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Modelling and Evaluation of the Potential for Cable Car System in Idanre Hill: A Road Map to Tourism Revival in Ondo State, South-western, Nigeria

Ayomide David Oluwatuyi[1] Anthony Enisan Akinlo[2]
Adewumi John Babafemi[3] Ireti Taiwo Temituro[4]
1.Institute of Ecology and Environmental Studies, Obafemi Awolowo University, Ile-Ife, Nigeria
2.Department of Economics, Obafemi Awolowo University, Ile-Ife, Nigeria
3.Department of Civil Engineering, Obafemi Awolowo University, Ile-Ife, Nigeria
4.Institute of Ecology and Environmental Studies, Obafemi Awolowo University, Ile-Ife, Nigeria

Abstract
The recent decline in oil price as the major source of revenue in Nigeria has posed significant negative impact on the national economy intensifying problems of unemployment, food insecurity and poverty. In a bid to seek alternative source of revenue, maximise the exploitation of available resources in wealth creation and provide possible solution through tourism sector, this paper argues the need to promote tourism in Idanre. It therefore modelled the potential for modern ropeway (cable car) system, amusement park and resort in Idanre Hill. The study made used of secondary and primary data. Secondary data were published information, Google Earth (software) images and Geographic Information System (GIS). These were used for spatial modelling of the landscape. Primary data involved site direct field observation and reconnaissance survey to investigate the feasibility of ropeway system on the landscape. Modern cable car system (ropeway), amusement park and resort were thus identified as viable source of centripetal (pull) force that can be accommodated in the study area and capable to draw tourists across the world.
Keywords: Resort; landscape; amusement park; tourism; economic; cable car system

1. Introduction

In general, Nigeria has a total land area of 983,213 km^2 and occupied by about 182,201,962 million people. According to United Nation' Report (2007), the urban population growth rate in Nigeria is put at 5.8% and the national population growth is 2.8 % per annum. The rapid increase in the population of urban centres has resulted in increase in the cost of living because of the higher demand on urban commodities (Joboye, 2011). Some of the symptoms associated to this include massive unemployment, underemployment, poverty, food insecurity, health challenges among others. According to World Bank (2015), more than 70% of Nigerian live below poverty line of one dollar per day. Meanwhile, before the discovery of petroleum in Oloibiri in Niger Delta in 1956, the major sources of revenue were from agricultural produce like cocoa, timbers and kola nut. Also, the swampy mangrove and rain forest in the southern; guinea, sudan and sahel savannah vegetation in the north constitute ecosystem wealth with their associated agricultural benefits. There is now a paradigm shift. Petroleum account for about 83% of national revenue and 98% of total export. In fact, Ibegbu (2008) has specifically stated, in 2000 oil and gas export earnings accounted for about 98% and about 83% of federal government revenue. Nigeria is the sixth largest producer of oil in the world. Despite this there are many concerns that warrant adventure into alternative source of revenue. Poverty and unemployment are not only national but also local issues with attending effects in the country and subsequently many cities in Ondo State. This demands urgent solution of which tourism can play a significant roles.

There is an increasing and widely accepted belief that tourism can play a fundamental role for developing countries to achieve economic growth and development (Armed *et al.*, 2011). For instance, World Tourism Oganisation (WTO) (2006) and Wall *et al.,* (2006) estimated that travel and tourism provide employment for nearly 220 million people worldwide. This accounts for 9% world capital investment and translated that one in thirteen workers. According to Cooper *et al*., (2008), the tourism sector is of sufficient economic importance and its impacts upon economies, environments and societies is enough for the subject of tourism to deserve academic consideration. Tourism is made up of a significant part of the world's growing service sector; in sub-Saharan Africa, tourism accounts for approximately 55% of service sector exports (UNWTO, 2004).

Poor attention to tourism sector in Ondo State has become a concern despite the availability of the natural endowment. James (2000), former World Bank president had earlier reported, poverty amidst of plenty is the world greatest challenge. This seems the reality in the study area. For instance, according to Arowosafe *et al.,* (2013), infrastructure such as power supply, water, entertainment and recreation facilities were lacking at the tourism sites in the state. It was in addition pointed out that other infrastructures such as accommodation, shopping centres, tours and travel agencies were available, but not adequate to meet the tourists' demands.

Besides, the need for alternative source of income especially in the area of tourism to boost or increase

internally generated revenue will give additional strength to the economy. It is an eco-friendly development that can be a substitute to the declining petroleum. The major source of revenue is gradually loosing popularity because of many reasons. Alternative source of energy is encouraged even at global level. More oil well are being discovered for exploitation. Environmental pollution and global warming and the associated hazards have been linked to burning of fossil fuel. Thus carbon emission is discouraged with carbon credit and so many other incentives worldwide. These may predict a further doom for the sector in the future.

However, this study aims at evaluating and modelling the potential for modern rope way system, amusement park and their associated infrastructures in Idanre Hill along with its possible benefits.

2. Brief Literature Review

2.1 Tourism and Economy Development

Telce *et al.,* (2006) was with opinion that tourism is a multidisciplinary activity with so many industries characterised by variety of skills and benefits to society as well as sectors of the economy. However, it has been proven that there is connection between tourism and economic growth. There are four perspectives on the relationship between tourism and economic development. The first view argues that economic development promotes tourism, while the second view opines that tourism promotes economic development. The third view contends that economic development and tourism are mutually beneficial. The fourth perspective argues that the two are independent of each other. The most popular opinion and the literature is that tourism promotes economic development in many country. The various channels through which tourism promotes economic development include revenue generation, employment, GDP growth, etc. However, the extent to which these benefits are realized depends on many factors. These include the governance structure, political will, technological knowhow, availability of resources, economic and the likes.

Studies have shown that tourism has potential for economic revival or development. Sadeh *et al.,* (2012) were with opinion that the goal of a given government is to develop her tourism as it is capable of generating GDP. In addition, tourism has accounted between 3%-10% of GDP in the developing world (WTO, 2016). According to World Tourism Organization (WTO) (2006)'s estimation, the annual average growth of international tourism arrivals in developing nations for years 1990-2005 was 6.5% against 4.1% growth worldwide in the same period. Isaac *et al,* (2015) observed that tourism activities have resulted to foreign exchange earnings and income to Nigeria government and many citizens. Poverty reduction has been pointed out as one of the primary focus of tourism development (UNWTO, 2016). Hui *et al.,* (2007) fund that tourism satisfaction is a key factor to achieve development. For instance, in South Africa, there is partnership between Business Trust and Department of Environment and Tourism since 2000. They established Tourism Enterprise Program (TEP) with a goal to encourage firms to develop commercial transaction that will create jobs, reduce unemployment and poverty in the sector. The organization in year 2000 estimated that over 30,000 jobs were created from tourism growth within six year in the country.

2.2. Cable Car System

Cable car is a transport technology that is associated with highland, rugged, rough or difficult terrains. According to Doppelmayr (1997), cable car transport is carried out using aerial cable cars, surface lifts, and funiculars. The first cable car dated back to 1826 was Fawon railway (Erskine, 1827). Currently, traditional and modern cable cars are not only operated in developed but also developing nations. Figure 1 shows the spatial distribution across the world (indicated with yellow boxes). Ropeway system has many application and benefits.

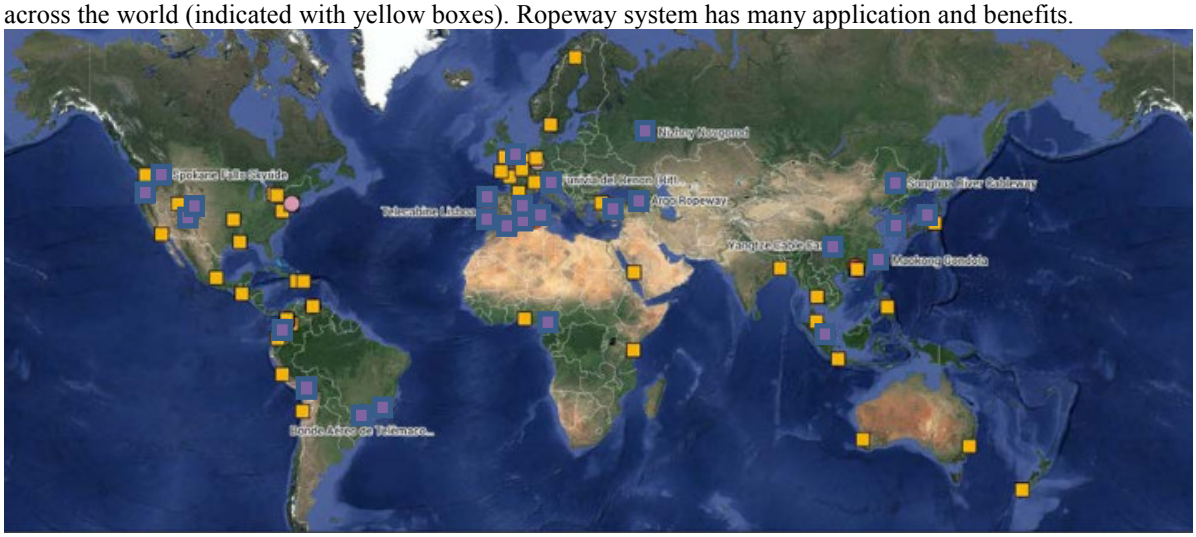

Figure 1: The world urban cable car system. (Screenshot and modified from gondola project.com. (2016)).

The system is reasonable and attractive for urban public transport as demonstrated in some cities like Rio de Janeiro, Colombia and London (Joachim *et al.,* 2013) (see fig. 2). According to Joachim *et al.,* (2013), ropeways has ability to overcome natural and artificial obstacles. There are many additional benefits of the system also.

There is eco-friendly advantage of ropeway system as well. For instance, it was aimed to reduce greenhouse gas emission from other automobiles and improving quality of city in Colombia. Other reasons for cable car include provision of efficient alternative to inaccessible rough location, purpose-built for a specific event and regular public transport or feeder traffic (www.goteborg.se/trafikkontoret). Examples of the respective types are those in Bolivian capital La Paz, London in UK (built for 2012 Olympic) and Ankara.

Figure 2: Cable cars in Medellin, Colombia (*left*) (Source: www.myclimate.org/carbon-offset-projects) and Saragossa, Spain (*right*) (*Photo: Leitner*)

Application of ropeway technology couple with proper management has been proven major source of revenue in developed and developing nations. The Obudu cattle range in Calabar Crossriver, Nigeria is example of where such technology has been implemented. This has provides a source of revenue to the state and also attracts tourists worldwide. Less than 8% of the world cable car is located in Africa (see Fig.1). This may be a clue pointing to an investment opportunity. Joachim *et al.,* (2013), yet argued that a relatively short ropeway at right place can be cost effective and profitable to operate because of its efficiency and unique service.

2.3 Tourism Influx in Idanre

There were 40,433 total tourisms influx in Idanre hill between 2005 and 2012 (see fig.3).

In this period, the total foreign tourists visited the site were 2,248 (5.6%) while total domestic tourists were 38,187 (94.4%). Year 2012 witnessed the highest domestic tourism influx of 9,098 visitors while the least so far was in 2007 of 765 visitors. Also, foreign tourism influx was highest in 2011 at 1,056 and no such visitors in year 2005, 2006, 2007 and 2012 respectively.

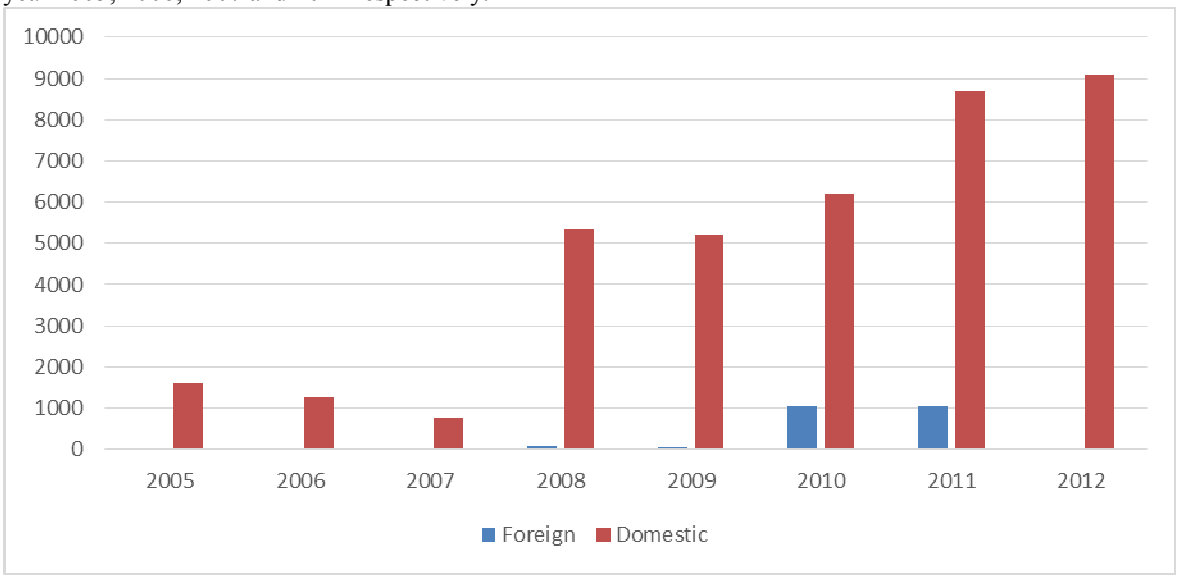

Figure 3: Tourism influx in Idanre Hill (**Source:** Ondo State Ministry of Culture and Tourism)

It can be deduced from figure 4 that tourism influx in the site is not growing steadily. Influx of foreign tourists that has potential to improve economic growth has not witnessed significant growth. This may not be unconnected to lack of word-class tourism infrastructures in the location. For instance, Arowosafe *et al.,* (2013)

were earlier with opinion that infrastructure such as power supply, water, entertainment and recreation facilities were lacking at the tourism sites in Ondo State. The underline reason to this is that there were no tourism infrastructure of international standard capable to captivate the foreign tourist visitors.

3. Study Area

3.1. Location

The study area is Idanre Hill also known as *Oke Idanre* (see fig.4). It is located in Latitude 7°02'N, 7° 15'N and Longitude 5° 03', 5° 16'°N in Ondo State, Nigeria. Ondo State has 18 local government ares. The study site is located in Idanre local government which is in the central senatorial district of the state.

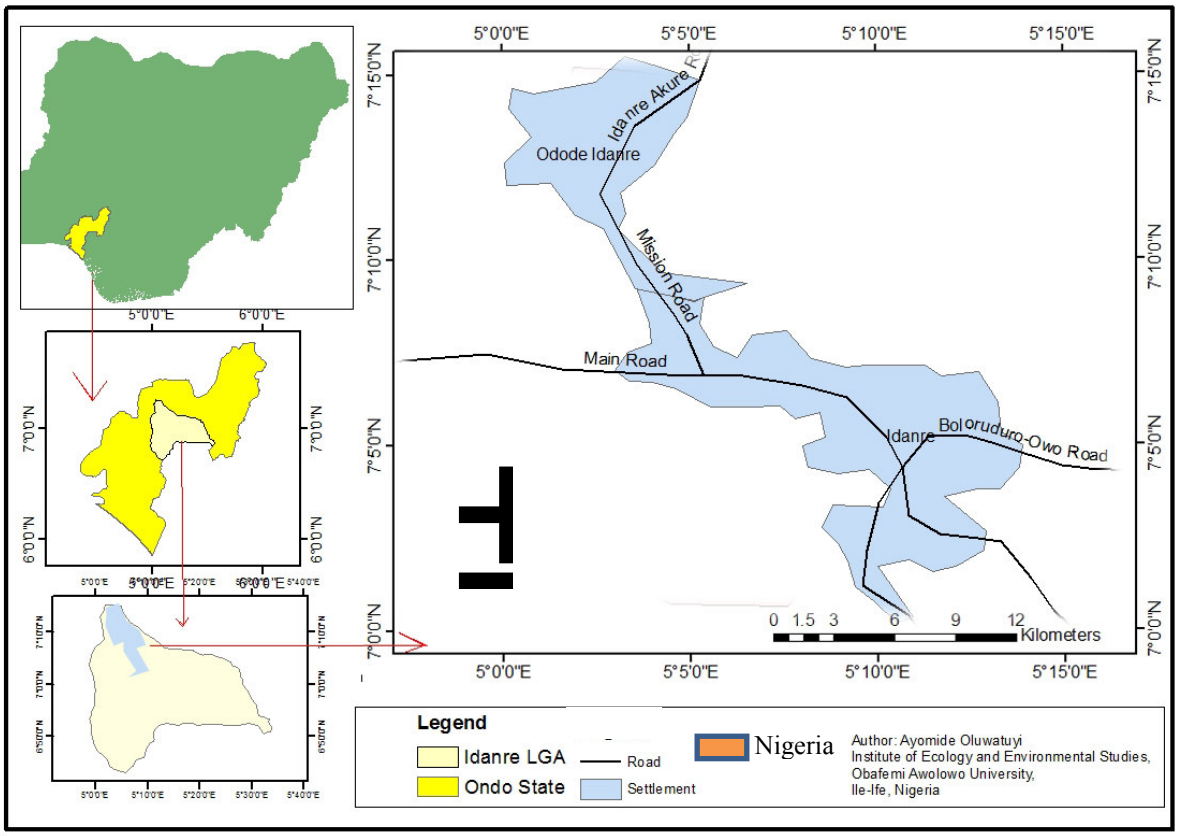

Figure 4: Map of the Study Area (Source: Author, 2017)

3.2. Site Description

Idanre Hill is one of the most awesome and beautiful natural landscapes in Nigeria. It was added to tentative list of UNESCO World Heritage Site in Oct 8, 2007. It has major historical and mythical sites like *Owa* ancient palace (see fig. 5), unreadable letters, thunder water (*Omi Apara*), *Arun* river and Agbogun footprint. Its highest point is about 1045 m above sea level (indicated with red arrow in fig. 5). It is an isolated hill amidst verse sedimentary plain.

The pass and valley aid transportation and settlement. This is shown with brownish part of the image in figure 5. The site is located about 6.90 kilometres southwest of Akure township, Ondo State capital. The summit of the hills had been a home for indigenous monkeys in the old time. The aboriginal inhabitants who claimed to migrate from Ile-Ife settled at the summit of the hill in the old time for defence and security reasons. Demand for more land in the later time has led to resettlement downhill hitherto (see Fig. 5).

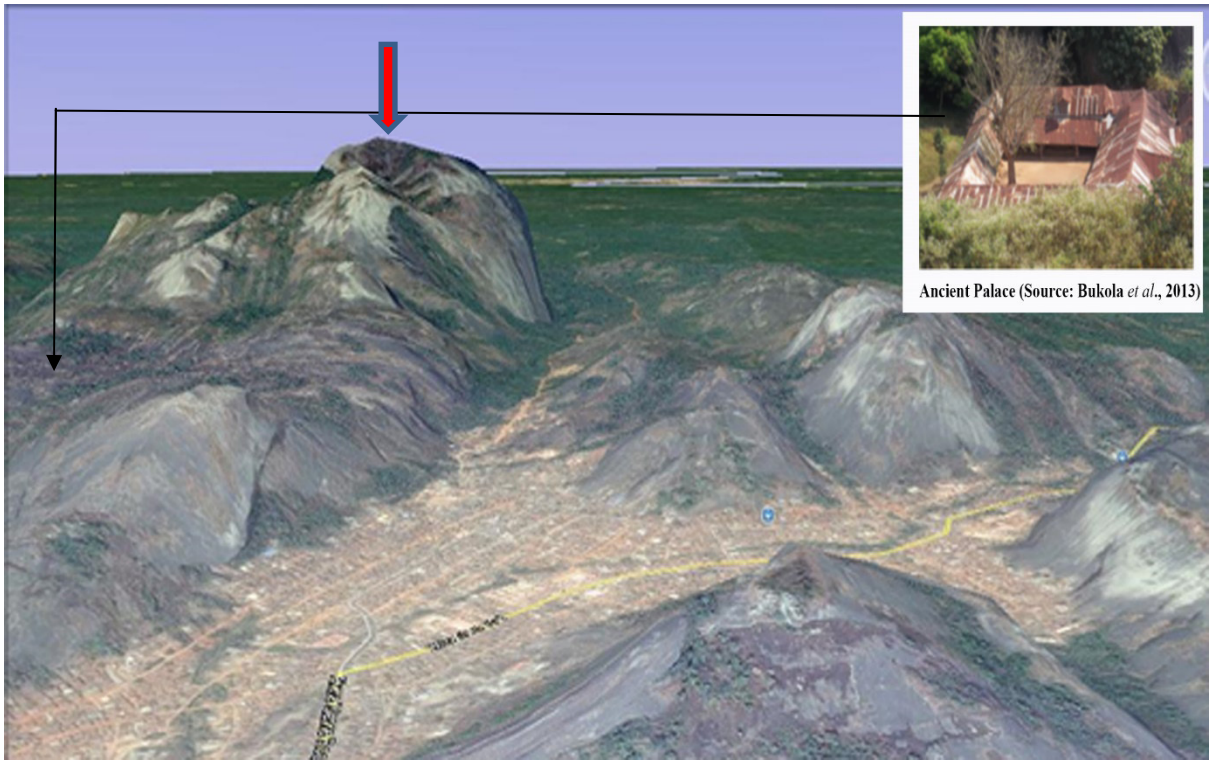

Figure 5: Aerial view of Idanre Hill (Source: Google Earth, 2017)

The study site is subset of sub-equatorial climate. The mean temperature is 27^{o}C (Iwena, 2012). The rainforest in the study site is of varieties of trees, herbs, and shrubs in storeys and layers. It is also a sub-set of southwestern geology of Nigeria. According to Odeyemi (1999), intrusive, foliation of rocks in this region are sourced from tectonic.

4. Methods and Data

The data for this study were obtained from both secondary and primary sources. Secondary data include Google Earth Images and other relevant published information. The Google Earth up to 2017 was used for terrain analysis and observation. The study area and area of interest was defined and located with shapefiles using ArcGIS software. The modelling involved the use of photoshop software to overlay the cable, mast, resort, and road facilities on the desired part of Google earth's images. Scaling was neglected for easier visual appreciation. Relevant literatures, books, internet resources among others were sourced. Primary data was obtained through direct field observation based on the researches' visitation experience in the study area. The appropriate coordinates of station points and masts were recorded to visualise their location.

5. Results and Discussion

5.1. Cable Car System

The study found that extensive igneous hill with its relatively flat surface can be harnessed to accommodate modern ropeways system, resort and other attractive tourism edifice. The cable car will convey tourists round the landscape and plain summit. The modelled ropeway covered about 6.22 km with about five mast (points) (see fig. 7) with different station points on its coverage.

Figure 6 shows the aerial landscape and the ropeways stations or points indicated with letters A, B, C, D, and E. Table 1 displays relative station point, function/name, X and Y coordinates and altitude (Z).

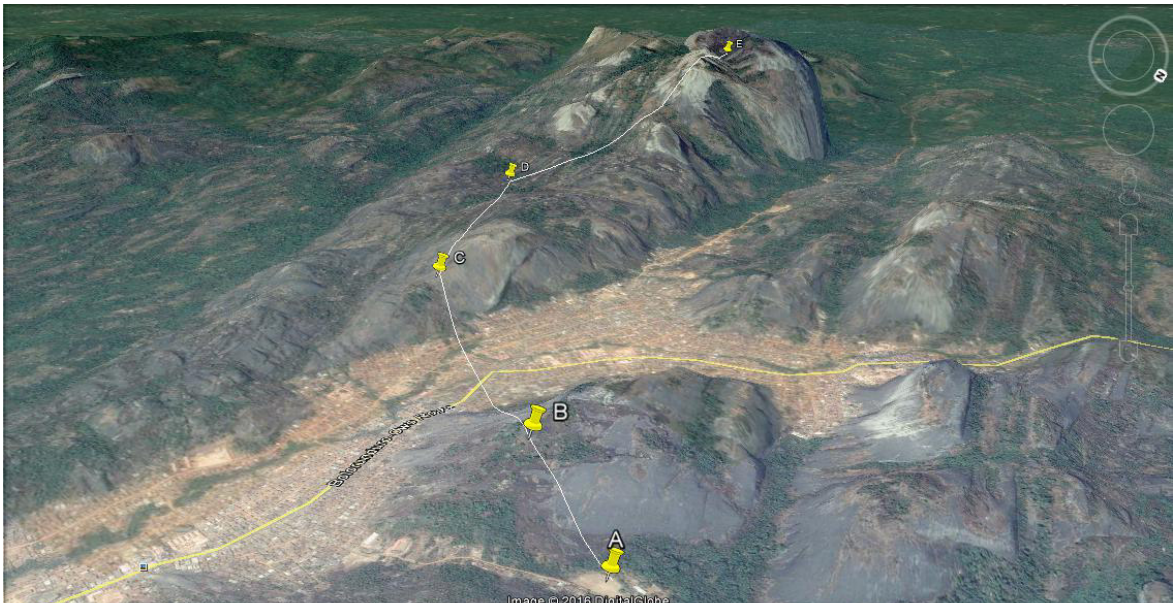

Figure 6: Ropeway station points (Source: Modified Google Earth image, 2017)

Table 1: Location of the stations points

Station point	Function/name	X	Y	Z
A	Base station	7.118318°	5.124832°	332
B	First mast	7.114180°	5.121961°	469
C	Hill top mast	7.104379°	5.113941°	482
D	Top hill resort	7.098125°	5.100843°	446
E	Tallest point	7.100052°	5.079802°	1055

Source: Field Survey (2017)

Figure 7 and 8 show the model of the cable car system and the relative crossectional view respectively. Station point A is the base station where the cabins mainly loads and takes off. Station B is the first mast that precedes station C. Station mast C is located at the adjacent hill top. The spectacular natural setting would eventually aid the airbuses to fly above the city into the adjacent centre of the hill. This will be substituted for the old "great steps" through which tourists were formally getting to the top of the hill. This will aid all aged tourists to be able to access the spectacular summit of the hill.

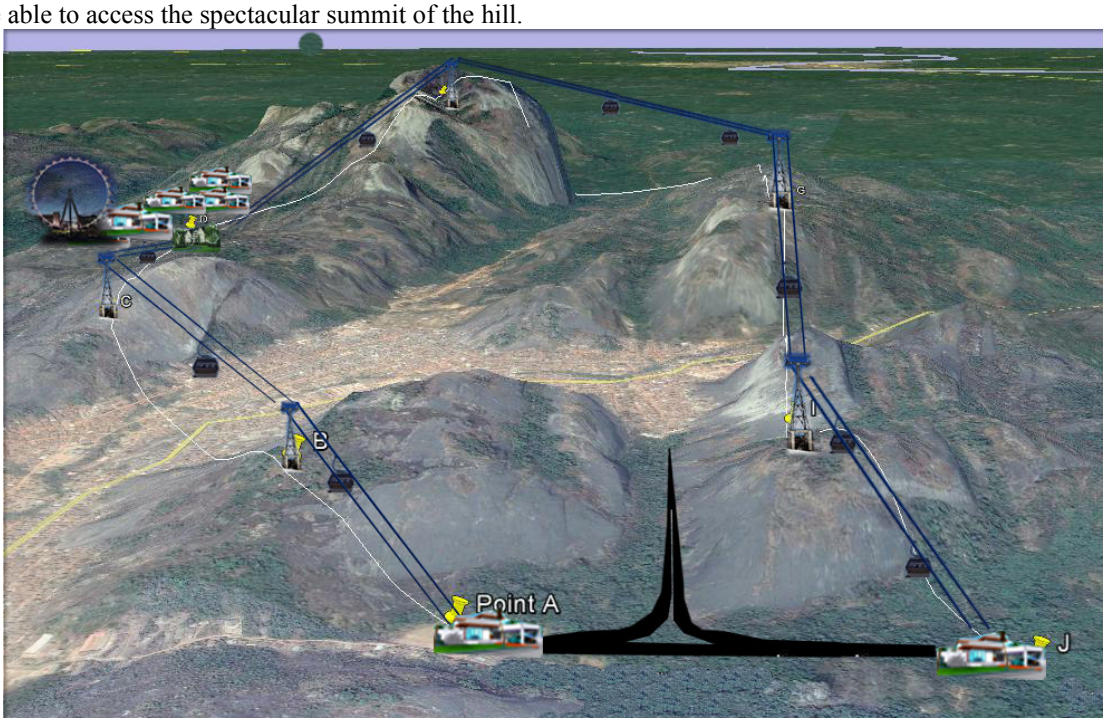

Figure 7: Cable car system model in Idanre Hill (Source: Modified Google Earth image, 2017)

The airbus descends after mast C into landing station at hill top resort D. The relative flat surface that can accommodate resort, guest and game house, museum (with archive preserving culture of ethnics in the state and even beyond), all form of relaxation activities, historic, entertainment and cultural centres.

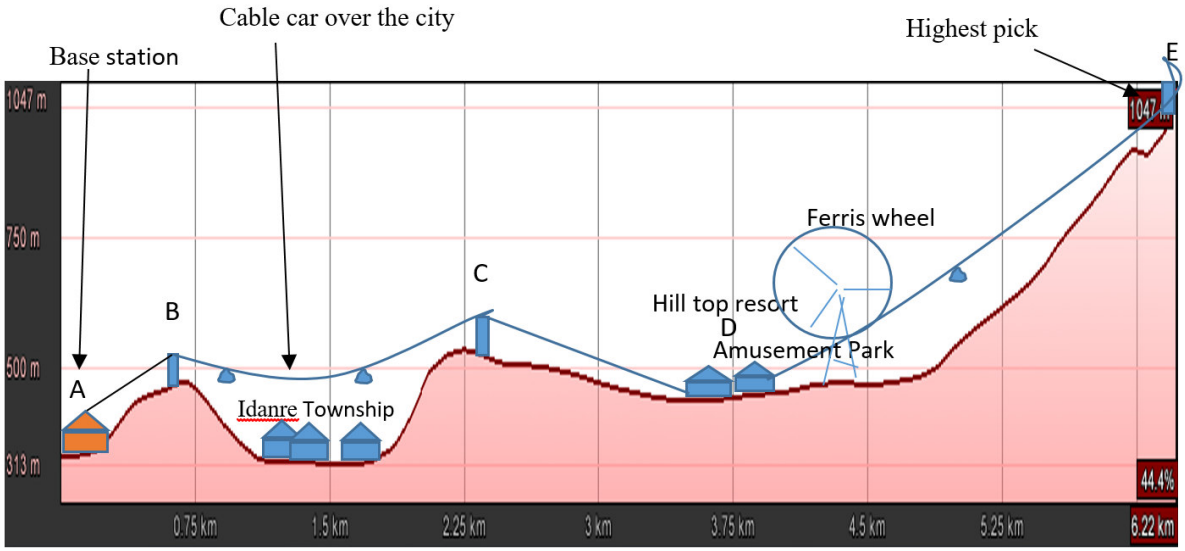

Figure 8: The crosssection view of the ropeway syatem (Sources: Author, 2017)

Further take off from top station in D would take tourists to the highest point in the landscape (about 1045m) E. A mini bar at this point and wide horizon view would create memorial adventure. Towns such as Akure, Ondo and other neighbouring settlement could be remotely viewed from this station. The view from this point would be spectacular to the viewer.

5.2 Amusement Park

The relatively flat hill top is modelled to accommodate amusement park with the associated infrastructures like amusement ride and others. Amusement ride or carnival rides are modern tourism infrastructures that create spectacular experience to tourists. They are designed to give tourist an enjoyable ride. There are basic categories according. These include flat, gravity, and vertical rides and can be accommodated on the hill as well. Flat rides include bumper cars, and the whip; gravitational rides subdivides into water slides and roller coasters; and vertical rides are enterprise, skydiver and ferris wheels.

6. Conclusion

The paper investigated and modeled the potential for ropeway system, amusement park and other tourism infrasstructure of international standard in Idanre Hill. Provision of these has potential to draw patronages of local and international tourists and subsequently leads to tourism or eonomic growth and development. This may also be part of remedial approach to Bukola *et al*, (2016)'s recommendation that there is need to innovatively improve Idanre tourism site through the creation of accessibility and appealing views that will attract tourists. This will eventually constitute centripetal forces that may transform the region into significant central place. Physically challenged, cooperate or less agile tourist could find it difficult to access the top of the hill through the traditional grate steps. The adoption of ropeway is a viable solution.

The finding of this paper demands urgent attention by the concerned stakeholders especially government. Local and international NGOs, private bodies and Business investors are also reminded of the golden opportunity to invest on the landscape. It is time to place value on the available natural resource or heritage that are capable to put food on the table of so many people and earn them means of livelihood.

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