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Factors Influencing the Realization of Smart and Comfortable City Development Study of Balikpapan City

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Abstract

This study aims to determine and analyze the influence of health factors, education, infrastructure availability and minimum wages on labor absorption both directly and through private investment and economic growth. This study uses secondary data in the form of life expectancy data, average length of schooling, distributed energy, provincial minimum wages, private investment (PMA and PMDN), GRDP, economic growth, and the number of working population in each province in Eastern Indonesia. The data is in the form of N The results of the study show that directly health factors, education, and provincial minimum wages have a negative and significant effect on labor absorption while infrastructure availability has a positive and significant effect. Indirectly health factors, infrastructure availability and minimum wages are able to increase labor absorption both through investment and economic growth in contrast to the education factor which has not maximized labor absorption both through investment and economic growth. This is in line with the conditions of KTI which are still dominated by informal sector employment.

Keywords: Average length of schooling, Private investment, Labor absorption

INTRODUCTION

The year 2023 is the Twenty-First (21) century with a very massive global trend, this causes the concentration of population in big cities. Large and densely populated cities can be very productive, innovative, beautiful environment, so comfortable to live in, is the expected condition in the future.

Balikpapan City is a city in East Kalimantan Province, which is close to the Development of the National Capital City of the Archipelago (IKN). The influx of immigrants will quickly present extraordinary challenges for the Balikpapan City government. Along with the positive benefits accumulated from population density, there are also negative aspects such as informal development, traffic congestion, waste management, and access to resources and crime.

The societal demand for real-time services (Internet of Things (IoT)) is one of the challenges leading to experimentation with new approaches to planning and designing, financing, governance, and operating urban infrastructure and services, broadly referred to as Smart Cities.

This research in the form of a dissertation tries to conduct an experiment by creating a research model to examine "Factors that influence the Realization of Smart and Comfortable City Development".

The difference between the terms "traditional city" and "smart city" is; in traditional cities, (sub)systems can generally only interact with their own environment. This means that the systems are mostly stand-alone, and cannot be operated with other systems. On the other hand, one of the main goals of a smart city is to connect various systems and subsystems among themselves to improve the quality of life, save energy, reduce emissions and ultimately create a smart and comfortable city to live in.

The government as a policy maker in planning and designing a smart city system is also an exogenous variable in this study. Governance greatly influences the results of a manifestation of a Smart and Comfortable City. The Agglomeration Force, from the Creative Economy which is also designed by the Government, is an exogenous variable in this research model. The mediating variable in this research model is the Availability of Infrastructure. The Availability of Infrastructure is expected to be a dispersion force, for the distribution of economic activities around the city area, so that the endogenous variables of this study, namely; Smart and Comfortable City, are hypothesized to be realized.

Global trends (Globalization) are constraints for analyzing economic activity in urban areas. In spatial economics, the interaction between Agglomeration forces, which draw economic activity to a particular area, and Dispersion forces, which spread economic activity throughout the surrounding area, determine the geographic distribution of economic

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activity. Spatial Economic Analysis will provide an understanding of how space (distance) affects economic behavior that refers to each type of economic entity.

The development approach based on the concept of regional development needs to consider spatial aspects to increase efficiency and reduce inequality. The framework of thought concerning spatial interactions between economic activities that lead to optimal utilization of resources, both between activities in the City Government to the Neighborhood Association (RT) level. The ninth (9) goal of Sustainable Development (SDG 9), namely "Building resilient infrastructure, encouraging inclusive and sustainable industrialization, and encouraging innovation", to realize a Smart and Comfortable City.

The smart city conceptualization offers economic development and environmental sustainability, as well as a better quality of life through policy decisions made by the City Government,(Mills et al., 2022). Meanwhile, according to(Yigitcanlar & Kamruzzaman, 2018), to implement the realization of Smart and Comfortable Cities, it is difficult to realize. According to their research, the relationship between city intelligence and carbon dioxide emissions is not linear, and the impact of city intelligence on carbon dioxide emissions does not change over time. This finding requires better alignment of smart city strategies to produce more tangible sustainable results, so that the popular smart city concept, for some, is seen as a vision, manifesto, or promise aimed at realizing an ideal and sustainable city form in the 2nd century, does not cause others, it is just a hype (sensational promotion). The results of the study conducted by(Černý et al., 2014), also shows that the realization of a Smart and Comfortable City, in the service sector for the public or community, such as sustainable public transportation, with three types of accessibility, namely: spatial, time and economic, usually strengthens the social pillar, then weakens the economic pillar.

The Qlue smart city application in Jakarta City, which involves the role of citizens and citizens feel empowered, in turn, causes citizens to feel satisfied with the Application created by the Jakarta City Government,(YQ Zhu & Alamsyah, 2022). While critical and creative data services are needed as a first step if we want to reorganize data services for a sustainable society, as well as empowering diverse communities,(Kelleher & Kerr, 2020).

The outbreak of the coronavirus disease 2019 (COVID-19) has brought great challenges to the improvement of Smart City services. High-quality information content, highly reliable systems, and highly responsive systems have a significant positive effect on citizens' ongoing experience, but not on citizens' direct experience. Both direct and continuous citizen experience have a significant positive effect on citizen engagement. Smart City management can understand citizens' reactions in emergencies,(W. Zhu et al., 2022).

Along with the development of cities, problems and challenges to the urban environment, urban resources and urban management, and other aspects are increasingly emerging and the solution is increasingly difficult. Urban transformation regarding low-carbon policies has become a strategic mode of urban development. In some places, there are still speculative concepts and blind phenomena in management and economy that are faced with uncertainty and risk. Therefore, it is very important to conduct a comprehensive study on the complexity of the urban system, impact factors and mechanisms of interaction and symbiosis,(WANG & WANG, 2016).

According to(Bash, 2015), Smart Cities illustrates, how information technology plays a role in shaping new norms of behavior, intended to facilitate sustainable dense population growth. It then explains the central hypothesis of the Urban Systems Collaboration, that increased accessibility of information will enable us to develop Urban Systems models that can help citizens, entrepreneurs, civil society organizations, and governments to see more deeply, how their cities work, how people use the city, how they feel about it, where the city is facing problems, and what improvements can be made.

Public Views on Smart Cities, such as research conducted by(Rijshouwer et al., 2022), that the digitalization and datafication of public space have a significant impact on how cities are developed, organized, perceived and used. Since technological developments are based on political decisions, which impact people's everyday lives, and from which not everyone benefits or suffers equally, we argue that the 'smart city' should be part of an ongoing public debate; that it should be considered and treated as a social issue. Through nine focus groups, we invited respondents to explore and discuss examples and dilemmas of smart cities. We investigated which interpretative repertoires they used to frame smart cities as social and actionable issues. We found that, in the context of the city of Rotterdam in the Netherlands, citizens do not experience and perceive smart cities as social and actionable issues. Although they associate the development of smart city technologies with potential threats, this does not change or limit their sense of 'actionability', or their behavior, because they perceive themselves as powerless individuals, in the complex, incomprehensible and inevitable situations they face. Interestingly, rather than specifically and contextually reflecting on smart city issues, respondents tended to express their concerns in the more general context of digital technology and data invading everyday life.

The need for a Smart and Comfortable City, it cannot be denied that this is a very urgent need due to globalization. Efficiency and a comfortable environment are very much needed by the community. This is in accordance with the results of research conducted by(Strielkowski et al., 2020), city planners, local government stakeholders, and urban policy makers dealing with smart city planning and management, that there is a need for better management including leaders to drive smart city policies and investments and to cover wider city areas, with economically sustainable projects and

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plans. In addition, smart city projects should aim to find solutions for smartly connected local energy storage systems to support more renewable energy sources in the electricity grid.

Other research on Smart Cities, such as that conducted in China, by(Song et al., 2022), that Smart Cities have positive effects on total economic and ecological efficiency (combining resource consumption and pollution emissions). However, the environmental protection effect is not as strong as the resource conservation effect.

In the modern urban environment, technology has become fundamental to everyday life and is increasingly embedded in that life. Smart cities are one example of the acceleration of technological change to address urban sustainability challenges, with Artificial Intelligence (AI) tools as one mode of engagement. However, the discourses through which cities engage with smart city growth and management can have long-term consequences for the diverse body of knowledge that exists within the smart urban imaginary,(Zaman & Hertweck, 2022).

In the end, the Research on Smart Cities, as conveyed by(Hasija et al., 2020), that recent developments in smart city initiatives around the world, are expected to motivate the opportunities and challenges posed by these initiatives. It is recognized that academic literature that can help in addressing some of these challenges is in its infancy and provides guidance on how scholars can contribute to the global smart city movement.

RESEARCH METHODS

The method used in this study is a quantitative research method. Multivariate analysis is used in analyzing research, involving variables in an amount of more than or equal to three variables. WarpPLS is multivariate-based and can analyze structural equation modeling (SEM),(Joseph F. Hair et al., 2014).

By using descriptive statistics, which is numerical data collected in research, and analyzed quantitatively using statistical tools. Descriptive analysis refers to the depiction, collection, and presentation of statistically interesting constructs or associations between constructs. Analysis refers to statistical testing of hypotheses (theory testing),(Bhattacherjee, 2012).

The influence between independent variables on dependent variables through hypothesis testing. In analyzing the data, researchers used the WarpPLS software program. Analysis using WarpPLS is a development of PLS (Partial Least Square). From the results of both theoretical and empirical studies, a hypothesis formulation can be formulated to be tested for its truth. In this study, hypothesis testing was carried out using quantitative tests using the Structural Equation Modeling (SEM) model analysis tool.

RESULTS AND DISCUSSION

1.1.1. The Relationship of Governance to Smart and Comfortable Cities

Relationship of Governance to Smart and Comfortable Cities, The Results of this Study are Positive and significant. The Governance of Balikpapan City is in accordance with the Vision of the Regional Head, namely: Realizing Balikpapan as a Leading City that is Comfortable to Live in, Modern, and Prosperous in the Framework of Madinatul Iman. While Mission I is: Realizing the Implementation of Good Governance.

Other important targets of Balikpapan City Government are: Improving the Quality of Human Resources and equalizing access to quality basic services to support economic development. Strengthening all Development sectors towards a prosperous, independent and modern society, and increasing the openness of public information, which is the main requirement for the creation of good Governance.

These results are in line with research conducted byKhanna et al.(2021), that for cities to become smart, we need standard frameworks and procedures to integrate technology, society and government.Bolivar (2018), many of the challenges that smart cities must face go beyond the capacity, capabilities, and reach of traditional institutions and their classical governance processes, and therefore new and innovative forms of governance are needed to address these challenges. According to the network governance literature, governance models in public administration can be categorized through the identification and analysis of several key dimensions that govern how cities are managed by governments.

The same research results were presented byKuzior et al.(2023), that the Information Technology factor is determined as the main factor that directly influences the Smart City Governance Index for the first smart city cluster with the highest e-governance indicator. Smart city is a complex concept that can be analyzed from various aspects and perspectives. E-governance plays an important role in facilitating the integration of all elements of a smart city.

Many countries and governments consider smart cities as a solution to global warming, population growth, and resource depletion. Many challenges arise in realizing smart cities. IoT (Internet of Things), blockchain, collaborative computing, simulation, and artificial intelligence technologies, offer great potential in transforming the current urban governance paradigm towards smart cities,Deng et al.(2021).

Research byLim et al.(2023), which explains how governance models change in smart cities using the experience of South Korea as a case study. The development of smart cities in South Korea is divided into three phases according to

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the national master plan and smart city maturity. Phase 1 lasted from 2008 to 2013, phase 2 extended from 2014 to 2018, and phase 3 started in 2019 and will last until 2023. The cases considered are three representative smart cities: Seoul, Songdo, and Sejong. This analysis explores how the governance models of each city changed in the three phases. According to the roles and relationships of stakeholders, the governance models are categorized into four types (corporate, market, multilevel, and network governance). The governance models in the three cities did not show much change. In Seoul and Songdo, market governance was dominant, while in Sejong, multilevel governance was dominant. However, in phase 3, the institutional arrangements were changed to facilitate network governance in the three cities. The government guides this collaboration, providing more opportunities for the private sector, academia, and civil society to get involved.

From the legal side (regulations and legislation), research conducted byHe et al.(2022), through the development approach to create a smart city that focuses on data collection and processing depends on the construction of efficient digital infrastructure and a safe trading environment under the protection of legal governance. Therefore, studying the role and improvement of legal authority in the construction of smart cities is very important. This study first describes the digital economy index in 31 provinces in China from 2014 to 2020, and analyzes the function of legal governance in the development of local smart cities based on the enactment and implementation of smart city regulations in the same period.

The results show that perfect central regulation can provide a safe and stable environment for smart cities, and there is a positive correlation between the number of local norms and the development of the digital economy. However, the limitations of legislation and its implementation create legal gray areas that hinder the development of smart cities. After conducting text analysis of several legal documents, we identified that the most critical issues are data security issues, data secrecy issues, public data openness, and sharing issues.

To achieve this goal, we examine the role of legal governance in the smart cities of New York and London using a comparative case approach. Overall, we propose a mechanism for future legal governance in smart city development, such as encouraging multi-subject participation in formulating legal norms, changing the model before legal regulation, and using local legal norms to determine the scope and quality of government data disclosure. This study further fills the gap in the study of China's smart cities from the legal system of risk identification and control, which can help regulators, policymakers, and researchers make better decisions to address the challenges of sustainable smart city development.

Research conducted in Makassar City, Indonesia, byHardi and Gohwong (2020), which discusses the Smart City Governance Program in Makassar City which is a flagship program of the Makassar City Government and identifies the factors that drive and inhibit the realization of the Good Urban Governance Program based on E-Government in Smart City. This research is qualitative with a descriptive approach. Data collection uses instruments in the form of observation and documentation which are then developed from informant interviews. Facts in the field show that E-Government-based city governance in the Smart City program in Makassar City is seen from the indicators of city management, namely planning, organizing, implementing and controlling according to the development objectives in the vision and mission of the Makassar City Government.

1.1.2. The Relationship between Governance and Infrastructure Availability

Relationship of Governance to Infrastructure Availability, The Results of this Study are Positive and significant. Achievement of city targets in the Balikpapan City RPJMD, especially the target of Good Governance in mission 1. The field that directly contributes to the achievement of this indicator is the e-Government field. With the SDGs Indicators, as follows:

1) The proportion of individuals who own/control a mobile phone, with an achievement of 91% (Performance Conditions at the end of the RPJMD period).
2) Proportion of individuals using the internet with an achievement of 75% (Performance Conditions at the end of the RPJMD period).

These results are in line with research conducted byWang and Li (2018), which examines the availability of four types of infrastructure: public transport, sanitation, health services, and elderly care. Three hundred and seven villages were included in the study. The findings show that the main funder of infrastructure and the status of village governance have an impact on the inequality of rural infrastructure availability. The impacts vary depending on the type of infrastructure considered. This is the first attempt to combine planning, finance, and governance factors in explaining rural infrastructure availability. It has strong policy implications and provides important insights into state-society relations and urbanization trends in China.

Research conducted byHizbaron et al.(2021), using qualitative observations on adaptive governance variables, namely the availability of infrastructure, information, conflict mechanisms, regulations, and adaptation. This study analyzes primary data collected from focus group discussions with key people in the Regional Disaster Management Agency, Regional Development Planning Agency, and Disaster Risk Reduction Platform responsible for this crisis and includes an online survey to validate the data. The study revealed that SRY has demonstrated adaptive governance to the COVID-19 pandemic, as seen among others through open access to spatial and non-spatial data, extensive use of a

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combination of both types of data, and rapid active involvement of community stakeholders in enforcing new rules and regulations mandated by the central and provincial governments. In addition, during the emergency response to COVID-19, stakeholders provided infrastructure and information, addressed conflicts in various spatial units, encouraged adaptation, and formulated emerging rules and regulations.

1.1.3. The Relationship of Creative Economy to Smart and Comfortable Cities

The Relationship of Creative Economy to Smart and Comfortable Cities, the Results of this Study are Positive and Significant. Creative Economy programs organized by the Balikpapan City Government, such as the Ramadhan Creative Market, which is enlivened by various competitions such as Fashion show competitions, drumming competitions and calligraphy competitions. The Ramadhan Creative Market activity is expected to be a productive event and produce a positive impact on the development of the creative economy in Balikpapan City.

The Indonesian Creative Economy Agency, which is in the Balikpapan City Government, through the Creative Economy Forum, has determined 16 Creative Economy sectors, ranging from culinary to Crafts. Meanwhile, Application and game development has been determined as the leading creative economy sector in Balikpapan City.

Research conducted byFajrian et al.(2023), creative industry is an economic process which includes production and distribution processes that require creative ideas. Balikpapan City has potential in the creative economy because Balikpapan City is called a city with sustainable innovation. Based on the results of observations and interviews, several problems were found in the digital creative industry in Balikpapan City. The problems faced include the lack of good business relations between the digital creative industry and the non-creative industry. Lack of appreciation from the non-creative industry to the digital creative industry, the lack of a good ecosystem in Balikpapan City, resulting in discrimination against local workers. The solution obtained for the problems in this study is the planning of a digital creative industry development strategy. The methods used to grow the digital creative industry include SWOT analysis and QSPM. The results of the study show that the Balikpapan creative industry is located in Quadrant II with IFE and EFE values of 2.756 and 3.025, respectively. In quadrant II, it means that the creative industry is advised to create a research and development team to conduct market research and maintain product quality and can increase customer satisfaction.

Different results of qualitative descriptive research conducted bySuminar Ayu et al. (2020), using interviews, observations, FGDs, and literature studies as data collection methods. The results of the study showed that out of 229 SMEs labeled as creative economy by the Kendal Regency Youth, Sports, and Tourism Office, only 66 SMEs met the criteria of the Creative Economy Agency-BEKRAF. This means that officials' understanding of the concept of creative economy is not yet comprehensive. Creative economy is very important for shaping regional image (city branding). On the other hand, Kendal Regency has a program to improve the city's image as a form of smart branding. Smart Branding is a derivative of the 2018-2028 Kendal Smart City masterplan. The lack of relevant data in the Kendal Regency Government shows that the desire to improve the city's image has not been effective.

1.1.4. The Relationship between Creative Economy and Infrastructure Availability

The Relationship between Creative Economy (CE) and Infrastructure Availability (KI) is Positive and Significant. The value of the Determination Coefficient (R2) = 0.40 or 40%, which means that Infrastructure Availability can be explained by the Creative Economy by 40%. The results of this analysis are in line with research conducted byPratomo et al.(2021), that regional economic development in Indonesia is still very minimal, so it requires new policies and strategies such as the creative economy. This study analyzes the influence of the creative economy represented by the concentration of the creative working class and its supporting factors on regional economic development. Using panel data from Barekraf/BPS statistics for 2011-2015, the results of the study show that the concentration of the creative working class has a significant impact on regional economic development, including supporting factors such as the proportion of highly educated graduates, electrification ratio, and internet coverage ratio. These findings indicate that the creative working class can drive the growth of regional economic development in an area. According toBahagia et al.(2022), Creative Economy needs to be developed so that tourism infrastructure as a supporter of tourism implementation can increase the attractiveness of tourist objects that become the attractions of tourism destinations.

Balikpapan City Government, the prospects for future economic support are the MICE (Meeting, Incentive, Convention, and Exhibition) sector, tourism, and the creative industry.

1.1.5. The Relationship between Infrastructure Availability and Smart and Comfortable Cities

The Influence of Infrastructure Availability (KI) on Smart and Comfortable City (KCN) is Positive ($\beta = 0.89$) and Significant ($P < 0.001$). The value of the Determination Coefficient (R2) = 0.80 or 80%. The results of this study prove that the Balikpapan City Government program has been felt by the Balikpapan City Community. The target of the Balikpapan City Government is one of them, namely the economic recovery of the community through strengthening the

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health system, bureaucratic reform and infrastructure. While the Strategy used is: Improving ICT Infrastructure, and the direction of the Policy is: Increasing infrastructure resources and intra networks.

Smart infrastructure contributes to the creation of smart cities, as well as good quality, good economy, good life, good governance and good atmosphere,Padmavathi and Aruna, (2022).

1.1.6. The mediating role of infrastructure availability on the relationship between governance and smart and comfortable cities

There is a Partial Mediation Role of Infrastructure Availability on the relationship between Governance and Smart and Comfortable Cities. This empirically proves that Infrastructure Availability is a significant need for the creation of Smart and Comfortable Cities, in addition to the importance of good Governance.

1.1.7. The mediating role of infrastructure availability in the relationship between the creative economy and smart and comfortable cities

There is a Complete Mediation Role of Infrastructure Availability on the relationship between Creative Economy and Smart and Comfortable City (KCN). This empirically proves that Infrastructure Availability is a significant need for the creation of a Smart and Comfortable City, in addition to the importance of the Creative Economy, which is a major contribution to economic growth in Balikpapan City.

Hypothesis testing is obtained by using the t Ratio Test and 95% Confidence Level (Confidence level used: 0.950). Critical T ratios:

1) *For one-tailed tests*: 1,645.
2) *For two-tailed tests*: 1,960.

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T ratios for path coefficients:

**********				
Critical T ratios				
**********				
For one-tailed tests: 1.645.				
For two-tailed tests: 1.960.				
**********				
T ratios for path coefficients				
**********				
	TKL	EK	KI	KCN
TKL				
EK				
KI	6.152	8.834		
KCN	4.498	1.819	18.486	

Figure 1. Hypothesis Test Results with T ratio for path coefficient

CONCLUSION

After conducting analysis and discussion of the results of this study, the following conclusions can be drawn; The relationship between Governance (TKL) and Smart and Comfortable City (KCN) is Positive and Significant. Other important targets of Balikpapan City Government are: Improving the Quality of Human Resources and equalizing access to quality basic services to support economic development. Strengthening all Development sectors towards a prosperous, independent and modern society, and increasing the openness of public information, which is the main requirement for creating good Governance. The Relationship of Good Governance (TKL) to Infrastructure Availability (KI) is Positive and Significant. Achievement of city targets in the Balikpapan City RPJMD, especially the target of Good Governance in mission 1. The field that directly contributes to the achievement of this indicator is the e-Government field. With the SDGs Indicator, as the Proportion of individuals who control/own mobile phones, with an achievement of 91% (Performance Condition at the end of the RPJMD period). The proportion of individuals who use the internet with an achievement of 75% (Performance Condition at the end of the RPJMD period). The Relationship of Creative Economy (EK) to Smart and Comfortable City (KCN) is Positive and Significant. Creative Economy programs organized by the Balikpapan City Government, such as the Ramadhan Creative Market, which is enlivened by various competitions such as Fashion show competitions, drumming competitions and calligraphy competitions. The Ramadhan Creative Market activity is expected to be a productive event and produce a positive impact on the development of the creative economy in Balikpapan City. The Indonesian Creative Economy Agency, which is in the Balikpapan City Government, through the Creative Economy Forum, has determined 16 Creative Economy sectors, ranging from culinary to Crafts. Meanwhile, Application and Game Development has been determined as the leading creative economy sector in Balikpapan City. The Relationship between Creative Economy (CE) and Infrastructure Availability (KI) is Positive and Significant. The results of the study indicate that the concentration of the creative working class has a significant impact on regional economic development, including supporting factors such as the proportion of highly educated graduates, electrification ratio, and internet coverage ratio. These findings indicate that the creative working class can drive the growth of regional economic development in an area. The Relationship of Infrastructure Availability (KI) to Smart and Comfortable City (KCN) is Positive and Significant. The results of this study prove that the Balikpapan City Government program has been felt by the Balikpapan City Community. The target of the Balikpapan City Government is one of the economic recovery of the community through strengthening the health system, bureaucratic reform and infrastructure. There is a Partial Mediation Role of Infrastructure Availability (KI) on the relationship between Governance (TKL) and Smart and Comfortable City (KCN). There is a Partial Mediation Role of Infrastructure Availability on the relationship between Governance and Smart and Comfortable City. This empirically proves that Infrastructure Availability is a significant need for the creation of a Smart and Comfortable City, in addition to the importance of good Governance. There is a Complete Mediation Role of Infrastructure Availability (KI) on the relationship between Creative Economy (EK) and Smart and Comfortable City (KCN). Infrastructure Availability on the relationship between Creative Economy and Smart and Comfortable City (KCN). This empirically proves that Infrastructure Availability is a significant need for the creation of a Smart and Comfortable City, in addition to the importance of the Creative Economy, which is a major contribution to economic growth in Balikpapan City.

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