



Geography in Development

Issues and Perspectives

S. L. Tilakasiri

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CHAPTER 21

RURAL ROAD TRANSPORT AND SOCIO-ECONOMIC DEVELOPMENT IN DEVELOPING COUNTRIES: A Geographer's Viewpoint

B. A. Usman

Introduction

Two major reasons why geographers are interested in transport are that transport is a major factor in the location and distribution of economic activities and because of its important role in the process of economic and social change. Transport has been identified as a key factor in the process of modernization, permitting and possibly promoting development but, at times impeding progress. A very important aspect of the economic importance of transportation is geographical in nature. This exists in form of provision of access to broader market base which promotes economies of scale in production and consumption. It also facilitates access to greater and more varied base of inputs like raw materials, energy, and labour and to markets. This is in addition to its influence in the location of economic activities (Hoyle, 1988; Rotrigue & Notteboom, 2017). The rural environment in developing countries is largely agrarian. As a result the vast majority of the people directly derive their sustenance from farming and other related activities. Agricultural production is influenced by a variety of factors among which is access to inputs and markets which

largely depends on availability of transport facilities. Transport also provides access to basic facilities like health and education among others. Therefore, improvement in transport is expected to result in improved production, access to employment as well as to income and to basic facilities.

There is no doubt that there is a close relationship between transport and development and it is expected that if there is a well developed transportation system, the economy will be invigorated. However, the actual nature of this interaction is still a subject of debate in the academic community. While it has been argued that transportation is one of the most important factors contributing to economic and social progress, it has also been observed that in some situations transport only plays a complimentary (permissive) role in development as its effects may be largely unnoticed. In some other instances, increased investment in transport has been associated with worsening spatial inequality particularly between rural and urban areas.

In addition to examining transport development models that attempts to generalizing the relationship between transport and development, this chapter dwells on the debate on the possible relationship that can exist between transport and development. It further used empirical evidences from different parts of the developing world to bring out the impact of rural road transport on socio-economic development, focussing on agricultural production and income and on access to basic facilities. These are believed to be good indicators for measuring progress in rural areas of the developing world.

Components of the Rural Road Transport System

Every transportation system is generally considered to consist of at least three main interrelated parts. These are the travel way, the vehicles and the terminal facilities (Onokerhoraye & Omuta 1977). No transport system can be said to be complete in the absence of transport services, which constitute a very important element of rural transport. Rural road transport system consists of transport infrastructure, transport operations (services) and the transport users. Rural

transport operations include; the commercial services and those provided by private vehicles (Barwell, 1996; Starkey et al., 2002). For any transport system to function effectively, apart from the appropriate infrastructure and transport services, there must exist maintenance and traffic management (Asian Development Bank, 2007). As rightly observed by Starkey et al. (2002), a very important but often neglected component of the road transport system consist of the various official regulators. The infrastructure includes the road network, tracks, paths and bridges (including footbridges only suitable for pedestrian and Intermediate Means of Transport (IMT) traffic). The means of transport consist of the private and "for-hire" vehicles providing transport services. The users include the rural people, operators of "for-hire" transport services and government officials (Barwell, 1996).

In Africa for instance, much of rural travel is however on foot or through IMT operating along the local footpaths and tracks. These constitute what Starkey (2005) referred to as "invisible" rural transport, consisting of footpaths, cart and cycle tracks and footbridges which may not be found on maps. While emphasizing the fact that few rural dwellers in Africa own motor vehicles, Barwell (1996) classified rural transport services into two main types. These are the "for hire" transport services and the transport services operated by governments and other agencies. With the exception of where people own IMT, local-level transport services are highly inadequate on the continent.

IMT are the means of transport intermediate between traditional mode of walking and the modern conventional motor vehicles like cars, trucks and so forth. Compared to conventional vehicles, IMT are characterized by lower investment cost, low transport capacity, less complexity of maintenance and simple infrastructural requirements. IMT used in different parts of Africa include wheelbarrow, hand-cart, animal-drawn carts, pack donkeys, bicycle, bicycle trailer and motorcycle (Ogunsanya & Galtima, 1993; Barwell, 1996).

Attempts have been made to model the rural transport system, and a good example is the hub and spokes model. This is presented as a system of connections which are arranged in the form of a wheel, within which all traffic flow along spokes

(routes) connected to a central hub. A transport hub has been described as a key location at which various routes and means of transport converge and diverge. A simple hub model can be shown with a central hub linked by spokes converging inwards and radiating outwards (Starkey, 2007). The routes and means of transport constitute the spokes of the system. This is shown in figure 1.

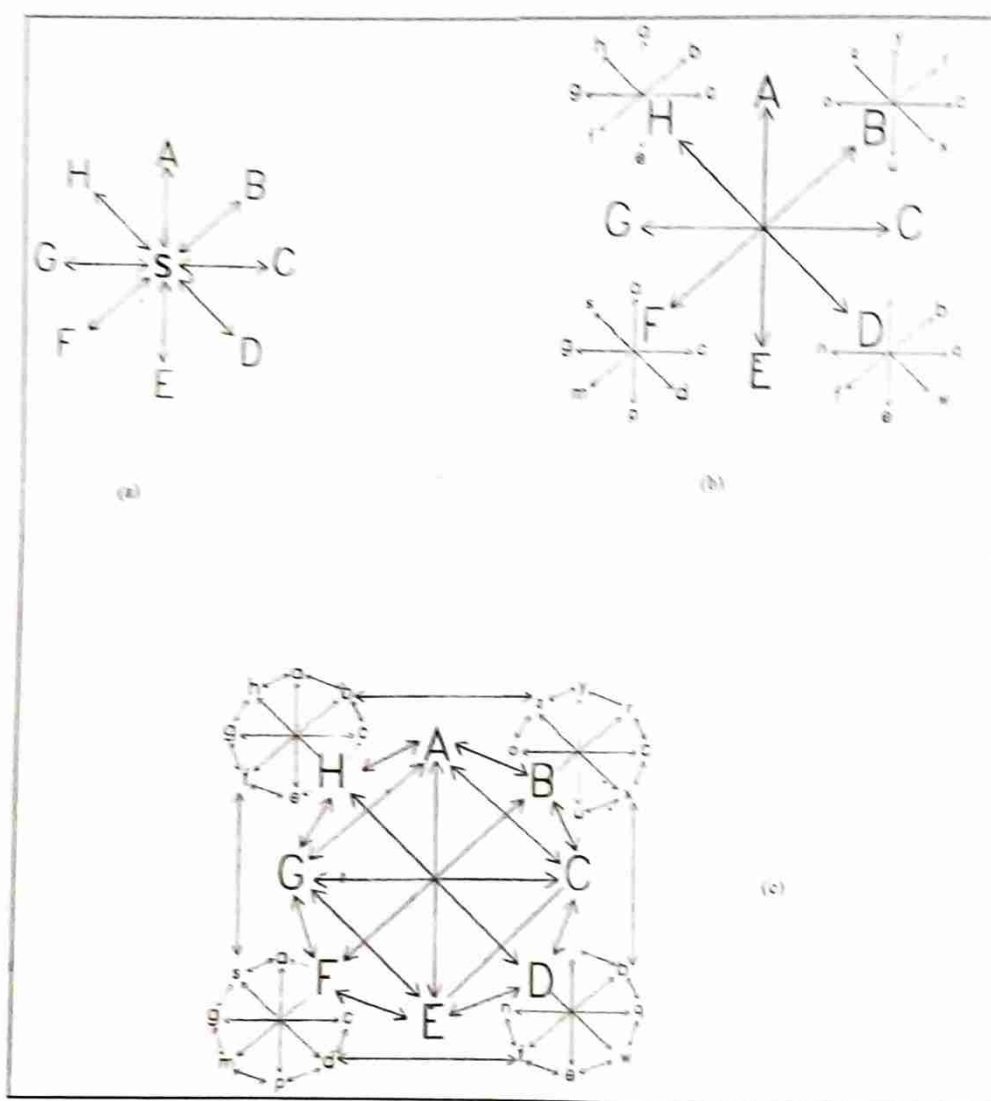


Figure 1: Model of a transport hub system.

Source: Starkey (2007).

This is however an oversimplified model of eight unconnected points linked to a central hub by spokes along which flow occur. In reality transport hub systems are more complex than the simplified model in figure 1.a. This is because

relationships exist between the nodes (points). Furthermore, the transport system consists of hierarchies of hubs, so that the hubs of a local transport system will be part of a larger network. In addition, the peripheral nodes may serve as hubs for smaller networks (figure 1.b). However, direct relationships may exist between the nodes without passing through the hubs (Starkey, 2007), (figure 1.c). This could be true for transport systems in Africa where footpaths and tracks exist outside the road network system (Barwell, 2006). Key rural hubs may include the regional capital, market towns and villages (Forum News, 2006).

A large village with basic facilities like primary school, small market or a health centre may serve as a hub. The village (hub) will have routes (spokes) connecting smaller villages or hamlets. The rural transport system is linked to the national transport system through the regional town and city hubs which are at higher scale. The area served by a hub is the 'catchment area'. For instance, in the case of the market town agricultural produce will flow in from surrounding villages, while people will also converge from surrounding villages to access facilities like schools and health centres. The size of the catchment area varies with the size of the hub and varieties of facilities available. Thus, the larger regional town will have a larger catchment area than the smaller market towns. The catchment area of a regional town would therefore, cover smaller market town hubs composed of various village hubs enclosing their own catchment areas (Starkey, 2007).

Though, the idea of hubs and spokes system is useful in explaining the rural transportation system, it is a simplification of reality. This is because rural transport involves a complex flow of people and goods in various directions using different means. For instance, Barwell (1996) noted that the travel and transport pattern of rural households in Africa consists of three major components. First, there are the frequent trips within the village and to nearby places outside the village mostly for farming, marketing and domestic purposes. Second, there are regular travels outside the village to more distant local markets mostly for marketing of produce and sometimes to seek paid employment. Third, there are the infrequent and irregular local and long distance trips outside the village to access basic facilities

and for social functions. The system of hubs and spokes exist but not in the form described in the model whereby, the lowest level village connects only to the next higher level. In reality villages connect to other villages but, may also connect directly to regional towns (International Forum for Rural Transformation and Development (IFRTD), 2005). Most transport hubs also connect to other systems which may be that of other districts or even other countries.

To further complicate the situation, a settlement at the periphery of a transport system may belong to two separate systems because of its location. In some areas, administrative and transport catchment areas may be different. For example, there are situations where a village may belong to an administrative unit and depend on a nearby transport system for marketing activities (IFRTD, 2005; Starkey, 2007).

The Concept of Development

Development is the process through which the standards of living of the generality of members of a society are improved. While economic growth is the foundation of that improvement, development is far broader than mere increase in incomes associated with economic growth (Hoyle, 1988). Development involves much more than economic growth measured through GDP and GNP and it must result in reduction of poverty, unemployment and inequality in the society (Seers, 1969). Further broadening the conception of development Seers (1977) explained that, apart from reducing poverty, unemployment and inequality it must result in self reliance. Development is thus both man centred and multidimensional in nature (Mabogunje, 1980) and leads to a cumulative increase in the standard of living for an increasing proportion of people in the society (Hodder, 2000; Madu, 2007). The improvement in standard of living is a combination of economic, social and political processes. It therefore involves the enhancement of quality of life by improving life choices and opportunity to have access to basic necessities of life (such as food, shelter, education, good health and potable water) (Hodder, 2000).

Development is the process through which the standard of living of all members of a society is improved. It is therefore, far broader than economic growth which is mere increase in income (Hoyle, 1988). Development implies improvement in the welfare of members of the society through necessary social, political and economic conditions. This should be reflected in quantitative and qualitative improvements in human capital like income and education and in physical infrastructures like transport and other basic facilities (Rodrigue & Notteboom, 2017). Therefore, development is about people and it must lead to improvement in general quality of life, while also ensuring access to basic necessities of life like food, clothing and shelter.

A range of measures have been introduced to try and generalize development into a single representative statistic. These include the use of social indicators, the Physical Quality of life Index (PQLI) and the Human Development Index (HDI). The use of social indicators as a measure of economic development emerged due to dissatisfaction with GNP/GDP per capita as measure of economic development. These consist of indicators like nutritional standard, number of hospital beds or doctors per head, infant mortality rates and sickness rates. Social indicators or basic needs lead to higher productivity and income through human development. However, apart from the controversy over the number and types of items to be included in the index, there are problems of assigning proper weights to the different items and over reliance on value judgment (Jhingan, 2005).

The Physical Quality of Life Index (PQLI) is a human development index that combines three component indicators. These are infant mortality rate, life expectancy at age one and basic literacy at the age of 15 years. It utilizes indicators such as education, health, drinking water, nutrition and sanitation. A combination of a decline in infant mortality rate, increase in life expectancy and increase in basic literacy is viewed as an improvement in the quality of life of the people. The index is calculated by averaging the three indicators which are given equal weight and measured on a scale of 0 to 100. The PQLI is however, criticized for not measuring development which it attempts to measure. This is because; it can not be used to explain

changes in the structure of economic and social organization (Jhingan, 2005).

The Human Development Index (HDI) has been adopted by the United Nations (Fabiyyi, 2007). The HDI focuses on dimensions of human development. These dimensions include having a long and healthy life (life expectancy), level of education (adult literacy and school enrolment) and decent standard of living (measured by purchasing power parity income). After choosing minimum and maximum values for each indicator, the HDI is calculated as an average of the three dimensions. Thus, the HDI for a country determines how far it has achieved the goal of an average life expectancy of 85 years, access to education for all and a decent standard of living (Jhingan, 2005). For instance, Nigeria with an HDI of 0.470 for 2005 was ranked 158th out of 177 countries considered (UNDP, 2008). The HDI has also been criticized for not being comprehensive enough to measure human development. This is because some other important indicators like gender, inequality and political freedom are not included (Fabiyyi, 2007). It is however, a better representation of the level of development than national income (Jhingan, 2005).

Transport Development Models

Various models have been developed with the intension of generalizing the relationship between transport and development at the global level. They attempt to provide a theoretical perspective on how transport systems evolve both in time and space. Three of the most important of these models are: the Vance model, the Rimmer model and the Taaffe, Morrill and Gould model. Although, the Vance model is based on the experience of North America, it is appropriate in this context because of its global relevance. The other two models are based on the experience of developing countries.

Vance Model

The Vance model shows the importance of external influence in the development of transport networks and the emergent spatial patterns (Hoyle & Smith, 1998). In this model Vance (1970)

identified five stages in the development of transport networks and evolution of urban hierarchy on the North American continent. In the first stage European exploratory activities expand due to the need to invest surplus capital resulting in initial contact along the coastal areas. The second and third stages involve the emergence and establishment of exchange of staple products for the manufactured products of Europe. At this stage the internal transport system of North America was still rudimentary. This was because of the external orientation of trading activities resulting in liner transport patterns. The development of internal trade and manufacturing activities in the fourth stage led to the emergence of some connecting routes.

The full establishment and development of internal trade in the fifth stage resulted in the development of modern transportation system. However, despite the highly modern transport system today, evidence of the historical evolution is still present on the continent (Hoyle & Smith, 1998).

Rimmer Model

The model illustrates the development of the dual transportation systems common to developing countries due to their colonial experiences. Rimmer (1977) identified four stages in the relationship between developing countries and their European colonizers. In the first stage the transportation system of the developing country consists of a network of foot tracks and movement along navigable rivers. This is the pre-colonial stage with no link to a colonial power. In the second stage there is direct contact with the colonial power by sea. This is the early colonial phase when the Europeans restrict their activities to the coastal areas. The third stage witnessed the introduction of modern transport facilities, diversification of the economy and settlement pattern of the developing country. This is the phase of high colonization. In the fourth stage (neo-colonialism) there is continuation of economic development in the developing country. While efforts are made to adapt to the changing economic conditions there is little improvement over the earlier stages. The result is a kind of dual or hybrid transport system where traditional and imported elements exists together (Hoyle & Smith, 1998).

Taaffe, Morrill and Gould Model

This model illustrates the evolution of a transport network from a pre-colonial era of underdevelopment, through a colonial era to the era of political independence in a hypothetical developing country. The model was developed using data mostly from Ghana and Nigeria and show the sequence of evolution of the political, economic and transportation systems in developing countries (Bradford & Kent, 1984; Hoyle & Smith, 1998). Six phases of sequential transport development were identified in the model (figure 2).

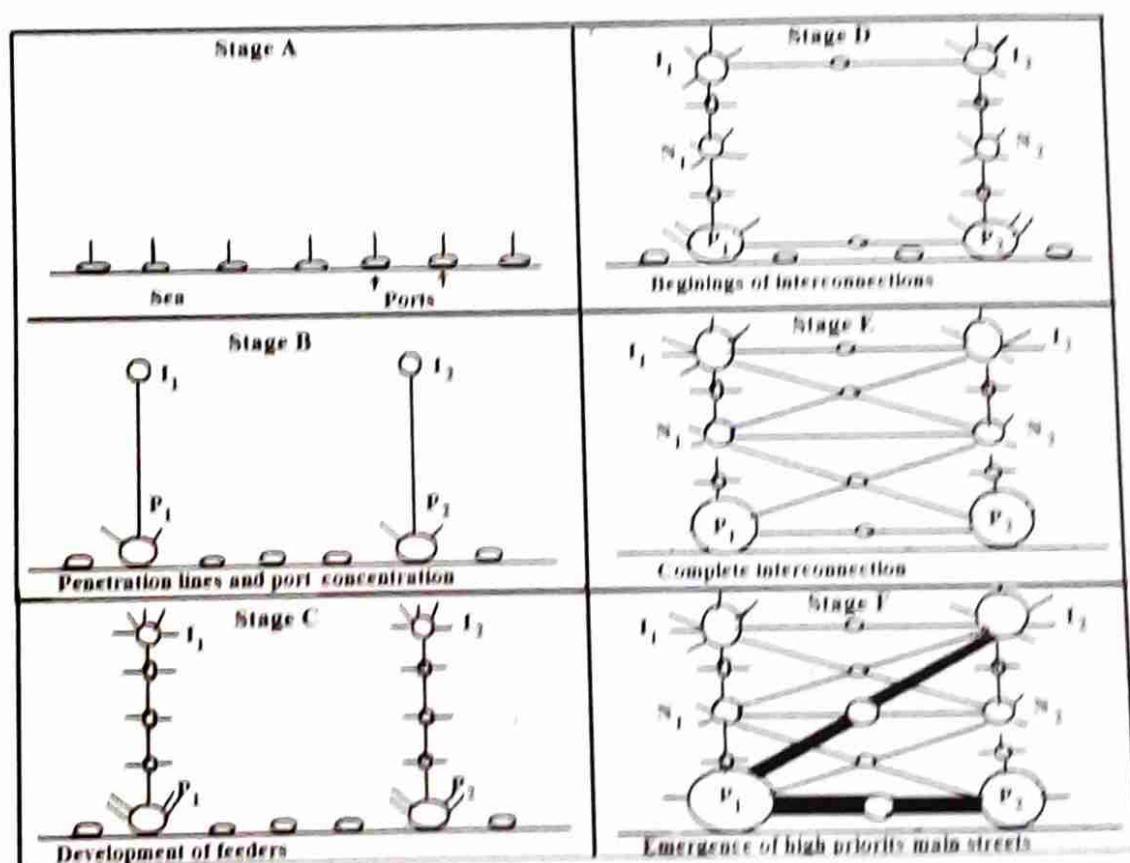


Figure 2: A Model for the Development of Transport Network in a Developing Country.

Source: Bradford & Kent (1984).

The first phase (A) witnessed the emergence of small, unconnected ports and trading posts with small hinterlands along the coast. In the second (B) phase the market areas of two of the ports expand as they develop trading and administrative links with interior settlements. At this stage feeder routes begin

to emerge. In phase C the hinterland of the two major ports continues to expand at the expense of the smaller ports. This is also the phase when small nodes emerge along the main routes while feeder development continues. From phase D through phase E the connectivity of the system gradually increases as some centres continue to grow while others continue to decline. In phase F a fully integrated transport network and urban hierarchy develops.

Relevance and Problems of Applicability of Transport/Development models

The Vance, Rimmer and Taaffe, Morrill and Gould Models are very useful for making generalizations that improves understanding of the processes involved in transport change (Hoyle & Smith, 1998). The Taaffe, Morrill and Gould model in particular is very useful for understanding the development of transport systems in African Countries (Onokerhoraye, 1985). For instance, its application to East Africa has provided a better understanding of inter-port competition (Hoyle, 1988; Hoyle & Smith, 1998). Most importantly these models show that observed patterns could be replicated in other parts of the world while also improving understanding of contemporary global systems (Hoyle & Smith, 1998).

These models however, represent oversimplification of reality (Onokerhoraye, 1985). For example, in the Taaffe, Morrill and Gould model it is difficult to account for the transition from one phase to another. Also, the nature of the development process involved is not clear. Furthermore, restricting this model to the colonial period provides no idea for understanding the pre-colonial and post colonial transport development (Bradford & Kent, 1984; Hoyle & Smith, 1998). Applications of the principles of these models to reality are constrained by some factors of political, social and strategic importance. For example, political interests may influence the quality and extent of transport networks (Bradford & Kent, 1984).

Relationship between Transport and Development

A complex relationship exists between transport and development and a number of factors are involved in this relationship. This relationship is however, highly dependent on the type of economy and society considered, the level of development and the types of transport improvements introduced. Based on the stage of development, an area must have the necessary level of transport facilities to function efficiently (Hoyle, 1988). Also, the transport system in any area can only be explained by a combination of environmental, historical, economic, political, demographic and technological factors (Hoyle & Smith, 1998). With specific reference to road transport Allum (1995) explained that, the relationship between transport and development depends on the level of development already achieved and identified three distinct phases in this relationship. In the first phase, the contribution of roads is limited due to limited potential for growth because of low level of education and access to capital. In the second phase, roads begin to play a stronger role by providing the necessary condition for the exploitation of available resources. In the third phase, the effectiveness of road provision reaches a saturation point and its contribution to development become less important.

In the past, the general assumption was that transport and development always go together. This idea was so popular that, for sometime there was little critical assessment of the actual contribution of road transport to socio-economic development (Ellis, 1997). Today, there is widespread agreement among scholars that transport is very important to spatial, economic and social growth but, there is no specific agreement on its specific roles in the developmental process (NISER, 2001). Three distinct viewpoints however exist on the role of transport in development. Transport may have a positive, permissive or negative impact (Wilson, 1966; Gauthier, 1970; Hoyle & Smith, 1998).

Various other scholars including Howe (1981) and Creighney (1993) have also examined the issue of causality between transport and development. Both of them argued that

investment in transport can be linked to the existence of good economic potential. According to Creighney (1993) investment in transport will likely be higher in areas with better economic opportunities and where pressures are higher. On the other hand, in cases where investment in transport is made to guide development failure has been recorded and therefore, suggested that investment in transport should be directed to areas recording growth or those areas with the best potential.

Possible Positive Relationship

There are those who assert that transport has a positive influence on economic growth and expansion of productive activities. Presenting an oversimplified model of the real world situation, Cole (1981) identified transport (links) as one of the six ingredients of development. The other ingredients include human population, natural resources, means of production, products and organization. Since different activities occur at different locations, it means that movement of goods, people and ideas is necessary between places. New transport facilities or improvements of existing services could have beneficial impacts on economic development. This may be in form of emergence of new industries, increase in agricultural production or attraction of immigrants with new ideas and expertise (Hoyle, 1988). Voigt (1967) noted that improvement in the transport system creates special stimuli for economic growth processes. This is because, improvement in transport give incentive for new investments by increasing the marginal productivity of capital. The resulting spill-over effects further lead to higher purchasing power and increasing demand for goods and services.

Based on past experiences of countries like Canada and the United States of America, Rostow (1960) had earlier observed that, the establishment of the railroads was a key determinant of economic growth of these countries in their early periods of industrialization. Annual rate of return of as high as 30 per cent was estimated for the Union Pacific railways for the period of 1870 to 1879. This was partly as a result of increase in productivity brought about as a result of the opening up of new lands for commercial exploitation (Forgel, 1960). Introduction of railways in those countries contributed to economic growth, by

directly opening up new lands for production and by increasing the efficiency of the mining and manufacturing sectors (Liu, 2005). Examples of positive relationship between transport and development is also reflected in the works of Wolfe (1962), Hunter (1965), Leinbach (1975), Owen (1987) and Filani (2001).

Explaining the impact of early economic growth of Canada, Wolfe (1962) agreed that the railways played a significant part in the economic growth of the country. The pattern of spatial development in the country reflected the distribution of the transportation system. Similarly, Hunter (1965) asserted that the success of the industrial revolution in Europe depended to a large extent on earlier revolution in transport technology. He therefore, concluded that there was a causative link between transport and economic development. Leinbach (1975) showed how development in transport brought about a significant expansion in the economy of Malaya. This was as a result of rapid expansion in the production of rubber and significant development that occurred in tin mining operations. Owen (1987) demonstrated a strong correlation between transport and the economy of developing countries. Using data from some developing countries, he observed a positive relationship between volume of flow of passengers and freight and Gross National Product. In a study of the relationship between transport and economic development in the Yangtze region of China, Sloboda & Haliemun (2010) attributed the major economic expansion in the region to investment in transport infrastructure and further noted that this has also resulted in positive spill over to surrounding regions.

In Nigeria, the extension of railway to the north in 1912 led to the rapid expansion of groundnuts production in the country (Mabogunje, 1980). For instance, in the Kano area, production of groundnuts increased by 1000 per cent between 1911 and 1913. The railways also, reduced travel time from the tin mines of the Jos plateau to the coast from 35 days to 35 hours and reduced the cost of transportation by more than 300 per cent (Filani, 2001). The low level of socio-economic development in rural areas of Nigeria has been attributed to the absence of efficient transport facilities (NISER, 2001). Poor conditions of rural roads have serious adverse effects on agricultural productivity and smooth

commodity flow between rural and urban areas (Adesanya, 1997).

Possible Neutral Relationship

Another school of thought believes that the effect of transport on development could only be regarded as permissive. This is because transport on its own can only impact on other productive activities where other necessary stimuli exist. Hirschman (1958) classified transport investment as an investment in social overhead capital, which is different from investment in directly productive activities and was in favour of investment in directly productive activities using the existing transport infrastructure. Investment in transport should only be made to address bottlenecks in the transport system. According to Hilling (1996) the permissive effect of transport operates when transport on its own does not stimulate economic growth but, it does not prevent growth resulting from other sources. Transport improvement on its own may not result in anticipated expansion in the economy and returns may be disappointing. It may however, result in widespread economic transformation in conjunction with other developmental activities (Hoyle, 1974).

Gauthier (1970) observes that transport should not be singled out as the only factor in the development process, because it will result in an over simplification of a very complex process. He argues that the development process involves a system of interaction between human and material resources. The impetus to economic growth may result from other parts of the system, while transport neither stimulates nor inhibits such growth. This is especially the case in developed countries, where the high level of transport development makes it very difficult to determine the contributions of transport improvement to the economy (Aderamo, 2007).

Transport investment is seen as a necessary but not a sufficient precondition for development. For instance, Wilson (1973) identified two important things in relation to investment in transport. These are the creation of economic opportunities and the response to economic opportunities. The creation of economic opportunities depends on the resources available

in the area, the type of change in transport rates and service quality and commodity prices. Furthermore, factors determining response to new economic opportunity include the awareness of its potential, availability of finance and the size of potential benefits compared to alternative investment opportunities. Though, increased access as a result of transport improvement may allow more people to take advantage of new economic opportunities, this could lead to disequilibrium or even a decline in markets protected by high transport cost (Rwebangira, 2005).

Possible Negative Relationship

Transport investment may also have negative impacts. This may occur when returns on investment in transport are lower than what would have resulted from investment in directly productive activities. There may even be the possibility of actual decrease in per capita income (Hilling, 1996). Transport development could bring changes in the structure of the economy that may be the opposite of those desired. For instance, using the example of Rio de Janeiro and Sao Paulo in Brazil, Gauthier (1968) observed that increased accessibility which resulted from improvement in transport increased the agglomeration advantage of urban areas at the expense of rural areas.

Generally, transport development in the colonial period contributed to the underdevelopment of colonial territories, by causing regional imbalance, core-periphery relations and conditions of exploitation and dependency (McCall, 1977). As seen in the case of Tanzania and some other developing countries the real gains from transport improvement accrued to the urban areas to the detriment of the rural areas (McCall, 1977). Generally, in most developing countries traditional economic activities stagnated and declined because, the colonial economy was based on the export of a small range of raw materials and importation of consumer goods (Hilling, 1996). In Nigeria, the colonial period witnessed the expansion of cash crop production while food crop farming and the local craft industries declined. The stagnation in agriculture which occurred has been sustained by the urban oriented resource allocation resulting in high rate of rural-urban migration and increasing decline in rural productivity (Filani, 1993).

Impact of Transport on Rural Production and Income, and Access to Basic Facilities in Developing Countries

Availability of adequate transport facilities is commonly associated with positive impact on agricultural production, farm and non-farm employment and vibrant economic activities. Improved mobility eases the evacuation and marketing of farm products and the delivery of farm inputs and extension services. In addition, it increases the time available for other economic and social services apart from also increasing access to basic facilities (Olukotun, 2007). Therefore, two major ways in which transport aid rural socio-economic development is through; its impact on rural production and income, and by improving rural dwellers' access to basic services like health, education, water and marketing facilities. These are believed to be some of the most important indicators for determining peoples' welfare level and for measuring socio-economic progress in rural areas. This therefore justifies the focus of the remaining part of this paper which is concerned with the effect of transport on agricultural production and income and on access to basic facilities in rural areas of the developing world.

Transport and Rural Production and Income

Improvement in transport is known to contribute to reduction in the cost of inputs, aid innovation diffusion, expand production and raise people's incomes (Gannon & Liu, 1997). For instance, Carvero (1992) observed that households in remote parts of Sumatra were associated with lower levels of consumption expenditure. The study further noted that value of farm outputs increased with road quality, frequency of transport services and proximity to commercial centres. On the other hand, level of access was found to have no effect on agricultural productivity in the Ashanti region of Ghana. Though, the more accessible villages had better access to other sources of income (Hine et al., 1983). Generally, transport cost as a proportion of production costs, increases with distance between village and fields. High transport costs may therefore, force the farmer to limit his cultivations to fields closer to the village (Riverson & Carapetis, 1991).

Improvement in transport stimulates economic development in rural areas through the expansion of opportunities for income and employment. For instance, in village level surveys carried out in Burkina Faso, Uganda and Zambia, Barwell (1996) revealed a positive relationship between level of access to roads and household income. The survey concluded that access to good roads raises the economic opportunities for people in rural Africa. Working in Bangladesh, Ahmed & Hussain (1990) observed that rural communities with better access to markets and basic services have lower poverty levels. Such communities had higher agricultural productivity, higher household incomes, better health and higher participation of women in economic production. For instance, they noted that household income was about 33 per cent higher in the villages with more facilities. In these villages agricultural incomes were higher by 24 per cent while, wages were higher by 100 per cent.

Evidence from rural China indicates that higher density of roads reduces the probability of households in the community falling into poverty (Jalan & Ravallion, 1998). Similarly in rural Peru, access to roads and public facilities increased farm and non-farm incomes thus, helping to raise peoples welfare level (Escobal, 2001). Kwom (2001) also established that roads have strong positive impact on income and agricultural productivity in rural Indonesia. Households in communities with better roads had higher farm productivity, better non-farm opportunities and higher incomes.

Access to personal means of transportation is also known to have positive effect on rural income generation. For example, in rural Sumatra households with IMT like motorcycles, bicycles and scooters have better access to agricultural and off-farm incomes (Carveto, 1992). Similarly, using evidences from Uganda, Burkina Faso and Zambia, Barwell (1996) noted that, the use of IMT improves household income by allowing larger areas to be cultivated, increasing labour productivity and helping to reduce losses at harvest time. In their study of Amuro District of Kogi State, Nigeria, Ipingbemi & Aloba (2005) concluded that the use of IMT enhances mobility of rural dwellers. They however, noted that male domination of the use of IMT like bicycles contribute to higher poverty level recorded among women. Usman & Ariyo

(2012) also observed a positive relationship between ownership of IMT and off-farm income of rural households in rural areas of Kwara State, Nigeria.

According to the World Bank (1989) road improvements in Nigeria has been associated with increased productivity and improvement in quality of life. The report further observed that transport infrastructure ensure the movement of agricultural and non-agricultural consumption commodities and ensure the personal mobility of rural households. Similarly, Yunusa et al. (2002) established that rural road improvement in part of rural Kaduna State, led to a significant increase in agricultural production, farm and non-farm employment and revitalization of economic activities in the area.

However, in some cases only some categories of roads have been found to have positive impact on economic development. For instance, Njoh (2012) discovered that only paved roads were positively associated with economic development, in a study of impact of transport on development in East Africa and the Indian Ocean Region. Unpaved roads were found not to have positive relationship with development in the area. Thus, rather than become an incentive, dirt roads may constitute obstacles to movement if they become impassable during the rainy season.

Rural Transport and Access to Basic Facilities

A significant contribution of transport to economic development is that, it improves people's welfare by providing access to basic facilities (Aderamo & Magaji, 2010; Usman & Sulyman, 2015). Access to basic facilities plays a very significant role in level of use of the facility by the people. Meanwhile, the level of access depends on the cost, time and effort required to reach the facility. On the other hand the cost, time and effort required depend on distance and the ease of mobility (Halseth & Ryser, 2006). Inadequate transport in developing countries limits access to basic facilities like health and education and reduces opportunities for improving income in rural areas (International Fund for Agricultural Development (IFAD) 2001; Global Action on Aging (GAA), 2008). Therefore, improvement in transportation improves people's opportunity to satisfy social

and economic needs such as those relating to health, education and marketing among others.

For health services for instance, transport plays the role of easing the movement of individuals to health facilities and facilitating the movement of health workers for outreach activities. In addition, it aids the timely provision of emergency services and distribution of drugs and other essential materials to health centres (Linke et al., 2008). In Nigeria, roads have been identified as been very vital to improving access to basic services and developing the rural economy. Evidence has shown that in communities with paved roads higher proportion of the people has access to health services compared to residents of communities without paved roads (World Bank, 1996). Distance has great impact on hospital attendance. For example, in Zambia 50 per cent attendance was recorded for people living within distance of less than 5 kilometres. On the other hand, only 2.0 per cent attendance rate was recorded for those residing within 33-40 kilometres of medical facilities (Howe, 1983). Distance to health facilities and the ease and cost of transport are very important in people's willingness and ability to seek health services (World Bank, 1993).

In the case of educational facilities, distance and ease of transport to school is known to have an impact on school enrolment, especially in the case of female education (Avotri et al., 1999). Evidence from Ghana has shown that higher travel time has negative impact on school enrolment (Jacoby, 1992). Similarly, in Morocco a study on schooling and cognitive achievement found that the presence of a paved road raised the probability of female attending school by 40 per cent and lowered the probability of dropping out by 7.0 per cent. Road improvement also, reduced probability of boys dropping out of school by 36 per cent (Khandker et al., 1994). A related study in the country also found that rural road improvements increased agricultural output and improved access to social facilities. Improvement was recorded in school enrolment rate, frequency of visit to hospitals and attraction of professionals to hospitals and schools (Levy, 1996).

In developing countries (in Sub-Saharan Africa in particular) marketing of agricultural produce is often limited by inadequate access to marketing facilities due to poor transport. Therefore, rural communities with better access to markets and other basic facilities are known to have higher incomes and greater participation of women in economic production (Ahmed & Hussain, 1990). Improved transport significantly improves access to markets and creates opportunity for improving production. This is by making new markets accessible thus, giving producers opportunity for higher prices, while also providing opportunity for cheaper and wider variety of inputs (Hine & Ellis, 2001).

In a study of the Nsukka region of Nigeria, Madu (2007) identified provision of roads as a strong underlying factor of rural development in the region. Areas with high road density and communities with high magnitude of link to other communities were found to have better access to basic facilities and also recorded higher levels of socio-economic development. Aderamo (2007) revealed that in Kwara State, Nigeria, areas with high road density have more basic facilities than those areas with low road network density. Aderamo & Magaji (2010) also observed a positive relationship between road network density and distribution of public facilities in Edu LGA of Kwara State. They emphasized that well maintained transportation system promotes socio-economic development and concluded that, improving rural roads will bring basic facilities closer to the people, improve economic opportunities and reduce rural poverty.

Conclusion

Transport plays a very important role in the process of modernization of society. Although, at times transport is known to hinder progress, it stands out as a key factor in socio-economic development. In the developing world, the rural economy is largely dependent on agriculture which is highly influenced by a variety of factors such as access to inputs and markets which largely depends on availability of transport facilities. Transport also plays the important role of providing access to basic facilities like health and education among others.

While taking cognizance of the different views on the actual relationship between transport and development, one cannot deny the fact that improved transport plays very important role in improving rural production and income and improving access to basic facilities in rural areas of the developing world. Transport improvement is undoubtedly an important tool for raising people's welfare in the society.

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