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AN UP-TO-DATE PROTAGONIST OF RAIL STRUCTURES IN EXPLOITATION OF COMMERCIAL AND INDUSTRIAL EFFICIENCY IN AN ECONOMY . A CASE STUDY OF THE NATIONAL RAILWAYS OF ZIMBABWE (NRZ) MUTARE

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Abstract

Transportation structures had been considered as a catalyst to financial improvement the world over. In Zimbabwe, special sorts of delivery modes have contributed to the social and financial improvement of the country, just like in the United States of America. The railway stratagem has been one of the main drivers of commercial productiveness and this research paper sought to set up the connection of those variables, this is the overall performance of the railway area and the economic productiveness of the country. A countries railway network system plays a very significant role in commercialization and industrial proficiency of its economy. The National Railways of Zimbabwe (NRZ) is a wholly State-Owned Enterprise (SOE) is the solitary company in the rail carrier in Zimbabwe. A case of NRZ Mutare became used to perceive the jobs the rail stratagem has performed in using and increasing commercial productiveness. Through an interchange and use of sectional surveys of (four) 4 major special largest rail corporations in the city of Mutare which are Delta Beverages, Green Motor Services (GMS), Manica Timba Boards and Mega Market, these four largest countries in city of Mutare generate 80 % of the city revenue and employ 75 % of the operational workforce in Manicaland province , were targeted as research studies . Interviews and questionnaires had been used to accumulate information, and regression evaluation became used to perceive the shape of a courting among the 2 variables. The findings had been reviewed that rail device has performed a superb position in using Zimbabwe commercial productiveness. Recommendations had been made that the railway device infrastructure with inside the USA be stepped forward and the State-Owned Enterprise to accomplice personal gamers in order that the railway delivery may be completely utilized and run successfully and effectively.

Keywords: *Modern Railway Systems, Economic development , Supply and Logistic Management, Operations Management , Business Management , delivery system.*

1. INTRODUCTION

The developing realization that delivery structures have a large position with inside the social and financial improvement of nations the world over has caused the popularity and development of the same. In his studies paper, Aldagheiri (2010) transportation have an effect on local productiveness via way of means of linking special areas and permitting alternate of products and services. In Zimbabwe, the railway device due to its fee effectiveness has been recognized as a style that is vital for growing manufacturing and enhancing accessibility. However, the Zimbabwe rail company, NRZ isn't running to its most potential and the researcher sought to perceive the connection of its overall performance and downstream corporations.

1.1 Rational of the Study

The important purpose of the look at became to perceive / examine techniques of enhancing operational overall performance and its next contributions to commercial productiveness.

1.2 Statement of the problem

The delivery system similar to many financial sports are suffering from the macro-financial overall performance of the USA. Zimbabwe's sole railway carrier company, the NRZ is presently confronted via way of means of many demanding situations which encompass running in a surrounding with excessive inflation, dwindling passenger and freight volumes, dilapidated railway infrastructure among different demanding situations. The 80/20 rule states that 80% of shipment need to be moved via way of means of railway and 20% need to be moved via way of means of street, but this isn't the case in Zimbabwe. Industries in particular delivery extensive industries which includes mining, production and agriculture had been suffering from the incapability of NRZ to transport the majority of shipment. If the railway device in Zimbabwe is to be completely utilized all the downward industries will sincerely advantage and manufacturing will significantly improve. High manufacturing will imply excessive sales via way of means of the Zimbabwean authorities. If this misnomer is left unattended then there's a danger of the NRZ remaining because of bankruptcy. However, loads has been completed within side the beyond to ensure that the railway device contributed immensely to financial improvement of the nation. The authorities supported and nonetheless helps NRZ. Despite NRZ being the most important provider of bulk for land delivery, street delivery appear to be sporting maximum of the majority loads. At its height NRZ used to transport 166 locomotives, and now it has 60 locomotives (Parliament of Zimbabwe).

1.3 Research Objectives

1. Establish cutting-edge operational overall performance of NRZ in Mutare.
2. Determine the connection among NRZ overall performance and enterprise overall performance in Mutare.
3. Identify demanding situations of NRZ.
4. To suggest techniques of enhancing rail overall performance and its contribution to commercial productiveness.

1.4 Research Questions

1. What is the cutting-edge profile/degree of overall performance of NRZ in Mutare?
2. What is the connection among NRZ overall performance and industries in Mutare?
3. What are the main demanding situations going through NRZ operational overall performance?
4. How can NRZ overall performance be stepped forward?

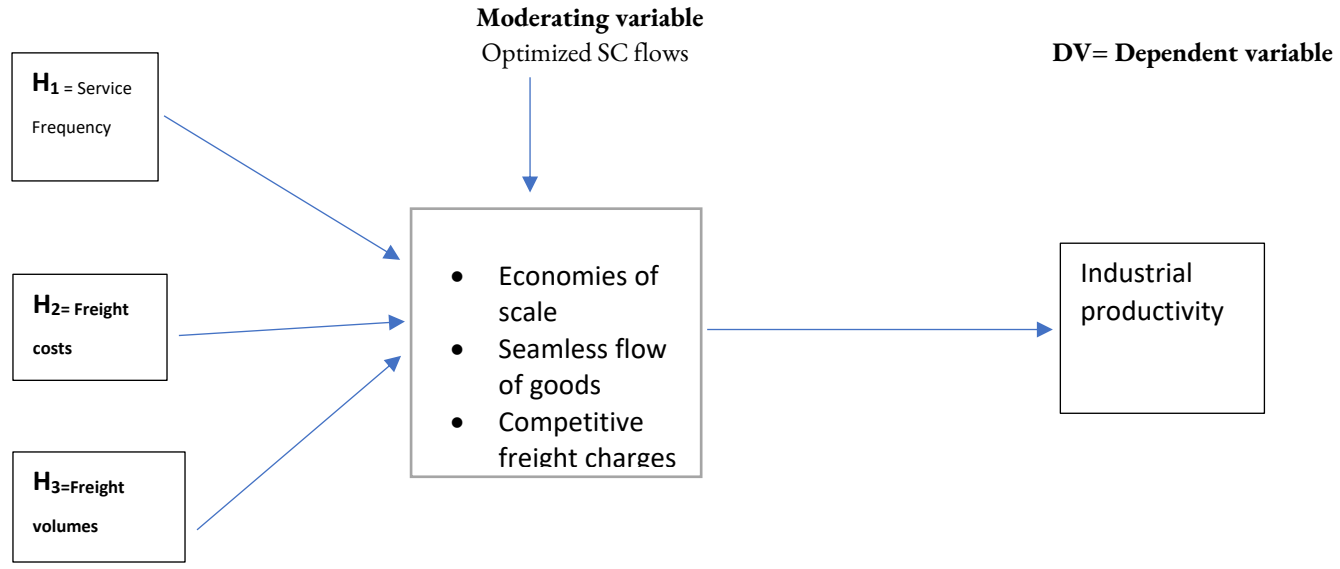
1.5 Statement of Hypothesis

This study was premised on the assumptions of the following hypothesis:

i. H_1: There is a positive relationship between rail frequency and industrial productivity.
   H_0: There is no positive relationship.
ii. H_1: There is a positive relationship between freight costs and industrial productivity.
   H_0: There is no positive relationship.
iii. H_1: There is a positive relationship between freight volumes and freight constructions.
   H_0: There is no positive relationship.

1.6 Conceptual Framework

Rail operations
IV= Independent Variable



Source: Author Construct, 2021

2. LITERATURE REVIEW

2.1 Operational Performance of Railway Systems

According to Mangan and Lalwani (2016) rail shipping's constant price are very excessive because of high-priced system necessities together with locomotives, wagons, tracks and centres together with freight terminals. However, the variable fees are exceptionally low. The trendy monetary overall performance of a rustic has an effect with inside the overall performance of railway shipping. If Zimbabwe is to have a monetary increase in its industries , its manner monetary activities together with production might need to be very low .If it's too expensive and does not have a variety of unlocked substances, semi-completed and completed items might be moved with inside the country and past the country's borders. Just like many international locations rail structures in lots of different international locations throughout the world, Zimbabwe's railway machine is monopolized through an entirely owned authorities' organization, the National Railways of Zimbabwe (NRZ). NRZ is a delegated company frame hooked up in phrases of a Zimbabwean Act of Parliament, which consequently manner that it operates according to the public region guidelines and regulations (http://nrz.co.zw). The country's railway services is an important key to organizational financial performance which is a vital position with inside the social and monetary interest of Zimbabwe and the southern African region. However, it's current running surroundings are characterized through various economic demanding and difficult VUCA business environmental situations together with stiff opposition from road shipping, growing older fleet, mismatch among staffing ranges and enterprise ranges among different demanding situations. A survey at NRZ Mutare reviewed that merchandise which might be in particular being transported through NRZ are from the agricultural, mining and production sectors.

2.2 Contributions through railway shipping to Industrial Productivity .

According to UNCTAD (2017) transportation performs a substantial position in phrases of exchange facilitation whether home or global. Transport performs a critical position and is one of the not unusual place denominator in deliver chains because it affords the critical linkage in transferring each inbound and outbound logistics (Rodriguez, 2020). Rail transportation stays the simplest land shipping mode with an excessive wearing potential as a wagon can convey as much as among 50 -one hundred tonnes of freight, this is greater than or 3 instances than that of a truck. In Zimbabwe, substances which might be being carried through teach encompass minerals together with coal, grain, chemical compounds, fertilizer, and timber among others. NRZ's enterprise includes establishments with inside the agricultural, business, mining and strength sectors which require rail offerings for the majority of motion in their inputs and outputs, domestically in addition to throughout the borders (http://nrz.co.zw).

Zimbabwe's main bulk transporter performs an important position in transporting inputs and completed merchandise for effective sectors of the economy. For instance, the Mutare –Beira-Mutare reach includes fuel, agricultural inputs together with fertilizers and chemical compounds and special uncooked substances together with timber. Waters (2003) argues that rail shipping is the maximum generally used for heavy and cumbersome hundreds over lengthy land journeys. Furthermore, trains can hold a regular common velocity and hyperlink with many modes to hold bins and bulk freight. According to Monczka (2009) rail motion is in particular in your price range for cargo of

agricultural merchandise, output from extractive industries together with coal or chemical compounds or merchandise from heavy production industries together with steel, agricultural system and automobiles.

2.3 Relationship of NRZ overall performance and Industries' overall performance of downstream companies

According to DFID (2015) the higher rail freight is managed, the larger is their contribution to improvement and ordinary network benefits. With a marked surge in call for in intake globally and necessity for excessive pace deliver chains there may be a sturdy case for funding with inside the rail region, many selection makers are eager to attract instructions from different exceptionally hit international locations (World Bank, 2015).

2.4 Challenges being confronted through railway shipping .

Railways are an easy and compact manner to transport tens of thousands and thousands of passengers and tens of thousands and thousands of tonnes of products throughout international locations and continents, but they represent a shrinkage proportion of shipping in lots of growing international locations, wherein railway carrier is frequently uncompetitive and poorly incorporated with different types of shipping (www.worldbank.org). Zimbabwe is one of the growing international locations, with its rail shipping machine being confronted through numerous demanding situations. The NRZ's growing older fleet is characterized through sluggish velocity, too many personnel and absence of reliability imply that capability customers pick out different shipping options. According to Lyons (2000) many rail networks are monopolies or oligopolies. NRZ has the monopoly to the railway machine in Zimbabwe and in keeping with the reasserts from NRZ Mutare, the State-Owned Enterprise operates an intensive rail community stretching 2760 path km. However, the infrastructure, which includes the rail community and the signalling and telecommunications system, are in terrible conditions. According to the Handbook of Logistics, Rushton et al (2010), says that a railway can convey greater passengers and freight than some other land primarily based totally machine. Nevertheless, this isn't always the case in Zimbabwe, a go to NRZ Mutare showed that there may be no passenger intercity journey at some stage in the country. There is the simplest intra town journey in Harare through NRZ, freight trains are nevertheless transferring albeit transferring constrained freight. From Mutare station, freight trains journey to Beira in Mozambique in addition to Harare. This has precipitated NRZ to have a constrained marketplace proportion (Mbohwa, 2008). The monetary viability of railway community is prone to downturns in monetary interest and in recession instances the extent of visitors the use of the machine may also lessen sharply while the constant fees of running the infrastructure stays (Handbook of Logistics, 2010). The scenario NRZ unearths itself nowadays concur with what Nubbins wrote, 'Railway is economically prone to fundamental adjustments with inside the business and societal sports of a given geographic area'. According to Mr Martin Dinha the Board Chairman of NRZ, the railway community is in a sorry kingdom characterized with a community with too many velocity regulations and a rolling inventory which in maximum times has outlived its beneficial monetary life. The to be had variety and kingdom of the rolling inventory, locomotives, wagons, coaches and different important system is inadequate to fulfil the majority shipping call for of the effective sectors of the economy (www.transcom.gov.zw). Excessive robbery and vandalism of overhead electric powered energy transmission cables has exacerbated through the years to the factor wherein the machine is non-existent.

2.5 Strategies to enhance the overall performance of railway machine

The World Bank (2017) asserts that rail utilization in Africa is at 35% and has been basically to serve a few business areas. Recently, World Bank in addition counselled the subsequent techniques if you want to enhance the overall performance of the rail structures:

1. Reforms with inside the manner railroads are organized and financed, inclusive of higher governance and greater opposition that allows you to offer higher carrier at decrease prices.
2. Integrating railways into a rustic's transportation community. This frequently calls for each new investments in terminals and a brand-new manner of considering how railroads mesh with roads, ports and enterprise in trendy.
3. Research into rail's effect on poverty. With a higher know-how of rail's capability to deal with poverty, shipping ministries and concrete planners could make greater knowledgeable choices on regulations and investments (www.worldbank.org) .

According to The Sunday Mail, 26 September (2021) the NRZ signed a Memorandum of Understanding with a Turkish organization, YAPI Merkezi to recapitalise and modernise the nation's railway structures. This organization is a globally famed emblem in rail technology, which efficaciously constructed a 422 km excessive velocity electric

3. METHODOLOGY

A research methodology refers to a process of following the steps, procedures and strategies for gathering and analysing the data in a research investigation (Saunders, 2015). This section outlines the research philosophy, research approach, research design and sampling techniques used in this study.

3.1 Research Philosophy

According to Zukauskas et al (2018) a research philosophy is the process of conceiving research assumptions and truth claims. The researcher used the positivism philosophy.

3.2 Research Approach / Strategy

Quantitative methods / paradigm and regression and Bita co-efficient were computed in SPPS package to show relationship between variables.

3.3 Research Design

A research design can be defined as an overall conceptual research structure that is used by the researcher in trying to answer the research questions (Sekeran and Bougie, 2020). In this study a cross sectional survey was used in order to solicit views from management and operation staff of the four selected companies.

3.4 Target Population and Sampling

The target population is management and operation staff of selected companies in Mutare. Four companies were selected and these were Manica Boards, Mega Market, Delta Beverages and Green Motor Services (GMS). A sample of 50 was used and Yamani formular was used.

3.5 Data Collection Instruments

The researcher used a structured questionnaire and it was designed using the five (5) point Likert Scale. It was administered on the 4 selected companies in Mutare which are Manica Boards, Mega Market, Delta Beverages and GMS. The questionnaire offered greater flexibility amongst respondents as they were able to answer it at their own free time.

3.6 Data Analysis

Mainly SSPSS was used to analyse data and regression analysis.

4. RESULTS PRESENTATION AND INTERPRETATION AND DISCUSSION

This section deals with results presentation and interpretation. Mainly graphs and frequency tables were used. Findings were discussed at the end of each presentation.

4.1 Response Rate

50 questionnaires were administered and 50 managed to respond giving a response rate of 100%. The major reason for this favourable response rate was the easy accessibility of the respondents by the researcher.

4.2 Current state of NRZ

The researcher intended to get an understanding of the current profile of NRZ operations and its influence of productivity of down-line industries.

Table 4.1

Statement	1	2	3	4	5
NRZ delivering in time?	4%	4%	12%	32%	48%
NRZ customer service satisfactory?	6%	6%	14%	28%	46%
NRZ has enough competent manpower?	16%	8%	14%	22%	40%
NRZ investing in modern equipment and technologies?	12%	8%	16%	30%	34%
NRZ top management innovative and practising good corporate governance?	18%	10%	8%	26%	38%

Key: 1. Agree 2. Strongly Agree 3. Neutral 4. Disagree 5. Strongly Disagree
Source: Author, 2021

Discussion

The responses are shown in Table 4.1 and most respondents viewed failure by NRZ to deliver in time as well as failing to meet customer service satisfactorily as some of the major current operational performance of the parastatal. Some respondents had mixed feelings on the existence of enough competent manpower, good corporate governance and investment in modern equipment and technologies. According to Mangan and Lalwani (2016) railway sector has high fixed costs which the company has to be efficient and satisfy its customers and grow its business.

4.2.1 The relationship between rail operations and economic development

The researcher sought to understand the relationship between rail operations and industrial productivity and regression analysis was used to establish the relationship.

4.2.2 Correlation

Freight volumes was found to be positive and significantly related to industrial productivity FV (r = 0.514, p-value = 0.002<0.005). Freight costs was found to be positive and significantly related to industrial productivity FC (r = 0.556, p-value = 0.009<0.005). Service frequency was found to be positive and significantly related to industrial productivity SF (r = 0.635, p-value = 0.000<0.005). Cargo security was found to be positive and significantly related to industrial productivity CS (r = 0.577, p-value = 0.001<0.005) as presented in Table 4.2.

Table 4.2 Correlation of variables

		Freight Volumes	**Freight costs**	**Service Frequency**	**Cargo security**
IP	Pearson Correlation	.514**	.556**	.635**	.577**
	Sig. (2-tailed)	.002	.009	.000	.001
	N	50	50	50	50
****. Correlation is significant at the 0.01 level (2-tailed).** ***. Correlation is significant at the 0.05 level (2-tailed).**					

From the table above, all variables were seen to be positively correlated to the industrial productivity dimension.

4.3. Regression Analysis

1.

Table 4.3 Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.877[a]	.771	.742	.31302

a. Predictors: (Constant), Freight volumes, Freight costs, Service frequency, Cargo security
b. Dependent Variable: Industrial productivity

The R square value in this case is 0.771 which clearly suggests that there is a strong relationship between Freight volumes, Freight costs, Service frequency, Cargo security and Industrial productivity as indicated in table 4.3. This suggest that Freight volumes, Freight costs, Service frequency, share a variation 77 % of RO and IP.

Table 4.4: ANOVA

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	7.837	4	1.958	20.122	.000[b]
	Residual	2.338	24	.097		
	Total	10.173	28			

a. Dependent Variable: Industrial Productivity
b. Predictors: (Constant), Freight volumes, Freight costs, Service frequency, Cargo security

The Anova table in table 4.4 indicates that the overall model was a good fit since (F-value=20.122 and p-value=0.000<0.05).

Table 4.5: Coefficients

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	.626	.276		2.275	.030
	Freight volumes	.398	.146	.386	2.731	.012
	Freight costs	.327	.145	.324	2.199	.036
	Service frequency	.667	.124	.625	5.441	.000
	Cargo security	.361	.112	.290	3.245	.003

a. Dependent Variable: industrial productivity

The model becomes:

$IP = 0.398_{FV} + 0.327_{Fc} + 0.667_{SF} + 0.361_{CS}$

Where: IP = Industrial Productivity

FV= Freight Volumes

FC= Freight Costs

SF= Service Frequency

CS= Cargo Security

Research Results

Freight volumes was found to have a positive linearly significant influence on industrial productivity (β=0.398, p=0.012<0.05). One unit change in freight volume results in 0.398 unit increase in productivity.

Freight costs was found to have a positive linearly significant influence on production costs (β=0.327, p=0.036<0.05). Here one unit change in freight costs results in 0.327-unit increase in production costs.

Service frequency was found to have a positive linearly significant influence on industrial productivity (β=0.667, p=0.000<0.05). Here one unit change in service frequency in 0.667-unit increase in industrial productivity.

Cargo security was found to have a positive linearly significant influence on industrial productivity (β=0.361, p=0.003<0.05). Here one unit change in cargo security results in 0.361-unit increase in industrial productivity. The beta coefficient indicates a relative importance of each independent variable (Freight Volumes, Freight Costs, Service Frequency and Cargo Security) in influencing the dependent variable (Industrial Productivity).

An improvement in freight volumes, service frequency, freight costs and cargo security emphatically influence the industrial productivity.

4.4 Challenges affecting operations performance at NRZ Mutare

The researcher sought to identify challenges affecting performance of rail services in Zimbabwe. The Likert scale was used to measure respondents' views.

Table 4.6: Challenges affecting rail services in Zimbabwe

Challenges affecting rail services in Zimbabwe	Mean	Std Dev
Failure to invest in modern technologies	4.71	0.542
Ageing fleet	3.63	1.053
Lack of funding	3.19	1.009
Vandalism and theft	3.06	1.536
Mismatch of number of employees and business activities	1.47	0.101

Source: Researcher, 2021

Discussion

The study established that of the many challenges the NRZ is facing, the challenge of failure to invest in modern technologies with a mean of 4.71 (Sd 0.542) is the major problem followed by company's ageing fleet with a mean of 3.63 (Sd 1.053). Other challenges include lack of funding with a mean of 3.19 (Sd 1.009), vandalism and theft with a mean of 3.06 (Sd 1.536) and then the mismatch of the number of employees and business activities of NRZ with a mean of 1.47 (Sd 0.101). All these challenges according to Mbohwa (2008) has resulted in NRZ losing a large share of its market to the trucking and bus industry. Lysons (2000) also said that the monopolistic nature of rail services is creating many challenges.

4.5 Strategic options to improve rail system in Zimbabwe

The study sought to establish strategies that can be implemented by NRZ to improve rail sector performance.

Table 4.7 Strategic options to improve NRZ performance

Strategic options to improve NRZ performance	Mean	Std Dev
Invest in modern technologies and equipment	2.89	0.319
Infrastructure development	2.66	0.439
Recapitalisation	2.65	0.088
Better governance	2.51	0.018
Collaborative relationships	2.50	0.673

Source: Researcher, 2021

Discussion

Most respondents supported the notion that there is need for the NRZ to invest in modern technologies and equipment with a mean score of 2.89 (Sd 0.319) followed by those who felt that there is a serious need of infrastructure development with a mean score of 2.66 (Sd 0.439). Further findings reveal that recapitalisation with a mean score of 2.65 (Sd 0.088) is another strategic option which can improve the performance of the parastatal. Other options are better governance with a mean of 2.51 (Sd 0.018) as well as the company entering into good collaborative relationships reputable business players with a mean of 2.50 (Sd 0.673). This is in sync with the World Bank Report (2017) which advocates for rail reforms in administration and investing in better infrastructure and equipment.

5. RESEARCH CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

A number of meaningful conclusions were made based on the research findings. Some of the conclusions are:

- The study concluded that NRZ is currently performing below its potential and expectations of the customers. The parastatal is in a free fall so much that an urgent and serious intervention is needed. Major setbacks to this below par performance is mainly caused by lack of funding, aging fleet and proper governance of the company.
- It was also concluded that there is a strong relationship between NRZ performance and industry performance. This was evidenced by the decrease of NRZ performance translating to reduced productivity by downstream companies since they will opt for expensive transport modes such as road.
- The study concluded that there are various alternatives that can be pursued to improve the overall performance of the rail sector in Zimbabwe. Recapitalisation and investing in modern technologies can greatly improve the performance of NRZ.

5.2 Recommendations

After drawing conclusions, the study proposed the following recommendations:

- Rail infrastructure to be urgently developed. The infrastructure such as Train Control System (TCS), locomotives, signals require repair, maintenance or replacement so that NRZ can be effective and efficient in its operations.
- NRZ to invest in modern technologies and equipment. The parastatal can sharpen its competitive edge by embracing automated Information Technology (IT) systems that can manage and coordinate rail cargo consolidation across firms.
- NRZ to consider recapitalisation by partnering global rail companies such TAPI Markezi of Turkey which the Zimbabwean government has signed a Memorandum of Understanding (MoU).
- Competent governance by appointment of Board of Directors with various skills in transport, business and engineering fields as well as recruitment of innovative, competent and dedicated management. Good governance will translate into improved business activities for NRZ.

Future Research discourses

After conducting this modern railway network systems research paper , many future questions emblem at the end of this research paper. These research questions can be used as basis for new research in the field of business management ,supply and logistics management and economic development .

1. What are the economic contributions of new state of the art rail way system ?
2. What is the impact of developing modern rail way networks on commercialisation and industrialisation in business management ?
3. How will new railway networks affect supply and logistics in business organisations?
4. Will inexpensive railway shipping cost in the future reduce cost of productions for organisation?

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