Article:	**Comparative Analysis of Spatial Disparities Based on Infrastructure Development and Socioeconomic Indices: A Case Study of Lahore**

Author(s):	Muhammad Asim[1], Saima Rafique[1], Muhammad Nadeem[2]
Affiliation:	[1]University of Engineering and Technology, Lahore, Pakistan [2]Yokohama National University, Yokohama, Japan

Journal QR

Article QR

Muhammad Asim

Indexing

Crossref

EuroPub

ROAD

World Catalogue of Scientific Journals

J-Gate
INDEXED

A publication of the
School of Architecture and Planning
University of Management and Technology, Lahore, Pakistan

Comparative Analysis of Spatial Disparities Based on Infrastructure Development and Socioeconomic Indices: A Case Study of Lahore

Muhammad Asim[1], Saima Rafique[1] and Muhammad Nadeem[2*]

[1]University of Engineering and Technology, Lahore, Pakistan
[2]Yokohama National University, Yokohama, Japan

Abstract

Infrastructure development and socioeconomic factors are directly related to the opulence and economic growth of any region. Disparity in the allocation of resources within a city has a huge influence on the socioeconomic factors of the population. Cities in developing countries manifesta vast disparity in the provision of infrastructural facilities and it leads to curbing the socioeconomic development of their residents. The current research aims to study the impact of disparity in infrastructure development on the socioeconomic factors has been assessed in the city of Lahore. Two towns of the city, that is, Johar town and Shalamar town were selected based on two different criteria to examine the impact of disparity in infrastructure development on the prevailing socioeconomic conditions. Primary data was collected with the help of a questionnaire encompassing major infrastructure development factors and socioeconomic indicators. Surveys were conducted in these towns with the disproportionate technique of stratified sampling. Data was analyzed through SPSS. Statistical Linear Regression Model was applied to determine whether a relationship exists among the infrastructural and socioeconomic indicators or not. The results showed that the town with better infrastructure development has far better socioeconomic conditions as compared to the less developed town within the same city.

Keywords: inequality, infrastructural development, socio-economic indices, spatial disparities

Introduction

Uneven development can be the result of unequal distribution of population or regional assets which is detrimental for financial growth (Rouf & Jahan,

---

[*]Corresponding Author: nadeem-muhammad-mb@ynu.jp

2007). The unequal distribution of resources is a serious issue in many developing countries. It poses a threat to the development and unity within the country. These problems eventually come in the way of economic progress (Shankar & Shah, 2003). In an urban environment, social inequality refers to the difference in the access to amenities of life such as health, employment, and education. This difference clearly defines the stark contrast among the lives of urban city dwellers. Such social disparities are observed in cities more than in rural areas. These disparities are the outcome of the unequal developments generated due to unequal distribution of resources. Scientists, social critics, and politicians have long discussed the link between the growth of a country and the inequality within it.

Despite their controversy, multidimensional inequalities are rising in developing countries, including Pakistan. Examples of such inequalities include inequalities of income, education, public services, access to open spaces, access to goods, public/ private intercity and intracity transport. Such inequalities lead to economic and social losses in society (Chen & Sun, 2006). Some studies claim that unequal distribution of resources poses a great risk to the quality of life, education, and organizational performance (Easterly, 2007). On the other hand, it has also been stated by other studies that such disparities have negative and positive influences on long run economic growth (Castells-Quintana & Royuela, 2017). Additionally, a strong relationship has been found between poverty alleviation approaches, unequal distribution of resources, and economic growth (Birdsall & Londoño, 1997), which has been found not only in developing countries (Balisacan & Fuwa, 2004) but equally effective in the case of developed nations (Kisiała & Suszyńska, 2017). This study examined the impacts of different infrastructural development on socioeconomic conditions by comparing the infrastructural development of two towns in Lahore.

Literature Review

The disparity in the distribution of resources and infrastructural development within the cities hinders economic growth. Such disparity adversely affects the socioeconomic conditions and gives rise to inequality within cities (Rana et al., 2017; Rana et al., 2017). The spatial segregation of rich and poor exists not only because of the difference in wealth but also because of unequal access to basic amenities such as education and health.

According to previous research, such disparities are the result of unfair distribution of resources which favors one social group and ignores the others. This disparity is widening the gap between the population groups (García-Sánchez et al., 2018).

Infrastructure development is essential for the economic development of any society. Additionally, equal access to services helps reduce social inequality and alleviates poverty. It is imperative that the poor are given better access to health, education, and infrastructure facilities since it is an essential prerequisite to attain sustainable economy and social growth (Srinivasu & Rao, 2013). Infrastructure development plays a vital role in sustainable economic development of a country (Sahoo & Dash, 2009; Sahoo et al., 2010). Statistically, Infrastructure development also plays a substantial role in the economic development (Owolabi-Merus, 2015; Owusu-Manu et al., 2019). Some researchers also analyzed the influence of infrastructural development on local effectiveness, monetary growth, income inequality, labor efficiency, the influence on the atmosphere, and well-being (Bristow & Nellthorp, 2000).

Furthermore, infrastructural development helps to determine spatial growth of regions and provides the necessary resources for this development at reasonable prices."Grundey (2008), along with other researchers, investigated the implementation of sustainable development policies. They concluded that in the field of strategic planning, infrastructural development is one of the most important aspects that is needed for the sustainable spatial and socio-economic development of a country (Grundey, 2008). In a like manner, Aschauer confirmed that the foundation for a good quality of life is through a well-established infrastructure. For example, good quality of roads reduces the number of accidents, increase public safety and help improve quality of life. In the same way, an efficient water distribution system reduces the rate of disease development, while a good waste management improves overall health and protects the environment from harm (Aschauer, 1989).

The association between infrastructure, health, and education offered in the community was examined by Agenor and Moreno-Dodson who claim that infrastructure services are vital to ensure quality and accessibility of

health and education, which is beneficial for economic growth of the country in the long run. (Agénor & Moreno-Dodson, 2006).
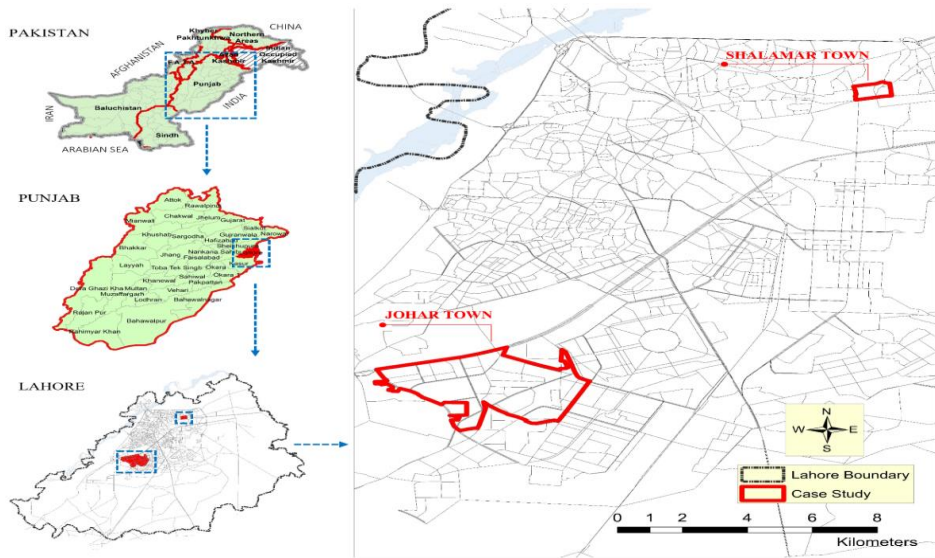
Methods

Development within towns of the same city varies according to the interest of influential figures. In Punjab, instead of focusing on the underdeveloped areas within Lahore, funds are utilized for the development of posh areas. The examination of development plans in Lahore shows that development is limited to some streets and areas of Lahore, especially Ferozepur Street, which leads to homes of dominant politicians. Conversely, most peripheries of the city are filthy and are filled with worn roads, stagnant water, and waste.

This study examined Johar town and Shalamar town in Lahore city to identify the effect of different infrastructural development on socioeconomic conditions (see figure 1). This research also examined how infrastructure promotes socio-economic development. This study examined complementary physical infrastructures such as telecommunications, power, transport (roads, railways, ports, and airports), and water supply along with elements of socio-economic development such as the building type, building infrastructure, and environmental condition used to develop strategies for sustainable infrastructure development in the two towns.

These two towns were selected for their planning dimensions, residential income status and property. Primary data was collected with the help of a questionnaire that was related to major infrastructure development factors and socioeconomic indicators. A disproportionate technique of stratified sampling was used to conduct the surveys in these towns, while the data was analyzed through SPSS. Statistical Linear Regression Model was applied to the data to assess whether there exists a relationship between infrastructural and socioeconomic indicators. The results of this analysis will help in the identification of unequal infrastructural development. It will also aid the policymakers in formulating policies at the local level that pavea path for national level policies. These policies would abolish social inequalities and unequal distribution of resources to ensure resource sustainability and prosperity of the nation.

Figure 1

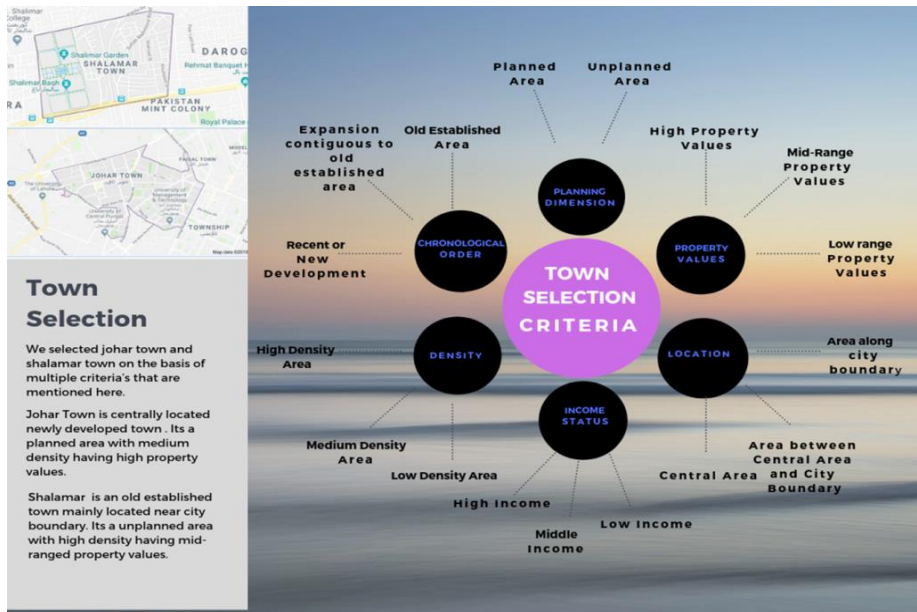*A Map Showing the Location of Shalamar Town and Johar Town*

Figure 2

Satellite Image of Shalamar Town

Figure 3

Satellite Image of Johar Town

Shalamar Town, which is an unplanned town (see figure 2), has a total population of about 5 lacs 98 thousand with an average household size of 7.1. It is an old established area where the majority of the people are working as shopkeepers or as government employees. Whereas, Johar town, which is a planned town (see figure 3), has a total population of about 1 lac 66 thousand with an average household size of 7.1. It is a newly planned area where the majority of the people are either running their businesses or are working as employees in both government and private sectors (see figure 4).

The Yamane formula was used to calculate the sample size of 399.3, it represented the total population. Johar town and Shalamar town are taken as two different developments developed heterogeneously. Johar town is a newly developed planned town with medium density and high property values; whereas, Shalamar town is an old, established, unplanned town with high population density and mid-range property values. By taking average, 200 responses are needed for each town; a random sample from each stratum is taken in a number proportional to the stratum's size. For this study, a random sample was taken from each town.

Figure 4

*Town Selection Criteria*

Results and Discussion

A questionnaire-based survey was conducted for the collection of primary data. For this purpose, a total of 400 questionnaires were filled by households living in both towns. The data was further analyzed using Principal Component Analysis (PCA) technique in SPSS software. The calculated value of Kaiser-Meyer-Olkin (KMO) was 0.669 which is more than 0.5 with significance of 0.000.It means that PCA can be applied and the factor analysis is valid and useful for the data.

This study aimed to identify the impact of different infrastructural development on the socio-economic conditions of the two towns. This examination employed a quantitative and comparative approach. A variety of data indicators were used to find out the effect of infrastructure on quality of life.
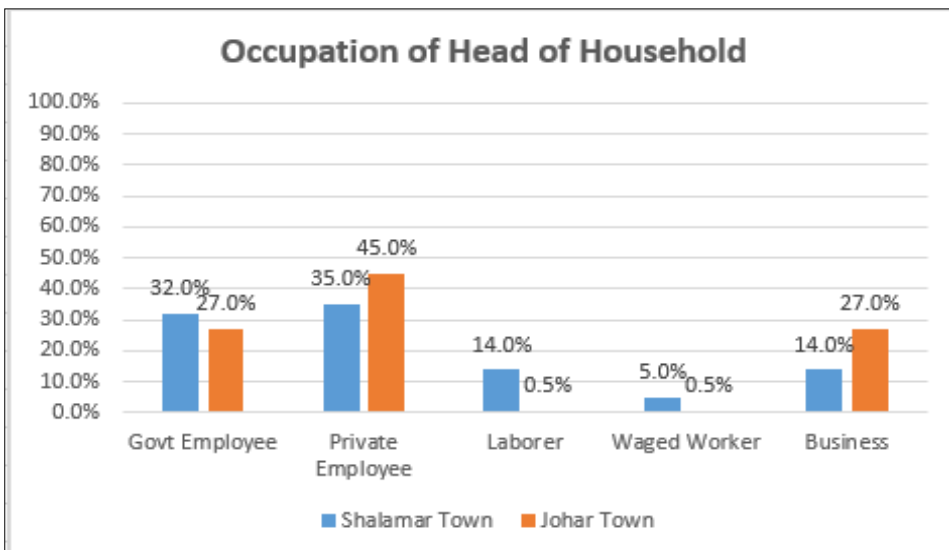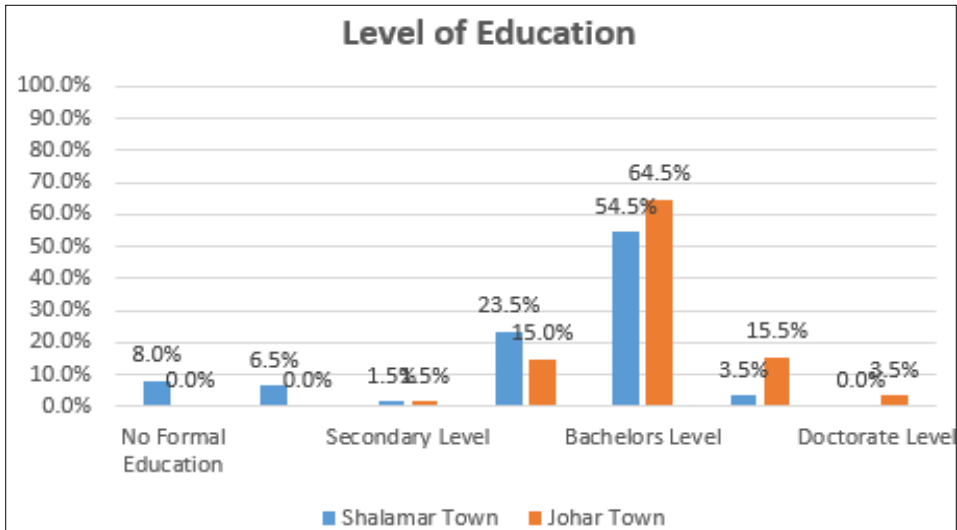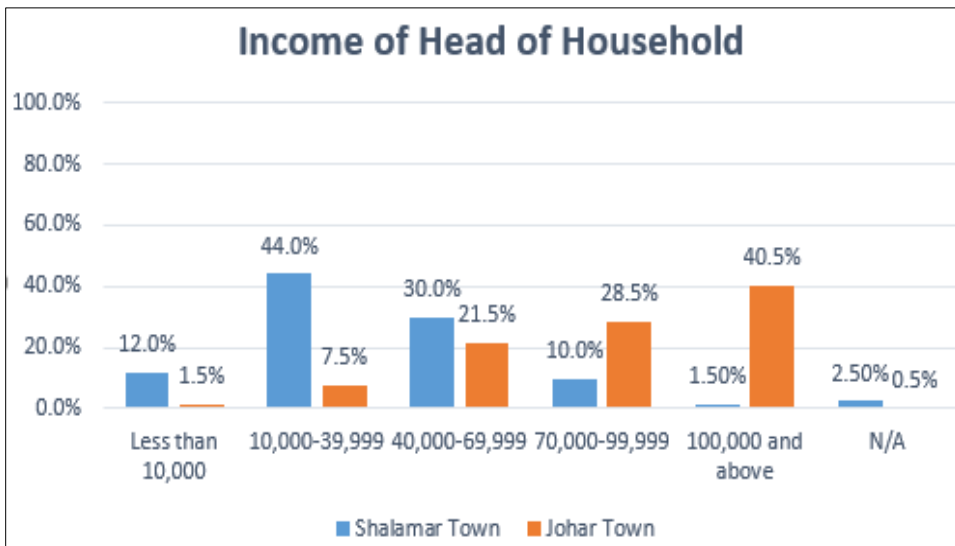
Figure 5

Comparison of Infrastructure Facilities
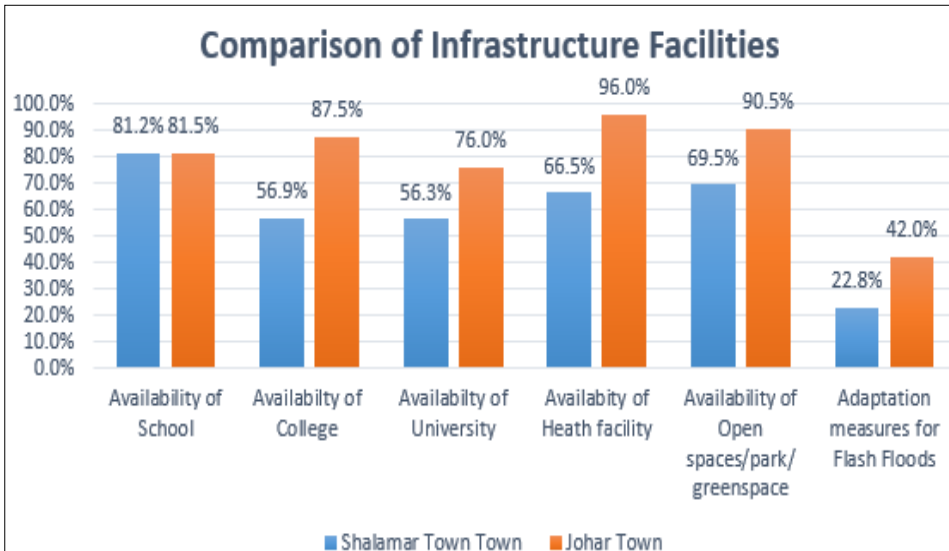
Figure 2

Occupation of Head of Household

Figure 7

Level of Education

Figure 8

Income of Head of Household

It was inferred from the comparative analysis (see figure 5) between two towns that Johar town's infrastructural facilities and socio-economic conditions are more superior to those found in Shalamar town (see figures 6 – 8). Through the findings of this analysis, we can conclude that infrastructural investment leads to socio-economic development.

Composite indices were prepared using the data standardization method 0-1 (zero to one). The transformation technique for the socio-economic and infrastructure development indicators was also formulated to examine the overall level of development in the sample towns. The rescaled data of indicators were either positive or neutral, where the higher value closest to 1 indicated ideally indicated higher level of development, while the value closest to zero denoted a lower level of development.

$$\text{Transformed Value (TV)} = X_{ij} - X_{i(min)} / X_{(max)} - X_{(min)}$$

Where

> X_{ij} = Value of ith indicator in town
> $X_{(min)}$ = Minimum value in subjected indicator
> $X_{(max)}$ = Maximum value in subjected indicator

The indices of socioeconomic indicators, infrastructure indicators, and the mean of both the indicators in each town were prepared using an excel sheet. These indices were used to analyze the aforementioned relationship in SPSS software. Statistical Linear Regression Model was applied to examine whether the relationship between infrastructural and socioeconomic indicators. The regression analysis was performed so that it can be used to infer causal relationships between the independent and dependent variables. Linear Regression analysis was employed so that the resultant model would identify factors which show the impact of the dependent variable on various other variables. The value of standardized co-efficient beta helps to determine variables that have a major impact on infrastructural development.

Table 1 shows the results of regression analysis that R square value is 0.937 and represents 93.7% of the independent variables. It can be explained by total variation in dependent variables. Whereas, R value of 0.968 shows a strong degree of correlation. The p-value for F-test is also

significant at 0.000. If we examine the overall result of the regression analysis, we can see that there is a strong relationship between infrastructure development and socioeconomic conditions. R Square is 0.93 and is a very good fit. It means that 93% of our values fit the regression analysis model. In other words, 93% of the dependent variables (y-values) are explained by the independent variables (x-values).

Table 1

Model Summary of Regression Analysis

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.968[a]	0.937	0.933	0.07227

Table 2

ANOVA

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	28.961	26	1.114	213.275	.000[a]
	Residual	1.948	373	.005		
	Total	30.909	399			

This table indicates that the regression model significantly predicts the dependent variables with p<0.0005.

This research study will be resourceful for other countries that have populations, geographical conditions, and infrastructure similar to that of Lahore. This research will also be helpful for policymakers, urban planners, and local governments since it can help reduce urban disparity in similar to Lahore, as the findings are equally applicable at the local, national, and international level.

Conclusions

Socioeconomic conditions inevitably reflect the infrastructure of a region. Towns with better infrastructure facilities, such as Johar town, will

have better socio-economic conditions, while towns with weak infrastructure development, such as Shalamar town, will have worse socioeconomic conditions in comparison. The examination of the education statistics given in the survey revealed that although the availability of education facilities, such as schools, colleges, and universities is high, it takes too long to reach these facilities. One of the conclusion derived established the relationship between the higher education levels of head of the family as compared to others. Similarly, the higher income of head of the family is related to his accessibility to more facilities for better education.

Similarly, in developed towns, if the availability of infrastructure facilities such as health, transportation, open spaces, telecommunication, water supply, and solid waste management was higher, then homeownership was higher as compared to the underdeveloped town where most of the houses were on rent.

Urban disparity can be reduced if government readdresses developmental priorities as per the needs of the towns. Efforts should be made to classify areas at the level of union council so that available resources are utilized efficiently. MNAs and MPAs need to be utilize the development grants rationally by incorporating socio-economic status indices. Additionally, annual development plans should be prepared in light of these indices.

References

Agénor, P.-R., & Moreno-Dodson, B. (2006). *Public infrastructure and growth: New channels and policy implications*: The World Bank.

Aschauer, D. A. (1989). Is public expenditure productive? *Journal of Monetary Economics, 23*(2), 177-200. https://doi.org/10.1016/0304-3932(89)90047-0

Balisacan, A. M., & Fuwa, N. (2004). Going beyond crosscountry averages: Growth, inequality and poverty reduction in the Philippines. *World Development, 32*(11), 1891-1907. https://doi.org/10.1016/j.worlddev.2004.05.010

Birdsall, N., & Londoño, J. L. (1997). Asset inequality matters: an assessment of the World Bank's approach to poverty reduction. *The American Economic Review, 87*(2), 32-37.

Bristow, A. L., & Nellthorp, J. (2000). Transport project appraisal in the European Union. *Transport policy, 7*(1), 51-60. https://doi.org/10.1016/S0967-070X(00)00010-X

Castells-Quintana, D., & Royuela, V. (2017). Tracking positive and negative effects of inequality on long-run growth. *Empirical Economics, 53*(4), 1349-1378. https://doi.org/10.1007/s00181-016-1197-y

Chen, X., & Sun, J. (2006). Sociological perspectives on urban China: from familiar territories to complex terrains. *China Information, 20*(3), 519-551. https://doi.org/10.1177/0920203X06070041

Easterly, W. (2007). Inequality does cause underdevelopment: Insights from a new instrument. *Journal of Development Economics, 84*(2), 755-776. https://doi.org/10.1016/j.jdeveco.2006.11.002

García-Sánchez, E., Willis, G. B., Rodríguez-Bailón, R., García-Castro, J. D., Palacio-Sañudo, J., Polo, J., & Rentería-Pérez, E. (2018). Perceptions of economic inequality in Colombian daily life: More than unequal distribution of economic resources. *Frontiers in Psychology, 9*, 1660. https://doi.org/10.3389/fpsyg.2018.01660

Grundey, D. (2008). Managing sustainable tourism in Lithuania: Dream or reality? *Technological and Economic Development of Economy, 14*(2), 118-129.

Gu, W., & MacDonald, R. (2009). The Impact of Public Infrastructure on Canadian Multifactor Productivity Estimates. *The Canadian Productivity Review, Catalogue, 21,*1-31.

Kisiała, W., & Suszyńska, K. (2017). Economic growth and disparities: An empirical analysis for the Central and Eastern European countries. *Equilibrium. Quarterly Journal of Economics and Economic Policy, 12*(4), 613-631.

Owolabi-Merus, O. (2015). Infrastructure development and economic growth nexus in Nigeria. *International Journal of Academic Research in Business and Social Sciences, 5*(1), 376.

Owusu-Manu, D.-G., Jehuri, A. B., Edwards, D. J., Boateng, F., & Asumadu, G. (2019). The impact of infrastructure development on economic growth in sub-Saharan Africa with special focus on Ghana. *Journal of Financial Management of Property and Construction, 24*(3), 253-273. https://doi.org/10.1108/JFMPC-09-2018-0050

Rana, I. A., Bhatti, S. S., & Arshad, H. S. H. (2017). Assessing the socioeconomic and infrastructure development disparity–a case study of city districts of Punjab, Pakistan. *International journal of Urban Sustainable Development, 9*(3), 346-358. https://doi.org/10.1080/19463138.2017.1320286

Rana, I. A., Bhatti, S. S., & e Saqib, S. (2017). The spatial and temporal dynamics of infrastructure development disparity–From assessment to analyses. *Cities, 63*, 20-32. https://doi.org/10.1016/j.cities.2016.12.020

Rouf, M. A., & Jahan, S. (2007). *Spatial and temporal patterns of urbanization in Bangladesh*. Bangladesh Institute of Planners.

Sahoo, P., & Dash, R. K. (2009). Infrastructure development and economic growth in India. *Journal of the Asia Pacific Economy, 14*(4), 351-365. https://doi.org/10.1080/13547860903169340

Sahoo, P., Dash, R. K., & Nataraj, G. (2010). *Infrastructure development and economic growth in China*[Discussion Paper, 261]. Institute of Developing Economies.

Shankar, R., & Shah, A. (2003). Bridging the economic divide within countries: A scorecard on the performance of regional policies in reducing regional income disparities. *World development, 31*(8), 1421-1441. https://doi.org/10.1016/S0305-750X(03)00098-6

Srinivasu, B., & Rao, P. S. (2013). Infrastructure development and economic growth: Prospects and perspective. *Journal of Business Management and Social Sciences Research, 2*(1), 81-91.