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The Impact of Flyover Development on Business Income in Surabaya Intersection Area, Banda Aceh

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Abstract: Surabaya Intersection is one of the main intersection with vigorous economic activity in Banda Aceh City, Indonesia. Nevertheless, it was also one of the main congestion points during peak hours. Therefore, a flyover infrastructure was developed in 2016 to reduce congestion. With better traffic, the income of businesses in its surrounding area was expected to rise. However, many businesses experienced declining conditions and even closed a few years after the construction. This research aims to study the impact of flyover development on the income of businesses in the Surabaya Intersection area. Data were collected through questionnaires supported by observation and interviews with related agencies and academics. The business income questionnaires were distributed to 100 samples from 320 businesses in this area, chosen with a purposive sampling technique. The study area was divided into 10 segments based on physical characteristics. The analysis conducted was descriptive quantitative supported by qualitative analysis. The result shows that after the flyover development, the business income declined. The income of businesses in most segments (7 of 10 segments) reduced between 3.33% to 27.2%. Only three segments experienced increasing income, ranging between 0.8% to 4%. As shown by interpolation result, all segments located right along the Surabaya Intersection flyover showed a significant decrease in business income. The decline in business income is caused by the lack of parking spaces, difficult interzonal mobility, and decreasing attractiveness. This condition indicates that the flyover development in Surabaya Intersection has caused an unsustainable impact on the businesses in its surrounding area.

Keywords: Banda Aceh, Business, Flyover, Income, Surabaya Intersection

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Introduction

Urban development aims to improve the quality of life, create livable and cultured urban areas, increase community productivity and creativity, and support socio-economic growth (Adisasmita, 2013). Infrastructure development, such as roads, catalyzes economic growth because it affects economic productivity and reduces production costs. Transportation development can enhance the development of other sectors as it triggers multiplier effect (Messakh et al., 2021). Road development plays a crucial role in improving the urban economy. Road development can increase economic activity, increase people's per capita income and stimulate economic growth (Suparta, 2010), (Banerjee et al., 2012). Therefore, road infrastructure development is positively related to economic growth because it provides mobility for efficient movement of people, goods, and services as well as open access to commercial and social activities (Ng et al., 2019).

Banda Aceh is the capital city of Province of Aceh, Indonesia. After tsunami 2004, the city performed rehabilitation and reconstruction and then experienced rapid growth physically, socially, and economically (A. Achmad et al., 2019). The growth of activity caused the city to develop. The urban area continues to grow, as indicated by the rapid growth of built-up land (Ashfa Achmad et al., 2015). The city accommodates the growing needs of its citizens by developing infrastructure. Sustainable infrastructure development is one of the development priorities of the city (The City Government of Banda Aceh, 2017). The economic development of Banda Aceh City goes hand in hand with increasing population and private vehicle ownership (Ruslan et al., 2020). The increasing number of private vehicles causes severe transportation problems in Banda Aceh City (Sugiarto et al., 2019).

The Surabaya Intersection was one of the major intersection in Banda Aceh which was also one of the main congestion points in Banda Aceh City (Ruslan et al., 2016). Surabaya Intersection area serves as a strategic and vibrant commercial area consisting of various businesses from culinary, clothing stores, and small and medium businesses, causing a high traffic density. This area is often visited because the commercial area generates and attracts a high amount of trips (Izanloo et al., 2017). The intersection connects the main activity center in Banda Aceh, such as the Baiturrahman City Center, the new city center in Batoh, and the trade and service area in Beurawe. So, the traffic in this area comes from several main roads in Banda Aceh, resulting in a high traffic flow.

To reduce congestion, the city government developed a flyover at the Surabaya Intersection area in 2015. This flyover has 851 m length and 17.5 m width consisting of road segment from Jalan Teungku Chik Ditiro to Jalan Teungku Imuem Lueng Bata (Saleh et al., 2017). The flyover can increase mobility and accessibility to improve traffic performance, increase the distribution of goods and services, and affect the surrounding community's environment, society, and economy (Martono & Gusdini, 2021). However, the flyovers can also have negative impacts, such as triggering a growing number of private vehicles in the long term due to priority on private vehicles as well as creating an empty and unattractive space under the flyover (Jamila & Wijayaningsih, 2022). In addition, the residual space under the flyover is often neglected and occupied by the homeless (Aisyah et al., 2020). In some cases, it can even trigger the emergence of slum areas (Yenny et al., 2019).

Given the different impacts, flyover planning should not only consider transportation aspects but must also consider social, economic, and aesthetic aspects (Supriyadi & Muntohar, 2015). Based on the flyover development feasibility study, the Surabaya Intersection flyover can positively impact easier access, streamline traffic, and save vehicle operating costs and travel time. In addition, this flyover can also encourage land use changes to increase interest in living and doing business in this area, triggering the growth of businesses and settlements around the area. Thus, the flyover can encourage the growth of business or trade service centers that will serve the surrounding settlements, especially road access to and from the flyover (Department of Public Works, 2014).

During the flyover construction, the traffic loading on several roads around the construction site increased and caused congestion (Ariansyah, 2017). The congestion decreased the business income around the site. This condition is expected to improve after the construction. However, the attractiveness of the Surabaya Intersection area as a commercial area declined since the flyover operated. The decline is indicated by the decreasing number of visits and the increasing number of closed shops in the Surabaya Intersection area.

Previous studies have discussed the business income change after the flyover development. For example, the construction of the flyover occurred in Pahoman in Bandar Lampung City decreased the business income in surrounding area (Allawy, 2018). Meanwhile, some flyovers did not cause significant changes, such as in Bandar Lampung City (Varisi, 2018). In addition, other research shows that traders in Pasar Kembang are not comfortable with flyovers around them because traders fear losing their jobs (Maharannie, 2014). However, another study found that the flyover bridge in the Pango area of Banda Aceh increased land prices in the surrounding area, which indicated an increase in the attractiveness of the surrounding area (Shamada, 2016). These studies show that flyovers can have both positive and negative impacts economically.

This research aims to study the impact of flyover on business daily income in the Surabaya Intersection area, Banda Aceh City. This study provides an overview of the effect of flyover on economic conditions based on changes in business income in the Surabaya Intersection area. This study analyzed the impact by using kriging interpolation tools in GIS software. The spatial interpolation algorithm can predict and analyze the spatial characteristics of unknown areas using the known data in the research area. Hence, it greatly improves the efficiency of information prediction in the study area (Liu & Yan, 2021). The analysis can show the impact of flyover on the change in business income spatially from the business income data from the sample taken. The result enables us to examine which area gained advantages or disadvantages from flyover development. Therefore, this research can contribute to seeing the economic impact of flyover development on a mesoscale to provide input for specific spatial policies and interventions. The result can be used to develop impactful measures for different segments to revitalize and even increase the attractiveness of Surabaya Intersection for business.

Research Method

Area of Study

This research was conducted in the commercial area around the Surabaya Intersection flyover in Banda Aceh. The area of the study area is about 15 hectares, covering some part of the administrative area of Gampong (Desa) Ateuk Pahlawan (Baiturrahman District) as well as Lamseupeung Village and Suka Damai Village (Lueng Bata District). The total number of businesses in the study area was 320 businesses. The study area was divided into ten segments based on the characteristics of the dominant business and activities in each segment. The study area is as follows:

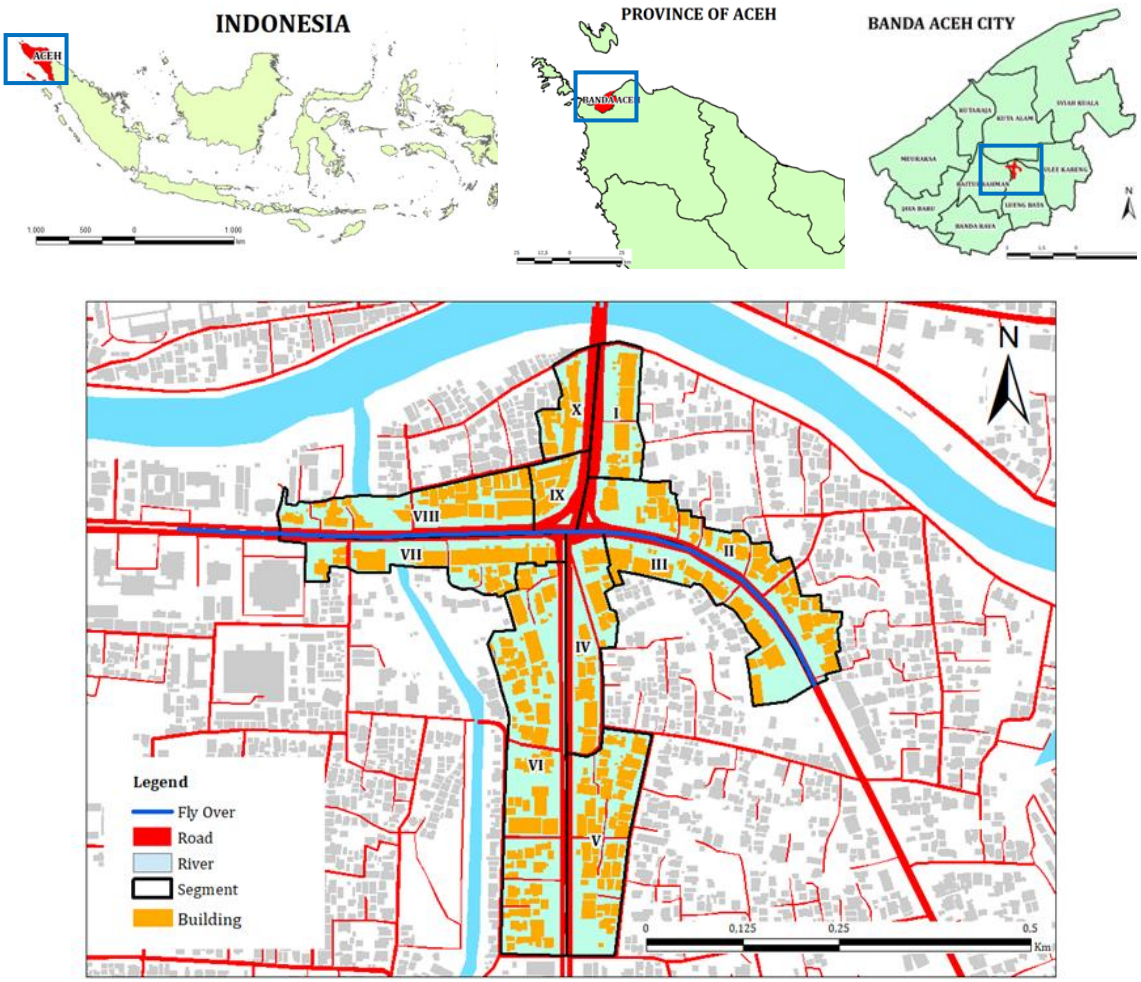

Figure 1. Study Area and Segment

Data Collection

Data on business daily income were obtained through a questionnaire distributed to business owners or managers. This questionnaire collected data on the increase and decrease in business income before and after the flyover construction. The questionnaire also contains the business name and type of business. The questionnaire also asks their opinion on mobility, accessibility, and attractiveness in this area related to the flyover. In addition, the location of the business was recorded on a map. Based on direct observations, the number of businesses was 320 units. Using the Slovin formula with an 8% margin error, the amount of sample was 100 respondents. The sample selected was the businesses that existed before the flyover construction until the survey was conducted. The sample was determined using a non-probability sampling technique where the amount of sample is proportional to the number of shops in the study area. Hence, the required number of samples is as follows:

Table 1 Sample and Type of Business

No	Type of Business	Total
1	Culinary	31
2	Printing	6

3	Buildings and Electronics	14
4	Clothes and Sports	25
5	Others	24
Total		100

The survey was carried out for two weeks, from August 21th-September 2nd, 2020. The survey was conducted during the Covid-19 period. Hence, respondents were verbally reminded to answer questions based on the business financial data prior to covid 19. It was conducted to avoid the bias of decreasing income due to Covid 19. The researcher also interviewed related agencies such as the Transportation Agency and the Regional Development Planning Agency of Banda Aceh, the National Road Implementation Center (BPJN) of Aceh, and *geuchik*/head of village of Ateuk Pahlawan, Lamseupeung, and Sukadamai. The business income data was processed in GIS software using the Kriging interpolation technique. Then, the analysis was carried out using a descriptive analysis approach.

Result and Discussion

Result

The Surabaya Intersection area was a vibrant commercial area with intensive activities. It has various types of business, store, and shop. Hence, it attracted many buyers. Nevertheless, the analysis shows that the flyover development negatively affected business income. The changes in the income of business actors in each segment are shown in figure 2:

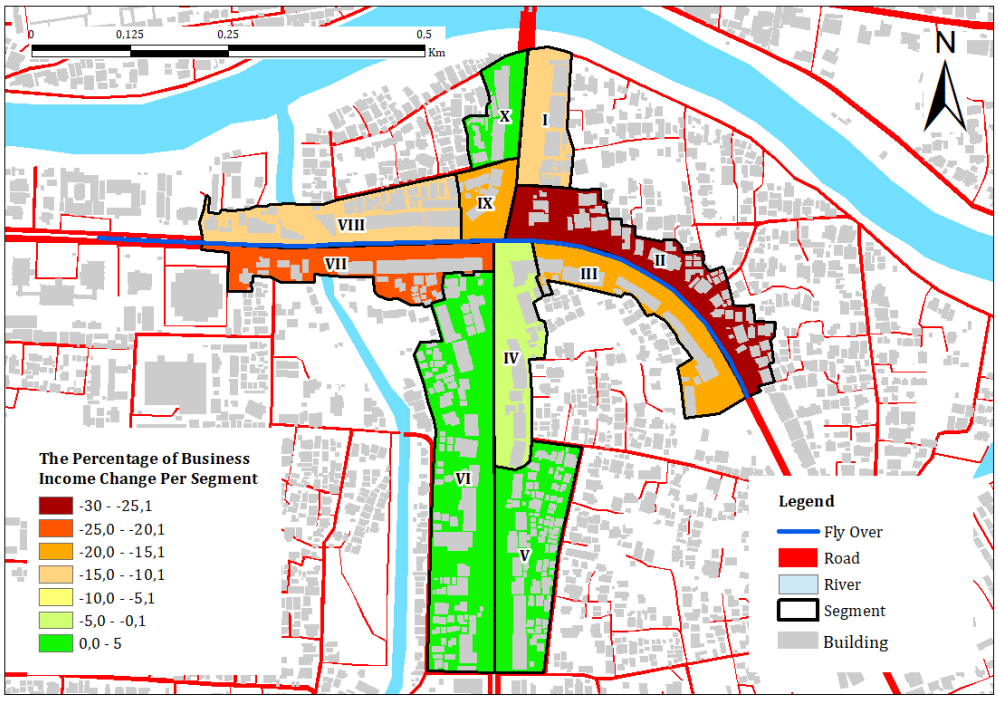

Figure 2. The Percentage of Business Income Change Per Segment After Flyover Development

Segments I and II serve traffic flow from the Beurawe area to Jalan Tgk Imuem Lueng Bata in Lueng Bata District. On average, businesses in the segment I experienced a 13% decline in income. Meanwhile, businesses in segment II are dominated by workshops and building material store. This segment experienced the highest decrease in business income,

namely 27.2%. Hence, this segment experiences the worst impact on business income after the construction of the flyover. This segment is located right on the side of the flyover.

Segments III, IV and V serve traffic from Jalan Tgk Imuem Lueng Bata to Surabaya Intersection and then goes south to Batoh, the new city center of Banda Aceh. In segment III, the average decrease in business income was 20%. Meanwhile, businesses in segment IV experienced an average decline of 3.33% in revenue. On the other hand, segment V experienced an increase in revenue of 4%. Thus, this segment experienced the largest increase in revenue. The flyover increased the flow of traffic to this segment. In addition, this segment leads the traffic to Batoh, the new city center. Hence, the traffic flow to this segment is higher after the construction of the flyover, trigger more visits to this area and increasing business income. Thus, this segment benefits the most from flyovers.

Segments VI and VII connect the traffic flow from the new city center of Batoh to Surabaya Intersection and then towards the city center in the Baiturrahman area. Segment VI is located on the other side of segment V. Segment VI also experienced an increase in business income of 2.5%. However, the next segment, namely segment VII, which is right on the side of the flyover, experienced the second largest decline in revenue, namely 20.6%. Thus, this segment also experienced the worst impact of flyovers on business income.

Segments VIII, IX, and X start from Jalan Tgk Chik Di Tiro, connecting traffic between the city center in the Baiturrahman area to Surabaya Intersection and then to the commercial and service area in Beurawe. Businesses in segment VIII experienced a 13,5% decline in income. Segment IX consists of shophouses and street food vendors, which are quite well known in Banda Aceh. Nevertheless, Segment IX experienced a 16% decrease in business income. Meanwhile, the business income in segment X increased slightly by 0.8%, indicating that this segment also benefits from the flyover. The geospatial data on the change in business income was then analyzed using the Kriging interpolation method in GIS software. The result is depicted in figure 3:

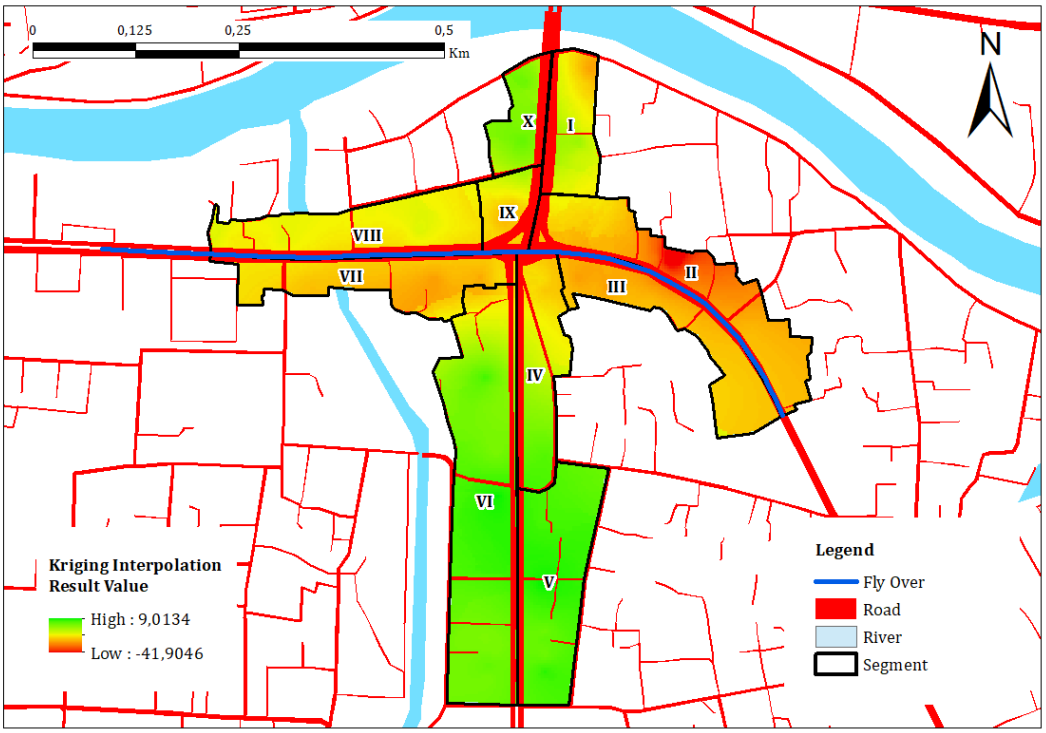

Figure 3. The Interpolation Result

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The interpolation result shows that most segments in Surabaya Intersection experienced a decrease in business income after flyover development. The declining income is experienced mainly by the segments directly on the flyover's sides, namely segments II, III, VII, VIII, and IX. In addition, some businesses in segment IV that are not far from the flyover also experienced a significant decrease in revenue. However, segments V, VI, and X, which are not located on the side of the flyover, experienced an increase in business income. It shows that each segment experiences a different impact from the flyover, depending on the segment's location to the flyover.

Discussions

The interpolation results show that businesses in all segments located right along the Surabaya Intersection flyover experience a significant income decline. The decreasing number of visitors caused the income decline since the flyover was operated. Meanwhile, segments not directly passed by flyovers experienced an increase in revenue. It shows that some segments benefit from the flyover.

One of the factors causing the declining number of visitors is the reduction in parking spaces. The flyover requires space, so the existing parking space is reduced to accommodate the additional road segment. Thus, only on-street parking is available in this area. Reduced parking space contributed significantly to income reduction for business located around the flyover (Liyanage et al., 2018). The Transportation Agency of Banda Aceh City (2020) stated that the parking space available in the Surabaya Intersection area is no longer adequate. The agency emphasized that business owners should provide parking spaces as regulated in the Banda Aceh City *Qanun* (local regulation) Number 2 year 2018 about the Regional Spatial Masterplan (RTRW) of Banda Aceh City year 2009-2029.

Figure 4. On Street Parking at Surabaya Intersection

The decline of visitors to this area is also caused by the increasingly difficult interzonal mobility, especially between segments separated by flyovers. From the questionnaires distributed, some business actors stated that the flyover makes interzonal mobility and parking within this area more difficult. Road users cannot directly access the buildings and facilities across the flyover. The flyover has changed the accessibility of different segment in Surabaya Intersection. The change in accessibility can lead to route switch behaviour among the flyover user's (Rahman & Baker, 2022). Flyover also makes this area became less friendly for pedestrians. A less pedestrian-friendly environment can reduce business income,

considering that walking comfort affects the number of visits to commercial areas (Muttaqin et al., 2022; Safitri & Amelia, 2019). In addition, flyover makes many segments becoming less accessible. Reduced access and mobility are one of the negative impacts of flyovers (Prasongko & Sari, 2019). The difficult mobility and accessibility harm the sales, reduce sales turnover, thereby reducing their business income generation.

Based on the questionnaire, business actors also stated that the attractiveness of the Surabaya Intersection area decreased after the construction of the flyover. In addition, the shops located on the left and right sides of the flyover is also considered less attractive, decreasing demand for shop rent, so that the cost for shop rent continues to decline. From the observations, it can be seen that many shops in the Surabaya Intersection area are closed and unoccupied. These closed shops were mainly found in segments II, III, VII, VIII, and IX, which experienced the most significant decline in business income. Therefore, closed shops lead to declining economic activity. Hence, the flyover caused the area to be less vibrant than before flyover development.

Based on interviews with the *geuchiks* (the village leader) of surrounding villages, the decline in business income and the area's attractiveness also resulted in lower land prices in most segments, especially on the left and right sides of the flyover. The geuchik said that some land experienced a drastic decline in land price up to 30% since flyover construction due to lower demand for land. Land prices only increased in segments that experienced an increase in business income, namely segments V, VI, and X. These segments were passed by traffic to and from Batoh, the new city center, which generated and attracted high traffic. Flyover raised the number of visits to the area and escalated the demand for land purchases in these segments. The different impact on land prices in different segments shows that the flyover increases the demand for land for some segments but decreases the demand for land for other segments, especially those segments on the side of the flyover.

Decreasing business income causes a slump in economic activity in Surabaya Intersection area. Without impactful intervention, the attractiveness of the Surabaya Intersection area can continue to decline, so the strategic value of the Surabaya Intersection area will be eroded. The decline in business income indicates a drop in the number of visits and attractiveness to consumers. Meanwhile, the declining shop rent demand and land prices indicate that Surabaya Intersection is no longer considered a strategic commercial area by business owners in Banda Aceh City. So, the flyover has significantly degraded the strategic value of the Surabaya Intersection area among business actors. The negative impact of flyover on business income was also found by (Liyanage et al., 2018) who studied the impact of Rajagiriya Flyover in Colombo City, Sri Lanka. The study found that only 14% business benefits from Rajagiriya Flyover development. In other hand, 51% business stated that flyover did not increase the income generation and 35% stated that their business income has gone down after the Rajagiriya Flyover development.

Although the declining attractiveness of the Surabaya Intersection area is visible, the government argued that the flyover has a positive impact on traffic and the economy at the city and national levels because it expedites traffic on the primary arterial road. The Regional Development Planning Agency, Transportation Agency of Banda Aceh City, and the Aceh National Road Implementation Center (BPJN) shared a similar view that the flyover had a positive impact because it expedited traffic flow at the city level. So, regardless declining business income, the representatives of the government considered the flyover development as a positive infrastructure development policy at the macro and city level.

This study shows that the existence of this flyover has a negative impact on business income in most segments in the Surabaya Intersection area, especially for the segments on the left and right side of the flyover. This declining business income shows that although the construction of this flyover can facilitate traffic flow, the negative impact on the economy of the Surabaya Intersection area is also very significant. This shows that the construction of

the flyover at Surabaya Intersection does not deliver a sustainable economic impact for businesses in this area. This problem requires priority intervention. The government needs to carry out various creative spatial and urban design policies to increase the attractiveness of the Surabaya Intersection area as it used to be. Hence, the flyover will not only have a positive impact on traffic at the city level, but also for economic development for the surrounding area.

Conclusion

After the construction of the flyover infrastructure, the business in the Surabaya Intersection area mostly underwent declining income. The segments on the left and right of the flyover experienced the most drastic decline in business income. Many shops in this area are closed and unoccupied. Declining income is caused by the lack of parking space, difficult interzonal mobility, and decreasing visits. However, some segments experienced rising income, especially those that did not directly intersect with the flyover. The segments benefit from better access due to the flyovers.

The flyover reduces the area's attractiveness, causing declining interest and demand of business owners to buy land and rent shops in this area. Therefore, shop rent and land prices in the segments that experienced a declining income. Thus, the flyover has degraded the strategic value of this area for business owners, leading to an unsustainable economic impact for businesses in Surabaya Intersection area.

This reserch show that the utilization of interpolation technique can give clearer view about the economic impact in spatial perspective. The interpolation method can display the impact of flyover spatially, giving more detailed insight and spatial analysis, leading to a more accurate intervention for every segment. Further research can be carried out with a different approach focusing on the impact of the flyover on the physical and social characteristics of the surrounding community.

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References

Achmad, A., Zainuddin, & Muftiadi, M. (2019). The relationship between land surface temperature and water index in the urban area of a tropical city. *IOP Conference Series: Earth and Environmental Science*, *365*(1). https://doi.org/10.1088/1755-1315/365/1/012013

Achmad, Ashfa, Hasyim, S., Dahlan, B., & Aulia, D. N. (2015). Modeling of urban growth in tsunami-prone city using logistic regression: Analysis of Banda Aceh, Indonesia. *Applied Geography*, *62*(2015), 237–246. https://doi.org/10.1016/j.apgeog.2015.05.001

Adisasmita, R. (2013). *Pembangunan Kawasan dan Tata Ruang* (1st ed.). Graha Ilmu.

Aisyah, L. P., Purnomo, E. P., & Kasiwi, A. N. (2020). Efektivitas konstruksi jembatan layang sebagai penguraian kemacetan dalam kerangka smart mobility di Kota Yogyakarta Tahun 2019 (Studi kasus jembatan layang (Fly over Janti). *Gorontalo Journal of Government and Political Studies*, *3*(1), 024. https://doi.org/10.32662/gjgops.v3i1.824

Allawy, M. F. (2018). Dampak pembangunan fly over terhadap kondisi sosial ekonomi masyarakat sekitar, studi deskriptif pada fly over pahoman. In *Tidak dipublikasikan*. Universitas Lampung.

Ariansyah, D. (2017). Studi dampak lalu lintas kawasan akibat pembangunan jalan layang (flyover) simpang Surabaya dan jalan lintas bawah (underpass) Kuta Alam Kota Banda Aceh. *Jurnal Teknik Sipil, Universitas Syiah Kuala*, *1*(1), 11–16.

Banerjee, A., Duflo, E., & Qian, N. (2012). On the road: Access to transportation infrastructure and economic growth in China. *National Bureau of Economic Research*, *145*. https://doi.org/10.1016/j.jdeveco.2020.102442

Departemen Pekerjaan Umum. (2014). Studi kelayakan fly over ruas jalan Sp. Jambo Tape, fly over ruas jalan Sp. T. Nyak Makam, fly over ruas jalan Sp. Surabaya dan under pass Beurawe di Provinsi Aceh. In *Direktorat Jenderal Bina Marga*.

Izanloo, A., Rafsanjani, A. K., & Ebrahimi, S. P. (2017). Effect of commercial land use and accessibility factor on traffic flow in Bojnourd. *Journal of Urban Planning and Development*, *143*(2), 05016016. https://doi.org/10.1061/(asce)up.1943-5444.0000366

Jamila, R. F., & Wijayaningsih, R. (2022). Utilization of empty space under fly over as an open public space. *MODUL*, *22*(1), 36–41. https://doi.org/https://doi.org/10.14710/mdl.22.1.2022.36-41

Liyanage, T., Liyanage, T. U., Ranasinghe, M. T., & Prasad, M. A. (2018). Post impact evaluation of Rajagiriya flyover. *IESL Annual Sessions*, *January*. https://www.researchgate.net/publication/359281092

Maharannie, R. D. (2014). Dampak pembangunan fly over Pasar Kembang terhadap kondisi sosial ekonomi pedagang sekitar proyek di Kecamatan Tegalsari dan Kecamatan Sawahan. *Swara Bhumi E-Journal Pendidikan Geografi FIS Unesa*, *3*(2), 168–176. https://jurnalmahasiswa.unesa.ac.id/index.php/swara-bhumi/article/view/6427

Martono, D. N., & Gusdini, N. (2021). Flyover development risk analysis: Review of the construction phase efforts to minimize environmental impact. *IOP Conference Series: Earth and Environmental Science*, *940*(1). https://doi.org/10.1088/1755-1315/940/1/012020

Messakh, T. A., Rustiadi, E., Intan, E., Putri, K., & Fauzi, A. (2021). Dampak sektor transportasi terhadap perekonomian di Timor Barat : Suatu analisis model input - output (I-O). *Jurnal Wilayah Dan Lingkungan*, *9*(2), 127–141. https://doi.org/10.14710/jwl.9.2.127-141

Muttaqin, M. Z., Munawar, A., & Irawan, M. Z. (2022). Pedestrian volume characteristic in the commercial area in Yogyakarta. *IOP Conference Series: Earth and Environmental Science*, *1000*(1). https://doi.org/10.1088/1755-1315/1000/1/012007

Ng, C. P., Law, T. H., Jakarni, F. M., & Kulanthayan, S. (2019). Road infrastructure development and economic growth. *IOP Conference Series: Materials Science and Engineering*, *512*(1). https://doi.org/10.1088/1757-899X/512/1/012045

Pemerintah Kota Banda Aceh. (2017). *Rencana Pembangunan Jangka Menengah Daerah (RPJMD) Kota Banda Aceh Tahun 2017-2022*. Bappeda Kota Banda Aceh. https://bappeda.bandaacehkota.go.id/wp-content/uploads/2020/03/RPJMD-KOTA-BANDA-ACEH-TAHUN-2017-2022.pdf

Prasongko, D. S. W., & Sari, S. R. (2019). Dampak pembangunan flyover Manahan Solo ditinjau dari aksesibilitas pengguna jalan. *Jurnal Arsitektur ARCADE*, *3*(3), 216. https://doi.org/10.31848/arcade.v3i3.222

Rahman, M. L., & Baker, D. (2022). The impacts of transport infrastructure development on travel route switch behavior in Bangladesh. *Cogent Social Sciences*, *8*(1). https://doi.org/10.1080/23311886.2022.2119688

Ruslan, R., Isya, M., & Anggraini, R. (2016). Evaluasi kelayakan ekonomi pembangunan flyover Simpang Surabaya - Kota Banda Aceh. *Jurnal Teknik Sipil*, *6*(1), 93–104.

Ruslan, R., Sugiarto, S., Anggraini, R., & Saleh, S. M. (2020). Forecasting private vehicle ownership and it effect to public transportation planning in Banda Aceh, Indonesia. *IOP Conference Series: Materials Science and Engineering*, *917*(1). https://doi.org/10.1088/1757-899X/917/1/012040

Safitri, R., & Amelia, R. (2019). Walkability index in commercial area of Pangkalpinang City. *Jurnal Infrastruktur*, *5*(2), 79–83. https://doi.org/10.35814/infrastruktur.v5i2.1009

Saleh, S. M., Sugiarto, S., Hilal, A., & Ariansyah, D. (2017). A study on the traffic impact of the road corridors due to flyover construction at Surabaya intersection, Banda Aceh of Indonesia. *AIP Conference Proceedings*, *1903*(2017). https://doi.org/10.1063/1.5011559

Shamada, C. (2016). Dampak keberadaan jembatan flyover terhadap nilai lahan di Wilayah Pango. *Jurnal Ilmiah Mahasiswa (JIM) Ekonomi Pembangunan Fakultas Ekonomi Dan Bisnis Unsyiah*, *1*(2), 321–328. http://jim.unsyiah.ac.id/EKP/article/download/5825/2485

Sugiarto, S., Saleh, S. M., Anggraini, R., & Merfazi, M. (2019). Investigating public perceptions and its implication toward Trans Koetaradja policy considering latent motivation. *IOP Conference Series: Materials Science and Engineering*, *523*(1). https://doi.org/10.1088/1757-899X/523/1/012036

Suparta, I. M. (2010). Economic growth and percapita income distribution: Case study of East Java Province. *Economic Journal of Emerging Markets*, *2*(1), 47–59. https://journal.uii.ac.id/JEP/article/view/2383

Supriyadi, B., & Muntohar, A. S. (2015). *Jembatan* (1st ed.). Beta Offset.

Varisi, A. E. (2018). Pengaruh pembangunan fly over terhadap tingkat pendapatan pengusaha Kota Bandar Lampung menurut perspektif ekonomi Islam (Studi pada pengusaha di kawasan fly over Kota Bandar Lampung) [Universitas Islam negeri Raden Intan Lampung]. In *Skripsi*. http://repository.radenintan.ac.id/4930/

Yenny, N., Rohani, R., Pinem, K., & Anggraini, N. (2019). Slum settlement phenomenon in Medan City (Case Study: Kampung Aur, Medan Maimun District). *JCSR Journal of Community Service and Research*, *3*(2), 63–70. https://doi.org/https://doi.org/10.24114/jcrs.v3i2.15807