or inferential statistics which are used to validate differences in average scores between two populations. The advantage of the difference test as reflected by the t-test is that it does not take a relatively long time. Moreover, the t-test leads to the assumption or central tendency that the data is normally distributed and the average of the data is known. In this test, the population variance is calculated to find a sample from the existing population. The population is projected on an interval scale and the variables for which the hypothesis will be tested

The data processing tool is operated with software called Statistical Program for Social Science (SPSS) version 26. The equation formula for the independent sample test is written as follows:

$$t = \frac{\overline{x}_1 - \overline{x}_2}{\sqrt{\left(\frac{\eta_1 - 1)\sigma_1 + (\eta_2 - 1)\sigma_2}{\eta_1 + \eta_2 - 2}\right) - \left(\frac{1}{\eta_1} + \frac{1}{\eta_2}\right)}} \quad (1)$$

where; t = t-statistics, $\overline{x}_1$ = 1st sample mean, $\overline{x}_2$ = 2nd sample mean, σ_1 = 1st sample variance, σ_2 = 2nd sample variance, η_1 = 1st sample size, η_2 = 2nd sample size, and $2r$ = correlation between two samples.

Below is a guide to making hypotheses in an independent sample test:

$$H_a : \mu_1 \neq \mu_2 \quad (2)$$

$$H_o : \mu_1 = \mu_2 \quad (3)$$

where; H_a = alternative hypothesis, H_o = null hypothesis, μ_1 = 1st population average score, and μ_2 = 2nd population average score.

If the t-value > t-table value, then both population means are the same or the null hypothesis is rejected and the alternative hypothesis is accepted. Conversely, if the t-value < t-table value, then the two population means are

not the same or the null hypothesis is accepted and the alternative hypothesis is rejected. Additionally, the formulation of the one sample test equation is as follows:

$$t = \frac{\overline{x} - \mu}{sd_{\overline{\chi}}} = \frac{\overline{\chi} - \mu}{sd / \sqrt{\eta}} \tag{4}$$

where; t = t-value, $\overline{\chi}$ = sample mean, μ = the population average or hypothesis to be tested, $sd_{\overline{\chi}}$ = standard error, *sd* = sample standard deviation, and η = number of sample data.

The equation path in the paired sample test is formed as follows:

$$t = \frac{\overline{\chi}_1 - \overline{\chi}_2}{\sqrt{\frac{s_1^2}{\eta_1} + \frac{s_2^2}{\eta_2} - 2r\left(\frac{sd_1}{\sqrt{\eta_1}}\right)\left(\frac{sd_2}{\sqrt{\eta_2}}\right)}} \tag{5}$$

where; t = t-statistics, $\overline{x}_1$ = 1st sample mean, $\overline{x}_2$ = 2nd sample mean, s_1^2 = 1st sample variance, s_2^2 = 2nd sample variance, *r* = correlation between two samples, sd_1 = 1st sample standard deviation, sd_2 = 2nd sample standard deviation, η_1 = 1st sample size, and η_2 = 2nd sample size.

Operationally, the hypothesis framework for a one sample test or paired sample test is interpreted as follows:

$$H_a = t_{value} > t_{table} \tag{6}$$

$$H_o = t_{value} < t_{table} \tag{7}$$

where; H_a = alternative hypothesis, H_o = null hypothesis, and *t* = t-statistics.

The standard procedure for making hypotheses using independent sample tests, one sample tests and paired sample tests can be based on a probability level of 5%. For social research such as economics, the critical threshold value can adopt a confidence level of 95% (Butkus *et al.*, 2021). Yet, one sample test modeling can also be compared between t-values and t-tables by adjusting the t-distribution table and degrees of freedom (Xu *et al.*, 2017). The mechanism is if the t-value > t-table, then the null hypothesis is rejected and the alternative hypothesis is accepted. Furthermore, if the t-value < t-table, then the null hypothesis is accepted and the alternative hypothesis is rejected. The equation function in the t-table is written as follows:

$$t_{table} = t_{(\alpha,\ df)} \tag{8}$$

where; t = t-statistics, α = alpha, and *df* = degree of freedom (*η-1*).

In statistical testing, including t-statistics, degrees of freedom are used to determine significance. Then, the econometric equation for degrees of freedom is formed as follows:

$$df = \frac{\left(\frac{sd_1^2}{\eta_1} + \frac{sd_2^2}{\eta_2}\right)^2}{\frac{1}{\eta_1 - 1}\left(\frac{sd_1^2}{\eta_1}\right)^2 + \frac{1}{\eta_2 - 1}\left(\frac{sd_2^2}{\eta_2}\right)^2} \tag{9}$$

where; df = degree of freedom, *sd* = standard deviation, η_1 = 1st sample size, and η_2 = 2nd sample size.

4. FINDINGS AND DISCUSSION

This chapter presents the output of data processing based on descriptive statistics and three stages in different tests which are converted to independent samples, one sample and paired samples. Descriptive statistics serves to collect the distribution of a dataset and visualize central tendency. Mathematically, there are two criteria for descriptive statistics. First, descriptive statistics for the overall data cover 2019–2024. Items in descriptive statistics for combined data include: minimum, maximum, mean, and standard deviation. Second, descriptive statistics for separate data (2019–2021 and 2022–2024). Descriptive statistics for this criterion are in the form of mean, standard deviation and standard error of the mean to examine two different groups of variables. The first group of variables is before IKN, while the second group of variables is after IKN was relocated. The descriptive statistical data output is integrated into the mean, standard deviation and standard error of the mean. In addition, the difference test is used to evaluate certain treatments on the same sample with two different observation periods. The independent sample test displays two items: (1) Levene's test for equality of variances and (2) t-test for equality of means. One sample test is verified with test value, while in paired sample test it describes paired samples correlations and paired differences.

4.1. Descriptive Statistics

During 2019–2024, the regional economy in PPU experienced dynamics (up and down). This reality cannot be separated from the realization of economic development data contained in descriptive statistics. As shown in Table 2, the only variable that appears to have increased impressively is HD. Even so, economic development in PPU which is connected to the other seven variables is still an inclusive prospect. For the record, only EG experienced a very drastic decline in 2021 amounting to -2.34% and 2022 amounting to -1.69% because economic stability at that time was disrupted by Coronavirus disease in 2019 (Roy *et al*. 2021). After that, in 2023–2024 to be precise, EG actually exceeded expectations and reached 14.49% and 29.85%.

Table 3: Descriptive Statistics Matrix for Combined Data

Variables	*Minimum*	*Maximum*	*Mean*	*SD*
GR	.26	.32	.29	.02
IpC	50.78	87.26	62.81	13.51
Pov	6.97	7.61	7.29	.22
OU	2.07	6.22	4	1.89
LFP	64.33	69.04	66.57	1.94
EG	-2.34	29.85	7.37	12.59
HD	71.13	73.3	72.01	.81
Inf	2.06	3.6	3.02	.58
Inv	1,602.8	20,904.1	12,429.85	7,913.42
Obs.	54	54	54	54

Abbreviations: Standard Deviation (SD), Gini Ratio (GR), Income per Capita (IpC), Poverty (Pov), Open Unemployment (OU), Labor Force Participation (LFP), Economic Growth (EG), Human Development (HD), Inflation (Inf), and Investment (Inv).

In general, there are striking differences between variables, especially in variables with measurements other than percentage (%), *i.e* IpC (Rp million) and Inv (US$ thousand). Based on Table 3, each minimum score, maximum score, mean score and SD score are sorted. In realization, GR (*min*. = 0.26; *max*. = 0.32; *mean* = 0.29; *SD* = 0.02), IpC (*min*. = 50.78; *max*. = 87.26; *mean* = 62.81; *SD* = 13.51), Pov (*min*. = 6.97; *max*. = 7.61; *mean* = 7.29; *SD* = 0.22), OU (*min*. = 2.07; *max*. = 6.22; *mean* = 4; *SD* = 1.89), LFP (*min*. = 64.33; *max*. = 69.04; *mean* = 66.57; *SD* = 1.94), EG (*min*. = -2.34; *max*. = 29.85; *mean* = 7.37; *SD* = 12.59), HD (*min*. = 71.13; *max*. = 73.3; *mean* = 72.01; *SD* =

0.81), Inf (*min.* = 2.06; *max.* = 3.6; *mean* = 3.02; *SD* = 0.58), and Inv (*min.* = 1,602.8; *max.* = 20,904.1; *mean* = 12,429.85; *SD* = 7,913.42).

Table 4: Descriptive Statistics Matrix for Separate Data

Variables	*Group*	*Mean*	*SD*	*SEM*
GR	1	.31	.015	.009
	2	.28	.018	.011
IpC	1	54.75	3.59	2.08
	2	70.88	15.74	9.09
Pov	1	7.31	.118	.068
	2	7.28	.321	.185
OU	1	5.62	.875	.504
	2	2.38	.494	.286
LFP	1	65.97	2.66	1.53
	2	67.17	1.11	.641
EG	1	.52	2.57	1.48
	2	14.22	15.78	9.11
HD	1	71.39	.255	.148
	2	72.62	.648	.374
Inf	1	2.64	.541	.312
	2	3.4	.296	.171
Inv	1	16,113.57	6,000.13	3,464.18
	2	8,746.13	8,935.58	5,158.96
Obs.	54	54	54	54

Abbreviations: Standard Deviation (SD), Standard Error Mean (SEM), Gini Ratio (GR), Income per Capita (IpC), Poverty (Pov), Open Unemployment (OU), Labor Force Participation (LFP), Economic Growth (EG), Human Development (HD), Inflation (Inf), and Investment (Inv). *Code:* 1 = Era before IKN and 2 = Era after IKN was formed.

There are notable differences in the descriptive statistics involving the data separately (see Table 4). The scores on the mean, SD, and SEM of each variable according to the group appear to vary. Each variable separated based on the first group is detailed as follows: GR1 (*mean* = 0.31; *SD* = 0.015; *SEM* = 0.009), IpC1 (*mean* = 54.75; *SD* = 3.59; *SEM* = 2.08), Pov1 (*mean* = 7.31; *SD* = 0.118; *SEM* = 0.068), OU1 (*mean* = 5.62; SD = 0.875; *SEM* = 0.504), LFP1 (*mean* = 65.97; *SD* = 2.66; *SEM* = 1.53), EG1 (*mean* = 0.52; *SD* = 2.57; *SEM* = 1.48), HD1 (*mean* = 71.39; *SD* = 0.255; *SEM* = 0.148), Inf1 (*mean* = 2.64; *SD* = 0.541; *SEM* = 0.312); and Inv1 (*mean* = 16,113.57; *SD* = 6,000.13; *SEM* = 3,464.18). In the second group, descriptive statistics are sorted as follows: GR2

(*mean* = 0.28; *SD* = 0.018; *SEM* = 0.011), IpC2 (*mean* = 70.88; *SD* = 15.74; *SEM* = 9.09), Pov2 (*mean* = 7.28; *SD* = 0.321; *SEM* = 0.185), OU2 (*mean* = 2.38; *SD* = 0.494; *SEM* = 0.286), LFP2 (*mean* = 67.17; *SD* = 1.11; *SEM* = 0.641), EG2 (*mean* = 14.22; *SD* = 15.78; *SEM* = 9.11), HD2 (*mean* = 72.62; *SD* = 0.648; *SEM* = 0.374), Inf2 (*mean* = 0.34; *SD* = 0.296; *SEM* = 0.171), and Inv2 (*mean* = 8,746.13; *SD* = 8,935.58; *SEM* = 5,158.96).

4.2. Independent Sample t-Test

According to Buchmeister & Herzog (2024), the independent sample t-test is useful for analyzing differences in the means of two unpaired samples. The main requirement in this test is that the data is homogeneous (not absolute) and has a normal distribution. Technically, the study variables tested using this technique are summarized in Table 5.

Table 5: Results of Independent Sample t-Test

Variables	*Levene's Test*	*t-Test*				
	F and Sig.	*t and Sig. (2-tailed)*	*MD*	*SED*	*95% CI*	
					LB	*UB*
GR1	.136 (.731)	2.187 (.094)	.03	.014	-.008	.068
GR2		2.187 (.096)			-.008	.069
IpC1	2.888 (.164)	-1.731 (.159)	-16.13	9.32	-42.01	9.74
IpC2		-1.731 (.214)			-52.83	20.57
Pov1	1.735 (.258)	.186 (.862)	.037	.197	-.52	.59
Pov2		.186 (.866)			-.66	.74
OU1	2.076 (.223)	5.594 (.005)**	3.24	.58	1.64	4.85
OU2		5.594 (.009)**			1.45	5.04
LFP1	4.452 (.102)	-.720 (.511)	-1.2	1.67	-5.82	3.43
LFP2		-.720 (.529)			-6.89	4.49

Variables	*Levene's Test*	*t-Test*				
	F and Sig.	*t and Sig. (2-tailed)*	*MD*	*SED*	*95% CI*	
					LB	*UB*
EG1	2.797 (.170)	-1.485 (.212)	-13.7	9.23	-39.31	11.91
EG2		-1.485 (.270)			-51.55	24.15
HD1	1.775 (.254)	-3.051 (.038)*	-1.23	.41	-2.34	-.110
HD2		-3.051 (.036)*			-2.62	.169
Inf1	.978 (.379)	-2.136 (.100)	-.76	.36	-1.75	.228
Inf2		-2.136 (.119)			-1.87	.352
Inv1	.771 (.430)	1.186 (.301)	7,367.43	6,214.13	-9,885.75	24,620.61
Inv2		1.186 (.310)			-1.0905.43	25.640,29
Obs.	54	54	54	54	54	54

Abbreviations: Gini Ratio (GR), Income per Capita (IpC), Poverty (Pov), Open Unemployment (OU), Labor Force Participation (LFP), Economic Growth (EG), Human Development (HD), Inflation (Inf), Investment (Inv), F-Distribution (F), t-Distribution (t), Significance (Sig.), Mean Difference (MD), Standard Error Difference (SED), Confidence Interval (CI), Lower Bound (LB), Upper Bound (UB), and Observations (Obs). *Code:* 1 = Equal variances assumed and 2 = Equal variances not assumed. *Note:* *p < 0.05 and **p < 0.01.

Through the independent sample t-test, two findings were confirmed. First, in Levene's test, the existing results claim that none of the variables have a relationship with each other simultaneously. This is proven by the F-value below the F-table, where the F-table for this study is 1.95. This means that there were significant differences simultaneously both before IKN and after IKN started between IpC1 and IpC2 (*F-value* = 1.288), OU1 and OU2 (*F-value* = 2.076), LFP1 and LFP2 (*F-value* = 4.452), and EG1 with EG2 (*F-value* = 2.797). Second, is the t-test. Partially, with a t-table of 1.688, there was a significant two-way difference between GR1 and GR2 (*t-value* = 2.187) and OU1 and OU2 (*t-value* = 5.594) before IKN or after IKN started. The remaining seven variables are not significantly related in an unpaired manner. Interestingly,

through Levene's Test and t-Test, OU is the only variable that is consistent among the other variables, where OU1 and OU2 are significantly related to each other in the editions before IKN and after IKN was implemented.

4.3. One Sample t-Test

One sample t-test is intended to analyze a sample that comes from a population group that has a known mean value. The advantage of this test is that it is very suitable for measuring small samples or population standard deviations in unknown situations (Al-kassab, 2022). Automatically, the one sample t-test will test whether the average of a sample is representative of the population or vice versa.

Table 6: Results of One Sample t-Test

Variables	*Test Value*			
	t and Sig. (2-tailed)	*MD*	*95% CI*	
			LB	*UB*
GR1	34.77 (.001)**	.31	.271	.347
GR2	26.16 (.001)**	.28	.239	.324
IpC1	26.44 (.001)**	54.75	45.84	63.66
IpC2	7.8 (.016)*	70.88	31.78	109.98
Pov1	108.1 (.000)***	7.31	7.02	7.6
Pov2	39.28 (.001)**	7.28	6.48	8.08
OU1	11.14 (.008)**	5.62	3.45	7.8
OU2	8.34 (.014)*	2.38	1.15	3.61
LFP1	42.9 (.001)**	65.97	59.35	72.59
LFP2	104.86 (.000)***	67.17	64.42	69.92
EG1	.349 (.760)	.52	-5.85	6.88
EG2	1.56 (.259)	14.22	-24.97	53.4

Variables	*Test Value*			
	t and Sig. (2-tailed)	*MD*	*95% CI*	
			LB	*UB*
HD1	484.15 (.000)***	71.39	70.76	72.03
HD2	194.15 (.000)***	72.62	71.02	74.23
Inf1	8.46 (.014)*	2.64	1.3	3.99
Inf2	19.9 (.003)**	3.4	2.67	4.14
Inv1	4.65 (.043)*	16,113.57	1,208.42	31,018.71
Inv2	1.7 (.232)	8,746.13	-13,451.07	30,943.34
Obs.	54	54	54	54

Abbreviations: Gini Ratio (GR), Income per Capita (IpC), Poverty (Pov), Open Unemployment (OU), Labor Force Participation (LFP), Economic Growth (EG), Human Development (HD), Inflation (Inf), Investment (Inv), t-Distribution (t), Significance (Sig.), Mean Difference (MD), Confidence Interval (CI), Lower Bound (LB), Upper Bound (UB), and Observations (Obs). *Code:* 1 = Era before IKN and 2 = Era after IKN was formed. *Note:* *p < 0.05, **p < 0.01, and ***p < 0.001.

In this study, the t-table shows 1.688. In a two-way relationship, there are sixteen variables from two different groups that are significantly affected before or after the IKN transfer regulations are issued. These variables are GR1 (*t-value* = 34.77), GR2 (*t-value* = 26.16), IpC1 (*t-value* = 26.44), IpC2 (*t-value* = 7.8), Pov1 (*t-value* = 108.1), Pov2 (*t-value* = 39.28), OU1 (*t-value* = 11.14), OU2 (*t-value* = 8.34), LFP1 (*t-value* = 42.9), LFP2 (*t-value* = 104.86), HD1 (*t-value* = 484.15), HD2 (*t-value* = 194.15), Inf1 (*t-value* = 8.46), Inf2 (*t-value* = 19.9), Inv1 (*t-value* = 4.65), and Inv2 (*t-value* = 1.7). The point from Table 6 above is that HD1 and HD2 are the variables with the most dominant t-value among the other variables, so that the success rate exceeds the model estimate. But, EG1 (*t-value* = 0.349) or EG2 (*t-value* = 1.56) whose success rate is the opposite of what was expected.

4.4. Paired Sample t-Test

Paired sample t-test was applied in this study to compare the average of two measurements taken from the same and related units. The strength of this test is that it can see the effectiveness of the treatment which is indicated by the

difference in the average before and the average after the treatment is given (Bewoor & Pawar 2010). Table 7 below describes the results of paired sample testing.

Table 7: Results of Paired Sample t-Test

Variables	*Paired Samples (Cor. and Sig.)*	*Paired Differences*					
		Mean	*SD*	*SEM*	*t and Sig. (2-tailed)*	*95% CI*	
						LB	*UB*
GR1–GR2	-.826 (.382)	.03	.032	.02	1.62 (.246)	-.05	.12
IpC1–IpC2	-.739 (.471)	-16.13	18.55	10.71	-1.51 (.271)	-62.21	29.95
Pov1–Pov2	.241 (.845)	.037	.32	.18	.202 (.858)	-.74	.82
OU1–OU2	-.998 (.037)*	3.24	1.37	.79	4.12 (.054)	-.15	6.64
LFP1–LFP2	-.741 (.468)	-1.2	3.57	2.06	-.59 (.619)	-10.06	7.65
EG1–EG2	-.696 (.510)	-13.7	17.66	10.2	-1.34 (.311)	-57.55	30.15
HD1–HD2	.467 (.690)	-1.23	.58	.34	-3.7 (.066)	-2.66	.21
Inf1–Inf2	.962 (.177)	-.76	.27	.16	-4.9 (.039)*	-1.43	-.09
Inv1–Inv2	.501 (.666)	7,367.43	7,881.49	4,550.38	1.6 (.247)	-12,211.26	26,946.13
Obs.	54	54	54	54	54	54	54

Abbreviations: Correlation (Cor.), t-Distribution (t), Significance (Sig.), Standard Deviation (SD), Standard Error Mean (SEM), Gini Ratio (GR), Income per Capita (IpC), Poverty (Pov), Open Unemployment (OU), Labor Force Participation (LFP), Economic Growth (EG), Human Development (HD), Inflation (Inf), Investment (Inv), Confidence Interval (CI), Lower Bound (LB), Upper Bound (UB), and Observations (Obs). *Codes:* 1 = Era before IKN and 2 = Era after IKN was formed. *Note:* *$p < 0.05$.

In Table 7, paired sample correlation and paired differences are displayed. The correlation value in paired samples reflects the relationship between the two variables in paired samples, while paired differences represent the differences between the initial variable and the final variable (Hedberg & Ayers, 2015; Purwaamijaya & Masri, 2023). For paired correlation, the condition is that positive correlation is greater than zero or close to one (between 0 and 1) and

negative correlation if it is less than zero (between 0 and -1). There are also those that are diversified with a score between –1 and 1 between two variables with the following three articulations: 0 and 1 (there is a positive correlation), 0 (no correlation), and 0 and -1 (negative correlation). From this proposition, a positive correlation was obtained between Pov1–Pov2 (*Cor.* = 0.241), HD1–HD2 (*Cor.* = 0.467), Inf1–Inf2 (*Cor.* = 0.962), and Inv1–Inv2 (*Cor.* = 0.501). Among these four positive correlation relationships, Inv1 and Inv2 are the most dominant and closest to perfect. Other empirical results show that Inv1 and Inv2 have a significant influence on each other in pairs both before IKN and after IKN. With a t-table of 1.679, there is synergy in OU1–OU2 (*t-value* = 4.12) in the same observation. Too, the eight other variables in pairs are not significantly related.

4.5. Summary of Difference Test

In this section, three models are compared in different tests: (1) independent sample t-test, (2) one sample t-test, and (3) paired sample t-test. Overall, there are differences in findings regarding whether IKN is able to have a concrete impact or whether economic development was actually better before IKN existed. All three models are validated based on t-statistics. With fifty-four units of observations, the t-table of the two models (independent sample t-test and one sample t-test) is 1.688 and the t-table of the third model (paired sample t-test) is 1.679. From Table 8, specifically the independent sample t-test, both GR1 and GR2 and OU1 and OU2 have a significant unpaired influence. In the one sample t-test, it was explained that the eight subjects in GR, IpC, Pov, OU, LFP, HD, Inf, and Inv, were able to represent the population significantly. In the paired sample t-test, there was a significant difference between OU1 and OU2. From both independent sample tests, one sample tests and paired sample tests, it was found that OU was the only variable that was significantly consistent compared to other variables before IKN in 2019–2021 and after the implementation of IKN in 2022–2024.

Table 8: Results on all Three Tests

Variables	*Group*	*Model 1*	*Model 2*	*Model 3*
GR	GR1	2.187 (.094)	34.77 (.001)**	1.62 (.246)
	GR2	2.187 (.096)	26.16 (.001)**	

Variables	*Group*	*Model 1*	*Model 2*	*Model 3*
IpC	IpC1	-1.731 (.159)	26.44 (.001)**	-1.51 (.271)
	IpC2	-1.731 (.214)	7.8 (.016)*	
Pov	Pov1	.186 (.862)	108.1 (.000)***	.202 (.858)
	Pov2	.186 (.866)	39.28 (.001)**	
OU	OU1	5.594 (.005)**	11.14 (.008)**	4.12 (.054)
	OU2	5.594 (.009)**	8.34 (.014)*	
LFP	LFP1	-.720 (.511)	42.9 (.001)**	-.59 (.619)
	LFP2	-.720 (.529)	104.86 (.000)***	
EG	EG1	-1.485 (.212)	.349 (.760)	-1.34 (.311)
	EG2	-1.485 (.270)	1.56 (.259)	
HD	HD1	-3.051 (.038)*	484.15 (.000)***	-3.7 (.066)
	HD2	-3.051 (.036)*	194.15 (.000)***	
Inf	Inf1	-2.136 (.100)	8.46 (.014)*	-4.9 (.039)*
	Inf2	-2.136 (.119)	19.9 (.003)**	
Inv	Inv1	1.186 (.301)	4.65 (.043)*	1.6 (.247)
	Inv2	1.186 (.310)	1.7 (.232)	
Obs.	54	54	54	54

Abbreviations: Gini Ratio (GR), Income per Capita (IpC), Poverty (Pov), Open Unemployment (OU), Labor Force Participation (LFP), Economic Growth (EG), Human Development (HD), Inflation (Inf), Investment (Inv), and Observations (Obs). *Codes:* 1 = Era before IKN and 2 = Era after IKN was formed. *Note:* *p < 0.05, **p < 0.01, and ***p < 0.001.

This study modifies several previous scientific works related to the theme of economic development. As in the paper by Lin & Rosenblatt (2012), the perspective in economic development needs to be rethought. In the 20th

century, there was a pattern of divergence to convergence due to a shift in economic growth which was characterized by a widening gap between developing countries and developed countries. With a small capacity (less than 10% of the economy on a global scale), only a few countries have moved out of the status of low and middle-income countries into high income countries. This phenomenon is caused by increasing economic networks between developing countries through mutually bound knowledge exchange. Like what is experienced by Bangladesh, where the economy in this country is supported by trade liberalization (Manni & Afzal, 2012). Economic achievements reviewed based on imports, inflation, exports and GDP growth have increased after Bangladesh carried out expansive trade liberalization. Economic indicators may influence the confidence of the business sector in Poland. Indicators such as unemployment, GDP and inflation will help the economic decision-making process in business activities (Olkiewicz, 2022).

From the three perspectives above, the main target of economic development is to spur prosperity (Bergmann, 2010). Fritz & Koch (2016) inform us that prosperity is a symbol that indicates whether the economy in a nation or region can run as it should or not. Success in encouraging prosperity can be seen from government initiatives, whether economic policies have touched and been felt by the population and vice versa (Jackson, 2010). To reduce economic inequality (including breaking the chain of poverty), population productivity is needed. Of the many indicators of economic development, the measure of basic human needs that is most highlighted is Gross National Product (GNP) per capita. Apart from describing economic output, GNP per capita is an adequate indicator in evaluating social and humanitarian development performance such as poverty alleviation (Hicks & Streeten, 1979). GNP per capita is closely related to labor income. This is in line with what Jehan & Khan (2020) wrote about demographic trends and economic growth in Pakistan that the demographic bonus which is characterized by an increase in the working age population ratio can encourage capital stock (investment and savings). Capital stock plays a role in mediating population changes based on the dependence of the young and old on employment. Comparing the two age ratios, elderly dependency is the most at risk of threatening economic growth.

5. CONCLUSION, POLICY SUGGESTION AND LIMITATIONS

The synthesis in this study is to review changes before IKN (2019–2021) and post IKN (2022–2024) using three different test flows, namely independent sample t-test, one sample t-test, and paired sample t-test. The conclusions that can be drawn are as follows:

- The gini ratio and open unemployment are significantly impacted before IKN or after IKN through a one sample test;
- Using the independent sample test, there is a significant effect on gini ratio, income per capita, poverty, open unemployment, labor force participation, human development, inflation and investment (both before and when the IKN relocation project is implemented);
- The modeling technique designed via a paired sample test, emphasizes that there is significant causality in the open unemployment variable group during normal times (before IKN) or after IKN. Uniquely, there are similar results from the three tests, where open unemployment is the most consistent variable that is significantly related to each other. This confirms that open unemployment experienced a significant increase at two different time characteristics, *i.e* before the IKN transfer was proposed and after the IKN was implemented. As a consequence, IKN development actually increases open unemployment and has the potential to trigger poverty and disparities in income distribution.

The implications of the study show that economic development in the new IKN is experiencing a shift, especially towards open unemployment. However, shifts in economic development, such as unemployment, are issues that must be followed up. The obstacle is that before and after the IKN transfer was implemented, relatively little IKN development opened up the field widely. Workers who are of productive age find it difficult to get employment opportunities, so that the population is not optimally absorbed as a workforce in various business fields in IKN. For this reason, the central government and regional governments as policy makers must evaluate the IKN development program for mature readiness. Other recommendations are also aimed at practitioners and stakeholders involved in development to help the government initiate strategic steps in boosting the IKN economy.

The weaknesses of the existing studies are recognized by the authors. Some of the weaknesses include: (1) data volume, (2) estimated variables, and (3) observations only focus on one object. For premise on the next agenda, it is recommended to refresh the model, especially deepening the variables with long-term data.

ACKNOWLEDGMENTS

Not applicable

DECLARATIONS

- **Funding:** This research received no external funding.
- **Institutional Review Board Statement:** Not applicable.
- **Informed Consent Statement:** Not applicable.
- **Data Availability Statement:** The datasets identified in this study are available from the authors on reasonable request.
- **Conflicts of Interest:** The authors declare no conflicts of interest.

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