International Journal of Social Science Research and Review

http://ijssrr.com
editor@ijssrr.com
Volume 6, Issue 9
September, 2023
Pages: 237-250

Road Infrastructure Resilience and SMEs Sales Performance in Tanzania: Evidence from the Government Departments Shift to Dodoma Region

Frank Arbogast Mwombeki

College of Business Education (CBE), Mbeya, Tanzania

E-mail: frank.mwombeki@cbe.ac.tz

http://dx.doi.org/10.47814/ijssrr.v6i9.1456

Abstract

This study focuses on the effect of road transport infrastructure in Dodoma city on Small and Medium Enterprises (SMEs) sales performance. Specific attention was to determine how several factors, such as market and road accessibility, ways of transportation, time management, and so forth, affect sales performance (measured by sales trend) of SMEs after Government Departments Shift to Dodoma Region. The data from Using the World Bank firm resilience and enterprise survey was employed to analyze 89 firms by using DiD technique to capture the outcome before and after the shift. The main variables, such as market accessibility, access roads to customers, improved transportation, and time management, positively affect sales performance. The results mean that the infrastructure constructed after the Government shift dramatically increases the sales volume. The other variables (ways of transporting goods, shifting to transport mode, transport cost, and expensive transport model) indicate the adverse effect. In addition, the study showed robust checks on the OLS model and profit as another measure of firm performance. The results indicate a similar effect to the baseline results, with a slight increase when the control variables are inserted into the model. The study concludes that transport infrastructure improved or constructed after the Government shift to Dodoma city boosted the sales and profit of SMEs. The paper recommends that the Government should continue improving road networks. Also, financial skills should be offered to SMEs. Through acquired skills, they can make knowledgeable investment decisions and develop entrepreneurial skills that will allow them to identify and adventure the available commercial opportunities.

Keywords: *Road Infrastructure; Sales Performance; SME; Dodoma City*

1. Introduction

This paper investigates the effect of improved Dodoma region road infrastructures on Firm Sales performance. Globally, well-improved infrastructures contribute to an excellent operative transportation

system that, in the long run, leads to the sustainable economic growth of the countries. This is because transport infrastructure links various parts of the nation and towns (World Bank, 2017). It links to delivers products to market and supports logistics, supply chain, and domestic and international trade. An enhanced transport infrastructure facilitates a better transportation system, vital to national growth, and catalyzes a country's urban areas and economic development in general. Thus, there is an association between transportation and productivity (Lu *et al.*, 2009; Tobiassen & Pettersen, 2018) as cited in Fungo & Maziku, 2022). The urban road infrastructure systems are integral to modern city expansion processes. Internationally, roads are the main transport resources and a treasured infrastructure used daily by millions of commuters, containing millions of kilometers worldwide (Kamunge et al., 2014). According to the Fungo & Maziku (2022) and World Road Association (2014), the average length of public roads in OECD countries is more than 500,000km and is the major publicly owned national resource. Such infrastructure takes about 15-20% of the entire city area. Similarly, it covers over 40% of city centers (Deluka-Tibljaš, 2013). Therefore, road infrastructure is unquestionably understood as an essential public asset that should be sensibly managed throughout the life cycle.

Infrastructure can be explained as a set of interconnected components that provide a basis that supports the whole structure for development, and it is a vital term for assessing a region or country's progress around the circle of growth (Mugo et al., 2019). The term refers to technical structures that support society for water supply, electricity grids, bridges, roads, telecommunications, and sewers, and also infrastructure is explained as the physical components of interrelated systems that provide products and services essential to sustain, enable existing societal situations (Mugo et al., 2019).

Due to geographical size, scattered settlement patterns, diversity, and dispersion of areas, it gives roads an exclusive role in mixing the national economy (Starkey & Hine, 2020). It is cited in Fungo & Maziku (2022) that road transport is the primary mode of transportation carrying over 90% of the travelers and above 75% of the freight traffic in Tanzania (URT, 2016). In particular, roads serve not only major Transport demand from seaports to inland on trunk roads also provides door-to-door services more effectively than any other modes of transport in rural areas where people need the freedom to move (World Bank, 2019).

Hanak *et al. (*2014) established that there is a straight-line relationship between the quality of road infrastructure and citizen's quality of life, such as health, safety, economic opportunities (Hanak *et al.*, 2014), and conditions for work and leisure (Marović, 2013). On the other side, researches expose that the poor road network, and infrastructure in urban areas, negatively influence the profit and sales of SMEs (Goldman, 2016). The main reason for that is the high cost SMEs incur in self-provision of infrastructure and distribution of finished goods (Marović, 2018; Obokoh & Goldman, 2016).

The Shift of the Government Departments to Dodoma City

Before the move in 2016, the Tanzanian government departments were operated in Dar es Salaam city. The city is also known to be the economic city, and of course, the largest city in Tanzania in terms of population (has 5,383,728 people), number of economic activities, and the GDP the city contributes annually.

The decision to transfer the Government's functions from Dar es Salaam to Dodoma was initially proposed in the national assembly by Joseph Nyerere (brother of our father of the nation, Julius K. Nyerere). Then it was raised again by TANU members (the then ruling party led by J.K Nyerere) in 1972, and finally, the decision to shift the Government was made in 1973. In that period, the Government needed to shift the capital from Dar es Salaam to a more central location (i.e., Dodoma region) to serve people conveniently. However, due to financial constraints and economic difficulties, Nyerere's decision wasn't implemented.

The process was never more straightforward because each phase that came into power try in its way until the fourth Government led by the late John P.J Magufuli managed to shift the Government departments to Dodoma. Instead of the ten years that were predicted when the process began, the journey lasted around 50 years (https://dailynews.co.tz/how-relocation-to-dodoma-began/).

In his official announcement through media, Prime Minister Majaliwa Kassim Majaliwa directed towns to work with the Tanzanian National Roads Agency (TANROADS) to develop local roads in Dodoma. Also, he urged the private sector to invest in Dodoma's services sector as this will be the business opportunity for the SMEs in Dodoma to develop (https://www.tanzaniainvest.com)

Figure 1: Tanzania map with cities of concern
Source**:** Modified map from Google

Dodoma City is the capital region of Tanzania, found in the center zone of the country. The city is 453 kilometers west of the former capital at Dar es Salaam, with a population of 410,956 in 1973 and 3,085,625 in 2022 (URT, 2022). For social and economic reasons, Dodoma was decided to be the capital region in 1996 (https://en.wikipedia.org/wiki/Dodoma). However, Dar es Salaam remained the region where the government functions were operated due to financial constraints until 2016 when the shift was executed.

Small and Medium Enterprises (SMEs)

SMEs are mostly available in emerging economies, and they dominate the economic life of the people in such countries (Gollin, 2008). They are considered motivators for economic growth and poverty elimination (UNCTAD, 2015). Mnenwa & Maliti (2008) and Fungo & Maziku (2022) highlighted that small businesses, mainly performed by SMEs, are the number one source of income in low-income economies like Tanzania. According to Tanzania National Baseline Survey for Small, Micro, and Medium Enterprises (2017), there are more than 3 million small businesses in Tanzania engaging in trade and service sectors, most of which are informal. It employs about 5,206,168 people; 3,447,469 are owners/spouses; 964,246 are paid workers; 718,663 are relatives and friends, and 79,390 are beginners. Thus, small businesses are essential for livelihood and economic growth (Kumburu *et al.*, 2019).

To improve their enactments, SMEs need a better-quality road network, particularly urban roads, which simplifies their operations and convenience of goods and services in a timely, whereby this will safeguard the access goods convenient reach to market and meet the demand of customers and the needed actions are taken in time (World Bank, 2017). The report from TARURA (2021) illustrates that an upgraded urban road around Dodoma city currently covers about 1187.03 km in total. About 158.30 km

are tarmac roads, equal to 13.34%, whereas 320.72 km are developed rough roads, signifying 27.02%. However, the remaining portion, which covers a distance of 708.01Kms representing 59.65%, is a rough road (TARURA, 2021). Therefore, there is potential to assess the impact of an improved urban road network on SMEs' performances in Cities like Dodoma.

In Tanzania, SMEs play a substantial part in providing employment, innovation, tax revenue, lowering poverty, and offering better living standards (URT, 2016). Despite the role played by small businesses in economic development, most are constrained by high operation costs obtained from unimproved infrastructures, hamper their performance (Mashenene & Kumburu, 2020). According to Obokoh & Goldman (2016) and Mugo et al. (2019), the infrastructure shortage negatively impacts SMEs' performance due to the high cost incurred by SMEs in the self-provision of infrastructure and supplying of goods.

Statistics in Dodoma City show that the number of registered SMEs is 22,334 enterprises (Dodoma City, 2020). The figures also show that 52% of firms have stopped doing business for the past three years. This suggests that the SMEs within the city do not perform well since many business premises have collapsed.

Earlier papers by Mashenene & Rumanyika (2014) presented that SMEs in Tanzania face some limitations that hinder their potential growth. One of the restrictions indicated by Mashenene & Rumanyika (2014) is poor infrastructure. Yet, the study did not argue the type of infrastructure limits the performance of small businesses. Moreover, Nkonoki (2010) and Nkwabi & Mboya (2019) also talk more of the constraints that hinder Tanzania SMEs but fail to explore the mechanisms on why they failed and which transport models are more seriously affecting SMEs in Tanzania. Therefore, this study filled the knowledge gap by evaluating the special effects of improved road infrastructures on the sales revenue of SMEs in Tanzania after the Government shifted its main functions from Dodoma City.

The remaining part of this paper is arranged as follows; section 2 talks about prior studies conducted, followed by methodology, where data source, definitions of variables, sample techniques, and model specification are presented. Section 4 is about the main results and discussion. Then it ends with a conclusion and recommendations concerning what has been found.

2. Empirical Studies

Gyergyay (2019) studied the road routes in Roman, where they used LiDAR data, soil maps, and least-cost path analyses. The paper exposes that improved urban roads donate to more accessible, inclusive, and liveable cities by optimizing road space use and vitalizing city centers. Developed cities increase the possibility of innovative firms enhanced by public transport use and support the transportation of goods and services. The study recommends maintaining the quality of road infrastructure to keep existing users and attract new ones.

Khanani *et al.* (2020) proclaim that improved urban roads greatly help accessibility to amenities and services. In urban areas, road improvements drive SMEs' performance and employment chances. Improved road infrastructures mutually benefit SMEs since they support the movement of people from one location to another and reduce the costs of transporting goods and services.

A study by Obokoh & Goldman (2016) conducted in Nigeria explored the infrastructure shortage and the performance of SMEs. Using structured interview on SMEs owners, the study concluded that infrastructure shortage negatively impacts SMEs' performance. The study clarified that poor urban road networks lead to the high cost to be incurred by SMEs in the distribution of finished goods and services. It recommends that the Government embark on road rehabilitation to ease the transportation of goods and services.

A study by Kinuthia (2013) in Kenya concludes that advancing urban road network cater transport safety, reduces transport costs, helps the accessibility of product market information, rises customers' flow into the business, improves marketing, and improves sales volume in businesses. Furthermore, the study establishes that an improved urban road network permits businesses to access product market information that stimulates the firm's profit.

Dumas & Jativa (2020), whose study was on improving roads in Tanzania, have noted that there is growth in the urban road network in Tanzania, which contributes much to the performance of SMEs. The improved urban road network has intensely facilitated reduced life satisfaction and decreased top product prices. The paper added that the situation is consistent with predictions obtained from trade models whereby lower-cost transactions face competition from lower-priced goods.

3. *Methodology*

3.1 Data Source

The current paper employs data from the Enterprise Surveys (E.S.) conducted by World Bank (https://microdata.worldbank.org/). The survey was completed in 2013 and 2018 in Dar es Salaam, Dodoma, and other regions. It is a firm survey series designed to collect information from private businesses focusing on the dependence on and reliability of critical and non-critical infrastructure. E.S. data contain information on infrastructure dependency (water, electricity, and transport), demand, cost and sales information, firm characteristics, use of suppliers, firm experience with disasters and risk management, and coping capacity and recovery of sales after a shock.

3.2 Definition of Sample

SMEs operating in various sectors in Dodoma were the main population used in this study, including Food, medicals, agriculture, and so forth. Probability and non-probability sampling techniques were used to pick the sample. Initially, the Dodoma region was purposively selected as the city of study. The reason is that it is currently announced (officially in 2016) by the president of URT to be the capital city and central region where government activities should be operated. Following that announcement and commitment, various infrastructure has been improved, and new ones have been constructed (I assumed this could be an opportunity for SMEs in Dodoma to operate smoothly). The paper employed a total sample of 837 firms surveyed in Tanzania. To adhere to parallel trend analysis in the Difference in Difference model, I considered the firms studied in both periods, 2013 and 2018. In this regard, firms surveyed in Dodoma city was 101, but the final sample of 89 firms in Dodoma was considered for the study. Moreover, I consider firms in Dodoma City the treatment group and firms in other cities/regions the control group. Table 1 below summarizes the details.

Table 1: Firms summary in periods

	Pre-2016		**Post-2016**	
Firms in	Control group	Treatment group	Control group	Treatment group
Dodoma city		89		89
Other Cities	736		736	

Source: Author construction (2023)

3.3 Selection of Variables and Descriptive Summary

The data set had several variables connected with Firms in Tanzania. The assortment of variables from the data source utilized as core attributes for improved infrastructure was initially grounded on

insights from the literature review. Additional variables related to infrastructure were also added to the author's knowledge. Table 2 below indicates the list of variables and their definitions.

Table 2: Variable definitions and descriptive summary

Variable	Definitions	N	Mean	Std Dev.
Firm performance	Trends of firm's sales revenue	89	11.852	12.319
Attributes of Improved Infrastructure				
Accessible roads to customers	= 1 if firm sites are accessible; 0 otherwise	89	7.054	7.192
Improved transportation of goods and services	= 1 if is improved; 0 otherwise	89	6.783	5.961
Ways of transporting goods	1= Through road transport; 0= otherwise	89	.833	.041
Shifting to transport mode	Percentage of goods a firm can shift to different transport model	89	2.416	.717
Firm receives inputs	The frequency with a firm receives inputs from supplier	89	3.185	9.055
Transport cost	The total amount of TZS incurred in transportation	89	6.901	4.049
Expensive transport model	1= it is more expensive; 0= if is cheaper	89	3.625	1.345
Time management	Number of days a firm takes to make delivery to customers.	89	1.647	.280
Market accessibility	= 1 if markets are easily accessible; 0= otherwise	89	5.610	5.375
Control variables				
Firm ownership	= 1 if is a male; 0 if is a female	89	1.993	.303
Operating Sector	Sector dummies	89	N/A	N/A
Firm experience in the sector	Number of years a firm being in the sector	89	4.761	4.932
Firm age	Number of years since a firm commencement	89	20.901	15.903
Firm location	1= in Dodoma town; 0= other districts	89	3.127	1.346
Supplier location	1= in Dodoma; 0= not in Dodoma but in Tanzania	89	3.742	1.301
Firm product/service	Type of product/service a firm offers	89	N/A	N/A
Transport disruption	1= if disruption occurred; 0= not occurred.	89	1.762	.427
Trade openness	1= if trade openness increases after infrastructure improvement	89	1.873	.471
Electricity consumption	Percentage rate of electricity consumption	89	2.617	.569

Source: Author computation (2023)

Table 2 above also indicates the descriptive statistics. The overall descriptive results show that access roads to customers, improved transportation of goods and services, transport cost, and firm age have a higher mean score than other remaining variables.

3.4 Baseline Model Specification

In this analysis, I utilized the difference-in-differences (DiD) strategy in the sense that it can efficiently circumvent the endogeneity issues. Also, some scholars use the time-varying DiD method to accommodate exogenous assumptions (Hengyun, 2022). A typical DiD regression model utilized in this study is shown in equation i below

$$Yit = \beta_0 + \beta_1(Treatment_i) + \beta_2(Post2016t) + \mu(Treatment_i \times Post2016t) + \varepsilon_{it} \quad \text{Eq i}$$

Where Y_{it} is the outcome variable, the sales trend (Treatment) indicates firms in Dodoma city, and (post2016) indicates the period after the shift. The main constraint of concern is μ, which provides the DiD evaluation for the effect of improved infrastructure variables. The subscript *i* still stands for an individual firm but is now defined as i = (1…89). However, following Akgündüz et al. (2018), I dropped the controls for (Treatment) and (Post2016) once I included year effects (λ_{it}) and city fixed effects (μ_{it}). So, in this regard, I use the time-varying DiD method to construct the regression model shown in Equation ii

$$Y_{it} = \beta_0 + \beta_1 X_{it} + \alpha Z_{it} + \lambda_{it} + \mu_{it} + \varepsilon_{it} \quad \text{Eq ii}$$

Where *i* and *t* denote firm and year, respectively, Y_{it} is the dependent variable, which indicates the revenue growth for firm *i* in year t. X_{it} is the infrastructure factors in firm *i* in year t. β_1 is the estimated coefficient that represents the impact of infrastructure factors on revenue growth. Z_{it} is a set of control variables. Further, I control for the year- and city-fixed effects described by λ_{it} and μ_{it}, respectively. ε_{it} is a random disturbance term in the model.

4. Results and Discussion

4.1 Parallel trend test

In this study, I use the time-varying DiD method to evaluate the impact of road infrastructures on firms' sales performance. The DiD method assumes that the control group is a counterfactual condition for the treatment group. As such, a parallel trend is an important prerequisite that the DiD method should fulfill. The two control and treatment group samples must be compared before the shift is implemented. Therefore, to test the parallel trend hypothesis, I add the interaction terms of the time dummy variables and the treatment group before and after the shifting to Dodoma, respectively. I set the regression model as follows:

$$Y_{it} = \beta_0 + \beta_1 X_{it}\text{-}1_{it} + \beta_2 X_{it} + \beta_3 X_{it}\text{+}1_{it} + \alpha Z_t + \lambda_{it} + \mu_{it} + \varepsilon_{it} \quad \text{Eq iii}$$

Where $\beta_1 X_{it}\text{-}1_{it}$ denotes the time dummy variable that advances the opening year of road infrastructures in firm *i* by one year; $\beta_3 X_{it}\text{+}1_{it}$ denotes time dummy variables that delay the opening year of the road infrastructures in Dodoma city by one year. Suppose the parallel trends are met, and the opening of the transport infrastructures improves firms' sales performance. In that case, the coefficient estimates of $\beta_1 X_{it}\text{-}1_{it}$ are expected to be insignificant or significantly negative, while the coefficient estimates of $\beta_3 X_{it}\text{+}1_{it}$ will be significantly positive.

Table 3: Parallel trend analysis

Variables	(1)	(2)	(3)
β1Xit-1it	0.0014 (0.011)		
$\beta 3X_{it}$		0.028** (0.008)	
β3Xit+1t			0.032** (0.005)
Constant	0.410** (0.113)	0.441** (0.071)	0.421** (0.071)
Control variables	Yes	Yes	Yes
Year fixed effects (λit)	Yes	Yes	Yes
Firm fixed effects (μit)	Yes	Yes	Yes
Observations	89	89	89

Note: ** represents the 5% significance level

Source: Author (2023)

As shown in Table 3, the regression results fulfill the hypothesis of parallel trends, whereas infrastructure improvement positively affects firms' sales performance over time.

4.2 Baseline Regression Results

In this section, I also estimate the effects using the DiD technique by describing firms in Dodoma City as the treatment group and the firms in other cities or regions as the control group. Since the government departments started to shift to Dodoma City in 2016, I define the firm surveys in years before 2016 as the pretreatment years and the firms' surveys in years after 2016 as the treatment years. Likewise, I include the control variables individually in the baseline regression, concentrating on the significance of the effect of transport infrastructures on sales performance. In column two, I include the year and city fixed effects. The year-fixed effects control the time trend of firm performance. The city-fixed effects exclude the marginal effects of the time-varying variables that control city heterogeneity. The results are indicated in Table 4 below. In Column 1 of Table 4, the estimated coefficients of most of the road transport infrastructures are significantly positive at the 5% level, indicating that road transport infrastructures significantly improve sales performance. As shown in Table 4, access roads to customers have a coefficient of 0.242 and a p-value of 0.003. This implies that any unit improvement of accessible routes to customers could increase the performance of small and medium enterprises in Dodoma city in sales revenue by 24.2%. These results are supported by those of Akinyele et al. (2016), who revealed that access roads to customers and SME performance are essential for businesses and the broader economy. A well-maintained and accessible road network is necessary for the efficient operation of businesses.

The results of market accessibility indicate a coefficient of 0.216 and a p-value of 0.004. This is a positive and statistically significant finding which suggests that any unit improvement of market accessibility due to an improved urban road network could increase the sales revenue performance of SMEs in Dodoma city in sales revenue by 21.6%. The results are consistent with

World Bank (2020) highlighted that improved urban road networks are essential for market accessibility and sales volume to small and medium enterprises (SMEs). The study added that SMEs in cities with good urban road networks are likelier to export their products and services than those in towns with poor road networks.

Moreover, the findings on time management were positively and significantly related to sales revenue with (coefficient = 0.259, p-value= 0.001). This denotes that any unit increase in time management due to an improved urban road network could increase the performance of small and medium enterprises in Dodoma City in terms of sales revenue by 25.9%. Findings align with Akinyele et al. (2016) who establish that SMEs could increase their performance if an improved urban road network allows for better time management. This could lead to increased productivity and efficiency.

Furthermore, the improved transportation of goods and services is positively significantly related to sales revenue with a coefficient of 0.220 and a p-value equal to 0.006. This implies that any unit of improved transportation of goods and services could increase the performance of SMEs in Dodoma city in sales revenue by 22%, resulting from an improved urban road network. Obokoh & Goldman (2016) found that the transportation of goods and services is essential for the performance of small and medium enterprises.

In Column 2, I include all the control variables together with variables for road transport infrastructure. I also consider the year and city effect in the model. The results show that when control variables are inserted in the model, the impact rises slightly in most road transport infrastructure variables, such as road and market accessibility, increasing sales performance significantly. On the other hand, the variables with negative effects still have the same effect even when controls are inserted in the model. Most of the control variables are also positive and statistically significant.

Table 4: Baseline Regression results

Variables	(1)	(2)
Transport infrastructures variables		
Accessible roads to customers	0.242** (0.003)	0.266** (0.008)
Improved transportation of goods and services	0.220** (0.006)	0.223** (0.023)
Ways of transporting goods	-0.103** (0.042)	-0.104** (0.042)
Shifting to transport mode	-0.149** (0.011)	-0.150** (0.011)
Firm receive inputs	0.205** (0.030)	0.205** (0.030)
Transport cost	-0.141** (0.012)	-0.141** (0.012)
Expensive transport model	-0.410** (0.021)	-0.412** (0.021)
Time management	0.259** (0.001)	0.207** (0.010)
Market accessibility	0.216** (0.004)	0.246** (0.014)
Control variables		
Firm ownership		0.005** (0.007)
Operating Sector		0.001** (0.009)
Firm experience in the sector		0.003** (0.005)
Firm age		0.001** (0.005)
Firm location		0.006** (0.000)
Supplier location		0.004** (0.041)
Firm product/service		0.002** (0.071)
Transport disruption		0.008** (0.000)
Trade openness		0.003** (0.003)
Electricity consumption		-0.006** (0.055)
Constant	0.622** (0.088)	0.625** (0.089)
Year fixed effects (λ_{it})	Yes	Yes
Firm fixed effects (μ_{it})	Yes	Yes
Observations	89	89

Standard errors in parentheses ***p<0.01, **p<0.05, *p<0.1.
Source: Author computation (2023)

4.3 Robustness Checks on Different Regression Models

I present the ordinary least squares (OLS) strategy for regression examination to assess the correctness of the baseline regression results. The OLS method tests whether the positive impact of road transport infrastructures on revenue growth is also valid in cross-sectional data. The OLS technique was

used because the dependent variable was captured and treated as a continuous variable. The following model identification was used:

$$Y_j = \alpha + \beta X_{ij} + Z_{ij} + \varepsilon_{ij} \quad \text{eq iv}$$

Where; Y at firm j = Trends of sales revenue (TZS) in a firm *j*, α = Constant term, β = Beta coefficient, X_{ij} = infrastructure factor *i* at firm j, Z_{ij} are firms control variables *i* at firm j, ε_{ij} is an error term. The results are listed in Table 5.

Table 5: OLS regression results

Variables	(1)	(2)
Transport infrastructures variables		
Accessible roads to customers	0.049** (0.004)	0.164** (0.008)
Improved transportation of goods and services	0.023** (0.007)	0.110** (0.023)
Ways of transporting goods	-0.013** (0.005)	-0.015** (0.005)
Shifting to transport mode	-0.045** (0.007)	-0.073** (0.007)
Firm receive inputs	0.411** (0.001)	0.441** (0.001)
Transport cost	-0.224** (0.000)	-0.233** (0.000)
Expensive transport model	-0.142** (0.021)	-0.252** (0.021)
Time management	0.051** (0.000)	0.0207** (0.010)
Market accessibility	0.062** (0.001)	0.145** (0.014)
Constant	0.021** (0.003)	0.029** (0.003)
Control variables	No	Yes
Year fixed effects (λ_{it})	Yes	Yes
Firm fixed effects (μ_{it})	Yes	Yes
Observations	89	89

Standard errors in parentheses ***p<0.01, **p<0.05, *p<0.1.
Source: Author computation (2023)

From Table 5 above, Columns (1) do not contain control variables, whereas Columns (2) comprise control variables. The effects from different methods show that transport infrastructures still have a significant positive effect on revenue growth. Also, the result is seen to have the same shape as the baseline model because when control variables are inserted in the model, most results of the variables rise slightly.

4.4 Robustness Checks on Different Measures of Firm Performance

This paper also considered the firm's profit (measured by sales minus expenses). The profit as a dependent variable was regressed against road transport infrastructure factors. Columns (1) do not entail control variables, while Columns (2) involve control variables. In all two specifications, the regression results show that most road transport infrastructure factors significantly increased the firm's profit. Improved infrastructure in Dodoma city accelerates the flow of sales movement. Improving road infrastructure and constructing new ones have intensified market accessibility and fast delivery of materials, goods, and services from firms to customers. This has increased competition and sales while reducing the operational expenses among firms and hence have become an essential factor affecting the firms' profit in Dodoma city. Table 6 indicates the effects of infrastructure on the firm's profit.

Table 6: Robustness results on Firm Profit

Variables	Dependent Variable: Firm Profit	
Transport infrastructures variables	(1)	(2)
Accessible roads to customers	0.067** (0.006)	0.074** (0.007)
Improved transportation of goods and services	0.033** (0.006)	0.043** (0.006)
Ways of transporting goods	-0.651** (0.013)	-0.627** (0.013)
Shifting to transport mode	-0.425** (0.021)	-0.433** (0.021)
Firm receives inputs	0.656** (0.001)	0.677** (0.001)
Transport cost	-0.165** (0.071)	-0.221** (0.031)
Expensive transport model	-0.341** (0.000)	-0.355** (0.000)
Time management	0.860** (0.071)	0.891** (0.071)
Market accessibility	0.282** (0.002)	0.372** (0.002)
Constant	0.323** (0.093)	0.536** (0.093)
Control variables	No	Yes
Year fixed effects (λ_{it})	Yes	Yes
Firm fixed effects (μ_{it})	Yes	Yes
Observations	89	89

Standard errors in parentheses ***p<0.01, **p<0.05, *p<0.1.
Source: Author computation (2023)

Therefore, results on firm profit are symmetric with those of the baseline. Road accessibility, market accessibility, improved transportation, and time management positively affect firm profit.

5. Conclusions and Recommendations

Conclusion

From the positive and significant results of the main variables, we can conclude that SMEs sales revenue performance is positive due to the improvement and construction of new roads mainly developed after the shift of the government departments in Dodoma city.

Recommendation

Government should continue to improve and build more urban roads around the city to foster for the easier operation of SMEs in the city, which will boost the GDP of the region and the country as a whole. Also, in collaboration with business development stakeholders, the Government should offer financial management skills to owners to increase the chance for SMEs to make informed investment decisions and enhance the entrepreneurial skills that will allow them to recognize and exploit the available business opportunities. Finally, the central Government should develop supportive policies, laws, and regulations that address the SMEs specifically for street vending activities using improved urban road networks. It will help street vending activities to be the same as other forms of formal business needing constructive interventions.

References

Aikaeli, J. (2017). Improving Competitiveness for SMEs to harness available Trade and Investment Opportunities: the Case of Tanzania.

Akgündüz, Y.E., Van den Berg, M & Hassink, W. (2018). The Impact of the Syrian Refugee Crisis on Firm Entry and Performance in Turkey. *The World Bank Economic Review*, 32(1), 2018, 19–40., https://doi.org/10.1093/wber/lhx021.

Akinyele, S. T., Akinyele, F. E., & Ajagunna, O. D. (2016). Infrastructural development as a predictor of small and medium enterprises performance in Nigeria. Kuwait *Chapter of Arabian Journal of Business and Management Review*, 6(3), 1-14.

Allen, R.C. and Stone, J.H., (2001). The Gauss Markov theorem: a pedagogical note. The American Economist, 45(1), pp.92-94.

Deluka-Tibljaš, A., Karleuša, B., & Dragičević (2013). "Review of Multicriteria-Analysis Methods Application in Decision Maki about Transport Infrastructure. *Građevinar,* 65(7), 619-63.

Dumas, C., & Játiva, X. (2020). Better roads, better off?: Evidence on improving roads in Tanzania. Université de Fribourg.

Fungo, I & Maziku, P (2022). Effects of Improved Urban Road Network on Financial Performance of Small and Medium Enterprises in Dodoma City, Tanzania. *CBE Business Economic Development Conference Paper*. http://dspace.cbe.ac.tz:8080/xmlui/handle/123456789/1230.

Gollin, D. (2008). Nobody's business but my own: Self-employment and small enterprise in economic development. *Journal of Monetary Economics, 55*(2), 219-233.

Gyergyay, B., Gomari, S., Friedrich, M., Sonnleitner, J., Olstam, J., & Johansson, F. (2019). Automation-ready framework for urban transport and road infrastructure planning. Transportation Research Procedia, 41, 88-97.

Hanak, T., Marović, I., & Pavlović, S. (2014). "Preliminary Identification of Residential Environment Assessment Indicators for Sustainable Modelling of Urban Areas". *International Journal for Engineering Modelling*, 27(1-2), 61-68.

Hengyun T., Jianqing Z., Fei F., & Zhengwen W (2022): High-speed rail, urban form, and regional innovation: a time-varying difference-in-differences approach, Technology Analysis & Strategic Management, https://doi.org/10.1080/09537325.2022.2026322.

https://www.tanzaniainvest.com/economy/government-headquarter-dodoma (Visited on 24th may, 2023).

https://dailynews.co.tz/how-relocation-to-dodoma-began/. (Visited on 24th May 2023).

https://en.wikipedia.org/wiki/Dar_es_Salaam (Visited on 24th may, 2023).

https://en.wikipedia.org/wiki/Dodoma. (Visited on 24th May 2023).

Kumburu, N. P., Kessy, J. F., & Mbwambo, S. J. (2019). The profitability of SIDO supported small-scale furniture industries against imported furniture in Dar-Es-Salaam and Arusha regions, Tanzania. *East African Journal of Social and Applied Sciences*, 1(2), 33-48.

Kamunge, M.S., Njeru, A., &Tirimba, O.I (2014).Factors Affecting the Performance of Small and Micro Enterprises in Limuru Town Market of Kiambu County, Kenya. *International Journal of Scientific and Research Publications*, 4(12), 1-20.

Khanani, R.S., & Adugbila, E.J., Martinez, J.A., & Pfeffer,K. (2020). The Impact of Road Infrastructure Development Projects on Local Communities in Peri-Urban Areas: the Case of Kisumu, Kenya, and Accra, Ghana. *International Journal of Community Well-Being*. Online accessed on 22nd August 2021 from https://doi.org/10.1007/s42413-020- 00077-4.

Kinuthia, B. (2013). The Effect of Road Infrastructural Improvement on Performance of the Matatu Industry in Kenya. A Case Study of Thika Super-Highway (Doctoral dissertation, Master's Thesis). Kenyatta University, Nairobi, Kenya.

Lu, I. J., Sue, J.L., and Charles, L. (2009). The Forecast of Motor Vehicle, Energy Demand and CO2 Emission from Taiwan" Road Transportation Sector. *Journal of Energy Policy*, (37), 2952-2961.

Marović, I. (2013). Decision Support System in Real Estate Value Management, [Ph.D. Thesis], University of Zagreb, Faculty of Civil Engineering, Zagreb, Croatia.

Marović, I., Androjić, I., Jajac, N., Hanák, T (2018). : Research Article on Urban Road Infrastructure Maintenance Planning with the Application of Neural Networks. Hindawi Complexity Volume 2018, Article ID 5160417, 10 pages https://doi.org/10.1155/2018/5160417.

Mashenene, R. G., &Rumanyika, J. (2014). Business constraints and potential growth of small and medium enterprises in Tanzania: A review. *European Journal of Business and Management*, *6*(32), 72–79.

Mashenene, R.G., &Kumburu, N.P. (2020). Performance of Small Businesses in Tanzania: Human Resources-Based View. Global Business Review, 1-15: https://doi.org/10.1177/0972150920927358.

Mnenwa, R., &Maliti, E. (2008). *The role of small businesses in poverty alleviation: The case of dares salaam, Tanzania* (Research Report 08.2). REPOA.

Mugo, A. N., Kahuthia, J. & Kinyua, G. (2019). Effects of infrastructure on the growth of small and medium enterprises in Kenya: A case of clothing and textile businesses in Nairobi Central Business District. *International Academic Journal of Human Resource and Business Administration*, 3(6), 133-14.

Nkonoki, E. (2010). What are the factors limiting the success and/or growth of small businesses in Tanzania? An empirical study on small business growth. Arcada University of Applied Sciences. International business. Helsinki. Retrieved from http://www.theseus.fi/bitstream/handle/10024/21942/Nkonoki_Enock.pdf.

Nkwabi, J.M., Mboya, L.B. (2019). A Review of Factors Affecting the Growth of Small and medium enterprises (SMEs) in Tanzania. *European Journal of Business and Management*, 11(33, 1-8.

Obokoh, L.O., Goldman, G. (2016). "Infrastructure Deficiency and the Performance of Small and Medium-sized Enterprises in Nigeria's Liberalized Economy," Acta Commerce 16(1), a339. http://dx.doi. org/10.4102/ac.v16i1.339.

Tobiassen, A. E., & Pettersen, I. B. (2018). Exploring open innovation collaboration between SMEs and larger customers: The case of high-technology firms. Baltic Journal of Management, 13(1), 65-83.

Starkey, P. and Hine, J., TRL (2020). Rural transport services: operational characteristics and options for improvements. Phase 3 Report. Interactions: Maintenance and Provision of Access for Rural Transport Services (IMPARTS) Project. Recap GEN2136A. London: ReCAP for DFID.

The World Road Association [PIARC] (2014). "The Importance of Road Maintenance: The World Road Association (PIARC). Accessed on 17th March 2021 from http://www.erf.be/images/Importance_ of_road_maintenance.pdf.

United Nations Commission of Trade and Development (UNCTAD). (2005). *Growing micro and small enterprises in LDCs: The "missing middle" in LDCs: Why micro and small enterprises are not growing*. https://unctad.org/en/Docs/poitetebd5.en.pdf .

URT- United Republic of Tanzania (2022), The national bureau of Statistics, national census. Retrieved from https://sensa.nbs.go.tz/, visited on 24th May, 2023).

World Bank. (2020). *Doing Business 2019*. The World Bank.