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ABSTRACT

The general objective of the study was to determine the factors that affect the performance of truck transportation in Kenya. The study was anchored on intermodal freight model, heuristics intermodal transport model and the model of multimodal road and rail freight transport. Through the use of a quantitative correlational research design, the data for the research was collected using structured questionnaires from a sample of 90 employees from Transeast limited that was selected using a stratified random sampling method from a target population of 117 employees. Data was analysed using Statistical Package for Social Science, version 22. The findings indicated that government regulations, cost of fuel, nature of cargo and road infrastructure all have moderate influence on the performance of the truck transportation in Kenya. The study concluded that improvements in road infrastructure and government legislation would enhance the performance of truck transportation in Kenya. The study also concluded that cost of transport and nature of cargo do not have a significant influence on truck transportation performance when the other factors (road infrastructure and government legislation) are held constant. The study recommended that; the government should allocate more funds for the improvement of road infrastructure in the country; the managers of the trucking companies should make adjustments towards using electric trucks and trucks that are fuel efficient; the managers of the truck transportation companies should ensure that their employees perfectly comply with the regulatory requirements at all the times; and the employees and their managers should strive to understand the nature of cargo that they handle in order to deliver them in the best conditions. The study finally suggested that a similar study should be undertaken within the same industry but using a different population and a bigger sample size in order to ascertain whether cost of fuel and nature of cargo are significant predictors of performance of truck transportation in Kenya.

Key Words: *Road Infrastructure, Government Legislation, Cost Of Fuel, Nature of Cargo, Truck Transportation*

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INTRODUCTION

Freight transport has grown even faster than passenger transport and is expected to continue rising in the coming years. Urban freight movements are dominated by trucks, while international freight is predominantly by ocean shipping (Drozdziel & Krzywonos, 2010). The modal distribution of intercity freight services varies widely across regions. In the United States, for example, all modes participate substantially, while in Europe, the market share is highly dominated by trucking compared to rail (Schorpp, 2011). Transport activities are expected to grow robustly over the next several decades. Unless there is a major shift away from current patterns of energy use, global transport energy use is projected to increase by around 2% per year, with the highest growth rates in emerging economies, and total transport energy use is projected to be about 80 per cent higher than current levels by 2030 (Kambey & Litouw, 2015).

At the time of the economic crisis between 2007 and 2010, there was a contraction in the global truck market. It appeared to have stabilized again by 2013 and further growth of about 3.7% or more annually was predicted between 2014 and 2020 (Kambey & Litouw, 2015). Transportation is majorly influenced by large-scale political, social, environmental, economic and social changes that influence the main global trends involved in shaping the business environment. Even though these trends are related throughout the world, they influence different regions in differing ways. As such, the future for the large commercial vehicles appear to be different from a country to the next (Schorpp, 2011).

Road transport is the most important form of land freight transport in Kenya (Hassan, 2009). Conversely, the progress of road transport depends not only on the advancement of road infrastructure, but also on the structure and growth of the truck fleet (Veldman, Liu, Haralambides & Drunen, 2011). A decade ago, there were approximately 57,800 lorries and trucks in Kenya and also about 159,500 pickups and vans (Onyango, 2003). Majority of these vehicles were owned by private individuals and were allowed to transport goods that belonged to the truck owners. However, about 17,700 trucks were licensed to carry freight for the accounts of others (Onyango, 2003). The Kenyan trucking industry was composed of these, and statistics indicated that most of the truck transporters in the country are private truck owners, with a few operators as licensed truck companies. Studies have revealed that the private truck owner faces severe efficiency challenges than the licensed truck companies on issues related to costs of operations and fleet maintenance.

The transport sector contributes between 5 to 15 % of the GDP in the countries in the Great Lakes Region (Rajé, Tight & Pope, 2018). However, the impact of transport goes well beyond its share of the economy as it serves as an intermediary service to all sectors and is therefore critical to economic growth and poverty alleviation. It is thus of paramount importance that the sector provides the society with adequate, effective, and efficient services, and that the sector provides these services at the least costs to society including collateral negative impact on environment and society (Ali, Kabanguka & Murithi, 2003).

Transeast Limited is a company within the Kenyan truck transportation industry. The company began operations in 1990 and has bases in the whole of East Africa; Kenya, Tanzania, Uganda and DRC (Transeast, 2019). The company has been successful since it began operations over a decade ago, and currently has a fleet size of more than 130 trucks operating in all the four bases. Transeast Limited's core business is the movement of Project Cargo to Gold Mines in Northern Tanzania, Eastern DRC and the Oil and Gas sector in Northern Kenya and Western Uganda. Transeast's specialized trailer fleet consists of heavy-duty hydraulic modular trailers, extendable spine step deck trailers for both air

and hydraulic air suspensions, short lightweight trailers for delicate electrical control panels for both gas and oil rigs.

Statement of the Problem

Road freight transport supports that international and domestic delivery of goods by road. Its primary requirements are high quality service to the satisfaction of both users and customers, with regard to the timeliness, cost and reliability of delivery; intermodal operations that are seamless; optimized utilization of capacity as well as the protection of infrastructure; management of operations; and minimization of the effects on the environment and natural resources (Murithi, 2004). The main factors that increase costs of transport are the low productivity of the trucking industry within Africa, often because of constrains of infrastructure, and weakness of infrastructure (Sergio & Francesc, 2018).

Kenya is a significant transit country within the Northern Corridor for the landlocked neighboring nations like Ugana, Burudi and Rwanda, as well as the eastern parts of DRC, southern Ethiopia, Southern Sudan, and Northern Tanzania. The overloaded Heavy Goods Vehicles (HGVs) result in the destruction of roads. As a result, the roads that are damaged significantly affect the conditions of operating conditions for both the HGVs and other vehicles (Onyango, 2003). As a result of corruption and weaknesses in management, the present axle 7 measures of read control have not effectively been lowering the damage to the roads. The government operates four weighbridges between Mombasa and Malaba, and these have been blamed to result in costly traffic delays (Murithi, 2004). There is an uncoordinated and fragmented institutional and legal framework for regulation, development, coordination and management of the road transport services. The functions of the Kenya National Highway Authority and National Transport and Safety Authority (NTSA), which are the industry regulators, do not include truck transport services demand regulation as per the transport plans (Macphee *et al*., 2013). The present licensing framework depend on applications, while supervision of the operators that are licensed is done by the traffic police whose main functions do not include this area of operational priority. Even though the license fees come from a number of licenses that are issued by the two bodies, the resources are sent to the exchequer, which is not under obligations to pass over the same to them. As a result, the two bodies are not financially independent and rely on the central government for financing (Murithi, 2004).

The cost of fuel is 46 per cent of the overall cost of hiring a vehicle. Tires and vehicle maintenance represents 11.6 per cent, while benefits and labor costs represent 5.7 per cent and 5.6 per cent respectively. The rising costs of fuel, which has often been attributed to the rise in demand, also leads to significant rises in the costs that companies in the truck transport industry incur. This lowers the profit margins, preventing the companies from investing in innovations that would improve performance in the industry (Onyango, 2003). The relatively small number of licensed truck companies that operate in the coastal region has contributed to congestion in the ports.

The government is currently undertaking a project of constructing a Standard Gauge Railway (SGR) to help in the elimination of the congestion problems in the ports (AllAfrica, 2014). This will increase industry competition, as significant amounts of cargo will be transported by rail. With the introduction of SGR cargo transport services, cargo haulers and road freight shippers are set for a significant challenge from their rail counter parts. Various companies in the truck transportation industry are already faced with the problem of empty trucks in return journeys, as exports are significantly lower than imports. Competition raised by SGR is an implication that

revenues of these companies are likely to fall significantly, while the costs may remain at the same level or increase. This, alongside the poor road infrastructure, government regulations, and the rising costs of fuel, is likely to hinder an improvement in industry performance. It was thus necessary to investigate how these factors influence truck transport industry, and come up with remedies to boost its performance.

Research Objectives

The general objective of the research study was to determine the factors that affect the performance of truck transportation in Kenya. The specific objectives were;

- To evaluate the influence of road infrastructure on the performance of truck transportation at Transeast Limited.
- To determine effect of government legislation on the performance of truck transportation at Transeast Limited.
- To examine the influence of fuel cost on the performance of truck transportation at Transeast Limited.
- To determine the effect of nature of cargo on the performance of truck transportation at Transeast Limited.

The study was guided by the following hypotheses

- **H_{01} :** Road infrastructure has no significant effect on the performance of truck transportation at Transeast Limited
- **H_{02}:** Government legislation has no significant effect on the performance of truck transportation at Transeast Limited.
- **H_{03}:** Fuel cost has no significant effect on the performance of truck transportation at Transeast Limited.
- **H_{04}:** Nature of cargo has no significant effect on the performance of truck transportation at Transeast Limited.

LITERATURE REVIEW

Transport models; Intermodal freight mode

The idea of intermodal transport is to use the strengths of various modes of transport in one unified transport chain. The highway network has the advantage of being able to reach almost any place and is also very versatile, while the rail and maritime networks have the capacity to transport goods at a low price over long distance. Barthel and Woxenius (2004) claim that this concept could be changed by using alternative techniques and/or better planning and governance. The major problem is intermodal transport, which involves all the elements of the network to work together, both at a technological level and at a management and system design stage. This interdependence makes the design of the intermodal transport system very demanding. For order to make maximum use of the benefits of intermodal transport, the network must be well organized. By combining the two networks, transport costs could be reduced (Saeed, 2013). In recent years, the development of an intermodal transport and intermodal transport system between highways and rail, also known as mixed transport, has drawn considerable interest as part of a feasible solution for viable and effective transport.

The Heuristics Intermodal Transport (hit) model

The Heuristics Intermodal Transport Model is a large-scale software heuristics model developed by Jonas Floden to design and test the intermodal transport scheme. The HIT model starts in a competitive position between conventional all-road and intermodal transport, where the efficiency of intermodal transport is measured by how well it performs relative to all-road transport.

The model can also be used as an instrument for calculating a specified transport system's expenses and environmental impacts. A transport customer should pick the mode of transportation providing the highest mix of transportation quality, price and environmental impacts, and there is also a need for intermodal transport to match or exceed the shipping times offered by all-road transport. In view of the demand for transport, this model describes the most effective modal

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split, sets train timetables, type and number of trains, number of rail vehicles, type of carrier, etc., and measures the company's financial costs, public financial costs and environmental impacts of the transport scheme.

Intermodal Road rail freight transport (ift) model

The theory of intermodal road-rail freight transport (IFT) is defined on the basis of time of transport, time of order, scheduling, timing and speed. Intermodal road-rail freight (IFT) also ranks among the top priorities for turning the European transport system in the right direction; (Sommar & Woxenius, 2007). The growth of IFT has followed somewhat disappointing paths and scenarios pointing to steeply increasing quantities for all road transport. Numerous studies have been launched by officials and study boards at European, national and regional level, as well as industry stakeholders, on why IFT does not actually take off (Kordnejad, 2016).

Intermodal road-rail freight model refers to the preferences of the shipper when selecting a specific mode of traffic. The notion of time in transport activities is genuinely multi-faceted, nevertheless, although it is an important part of a lot of science, it has not attracted the attention of many scientists (ECMT, 2005). For example, Shinghal and Fowkes (2002) used these as the only quality characteristics when exploring the mode of choice for freight facilities in India, transport time, punctuality and frequency are mandatory components of shipper mode preference studies. Reis (2014) identified the key modal characteristics in the content analysis of the modal choice literature. Speed (considered synonymous with transit time but less logically terminal time and transhipment time) and transit time quality finished second and third both when counting the number of appearances and when trying to assess the comparative importance of the surveyed study. Service (unknown) was the most common, while the most significant price was regarded. Frequency was much smaller, and frequency and time of order were omitted from this study (Iimi, Humphreys & Mchomvu, 2017).

Jensen and woxenius combined transport model

Jensen and Woxenius split the unified transport systems into operational and physical frameworks in the Jensen (1990) and Woxenius (1994) transport system models (Woxenius, Persson & Davidsson, 2013). There is complex system interdependence. The physical limits can be adjusted based on the performance of the administrative scheme and vice versa for example, a good administrative system might generate demand for an expanded rail network, fresh terminals, better rail vehicles, etc. On the other hand, the operational system would be influenced by a change in the physical system, such as a reduction in load capacity. There are also interdependencies within the schemes themselves. For instance, a better-designed schedule could attract fresh clients, forcing resource shifts to serve these new clients, leading to a decrease in service and loss of clients in other areas of the scheme.

Research demonstrates that most customers are not interested in the real transportation or modal shipping decision (Woxenius *et al*., 2013). Some customers are satisfied as long as their total shipping time, price, transport performance, etc. requirements are met. Nevertheless, some have more specific requirements, such as environmental conditions or the choice of the operator. Generally speaking, the more products they send, the greater their interest in transport. The end-customer of transport has little interest in the mode of transport used. The transport client focuses primarily on quality and cost variables. Road transport is by far the most important mode of transport of land freight. However, the growth of road transport depends not only on road infrastructure growth, but also on truck fleet growth and structure.

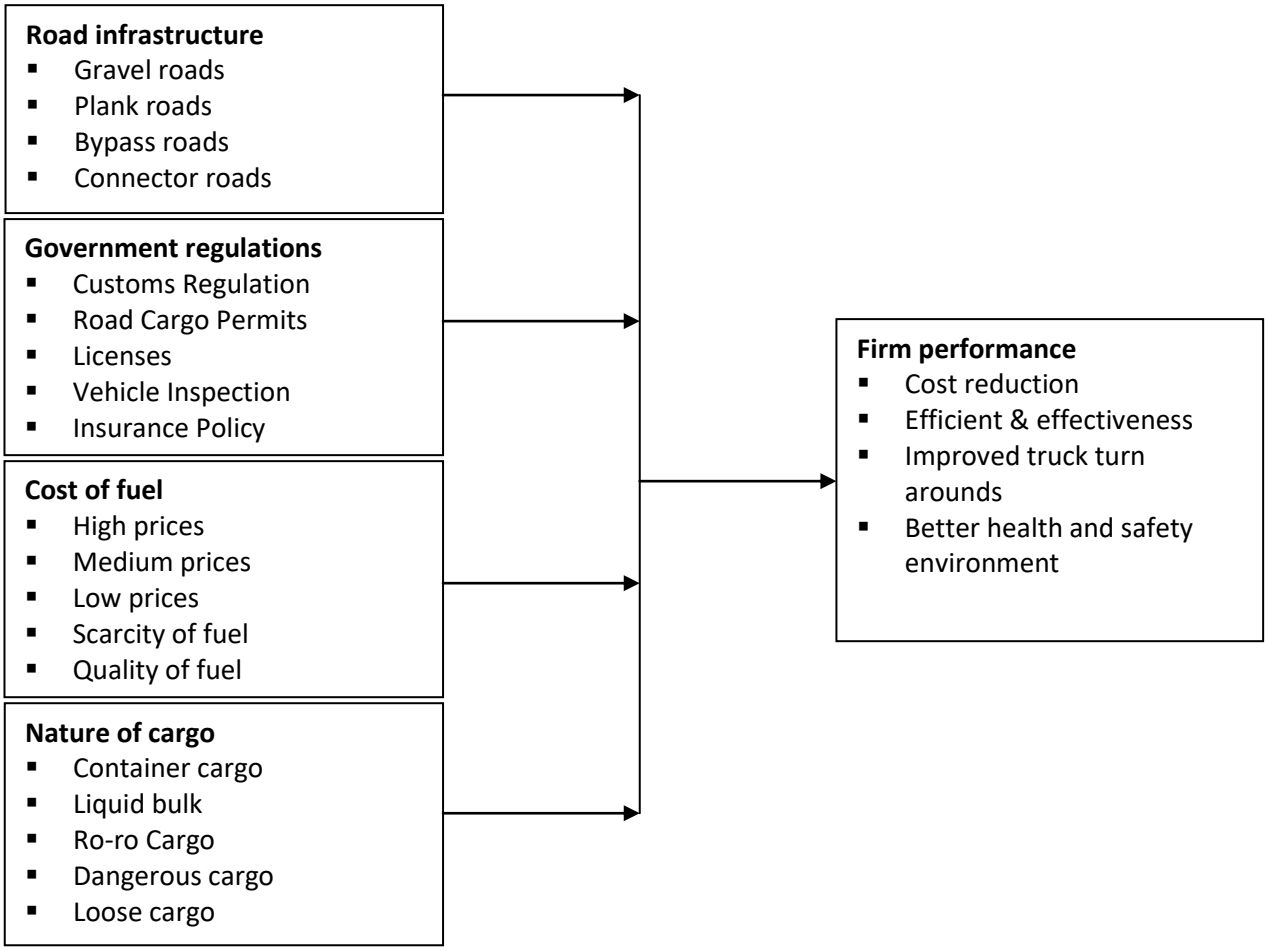

Figure 1: conceptual framework

Literature Review

Physical infrastructure development and maintenance are prerequisites for fast economic growth and poverty reduction as they affect cost of manufacturing, job creation, market access, and investment. Costs of production, job creation, market access, and investment rely on infrastructure quality, particularly transport. Road transport is the most widely used means of transportation in Kenya. The fragmentary nature of the railway system and the limitations imposed on the scope of inland water transport by geographical factors mean that transport of people and freight by rail and inland waterways must be supplemented, usually by road transport over long distances. Attempts are being made to control axle loads on the major corridors, with some success in eliminating the gross axle loads prevalent in the past. But, despite this policy and funding framework, sections of the road sector are still in poor condition, with some allegations of corruption, inefficiency and waste (Murithi, 2004). The situation since 2003 has improved in many ways, although some of the underlying problems still remain. In an effort to improve the country's economic performance and meet the Vision 2030 targets and the significant role that truck transport plays in the country's economic development, the investigation of factors that influence the performance of the industry is significant, as it will unveil remedies to increase the performance of truck transport in Kenya.

Successive governments in Kenya have always recognized the provision of adequate infrastructure as an essential precondition for

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sustainable economic and social development (Murithi, 2004). The policy concern has been about how to ensure the delivery and upkeep of satisfactory infrastructure. At the time of independence, the provision of infrastructure was deemed a public sector responsibility on the rationale that the market would not be a suitable mechanism. That is, it was thought that pervasive market failures justified public sector involvement in the development of physical infrastructure (Macphee *et al*., 2013). Thus while Kenya's independence government recognized the need for limited private sector participation, it largely pursued a policy of public provision and maintenance of physical infrastructure. The strategy was to develop physical infrastructure so as to draw the entire nation into the market economy and to lay the basis for rapid industrial growth (Onyango, 2003).

The sharp rise in fuel price in the 2000s reignited interest in the study of the influence of energy prices on many economic activities including transportation (Sharpe & May, 2015). This rather small share led to the perception that much of the strategic decision-making of firms is relatively insensitive to variation in fuel prices. Although transport costs remain relatively small for shippers, fuel costs for freight carriers have always been significant because fossil fuel is still the main source of energy for motive power (Knittel, 2012; Abate, 2014).

There is a major variation in the nature of cargo that is often transported from a region to another via trucks. Companies have to specialize in the transportation of a given type of cargo to ensure the products are delivered safely and companies make profits out of their businesses (Raballand, 2012). It is challenging for a company that specializes in the conveyance of sugar cane products to take part in the freight of petroleum products and vice versa. The natures of cargo that various carriers transport that have influence in the general company's performance, growth and sustainability.

Historically, Mombasa Port has been an important trading post within the Indian Ocean in East Africa. Mombasa is the point of access for Kenya and a hinterland made up of Uganda, Northern DRC, Burundi and Rwanda, although Burundi is currently served mainly from Dar es Salaam. Nevertheless, a significant fraction of shipments of about 5 % to 18% of Kenyan exports are shipped by air from Nairobi (World Bank, 2005). Approximately 27.36 million tons were transported via Mombasa in 2016, a 2.4 percent increase compared to 2015. The cargo included 11.25 million imports to Kenya, landlocked countries and 8.37 tons of exports and 7,74 million tons of transshipments. Nearly half of the import volume, 48.4%, contained liquid (oil) content (KPA 2018). According to this data from the Kenya Ports Authority, from 11.25 million tons, 7.31 million tons of imports were transported to and from Uganda and, by contrast, about 80 percent of exports were air freight.

METHODOLOGY

The study adopted a quantitative correlational research design. The population of interest included all the employees at Transeast Limited. The firm had 117 employees including two directors, one hundred permanent employees, and fifteen casual employees. Being a case study of the company, the all the employees formed the target population because their job duties related to the performance of the truck transportation company. Stratified random sampling was applied in the selection of 90 employees from the target population of 117 employees in Transeast Limited. The tool applied in collecting the data from respondents was structured questionnaires. Data analysis was based on statistical package for social science (SPSS version 22.0) and content analysis.

FINDINGS AND DISCUSSIONS

Firm Performance

In order to determine the extent to which the research factors influence the company's efficiency, the participants were asked a few questions they were requested to rate on the basis of a score of five: (1) Not at all; (2) Little Extent; (3) Moderate Extent; (4) Large Extent; and (5) Very Large Extent. Table 1 presented the results.

Table 1: How the variables affect firm performance

	N	Minimum	Maximum	Mean	Std. Dev.
Road infrastructure	90	1	5	3.50	1.041
Government regulation	90	1	5	3.19	1.280
Cost of fuel	90	1	5	2.92	1.292
Nature of cargo	90	1	5	2.90	1.27
Valid N. (listwise)	90				

It was found out that all factors affect the firm's efficiency somewhat. All the variables moderately influence the performance of the firm, with road infrastructure having a mean of 3.50 and standard deviation of 1.041, government regulation having a mean of 3.19 and standard deviation of 1.280, cost of fuel having a mean of 2.92 and a standard deviation of 1.292, and nature of cargo having a mean of 2.90 and a standard deviation of 1.272. These findings indicated that there are other dependent variables that also influence the firm's performance alongside the variables of the study.

Impact of road infrastructure on truck transportation performance

The first objective pursued the influence that road infrastructure has on the performance of truck transportation in Kenya. To achieve the objective, the respondents were asked to base their opinions on a five scale rating in which; (1) Not at all, (2) Little Extent, (3) Moderate Extent, (4) Large Extent, and (5) Very Large Extent. Table 2 presented the results.

Table 2: Infrastructure and truck transportation performance

Statement	N	Mean	Std. Dev.
Impact truck turnaround times i.e. daily movement of trucks per day	90	3.49	1.008
Impact on client cargo delivery timelines	90	3.51	1.144
Impact on cost of repairs and general maintenance trucks	90	3.57	.912
Impact on truck break downs on the road	90	3.56	.984
Affects movement of sensitive and out of gauge cargo	90	3.44	1.051
Valid N (listwise)	90		

The findings showed that majority agreed that that road infrastructure in Kenya impact the turnaround times of trucks everyday (m= 3.49, Std. deviation= 1.008). It was also found out that the road infrastructure majorly influences time of delivery of the client cargo (m= 3.51, Std. deviation= 1.144). Majority equally agreed that road infrastructure has a great impact on the costs of repairs as well as the general maintenance of trucks (m= 3.57, Std. deviation= 0.912). Moreover, most of the respondents stated that road infrastructure impacts the truck breakdowns on the roads to a great extent (m= 3.56, Std. deviation= 0.984). Finally, most of the respondents indicated that the effects of road infrastructure on the movement of sensitive and out of gauge cargo is large (m= 3.44, Std. deviation= 1.051).

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Impact of government regulations on truck transportation performance

The second objective sought was to determine the influence that government regulations have on the performance of truck transportation in Kenya. To achieve the objective, the respondents were required to base their opinions on a five scale rating in which; (1) Not at all, (2) Little Extent, (3) Moderate Extent, (4) Large Extent, and (5) Very Large Extent. Table 3 presented the results.

Table 3: Government regulations and truck transportation performance

Statement	N	Mean	Std. Dev.
Government regulatory bodies are easily accessible	90	3.48	1.062
Personnel of government regulatory bodies have the necessary expertise and know how e.g. engineers at KENHA. Inspectors at NTSA etc	90	3.57	.984
Government regulatory bodies are responsive to transporter applications / needs e.g., permits	90	3.38	1.097
Penalties charged for offences / irregularities are reasonable	90	3.28	1.122
Cost of government statutory fees are reasonable e.g., permits	90	3.26	1.117
Valid N (listwise)	90		

From the findings, most of the respondents stated that to a large extent, the government regulatory bodies are accessible (m= 3.48, Std. deviation= 1.062). Many also agreed that the personnel within the government regulatory bodies such as NTSA and KENHA have the necessary expertise for the job (m= 3.57, Std. deviation= 0.984). From the responses, majority indicated that to a moderate extent, the regulatory bodies of the government are responsive to the applications of transporters such as permits (m= 3.38, Std. deviation= 1.097). Majority of the respondents agreed that to a moderate extent, the penalties charged for irregularities and offenses are reasonable (m= 3.28, Std. deviation= 1.122). Finally, the respondents agreed that to a moderate extent, the government statutory fees are reasonable (m= 3.26, Std. deviation= 1.117).

Impact of cost of fuel on truck transportation performance

The third aim was to determine the impact of fuel costs on truck transport efficiency in Kenya. To achieve the objective, the respondents were required to base their interpretations. Table 4 presented the results.

Table 4: Cost of fuel and truck transportation performance

Statement	N	Mean	Std. Dev.
Fluctuation of prices (upward and downward)	90	3.349	.974
Quality of fuel on truck affects performance of truck	90	3.59	1.048
Scarcity / limited supply of fuel in the market	90	3.74	1.066
Statutory requirements for transport of fuel	90	3.53	1.041
Training of drivers helps minimize fuel costs	90	3.47	1.073
Nature and weight of load affects fuel consumption	90	3.62	1.012
Road terrain impacts fuel ratio with regards to distance	90	3.56	1.133
Type of truck / trailer used affects fuel consumption	90	3.67	.983
Valid N (list wise)	90		

The findings averagely showed that cost of fuel affects the performance of truck transportation in Kenya to a large extent. Most respondents indicated that the fluctuation of fuel prices has a major influence on performance of truck transportation (m= 3.47, Std. deviation=

0.974). The respondents equally indicated that to a moderate extent, the quality of fuel affects performance of trucks in Kenya (m= 3.59, Std. deviation= 1.048). The participants agreed to a big extent that the restricted supply of gasoline on the market has an impact on truck efficiency (m= 3.74, Std. deviation= 1.066). The respondents equally stated that statutory requirements for transport of fuel affects the performance of trucks in Kenya (m= 3.53, Std. deviation= 1.041). Training of drivers also minimizes the costs of fuel to a moderate extent (m= 3.47, Std. deviation= 1.073). Most of the respondents agreed that to a large extent, nature and weight of load affects fuel consumption (m= 3.62, Std. deviation= 1.012). Most respondents agreed that road terrain have a major influence on fuel ratio with regard to distance (m= 3.56, Std. deviation= 1.133). Finally from the responses, the type of truck used affects fuel consumption to a large extent (m= 3.67, Std. deviation= 0.983).

Impact of Nature of Cargo on Truck Transportation Performance

The last aim was to determine the impact of the nature of the cargo on truck transport performance in Kenya. To accomplish the goal, the participants were asked to base their opinions on a rating of five scales where; (1) Not at all, (2) Little Extent, (3) Moderate Extent, (4) Large Extent, and (5) Very Large Extent. Table 5 presented the results.

Table 5: Nature of cargo and truck transportation performance

Statement	N	Mean	Std. Dev.
There is a high level of understanding among employees on the nature of cargo transported	90	3.88	.992
The cargo type influences the truck / trailer to be used	90	3.63	.988
The nature of cargo contributes to company profitability	90	3.70	.965
Top level management is wiling to invest in modern equipment for sensitive abnormal & OOG cargo special training of staff required	90	3.61	1.078
Abnormal, sensitive & OOG have additional requirements e.g., escorts	90	3.67	1.039
Valid N (list wise)	90		

The findings indicated that nature of cargo affects performance of truck transportation to a large extent. Most respondents specified that there is a great level of understanding among employees on nature of cargo that is transported (m=3.88, Std. Deviation= 0.992). The respondents stated that the cargo type influences the truck or trailer that is used (m= 3.63, Std. Deviation= 0.988). Most of the respondents indicated that the nature of the cargo loaded contributes to profitability of the company (m= 3.70, Std. Deviation= 0.965). From the results, the top-level management is willing to invest in modern equipment for the sensitive, abnormal and OOG cargo (m=3.70, Std. Deviation= 0.988). The respondents agreed that special training of staff is required in order to handle cargo (m= 3.61, Std. Deviation=1.078), and that there are additional requirements for abnormal, sensitive and OOG cargo (m= 3.67, Std. Deviation= 1.039).

Pearson correlation results

A Pearson correlation assessment was carried out to determine the connection between the dependent variable (Company's performance) and the independent variables. Table 6 presented the results.

Table 6: Multiple correlation analysis

		Performance	Govt regulations	Road infrastructure	Nature of cargo	Cost of fuel
Performance	Person Correlation	1				
	Sig. (2 tailed)					
	N	90				
Govt. Regulations	Person Correlation	.961**	1			
	Sig. (2 tailed)	.000				
	N	90	90			
Road infrastructure	Person Correlation	.940**	.949**	1		
	Sig. (2 tailed)	.000	.000			
	N	90	90	90		
Nature of cargo	Person Correlation	.891**	.900**	.923**	1	
	Sig. (2 tailed)	.000	.000	.000		
	N	90	90	90	90	
Cost of fuel	Person Correlation	.902**	.918**	.953**	.961**	1
	Sig. (2 tailed)	.000	.000	.000	.000	
	N	90	90	90	90	1

**. Correlation is significant at the 0.01 level (2-tailed).

The results showed a significant positive connection between the company's performance and fuel costs ($r = 0.902$, $p < 0.01$), government regulations ($r = 0.961$, $p < 0.01$), nature of cargo ($r = 0.891$, $p < 0.01$), and road infrastructure ($r = 0.940$, $p < 0.01$). These implied that handling issues that raise cost of fuel improves firm performance, improving negative issues in government regulations improves firm's performance, improving the understanding and handling of cargo improves performance, and improving the road infrastructure improves the company's performance.

Multiple Regression Results

The study conducted multiple regression analysis to analyze the predictive value of multiple regression in terms of the overall model and how well each independent variable (road infrastructure, cargo nature, government regulations, and fuel costs) predicts the dependent variable (firm performance). The results were presented in tables 7, 8 and 9.

Table 7: Summary model of cofactors on firm performance

Model	R	R. Square	Adjusted R. square	Std. error of the estimate
1	.965[a]	.932	.929	.338

a. Predictors: (Constant), Road Infrastructure, Gvt Regulations, Cost of Fuel, Nature of Cargo

The results ($R^2 = 0.932$) in table 7 is an indication that the company's performance variation of 93.2 percent was explained by the variation in road infrastructure, nature of cargo, government regulations, and fuel costs.

Table 8: Anova of cofactors on firm performance

Model		Sum of squares	Df	Mean square	F	Sig.
1	Regression	132.700	4	33.175	290.716	.000[b]
	Residual	9.700	85	.114		
	Total	142.400	89			

a. Dependent Variable: Performance

b. Predictors: (Constant), Road Infrastructure, Gvt Regulations, Cost of Fuel, Nature of Cargo

The results (F[4, 85] = 290.716, p < .01) in table 8 indicated that, at 95 percent confidence-level, the regression model (with the four independent variables) was significant in predicting the performance of Transeast Limited.

Table 9: Partial coefficients of cofactors on firm performance

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	.766	.138		5.549	.000
	Road infrastructure	.380	.146	.309	2.606	.011
	Govt regulations	.793	.107	.680	7.411	.000
	Cost of fuel	.175	.160	.142	1.092	.278
	Nature of cargo	.162	.129	.129	1.254	.213

a. Dependent Variable: Performance

The partial regression coefficients shown in table 9 indicated that, when the other independent variables are held constant, road infrastructure is a significant predictor of the performance of Transeast Limited (β_1= 0.380; t = 2.606; p < 0.05); government regulation is a significant predictor of the performance of Transeast Limited (β_2 = 0.793; t = 7.411; p < 0.01); cost of fuel is not a significant predictor of the performance of Transeast Limited (β_3 = -0.175; t = -1.092; p >0.05); and nature of cargo is not a significant predictor of the performance of Transeast Limited (β_4= 0.162; t = 1.254; p > 0.05).

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

$$Y = -0.766 + 0.380X_1 + 0.793X_2 - 0.175X_3 + 0.162X_4$$

Where: Y is the dependent variable (firm performance); α represents the regression constant; B_i represents the coefficients of the independent variables; X_1 represents road infrastructure; X_2 represents nature of cargo; X_3 represents government legislations; X_4 represents cost of fuel and ε is the error term. Based on the partial regression coefficients, the study hypothesis are tested at 95% confidence level as shown in table 10.

Table 10: Hypotheses test results

Hypotheses statement	β	T	p-value	Decision
H_{01}: Road infrastructure has no significant effect on the performance of truck transportation at Transeast Limited	.380	2.606	.011	Reject H_{01}
H_{02}: Government legislation has no significant effect on the performance of truck transportation at Transeast Limited.	.793	7.411	.000	Reject H_{02}
H_{03}: Fuel cost has no significant effect on the performance of truck transportation at Transeast Limited.	.175	1.092	.278	Accept H_{04}
H_4: Nature of cargo has no significant effect on the performance of truck transportation at Transeast Limited.	.162	1.254	.213	Accept H_{03}

Discussion

The study established that road infrastructure had a significant effect on the performance of truck transportation at Transeast Limited. The respondents stated that the road infrastructure in Kenya has a major impact on the performance of truck transportation. The infrastructure in the country affects the turnaround times of trucks every day, the delivery timelines of cargo, truck breakdowns, and the movement of sensitive cargo. The findings are similar to the findings of Ali *et al*. (2003) who noted that run-down infrastructure in Kenya has a harmful influence in the truck transportation industry because they result in slow growth.

The study established that government legislation had a significant effect had a significant effect on the performance of truck transportation at Transeast Limited. The respondents stated that government legislation has a major effect on the performance of truck transportation in Kenya. The government regulatory bodies such as NTSA and KENHA offer licenses and permits to the tracking companies in Kenya, and implement various regulations that regulate the activities of the trucking companies in the country. Various penalties are put in place for any irregularities and offences by the trucking companies, and this is meant to ensure all the activities are undertaken as per the law. The penalties range from loss of permits and licenses for major offences to various cash penalties for minor offences. Some activities of the regulatory bodies that affect the performance of trucking companies in Kenya include the accessibility of the bodies, expertise of the personnel who undertake activities of the bodies, responsiveness and transparency in issuing permits, and the nature of penalties.

According to Blouin and Njoroge (2004), the Traffic Act is the legislation that has a direct influence on the trucking industry in Kenya.

The study established that cost of fuel had no significant effect on the performance of truck transportation at Transeast Limited. However, majority of the respondents were of the opinion that cost of fuel has a major impact on the performance of truck transportation in Kenya. When the prices of fuel rise, costs incurred increase making the trucking companies to raise prices. In areas that have a history of suffering from elevated inner transport expenses such as sub-Saharan Africa, trade facilitation is of significant importance. In sub-Saharan Africa, freight expenses are greater than any other region in the globe and have been rising since the early 2000s (The African Development Bank, 2010). The high prices of transportation lower the economic competitiveness of the ountries (Raballand & Macchi, 2009), hinder the participation of the economies in the production networks in the world (Christ & Ferrantino, 2011) and undermine the efforts of regional integration with the neighboring countries.

The study established that nature of cargo had no significant effect on the performance of truck transportation at Transeast Limited. However, majority of the respondents were of the opinion that the variations in the nature of cargo also have a major influence on the performance of trucking companies in Kenya. As explained by Coughlin (2013), the major aim of any carrier company is the prevention of deterioration and damage of cargo while under transportation and to ensure it is delivered in perfect condition and order as it was at the time it was received aboard. The carriers thus need to have a perfect knowledge of various kinds of cargo that they are likely to carry, their characteristics, liability to deterioration, decay and damage, their measurements and their common methods of packing, loading, discharging and stowage. This knowledge helps the company in safe loading of trucks and proper stowage of cargo (Tavasszy & Jong, 2014).

CONCLUSIONS AND RECOMMENDATIONS

The study concluded that road infrastructure significantly and positively affects truck transportation performance in Kenya. The findings indicated that, even when the other variables (government legislation, cost of fuel and nature of cargo) were held constant, road infrastructure still exhibited significant predictive value on the performance of truck transportation at Transeast Limited. This implies that improvements in road infrastructure would have a major positive impact on the performance of truck transportation industry in Kenya.

The study concluded that government legislation significantly and positively affects truck transportation performance in Kenya. The results revealed that, even when the other variables (road infrastructure, cost of fuel and nature of cargo) were held constant, government legislation still exhibited significant predictive value on the performance of truck transportation at Transeast Limited. This suggests that improved legislations in the transportation industry would significantly enhance the performance of truck transportation industry in Kenya.

The study concluded that cost of fuel is not a significant predictor of truck transportation performance in Kenya. In spite of the results indicating significant and negative relationship between cost of fuel and truck transportation performance (without controlling for road infrastructure, government legislation and nature of cargo), the relationship is rendered insignificant when the other variables are held constant. This implies that the influence of cost of fuel on performance of truck transportation depends on its interaction with the other variables (road infrastructure, government legislation and nature of cargo).

The study concluded that nature of cargo is not a significant predictor of truck transportation performance in Kenya. In spite of the results indicating significant and positive relationship between nature of cargo and truck transportation performance (without controlling for road infrastructure, government legislation and cost of fuel), the relationship is rendered insignificant when the other variables are held constant. This suggests that the influence of nature of cargo on performance of truck transportation depends on its interaction with the other variables (road infrastructure, government legislation and cost of fuel) are held constant.

The government should allocate more funds for the improvement (construction or repair) of road infrastructure in the country. The truck transportation companies should report the conditions of different roads to the authorities to ensure they are repaired.

The managers of the trucking companies should make adjustments towards using electric trucks and trucks that are fuel efficient. Drivers should be taught on how to conserve fuel, and strategies should be set to ensure that the return trucks are not empty while traveling back from delivering goods.

The managers of the truck transportation companies should ensure that their employees perfectly comply with the regulatory requirements at all the times. They should also report any issues of corruption to ensure that the traffic police officers follow the requirements of the law at all the time.

The employees and their managers should strive to understand the nature of cargo that they handle in order to deliver them in the best conditions. Understanding the nature of goods will help the companies know the right mode of transport to use and the ways in which the cargo is handled. This helps in delivering goods in the right state at the right time and thus improving customer loyalty as well as the ability to retain them.

Areas for further research

A similar study should be undertaken within

the same industry but using a different population and a bigger sample size in order to ascertain whether cost of fuel and nature of cargo are significant predictors of performance of truck transportation in Kenya.

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