



ASSESSMENT OF DUAL CARRIAGEWAY FOR SUSTAINABLE SOCIO-ECONOMIC DEVELOPMENT IN ADO EKITI, NIGERIA

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ABSTRACT

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Various studies have been carried out on urban dual-carriage ways and its implication on sustainable development in different parts of world. In Nigeria, work on dual carriageway for sustainable development still remained under explored. This study therefore, focused on urban dual carriageway for sustainable development of Ado-Ekiti and to enhance good quality of life of the people. Data for this study were obtained from primary and secondary sources as well as field observation. 250 copies of questionnaire were administered in 5 purposively selected areas in Ado-Ekiti with the use of questionnaire. Simple random sampling method was used to choose 30 houses at an interval of 10 houses through balloting. Secondary data were sourced through journal articles and edited books. Data were analyzed using both descriptive and inferential statistic techniques. Chi-square statistical method were adopted to test the two hypotheses stated (i) effect of dual carriageway on socio-economic activities in the area and (ii) the impact of dual carriageway on travel time and cost of transport in the area at 5% level of significance. It was discovered that dual carriageway has great influence on socio - economic activities, trip generation, travel time, cost of transport among others in Ado- Ekiti

1. INTRODUCTION

An efficient transport system will continue to play a significant role in accessing public facilities both in the rural and urban areas of the world. The main purpose of effective transportation most importantly in the urban areas is directed towards fulfilling the demand for transportation that enhances movement of passengers, freight and information. One fundamental fact is that transportation is an indispensable component of the economy that plays a major role in spatial relations between two locations (Origin and destination) (Ogunbodede, 2008)

An efficient transportation according to Ogunbodede and Ale (2015) and Ogunsanya (1998) creates valuable links between people at global level. Overtime, transportation has been as still playing a very role in production and consumption of goods and services at different levels, which allows specialization of products to occur as well as the distribution of those products to take place at different levels (Ikporukpo, 1998; Aderamo, 2012).

The changes in the physical environment in the modern society has resulted from the large distance between home and work place, shops, recreation center, religious, and medical center which allows people to demand for mobility to aid from the various location.

Unlike other modes of transportation systems, road transport is the most flexible means which allows easy traffic flow, goods and passengers over a given distances, thus signifies that road improvement between two

locations most importantly dual carriage-way has not only allow free flow of vehicles but also allows smooth journey between places reduction in traffic hold up as well as enhancing quick delivery of goods and services.

In recent time, urban areas are characterized by various land use activities that are spatially distributed. In view of this, the existing roads need to be improved upon either by increasing the width or through dual expansion so as to facilities easy accessibility and allow free flow of traffic to the various land use. However, as city develops and expands, the distance separating the land use system also separating the land use system also increases. The flexibility of road network in terms of speed and travel time allows the need for provision of dual way within the city (Osoba, 2012).

The significance of dual carriageway cannot be over-emphasized both in the developed and the developing nation of the world (Osoba, 2012). For example, in North America, dual carriageways were built with medium strip lanes in each direction of flow. Regardless of the importance of the dual carriageway in transport terms, there is an environment connotation as part of the environment undergoing certain transformation (geometry)

Unlike other mode, sophisticated movement control measures are also very necessary such as; traffic light, pedestrian crossing, warning signs and road marking that are required. In Nigeria, cities are developed on several factors both economic, social and politically, which has led to the fast growing of some modal settlements as well as countries side. The increase and expansion of these cities reveals negative effects on transport system of such areas like high magnitude of traffic congestion, pollution, traffic accident and robbery. As a result of increase in the level of car ownership, narrow ways and poor condition of the city road network.

However, the ultimate goal for dual carriageway is to facilitate swift movement of traffic, convenience and to promote effective services delivery and to further improve or transform the transport landscape of the environment. Hence, the need to evaluate the impact of dual carriageway for sustainable development of Ado-Ekiti.

1.1. Statement of the Problem

As city grows, develops and expands, land use becomes dispersed, trips length increase and morphology of the city requires greater and better forms of transportation system to meet the ever increasing and the demand for a functional transport infrastructure of such center (Ogunsanya, 1992).

As noted by Axhausen and Gärling (1992) with rapid increase in the number of megacities all over the world, coupled with the fact that more than half of the world population lives in the cities, there is need for efficient improvement in the network and other transportation infrastructure within the urban areas which can be achieved in various ways. In Ado Ekiti, the rapid growth in both social and economic activities in recent years was due to the fact that Ado was made the state capital of Ekiti State. This however, influences all classes of worker to the city as a result of salary increase by the governments coupled with economic opportunities all there put together has led to high level of vehicle ownership (both private and public) which has consequently led to a tremendous increase in the number of commuters and other road users in Ado Ekiti.

However, the narrowness and the poor condition of road network and other transport infrastructure in Ado Ekiti did not only hindered the free-flow of vehicle, but also led to mobility constraints such as traffic jam, parking problems, noise and air pollution and traffic accident most importantly at the T-junctions. Considering all these problems, there is need for the dual carriageway of the major highways connecting various points (communities) to the city centers in Ado-Ekiti such as Ajilosun to old garage, Ijigbo-Okesa, Fajuyi to Basiri- Iyin Road, Fajuyi to Adebayo, Old Garage to Shagari Housing Estate and to Odo-Ado-Poly Road respectively.

In view of this, the study aimed at examining dual carriageway in Ado-Ekiti with a view to assess its impact on the social-economic activities as well as its sustainability on the quality of life of the people in the study area. To achieve this, the following objectives are considered; to identify the impact on social-economic activities in the area and to determine the effects on travel distance, travel time, wasting time as well as trips generation of the road users in the area.

2. CONCEPTUAL ISSUES AND LITERATURE REVIEW

The concept of urban transportation improvement according to [Ogunsanya \(1992; 1998; 2004\)](#); [Adefolalu \(1987\)](#) implies increases in the expansion and modernization of the existing Urban transport facilities, through the introduction of modern technology to facilitate both intra and inter urban movement of labor, raw materials and finished products from the factory to the market. However, [Tanimowo and Atolagbe \(2006\)](#) emphasized that spatial organization of a city is all about interaction that takes place within and between cities, how movement is undertaken both within and between locations as well as the ease at which movement is undertaken within and between locations.

The efficient functioning of a country's economy depends largely on the adequacy and efficient of its transport system. According to [Odunfunwa \(2010\)](#) the basic facilities needed for transport are; the right way of network, the need for terminal facilities and the carriers (i.e. the rolling stock), which perform the actual services of moving people and language. The combined utilization of these facilities results in traffic flow that varies from value, density and flow based on time and space. As city developed, there is high tendency for increase in distance between various land uses, however flexibility of road network in terms of its ability to change location, direction, speed and time of travel required quality road within city so as to aid door to door services.

2.1. Concept of Urban Growth and Urban Transport

According to [Oyesiku \(2002\)](#) in the year past, most Africans lived in the villages and in small towns where movement is confined within a few meters to obtain goods and services. However, in recent time, increase in urbanization, spatial expansion with differences in land use has changed this principle. The variation in the land use system has changed the characteristics of many settlements and this has greatly increased the need to commute between and within settlements of different sizes, function and land uses.

This is why the study of roads has evoked much interest in literature, most importantly in the study of urban transport. Roads are indispensable for daily mobility as well as enhancing good quality of life, it allows the demand of people to be met over space, allows people to commute to workplace, schools, factories, recreation centers for religious activities among others. At the same time, time to work place is reduced with efficient road infrastructure.

An efficient road network will considerably improve free flow of vehicles and at the same time reduces man's lost hour to traffic jam and hold-up. While standard of road infrastructure will guaranteed human safety on motor ways while road signs and traffic warders will prevent unnecessary hold-up at the road junctions..

Urban land uses are not evenly distributed while different land uses have different capacity and generate different volume of vehicular traffic within the city. Base on this, a spatial imbalance is created which can only be bridged by transport. It is a clear fact that most cities in both developing and developed countries of the world are increasingly witnessing rapid rate of urbanization which has impact on both land use and transport system of such area.

However, most unplanned land in many urban areas in Nigeria are confronted with various urban traffic problems, therefore, there is need for adequate provision of infrastructural facilities most importantly in the transport sector. The relationship between transport and urban growth is a subject to theoretical interest. To some people, transport is a pre-condition of economic growth; others did not share the same view. For example, [Banister \(2002\)](#) in his opinion agreed that transport network is only part of infrastructural development that affects urban growth. While [Olayemi \(1977\)](#) in his studies, regarded transport improvement as indispensable to acceleration of development process but to other scholars, transport is a key to development. In essence, this simply signifies that transport development is inevitable to the acceleration of economic growth and development not only within the city but at regional level ([Aderamo, 2012](#)).

The growth patterns of any city is affected among other things by its location and nature of its location and nature of its interaction that brings about by improved transport network meant to link one region to another. If an

area is not well linked and served by an efficient transport network, it may have negative consequences on the growth of such center. In Nigeria today, the creation of states have led to the development found in some cities as headquarters of some states. According to [Tanimowo and Atolagbe \(2006\)](#) and [Ogunbodede \(2006\)](#) in their studies agreed that states creation will lead to the development of more growth pole centers and indeed brings about more development as well as improvement in the demand for more roads.

2.2. Concept of Road and Urban Transport

The effective and efficient functioning of a nation's economy depends largely on the adequacy and effective transport system of such nation.

According to [Adefolalu \(1987\)](#); [Axhausen and Gärling \(1992\)](#) and [Odufunwa \(2010\)](#) three basic facilities are highly necessary and required for an effective urban transportation system. First, is a right of network or link, second is the need for terminal facilities and third, the carrying units that performs the actual services of mobility and flow of people and goods along a given network corridor. It could as well be the combined utilization of these facilities an infrastructure results in effective traffic flow that varies in volume and density with different network overtime at a given space.

Unlike air and water transport, road transport is more flexible and thus allowed and aids the movement of passengers and goods. Road network either dual carriage or single lane between locations have not only allow easy flow of traffic but also enhanced quick delivery as well as allowing door to door service delivery over space.

Inadequate and suitable road network may result into road congestion, traffic jam, frustration and lost man's hours as well as traffic accident among others. Hence, this may results to the decline in the importance and value of city areas, considering the day-to-day business and other social and political activities ([Ipingbemi, 2010](#); [Odufunwa, 2010](#); [Osuji and Onyenechere, 2013](#)).

The continuous demand for land use in the cities, had led to the increase in recent economic activities in many urban centers and this in turn had led to the increase in traffics to the city centers from the country-sides which makes planning and demand for route expansion as well as dual carriageway the major artery roads inevitable.

2.3. Socio-Economic Effects of Dual carriageway in Nigeria

Many Nigerian cities are experiencing serious challenges in their main city centers. These problem ranges from poor road network, narrowness of the routes and bridges that had led to different crisis such as traffic jam and hold up, traffic accident and lost in man's working hours in cities like Lagos, Onitsha, Ibadan, Akure, Port Harcourt among others.

The components of these problems are as a result of the increase in the number of commuters, numbers of vehicles that ply the roads and improvement in the socio-economic and political activities within the city centers added to the poor state of the urban roads network system.

[Ogunsanya \(2004\)](#); [Ogunbodede \(2004\)](#) from their various studies pointed out that urban transport problems and traffic delays are among the symptoms of malfunctioning of urban traffic system. In recent times the growing volume of road traffic and other related problems have perhaps claimed more public attention than any other urban problems in Nigeria ([Ogunbodede, 2004](#)). The reason for this is quite clear in that it is the most visible problem that seems to affect nearly every commuter in many urban cities in Nigeria, the fact that one owns a personal car for transport does not confirm transport comfort-ability of such motorist, because nearly every individual experiences the challenges of traffic delay and congestion of intra-urban transport. This problem therefore have received considerable attention of scholars in Nigeria such as [Ogunsanya \(2004\)](#); [Ogunbodede and Aribigbola \(2003\)](#).

According to [Ogunsanya \(2002\)](#) transport is regarded to be the maker and breaker of cities. Even though the provision of urban transport has enabled people to live further and farther away from their places of work and at the same time increased spatial distribution and diffusion of goods and ideas. Hence, urban transport has equally

promotes; a competition for urban space; create traffic congestion problem; increases in cost and break in family ties; results in traffic accident; promotes environmental pollution as well as traffic noise

However, these problems vary from one urban area to another. For example, such problems are more pronounced in Lagos State, Kano, Abuja and Port-Harcourt. Although places like Oshogbo, Akure and Ado Ekiti are beginning to experience some of these challenges on specific artery routes within the metropolis, In Ado-Ekiti, for example, places like, Ajilosun, Fajuyi – Iyin road, Ejigbo, Old garage and Adebayo have been facing similar problems.

This is simply because of the astronomical increase in the volume of vehicles plying these roads in the recent years coupled with the fact that the urban mass transit, which would have reduced the use of privately owned vehicles, remains relatively under-developed. This has accentuated the problems of traffic congestion, noise and pollution as well delay in most of the city centers in Nigeria.

The federal government in her third national development plan in 1975-1980 embarked upon various steps to improve on the problems of urban transport in some major cities in Nigeria. These steps according to [Ogunbodede \(2007\)](#) includes; construction of major by-pass, ring roads system, bridges and pedestrians fly over-coupled with commissioning work on improving urban transportation problem. Yet transport challenges in these urban centers continuous worsen on daily basis.

3. STUDY AREA

The study area is Ado- Ekiti in Ekiti State. The state was carved out from the then Ondo State in 1996. This gave the study area an accelerated development growth both physically, socially, economically and politically. The study area lies between latitude $7^{\circ} 37'$ and 8° North of the equator and longitude $5^{\circ} 13'$ and $5^{\circ} 23'$ East of the Greenwich meridian. The study area is bounded in the North by Iyin, Ikere Ekiti in the South while Ilawe and Iworoko and, Are and Ijan to the East respectively.

The study area fall within the tropical climate with two distinct season (Wet and dry).The dry season brought along the tropical continental air mass (TCAM) from the Sahara desert. This air mass is accomplished by harmattan while the wet season comes with tropical maritime (MT) air mass, which originated from Atlantic Ocean that normally brings moisture laden to the hinterlands. The temperature of the study area is almost uniform throughout the year, except little variation between February and march that mark the hottest month of about 28°C and 29°C respectively.

Similarly, the mean annual rainfall is about 1, 367 mm. The relief of the study area rises from about 335 meters in the South to about 730 meters to the South-West. The landscape of Ado-Ekiti is dotted with hills of volcanic origin with complex basement rocks. River drained this area include, river Amu, Awedele, Ajilosun, Adere, Irona and Ogbese. The vegetation of the study area is of tropical rainforest type that is characterized by economic trees such as mahogany, Iroko, Obeche, Afara etc.

The population of the study area as projected by [NPC \(2006\)](#) was put to be 409, 060 People since the creation of Ekiti State, Ado Ekiti had been expanding, this expansion became so significant that called for road expansion and dual carriageway as a result of the expansion in the land use patterns as well increase in the demand for transportation system in the area.

4. METHODOLOGY

Data used for this study were obtained from both primary and secondary source. For primary Data, questionnaire were designed to sought information from the respondents on socio-economic status, impact or road dual carriageway on travel distance, trips patterns as well as the environmental impact of road dual carriageway on the residence of the study area. Similarly, field observation was also employed to collect Data for the study. For

example, identification of the land uses. 50 copies of questionnaire were administered in 5 purposively selected areas in Ado-Ekiti.

This areas are Ajilosun, Old- garage, Fajuyi, Basiri and Adebayo. Simple random sampling method was used to choose 30 houses at an interval of 10 houses through ballot. Thereafter, the head of each household were interviewed. Secondary Data were sourced through journal articles and edited books. Data were analyzed using both descriptive and inferential statistic techniques. Descriptive analysis and summarized frequency table of percentage, charts and graphs were used to analyze socio- economic variable of the respondents while chi-square statistical method were adopted to test the two hypotheses stated. (i) H_0 : dual carriageway has no significant effect on socio-economic activities in the area and (ii) H_0 : dual carriageway in Ado- Ekiti has no impact of travel time and cost of transport in the area at 5% level of significance.

5. RESULT AND DISCUSSION

Data collected from the field through administration of questionnaire were summarized in Table 1

Table-1. Socio-Economic characteristics of the respondents

Age	Frequently	Percentage
30-40 years	63	44
41-50 years	39	26
51-60 years	21	14
61-70 years		
Sex		
Male	87	58
Female	13	42
Marital status		
Single	36	24
Married	87	58
Divorce	15	10
Widow	12	08
Education/qualification		
Non formal Education.	30	20
Primary	57	44
Sec. Sch. Cert	42	28
Post sec. Sch.	27	18
Occupation		
Artisan	33	22
Trader	27	18
Transport	30	20
Farmer	24	16
Civil- servant	36	24
Income		
< 10,000	15	10
N 20,000-N30,000	45	30
N 31,000-N40,000	30	20
N41,000-N50,000	15	10
N51,000-N60,000	25	16.7
N> 60,000	20	13.3

Source: Author's Field Survey, 2016

From the analysis, Age, Sex, marital status Educational qualification and level of income of the respondents were summarized as shown in Table1 From the table, it was discovered that larger percentage (70%) of the respondents fall within the age bracket of 30-50years while the remaining 18% of the respondents were above 60 years old which could as well be regarded as the elderly people. Similarly, it was discovered from the table that 58% of the respondents were male while the remaining 42% were female this signifies that the male respondents are higher than that of the female.

On educational qualification, it was discovered from the table that larger percentage (80%) of the respondents have former education, ranging from primary school living certificate to higher degree while only 20% of the respondents were those who did not attain any qualification (illiterates). From the table, it was also discovered that higher percentage of the respondents fall within the low income earner compare to what is obtainable in the developed world. This signifies that most of the respondents were still within the poverty level.

5.1. Impact of Road Dual carriageway in the study Area

The impact of dual carriage way on travel and wailing time, period of travel time and hold-up experienced in the study area were analyzed as shown in Table 2. From the table, t5he time covered in travelling from one location to another for various activities by the respondents were carried out before and after the dual carriageway of the roads in the study area (see Table 2).

Table-2. Travel Time Before and After Road Dual Carriageway in Ado-Ekiti.

Trip generation	Travel Time Before Road Dual Carriageway in Minutes						Travel Time After Road Dual Carriageway in Minutes					
	<20 minutes	21-30 minutes	31-40 minutes	41-50 minutes	> 1 hour	Total	<20 minutes	21-30 minutes	31-40 minutes	41-50 minutes	> 1 hour	Total
Health center	13	12	56	27	42	150	49	52	22	20	7	150
Market	21	24	35	34	36	150	78	35	22	15	-	150
Religious center	17	8	29	68	28	150	67	44	23	11	5	150
Work	15	10	32	35	58	150	87	34	29	-	-	150
Recreation center	18	25	23	33	51	150	64	36	32	18	-	150
Educational center	13	26	32	33	46	150	79	58	7	5	1	150
Total	97	105	207	230	261	900	424	259	135	69	13	900

Source: Author's Field Survey, 2016

Analysis from the table showed that five points of activities were identified in the study area. However, a total of 900 trips were generated both before and after dual carriageway in Ado-Ekiti. Before the dual carriageway was constructed, it was discovered that larger proportion of the respondents spend between 30 minutes to 1 hour to get to their various points of activities in the study area. This is because of the poor condition of the road as well as problem of traffic hold up. For example about 23% of the respondent spend above 30 minutes as their travel time, 25.5% spend between 40 to 50 minutes as a results of the poor state of the road while 29% of the respondents spend over one hour to get their various destination before the dual carriageway of the road. This simply means that much time is wasted in making trips to different land use by the respondents as a result of the poor transport infrastructure in the study area, knowing well that time is wealth.

Comparatively, the situation differs and never remains the same after the construction of the dual carriageway in the study area. This is so because the trips that normally take much time before the dual carriage now take little time. For example, 47. 1% of the respondents spend less than 20 minutes to travel from their various origins to destination, such as home to shopping, religious centers, recreation among others. While only 1. 4% of the respondents spend between 50 to 1 hour to get to their destination from their homes, perhaps these are the people that resides in new and very remote area far away to the point of accessing vehicles. In most cases they rely on the using of commercial motorcycle to get to the main point of accessibility. However, improvement on road network infrastructure is a function of travel time, cost of transport and conveyance. This is in line with the findings of Ogunsanya (2004).

5.2. Impact of Average waiting time Before/After Road Dual Carriageway in Ado-Ekiti.

The significance of dual carriageway on waiting time of committers to get vehicles from access points to their various distinctions was sorted for in the analysis as shown in Table 3.

Table-3. Average Waiting Time Before/After Dual Carriageway in Ado-Ekiti.

Waiting Time	Before Dual Carriageway	Percentage	After Dual Carriageway	Percentage
< 10 minutes	05	3.3%	78	52
10-20 minutes	10	6.7%	52	34.7
21-30 minutes	18	12%	10	6.7
31-40 minutes	21	14%	7	4.6
41-50 minutes	33	22%	3	2
>1hour	63	42%	-	-
Total	150	100	150	100

Source: Author's Field Survey, 2016

From the table, it was discovered that before dual carriageway in the study area, larger proportion of the respondents (42%) spend over an hour waiting for vehicle to their various destinations. This showed that more main's hours are lost in waiting for vehicle to get to their various point of activities in the study price.

Contrary to this, little time were spent by the respondents after the construction of the dual carriageway and rehabilitation of other roads in Ado-Ekiti. For example larger percentage (52%) of the respondents spend less than 10 minutes to get vehicle or commercial motorcycle to their various point of activities, other people spent between 10 to 20 minutes while some spent lesser time to get vehicle to their various points of calls. The implication is that improvement in road network infrastructure and other transport facilities facilitates easy movement of vehicle and commuters as well as increases the daily incomes of the motorist.

5.3. Hypothesis Testing

(1) H₀ "Dual carriageway has no significant effects on socio-economic activities in Ado-Ekiti"

The above hypothesis was tested using the summary in table 4 of the Data collected on dual carriageway and socio-economic implication in the study area (see table 4).

Table-4. Summary of χ^2 Statistical Analysis

	Degree of freedom	α	Cal. χ^2 val.	Tabulated χ^2 value	Decision
Dual Carriageway has no significant effects on socio-Economic activities in Ado-Ekiti	(n-1) (10-1)= 9	5%	22.4	18.3	H ₀ is rejected while H ₁ is accepted

Source: Author's Field Survey, 2016

From the table it is evidence that at nine (9) degree of freedom of 5% significant level of confidence, the calculated chi-square value (22.4) is higher than the tabulated Chi-Square value, therefore, the null hypothesis is rejected. According to Okoko (2008) one can succinctly say that dual carriageway has greater influence on socio-economic activities in Ado-Ekiti. For instance, it will enhance access to market, health centers, recreation land use area, reduction in the level of hold up as well increase in the landed properties of the adjoining land. This is in line with assertion of Tanimowo and Atolagbe (2006) that urban dual carriageway has considerable. Impact on day-to-day business and socio-activities of the populate in such an area

5.4. Hypothesis Testing

(2) H₂ Dual Carriageway has no effect on travel Time and cost of transport in the study area"

The above hypothesis was tested using summary of data collected on average travel time and cost of transport of the respondents in the study area. The summary of the result of the analysis is as shown in Table 5.

Table-5. Summary of χ^2 Statistical Analysis

	d/f	α	Cal.χ^2	Table value	decision
Dual carriageway has no effect on travel time and cost of transport	(n-1) (n-1)=4	5%	4.72	3.18	H ₀ is rejected while H ₁ is accepted

Source: Author's Field Survey, 2016

From the above statistical analysis, it is vivid that at 4 degree of freedom, and at 5% significant level of confidence. The computed Chi-square value (4.72) is greater than the table value (3.18). Since Chi-square value is greater than the tabulated value, the null hypothesis is rejected while the alternative hypothesis is accepted that dual carriageway has effect on travel time and also influence cost of transportation in the study area. This statement is confirmed with the assertion of Ale (2014) that any improvement on road network infrastructure in terms of road rehabilitation will further improved on transport accessibility and connectivity for easy service delivery of any environment

6. CONCLUSION

The impact of dual carriageway for sustainable socio-economic development of any nation most importantly in Nigeria cannot be over-emphasized. However, the study examined the significance and contributions of intra-urban dual carriageway to the sustainable development of Ado-Ekiti in terms of road network efficiency, effective transport accessibility and connectivity. Coupled with the increase in transport demand of the inhabitant of the study area as a result of city expansion .the study therefore, revealed that there is a strong relationship between urban dual carriageway and improvement in socio-economic development, improve in standard of living as well as providing solution to traffic challenges in the study area. Finally the study had discovered that improvement on transport infrastructure in Ado-Ekiti will create a kind of value added to other economic activities in terms of trading activities, quick service delivery and increase in the value of landed properties.

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