

# ASSESSMENT OF THE EXPENDITURE ON ROAD CONSTRUCTION AND ECONOMIC GROWTH IN TANZANIA

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**ABSTRACT :** The study sought to assess the expenditure on road construction and economic growth in Tanzania. The secondary data were obtained for the period of 31 years (1990-2020). This data was quantified and coded using descriptive and inferential statistics using STATA Version 13. Findings revealed that there is a significant relationship between expenditure on road construction, government spending, industry value-added, foreign direct investment, and economic growth whereby the value of  $R^2$  was 64.64 percent, which is a significant level to describe our model. This means that expenditure on road construction, government expenditures, manufacturing value-added, industry value-added, inflation, and foreign direct investment all have an impact on economic development. The entire value of  $R^2$  indicates the six independent variables, while with the remaining 35.36 percent explained by other factors hence results indicated that there is an insignificant relationship between Manufacturing Value Added, Inflation and Economic Growth. The researcher recommended that there is a need for the government to ensure the execution of policies that stimulate road construction spending to boost Tanzania's economic growth by providing a price policy, a perfect market, and financing facilities. Either, this study suggests a further in-depth investigation of the impact of road construction expenditure on Tanzanian economic growth.

**Keywords:** Road, Construction, Expenditure, Economic Growth

## 1.0 BACKGROUND OF THE STUDY

Tanzania's national development strategy emphasizes that extensive and efficient infrastructure is critical to ensure the effective functioning of the country's economy. It is in this context that the African Development Bank (AfDB) aims to strongly focus on infrastructure as an enabling sector of the economy. Thus, a sizeable share of the Bank's new commitments will be directed to infrastructure investments, focusing on reducing travel times between regions, integrating the national market and connecting it to other markets in the East African Community, and eliminating non-tariff barriers to trade. Tanzania is the international gateway for several of its landlocked neighboring countries. Burundi, Rwanda, Uganda, DR Congo, Zambia, and Malawi are all dependent to some extent on the country's transport network for their access to global markets (TANROADS 2020).

The road network in Tanzania currently comprises 86,472 km of roads in the formal inventory of which 12,786 km are categorized as trunk roads, 21,105 km as regional roads, and the remaining 52,581 km as district, urban, and feeder roads. The trunk and regional roads are under the responsibility of the Tanzania National Roads Agency (TANROADS) which is a semiautonomous agency under the Ministry of Works. The district, urban and feeder roads are the responsibility of local government authorities (LGAs) who are under the oversight of the Prime Minister's Office Regional Administration and Local Government (PMO-RALG). PMORALG has an oversight function of preparing policies and strategies in consultation with stakeholders as well as coordinating, monitoring, and providing support to LGAs in road works implementation activities (TANROADS 2020).

Road transport continues to play an indispensable role in the movement of passengers and freight. This is a requirement for poverty alleviation and socio-economic development in developing countries. Despite the importance of roads in overall economic development, the efficiency of road transport systems in many developing countries are often constrained by high vehicle operation and maintenance costs due to poor road conditions. While demands for transport infrastructure continue to grow - a result of high population growth rates, urbanization, and growth in economic activities - resources for road maintenance and road network replacement continue to be a burden for many developing countries (Adewale et al, 2016).

Transport and related infrastructure have played a pivotal role in economic growth and development during the last century, and many theoretical and empirical studies have recognized it as an important factor in maintaining and promoting economic growth. Transport infrastructure may be the prerequisite for economic development, while transport and the supporting infrastructure network can be an engine in promoting economic growth. However, the transport infrastructure alone is not sufficient for economic growth (Badalyan, Herzfeld, and Rajcaniova 2019).

On the other hand, some studies try to explain the economic impact of transportation. For example, through the decomposition of the decoupling index of road freight traffic, Kveiborg and Fosgerau (2018) find that the use of large vehicles, larger truckloads, and fewer empty loads are the most important drivers of economic growth. Li et al. (2017) found that highway passenger turnover, annual average quality ratings of highways, and the rate of cement highways to administrative villages are the three primary factors that should be focused on in the future. Their findings also show that the development of highway traffic is closely related to the speed of economic development and transportation investment. The current study sought to assess the expenditure on road construction and economic growth in Tanzania.

## 1.2 STATEMENT OF THE PROBLEM

Road construction in Tanzania is growing significantly in the country and its link to economic growth is not yet been explored by some researchers to find out some empirical studies that could help policymakers make informed policy choices on road constructions, Variable under the study will be assessed by using regression analysis. Time series data was applied to draw findings for empirical analysis. Also, assessing the relevance of economic growth in predicting road construction in Tanzania and ascertaining whether economic growth is significant to explain the road construction or not. The study has not been done before with empirical analysis from Tanzania as other researchers such as Carter (2019) analyzed the contribution of Belgium's economic development on highway transportation. The results showed that highway transportation has a positive effect on the promotion of social employment and economic growth. Adewale et al, (2016) studied the relationship between economic development and regional transportation in Egypt from 1999 to 2013 and predicted that their development trend will change from lagging growth to leading growth between 2015 and 2020. Zhang et al. (2018) found that highway transportation's contribution to Japan's economic growth is on a path of sustained and rapid growth over time. The current study applied inferential statistics to examine the relationship between expenditure on road construction and economic growth in Tanzania.

### 1.3 RESEARCH OBJECTIVES

#### 1.3.1 GENERAL OBJECTIVES

The main objective of the study is to assess the expenditure on road construction and economic growth in Tanzania.

#### 1.3.2 SPECIFIC OBJECTIVES

- i. To examine the influence of expenditure on road construction and economic growth in Tanzania
- ii. To assess the relevance of expenditure on road construction in predicting economic growth in Tanzania
- iii. To ascertain whether expenditure on road construction, government spending, manufacturing value added, inflation and industry value added are significant to explain about the economic growth in Tanzania or not

#### 1.3.3 RESEARCH HYPOTHESES

This study was guided by the following hypothesis;

- Expenditure on road construction cannot be used to influence the economic growth in Tanzania
- Expenditure on road construction cannot be used to predict economic growth in Tanzania
- Expenditure on road construction, government spending, manufacturing value added, inflation and industry value added cannot be significant to explain about the economic growth in Tanzania.

## 2 LITERATURE REVIEW

**This was guided by theory of Unbalanced Growth** pioneered by the economist Ragnar (1961) and has been supported by various intellectuals as Rostow et al. (2019) in understanding the development of underdeveloped countries. The theory emphasizes constructions investments should be done in critical sectors of the economy and not all sectors hand in hand. The well-being and development of different people are impacted by the crucial factor of transport being significant to any economy (Weisbrod, 1997). Systems of transport when effective can deliver different societal chances and numerous benefits impacting positively in the economy of any country. On the other hand, when this same transport system is lacking, negative costs of the economy can be experienced and opportunities that would improve the welfare of the citizens of a country missed. Berechman & Banister (2018) illustrate how transportation advancement has been observed since the start of an industrial revolution which was associated with increasing opportunities in the economic sector. A specific method of transport was seen to be used at various stages of societal development in humans. In improving living conditions in rural areas roads are crucial in enabling these conditions. Nonetheless, the distribution of socioeconomic benefits that result from the development of rural roads is a separate issue, and there are no assurances or intrinsic mechanisms to guarantee that these benefits will be spread fairly amongst the poor and the non-poor in different communities (Africa Development Bank, 2015). Significant expenditure on road construction activities can be attributed to the economic growth of the nation. According to (European Investment Bank, 2017) expenditure on road construction activities impacts economic growth. This theory was significant in this study as it brings in the argument that economic growth in Tanzania is impacted by expenditure road constructions.

Also, Sun et al., (2017) carried out a study on the Relationship between Land Transport and Economic Growth in Xinjiang. The study unveiled that, there is no significant relationship between transportation investment and economic growth. Oladinrin et al., (2019) attempted to investigate the relationship between the construction sector and the aggregate economy. The result indicates that construction output is Granger caused by GDP, while the construction output also granger causes the GDP. Both GDP and construction output lead each other by one year. The study concluded that Nigerian road construction is very important because of its capacity to lead the economy of Nigeria.

Lenz (2018) revealed positive effects in the case of all estimated variables, except inflation where the effects seem to be negative. The results illustrate the long-standing problem of inefficient and outdated railway infrastructure. Sutherland, Égert, and Kožluk (2019) showed that effect varies across countries and sectors and over time. In some cases, these results reveal evidence of possible over-investment, which may be related to inefficient use of infrastructure.

Ng et al., (2019) demonstrated that the growth in road length per thousand population, per capita export, per capita education expenditure, and physical capital stock per worker contributed positively to economic growth. Aschauer (2019) discovered that the basic infrastructure of streets, roads, airports, public transportation, sewers, and water systems had the greatest explanatory power for productivity. Barro (2019) found that government investment spending had a beneficial influence on economic growth, and it was determined that government investment spending should be promoted to improve economic growth. Marbuah, (2019) found evidence of a significant threshold effect of inflation on economic growth with and without a structural break. Specifically, the evidence showed both minimum and maximum inflation threshold levels of 6% and 10% respectively. Umaru and Zubairu, (2017) revealed that inflation possessed a positive impact on economic growth through encouraging productivity and output level and on the evolution of total factor productivity. Mallik and Chowdhury, (2020) found that inflation and economic growth are positive and statistically significant for Bangladesh, Pakistan, India, and Sri Lanka.

Su and Yao (2017) conclude that manufacturing is indeed the growth engine of economies and, hence, that premature deindustrialization has negative effects on economic growth. Kathuria and Natarajan (2018) tested the engine of development hypothesis in India, a place where the service sector plays a significant role in economic growth. A previous study by Chakravarty and Mitra (2019) found that manufacturing value-added and constructions have been the drivers of economic growth. Szirmai (2019) reiterated no uncertainty about manufacturing being a significant growth driver in most emerging economies. The statistical findings revealed that manufacturing's prominent role is uncertain and therefore questions if manufacturing will remain the growth engine of economies. Tapsin (2017) found that there exists a bidirectional relationship between the industry value added variable and economic growth in the long term. Mawejje and Mawejje (2016) found a significant relationship between industry value-added and economic growth in the long term. Husaini and Lean (2015), analyzed the relationship between industry value-added and economic growth in Malaysia. According to the results, it was seen that industry value-added and economic growth were co-integrated in the long term and there was a positive correlation among them.

Anetor (2019) found that FDI accounts for the significant variation in Nigeria's economic growth compared to other capital inflow into the country. The result shows that shocks of FDI and portfolio investment inflow have a positive and direct relationship with economic growth in Nigeria and are statistically significant. Akiri, Vehe, & Ijuo (2016) contributed to the debate using secondary data for the period 1981-2014, and result from the VECM shows a significant positive effect of FDI on economic growth in Kenya. In Cambodia, FDI also enhances economic growth, a study by Sokang, (2018), utilized annual time series data between 2006-2016, analyzed using a correlation matrix and multiple regression to investigate the impact of FDI on economic growth in Cambodia, the result shows a positive relationship. The same result was achieved in Pakistan by Gudaro, Chhapra, & Sheikh (2019) for the period 1981-2017 using time series data, and multiple regression techniques. According to Melynk, Kubatko, & Pysarenko (2018), there is also a positive impact of FDI on economic growth in the communist transition countries, using panel data on annual transition report indicators from 1998-2010, analyzed using the Fixed-Effects estimation to analyze the data.

### 3.0 METHODOLOGY

As for this study, a correlation research design was used in conducting the research. A quantitative research approach was adopted in this study. The study used secondary data only. The secondary data was obtained from the annual reports of the National Bureau of Statistics, Bank of Tanzania, Ministry of Works, Transport and Communications Tanzania, and the World Data Indicators for the period of 31 years (1990-2020), the data gave a whole-some understanding of the stated objective. This data was quantified and coded using descriptive and inferential statistics.

The researcher tested for stationarity to examine whether the named variables are stationarity or not. STATA Version 13 was applied to determine about stationarity and accept or reject based on this criteria. Measures of central tendency were used in data analysis together with tests of significance.

The data expressed in the form  $Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \varepsilon$

Where: Y = Economic growth;  $X_1$  = Road Construction;  $X_2$  = Agricultural growth;  $X_3$  = Government spending;  $X_4$  = Manufacturing Value Added;  $X_5$  = Industry Value added

$X_6$  = Government revenue;  $\varepsilon$  = Error term;  $\beta_0, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8, \beta_9$  = Coefficients

## 4. FINDINGS AND DISCUSSIONS

Here the researcher presents summary statistics for Economic growth as the dependent variable on this study were measured on the continuous scale-interval which was linear and got trend while independent variables were continuous so this made the data be analyzed through multiple regression.

### 4.1 Regression Results

Tanzania's Economic Growth was set as a dependent variable while the independent variables were, expenditure on road construction, government spending, manufacturing value-added, industry value-added, inflation, and foreign direct investment. The main objective was to determine whether expenditure on road construction, government spending, manufacturing value-added, industry value-added, inflation, and foreign direct investment are jointly significant to explain Tanzania's Economic Growth earnings or not. The results are presented in the table below;

Table 1: Regression Output

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. regress gdp exproadcons govspend manvaladd indvaladd inf fdi
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Source	SS	df	MS			
Model	79.7647203	6	13.2941201	Number of obs =	31	
Residual	43.6274953	24	1.8178123	F( 6, 24) =	7.31	
Total	123.392216	30	4.11307385	Prob > F =	0.0002	
				R-squared =	0.6464	
				Adj R-squared =	0.5580	
				Root MSE =	1.3483	

  

gdp	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
exproadcons	.1282463	.2484338	0.52	0.610	-.3844959	.6409884
govspend	.0640931	.0165397	3.88	0.001	.0299567	.0982294
manvaladd	.0626929	.4739744	0.13	0.896	-.9155422	1.040928
indvaladd	-.0603644	.221297	-0.27	0.787	-.5170989	.3963701
inf	-.1336842	.0522623	-2.56	0.017	-.2415484	-.02582
fdi	.5006438	.2008684	2.49	0.020	.0860718	.9152158
_cons	4.423256	3.26487	1.35	0.188	-2.315105	11.16162

### Value of R – Square (R<sup>2</sup>)

Based on the data above, the value of R<sup>2</sup> was 64.64 percent, which is a significant level to describe our model. This means that expenditure on road construction, government expenditures, manufacturing value-added, industry value-added, inflation, and

foreign direct investment all have an impact on economic development. The entire value of R<sup>2</sup> indicates the six independent variables, while the remaining 35.36 percent is explained by other factors.

As a consequence of the R<sup>2</sup> results, expenditure on road construction and the controlling variables: government spending, manufacturing value-added, industry value-added, inflation, and foreign direct investment may all affect economic growth by 64.64 percent, indicating that the model is strong and can be used for prediction. This implies that policy must be established based on this relationship if we are to create and attain the appropriate degree of economic growth. The following equation validates the link and prediction between the dependent and independent variables and is thus jointly significant. The following is an equation for predicting economic growth;

$$GDP = (4.423256 + 0.1282463EXPROADCONS + 0.0640931GOVSPEND + 0.626929MANVADD - 0.0603644INDVALADD - 0.1336842INF + 0.05006438FDI + \epsilon)$$

For the regression output, this equation is produced from the preceding table. The link between a dependent variable and independent variables for time series data from 1990 to 2019 is illustrated. It reveals the influence of expenditure on road construction in explaining the dependent variable (economic growth). The theory suggests that significant expenditure on road construction activities can be attributed to the economic growth of the nation.

**Decision on the General Results Based on F- Statistics and P-Value**

The table findings show that the statistics for F are 7.31 and the values for P are 0.0002. Given such a figure of P less than 5%, the researcher rejects the null hypothesis and accepts the alternative hypothesis expenditure on road construction, government spending, manufacturing value-added, industry value-added, inflation, and foreign direct investment jointly influence Tanzania’s economic growth.

**4.2 Diagnostic Checking**

A multiple regression assumption test that justifies using a multiple regression analysis for inferences and/or predictions purposes is required. Shapiro wilk test, heteroscedasticity, and serial correlation were the assumptions evaluated in this study.

**4.2.1 Shapiro Wilk Test**

The researcher examined the model whether or not the residual is normal. In the worksheet under the following hypothesis, a further new variable was established, namely U as a new variable for diagnostic testing;

Table 2: Shapiro Wilk Test

Shapiro-Wilk W test for normal data					
Variable	Obs	W	V	z	Prob>z
U	31	0.93240	2.202	1.635	0.05098

Based on the aforementioned hypothesis findings of a Shapiro Wilk W test for standard data, it reveals that there is a probability of 0.05098 which is greater than 5%, thus we cannot reject the Null Hypothesis.

**4.2.2 Heteroscedasticity**

The researcher also looked at the model whether the model has heteroscedastic or not under the following hypothesis;

Table 3: Breusch Pagan Test Results

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. estat hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
Ho: Constant variance
Variables: fitted values of gdp

chi2(1)          =          0.15
Prob > chi2      =          0.6993
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Based on the Breusch Pagan heteroscedastic test we can see that the probability of 69.93% is greater than 5% and that is why the null hypothesis that the residuals are homoscedastic is not rejected.

**4.2.3 Serial Correlation**

The investigator also examined serial correlations to see whether serial correspondence exists between variables or not.

Table 4: Durbin Watson Test for Autocorrelation

Durbin's alternative test for autocorrelation

lags ( $p$ )	chi2	df	Prob > chi2
1	0.212	1	0.6451

H0: no serial correlation

Based on the data, the probability value (p-Value) is 64.51 percent more than the 5% threshold of significance, therefore we cannot reject the null hypothesis and declare that there is no serial correlation.

## 5. DISCUSSION OF FINDINGS

Road construction projects may have different consequences, including productivity, employment, activity, property, investment, and fiscal income, on a national economic development target (in this case "community" can range in scale from individual households to cities, regions, nations, or even the entire world). Results established that there is a significant relationship between Expenditure on Road Construction and Economic Growth. In this study, the theory of unbalanced growth indicated that the expenditure on road construction activities impacts economic growth. Road construction will enhance access to other places by the community. This enhances the labor pool of enterprises and decreases costs in the procurement of input goods and services. This increases "scale savings" in manufacturing processes, which leads to increased productivity by decreasing costs per unit of production. The findings of this study are in line with Oladinrin et al. (2019) that the Nigerian road construction is very important because of its capacity to lead the economy of Nigeria as well as Sutherland, Égert, and Kožluk (2019) found positive impact of infrastructure investment on economic growth. Although, Sun et al., (2017) in Xinjiang found that, there is no significant relationship between transportation investment and economic growth.

The relationship between government spending and economic growth has attracted widespread attention over the years as economists and politicians battle to establish the impact of government spending on economic growth. The findings of this study showed that there is a significant relationship between government spending and Economic Growth. These findings correlate with the results of Aschauer (2019) revealed that public expenditure has a more significant positive impact on economic growth. Also, these findings match the findings of Barro (2019) that that government investment expenditure had a positive impact on economic growth and it was concluded that investment spending by a government should be encouraged to boost economic growth.

The economic manufacturing added value (MVA) is a general estimate of the net production of each resident manufacturing unit, achieved by additional output and intermediary consumption subtraction. Study findings unveiled there is an insignificant relationship between Manufacturing Value Added and Economic Growth. These findings reflect the situation of Lenz (2018) who concluded that the Manufacturing Value Added in Central and Eastern European Member States in 1995–2016 has infrastructure for economic growth. These findings also support the findings of Su and Yao (2017), Kathuria and Natarajan (2018), and Chakravarty, and Mitra (2019), who discovered additional value for manufacturing. However, the results of Szirmai (2019) show that the leading role of manufacturing is unsure, which is why it is questioning if manufacturing remains an engine of economic growth.

Mohammadzadeh (2018) claimed that a private-sector or government-wide contribution to GDP is the value-added of an industry also known as the gross domestic product (GDP). Value-added components include salaries for personnel, manufacturing, and import taxes with reduced gross operating surplus and subsidies. The finding of this study portrays that there is a significant relationship between Industry Value Added and Economic Growth. Tapsin in Turkey and Maweje and Maweje in Uganda (2017) showed this result that the link between the value-added of industry and long-term economic growth is varied. While Husaini and Lean (2015) who analyzed the relationship between industry value-added and economic growth in Malaysia found there exists a unidirectional relationship from the industry value added to economic growth.

Economic growth and inflation have fluctuated worldwide. Inflation rates have also dominated in nearly many years compared to growth rates (Madhukar and Nagarjuna 2017), with inflation-economic growth remaining one of the greatest macroeconomic concerns. The nature of the link between inflation and economic development and the mechanisms that influence real economic activity is still questionable (Li, 2016). Neither Tanzania's economic system nor the globe at large is new to inflation. Variations in magnitude or rates have occurred. From the year 1990 to 2019, the inflation rate in Tanzania has recorded an average of 12.07%. a minimum of 3.29% and a maximum of 35.82%. Based on the results, Inflation was found to have a negative relationship with the economic growth in Tanzania.

Foreign Direct Investment (FDI) is used in most developing nations to generate international reserves through investments, enterprises, and foreign aid from industrialized countries. FDI is seen as a vital source of financing and capital formation, technology transfer and know-how, and a viable channel for inter-country commerce. Tanzania is now undergoing massive road development in all of its regions to diversify the economy away from agriculture earnings. These structures are aimed at strengthening the industrial sector, which, predictably, results in austerity. From correlation analysis, study findings unveiled that Foreign Direct Investment had a positive association with economic growth in Tanzania. These findings contradict those of Marbuah (2019), Umaru and Zubairu (2017), and Mallik and Chowdhury (2020), all of whom found a substantial threshold effect of inflation on economic growth. These findings are consistent with those of Anetor 2019 in Nigeria, Akiri, The, and Ijuo 2016 in Kenya, Sokang 2018 in Cambodia, Gudaro, Chhapra, and Sheikh 2019 in Pakistan, and Melynk et al.2018 in communist transition countries, all of which found that FDI had a positive impact on economic growth.

## 6.0 CONCLUSION AND RECOMMENDATION

This study assessed the expenditure on road construction and economic growth in Tanzania using secondary data from 1990 to 2019. The results value of  $R^2$  is 64.64% which is a significant level to explain our model. This means that variation in economic growth can be influenced by expenditure on road construction, government spending, manufacturing value-added, industry value-added, inflation, and foreign direct investment. The value of  $R^2$  in totality represents the four independent variables while the rest of 35.36% can be explained by other variables. The predicted model was assessed using the Shapiro Wilk W test, test for heteroscedasticity, test for serial correlation, and found to be a valid prediction model. The study reveals that expenditure on road construction is positively related to economic growth. This means that as expenditure on road construction increases also economic growth increases and when expenditure on road construction decreases also economic growth tends to decrease. The study also demonstrates that expenditure on road construction is very significant to explain the economy in Tanzania given the p-value and its positive coefficient. Therefore the government has to be careful on policy decisions on expenditure on road construction that can be used to influence the level of economic growth. This is because road construction leads to lowering transportation costs, providing door-to-door services, improving accessibility and safety. Government expenditure on road construction makes the transportation network more dense and smooth, thereby increasing the accessibility and safety, resulting in the high relative speed of vehicles, and flexibility of route choice hence improving economic growth.

Government has to make sure that it formulates the policies that would increase the road constructions that are linked to the overall strategic goals of the nation. Government should make sure that expenditure on road constructions is a rigorous, fact-based project evaluation and a transparent process for establishing what can be done and in what order for the sake of Tanzania's economic growth. Moreover, expenditure on road construction adheres to good governance and excellent collaboration between a broad range of stakeholders from the private sector, public sector, and citizens.

This study was conducted on the expenditure on road construction and economic growth in Tanzania; more research may be conducted on other East African nations to determine the influence of expenditure on road construction and economic growth in the East African area.

In developing countries, railways are projected to play a larger role in meeting the rising demand for transportation infrastructure services in the future hence improving economic growth. Many African countries have built new railway lines in recent years. Furthermore, freight transportation via railway is projected to be a significant design component of future multimodal transport corridor developments. However, evidence of railway construction expenditure with economic growth in the literature is scant. Deeper knowledge is required for the design of economically as well as ecologically, and socially inclusive railway construction projects.

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