

Upgrade of Rail Infrastructure as a Solution to Zambia Economic Growth: A Case of Tanzania – Zambia Railway Line

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Abstract: This study was conducted to ascertain how improving the Tanzania-Zambia railway line may encourage efficient freight transportation and hence positively impact Zambia's economic development. A focus on the quantity of cargo moved throughout a five-year period was offered in order to comprehend the demands for railroad transportation, lessen the issues rail transportation faces, and increase rail freight transportation. Secondary and primary data were used in conjunction with the descriptive data analysis technique to estimate the volume of freight transported by the central railway. Only 45% of the entire freight was transported, according to the study's findings, which shows that there is a big demand for cargo transit on the Tanzania-Zambia railway line. It is challenging to find train engines that are technologically suitable, and the majority of railway bridges have limited capacity for carrying huge products. Additionally, it was shown that a number of factors affect train traffic. The TAZARA and Central Railway line had been able to transport 1.066 million tons of cargo over the preceding five years despite these operating challenges (2010–2014). According to the findings, it is suggested that Tanzania Zambia Railway create a plan to upgrade existing engines and purchase new ones in order to alleviate the problem by promoting freight movement. Engineers should routinely participate in training on new technologies in order to maintain standards. Tanzania Zambia Railway must also develop a strategy outlining how to deal with competition from road vehicles, including efficient marketing of its freight transport services and thorough track and bridge repairs.

Keywords: Cargo: Refers to goods that are transported from one location to another via various mediums of transportation like air, water, and land.

Freight Carriers: an individual or a company that specializes in shipping, and they directly handle your cargo

Port: a place where ships may ride secure from storms

Mitigation: provide for a system to reduce, avoid or offset the potential adverse environmental consequences of development activities.

Railroad Transportation: A long-term route with a set of rails fastened to ties and installed on the roadbed to serve as a track for vehicles or equipment pulled by locomotives or pushed by independent motors additionally: such a road and its assets are one property.

Reconstruction: Replacement of components of an existing facility to such an extent that:

Renovation: To restore to a former better state as by cleaning, repairing, or rebuilding

Respondent: a person who answers a request for information:

Abbreviations and Acronyms

AAR	Association of American Railroads
GDP	Gross Domestic Product
U.N.	United Nation
UNOPS	United Nations Office for Project Services
TAZARA	Tanzania Zambia Railway Authority.
ZRL	Zambia Railways Limited
SADC	Southern Africa Development Community
COMESA	Common Market for Eastern and Southern Africa.
SPSS	Statistical Package for Social Sciences

1. INTRODUCTION

1.1 Background

The state of Zambia is a landlocked nation that relies on air, rail, and road transportation to import and export products both within and outside of its borders (African Development Fund Report, 2017). The Zambian government has spent a significant sum of money since 2012 building new links or modernizing existing links to improve the country's road infrastructure.

When the Road Link Zambia 8000 Kilometers Project was first announced in 2013, it was anticipated to last at least five years. The estimated cost to the nation of this endeavor, which is still ongoing, ranges from \$5 billion to \$6 billion (Bureau of Economic and Business Affairs, 2013). Despite government expenditures for road building, the nation's economy has deteriorated as a result of subpar construction and maintenance of the roads (European Investment Bank Report, 2018). To save the nation's economy, the lifespan of its roads, and human life, it makes sense that Zambia should switch to train transit and update and diversify its transportation network in the most effective and efficient manner feasible. Therefore, the purpose of this essay is to assess how the redevelopment of the Tanzania-Zambia Railway (TAZARA) transportation network might help the government of Zambia expand its economy.

1.2 Problem Statement

There are 67,671 kilometers of gazetted roads in Zambia. According to the RTSA Annual Report, the road network consists of trunk, district, urban, and principal feeder highways (RTSA Annual Report, 2018). Although there were more incidents on the road, most of Zambia's highways had recently been resurfaced. The percentage of trunk, main, and district paved roads that were assessed as good in 2014 was 87 percent, up 69 percent from 2009. (RDA, 2014). Nevertheless, the majority of these roads are in poor condition as a result of the frequent use by large vehicles transporting cargo to and from border towns and ports. The excessive frequency of road reconstruction expenditures and the loss of labor due to traffic accidents are draining the nation's economy. Road traffic injuries and fatalities are a major public health concern that have an impact on the nation's economy, according to the Zambia Police report for 2021. Police in the country reported a total of 32,372 traffic accidents (Zambia Police Report, 2022). Additionally, it was found in some police reports that there were 1757 fatal traffic accidents, resulting in more than 2160 fatalities.

According to the Road Transport and Safety Agency's (RTSA) 2018 Annual Report, not all gazetted roads are paved with asphalt; in fact, over 80% of them are constructed of gravel and dirt. Several Zambian roads are of low quality due to insufficient maintenance, according to information provided by the Civil Society for Poverty Reduction. Poor roads have boosted the frequency of serious traffic accidents, which have claimed a great number of lives and affected both domestic and international goods movement. Therefore, Zambia's inadequate transportation infrastructure has hampered the flow of products, which has had a negative effect on the country's economy (Lusaka times, 2013). Tanzanian-Zambia Railway Transport and Zambia Railway Transport are Zambia's two rail transportation firms. While the nation's rail transportation system has been neglected and is currently not functioning normally, the nation's road transportation infrastructure has undergone considerable upgrades.

1.3 Purpose of the Study

To investigate how upgrading the Tanzania-Zambia railway line infrastructure can boost the economic growth of Zambians.

1.4 Specific objectives

- To investigate how rail transport can effectively improve the economy of the country.
- To investigate how transportation of goods by rail can mitigate the deterioration of road infrastructure
- To determine alternative strategies that can increase the efficiency of transportation of goods and people by use of the railway system.

2. LITERATURE REVIEW

A report on the various issues influencing transport connectivity in landlocked developing countries like Zambia was published in 2016 by the Economic and Social Commission for Asia and the Pacific. According to the author, both small islands and developing countries that are landlocked face obstacles including limited investment in transportation services and infrastructure or having challenging geographic conditions that hinder their ability to achieve required advancements (U.N. Economic and Social Council, 2016). Despite the fact that landlocked countries lack sufficient economical and effective means of accessing seawater bodies, geography has a big impact on how well these countries are doing socioeconomically. On the other hand, knowing the problems facing the sector requires an understanding of the development of Zambia's railway transportation management (Mulenga and Lusaya). Zambia's economic development and growth are highly encouraging. Zambia is among the majority of African nations that have increased their demand for more effective transportation. The expansion of international trade in these areas has enhanced the significance of the transportation industry. Life without transportation would not be possible. The foundation of all socioeconomic transactions is it.

2.1 Transport and Economy Growth

To transfer commodities freely and effectively into and out of the country, a good transport infrastructure is necessary for a nation's economy to flourish and prosper. Being a landlocked nation at the intersection of East Africa, Central Africa, and South Africa, Zambia depends on transport routes through its neighbors to access water transportation. The annual exports of Zambia range from 7.5 billion to 8 billion dollars. Its total exports in 2018 were valued 9.1 billion dollars. A significant portion of the population in Zambia also lives in poverty. Since the nation is landlocked and its economy is more dependent on the trading of copper (Kolala & Dokowe, 2021), a robust transportation system is needed to connect its exports to global markets and to make it easier for goods like fuel and machinery to be imported into the nation. Agriculture is also a backbone of the economy of Zambia (Phiri et al., 2020). The operational activities in the country are also affected because of insufficient foreign exchange allocations on roads and vehicle repair.

Roads, bridges, train, and air travel all fall under the category of transportation in Zambia. Road transportation accounts for more than 60% of all freight in the nation and reaches even the most remote regions of the nation over a distance of almost 37,000 km. Due to a lack of road maintenance, the infrastructure's condition has deteriorated (Sakala, 2018). Given the status of the economy, the country spent around \$5 billion on road development, but it was unable to fully connect with the rural areas, making it difficult for farmers there to connect their products to the market and contributing to a higher level of poverty. Around 1000 people per year die in traffic accidents as a result of poor road conditions, which costs the nation's GDP on average by 2.3 percent yearly.

Upgrading Rail to Reduce Roads Maintenance

Zambia might try to extend the usefulness of built-up highways by upgrading and maintaining rail transit as a substitute. Rail transportation is crucial for improving mobility in both developing and wealthy countries, according to Saruchera (2017). Rail transportation has many advantages, including low energy usage, a large carrying capacity, and environmental sustainability and friendliness. Additionally, because of its enormous carrying capacity, rail transportation is able to move other forms of transportation on its freight carriers, including tractors, fuel tanks, agricultural and mining equipment, and other vehicles that may be put onto it (Saruchera, 2017). The second most popular means of transportation after driving is rail, according to Kinuthia (2014). However, due to inadequate rail infrastructure and the general disapproval of it as a mode of transportation, rail use has been dropping over time in various African countries (Kinuthia, 2014), which has put a lot of strain on the road transportation system. Because most rail users aren't satisfied with their experience, there has been a fall

in rail use in countries like Namibia (Saruchera, 2017). As a result, it would be vital to take consumer preferences and satisfaction into account when upgrading and maintaining rail transportation as a means of reviving and preserving the economy.

2.2 Upgrade of the TAZARA Infrastructure can Increase Economic Growth in Zambia

Zambia's poor transportation infrastructure has hampered the flow of products, which has hurt the country's economy. To establish a different route for the transportation of copper from Zambia to the Indian Ocean, the Tanzania-Zambia Railway line, which connects Zambia to Dar es Salaam, was built. The railway line connects Kapiri Mposhi in Zambia, where it connects to the Zambia Railways Limited, with Dar-es-Salaam (ZRL). It travels 1860 kilometers, carrying both passengers and freight (Mulenga and Lusaya). The 1,860 km long railway system is jointly controlled by the governments of Tanzania and Zambia and is the longest in sub-Saharan Africa. Between 1970 and 1975, the Republic of China constructed it to grant Zambia economic freedom (Simbao, 2022). According to a 1964 World Bank analysis, the goods being transported between Tanzania and Zambia could not support rail transportation and suggested roads may be built in its place. The railway is currently owned by multinational organizations.

In Zambia, a significant portion of industry, including agriculture, are situated along railroad lines. Rail transportation is a cost-effective way to move a lot of commodities from domestic to international markets. Trains utilize less gasoline than trucks do, and their fuel costs are less than those of the road. According to the Association of American Railroads (AAR), a double-stacked train can support a load equivalent to 280 trucks. Rail freight delivery is very cost-effective, maximizing profitability. In contrast to highways, railroad tracks are engineered to withstand the maximum weight of trains, making them strong and less likely to deteriorate quickly. The Chinese government erected the Tazara railway as a result of seeing Zambia's enormous potential for economic development. To restore Zambia's economic glories, the infrastructure of the highway connecting Zambia and Tanzania needs to be improved.

Zambian economic growth can be boosted by improving the infrastructure of the Tanzania-Zambia railway line (Ruth, 2020). More than 60% of Zambians live in poverty. Slums are home to 70% of the population in urban areas. The nation's futile attempts to rebuild the road system have resulted in enormous external debt accumulation. In the 2019 budget, the government had a 10.9 percent GDP deficit. However, by modernizing the Tazara railway, Zambia's economy would have a stronger chance to grow by at least 10%. The sole obstacle to the country's ability to export its agricultural goods to foreign markets is the country's wealth in agricultural products and the country's rising copper prices.

According to Chege et al. (2019), among the improvements being made to the Tanzania-Zambia railway are the introduction of a speed train system for moving people between towns along Zambia's railway lines and from Zambia to Tanzania. The nation can start using computer-driven trains, which are significantly more effective than manually operated ones. For processing, trains can convey freight from ports to an inland port region equipped with port shuttles. The shuttles are able to move highway freight in and around cities. Old trains can be restored, or new trains can be launched that can survive a long time without having to have their equipment repaired. It is necessary to improve signal and telecommunication link between rails. Both Zambia and Tanzania should build a state-of-the-art rail station with parking (John, 2020). The country will be driven to manufacture more copper and agricultural products, among other things, to meet the needs of the railway, which will signal a significant boost to the country's economy. The country will be able to pay off its debts and develop both urban and rural areas together with their industries, which will strengthen the economy of Zambians. With increased production of commodities and reduced costs for road maintenance.

2.3 Impact of Tanzania-Zambia Railway Line Upgrade

A single double-train can carry a load that would typically require 280 trucks to move, therefore expansions and enhancements to the Tanzania-Zambia railway's capacity will relieve pressure on the on-road transportation system. Reduced traffic, which is a major difficulty when using the road system to transport commodities over long distances, will improve the efficient flow of goods within and outside the nation (Kelle et al., 2019). Since the railway line will serve as a backup method of transporting imports and exports, the frequency of repairing the roads will decrease because they won't now be abused. Without concern for how Zambia's economy would be impacted by transportation issues, high-quality roads will be built at the country's own speed. The Tanzania-Zambia railway will lower the number of traffic accidents, which typically happen when trucks are rushing to deliver goods to markets within a finite amount of time. Additionally, it will increase road visibility for drivers of privately owned vehicles and passenger vehicles, allowing them to enjoy their time on the road without being obstructed by enormous trucks.

The Zambian government must establish alternative plans that will improve the effectiveness of moving people and products via the railway system. To strengthen the project's efficiency and attract more public and private investors, they should raise spending in the transportation sector. In order to secure dependable railway infrastructure at a reasonable cost, the government needs establish contacts with high-quality infrastructure providers. To minimize fuel use and lower fuel costs while increasing revenue, train manufacturers and operating businesses could electrify their fleets. By supplying them with secure networks, rail technology using specialized computer software can ease the transportation of goods and people. To enhance the parking space for cars and engines, the rail needs to be side-stepped. For the safety of the goods and passengers, train location and movement should be monitored by integrated train control systems. To encourage more usage of railroads as opposed to roadways, the government should make greater investments in data relating to service quality. The objective is to increase revenues, cut expenses, and maintain high-quality services.

To sum up the literature review for this thesis, Zambia is a land-linked nation that depends on roads, railroads, and air travel. Ironically, despite being the second-largest copper producer, a sizable portion of the people lives in poverty. The capacity of the Tanzania–Zambia railway can be increased and ease pressure on the on-road traffic system. By lowering traffic, which is a major challenge when using the road system to transport goods over long distances, it would promote the smooth movement of goods and people both inside and outside the country. Trucks were constantly on the road due to overuse of the roads as the primary mode of transportation, which soon degraded the road quality and presented a significant maintenance burden that cost Zambia a lot of money.

Zambia's declining economy combined with its poor road infrastructure has rendered trade there ineffective. If upgraded, the Tanzania-Zambia railway can address Zambia's economic problems and help maintain good roads. By utilizing cutting-edge technology in the railway system and investing in railway improvement, the government should devise plans to support the development and modernization of TAZARA. Development of a high-speed rail system to replace buses as a means of public transportation, as well as port shuttles to help with the movement of freight both inland and offshore. Because the roads won't be used as frequently as they are now, maintenance costs will drop, freeing up funds for other projects. Without worrying about the economy being affected by transportation challenges, high-quality roads will be created at Zambia's rate. The Tanzania-Zambia railway will lower the number of traffic accidents, which typically happen while cars are hurriedly transporting goods or people to markets and/or places of employment. Additionally, it will free up the drivers of passenger cars and privately owned vehicles to travel without being impeded by huge trucks. The TAZARA upgrading program is the answer to Zambia's economic problems.

3. METHODOLOGY

3.1 Overview

This chapter outlines the research methods for the study. The chapter discusses the methods utilized to acquire the data, the kind of research design that was employed, the area of study, the sample, and the sampling process. This chapter also includes the data analysis method that was used to examine the data.

3.2 Approach

This study used a realistic approach because it maintains many of positivism's objectives while acknowledging and accepting the subjective nature of research and the vital part that values play in it (Colin, 2010). The researcher believes that this method was advantageous since the focus of the study was on correct data. The research themes were different from the researcher's opinions and worldviews, which affected the study approach.

3.3 Design Process and Sources

The research focused on the central railway's promotion of freight transportation. It uses both primary and secondary data from qualitative analysis, with the primary data coming from interviews and questionnaires and the secondary data coming from document reviews at the Tanzania - Zambia Railway office. Five Tanzania Zambia Railway managers from various departments participated in the interview, and managers and officers from several departments were given a questionnaire on the transportation of goods.

3.4 Study Area

According to Ordo and Kombo (2002), an area of study is the place or region where the research is conducted. The research focused on the central railway's promotion of freight transportation. It uses both primary and secondary data from qualitative analysis, with the primary data coming from interviews and questionnaires and the secondary data coming from document reviews at the Tanzania-Zambia Railway office. Five TAZARA Managers from various departments participated in the interview, and managers and officers from several departments were given a questionnaire on the transportation of goods.

3.5 Population

The population of Tanzania-Zambia Railway workers served as the source of the study's sample. 100 Tanzania-Zambia Railway personnel who are department heads, managers, and officers make up the population for this research. The officials chosen for this study are those in charge of transporting goods and people.

In terms of statistics and quantitative research methods, a sample, according to Pfeiffer (1994), is a subset or segment of the population being studied that serves as a representative sample of the whole population. The officials working in the Tanzania-Zambia Railway in different departments make up the study's population. As a result, the sample for this research was obtained from Tanzania-Zambia Railway's corporate headquarters. The researcher asked the public relations officer for a list of the Tanzania-Zambia Railway departments that were open for business. The researcher included at least one representative from each of those divisions who are in charge of moving both freight and people. TAZARA plays a significant role in the Southern Africa Development Community (SADC) states' and COMESA states' transportation systems.

3.6 Sampling Criteria

The goal of the sampling method is to guarantee that the chosen sample accurately reflects the target population and the unit of analysis. According to Katrina. A.K. (2012), some of the most popular sampling techniques are as follows:

Every member of the target population has an equal probability of being selected for the sample using a simple random approach. Up until the sample size is attained, the sample is chosen methodically and at random. Saunders and others (2009). To prevent a set of identical numbers, the random numbers acquired for each sample must not be the same. The term "random" refers to a selection that is made without regard to goals or trends. In academic research, this approach is seldom ever employed. Katarina (2012) describes stratified random sampling, which is a variation on random sampling, the population is divided into groups according to the pertinent characteristics, and the presence of significant strata indicates that the sample is likely to be representative because the researcher can make sure that each stratum is fairly represented in the sample.

A method known as "purposeful" or "judgmental" sampling allows researchers to choose a target population they consider to be typical or relevant for a particular reason that will best enable them to address their research questions and achieve their aims (Saunders et al, 2009). According to Katarina (2012), researchers should consider variables that might have an impact on the population, such as social-economic level, Intelligence Quotient (IQ) level, access to education, etc. When dealing with a tiny sample, such as in case study research, this kind of sample is often employed. Multistage sampling was described by Kothari (2004) as an extension of the concept of cluster sampling. This method was designed for significant investigations, including a vast geographic region, such as a whole nation.

Before choosing the same families inside the town, the sample stage may first choose significant main sampling units like the state, district, and town. Multistage sampling relies on a variety of sample frames, all of which must be guaranteed to be suitable and accessible. Purposive sampling was used in the study to enable the researcher to choose officers and managers in various departments related to cargo transportation, including the departments of transportation, planning and management, finance, and information technology, which are the sources of data on how cargo and passenger transportation is run. This process was also chosen by the researcher as the most helpful technique in this study when compared to the other procedures since it allowed the researcher to pick officials who explicitly play a crucial role in railway operations, particularly in the transit of goods and people.

Data sources, including primary and secondary data sources, influence the data gathering methods or processes. In this study, the secondary data were collected through document reviews, particularly those pertinent Tanzania-Zambia Railway documents that document information on cargo transport and income realized on cargo transport service by railway. The primary data were collected through face-to-face interviews and through questionnaires. When addressing a real-world issue, the data currently available are insufficient, making it essential to gather more suitable data. Kothari (2004). Following are main data sources first, followed by secondary data sources stated as follows:

Primary data were gathered via questionnaires with questions focused on the railway's functions in encouraging freight transportation and face-to-face interviews conducted by the researcher.

The literature review used the interview approach during the interview process, allowing the researcher to ask a variety of follow-up questions and get a deeper knowledge of the issue at hand from the participating Tanzania Zambia Railway managers and officers.

The most crucial technique for gathering primary data was a questionnaire. This approach involves the researcher outlining the data needed to fulfill the study's goals, followed by questions based on that data. Based on the amount of cargo moved during the previous five years and the revenue received for the cargo transported, secondary data was derived by evaluating pertinent Tanzania-Zambia Railway recorded information. Because it made it easier to acquire records regarding railroad performance throughout different eras, literature reviews were used. These documents' data were condensed into notebooks and used as part of the study.

Therefore, before data analysis, a data cleaning procedure was conducted in which the researcher used the SPSS program to identify and eliminate any significant mistakes and unnecessary data that appeared between variables. This process was completed to provide high-quality data and findings. The following technique is a data cleaning test executed on the cargo promotion and involves checking on the frequencies and percent of the variables as well as cross tabulation for variables. The variable under test demonstrates the accuracy of the data.

Table 3.1: Frequency and Percent Test for Data Cleaning

Cargo promotion				
Valid	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly disagree	13	26.0	26.0	26.0
Agree	33	66.0	66.0	92.0
Strong agree	4	8.0	8.0	100.0
Total	50	100.0	100.0	

Research findings

3.7 Data Validity

According to Phelan and Wren (2006), validity is the degree to which a test measures what it is intended to measure, and reliability is the extent to which an assessment instrument delivers stable and consistent findings. The validity of the data was assessed by ensuring that the respondents chosen are the most important and have the greatest level of expertise in both freight and passenger transportation. The researcher uses the reliability command in the statistical package for social science to conduct the alpha test to check the consistency of the findings (SPSS).

4. ANALYSIS

Using the statistical software for social science (SPSS), which made cross-tabulation of variables simple, data were analyzed and reported about specified research goals. Tables and graphs have been produced using Microsoft Excel and the histogram. The result was obtained in SPSS by cross-tabulate.

Table 3.2: Results for variable Cross Tabulation

Cargo promotion * Improving economy Cross tabulation					
		Improving economy			
		A	SA	Total	
Cargo promotion	SA	Count	1	3	4
		% within Cargo promotion	25.0%	75.0%	100.0%
		% within Improving economy	10.0%	7.5%	8.0%
		% of Total	2.0%	6.0%	8.0%
	A	Count	0	33	33
		% within Cargo promotion	0.0%	100.0%	100.0%
		% within Improving economy	0.0%	82.5%	66.0%
		% of Total	0.0%	66.0%	66.0%
	SD	Count	9	4	13
% within Cargo promotion		69.2%	30.8%	100.0%	
% within Improving economy		90.0%	10.0%	26.0%	
	% of Total	18.0%	8.0%	26.0%	
Total	Count	10	40	50	
	% within Cargo promotion	20.0%	80.0%	100.0%	
	% within Improving economy	100.0%	100.0%	100.0%	
	% of Total	20.0%	80.0%	100.0%	

Two variables, which are cargo promotion and economic progress and displaying the proportion and connection between the two. The percentages within cargo promotion are represented by the row %, the percentage for increasing the economy is shown by the column percentage, and the overall percentage is shown as the overall percent.

Three of the four participants in the row who strongly believe that Tanzania-Zambia Railway promotes freight transportation—or 75 percent—also strongly think that Tanzania-Zambia Railway improves the economy. Out of 40 participants, 7.5 percent said in the column that they strongly agreed that Tanzania-Zambia Railway should increase freight transportation to improve the economy. Out of the 50 participants, 40 strongly agree that Tanzania-Zambia Railway promotes freight transportation, which is equivalent to 80%. Only 40 out of the 50 people strongly believe that Tanzania-Zambia Railway is boosting the economy overall, which is equivalent to 80%. Finally, only 3 out of the 50 participants strongly agree that Tanzania-Zambia Railway is promoting freight transportation and improving the economy.

4.1 Results

The study's conclusions are presented in this chapter based on questionnaire responses and the analysis of Tanzania-Zambia Railway papers. In this section, respondents were asked to provide information on their gender, education, job title at Tanzania-Zambia Railway, and the departments in which they are employed. The respondents were asked to specify whether their gender represented a male or a female to determine their gender. The replies are shown in the following table:

Table 4.1 Respondents' Gender

		Frequency	Percent	Cumulative Percent
Valid	Male	32	64	64
	Female	18	36	36
Total		50	100	100

Table 4.1 above demonstrates that there were more men than women among the research respondents. 50 people responded in all, although only 36% of them were female and 64% were male. The selection of responders was made without regard to gender. The availability of Managers and Officers at Tanzania Zambia Railway's corporate headquarters contributed to the discrepancy in numbers.

4.2 Respondents

The four alternatives on the questionnaire were offered to the respondents to choose from to determine their level of education. Certificate, diploma, bachelor's degree, and master's degree were the available choices. The following table shows the replies as they were given:

Table 4.2 Respondents' Level of Education

		Frequency	Percent	Cumulative Percent
Valid	Certificate	0	0	0
	Diploma	0	0	0
	Bachelors'	38	76	76
	Masters	12	24	24
Total		50	100	100

According to the data in table 4.2 above, 76% of the study participants who responded to the survey received a bachelor's degree, while 24% received a master's degree. None of the respondents said they had a diploma or certificate.

Knowing the respondents' profession was excellent. On the questionnaire, the researcher requested that they list their employment titles. The following table lists the titles after they have been briefly summarized:

Table 4.3 Respondents' Occupation

		Frequency	Percent	Cumulative Percent
Valid	Manager	5	10	10
	Ass Manager	8	16	16
	Accountant	2	4	4
	Officers	35	70	70
Total		50	100	100

The table 4.3 above demonstrates that there were more Tanzania-Zambia Railway Officers than Managers and Assistant Managers who participated in the survey. 70% of the officers were present. Ulrich (1997) asserts that junior employees make up a larger proportion of staff members than senior employees. Because Tanzania-Zambia Railway has more than five Assistant Managers and Officers reporting to one Manager, this was accurate.

The purpose of the study was to evaluate the contribution of TAZARA line to employment, economic growth, and freight transportation. Respondents were requested to express their opinions by rating a few statements that center on evaluating the core railway line's function. There were four rating scales available for selection. Strongly disagreeing is graded as S.D., neutral is N, agree is A, and strongly agree is graded as S.D. The results are shown in the table below:

Table 4.4: Frequency and Percentage for Scale Rates

S/N	Frequency				Percent (%)			
	SD	N	A	SA	SD	N	A	SA
Cargo Promotion	13	0	33	4	26	0	66	8
Volume Transported	33	0	11	6	46	0	22	12
Economy Improvement	8	0	10	40	0	0	20	80
TAZARA Operations	0	0	36	6	16	0	72	12
Cargo Safety	1	0	48	2	0	0	96	4
TAZARA Infrastructure Renovation	4	0	39	6	2	8	78	12
Transportation Cargo Profit	9	0	40	1	94	0	21	2
Overcharge		4			18	8	80	2
Customer Deletion	26	1	23	0	52	2	46	0
Unemployment Reduction	0	0	28	22	0	0	56	44

Table 4.5 Roles of Tanzanian Central Railway Line

Statistics	Frequency				Percent			
	SD	N	A	SA	SD	N	A	SA
	Cargo promotion	13	0	33	4	26%	0%	66%
Volume transported are reasonable	33	0	11	6	66%	0%	22%	12%
Improving economy	0	0	10	40	0%	0%	20%	80%
TRL pay attention on its Operations	8	0	36	6	16%	0%	72%	12%
Safety of transported cargo	0	0	48	2	0%	0%	96%	4%
TRL renovate infrastructure	1	4	39	6	2%	8%	78%	12%
No profit in transporting cargo	47	1	1	1	94%	2%	2%	2%
No overcharge	9	0	40	1	18%	0%	80%	2%
Not delude the customer	26	1	23	0	52%	2%	46%	0%
Reduce unemployment	0	0	28	22	0%	0%	56%	44%

Key: "SA" stands for strongly Agree, "A" stands for Agree, "N" stands for Neutral and "SD" stands for strongly Agreed.

According to the results shown in Table 4.5 above, 66% of the Tanzania-Zambia Railway personnel who took part in the survey agree that the central railway line encourages freight transit throughout the nation. 8% of respondents disagree just with Tanzania-Zambia Railway's promotion of freight transportation. However, 26% of those surveyed disagreed. Therefore, the researcher concludes that the Tanzania-Zambia Railway is crucial in encouraging freight transportation in the nation from these replies. Sixty-six percent of Tanzania-Zambia Railway workers who took part in the research felt that the amount of freight being delivered by the company was not fair. This indicates that Tanzania-Zambia Railway does not transport the anticipated volume of goods.

This was corroborated by the transport manager, who said that throughout the previous five years (2010 to 2014), Tanzania-Zambia Railway moved 1,065,891 tons of freight or 45% of its real capacity. The number of cargoes moved by the central railway line during the previous five years was not sufficient, according to a comment from the transport manager. At the time, neither the infrastructure nor the engines were in decent shape. Nevertheless, depending on the state of the infrastructure and the condition of the engines, the volume fluctuates and then picks up again. But the amount of cargo needed each year will start to increase once engine remanufacturing at the Morogoro plant begins to perform successfully. Various workers had different views. 11 out of the 50 workers that took part in the research believed that Tanzania-Zambia Railway carried adequate cargo volume, or 22%. Another set of 6 out of 50 people, or 14%, said that they strongly agree. It is clear from a comparison of the three groups that Tanzania-Zambia Railway is not operating at full capacity when it comes to cargo volume. Tanzania-Zambia Railway transports a variety of goods from one location to another, although the most common cargo is: Transit products: imported commodities transferred to a neighboring nation through the Central Railway line from the port of Dar es Salaam. Domestic products are items that are moved inside the regions serviced by a central railway line. Additionally, the Central Railway transports raw products utilized in our industries and exported from other nations, such as cotton, tobacco, and coffee. Construction supplies and other general commodities are also carried.

The researcher got the chance to confirm some information on the amount of cargo moved during the five years period from a recent Tanzania-Zambia Railway report (December 2014). The cargo volume over the last five years is shown in the table below:

Table 4.6 Volume of Cargo in Tons for Year 2010-2014

Types of Cargos	2010	2011	2012	2013	2014	Total
Domestic goods	255,710	237,564	166,042	141,836	185,350	989,500
Transit Goods	480	29,444	31,982	12,505	4,978	79,389
Total	256,190	267,008	198,024	154,341	190,328	1,065,891

Information on table 4.6 above is presented in the diagram below for further analysis and comparisons:

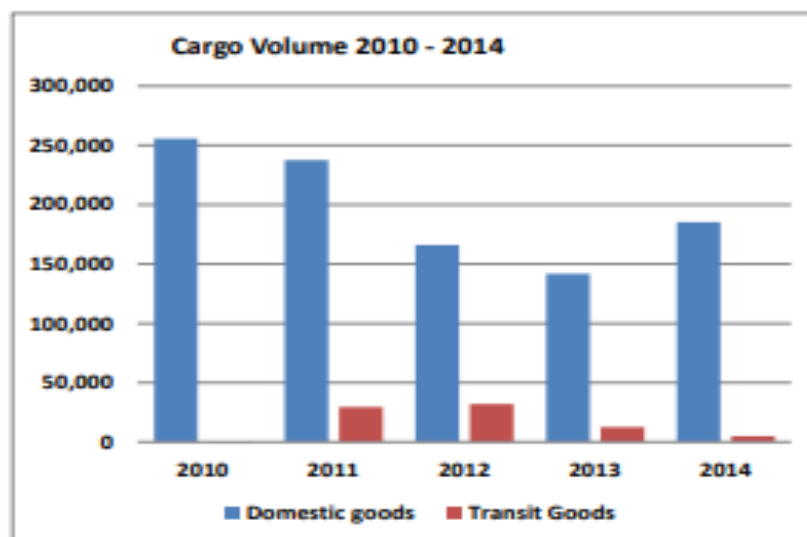


Fig. 4.1 Volume of Cargo Transported by TRL for Past Five Years

The information shown in figure 4.2 and table 4.6 above leads to the following conclusions: In the previous five years, Tanzania-Zambia Railway has carried 907,113 tons more domestic goods than transit cargo. Instead of rising, the amount of domestic freight delivered by Tanzania-Zambia Railway decreased. This is shown by the fact that Tanzania-Zambia Railway moved 255,710 tons of domestic freight in 2010 but only 185,350 tons in 2014. This represents a decrease in cargo

volume of 27.5%. In terms of transit freight, Tanzania-Zambia Railway began operations at a modest level in 2010, when 480 tons of goods were carried. However, tremendous progress was made in the two years that followed, 2011 and 2012, when a total of 29,444 and 31,982 tons were sent abroad. However, transit freight volume decreased once again in 2013 and 2014, hitting 12,505 and 4,978, respectively. Eighty percent of Tanzania-Zambia Railway personnel believed that the railway contributed to the growth of the national economy when asked about the core railway line.

The central line has the potential and ability to generate significant amounts of cash in a short length of time, according to the finance manager, who validated this information. For instance, the railway produced a total of K28.2 billion through its routine operations, which include the transportation of passengers and goods, during a calendar year in 2014, from January to December. The Tanzania-Zambia Railway Transport Manager further disclosed that: By ensuring that the Government's goal to boost the economy and alleviate poverty is conducted successfully, the train network continues to be a crucial instrument. The Government's efforts to achieve the millennium goals have benefited from the rail network, which can reach even rural areas, making it simple for farmers to obtain the agricultural tools and fertilizers that are the foundation of nations. The rail network has also aided in the cheap distribution of various farm and industrial products in rural areas. According to table 4.5, which also shows that 80% of employees felt that the cargo was carried at an acceptable cost, trains have the potential to move heavy items and several cargoes at once. Due to this, dealers may advertise their goods at reasonable prices.

By investing some of the railway employees' contributions in different development initiatives, the employment of railroad workers has helped to increase the capital in social security funds. As farmers and business people transport and sell their commodities and products that are subject to value-added tax, Tanzania-Zambia Railway helps to increase GPD (VAT). The study's participants from Tanzania-Zambia Railway were asked how they felt about the company's degree of attention to its business operations. Results showed that 36 of the 50 research participants, or 72%, believed that Tanzania-Zambia Railway gives its operations an appropriate amount of attention. The transport Manager cited the ongoing repair of engines and the railway line as an illustration of Tanzania-Zambia Railway's devotion to its functioning. He said that the shipping is conducted 24 hours a day by the Tanzania-Zambia Railway shipment timetable, with cargo acceptance by Tanzania-Zambia Railway taking place daily from 8 a.m. to 8 p.m.

However, other workers felt differently about Tanzania-Zambia Railway's dedication to its business operations. Six out of the 50 Tanzania-Zambia Railway workers who took part in the research, or 10%, strongly agreed that the company is aware of its activities. However, 8 people (or 16% of the group) firmly disagreed. They see this as a sign that Tanzania-Zambia Railway is not fully focused on its business. 48 out of 50 Tanzania-Zambia Railway workers, or 96% of those who took part in the research, agreed that Tanzania-Zambia Railway ensures the safety of the cargo. Other 2 Tanzania-Zambia Railway personnel (equivalent to 4% of those who participated in the research) firmly agreed that Tanzania-Zambia Railway ensures the safety of the cargo.

According to Tanzania-Zambia Railway Transport Manager, cargo safety is one of Tanzania-Zambia Railway's top priorities since it contributes to gaining the trust of cargo owners. The proper handling of cargo begins at the time of receiving it and continues through storage, loading into railway cars, and unloading. There are workers with particular knowledge in handling various cargo categories. The researcher was interested in understanding how Tanzania-Zambia Railway personnel felt about infrastructure upkeep. 39 out of 50 Tanzania-Zambia Railway workers, or 78%, agreed that Tanzania-Zambia Railway performs routine maintenance on its infrastructure. However, 6 out of 50 Tanzania-Zambia Railway workers (or 14% of those who took part in the poll) firmly agreed that Tanzania-Zambia Railway performs routine maintenance on its infrastructure. Out of the 50 participants in the research, 4 other workers (8%) were neutral. They made no comments about the upkeep or upgrading of the Tanzania-Zambia Railway infrastructure.

The central railway line has had operational challenges over the last five years as a result of the employment of obsolete engines and aging infrastructure, according to the transport manager. This prevented them from achieving their objectives. But Tanzania-Zambia Railway began updating the principal railway line and maintaining the engines in 2014. Tanzania-Zambia Railway has now begun to accomplish its intended objectives. Transporting passengers and freight generates a considerable profit for Tanzania-Zambia Railway. Out of 50 Tanzania-Zambia Railway workers, 47 of them—or 94%—reported having experienced this. This is due to how inexpensive railroad transportation is. It simultaneously transports vast amounts of people and freight. For long-distance travelers and huge amounts of goods, it is more cost-effective. According to the Assistant Transport Manager, it takes an average of 3 days for freight to travel from Dar es Salaam to Kapiri. In actuality, the time is less than that required by a long-distance car. However, this is the problem which can be solved with the introduction of speed trains believed to cover the some distance in one day. The researcher was interested in learning

how Tanzania-Zambia Railway personnel felt about the expense of moving freight. A total of 40 out of 50 workers, or 80%, agree that Tanzania-Zambia Railway's freight transport charges are acceptable. Other 9 out of 50 respondents (equivalent to 18%) said they strongly disagreed, while another 1 out of 50 respondents (equal to 2%) said they strongly agreed.

The researcher believes that organizations and people that utilize Tanzania-Zambia Railway to convey their merchandise can provide a better response to this topic. Additional research may be required to determine the cargo transport fees imposed by truck owners that employ road transportation. By stating they strongly disagree, 26 out of 50 respondents (equivalent to 52%) said that Tanzania Zambia Railway does not deceive clients when asked whether they do. A further 23 of the 50 respondents, or 46%, agreed that Tanzania-Zambia Railway did not deceive its consumers. Tanzania-Zambia Railway does not mislead clients, according to 1 out of 50 respondents (or 2 percent), who are neither in agreement nor disagreement. These results demonstrate that Tanzania-Zambia Railway manages consumers' demands transparently. Tanzania-Zambia Railway, a significant participant in the transportation industry, is anticipated to help create jobs. 28 respondents, or 56%, agree that Tanzania-Zambia Railway helps the nation's effort to increase employment. 22 more respondents (44%) said that they universally agree with Tanzania-Zambia Railway's contribution to employment. None of the respondents either strongly agreed or had no opinion. These results typically demonstrate that Tanzania-Zambia Railway supports employment.

4.3 Discussion

According to the report, the core railway line is only able to convey 45% of the goods of which it is capable. This indicates that there is more freight available for rail-road transportation. The railway line is not moving a sufficient amount of domestic and transit freight, according to the Tanzania - Zambia Railway workforce. Issa (2013) taught us that railroad transportation is essential for moving goods from one location to another. Rail freight transportation is much less expensive than other types of transportation. For this reason, businesses like Bakes Group, Mohamed Enterprises, and Capco in Tanzania use Tanzania - Zambia Railway to ship their goods overseas. The Democratic Republic of Congo, Zambia, Malawi, Uganda, Rwanda, and Burundi are among landlocked nations that may benefit from handling and shipping freight via Tanzania-Zambia railway line. According to data gathered from Tanzania-Zambia Railway Transport Manager, 1,065,891 tons of goods were moved during the previous five years (2010 to 2014). This volume of freight is large, but according to the Tanzania-Zambia Railway Accountant and the Transport Manager, this is just 55% of what the Tanzania-Zambia Railway can manage with improved connection rail routes, movement schedule and train engines. This is consistent with Wittke's (2011) argument that before establishing goals for passenger or freight transportation, it is vital to evaluate the efficacy of railway transportation requirements. The researcher for this study concurs with the author that the volume of freight moved during a certain period influences the development of the railway transportation industry. The profitability of the railway company will be great for both mine industries and the public at large because the more goods that will be moved using rail and the more people will prefer to use the rail transport, hence the more money will be made from the railway transportation system itself and the other resources Government will serve with reduced road maintenance.

4.4 Challenges

This study shows that there are certain issues with railway transport operations. These difficulties include variables related to railway line width, aged engines that are losing their typical capability, and variation and tear and wear on the actual railway line. Tanzania-Zambia Railway Transport Manager claims that the breadth of the rail line is less than current international norms. This in tells that there is need for Tanzania -Zambia rail breadth expansion to meet the current international standards.

The difficulties Tanzania-Zambia Railway faces are different from the difficulties the Nigerian railway system faces. According to empirical research by Igwe et al. (2013), the Nigerian Government's involvement with a management structure, lack of flexibility to establish prices, underfunding, technical issues, and rigid bureaucracy all have an impact on the public railway system. For this reason, TAZARA firm must critically assess its internal and external issues and create a clear strategy to overcome its difficulties if it is to operate profitably. Scholars Firzli and Nicolas (2013) argue that information gathered during infrastructure assessments will guide strategies to enhance operations and investment choices made inside the railway corporation, which is consistent with this assertion of the firm. A constant evaluation of infrastructure services and rail operations will provide space for better freight and passenger transit.

5. CONCLUSION

Zambia economic growth through TAZARA line transportation upgrade was established to directly investigate the real requirements for freight transit infrastructure and operational improvement of the railway line. This research was able to get an easy-to-understand estimate of the amount of freight that must be conveyed over the main railway line. However, an approximate estimate might be obtained by evaluating Tanzania-Zambia Railway's real ability to ship freight to both local and foreign locations. Tanzania-Zambia Railway moved 1.065 million tons of freight in five years from 2010 to 2014, to both local and foreign locations. In addition, Tanzania-Zambia Railway Manager stated that this was below Tanzania-Zambia Railway's capabilities. According to conventional estimations, only 45% of the space was occupied, and this location could hold up to 2.368 million tons of goods at all times. This research proves that the firm has been performing below its expectation as most goods are transported through road transport to and from the ports as a result of poor rail network. Over reliance on road transportation of cargos in and outside the country has directly accelerated the depreciation of the newly built roads resulting in losing millions of dollars by the Zambian Government.

The purpose of this study was to investigate how upgrading the Tanzania-Zambia railway line infrastructure can boost the economic growth of Zambians through rail infrastructure upgrade and alleviating some of the surrounding challenges that the firm has been experiencing. By reaching out to the railway Authority, a different railway corporation in Tanzania, was beyond the purview of this research (TAZARA). But seeing the central railway line operating under Tanzania-Zambia Railway, the researcher outlined the following difficulties that the central railway line, in particular, faces in Tanzania;

- Finding train engines that work with the architecture and technology of an existing railway route is challenging.
- The current railway line weighs a yard of under 80 pounds. This is out-of-date and old-fashioned. The majority of railroad bridges have limited capacity to carry big loads. This occurs as a result of inadequate bridge maintenance.
- The core railway line in Tanzania was built beginning in 1905, and it reached Kigoma in 1914. This demonstrates how outdated part of Tanzania-Zambia Railway infrastructure is particularly its bridges. For instance, currently, the train from Tanzania cannot reach Kapiri Mposhi station due to broken down Chambeshi Bridge in Zambia. Because of the widespread usage of obsolete technology, it might be difficult to find the replacement components required for maintenance. Sometimes, even when the components are readily accessible, the equipment repair process takes longer.

Based on the Tanzania-Zambia Railway past performance between 2010–2014, the researchers concluded that, despite several substantial obstacles that influence the central railway line, the railway plays a key role in enhancing freight transportation of goods and people between Zambia and Tanzania. Moving of commodities or people by rail-line from one location to another can have the following economic growth impact to the Zambian country;

- Preserve the longevity of the roads which will the Zambian Government to spend less on road maintenance.
- Decongest the roads and minimize the number of trucks using the roads which proportionally reduce the road traffic accidents and serves the country from losing humane resource through road accidents,
- The train is capable of carry bulk cargos on one trip with less chances of rail accidents compared to road transportation
- Introduction of speed train for TAZARA passengers will attract large number of business men and women moving from Tanzania-to Zambia and vice versa within acceptable time.

5.1 Limitations

The following observations and recommendations are based on the facts and conclusions drawn from these results, which have numerous important consequences. To satisfy new regulations and keep up with technological advancements, Tanzania-Zambia Railway should devise a strategy to repair current engines, buy new engines, and provide frequent training to engineers on new technologies. The bridges and railroad need to be fully repaired by Tanzania-Zambia Railway. By doing this, the bridge's capacity to carry big weights will grow. Improved railroad infrastructure increases train speed while lowering the likelihood of an accident. To make sure that the available wagons are consistent with the demand for transportation, Tanzania-Zambia Railway should also expand the number of wagons. Customer satisfaction and freight transportation volume will both increase as a result.

5.1 Recommendations

To maximize and preserve the advantages large resource generation, Tanzania-Zambia Railway should think about converting the railway line to standard gauge, which is widely accepted and giving preference to landlocked nations in using ports for import and export of their commodities. By doing this, the intended improvement in cargo promotion as one way of growing the country's economy will be precisely achieved.

Tanzania-Zambia Railway has to have a strategy for fending off competition from road trucks. One of the techniques may be to properly promote Tanzania-Zambia Railway's cargo transport services to businesses and people who need to move their goods but are unaware of the company's services. In a similar vein, it is advised that legislative structure and institutions be updated to guarantee that political motivations have little influence on the effectiveness and sustainability of cargo transportation.

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