

The Impacts of Road Transport Infrastructure and the Socio-Economic Development in the Bamenda III Municipality, Mezam Division, North West Region Cameroon

Dr. Tanwie Linda Ngewie

Department of Public Law and Public Administration, Faculty of Laws and Political Science
University of Buea, Cameroon

ABSTRACT

Transport is a vital infrastructure that drives the socio-economic development around the world. This is the case with the Bamenda III sub division in Mezam Centre, North West Region of Cameroon. The development of transport infrastructure produces diverse impact on the socio-economic development. The research examines the role of transport infrastructure on the socio-economic development of that sub division. The aim of this study therefore was to assess the role of transport infrastructural development on socio-economic development in the Bamenda III municipality. The study used a survey design to collect and analyses the required data. Data collection was done using questionnaires, semi-structured interviews, observations and from secondary sources like text books. Chi square was used to test the hypothesis. The results show that road infrastructural development has played significant role in the socio-economic development in the Bamenda III municipality. Household in Bamenda III have different opinion on the role of transport infrastructure on socio-economic development. From the field observation, it was seen that majority of the respondent (89%) were of the opinion that transport infrastructure play significant role in the socio-economic development while a smaller proportion (11%) of the respondents were of the opinion that transport infrastructure does not play significant role. Transport infrastructure has play significant role in the socio-economic development some of which includes; improve social wellbeing through excellent production transport infrastructural development, reduces transport cost among others. There are some challenges faced by the transport sector in the Bamenda III municipality some of which include; traffic congestion, climate and poor drainage. Participants also propose some recommendations that could be put in place to reduce the challenges faced by the transport sector. Some of these recommendations include; traffic measurement measures, systematic and non-random construction of houses.

KEYWORDS: Road Transport, Infrastructural Development, Socio-Economic Development, Bamenda III Municipality, Mezam Division, North West Region, Cameroon.

Introduction

Transport has become an important subject for two major reasons: it is an important human activity with a strong spatial component; secondly it is an important factor influencing the spatial variation of many other social and economic activities (White et al. 2010:4-8). This has therefore brought the need to develop the various modes of transport: road transport being the major and widely used mode of transport. Transport is means by which people and commodities are moved from one place to another by air, land and or water. Road transport is thus the movement of people and commodities by road using, different types of road locomotives.

Road transport system constitutes one of the key indicators of every national development, thus, facilitating the movement of people, goods and services for diverse purposes. The road infrastructure forms the backbone on which a society is built (Buertey and Asare, 2014:5-6).

Historically, transport was a primary factor of economic development. This was the case with New Zealand's early economic development; and it remains true in developed and many developing countries, where the transition from a rudimentary, fragmented transport system to even a poorly-developed network was of great importance. The absence of a well-developed transport system acts as a serious constraint on economic growth. Technological progress in transport, and the consequent capital investment, was essential to New Zealand's early economic development. (Francois, 2005:1-3)

In America, roads and railroads allowed the United States to expand from states hugging the coast of the Atlantic Ocean to all the land between the Atlantic and Pacific. In addition, improved transport infrastructure has expanded the range over which goods can be marketed and thus create room for income generation for other developmental purposes such as settlement construction, adoption of modern farming techniques and equipment. Although there is very little empirical evidence to this effect, it is generally believed that the U.S. government's massive investment in road transportation development and infrastructural development in the 19th century led to the significant growth registered by the country's economy during that period (Gillen, 2009:9-11). This growth was however a step towards socio-economic development.

In the case of developing world: Africa, India and Latin America are all lacking in terms of road transport accessibility and this has been a major problem in economic development underline the role of improving transport links between geographically separated markets in helping to remove bottlenecks in production, trade, and economic integration. The principal role of transport is to provide or improve access to different locations for businesses and individuals, for both freight and personal movements. For the business sector, this involves connections between businesses and their suppliers, between businesses and other businesses, and between businesses and their markets. For the household sector, transport provides people with access to workplaces, schools and shops. It connects them to social, recreational, community and medical facilities for personal and leisure activities. (Blenda, 2001:10-12)

Based on a study carried out on the GMS (a region comprising Cambodia, Lao People's Democratic Republic (Lao PDR), Myanmar, Thailand, and Viet Nam, as well as Yunnan Province and Guangxi Zhuang) Autonomous Region of the People's Republic of China (PRC); at the time of the inauguration of the GMS Economic Cooperation Program (1992), most of the region's infrastructure was of a very poor quality (Ishida 2007:3-5). In response to this, the GMS commission adopted the Transport Master Plan in 1995, which identified priority transport links mostly road projects in which the need for infrastructures like asphalted roads, turning points (roundabouts), motor parks and bus stations designed to generate the greatest and most immediate improvements in connectivity and interaction. This was an important step in socio-economic development, with improvements in transportation infrastructure boosting economic opportunities throughout the region, for example by significantly reducing travel times and costs speeding up mobility of people, goods and services.

As the countries have moved away from a strategy of self-sufficiency to one of regional cooperation, major efforts have been made to develop the infrastructure linking the GMS and beyond, particularly through the identification of ambitious economic corridor projects. These infrastructure projects have been supported by a number of international agencies, including the Asian Development Bank (ADB), with the hope that they will lead to significantly improved opportunities for the region and beyond borders.

In Africa, there are countries where the transport sector is poorly developed with untarred roads in the rural areas and poorly tarred roads in the urban areas have been a major characteristic which affects socio-

economic activities especially farmers livelihood. This has made it difficult for farmers to transport their agriculture products to the market meanwhile, agriculture is one of the main indicators of economic growth to every society. Improved transportation infrastructure hence gives rise to complex economic interactions, with the exact causal relationship between economic growth and infrastructure investment as observed in some parts of some African countries. Blum, (2002:5-7).

In Ghana, road transport forms an essential part of the Ghana Shared Growth and Development Agenda aimed at addressing infrastructure and human settlement challenges (Road Infrastructure Development Annual Report, 2011). According to the Ghana Investment Promotion Centre Report (2009), road transport in Ghana accounts for 94% and 97% of freights and passenger traffics respectively. Development in the road network has served as an important indicator for socio-economic growth throughout history although most parts of countries are still underdeveloped in the area of road transport. However, meeting the needs and expectations of road users for an improved road infrastructure delivery is still a growing concern for many governments and road agencies.

In Nigeria, it was found that the contribution of transport activities to total gross domestic product has been on the downward trend in spite of the fact that 20% of annual budget is put on road projects at both federal and state level and an estimated loss to the Nigerian economy as a result of poor state of roads and infrastructure is about N450 billion yearly. These indices allow for the measurement of the impacts of improved transport and infrastructure on the economy of nations. (Vickerman, (2007:6-8)

In Cameroon, the Government of Cameroon announced its long-term development vision 2025-2035 based on the Dam Safety Review Panel (DSRP) to be used for formulating aggressive long-term development vision. The DSRP regards the country as an intersection of Central Africa and one of the visions is economic growth led by new infrastructure development of “roadways” among other transport infrastructures such as airports, ports and harbors, gas and pipelines and power grid. It does not touch upon any specific infrastructure development project. The Development Strategies of Douala and Urban Zone prepared in 2009 by the CUD based on the DSRP describes short-, mid- and long-term development strategies of the urban zone including Douala where road infrastructures such as tarring of roads and construction of bridges are major priorities. The case of Douala as the economic capital of the country is an empirical evidence of the role of improved road transport development on socio-economic development in that, although some of the roads are in deplorable conditions, the monetary value of the amount of flow observed on daily basis on some major roads and infrastructures like Wouri Bridge is immeasurable (Urban Development Master Plan for Douala City, 2015/2025).

In this study, we attempt to quantify the impacts of some of the key linkages between upgraded road transport, economic growth, and poverty reduction in the Bamenda III Municipality. This enables us to describe how the costs and benefits of improved transport infrastructure may be transmitted to different domains of human life and how they impact different household groups, including the implications on poverty alleviation.

Problem Statement

The challenges facing urban centers like Bamenda III Municipality have continued to grow particularly within the last 2 decades. In fact, the city will increasingly face worse situations in the near future given that the current pace of development maintains and the factors causing these challenges continue to manifest and expand. Accessibility is one of the major and fundamental aspects of flow of goods and services and even humans in which strategic points become attractive for service (commercial activities, administrative, institutional and industrial activities etc.) to be concentrated after human habitation.

Socio-economic activities refer to those activities which are intended for interaction and exchange in a market or convenient activity space (interaction between two or more persons) for profit making and or

social interactions like academics, social groups, churches sports and play grounds. The occurrence of these activities as observed in the Bamenda III Municipality is very much diverse and can be found in areas occupied by humans. The areas occupied by humans in the municipality which are referred to as residential areas are mostly situated near roads and thus, these commercial activities often occur along major road stretches giving transport links and infrastructures a high influence on the spatial distribution of socio-economic activities and the state of the transport facilities definitely act as a motivating or retarding factor to these activities. In this research, the transport sector of Bamenda III Municipality will be analyzed with focus on the role of transport and infrastructure on socio-economic development in the Bamenda III Municipality though there are some challenges faced by the road transport network within the municipality.

Research Questions

What are the impacts of road transport infrastructure on the socio-economic development of Bamenda III municipality?

Objective of the study

To evaluate the impacts of road transport infrastructure on the socio-economic development of Bamenda III municipality.

Research Hypotheses

This study is guided by the following hypothesis.

H₁: Road Transport Infrastructure has significantly impacted the socio-economic development of Bamenda III municipality.

Null Hypothesis

H₀: Road Transport Infrastructure has not significantly impacted the socio-economic development of Bamenda III municipality.

Theoretical Framework

The work employed the Theory of Road Transport Development by Taaffe, Morrill and Gould (TMT) (2003). Taaffe, Morrill and Gould, (2003:503 -529), undertook a comparative analysis of the development of road transport network in developing countries and they were able to show that certain board regularities permitted “a descriptive generalization of an ideal typical sequence of road transportation development”.

Their special model of road transport network development in developing countries has proved to be a valuable help in the understanding of road transport development and has been widely applied. The model which Taaffe and his colleagues devised was based upon Ghanaian and Nigerian experience, but it has been found to be applicable to other developing lands, for example, in Latin America.

Taaffe et al. (2003:12-15) identified six stages in their sequence of transportation development. The first stage consists of scattered settlements and small ports along a coast, which arose from colonial occupation. Such coastal settlements developed trading functions, though in the beginning these were of a very limited nature and in consequence their hinterlands were very restricted.

Furthermore, there was little lateral inter-connection between the scattered settlements, except for those effected by native fishing craft of occasional trading ships. The second stage evolved slowly but gradually as lines of inland penetration developed and some of these which linked up mining settlements or centers of population became more important than the others.

With the emergence of these major lines of penetration, often linked to the best location of the coastal ports, port concentration begins to develop and these commence to grow at the expense of their neighbors, some of

which eventually disappear as trading centers or at best linger on as relict ports. This second stage goes on, hand in hand with the growth of an efficient administrative system and more particularly with the expansion of production for export and development of economic activities.

The third stage is marked by the development of 'feeder' routes which focus more particularly upon the main ports and the more economic centers in the interior. At the same time, as the growth in the export trade stimulates economic expansion generally in the hinterland, a number of intermediate centers begin to develop in to nodes which become focal points for feeder networks of their own.

The beginnings of lateral interconnection also take place with lands within the major ports and the major inland towns being affected. Stage five sees the emergence of complete inter-connections as the various feeder networks grow around the ports, major inland centers and main in-land nodes and begin to link up.

Finally, in stage six, as the economy becomes more developed and integrated, all the principal centers and many of the minor centers are linked together in the transport system, while a number of high priority trunk routes develop which link the largest or most important centers.

Weakness of the Theory.

The first weakness of the theory is that it can be applied only in advance countries. It omitted the influence of government intervention, physical or economic contribution of the area. Also, it did not determine the type of transport network that was used at the time. That notwithstanding, the theory is still of great significance to the work despite its lapses.

Relevance of the theory to the work.

From the theory explained above, it can be seen that in Bamenda III municipality, transport infrastructural development displaced and altered the spatial distribution of economic activities, in which cluster and linear distribution of economic activities can be distinguished. According to Taaffe et al, (2003:16-17), the development of feeder roads tends to bring about development of trade and economic development, major road in Bamenda III municipality tend to bring about an increase in the concentration of linear economic activities from TOTAL to Mile Four Nkwen and many other areas.

Literature Review

The impact of transport infrastructure on socio-economic development has recently been the subject of a growing literature that often combines economic theory with geographic information such as the exact location of transport infrastructure.

While the empirical analysis of this research builds on general equilibrium trade theory, it is also related to recent studies on the local effects of transport infrastructure such as the growth of business centers. For example, Akuhanna (2003:205- 221) study the effects on firms located in the proximity of the new highways and find positive effects on manufacturing activity.

They rely on an identification strategy similar to the one proposed by Chandra and Thompson (2000:7-9) and Michaels (2008:3) who estimate the effect of U.S. highways on counties that lie between two larger nodal cities. This is based on the observation that the highways as major transport infrastructure are built to connect larger cities and thereby pass through other counties which consequently obtain access to the new transport infrastructure without being targeted themselves. Crawford et al (2010:10) analyzes internal and external trade barriers in India using state-level trade data. Allen and Atkin (2016:6) consider the effect of changes in the Indian highway network on the agricultural sector. Road transport plays a major role with immeasurable impacts on interactions within different sectors of human dynamics in different places thereby accounting for growth and development which results from the flow of better goods and services from

developed areas to underdeveloped. Road transport plays the role of a driver of socio-economic development catalyst less developed parts of cities and beyond.

Road transport infrastructures are semi-public goods, with “externality” playing an integral role in creating indirect long-term impacts on economic development, which is referred to as wider economic benefits or impacts.

Impacts of Road Transport on Socio-Economic Development

Although there is no definite method of quantifying the impacts of road transport development on socio-economic development, Pathatak et al (2007:4-7) made clear that the proportion of transport cost on total cost of a firm varies significantly from sector to sector. For some firms, they may present a major item as Diamond and Spence (2009:9) indicated that transport costs accounted for about 2.6 % of total operating cost in major vehicle parts production, 7.7% for pharmaceutical and 12% for wholesale distribution. They add that, in other sectors the figures may be significantly higher and potential improvements of transport infrastructures may be lesser than of considerable benefits.

Transport according to Martha et al (2022:8) is the means by which people and commodities are moved from one place to another by a number of physical modes including roads, water, railways, airlines and pipelines etc. which constitute infrastructure of the transport sector. So, transport in one form or another is a basic and essential part of the daily rhythm of life throughout the inhabited world in which social and economic activities circulate. Road transport is the most widely used and developed means of transport because it is the most flexible and less expensive and also most productive.

The development of the road transport sector plays an important role in the economic development of a country and, therefore, the kilometer-age of paved roads, air lines and water ways existing in a country is often used as an index to assess the extent of its development. The proper development of the transport network not only reduces the cost of transportation, both in terms of money and time, but also helps in the integration of various regions within the country and the better understanding of neighboring countries at the international level.

Jacob et al, (2008:1-10) stated that transport has become an important subject matter for geographers for two main reasons. Firstly, transport is a significant human activity with a strong spatial component. Secondly, it is an important factor influencing the spatial variation of many other social and economic activities.

Based on Pavia et al, (2008:6) observation, “the transport system may be likened to the blood circulation system in a living organism. Without it the organism dies”. Transport is considered an essential feature of all modern economies. In general terms, as an economy grows and develops, it becomes more dependent upon its transport sector. In this regard, human activities which bring forth income for survival can be tied to mobility, that is, movement to-and-fro work places, markets, farms, schools etc. upon which their livelihood depends. These entails that the state of the transport infrastructure can retard or foster living standards of a people limited to developed places by roads and related structures.

According to the Prud’homme, R. (2004a:6), the proper development of a road transport not only reduces the cost of transportation both in terms of money and time but also helps in the integration of various regions within the country and better understanding of the neighboring countries on an international level. It adds that roads contribute to the development of a country by bringing in direct benefits from their role in the development of activities such as agriculture, industry, commerce and mining and by bringing in indirect benefits from the enhancement in the value of property and the change it sets in the way of life and thinking of its people. It is therefore no wonder that all developed countries complete networks of roads and other transportation infrastructure and in the same way developing countries are making huge investments in developing and improving their transportation systems, including road networks. In the vast Kingdom of

Saudi Arabia, where the main population centers are not only scattered all over the country, but are also separated by deserts, sand dunes, valleys and mountains, fast and reliable means of transportation become all the more important and essential because trade, commuting and socialization occur and are facilitated.

According to Vukeya, V. (2015:15) increasing investments in transport infrastructure is a proven and reliable way to stimulate economic growth and development. In the short term, an increase in the number of investments in construction of transport infrastructure creates new workplaces and room for social interactions and benefits amongst the populace of an area. In the medium term, it stimulates economic growth, and in the long term it reduces transport costs of enterprises and improves the quality of life of the region's inhabitants. Simultaneously, road transport system can be a bottleneck of any economy since the problems of transportation system facilitate the infrastructural restrictions and create the threat of deceleration of social and economic development of the country.

According to Datta, H. et al., (2012:9-15) the immediate socio-economic effects originate from the essential feature of transport infrastructure like roads as a production sector in a particular form. Apart from its own production benefits, improved road transport facilitates the development of upstream production sectors and those sectors that take the former as intermediate products due to its extremely close relationship with various social and economic sectors. In addition, transport infrastructure produces socio-economic benefits by creating jobs, reducing poverty, and improving socio-economic conditions.

Road transport infrastructures are semi-public goods, with "externality" playing an integral role in creating indirect long-term impacts on economic development, which is referred to as wider economic benefits or impacts. There are two main aspects of the theoretical and empirical findings in this regard. One is the identification of multiple mechanisms with economic and geographic theories to link transport infrastructure and economic growth. For instance, transport infrastructure creates indirect positive externalities and smoothen the business cycle by reducing production and transport costs and increasing the productivity of input factors. Meanwhile, it is widely and typically acknowledged that transport infrastructure fundamentally improves accessibility, which causes a series of economic impacts. Specifically, it provides the necessary conditions for the agglomeration and diffusion of a spatial economy (transport-induced agglomeration effects) and makes agglomerations or large spatial clusters possible; hence, a variety of agglomeration economies and endogenous growth effects follow, thereby augmenting the economic effects of transport infrastructure. For instance, the sports industry can combine with hotel management to provide services to sports activities in sports complexes, stadium and lodging facilities to people during sport events like Nation Cup, world cups, League cups etc.

The other aspect has to do with the long-term spillover effects, which refer to economic, technical, knowledge growth, and other effects within and across regions as the impacts of transport infrastructure increase. Transport infrastructure can facilitate local and foreign investments and materialize in new capital formation, thus spurring economic activities through its impact on the private sector and can significantly raise land prices in and around an area, which is difficult to quantify but profound. The benefits mentioned above mainly reflect improvement after transport infrastructure is implemented like the case of the Bamenda III municipality where, land prices have increased, prices of basic commodities also increase gradually and steadily due to the construction of the new road in Mile Four Nkwen which has influenced building of residential and commercial settlement in the area and led to the development of businesses.

Adversely, failures occur where improvements in road transport infrastructure does not achieve expectations, even though there may be some benefits. If projects do not yield sufficient "flow" of income, not only do the follow-up construction, updating, and upgrading suffer from a dilemma but also the confidence and trust among investors may collapse such that a more detrimental boomerang effect may occur: the accumulation of non-performing loans increases the national debt risk.

Research Methodology

Both primary data and secondary sources were used. Primary sources were basically field techniques which were used to obtain data from the field, through observation, interviews and the administering of questionnaires. The households of the various localities that were visited were selected randomly and questionnaires distributed to both male and female house owners of different age groups. Secondary Sources involve the acquisition and evaluation of already existing data of interest to the study. These sources used included published journals and textbooks.

Result and Discussion

Impacts of Road Transport Infrastructure on the Socio-economic Development of Bamenda III sub-division in Mezam Division, North West Region, Cameroon.

| SN | Statement | SA | A | SD | D | N | Total |
|----|--|---------|---------|-------|-------|-------|-----------|
| 1 | It facilitates the development of upstream production sector | 39(39%) | 54(54%) | 2(2%) | 3(3%) | 1(1%) | 100(100%) |
| 2 | It leads to job creation | 39(39%) | 47(47%) | 2(2%) | 5(5%) | 7(7%) | 100(100%) |
| 3 | It leads to poverty reduction | 51(51%) | 37(37%) | 3(3%) | 1(1%) | 8(8%) | 100(100%) |
| 4 | It results in socio-economic conditions improvement | 49(49%) | 39(39%) | 5(5%) | 4(4%) | 3(3%) | 100(100%) |
| 5 | It smoothens the business cycle by reducing production cost and increasing the productivity of input factors | 46(46%) | 42(42%) | 7(7%) | 3(3%) | 2(2%) | 100(100%) |
| 6 | It improves accessibility | 51(51%) | 42(42%) | 2(2%) | 4(4%) | 1(1%) | 100(100%) |

Source: Field Survey, 2023

From the research, the result indicates that majority of the respondents (54%) agreed that transport development facilitates the development of upstream production sector. This is closely followed by 39% who strongly agreed, and then next by 3% who disagreed which is followed by 2% who strongly disagreed and lastly by 1% who were neutral.

Therefore, from the information gathered, the development of upstream production sectors can be facilitated by transport development.

From the findings, the results indicate that out of the 100 respondents, majority with a percentage of 47% agreed that transport development leads to job creation. This is followed by 39%, who strongly agreed, then next by 7% who were neutral which is closely followed by 5% who disagreed and finally by 2% who strongly disagreed.

Thus, based on the responses from respondents, transport development can lead to job creation.

Data from the research shows that, 51% out of the 100 respondents strongly agreed that transport development leads to poverty reduction. This is closely followed by 37%, who agreed, and then next by 8% who were neutral which is followed by 3% who strongly disagreed and lastly by 1% who disagreed.

Data from the research indicate that majority of the respondents with a percentage of 49% strongly agreed that transport development results in socio-economic conditions improvement in Bamenda III subdivision. This is closely followed by 39% who agreed, next by 5% who strongly disagreed followed by 4% who disagreed and lastly by 3% who were neutral. From the information gathered, it is observed that improvement in socio-economic conditions can be spurred by transport development.

From the findings, the result shows that out of the 100 respondents, 46% strongly agreed that transport development smoothens the business cycle by reducing production costs and increasing the productivity of input factor. This is followed by 42% who agreed and then next by 7% who strongly disagreed, followed by 3% who disagreed and finally by 2% who were neutral. Therefore, reduction in production costs and an increase in productivity of input factors can be smoothen by transport development.

Research shows that 51% out of the 100 respondents strongly agreed that, transport development improves accessibility. This is closely followed 42% who agreed, next by 4% who agreed, followed by 2% who strongly disagree and lastly by 1% who were neutral. Therefore, transport development improves accessibility since the information gathered indicates that 51% and 42% of the 100 respondents strongly agreed and agreed respectively.

Alternative Hypothesis

H1: Transport infrastructural development has significantly impacted the socio-economic development of Bamenda III municipality.

Null Hypothesis

H₀: Road Transport infrastructure has not significantly impacted the socio-economic development of Bamenda III municipality.

The Table below shows observe frequencies of respondents on the question” Do you think transport infrastructural development impacts socio-economic development?”

Observe Frequencies of Respondents

| Impacts of transport development | Yes | No | Neutral | Total |
|--|------------|-----------|----------------|--------------|
| It improves accessibility | 20 | 10 | 4 | 41 |
| It facilitates the development of production | 15 | 7 | 3 | 25 |
| It leads to poverty reduction | 10 | 8 | 5 | 22 |
| It leads to job creation | 2 | 5 | 5 | 12 |
| Total | 53 | 30 | 17 | 100 |

Source: Field Survey, 2023

From the above responses, the expected frequency distribution of respondents was computed as follows:

$$EF = \frac{\text{Total Columns} \times \text{Total Rows}}{\text{Grand Total}}$$

This implies;

$$26; \frac{53 \times 41}{100} = 21.73$$

$$15; \frac{53 \times 25}{100} = 13.25$$

$$10; \frac{53 \times 22}{100} = 11.66$$

$$2; \frac{53 \times 12}{100}$$

$$10; \frac{30 \times 41}{100} = 12.3$$

$$7; \frac{30 \times 25}{100} = 7.5$$

$$8; \frac{30 \times 22}{100} = 6.6$$

$$5; \frac{30 \times 12}{100} = 3.6$$

$$4; \frac{17 \times 41}{100} = 6.97$$

$$3; \frac{17 \times 25}{100} = 4.25$$

$$5; \frac{17 \times 25}{100} = 3.74$$

$$5; \frac{17 \times 12}{100} = 2.04$$

The expected frequency distribution table is therefore;

Expected Frequency Distribution

| Impacts of transport development | Yes | No | Neutral | Total |
|--|------------|-----------|----------------|--------------|
| It improves accessibility | 21.73 | 12.3 | 6.97 | 41 |
| It facilitates the development of production | 13.25 | 7.5 | 4.25 | 25 |
| It leads to poverty reduction | 11.66 | 6.6 | 3.74 | 22 |
| It leads to job creation | 6.36 | 3.6 | 2.04 | 12 |
| Total | 53 | 30 | 17 | 100 |

Source: *Field Survey, 2023*

From the table, the research was to determine the significant level and the degrees of freedom in order to ascertain which of the hypotheses is statistically significant. The formula is used as follows:

$$\chi^2 = \sum \frac{(O-E)^2}{E}$$

Where;

χ^2 =Symbol for Chi Square

O=Observed frequency

E=Expected Frequency

Σ =Summation Sign

Therefore;

$$\frac{(26-21.73)^2}{21.73} + \frac{(10-12.3)^2}{12.3} + \frac{(4-6.97)^2}{6.97} + \frac{(15-13.25)^2}{13.25} + \frac{(7-7.5)^2}{7.5} + \frac{(3-4.25)^2}{4.25} +$$

$$\frac{(10-11.66)^2}{11.66} + \frac{(8-6.6)^2}{6.6} + \frac{(5-3.74)^2}{3.74} + \frac{(2-6.36)^2}{6.36} + \frac{(5-3.6)^2}{3.6} + \frac{(5-2.04)^2}{2.04} +$$

$$\frac{18.23}{21.73} + \frac{5.29}{12.3} + \frac{8.82}{6.97} + \frac{3.06}{13.25} + \frac{0.25}{7.5} + \frac{1.56}{4.25} + \frac{2.76}{11.66} + \frac{1.96}{6.6} + \frac{1.59}{3.74}$$

$$\frac{19.01}{6.36} + \frac{1.96}{3.6} + \frac{8.76}{2.04}$$

$$\chi^2 = 0.84 + 0.43 + 1.27 + 0.23 + 0.03 + 0.37 + 0.24 + 0.03 + 0.43 + 3 + 0.54 + 4.29$$

Therefore, the calculated value of Chi Square (χ^2) = 11.7

Degrees of Freedom

$$DF = (\text{Number of Rows} - 1) (\text{Number of Columns} - 1)$$

From table 4.6.0 therefore,

Number of Rows = 4

Number of Columns = 3

$$DF = (4 - 1) (3 - 1)$$

$$3 \times 2 = 6$$

Significant Level = 0.5%

Critical Value (CV) = 5.99

Interpretation of Results

From the above calculation, the calculated value of Chi Square is 11.7. Since the value of Chi Square is (11.7) is greater than the critical value (5.99) at the degrees of freedom (6), the null hypothesis which states that road transport infrastructure has not significantly impacted the socio-economic development is rejected, implying that there exists a significant relationship between transport development and socio-economic development. This means that, the alternative hypothesis is accepted implying that road transport infrastructure has significantly impacted the socio-economic development in the Bamenda III municipality in Mezam Division, North West Region of Cameroon though there are some challenges involved.

Conclusion

To conclude, road transport infrastructure plays positive role in the socio-economic development of the Bamenda III municipality, especially when it involves the reduction of travel times and travel costs. This study had a key specific objective set out to examine the impacts of road transport infrastructure on the socio-economic development of Bamenda III municipality in Mezam Division, North West Region, Cameroon. From the findings, it was observed that the socio-economic aspects such as job creation, poverty alleviation, industrial development, business set ups and international investment amongst others depend on road transport infrastructural development. This is to say that road transport infrastructural development determines the functioning and the level of socio-economic development in the Bamenda III municipality though there are some challenges involved.

Recommendations

Based on the discussion of the findings and conclusion the following recommendations are addressed to the council, government and the road users.

To the government

The government should change its approach on project execution and the procedures so that money will no longer pass through many huddles leading to embezzlement. By this, engineers will receive the expected amounts for projects and deliver sustainable infrastructures.

The government should moderate its policy on individuals constructing infrastructures. It will give people the right to construct roads to their homes and quarters even. A typical example of this is Nigeria where individuals are permitted to carry out road developments. This results in competition among, quarters, municipalities and regions.

To the users

Road users should learn to follow road use modalities so that the road will contain the traffic and avoid traffic congestion to a greater extent minimize the occurrence of road accidents.

Regarding construction near the road, people should avoid building very close to the road and using the space reserved for future expansion of the road if need be as it will always be due to continuous increase in urban population and increase car ownership.

To the council

The council should carry out regular checks on the roads to monitor the changes in the state of the road for any possible maintenance. This will reduce the road of deterioration of roads in the municipality.

REFERENCES

1. Adam H. and Viegas, J. Making urban road pricing acceptable and effective: searching for quality and equity in urban mobility. *Transport Policy* 8(4), 289-294
2. Akuhanna (2003). The impact of climate change and weather on transport: An overview of empirical findings. *Transportation Research Part D: Transport and Environment* 14(3), 205-221

3. Allen and Atkins (2016), *Africa's first full rapid bus system: The Rea Vaya Bus System in Johannesburg, Republic of South Africa*. U.S.A: Crisp production
4. Blenda (2001, Blum (2002: 5-7), Vic Kerman (2007: 6-8), Zahra, A. (2016). Impact of electricity consumption and transport infrastructure on the economic growth of Pakistan, *6(10)*, 291–300. Retrieved from: <https://doi.org/10.6007/IJARBSS/v6-i10/2358>
5. Buerfey, N., and Asare L. (2014), *The impact of infrastructure investment on economic growth in South Africa*. London: Morrison and Gibb Ltd.
6. Chandra and Thompson (2000:7-9), Michael (2008:3), *Sustainable Urban Transport Financing from the sidewalk to the subway: Capital, Operations, and Maintenance Financing* Washington, D.C.: World Bank.
7. Crawford, a., Svinicki, M. D. (2010). A guidebook on conceptual frameworks for research in engineering education. *Rigorous Research in Engineering Education NSF*, 1–53.
8. Datta, H. D. (2012). *Transport and Development Policy. Cycling and walking*. Switzerland: Springer
9. Diamond and Spence (2009: 9). Brazilian transport initiatives with GHG reductions as a co-benefit. *Climate Policy* 8(2), 220-240.
10. Francois, T., (2005). Institutions and systems: Analysing technical innovation processes from an institutional perspective, pp. 23–48.
11. Gillen, W., (2009), *What are the 'ingredients' for economic growth?* New York: Seabury Press
12. Ishida, E., Trimbath, S. (2007). *Transportation infrastructure: Paving the way*. London: Macmillan
13. Jacobs, H. T. (2008). *Flooded bus barns and blocked rails. Public Transportation and climate change adaptation*. New York: Harper and Row
14. Martha, P.-P. R. (2022). *The Geography of Transport Systems. 3rd ed.* New York: Routledge.
15. Pathatak, L., Stapelberg, H. (2007). The role of transport planning in the quest for sustainable land use. *SATC Proceedings of the 25th Annual Southern African Transportation Conference*. Pp. 1-2,15-31
16. Pavia, H. Q, Cesar A. and S. G. (2008). *Road infrastructure and economic development: some diagnostic indicators*. World Bank Publications. Switzerland: Springer
17. Prud'homme, R. (2004a). *Infrastructure and development*. Paper prepared for the ABCDE (Annual Bank Conference on Development Economics), Washington, DC. May 3-5
18. Taaffe, E. Morrill, R. Gould, P. (2003) *Transport Expansion in Underdeveloped Countries: a Comparative Analysis*. *Geographical Review*, 53, pp. 503 - 529
19. United Nations. (2011: 7-27). *Infrastructure for Economic Development and Poverty Reduction in Africa*. United Nations.
20. Vukeya, V. (2015). *The impact of infrastructure investment on economic growth in South Africa*. Oxfam: Oxford
21. White S., Pradhan, R.P.; Bagchi, T.P. (2010), *Effect of Transportation Infrastructure on Economic Growth in India: The Vecim Approach*. *Res. Transp. Econ.* pp, 4-8, 38, 139-148.