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Kenya – The Standard Gauge Railway (SGR) Challenges and Solutions

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Abstract:
This study aims to present the relevant solutions to the challenges faced by The Standard Gauge Railway (SGR), Kenya's largest railway transport that will help improve its functionality. The starting point of finding solutions is learning the challenges faced by the railway system The Standard Gauge Railway (SGR), knowing the causes of the redundancy in its growth that can result in the easier gathering of solutions. The Standard Gauge Railway (SGR) serves approximately 6 000 people daily, which is approximately 2 190 000 people annually. This means that it serves approximately three-quarters of the people travelling between Mombasa and Nairobi. The study used a qualitative approach which entails gathering and studying non-numerical facts to comprehend ideas, views, or experiences. Thirteen respondents contributed to this study, including the general managers, train crews and passengers. The primary data was collected using questionnaires. It was cleaned and coded to reduce the error and after that, it was analysed using Microsoft Office Excel. Following data analysis, the researcher presented the findings in the form of tables and charts with percentages for comparison. The political impact of each new government bringing its own new regulations on how the management of the company must operate is one of SGR's main challenges. The company should make the most of its chance to be sponsored by the government by fully planning itself to be a stand-alone business where it can make decisions on its own without being significantly influenced by outside factors. Once the new government understands the SGR's management and how it will readjust to the new directive by the government, the study suggests further research to learn how these challenges were fully encountered.

Keywords:	Kenya, East Africa, Railway transportation, The Standard Gauge Railway (SGR)
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1   INTRODUCTION

The rail system was regarded as the best means of transportation during the industrial revolution, but road transportation eventually surpassed it. The railroad operating businesses were not doing well at that time. Since then, road trucks have dominated rail trucks because the railway gave up its market share to the latter. However, the rail industry has made a significant recovery over the past 20 years or more. A significant global effort has been made to restore the railway to provide a competitive alternative to road trucks for the transportation of goods and people. This was a deliberate attempt to counter road transportation's dominance. To put it briefly, this was an intentional campaign to target businesses and organisations that provide services for road transportation, including freight corporations and passenger service businesses (Mike's Trucking Service, 2020).

A deliberate attempt was made by the majority of developed nations to transition from using roads for transportation to using trains. With the help of funds offered by their governments to encourage train use, customers ultimately experienced lower transportation expenses. For instance, the European Union (EU) launched the so-called "Marco Polo" program to assist in shifting the balance away from road transport. This was an EU-funded program for initiatives that moved freight from roads to rail, and sea. According to statistics, since the program's launch in 2003, more than 500 companies had successfully switched. The program aimed to get 54 billion tons of freight that were being transported by road freight operators off the roads each year. As a result, most of the freight that had previously been handled by road was switched to rail, especially since it was thought of as rail's main competitor (International Transport Forum, 2014).

Closer to Kenya, the Ethiopian government began freight operations in the early months of 2018 using advanced electric-operated Standard Gauge Railway (The longest transboundary electrified railway in Africa), as well as diesel-operated trains running from the port of Djibouti to Addis Ababa in-land dry container deport. There were more than thirty trains on the Ethiopia-Djibouti Standard Gauge Railway, each carrying about 1,100 freight wagons adding up to 3,500 tons. Two hundred trucks would have been on the road in this situation. As a result of this achievement, Ethiopia was able to carry cargo

quickly and effectively from the port of Djibouti to its landlocked capital, Addis Ababa. The trains were anticipated to go at rates of up to 100 km/h, which was far faster than the 80 km/h cap on-road truck speeds. It was anticipated that the SGR would speed up goods transit by 10 hours when compared to the old Meter Gauge Railway and by three to twelve hours when compared to vehicles on the road. The time it takes to move a container from Addis Ababa to Djibouti should decrease from three days to ten hours, and the cost is anticipated to decrease by a third once commercial services start on the line in a few months (Olingo, 2018).

According to officials, each freight train is capable of carrying as many goods as two hundred trucks. The road transportation business was undoubtedly impacted by this significant infrastructural development as more vehicles jostled for the remaining freight, increasing competition between road transportation companies. The most fundamental survival instinct for every firm is to fight back for customers, thus it may have been necessary for the road companies to develop tactics to deal with the new, intensely competitive business climate (Aglionby, 2017).
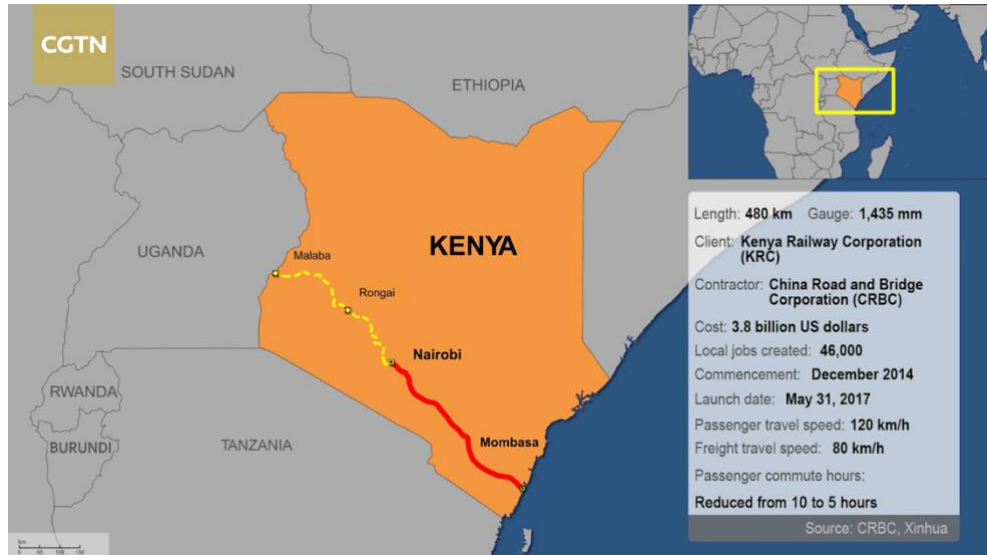
Figure 1: The Standard Gauge Railway (SGR) network (Hong, 2017)

China Road and Bridge Corporation, a China Communications Construction Company division, started the Kenya Standard Gauge Railway project in December 2014 and

completed it two years ahead of schedule. In May 2017, it first opened its doors to the public (Yifeng and Akoth, 2020).

The railway project cost US$3.8 billion, with a loan from the Export-Import Bank of China covering 90% of the cost and the Kenyan government covering 10% (Nyumba, 2021). The majority of road and railway contracts are held by China Communications Construction Co (CCCC) and its subsidiary China Road and Bridges Corporation (CRBC), which earns approximately KES777.1 billion (US$6.9 billion) (Guguyu, 2022).

This construction is also marketed as a way to advance agricultural production, electricity, petroleum, gas, and mining in Kenya as well as the greater East African region. It proposes to connect South Sudan, Uganda, Rwanda, and Burundi to the trade routes that run along the eastern shore of the Indian Ocean. Being landlocked (not having a direct connection to the Indian Ocean, preventing them from having direct sea transportation), these bordering countries will benefit greatly from the SGR because shipping will be much faster and less expensive than the outdated road transportation that they were reliant on from the port of Kenya. The Kenyan economy will benefit from the extended boundaries to serve the mentioned countries, South Sudan, Uganda, Rwanda, and Burundi (Patel, 2022).

The potential for significant socioeconomic advantages makes projects like this known as development corridors. They include opening remote communities, gaining access to markets and jobs, and providing effective transportation and affordable food supplies (Patel, 2022).

The advancements in the railway industry did not spare the freight and passenger businesses in Kenya either. Kenya experienced the same difficulties as road freight businesses in other affluent nations did. Unofficial sources said that unanticipated market risks and hurdles were decreasing the revenues of Kenyan freight companies. Some of the businesses asserted that the Standard Gauge Railway caused them to miss out on several lucrative deals. The decline in activity, all of these caused the businesses to make losses. The study looked into the strategic plans that the businesses implemented in response to the Standard Gauge Railway. Various businesses shared their thoughts and

impressions about the SGR. Others saw opportunities, while some saw threats. The study discovered how different road freight businesses were positioning themselves strategically as a result of the SGR through diverse marketing and operational methods (Genghis-capital, 2018).

The researcher investigated the transportation ports challenges and solutions in Mombasa and Nairobi Standard Gauge Railways Terminus.

1.1 Problem statement

The primary issue of contention in the world's transportation sector now is whether rail freight transport will exceed road freight transport market share or if it is only a euphoric occurrence. However, the standard gauge railway was expected to put pressure on road operators and spark pricing wars. Therefore, the main question circulating in the transportation industry was how freight businesses would plan to strategically position themselves to benefit from the contemporary railway. Although the general public believed that railroads would fundamentally change the majority of freight or cargo-moving businesses, the real challenge was how such businesses would respond and function in the face of an alluring railway that offered competing services. Companies were shrinking because of a decline in sales and generally changing company models was some of the possible methods that the public speculated (Wafula, 2017).

Another significant issue is how the standard gauge railway will make up the remaining distance for the train since trucks are still used to transport freight, and since they charge highly for their services, the entire process is nearly as expensive as using a truck to travel from the port to the destination. Passengers also need to commute to the SGR station which is also expensive and a tiresome process. Regardless of whether this was the actual situation, the study set out to shed light on it and paint a more accurate image by looking into the various defensive measures that the freight companies were doing.

Some of the difficulties Kenya is currently facing were also encountered in other advanced nations. Competing modes of transportation also reacted differently to the development as the rails were modernized and train speed and capacity expanded. Despite having highly developed train technology, there is still a push in Europe to try and lessen

reliance on the road by promoting railway growth as a substitute for road freight transportation. As a favoured method of environmentally friendly freight transportation, railway freight won out over electric locomotive freight in Europe. Despite difficult rules, road transportation was nevertheless able to outperform rail in terms of market share for freight. There was no chance for rail freight to take the position of road freight (Mancera, Klaas, Weidmann, and Nash, 2017).

SGR's arrival in Kenya sparked a lot of rumours and suggestions. Transport industry stakeholders acknowledged the newcomer and agreed that the SGR will provide competition, though not sufficiently to change the current market share between different modes. Transporters contended that giving SGR special treatment in the cargo industry would drive them out of business (Muchira, 2017).

Built by a Chinese enterprise, the railroad transportation industry in Kenya has many benefits in terms of transportation becoming convenient, quicker, and cheaper, infrastructure being built for Kenya, job opportunities, revenues being created, and key financial projects being stimulated. All of this was accomplished with Chinese financing and contractors, providing Kenya with great opportunities, and making the country East Africa's largest railroad transportation industry. This research is looking to explore the challenges that the standard gauge railway (SGR) faces in the railroad transportation world and the public transportation industry as well as get familiar with the solutions to solve those challenges. Once the solutions are found, the SGR will be embraced by not only the Kenyans but all the East African countries, since it will be nearly 100% perfect in its operation and revenue generation, which will improve the living standards of many people and increase the government revenue.

1.2 Aim of the study

The aim of this bachelor thesis is to conduct extensive research on the challenges Kenya faces as East Africa's largest railroad transportation industry, as well as identify and suggest some of the solutions that can aid its growth.

The thesis discusses the impact of the railways and public transportation separately from a logistical point of view, as well as giving insight into some aspects of the economy, the country's government, social environment, legislation, political decision-making, and work labour.

This study answers two research questions:

RQ1. What are the challenges that Kenya faces in managing the Standard Gauge Railway (SGR), as the largest railroad transportation in East Africa?

RQ2. How does Kenya deal with these obstacles?

1.3 Demarcation

A lot of studies have been done about East Africa's railroad industry and the research majorly does not focus on the standard gauge railway in Kenya, yet Kenya is the largest growing economy in East Africa. This is the reason why the demarcation of this study focuses on Kenya's SGR and the challenges that it faces as the biggest train transportation hub in East Africa, as well as identifying and addressing some of the solutions.

2 THEORY

This chapter examines previous studies and research on railroad transportation challenges and solutions conducted by other experts. The literature demonstrates how railroad companies strategically planned their business operations and marketing strategies to gain an advantage over the strengths and limitations of rival transportation companies.

2.1 Rail Transport in Kenya

Africa's railways are disjointed and hardly qualify as a system because they connect the interior to seaports and were primarily created for the interests of foreign trade. South Africa makes for around 22,500 of the estimated 73,000 route km total of African railways throughout the continent. The national railway networks in Africa are largely independent of one another, with the exception of the eastern and southern African railway systems. The networks were constructed during the end of the nineteenth or the

start of the twentieth centuries, with the exception of the difference in terms of gauges, couplings, brake systems, and buffers, among other technical attributes. Particularly in Sub-Saharan Africa, the 1,067-metre gauge predominates whereas, in North Africa, the 1,435-metre gauge accounts for 76.1 percent of the total railway kilometres. The Tanzania-Zambia Railway (TAZARA) passes through the two West African countries, Gabon and Cameroon, which invested in track realignment, signalling, safety systems, and rolling stocks that would be necessary to upgrade current railway lines (African Development Bank, 2015).

After the East Africa Railway Company (EARC) demise in 1977, the Kenya Railway Company (KRC) was founded the following year. The country's railway network, known as the Uganda Railway (UR), was initially constructed to serve as a bridge between landlocked Uganda and the outside world. Later, as Kenya expanded from the East African Railway Company, the "White Highlands" which was then an area in the central uplands of Kenya, it was easier to access the White Highland at the time and the interest in the place got higher, in which they took in control on increasing the railroad operation, leading to the renaming of the Kenya-Uganda Railway (KUR) line. (Farnworth, 2018).

Kenya's railway network consists of a single-track main line that runs 1,082 kilometres from Mombasa to Malaba. The Nakuru-Kisumu and Nairobi-Nanyuki railway lines are its significant branch lines, while Voi-Taveta, Gilgil-Nyahururu are its smaller branch lines. Kenyan Railway Transport expanded its line from Leseru-Kitale and Rongai-Solai in September 2000, which were primarily constructed to serve the previous White Highlands. Kenya Railway Company (KRC) uses a system with a 1000 mm (metre) gauge, which was constructed in the late 19th and early 20th century (Irandu, 2000).

The table below lists the principal branch lines and their lengths, which (*) some of the roots are dormant for most of the year.

Table 1: Kenya Railways Track Mileage (Irandu, 2000, p. 13)

Line	Length (km)
Principal Lines	
Mombasa – Nairobi	530
Nairobi – Malaba	552
Nakuru – Kisumu	248
Minor Lines*	
Voi – Taveta	119
Konza – Magadi	150
Nairobi – Nanyuki	262
Gilgil – Nyahururu	82
Eldoret – Kitale	90
Kisumu – Butere	69
Rongai – Solai	28

There are 2,130 kilometres of tracks in the complete railway transportation system. Additionally, these 2,130 kilometres have different routes with different capacities of the weight load they can carry. For instance, Kisumu and Nanyuki have a lower weight load of 80 lb/m, while the main line from Mombasa to Malaba is 95 lb/m. Lastly, 50 lb/m rails are used on smaller branch lines. (Irandu, 2000, p. 13).

With the exception of the Nakuru-Kisumu branch line, it has multiple bridges and viaducts due to the differences in the terrain. The majority of the railway system has a comparatively low prevalence of bridges, which then the railroad and the road are parallel along the Northern Transport Corridor. This corridor consists of a single highway that connects Mombasa to Nakuru before splitting into two branches, one of which travels to the Ugandan border at Malaba and the other one to Kisumu. The rail and the road lines split at Kisumu, with later continuing to the Ugandan border at Busia, while wagons use the ferry across Lake Victoria. Overall, the amount of freight transported on the corridor by road is nearly twice used by the railway. This equates to roughly 3.7 million tons of freight, but only 1.6 million tons are moved by rail transport. The KRC administration is making every effort to recover from the cargo that has been lost to road transportation in recent years (Arvis, Carruthers, Smith and Willoughby, 2011).

The railway track has several drawbacks, including poor maintenance brought on by insufficient resources for maintenance and a narrow gauge of 1 metre that restricts the commercial speed to 40 kph and a low equipment availability of roughly 50% of the maintenance. This is primarily because there aren't enough spare parts available and many

people working at the railway services from the corporation's engineering guidelines need intense staffing practices. Businesses had adjusted their strategies on taking advantage of the Standard Gauge Railway's new commercial potential. The Port of Mombasa was anticipated to become more efficient as a result of the SGR and larger vessels would be drawn to the port as a result. This would significantly increase the number of goods locally and internationally, which could increase freight businesses more. Eventually, the optimal condition is for up to 30% of the cargo to be transported by rail and 70% by road transportation. This indicates that logistic companies will increase their relevant services, such as customs clearance and warehousing, as well as create new products to address this new development (Kitimo, 2020).

The Standard Gauge Railways had been viewed as a disruptor in the transportation industry, which was the driving force behind this study's motivation. However, the researcher sought to know East Africa's largest railroad transportation port challenges and solutions (Standard Gauge Railway's - Kenya). A company can only succeed against the competition by doing a thorough examination of the variables that affect the business. The researcher did this with the intention of using the knowledge gained to aid in the creation of strategy and policy in the transportation industry. The focus of the study, therefore, was to investigate East Africa's Largest railroad transportation port challenges and solutions.

The Global Times article explained the import of railways and public transportation separately in the Chinese-built Standard-Gauge Railway (SGR) correlating Kenya's port city Mombasa to its capital Nairobi. The article cited a huge incentive, particularly in terms of becoming more interested in this topic and learning more about the railroad's challenges and solutions (China-built modern railway transforming lives in Kenya - Global Times, 2021).

Practically all the rail frameworks in Africa have their beginnings in the mid-twentieth century when European colonial powers constructed railroad lines to help military developments and to transport goods produced by massive mining or farming operations (Rail Infrastructure in Africa - Africa Development Bank, 2015).

Throughout history, railroads have played an important role in the economic development of the majority of African countries. For several years, railways played a dominant role in low-cost passenger and freight transportation, enabling the growth of agriculture and manufacturing. Governments in Africa and around the world have spent the last 50 years focusing exclusively on improving the road infrastructure, disregarding railways, while road transit has developed significantly to become a major component of the automotive industry. The slow response of railways to the new market conditions, along with the liberalization of road transport, resulted in a dramatic drop in rail freight (Railway Transport Framework for improving railway sector performance in Sub-Saharan Africa, 2013).

Between 1891 and 1895, heated arguments erupted in the British parliament regarding the necessity of building a railway line across a country inhabited by the Maasai and unlettered African tribesmen. It was looked at as completely absurd since the price, was estimated to be GBP 5 million and was regarded expensive at the time, and the line caused outrage in the British government and media (Kenya Railways, 2022).

2.2 Advantages and disadvantages of Railroad Transportation

Rail freight has a positive environmental impact, which is its primary benefit. Rail is perhaps the least environmentally harmful of all the freight transportation options, especially when pulled by an electric locomotive. Additionally, rail offers a significant advantage over vehicle transportation over medium to longer distances. As a result, the average cost of moving a unit by rail decreases, whereas the average cost of moving a unit by road grows as the distance increases. This is nearly completely due to the different cost structures of the two modes; the road has few fixed expenditures; therefore, average costs increase directly with distance. Rail, on the other hand, has a relatively high percentage of fixed expenses; as a result, when distance grows, these costs are dispersed across a greater number of ton kilometres and the average cost per unit decreases (Cowie, 2010, p. 290-292).

The capacity of railroads is another benefit. Unlike road transportation, rail has a far bigger capacity that can stretch up to a full train size. However, train lengths tend to differ

from country to country. For instance, Germany limits the length of its freight trains to 700 meters, whereas Eastern European nations limit them to 1,000 meters. In contrast, US and Canadian freight train lengths are typically much greater. Regardless of any length limitations, a freight train's capacity is much higher than that of a road truck. Therefore, rail has the ability to efficiently and rapidly transport massive quantities of freight over great distances. Power cost is another benefit of railroads. The cost of power for rail transportation is quite low per ton transported. This is because rail has a very high level of capacity; hence, comparatively speaking, a large weight may be carried with little power. Because of capacity and electricity costs, a rail is a viable option for transporting low-value, high-volume goods like coal, aggregates, shale, etc (Cowie, 2010, p. 290-292).

Rail is typically one of the least weather-restricted alternative modes of transportation among all those that are available, which brings us to our next advantage. As a result, the chance of a delay caused by bad weather is the lowest.

The most significant disadvantage of rail transportation is that it can't reach all destinations. This means that the passengers have to use connectors to their final destination. Also, transhipment to other modes of transport is required (Veraart, 2011, p. 62).

Rail only has a relatively small number of points of access, in contrast to road transportation, which has an infinite number of entry points to the road network. These serve as marshalling yards and collection locations, essentially. This means that in order to deliver point-to-point transportation and remain completely competitive, rail firms must make a use of other modes of transportation. The size of the shipping is another drawback. This brings to light one of the main disadvantages of rail freight, namely the need for a minimum package size in order to benefit from rail transportation. This will either be a full wagon load or a full container load for immediate access. Such shipments can be created by third parties in the form of freight forwarders; however, the procedure becomes much more complex and challenging. It is not only more expensive, but it also requires a range of shippers who all wish to convey cargo between the same two sites (Cowie, 2010, p. 290-292).

High levels of capacity result in relatively infrequent rail freight services. In simple terms, a truck can leave once it is loaded. However, a train must be loaded or assembled with a lot more weight, which implies that such services will be less frequent. Regular rail freight services consequently tend to only run along routes where there is a high level of demand between the locations. This could lead to an intermodal service built around a hub-and-spoke system. According to the notion, multimodal combines the benefits of road travel over shorter distances with the advantages of rail travel over vast ones. Rail terminals serve as hubs, with road transport serving as spokes. However, intermodal freight is a topic that receives a lot of attention from the government, despite the fact that there hasn't been much progress. For instance, the EU effort on multimodal transportation, Marco Polo II, has a relatively modest overall budget of four hundred million euros spent between 2007 and 2013. This is done in order to help financially with the start-up expenses of intermodal operations (Cowie, 2010, p. 292).

2.3 The Standard Gauge Railway (SGR)

A standard gauge railroad is one that is constructed with a consistent length or distance between the inner sides of the rail. Such lines are modified as part of attempts to provide connectivity and compatibility when the growth of rail transportation becomes necessary (Shaban, 2017).

The standard gauge is now considered the new international standard, with the exception of a few countries, such as the United States, that do not use it. When building new railroads, other gauges are rarely employed unless there is a direct connection to an existing line, like in South America. Another aspect of the SGR's attraction is the growing economic influence of China in East Africa. China has provided technical standards and support to many African countries that are now receiving financial support from the East. Ethiopia, Kenya, and Uganda are excellent examples of places in the region where standard-gauge networks supported by China are taking development. The SGR in Tanzania is being funded largely by the World Bank. There is a considerable chance that East and Central Africa may soon accept the standard gauge (Oirere, 2017).

Kenya began building a new railway in 2014 to link the Mombasa Port with the interior and then to the landlocked nations of Uganda and Rwanda. Today, 120 km northwest of Nairobi, the Standard Gauge Railway abruptly terminates at Naivasha. In the end, it is intended to reach the Ugandan border at Malaba, assisting in tying East Africa's regional transportation and trade together.

On May 31, 2017, Kenya's Standard Gauge Railway (SGR), which was built by China Road and Bridge Corporation and largely financed by Chinese credit lines, was completed, ending a 110-year reliance on colonial infrastructure. The SGR is a part of China's new "Belt and Road Initiative," which aims to make East and Central Africa more accessible to foreign trade and investment (Wissenbach and Wang, 2017).
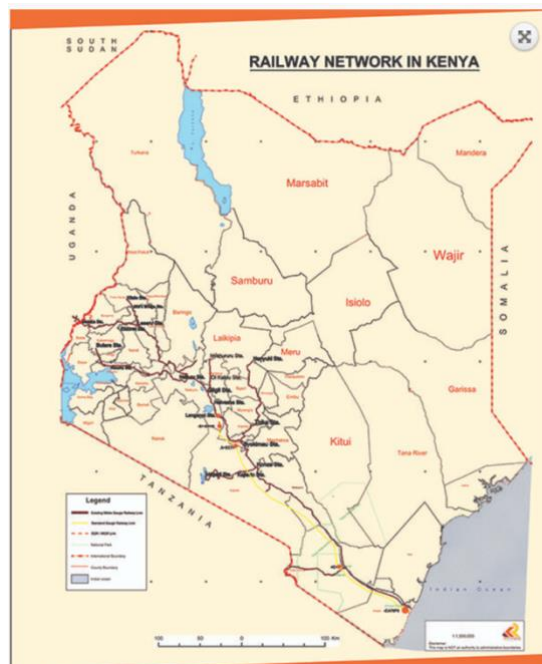
Figure 2: Railway network in Kenya (Railway Network – Kenya Railways, 2022)

This figure represents the railroad network in the country of Kenya.

From May 2022, the government has issued a notice that it intends to hand over control of the country's standard-gauge railway to Kenya Railway Corporation. Africa Star Railway Operation Co is now operating the line under a 10-year contract that includes a five-year break option (Oirere, 2021).

2.3.1 Kenya Electricity Transmission Company (KETRACO) and Standard Gauge Railway fuel

Kenya Electricity Transmission Company, or KETRACO, is a government-owned corporation that functions as Kenya's Transmission System Operator (Wissenbach and Wang, 2017, p. 24).

On the 25th of January 2018, the Kenya Electricity Transmission Company Limited (KETRACO) and China Electric Power Equipment and Technology Company Limited (CET) inked a contract for US$40 million. The SGR rail line, which is now powered by diesel, will be electrified as a result of this deal. Between Mombasa and Nairobi, fourteen substations will be built as part of the project. The main goal of this project is to ensure that when the SGR switches to a clean energy power source, not only the train but also other facilities along the Mombasa-Nairobi economic belt, such as train stations, planned industries, factories, and businesses near the railway, will have a reliable and sufficient supply. This will attract more large power users and consumers to the area, as well as new prospects for the residents (Ketraco, 2020).

The SGR railway's design, which was initially powered by diesel locomotives, provides for the construction of a single electric line that would connect to KETRACO's 482-kilometre 400-kilovolt Mombasa-Nairobi Transmission Line (MNTL), which was electrified by President Uhuru Kenyatta on August 4, 2017. Diesel trains overtook steam engines as a cleaner and more efficient mode of transportation for passengers and goods around the turn of the twentieth century. Engineers across the world built electric diesel "hybrid" trains after that. Kenya will soon join the mix of countries with electric trains powered by sustainable energy sources, due to the implementation of environmentally friendly wheeled vehicles in the twenty-first century, combined with technological innovations in the field of energy production (Ketraco, 2020).

2.4 The government of Kenya

Local communities and Kenya's economy as a whole have profited from The Standard Gauge Railway's expansion by developing new business opportunities while supporting

local businesses. The SGR employees' support of regional businesses has contributed to the rising demand for everyday consumer goods. To better customer service railway workers, some banks have opened more branches. Several of these workers are also starting their own small businesses (Irandu, 2020).

2.5 Work labour

According to the general manager who was interviewed through the use of a questionnaire, there were a lot of Chinese workers during the construction time and when the SGR started operating. This was a major challenge since the majority of Kenyans did not speak Chinese. The Kenyan government only permits foreign experts to work in Kenya when few or no Kenyans are available to do that job. As a result, 98% of Kenyans who successfully completed their training at the Railway Training Institute were hired by the SGR. As opposed to before, when there were numerous Chinese working in almost every industry. There are currently a few Chinese working in technical departments including engineering and control rooms.

2.6 Political decision-making

The Kenyan government's level of interest and approach to the Standard Gauge Railway project is very different from the national and local levels. At the national level, the debates surrounding the SGR included the entire commissioning and contracting process for the railway, including the costs of secrecy. These expenses raise the possibility that national elites may have benefited illegally from the contracting process, according to several analysts. The original designs for the SGR were developed by the previous coalition government, led by the infamously corrupt President Kibaki (2008–2013), but President Kenyatta's administration carried them out (Kacungira, 2017).

The shift in the government coalition's ethnic make-up following the 2013 elections is one cause of political friction. Presidents Kibaki and Kenyatta are from the Kikuyu ethnic group, which has dominated both administrations. The Kalenjin group, which has been a member of Kenya's ruling Jubilee coalition since 2013, appears dissatisfied that it was excluded from the purportedly illegal agreements negotiated during the prior Kibaki

administration when the Kalenjin were a part of the opposition. It may be part of a political plan to resolve these ethnic issues because the railway was recently decided to be extended to Naivasha in the Rift Valley, a Kalenjin stronghold where the majority of the 2008 post-election violence between the Kalenjin and Kikuyu populations broke out (Tauris, 2012).

The objective is to find problems in the planning and contracting processes that have been raised by the Kenyan Parliament, of which Members of Parliament (MPs) from the Kalenjin tribe have been the most outspoken opponents. The widespread corruption in Kenya is a significant issue. As a result, the argument over whether Chinese (and other foreign) contractors act dishonestly highlights a flaw in the nation's political culture. In a 2014 survey by the Sino-African Centre of Excellence, the biggest barrier to establishing a business in Kenya, according to 75 Chinese enterprises, was corruption. In a survey of people who worked for Chinese companies, corruption was cited as a "very major difficulty" by 53% of respondents, and a "serious challenge" by 15% (D. Johnson, "Deal or No Deal", p. 26).

Many people believe that long-established Kenyan political elites have received large payments from the SGR. The project's main goals and a true contribution to bridging East Africa's infrastructural gaps are overshadowed by these views. Even though they have their roots in Kenyan politics, the SGR planning, finance, and execution debates have a bad impact on Chinese developers who are frequently accused of working with dishonest politicians (Wekesa, 2015).

2.6.1 Legislation

Since Kenya gained independence in 1963, the Standard Gauge Railway (SGR) has been the country's most significant infrastructure development. The SGR concept was introduced in 2008 by Kenya and Uganda as a component of the Northern Corridor Initiative, which connects Mombasa, a coastal city in Kenya, with the landlocked nations of the Great Lakes region. The economic sustainability of a standard gauge railway was a contentious issue among consultants, decision-makers, and civil society activists even

before Kenya's Treasury signed a memorandum of understanding (MoU) with China's Exim Bank in July 2013 (The economic Rail Gauge in East African Community, 2022).

In an agreement struck in August 2009, CRBC agreed to do a free feasibility study on the SGR project on behalf of Kenya's Ministry of Transport (MoT). The Ministry received the feasibility study from CRBC in January 2011. The research suggested switching the SGR's electric engine for a diesel one. The free feasibility study implied that the two governments would use its conclusions, but it might have also implied that the procurement process would favour CRBC since it had already completed the feasibility study. This arrangement was also in line with the strategy used by China's Exim Bank, which often demands that a Chinese company that has performed a feasibility study move forward with a project. Kenya Railways Corporation (KRC) asked China's Exim Bank for funding in January 2012 through Kenya's embassy in China to build the SGR (National Assembly, 2014).

Although preparations for the SGR were made before President Uhuru Kenyatta took office in March 2013, the initiative quickly rose to the top of his administration's agenda. On December 12, 2014, there were demonstrations against the SRG's potential environmental dangers. Despite these worries, Kenyatta's government was committed to finishing phase one by May 2017 in time for the national elections in August 2017. Phase two's 120-kilometre-long construction phase started in late 2016 and ended in August 2019. Phase three has not yet started; it will go from Narok, southwest of Nairobi, to Kisumu, in western Kenya. Importantly, China's Exim Bank did not, as anticipated, sanction the credit for phase three of the SGR in August 2018, raising concerns for the SGR's expansion to other regions of East Africa. The original plan called for the Kenyan section of the railway to be finished before it could be extended into Uganda (Otele, 2018).

2.7 Social environment

The Standard Gauge Railway (SGR), which connects Mombasa and Nairobi, has the biggest effects on air, water, and soil pollution as well as the disturbance of natural processes.

The SGR project was approved after two Environmental and Social Impact Assessments were completed, however, given the evidence of widespread environmental damage in the region, scientists are sceptical about how well the suggestions were incorporated into the development (Science Daily, 2021).

2.8 Economy

Kenya is the East African continent's commercial, financial, and transportation centre. For the past ten years, Kenya's real GDP growth has averaged around 5%. Kenya has been classified as a lower middle-income country by the World Bank since 2014 when its per capita GDP exceeded a certain level. Kenya's economic progress has been hampered by poor administration and corruption, despite the country's expanding entrepreneurial middle class and stable growth. Despite precise figures being difficult to come by, levels of unemployment are amazingly high, maybe approaching 40% of the population (World Bank, 2014).

Kenya needed to strengthen its yearly growth rate so that it may truly address unemployment and poverty continue to be hampered by inadequate infrastructure. External investment for infrastructure development has been successfully courted by the KENYATTA administration. Kenya's growth and development are still dependent on international financial institutions and sponsors, but the country has also been important in increasing funds through the global bond market, with its first debt securities offering in mid-2014 and a second in February 2018 (World Bank, 2014).

3 METHOD

Comparing qualitative methods to quantitative research methods shows a diverse approach to academic study. Despite having comparable methods, qualitative approaches use written and visual data, have special steps for data analysis and use a variety of designs. One of the requirements for writing a methods section for a qualitative research proposal is to inform the reader about the purpose of qualitative research, discuss specific design ideas, thoughtfully consider the researcher's role in the study, gather from an ever-growing range of sources for data, follow specific protocols for recording data, analyse

the data through multiple steps of analysis, and mention methods for demonstrating the validity or accuracy of the findings (Creswell, 2015, p. 132-137).

Both methods have an evolutionary history, with quantitative methods leading social science research from the late 19th century through the middle of the 20th century. The development of mixed methods research coincided with the rise in attention in qualitative research in the second half of the 20th century (Creswell, 2015, p. 132-137).

3.1 Choice of method

The required data for this study was gathered through a semi-structured interview. Examining participant's ideas, views, and beliefs regarding The Standard Gauge Railway (SGR) allowed for the gathering of open-ended data using a qualitative method, which was relevant in this case. The questionnaires were distributed to the SGR managers, train crews, and passengers, among the 25 target groups. As a method, a qualitative approach was selected. Participating in member interviews is a type of qualitative research method that will be discussed further.

The world of concepts, beliefs, motives, goals, values, perceptions and human emotions gained with research subjects in their subjective and living circumstances is the focus of qualitative research. Qualitative research is indeed a wide phrase that encompasses a variety of research approaches with varying epistemological assumptions, which is to say, they are concerned with what can be known (Shrestha, 2021).

In that case, this method will allow us to have an important and beneficial discussion around the research question of what obstacles Kenya faces as the largest railroad transportation port in East Africa and how Kenya deals with these obstacles.

3.1.1 Questionnaire

A questionnaire's objective is to collect data from respondents by presenting a series of questions to them. These tools may include written or verbal questions and have an interview-like structure. A researcher is not always required to be present when providing

questionnaires, which can be either qualitative or quantitative and can be done online, over the phone, on paper, or in person (What Is a Questionnaire | Types of Questionnaires in Research, 2022).

3.1.2 Linkert Scale Survey

An evaluation tool for sentiments, opinions, and/or perceptions used in research investigations is a Likert Scale Survey, often known as a rating system. Respondents select from a variety of possible answers to each question or statement. For instance, common responses are Strongly agree, Agree, Neutral, Disagree, and Strongly disagree (Likert Scales: Definition, Benefits & How to Use Them | Qualtrics, 2022).

3.1.3 Population

Population is the total number of items or instances that are the focus of a study. A population is a limited or limitless number of things being considered (Etikan, Abubakar and Alkassim, 2016, p. 1).

In order to conduct this study, information from those working in both the cargo and passenger's transportation process at The Standard Gauge Railway at Mombasa and Nairobi terminus, Kenya was sought after. 25 people, both employees and passengers that were either directly or indirectly involved in freight transport were the target audience. These included general managers, crews, and passengers.

Table 2: Target population distribution

Source: Made by the author

Category	Target number	Respondent number	Percentage (%) of the target number
Managers	5	2	20
Crews	8	4	32
Passengers	12	7	48
Total	25	13	100

3.1.4 Sampling design

In statistics, sampling is a procedure or technique used to choose a representative sample of people or cases from a given population. The principles and techniques by which a subset of the population is included in the sample are referred to as sampling design (Berman, 2018).

The sample size was chosen to account for possible non-responses. For this study, a sample of respondents was selected using convenience and purposeful sampling. The sample was chosen from The Standard Gauge Railway, Kenya.

3.1.5 Sampling frame

A comprehensive list of all the eligible sampling units in the pool that can be sampled is called a sampling frame (Gentles, Charles, Ploeg, & Mckibbon, 2015).

The source material or apparatus from which a sample is taken is known as a sampling frame (Rahi, 2017).

The study's sampling frame included The Standard Gauge Railway Nairobi and Mombasa terminals. General managers, crews, and passengers were the respondents in the sample.

3.1.6 Sampling technique

Researchers use convenience sampling and purposive sampling as nonprobability sampling techniques to choose a sample of individuals or units from a community. The study employed convenience sampling and purposive sampling, where the study's company was selected based on how simple it was to visit their offices. The deliberate selection of a participant based on the participant's personal attributes is known as purposeful sampling, often referred to as probability sampling method. There are no underlying theories, or a set number of participants needed for this approach (Etikan, Abubakar and Alkassim, 2016, p. 1).

Using convenience sampling, also known as Haphazard Sampling or Accidental Sampling, members of the target population who satisfy certain practical requirements, such as ease of access, geographic proximity, availability at a particular time, or a willingness to participate, are included for the purpose of the study (Etikan, Abubakar and Alkassim, 2016, p. 1).

These two methods were appropriate for the study since there was a known concentration of people with the necessary characteristics who could contribute to the pertinent research and because the participants were willing to share their knowledge or experience in this field. In order to conserve resources, the Headquarters of The Standard Gauge Railways was chosen for the sample because it was administratively or physically closer to the researcher.

3.1.7 Sample size

The number of persons in the sample was obtained using Yamane's formula (Dykstra, 1967, p. 702). Using the sample size method with a 5% error and a 95% success rate, 25 people were discovered out of a total population of 27, according to the calculations. Using Yamane's formula, the following sample size was determined:

$$n = \frac{N}{1 + N(e)^2} \qquad \text{(Yamane, 1967)}$$

Where:

n = the sample size,
N = the population size, and
e = is the level of precision.

Figure 3: Yamane formula (Yamane, 1967)

n= N/(1+Ne^2)
n= 27/(1+27*0.05^2) = 25

Where, n = the sample size N = the size of the population e = the error of 5 percentage points. There were 25 participants, and a total of 25 questionnaires were given out, with 5 for managers, 8 for crews, and 12 for passengers.

3.2 Research approach

In this study, an interview guide and a questionnaire were used to conduct the research. This helped organize the interview questions and questionnaires and helped answer the research questions. There were two sections in the interview guide. The first section focused on semi-structured questions that were asked orally about transportation on Kenya's Standard Gauge Railway, while the second section focused on the Likert Scale Survey, which was further subdivided into the following nine sections: General information, transportation service, equipment, marketing, customer care, service support, freight loss and damage, e-commerce, and overall, which the respondents were given the opportunity to fill out on their own, see Appendix 2. Likert Scale Survey. The interview was scheduled for two different days and locations. The passengers were interviewed on the first day in Mombasa, while the managers and crews were interviewed on the second day in Nairobi, Kenya's capital city.

3.3 Respondents

Based on Kenya's Standard Gauge Railway, the choice of my respondents was made based on the level of knowledge that the employees have. The decision of the respondents was analysed based on the results of this thesis. The respondents for this thesis are 13, one of them being the business commercial and operation expert, team leader for Kenya's Standard Gauge Railway and the second respondent being the train crew instructor.

There are presently few Chinese employees at Kenya's SGR, but their numbers have decreased, with only a few experienced staff of critical sectors remaining, such as engineers and ICT experts in the control room (Otieno, 2017).

The researcher was in contact with the respondents mostly through email and did the interview at the Headquarters in Nairobi, Kenya while visiting the country.

3.4 Interview guide

The semi-structured interview will be the focus of this thesis. This structure is a technique for gathering data that involves making statements inside a predefined theme framework. The questions, therefore, are not in any particular order or format see Appendix 1.

Semi-structured interviews in research are frequently qualitative. In business, social science, survey methodology, as well as other fields of study, they are commonly used as an exploratory tool. They're particularly common in field research with a large number of interviewers because they provide all with the same theoretical framework while enabling them to look into different aspects of the research issue (George, 2022).

Semi-structured interviews are defined by theme guidelines that contain significant questions which are used in the similar method throughout every interview, though the order of the topics and the level of information searched by the interviewer that may change. When the researcher already has a good understanding of what's going on in the sample in terms of the research topic, semi-structured interviewing is a good option (Morgan, 2016).

3.5 Analysis of the data

The researcher reviewed the questionnaire in close consultations with the supervisor. This was followed by the researcher submitting the research proposal and the research questionnaire to the supervisor for approval. After approval from the supervisor, the researcher was given a letter of approval with the necessary authorization to carry out the study, the researcher first wrote emails attaching the formal request letter from the university and the questionnaire to The Standard Gauge Railway's Headquarters to seek permission to use the company as the target population. The researcher requested permission from the company's management before approaching the employees. The general managers, crews, and the passengers received the questionnaires from the researcher and provided input.

3.5.1 Data analysis method

Descriptive statistics were mostly used in the data analysis. The researcher cleaned, edited, and coded the data to guarantee organization, clarity, consistency, and error reduction. Microsoft Office Excel will be used for the data preparation, analysis, and statistical calculations, which will combine both inferential and descriptive statistics. In those, the mean and percentages will be presented. Following data analysis, the researcher will compare the data gathered and reach a clear conclusion using tables, frequencies, and percentages. The data from the outcomes of this study will be presented in tables and figures. The data will be analyzed using the SWOT and PESTEL frameworks once the researcher has gathered it all from the various study methods.

3.5.2 PESTEL analysis

PESTEL analysis is a framework for strategy that evaluates a company's external environment by breaking down opportunities and challenges into Political, Economic, Social, Technological, Environmental, and Legal aspects. When developing a company strategy, PESTEL Analysis is a helpful technique for assessing the advantages and disadvantages of a business plan. The PESTEL framework is a variant of the PEST strategic plan that also takes into account potential environmental and legal factors that could have an impact on a corporation (Peterdy, 2022).

3.5.3 SWOT analysis

A framework for evaluating a company's worth and creating strategic plans is the SWOT analysis (strengths, weaknesses, opportunities, and threats). In a SWOT analysis, internal and external factors, current and potential future outcomes are all assessed. It is meant to make it possible to assess the strengths and weaknesses of a company, project, or sector using accurate, factual information (Kenton, 2022).

3.6 Validity and reliability

Research's quality is assessed using the concepts' reliability and validity. They describe the accuracy with which a method, approach, or assessment which is made about

something. Consistency is referred to as reliability (or accuracy). That is, if you use equipment or test multiple times, the findings should be consistent. If the data is inaccurate, it is assumed that the data is not related to the occurrence or idea being measured. As a reason, the results cannot be replicated. Validity refers specifically to whether or not a test or tool is evaluating what it claims to be assessing. Internal and external validity are commonly used in evaluations. Internal validity relates to how well a tool (or an analysis) answers the questions it promises to deliver regarding the subject under investigation (Hategan, 2020).

Overall, the researcher will be using and focusing on reliability research in this study, which we will return to in chapter 5, when we analyse discussion of method.

3.7 Ethical issues

Ethical issues are a collection of principles that guide the design and implementation of research projects. When gathering data from people, scientists and researchers must always abide by a set of ethical principles. (Bhandari, 2022).

The researcher inquired from the customer care desk at The Standard Gauge Railway in Mombasa terminus on the procedure of conducting the research at the company. The researcher was directed to write an email again to the top management employees requesting to interview some participants regarding the thesis title. The researcher was given permission to conduct on any participant in the station with exception of the managerial interview who was directed to the General Manager in Nairobi city at the headquarters.

4 RESULTS

The study's findings and outcomes from the field data are presented in this chapter. The study's goal was to investigate and determine East Africa's largest railroad transportation challenges and solutions through a case study in Kenya Standard Gauge Railway. It begins with general information about railroad transportation, then focuses on the railway

in Kenya, followed by the challenges facing railroad transportation in Kenya, as well as the perceptions of The Standard Gauge Railway (SGR) on other modes of transportation. This chapter examines in detail the main challenges facing SGR Kenya, as well as potential solutions extracted from the respondents.

4.1 The main challenge that SGR faces as the primary railroad transportation company

As stated in the problem statement in Chapter 1.1, SGR has a problem with how to fill the gap of the last mileage, this means that the customers still use trucks to transport their goods to their final destination. Ninety-eight percent of the respondents agreed that SGR end terminals at both Nairobi and Mombasa are far away from the Central Business District (CBD). This makes the passengers use extra means, such as buses and taxis to the CBD. Other challenges have been discussed according to the respondents' questionnaire analysis.

4.2 Interview 1.: James Siele

The Standard Gauge Railway (SGR) project was to be the biggest transportation service in East African Countries (EAC). The transportation of cargo was anticipated to be smooth and uninterrupted when moving from one country to another. The agreement of each EAC country to construct SGR according to the agreed plan is yet to be implemented in other countries, yet Kenya is almost completing its part. This was to reduce the transportation cost of goods imported from other countries and to improve the EAC economy.

According to James Siele who is in charge of operations and business in the Kenya railways, both at the SGR and the Meter Gauge Railway (MGR), countries such as Uganda are still connected with Kenya on the old MGR lines. Kenya has constructed an interchange terminal between SGR and MGR. This allows cargo to be transferred smoothly to its destination without much disruption. Siele added that although the old MGR is slower and a lot of time is wasted at the interchange terminal, it is still the best option for most customers compared to road transport.

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Most developing countries still have the problem of the last mile connection of the rail network. This forces the customers to use other means of transportation to their destination (Veraart, 2011, p. 62).

This is also the distinctive problem with SGR Kenya. According to James Siele, although SGR is cheap, faster and safe when transporting cargo, it does not take the cargo to its final destination. This is the part where the road transporters take advantage in the transportation of goods. For instance, transporting goods from Mombasa to ICD Nairobi, which is around 470 km away, SGR charges US$500 per container but the trucks charge USD250 for transporting it from the terminals to the industrial areas within Nairobi which is barely 10 km away. This becomes more expensive compared to road transportation.

During the plan by the previous government to construct a modern railway system, the train engine was to be powered by electricity, an agreement was made between KETRACO and the KRC before the start of the project (Ketraco, 2020).

Kenyans complained about the expensive project in which the engines are powered by diesel instead of electricity. When James Siele was asked why the trains are powered by diesel but not electricity, he responded by saying that the government decided to opt for diesel engines since the generated electricity is still not enough to light up the entire country. He added that the use of an electricity-generated engine will take time to be implemented since it will require a complete change of the train system which is quite expensive. SGR is considered to be the most effective when it comes to the energy used compared to the capacity it carries. This comes to an agreement (Cowie, 2010, p. 290-292).

Siele says they were earlier planned for one train per day, but the demand has raised, and they are working with three trains per day to and from Mombasa and Nairobi. They are planning to add twenty more coaches to meet this demand.

SWOT analysis		
Interviewer 1. James Siele	**Strengths**	**Opportunities**
Political **Economic** **Social**	• Funds from the government • Reduced the transportation cost • Development along the SGR route • Entrepreneurship opportunities • Regional growth • Development of economic corridor-LAPSSET (Lamu Port-South Sudan-Ethiopia-Transport)	• Improves business within the East African Countries since Kenya is the entry point for the landlocked countries in EAC • SGR has reduced the transportation cost by over 55% per ton per kilometre • SGR will have a big impact on how land is used and encourage development in the places it passes through. This will attract human settlement and traders • The creation of economic corridors will promote regional cooperation and international trade. The new Mombasa port container terminal and ICD will result in better cargo handling and port efficiency
Technology **Environmental** **Legal**	• The use of hybrid engine on SGR trains • Advancement in technology innovation (social media, artificial intelligence) • Green and blue economy • Change in international Trade Policies/ Laws	• This discharges less carbon into the atmosphere than the many trucks that could have been used to transport the cargo, all of which rely entirely on diesel engines • In the coming years, there will be inclusive trade growth. For example, artificial intelligence and machine learning can be used to optimize trade shipping routes, manage truck and vessel traffic at ports, translate search queries from one language to another, and return translated inventory in response • Trade opportunities in green economies across the country can help the economy grow. Countries will take part in the development of standards, certification, and the marketing of eco-friendly goods and services. This will help with trade and economic diversification • Bilateral and Reginal trade agreements (RTAs) is now much more common, and a considerable share of the world's states have signed up the agreement

Figure 4: Strengths and Opportunities in SGR

Source: James Siele

SWOT analysis		
Interviewer 1. James Siele	**Weaknesses**	**Threats**
Political **Economic** **Social**	• Change of Government policies/ Presidential directives • Economic stabilities • Social activism	• The operation of the SGR may be impacted as a result of the new Kenyan president's order for the cargo to be cleared for return to Mombasa from the dry ports in Nairobi and Naivasha. • Economic growth expectations that are not realized, as well as weak private sector investment, may slow growth in the near future. As a result, import and export businesses may suffer. • Globally, social activism is growing rapidly. It could try to prevent changes to laws or administrative processes affecting SGR management.
Technology **Environmental** **Legal**	• Rapid change of technology • Environmental damage • Legal framework	• Given the rapid evolution of computer, phone, and network technologies, the agency's IT systems and infrastructure face the risk of becoming obsolete. The high costs of the latest single windows system for SGR program improvement and the upgrading of redundant primary and secondary sites may have a negative impact on the agency's economic stability. • SGR construction has caused more soil erosion and habitat destruction. • The effective legal and regulatory framework on SGR could hinder the agency's ability to carry out its mission effectively

Figure 5: Weaknesses and Threats in SGR

Source: James Siele

4.3 Interview 2.: Wycliffe Otoki Mwangi

My second interview was with Wycliffe Mwangi who is the instructor on the train. Our interview did not last long enough since he was in operation when the interview was taking place. Mwangi did not feel comfortable talking about the involvement of the government of Kenya in the SGR project, claiming that he is just an employee and does not know much about the situation.

The former government which was the facilitator of the SGR project has been criticised for the involvement of corruption in the project (Jognson and Sanghi, 2016).

Although Kenyans now manage 90% of Standard Gauge Railway (SGR), Mwangi strongly believes that Chinese management is far superior to Kenyan management in terms of technology and experience. Most of the customers have raised a lot of concerns

about the SGR customer care service. They take a longer time to respond to the issues and sometimes they may not be able to respond at all. Mwangi explains that they serve over 6,000 customers per day, the majority of whom have various problems that need to be handled. They are occasionally overwhelmed by the situation.

SWOT analysis		
Interviewer 2. Wycliffe Otoki Mwangi	Strengths	Opportunities
Political **Economic** **Social** **Technology** **Environmental** **Legal**	• Economic Stability • Literacy level • Installation of network towers along the SGR line • Reduced accident of the wild animals • ISO certification	• SGR raised the revenue collection of Kenya. • The majority of employees received updated training on how to use SGR equipment. • Communication network coverage in Kenya has increased • Since both the road and the SGR travel through the national park in Nairobi, Tsavo West, and Tsavo East, the SGR has been built so that animals cannot directly cross the railroad • Quality standards underpinned by ISO certification

Figure 6: Strengths and Opportunities in SGR

Source: Wycliffe Otoki Mwangi

| SWOT analysis		
Interviewer 2. Wycliffe Otoki Mwangi	Weakness	Threats
Political **Economic** **Social**	• Shifting of the cargo clearance area • Increased enmity with road transporters	• The government has reduced economic growth at SGR terminals because investors are afraid of changing cargo clearance and trying port from place to place. • Not in good relationship with other partners like Road Transport Association
Technology **Environmental** **Legal**	• High-quality technology was used. • Disruption of the wild animals in the park • Change of management policy	• Most Kenyans believe they are technologically behind • The sound and length of the SGR train scares the animals and interferes with their territories and feeding systems • Conflicting laws regulating trade, customs, licensing, and related paperwork might further obstruct the Agency's attempts to promote trade.

Figure 7: Weaknesses and Threats in SGR

Source: Wycliffe Otoki Mwangi

4.4 Questionnaire from the respondent's point of view

The perspectives of the thirteen respondents, including general managers, crew members, and passengers, will be examined in this section about some of the services provided by the SGR. To include all of the respondents in the research findings, the researcher began by asking the respondents about their gender. The researcher also asked about their age range since this may be important when determining the group age most affected by the SGR services. Level of education was also asked to determine who is more knowledgeable about the SGR services. Lastly, this chapter includes The Likert Scale Survey for different services offered by the SGR, to determine the degree to which respondents agree or disagree with a given statement.

1. Select your gender.
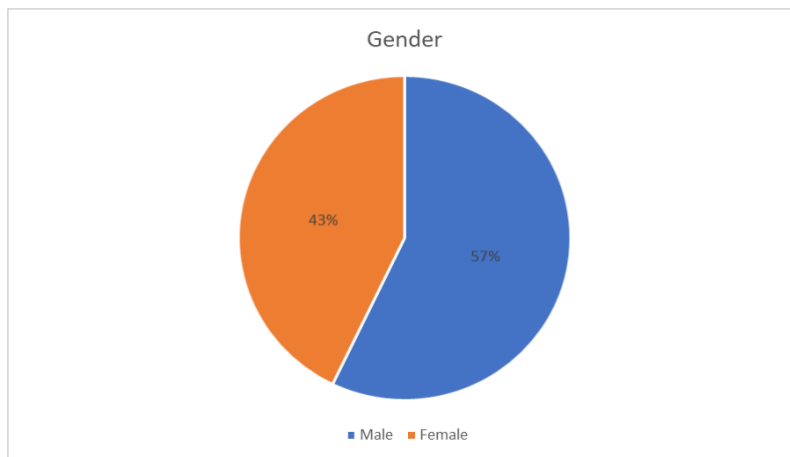
Figure 8: Gender of the respondents

Source: Made by the author

The researcher aimed to determine the gender of the respondents. Gender was important since it would show who is primarily involved in rail transport at the SGR. Figure 8. shows that both male and female respondents were fairly represented in terms of gender, with male respondents making up the majority of 57%, while female respondents made up 43%. This provided a crystal-clear demonstration of how both genders were involved throughout the project.

2. Select your age group.
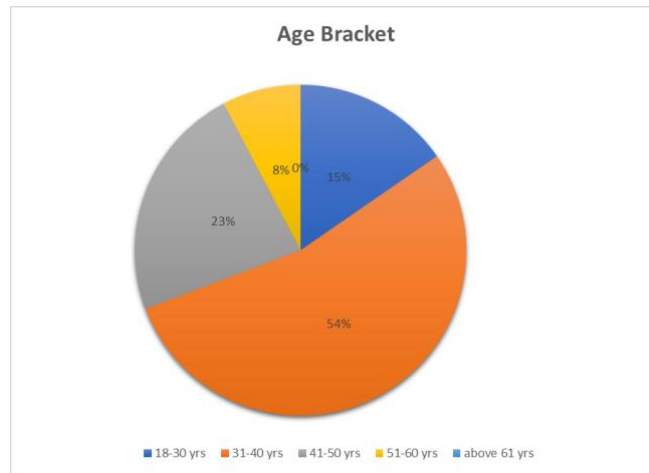
Figure 9: Age group of the respondents

Source: Made by the author

The respondents were asked to identify their age categories in order to determine their ages. The research revealed that 23% of respondents were between the ages of 41 and 50, 54% of respondents were between the ages of 31 and 40, 15% of the participants were between the ages of 18 and 30, 8% were between the ages of 51 and 60, and none were over the age of 61. Figure 9 demonstrates that the majority of participants were of a normal age and, as a result, had sufficient knowledge of the topic at hand.

3. State your highest completed education level.
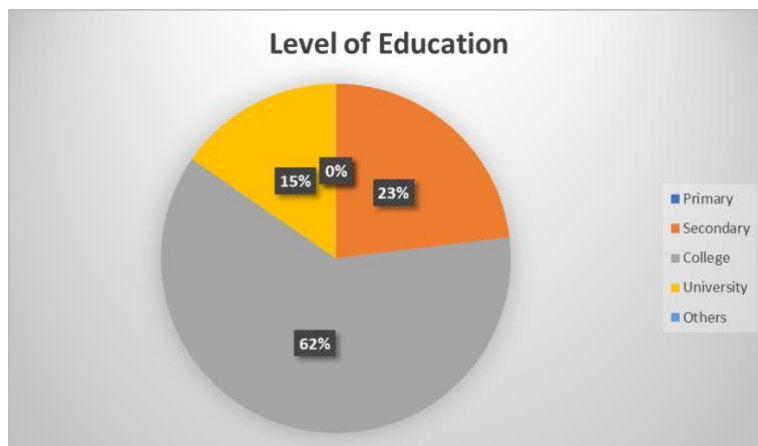
Figure 10: Level of education

Source: Made by the author

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Finding out the respondents' level of education was the main objective of the study in this section. This was important since it would show how familiar the respondents were with The Standard Gauge Railway. According to the chart in Figure 10., 62% of the total went to college as their highest level of education, followed by 15% who went to university, 23% who went to secondary school, and none were uneducated. This demonstrates that the majority of respondents have the necessary knowledge and intelligence to comprehend the railway project's steps and components.

4. Position in the company.
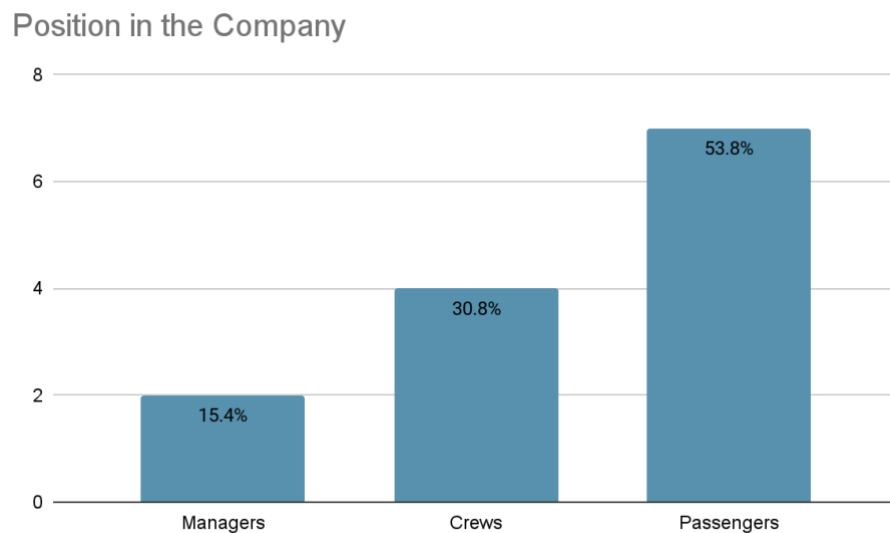
Figure 11: Position in the company

Source: Made by the author

The study sought to comprehend the employees' position in the company. According to the study's findings, the percentage of employees was as follows: Managers were represented by 15.4% of the total, followed by crews 30.8%, and passengers 53.8%. Figure 11. represents the study's findings on the position in the firm.

5. The Likert Scale Analysis

The study's aim was to determine the challenges that Kenya faces in managing The Standard Gauge Railway (SGR). The Likert Scale was used in the study to evaluate the magnitude of the construct being measured. The scale was as follows: very satisfied, somewhat satisfied, neutral, somewhat dissatisfied, very dissatisfied, and don't know/not applicable. The respondents were asked to evaluate how much they agreed with various transportation service claims, and the results were analyzed as follows:
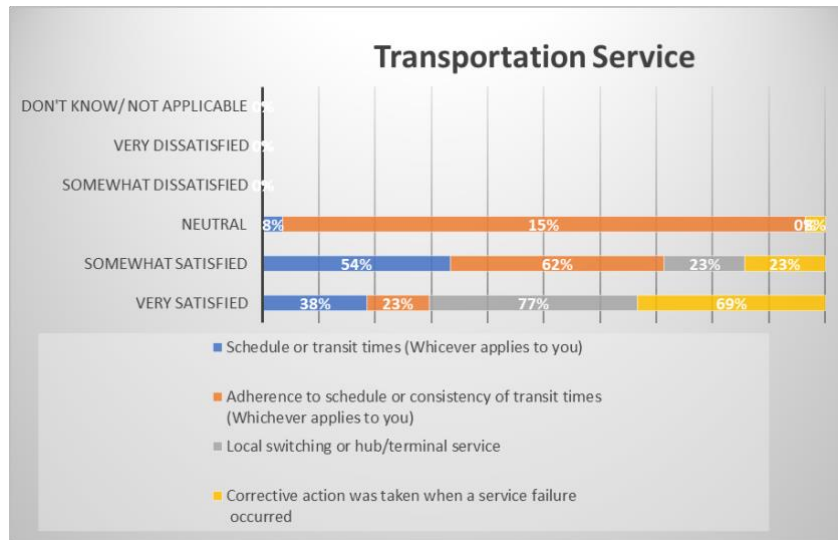
Figure 12: Transportation service

Source: Made by the author

Figure 12 shows that 54% of respondents are satisfied that the SGR complies to the schedule or transit time, 77% strongly agree that the SGR provides satisfactory local switching/terminal services, and 69% are very satisfied with the corrective action taken when a service failure occurs. The majority of employees, such as train crews and managers, were pleased with the transportation services. This could be because they interact with the services that are frequently provided to passengers.

Figure 13: Equipment

Source: Made by the author

Figure 13. illustrates the average satisfaction of SGR employees with the equipment provided by the company for maintenance and repair. Although 8% are dissatisfied with how the equipment ordering process is carried out. It takes some time, and there are some mistrust issues with the procurement office.
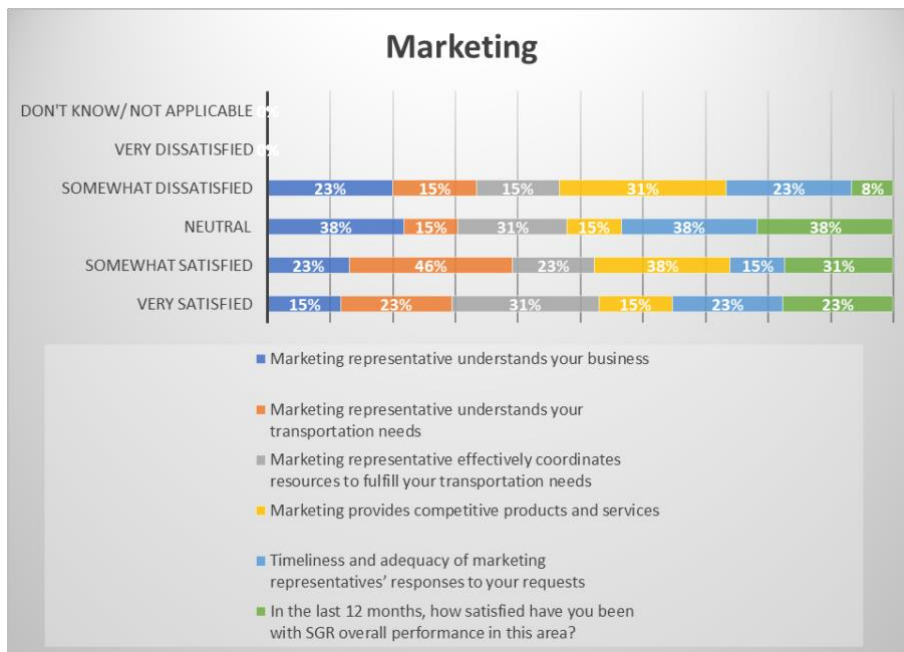
Figure 14: Marketing

Source: Made by the author

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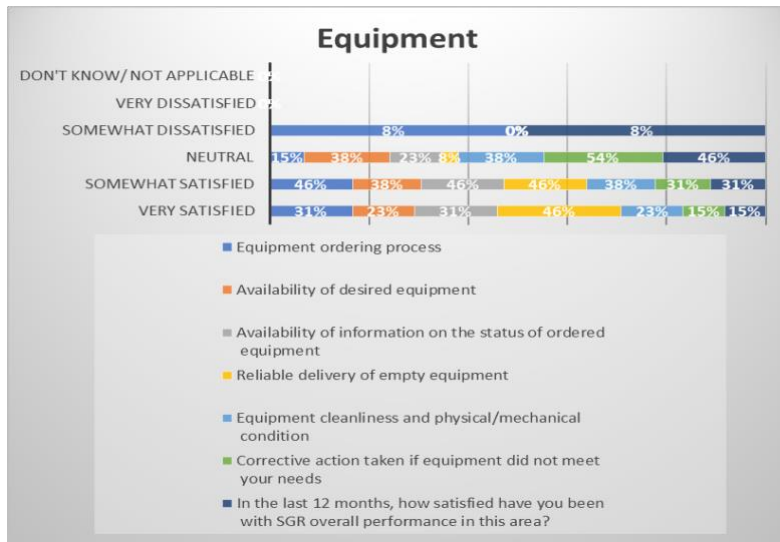According to this chart, only 15% of the marketing team understands their tasks very well. 46% of employees and customers are pleased with how the marketing team comprehends their transportation needs. An average of 28% of respondents agree that the marketing department effectively coordinates resources to meet their transportation needs. This means that the SGR company must engage its marketing team by providing them with the necessary training and tools to complete their tasks.
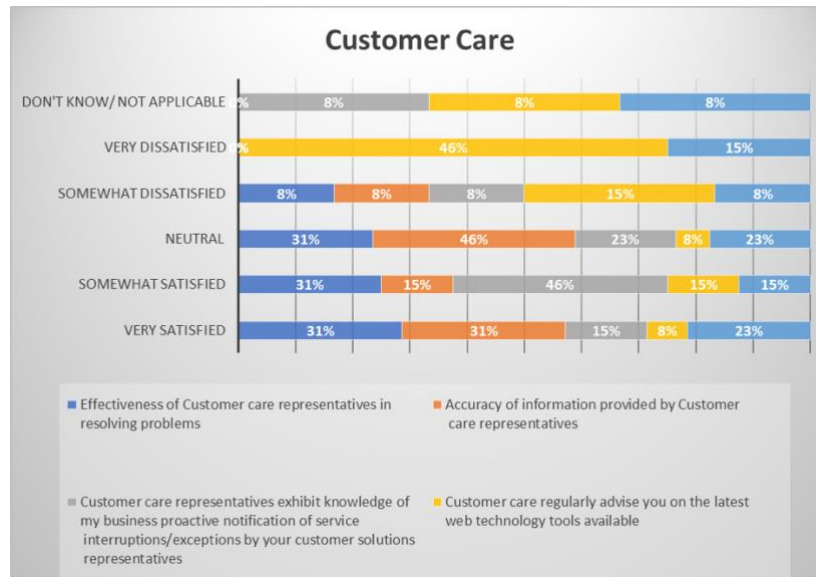
Figure 15: Customer service chart
Source: Made by the author

Figure 15. demonstrates that, on average, only 20% of respondents feel that customer service representative's responses to problems are effective. 30% of people on average report that they have never received a briefing on the most recent technology tools that are accessible to them. This is because the self-ticket printing devices can take a long time to reply to a request. The data also reveals that there aren't many customer service members available, which is a problem when there's a strong demand for transportation.
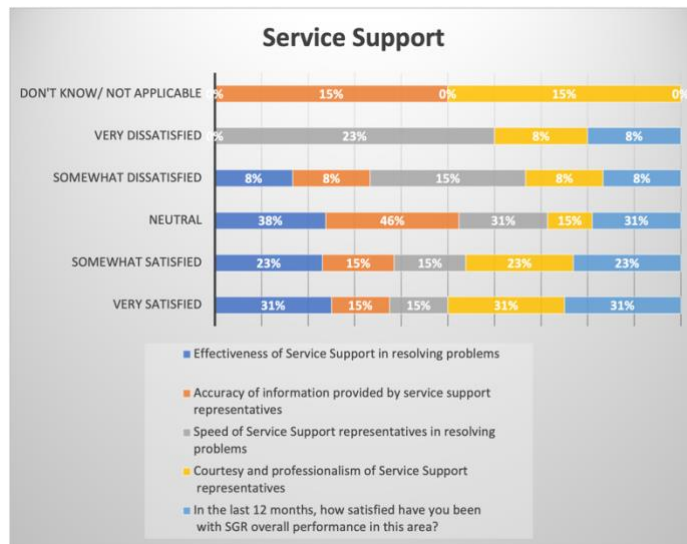
Figure 16: Service Support

Source: Made by the author

Under the collection designed to efficiently manage the operation of SGR services, 31% of respondents were very satisfied with the effectiveness of service support in resolving a problem, while 8% were dissatisfied. Only 15% agreed with the accuracy provided by service support representatives, with 46% neutral and 15% unsure. According to the analysis, only the SGR's top management is responsible for providing technical service support. According to Figure 16, only 31% of respondents are very satisfied with the professionalism of service support representatives, while an average of 20% believe the representatives are not professional in their services.
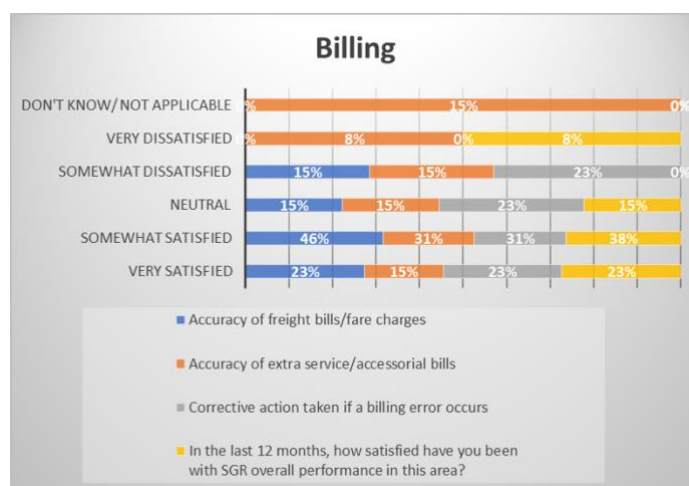
Figure 17: Purchasing the train tickets

Source: Made by the author

According to the analysis in Figure 17, most customers find it difficult to purchase a train ticket in cash when they are about to travel because the train is usually fully booked by that time. Since most customers do not know how to access and use the SGR ticket booking system, they find it difficult to use the SGR booking system in general.

The analysis also shows that even with the availability of the unstructured supplementary service data (USSD) code for those without smartphones, it is still difficult to use. The analysis also reveals that the ticket printing machines available at the terminals sometimes take a long time to respond to the command, causing some customers to be left behind by the train.
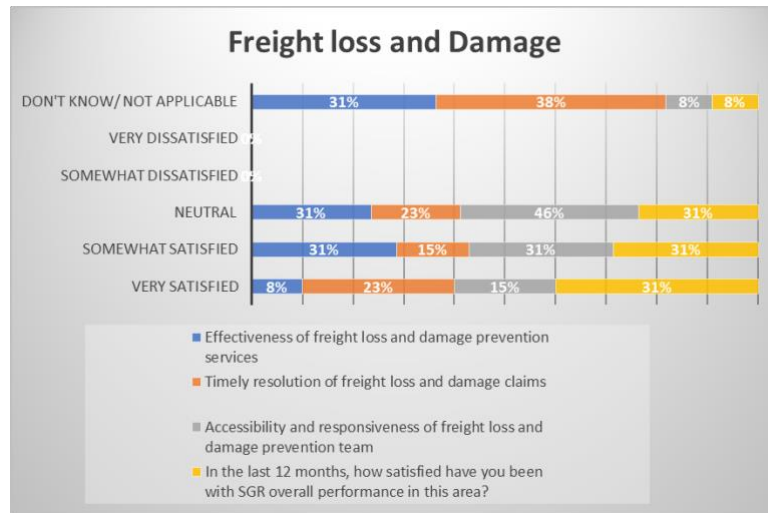
Figure 18: Freight loss and damages
Source: Made by the author

According to the analysis, an average of 40% of respondents believe that SGR is the most effective mode of transportation when it comes to freight loss and damage, while 30% are unaware of it since they are not in the freight services. According to the research, the freight loss and damage team is easily approachable and resolves issues in a timely manner, as shown in Figure 18.
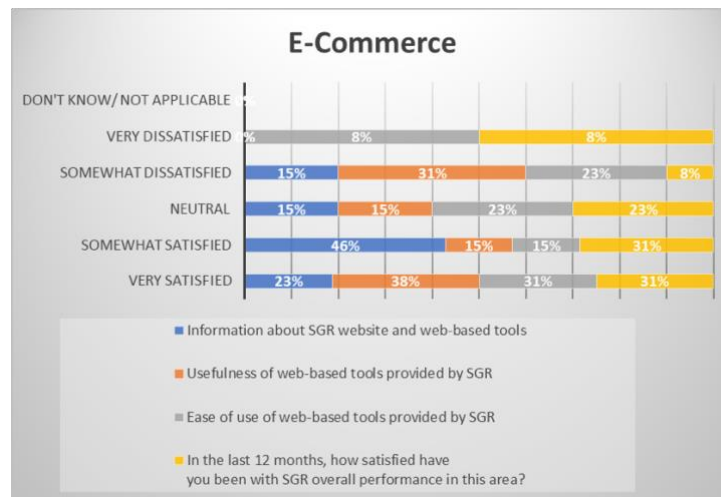
Figure 19: E-Commerce chart

Source: Made by the author

Figure 19 shows that the SGR company does not represent their service information on social media platforms other than its website. As a result, the SGR details don't really reach the required number of customers. The study also shows that it allows misconceptions and misunderstandings about SGR in the community to spread throughout the country. Despite all of the unsatisfactory responses from the respondents, the majority of them prefer the SGR to road transportation services since it's safer and more convenient.

5 DISCUSSION

The aim of the study was to determine the challenges and solutions on Kenyan's largest railroad transportation, The Standard Gauge Railway (SGR). The chapter entails both the discussion of the results and the method.

5.1 Discussion of results

Kenya's government has been a strong supporter of the SGR project throughout its planning, construction, and now operation. However, the SGR is still struggling to establish itself in the transportation service industry. Apart from being the fastest, safest, and cheapest mode of cargo transportation when compared to road transport, road transportation companies are not allowing them to dominate the market. The SGR's main

challenge is that it cannot reach all destinations, which allows road transporters to take advantage of the situation and charge SGR clients a high rate for transporting their cargo over a short distance. This equates to nearly the same cost as using road transportation. Mr. James Siele, one of our study's interviewees, defined this case as the most serious issue SGR is currently facing. Kenya is the primary entry point for East African landlocked countries, with imports and exports passing through the country. The Memorandum of understanding among the East African Countries (EAC) to construct the SGR and interlink the railways in each country has not been implemented.

It has been noted that the SGR still relies 100% on road transport for the last-mile solution. This makes the road transportation companies charge the customers abnormal prices to discourage them from using the SGR. It has also been noted that the East African Countries did not fulfil their MOU (Memorandum of understanding) over the construction of the SGR to interconnect the countries for easier transportation of freight. Kenya did its part while other countries within the EAC fail despite some of them being landlocked. Competitive companies are spreading myths and misconceptions about SGR. While on the other hand, the SGR has not put proper measures on their service awareness through advertisement, leaving their service to be in a bad position in the future. The SGR also needs to improve and upgrade the software and hardware of the ticket printing machine to be faster and more efficient. Despite the challenges, SGR remains to be the most preferred means of transportation on land for its safety and time management in terms of departure and arrival.

The primary issue is the bad relationship between the current government and the previous government in every EAC country. This has made many mega projects launched by the previous government stack due to a lack of support from the present government. Since Kenya has constructed its SGR, the other EAC countries have not yet begun building the SGR as agreed.

The General Manager of the SGR and Meter Gauge Railway (MGR), James Siele, mentioned that they were obligated to construct an interchange terminal linking the SGR and the former meter gauge railway (MGR). To transport goods to other regions of the EAC countries using the MGR, which was built by the European colonists. This wastes a

lot of time while the cargo is being exchanged, and the MGR has a speed limit of 40 km/h and a low carrying capacity of 80 lb/m. The political involvement in the SGR project is another notable challenge from the study.

During the previous Jubilee government's manifesto, which implemented the SGR project, the government assured Kenyans that it would be able to launch the USD3.6 billion megaproject of electric trains. Many people complained about the costly project, which was not originally planned to be electric.

The same government was also found on the spot for an unclear project awarding tender that was full of corruption (Johnson and Sanghi, 2016).

The train is currently powered by a diesel engine, as we are discussing. According to the research, Kenya Electricity Transmission Company (Ketraco) signed an agreement contract with China Electric Power Equipment and Technology Company (CET) for the electrification of Kenya's Standard Gauge Railway from Mombasa to Nairobi (SGR). However, according to James Siele, the electricity generated in Kenya is insufficient to power both domestic use and the SGR. This simply means that there was poor planning and a hidden agenda between the awarded contractors (China Road and Bridge Corporation) and the government, as they could not have accepted the project if electricity was limited. It was stated that the current powered diesel engine could not be used to replace the project plan because it would take more time to plan the project and the construction timing. It would have also been an expensive project considering that it required a complete change of engines and other electronic tools.

The study contributes to a better understanding of the global problem of pollution caused by transportation. The large cargo capacity of one SGR train, which equates to nearly 500 trucks on the road carrying the same cargo, has reduced air pollution caused by carbon monoxide emissions in the air. Although this was supposed to be eliminated by the use of electricity, it is a step in the right direction forward into reducing environmental pollution. The government should form a task force to investigate how it intends to transform the SGR to run entirely on electricity.

In terms of branding and marketing in the SGR image, it should be higher since learning about the SGR strategic plan can change clients' misconceptions about them. To engage the younger generation, they must begin their marketing campaign on social media platforms by showcasing their sustainable projects. The SGR should also use mainstream advertising, such as billboards and TV commercials, to spread the message and improve the reputation of its brand. The theoretical section outlines the company's primary problems, which are then demonstrated in the empirical section. The ticketing and billing sections require significant improvement because all SGR passengers must pass through ticketing machine booths when printing their train tickets. According to the research, most customers find it difficult to print their tickets. They are also on the slower side when many customers request their tickets to be printed. The SGR system must be upgraded to be faster and more interactive. When printing the tickets, they also need to start using a user-friendly Graphical User Interface (GUI) and a few commands.

Throughout the study, the main challenges and problems have been highlighted, as well as their potential solutions, such as the purchase of SGR trucks to close the gap of the last mileage transportation of cargo, the use of appropriate technology and user friendly to the customers, the improvement of the company's market and branding, and the creation of a good relationship among the EAC countries in the near future. The main issue is still the current political status of the SGR, as the new government's first directive was to issue an executive order to revert the operation back to Mombasa, which was contrary to the previous government.

5.2 Discussion of method

The method used to collect the data for this thesis worked as expected. The researcher collected data through both interviews and questionnaires. The questionnaire method worked perfectly as planned since all of the questions were answered by the respondents. When the questionnaires were given to the individuals, there were no issues. The only problem was that 48% of the total questionnaire administered to the target sample size did not respond. It was noted that most of the target individuals were unwilling to answer some questions due to the information being too sensitive for them to respond. The

researcher also came to realise that other employees were new in the station and in that case some of the questionnaires were not answered.

The interview method was also used by the researcher. This method worked well since most detailed data was gathered through interviews with respondents. Although some of them were afraid to answer some of the more sensitive parts of the questionnaire, they answered most of the questions thoroughly. The researcher felt that the methods used in this research were the best and that no other method could have worked in comparison to those used.

The researcher relied entirely on the data collected, which was cleaned, analysed, and drawn conclusions without administering any new data along the way. From both the questionnaire and the interview, the researcher finds out that the data collected were valid and reliable since the consistency of the data was obtained from both methods. This shows that both the method used were trustworthy.

6 CONCLUSIONS

The purpose of this study was to determine the challenges and solutions on Kenyan's largest railroad transportation, The Standard Gauge Railway (SGR). This chapter draws conclusions based on the research questions, limitations of the study and suggestions for further studies. The research questions for this study were: What are the challenges that Kenya faces in managing the Standard Gauge Railway (SGR), as the largest railroad transportation in East Africa? and how does Kenya deal with these obstacles?

According to the study's findings, SGR's customer service has not improved; as a result, they must broaden their marketing strategies to ensure their success in the transportation services sector, including the establishment of a strong customer-care department to handle client complaints. They must also implement customer follow-up, which will increase client satisfaction with how SGR, as a transport and logistics company, should be regarded in terms of service quality.

Concerning the issue of last-mile coverage, the study suggests that SGR management should consider purchasing their own trucks in the future to assure their clients that the cargo will be handled primarily by them to the final destination. This suggestion, however, may cause confusion among Kenyans who have worked and invested in transportation services. Many people will lose their jobs, raising Kenya's unemployment rate. This is the gap that the next researcher can fill if the current government can reach an agreement with the SGR management. Since the current government reinstated cargo clearance from Naivasha dry port to Mombasa Island, clients have had the opportunity to select their preferred mode of transportation from Mombasa to their destination. Previously, they were required to take the SGR from Mombasa to Nairobi. To be seen as genuine market competition, SGR management should now take advantage of this opportunity to introduce their own trucks, which will be used to transport goods from the SGR terminal to the final destination.

Disagreements among African leaders should not have an impact on projects that benefit the country's citizens. The SGR project has the potential to reduce transportation costs while increasing revenue in EAC countries. According to the study, SGR should not be used as a political battleground. SGR must develop a policy that protects it from the direct influence of political parties' agendas. The new government's executive order to revert cargo clearance from the Nairobi and Naivasha ICD has dragged the SGR's vision and mission backwards.

6.1 Limitations of the study

Due to the researcher's limited time in Kenya, they did not have enough time to contact and analyze a larger sample size of the population. The more accurate the result, the larger the sample size, and vice versa. Another limitation of this study is the selection of a particular manager to answer all of the questions. The manager in Mombasa whom the researcher initially approached could not answer their research questions since he stated that the study was beyond his comprehension. He directed the researcher to the Nairobi regional manager.

The language barrier was another notable limitation. The majority of the respondents were willing to provide sufficient information, but due to the language barrier, the researcher relied on those who could speak English. The researcher was also obligated to continue the research further in Nairobi as those in Mombasa were unable to provide some information to a foreigner or a university student who did not hold the country's citizenship or who was not a dual citizen.

6.2 Suggestions for further studies

The aim of the study was to determine the challenges and solutions on Kenyan's largest railroad transportation, The Standard Gauge Railway (SGR). The study suggests further research into how the SGR will strategize after the government relocates most of its services from Nairobi and Naivasha ICD to Mombasa Island. The study can also look at how SGR will survive in the market after its monopoly on cargo transportation to Nairobi and Naivasha ends.

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APPENDIX 1. QUESTIONNAIRE

Questions for the managers, train crew and the passengers

Creator: Nawal Sabrie

Managers questions SGR

1. Could you tell us a little background of your role in the company?
2. What are some of your daily responsibilities as an SGR employee?
3. Could you kindly describe and tell us about your organisations working culture?
4. What challenges does SGR face as East Africa's largest railroad transportation port?
5. What is SGR's strategy for overcoming these challenges?
6. What do you think SGR will be like in the next five years as the largest railroad transportation hub in East Africa?
7. On the 25th of January 2018, the Kenya Electricity Transmission Company Limited (KETRACO) and China Electric Power Equipment and Technology Company Limited (CET) signed a contract with the SGR rail line, which is now powered by diesel to be electrified as a result of this deal. Have the trains been switched to clean energy power sources or not? If not, could you please tell us the challenges that have been faced to derail the initiative? If yes, could you kindly share some examples of this project?
8. What are the challenges that have been faced in the handling of the passengers/booking systems in SGR?
9. Could you also share the challenges for rail freight transportation?
10. What are the solutions you have for both of the challenges?
11. Approximately, how many people use the SGR train daily?
12. Are there any difficulties in transporting delicate cargo while transporting goods?
13. Is it likely that the number of logistic/cargo businesses using rail freight transportation (SGR) will increase in the future since it is popular at the moment?
14. Are there any competitions that you are facing from the other means of transport, like roads?
15. Would you like to add your thoughts and opinion on this topic?

16. Anything else to add?

Train crew SGR questions

17. Could you tell us a little background of your role in the company?
18. What are some of your day-to-day responsibilities as an SGR employee?
19. Have there been cases of misunderstanding with the passengers?
20. As a train crew of SGR, are you trained locally in Kenya or by the Chinese?
21. How do you communicate with the Chinese managers since most of you are Kenyans and have not learned Chinese yet?
22. The government had plans to introduce Chinese in the school curriculum; do you think the SGR is the main reason for this?
23. How many people on average use the SGR on a single day?
24. How do you rate Chinese management?
25. Do you think a Kenyan company could manage this better than the Chinese?
26. How is misunderstanding handled between; a) You and your managers b) You and your passengers.
27. Would you like to add your thoughts and opinion on this topic?
28. Anything else to add?

Passengers' questions

29. Are you comfortable with the fare charges by the SGR?
30. How many ways do you know how to purchase the ticket? Which one do you prefer to use?
31. Are you comfortable with the current train schedules? What are your preferences?
32. Are you comfortable with the time taken by the train to reach your destination?
33. How comfortable is the train coach?
34. What can you say about the security at the terminal and the coach?
35. Are there enough printing booths in the stations?
36. What can you say about the accessibility of the station from the Central Business District (CBD)?
37. Are you comfortable with the transportation services connecting the Mombasa terminal and another transportation mode?
38. Have you ever missed a train? What made you miss it?
39. Have you ever cancelled your trip? If so, did they refund you for the same?

APPENDIX 2. LIKERT SCALE SURVEY

Linkert Scale Survey

Train Crew/Instructor and the General Manager at The Standard Gauge Railway (SGR)

Creator: Nawal Sabrie

SECTION A: GENERAL INFORMATION (*mark as appropriate in the box provided*)

1. Select your appropriate gender

   Male ☐   Female ☐

2. Select your age bracket

   18-30 y/o ☐   31-40 y/o ☐   41-50 y/o ☐

   51-60 y/o ☐   above 61 y/o ☐

3. State your highest education level

Primary	
Secondary	
College	
University (Bachelor's Degree)	
University (Master's Degree)	
Other (specify)	

SECTION B: TRANSPORTATION SERVICE (*mark as appropriate in the box provided*)

1. How satisfied have you been in the last 12 months with each of the following?

	Very Satisfied	Somewhat Satisfied	Neutral	Somewhat Dissatisfied	Very Dissatisfied	Don't Know / Not Applicable

Schedule or Transit times (Whichever applies to you)						
Adherence to schedule or Consistency of transit times (Whichever applies to you)						
Local switching or hub/terminal service						
Corrective action was taken when a service failure occurred						

SECTION C: Equipment *(mark as appropriate in the box provided)*

2. How satisfied have you been in the last 12 months with each of the following?
Complete this section IF YOU USE EQUIPMENT SUPPLIED BY THE SGR.

	Very Satisfied	Somewhat Satisfied	Neutral	Somewhat Dissatisfied	Very Dissatisfied	Don't Know / Not Applicable
Equipment ordering process						
Availability of desired equipment						
Availability of information on the status of ordered equipment						
Reliable delivery of empty equipment						
Equipment cleanliness and						

physical/mechanical condition						
Corrective action taken if equipment did not meet your needs						
In the last 12 months, how satisfied have you been with SGR overall performance in this area?						

SECTION D: Marketing *(mark as appropriate in the box provided)*

3. How satisfied have you been in the last 12 months with each of the following?

	Very Satisfied	**Somewhat Satisfied**	**Neutral**	**Somewhat Dissatisfied**	**Very Dissatisfied**	**Don't Know / Not Applicable**
Marketing representative understands your business						
Marketing representative understands your transportation needs						
Marketing representative effectively coordinates resources to fulfill your transportation needs						
Marketing provides competitive products and services						
Timeliness and adequacy of						

marketing representatives' responses to your requests						
In the last 12 months, how satisfied have you been with SGR overall performance in this area?						

SECTION E: Customer Care *(mark as appropriate in the box provided)*

4. SGR Customer Care Department is the customer contact for issues and inquiries concerning railroad status, service commitments and logistic solutions. How satisfied have you been in the last 12 months with each of the following?

	Very Satisfied	Somewhat Satisfied	Neutral	Somewhat Dissatisfied	Very Dissatisfied	Don't Know / Not Applicable
Effectiveness of customer care representatives in resolving problems						
Accuracy of information provided by customer care representatives						
Customer care representatives exhibit knowledge of my business proactive notification of service interruptions/exceptions by your customer solutions representatives						
Customer care regularly advise you on the latest web technology tools available						
In the last 12 months, how satisfied have you been with SGR overall						

	Very Satisfied	Somewhat Satisfied	Neutral	Somewhat Dissatisfied	Very Dissatisfied	Don't Know / Not Applicable
performance in this area?						

SECTION F: Service Support *(mark as appropriate in the box provided)*

5. How satisfied have you been in the last 12 months with each of the following?

	Very Satisfied	Somewhat Satisfied	Neutral	Somewhat Dissatisfied	Very Dissatisfied	Don't Know / Not Applicable
Effectiveness of Service Support in resolving problems						
Accuracy of information provided by service support representatives						
Speed of service support representatives in resolving problems						
Courtesy and professionalism of service support representatives						
In the last 12 months, how satisfied have you been with SGR overall performance in this area?						

SECTION G: *Billing* *(mark as appropriate in the box provided)*

6. How satisfied have you been in the last 12 months with each of the following?

	Very Satisfied	Somewhat Satisfied	Neutral	Somewhat Dissatisfied	Very Dissatisfied	Don't Know /

						Not Applicable
Accuracy of freight bills/fare charges						
Accuracy of extra service/accessorial bills						
Corrective action taken if a billing error occurs						
In the last 12 months, how satisfied have you been with SGR overall performance in this area?						

SECTION H: Freight Loss and Damages *(mark as appropriate in the box provided)*

7. How satisfied have you been in the last 12 months with each of the following?

	Very Satisfied	**Somewhat Satisfied**	**Neutral**	**Somewhat Dissatisfied**	**Very Dissatisfied**	**Don't Know / Not Applicable**
Effectiveness of freight loss and damage prevention services						
Timely resolution of freight loss and damage claims						
Accessibility and responsiveness of freight loss and damage prevention team						
In the last 12 months, how satisfied have						

	Very Satisfied	Somewhat Satisfied	Neutral	Somewhat Dissatisfied	Very Dissatisfied	Don't Know / Not Applicable
you been with SGR overall performance in this area?						

SECTION I: E-Commerce *(mark as appropriate in the box provided)*

8. How satisfied have you been in the last 12 months with each of the following?

	Very Satisfied	Somewhat Satisfied	Neutral	Somewhat Dissatisfied	Very Dissatisfied	Don't Know / Not Applicable
Information about SGR website and web-based tools						
Usefulness of web-based tools provided by SGR						
Ease of use of web-based tools provided by SGR						
In the last 12 months, how satisfied have you been with SGR overall performance in this area?						

SECTION J: *Overall (mark as appropriate in the box provided)*

	Very Satisfied	Somewhat Satisfied	Neutral	Somewhat Dissatisfied	Very Dissatisfied	Don't Know / Not Applicable
Overall, how satisfied have you						

been with the SGR?					

	I would prefer to use the SGR	**SGR is slightly better than other carriers**	**SGR performance is about the same as other carriers' performance**	**SGR is slightly worse than other carriers**	**I would prefer to use another carrier if / when possible**
Compared to other rail and intermodal transportation providers, how would you rate SGR?					

APPENDIX 3. PARTICIPANT CONSENT FORM

Consent for participation in interview research

Title of study: Kenya – East Africa's Largest Railroad Transportation Port Challenges and Solutions

I voluntarily agree to take part in a study that Nawal Sabrie from Arcada University of Applied Sciences is doing. The study's objectives are to perform academic research on the challenges Kenya faces as the largest railroad transportation port in East Africa, as well as to identify and discuss some of the solutions they have proposed.

1. I grant permission for the data collected during this study to be used for this research.
2. I reviewed the study's information brief and had the opportunity to ask the researcher questions if certain points were unclear.
3. Participation entails being interviewed by the researcher, Nawal Sabrie. The interview will last approximately 45 minutes. During the interview, notes will be taken. The interview and subsequent conversation will be recorded on audio tape.
4. If you have read the information above and agree to participate in the study, please sign the consent form below by inserting today's date.

I have read and understood the information provided, and I have had the opportunity to ask questions. I am aware that my participation is entirely voluntary. I comprehend that a copy of this consent form will be provided to me. I voluntarily consent to participate in this study.

Participant's name

Participant's signature _____ _____   Date 14.07.2022

Researcher's signature _____   Date 14.07.2022