

## Impact of Rwanda Carpark on Socio-economic Development

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### ABSTRACT

Parking is seen a service to be provided based on measurable demand . It is becoming a crucial issue in managing the transportation system since it affects the overall accessibility of a city . It has increased significance as an integrated factor for urban transportation planning due to the substantial rise in car ownership and absence of adequate land space for parking. The purpose of this study was to assess the impact of car park on socioeconomic development by identifying the benefits of Ruhango car park on surrounding people, highlighting the contribution of these benefits of carpark on social economic development and finding out Challenges facing Ruhango carpark and propose possible solutions. The study employed questionnaires and interview as the main study instruments. Target population was 252 where 79 respondents were selected using simple random sampling and purposive sampling techniques. The results show that there is a great improvement in terms of economic development when the car park is introduced in Ruhango district. After establishing car park, people got employment, started their own business and they started gaining high income from different business activities. Car park is very important in the increase of social economic of neighboring community and since those proposed solutions are effectively implemented, people will gain more benefits from car pack and achieve developed socio-economic development. It was recommended that Government should seek to improve or build the capacity of the local infrastructures through raising funds to repair destroyed road.

**Keywords:** Car parks; Socio-economic; Transport; Local infrastructure.

### 1. Introduction

Globally, availability of parking plays a vital role in Controlling, depriving and encouraging access to the city. With the increase in car ownership, parking is becoming a serious problem of cities, especially in the historical cities which were designed to serve pedestrians and more traditional form of transports. This creates a tremendous pressure on parking which results an increase the demand on on-street parking in major arterial roads. Even though the local government and regulatory bodies has introduced various initiatives with number of policies and solutions for parking in many cities, the problems still exist in many cities due to inadequate understanding of the root cause of parking problem. Parking is taken as a service to be provided based on measurable demand [1]. It is becoming a crucial issue in managing the transportation system since it affects the overall accessibility of a city [2]. It has gained an increased significance as an integrated factor for urban transportation planning due to the substantial rise in car ownership and absence of adequate land space for parking [3]. It is widely believed that in order to understand the impact and appeal of parking on urban accessibility; parking policies are obligatory [4]. It is presumed that the “Economic (welfare) Theory” gave the foundations of parking regulation as it has the characteristics of a private good [5].

In 1960’s the Netherlands were first to introduced parking pricing policy and since then, it has been continuously expanding in the European countries. First parking meters were introduced to control on street parking in London in 1958. However, after 1991, when local authorities became able to take over parking enforcement from the

police; improvement in parking policies ensued [6]. Additionally, parking needs space which is a scarce resource, the use of it should be charged. However, in practice the scenario is quite different. Very few cities have applied parking fees that reflect the costs of providing parking [7]. Parking regulation especially in South Asia, recommended that some building owners would prefer less parking than regulations requirement and this is apparently giving an opportunity to the local government for corruption [8].

Car parking has a necessary role to play for Economic growth of population in either developed or developing countries. It plays a role of outstanding importance in any national economy, both through its own direct contribution to gross domestic product (GDP). And employment as well as through the provision of services which are indispensable for the development of all other economic sectors, like transporting goods and passengers. The government of Rwanda have tried to construct car parks across the country, the same as Ruhango district in order to develop economy and welfare of the people. It also built roads which include flexible road pavement, marram roads and bridges. But more relevant to the goal of poverty reduction are car parks services, which include the social and economic benefits associated with transport and communication.

It is clear that despite the implementation of national policies, poverty reduction in Ruhango district has not been achieved at the same extent across the district. This suggests that there may be specific barriers to achieve socio economic development among the people. The general objective of this study was to explore impact of Ruhango carpark on social economic development in that district. Management of parking can have a positive impact on economic viability by enabling ‘better’ (more productive) use to be made of the spaces within towns, providing that it is done sensitively and appropriately.

## 2. Literature

Parking is an integral component of the transport system. It plays a crucial role in the management of traffic and congestion. The significant role of transport in the movement of people, good and services from origin to destination which thus improved the socio-economic status and the general development of the nation cannot be overemphasized. The primary function of any transport is the movement of goods and passengers from point of origin to the various point of destination [9]. The major objectives of transportation planning are ease the movement of passengers and goods on urban roads. However, in many towns and cities all over the world, there is undesirable degree of traffic congestion on urban roads. The provision of new roads is often expensive and most municipal government usually considers the option of widening existing roads which involves the destruction of houses and properties. The literature reveals that widening of roads and concomitant destruction of buildings are not necessarily the panacea needed in controlling traffic congestion on our roads [10]. Categories of space in urban center include exchange space and movement space which related to motor park, interchange point etc. As city transportation system expands, it takes up more spaces. The construction of new roads, the expansion of the existing roads, the building of parking lot requires the acquisition of part of the exchange space. The more space allocated to transport, the greater the requirement for more traffic space. Automobile therefore has an insatiable appetite for space, it uses space at home, at work, shopping and even when some spaces are empty, and it is tied up or reserved for the automobile. Automobile do not only have exclusive space for moving, they also have a” zone of

influence” which expands as the speed and quantity of traffic increases, thus reducing the effectiveness of exchanges space and the level of interaction [11]. Although parking facilities are one of the main components of transportation infrastructure, little is known about the incidence of parking-related crashes, injuries, and fatalities. Slower speeds in parking facilities give people a false sense of security. However, both drivers and pedestrians must be cautious in parking facilities [12].

Since every vehicle trip is associated with parking at the trip origin and destination, parking facilities are considered as important infrastructure components of the highway transportation system, according to a survey conducted by the American Automobile Association [13]. The average time a vehicle spent traveling on roadways was approximately 59 minutes/day during 2019–2020. For the rest of the day, this vehicle is parked in a space. As a vehicle spends an average of 96% of a day occupying a parking space, an extensive amount of land is necessary to meet parking needs. The United States, parking lots take up more land area than the State of Massachusetts. In some cities in the United States, parking density (parking spaces per acre) is twice as much as the population density (persons per acre) [14].

### **Parking characteristics**

It is necessary at the initial stage of study to have data regarding the availability of parking space, up to what extent it is being used, how much is the duration of parking, assessment of parking demand, etc., for taking any effective actions for the furtherance of parking conditions. Different surveys are conducted to derive different properties related to parking which termed as parking characteristics or statistics. In general, following characteristics of parking are used [15].

Parking accumulation is the total number of vehicles parked at a particular interval of time. It is generally represented by the bar graph called accumulation curve/profile. It shows the variation in the parking accumulation for a given parking facility over a specified period of time or survey period. Capacity is the total number of parking space/bays available for parking at a particular parking lot. Occupancy factor or parking index for particular parking facility is the total number of parked vehicles at a specified duration, i.e., accumulation divided by the capacity. It is also obtained by dividing the parking load by the capacity for a given time interval. It is a measure of efficiency of parking lot that how effectively it is being utilized [16].

### **Evaluation of parking system and its characteristics**

At strategic level of planning, it is important to evaluate the existing parking facilities to develop level of service in order to make better future plan and operation. Several approaches have been established in the past to evaluate the existing parking system performance considering different parking characteristics. At an earlier stage, various parking variables which are significant to assess the parking service level and can measure the individual parking efficiency [17]. As the vehicles used more intensively, the required space diminishes and there is less likely to park unused in parking lots of various land uses. In general, the integration of carsharing into land use and transportation policies aids in achieving overall environmental and sustainable development goals [18]. Behavior and demand for parking, which can be broadly classified as psychological and socio-economic characteristics of

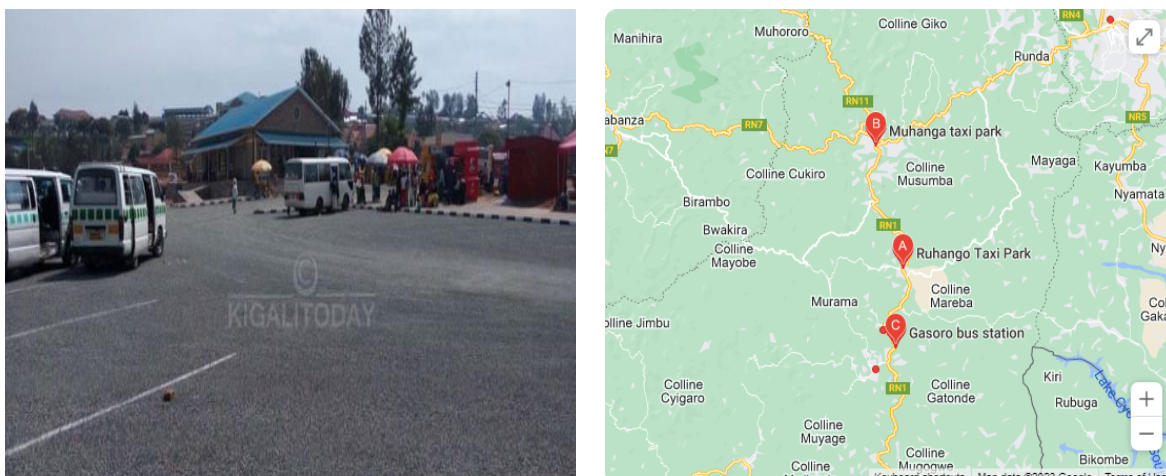
drivers, characteristics of parking facility and guidance system, characteristics of an alternative mode as well as impact of parking policies [19]. Out-vehicle costs, which may be the combination of parking charges, cruising time and walk time, are more important to users than in-vehicle costs like fuel cost, travel time, etc. The studies discussing the policies, which may be useful for effective utilization of available resources and having positive impact on the sustainable transportation concept, have been reviewed. It is remarkable that parking policy should be considered as an integral part of transport planning and management. In general, to freeze or reduce the private vehicle traffic in urban areas, car-restrained parking policy and improvements in public transit have key roles. Private vehicle traffic restriction can be achieved through parking restrictions, which are more environmentally favorable because they produce less noise, air pollution and driver stress [20].

In addition, parking restraint policy affects different users, including residents, commuters, customers, visitors and commercial traffic, in different ways which reflects easy access to residents and commercial traffic against commuters who can most easily shift to public transit and park-and-ride. As the vehicles used more intensively, the required space diminishes and there is less likely to park unused in parking lots of various land uses. In general, the integration of carsharing into land use and transportation policies aids in achieving overall environmental and sustainable development goals. Behavior and demand for parking, which can be broadly classified as psychological and socioeconomic characteristics of drivers, characteristics of parking facility and guidance system, characteristics of an alternative mode as well as impact of parking policies

### 3. Methodology

#### 3.1. Introduction

The methodology employed are highlighted below. An in-depth review of relevant literatures on the subject of parking in general and on-street parking in particular to obtain series of information from previous research and extraction from published and unpublished text book, journal, articles and web materials were carried out. The information obtained from the exercise was treated as secondary information. This study evaluated the benefits of Ruhango car park on socio economic development of the country. Questionnaire and interview are the methods used for collecting information in this study.



**Figure 1.** Ruhango Taxi park

### 3.2. Target Population

A population is a well-defined set of people, services, elements, event, and group of things or households that are being investigated. The targeted population of this study consist of 252 traders around Ruhango carpark, 20 drivers and 4 local authorities. The total population used in this study equal to 252 of population.

### 3.3. Sample size and sampling techniques/procedures

#### 3.3.1. Sample size

In this study, Yamane formula (1967) of sample calculation to determine the sample was used as cited by Kasunic (2005).

$$n = \frac{N}{1 + Ne^2}$$

Where, n = Sample size, N= Total population (252 traders) and e = sampling error. The sampling error, e, can be given based on the fact that the investigator considers 10% as marginal error calculated by just dividing from 100. Therefore, 10% is equivalent to 0.01.

$$n = \frac{252}{1 + 252(0.10)^2} = 71 \text{ traders who were selected using simple random sampling technique while drivers and local}$$

authorities were selected using purposive sampling technique. Hence 4 drivers who were available and 4 local leaders was added to provide convincing data. Therefore, total sample was 79 individuals.

### 3.4. Research Instruments

In the information from the primary data were obtained through a structured questionnaire and an interview schedule were applied as to obtain necessary data. The research used both self-administration questionnaire and semi structured interview as research tools to collect data from the respondents. The questionnaire was administered to traders while interview was used to the drivers and local leaders.

## 4. Presentation and Interpretation of Findings

### 4.1. Distribution of respondents by sex and ages

The total number of respondents are (71 respondents) used in this study, where 46.4% of respondents were female while 53.5% of respondents were male. This explains the higher number of male respondents than female respondents. The distribution of respondents by their ages; the frequency and percentage of respondents' distribution by ages are also indicated on the table 1.

**Table 1.** Respondents by age (Source: Primary data)

Age	Frequency	Percentage
15-30 years	14	19.7%
31-40 years	36	50.7%
41 and above	21	29.5%
<b>Total</b>	<b>71</b>	<b>100</b>

Age was an important demographic characteristic since It is associated with the personal qualities such as wisdom, decision-making and leadership. This characteristic was considered from respondents as it could affect the quality of the information provided. Therefore, age helped to obtain quality and updated data because I considered different ages.

#### 4.1.1. Education level of respondents

The study aimed at finding the education level of the respondents in order to enable the researcher to draw conclusion on benefits of Ruhango car park on surrounding people.

**Table 2.** Education Level of respondents (Source: Primary data)

Education level	Frequency	Percentage
None	11	14.5%
Primary	30	42.2%
Secondary	26	36.6%
College/ university	4	5.6%
<b>Total</b>	<b>71</b>	<b>100</b>

Table 2 indicates majority of the respondents, 42.2%, had the highest level of education as being primary level because they were unable to go ahead to further studies like secondary school.

#### 4.2. The findings according to research objectives

##### 4.2.1. The benefits of Ruhango car park on surrounding people

**Table 3.** Ruhango car park facilities (Source: Primary data)

Respondents 'answers	Frequency	Percentage
Enough employees	61	85.9%
Enough drivers	68	95.7%
Vehicles	42	59.1%

As it is shown in table 3 85.9% of respondents reported enough employees including cleaners, ticket providers, porters and customer care officer among others. The finding revealed vehicles (59.1%) that are used to transport people and goods, 95.7% of respondents said that there are enough drivers. Therefore, there is enough evidence to conclude that Ruhango car park has as many as facilities which support transportation to be effective to the people who use it and those who are living near of it.

**Table 4.** The Social benefit from Ruhango car park facilities (Source: Primary data)

Social benefits	Frequency	Percentage
Children arrive to school on time	55	77.4%
Ease to reach at health centres	65	91.5%
Improved standard of living	48	67.6%

77.4% of the respondents mentioned that children arrive to school on time because of Ruhango car park which is easily for the children to get a car. Again, 91.5% noted that it is easy to reach at health centres by using cars from Ruhango car park and this enable people to save their lives and live long. 67.6% indicated that Ruhango car park improved standard of living because people use income and profits from the park in order to improve their standard of living. This implies that Ruhango car park impacts on social wellbeing within the community.

**Table 5.** The Economic benefits from Ruhango car park facilities

<b>Economic benefits</b>	<b>Frequency</b>	<b>Percentage</b>
People mobility: Employees and traders	63	88.7%
Goods and materials mobility	59	83.1%
Transport of Agro products to the markets	60	84.5%
Availability of needed products and materials at affordable prices	51	71.8%
Availability of manpower	70	98.6%

As reported by 88.7% by respondents, Ruhango car park help Employees and traders to move from one place to another which favor them to improve their socio-economic development. Besides 83.1% confirmed that Ruhango car park help in Goods and materials mobility which give taxes from businesses created due to Ruhango car park. It also helps to transport Agro products to the markets as 84.5% of the respondents confirmed it. Also, the availability of needed products and materials at affordable prices is a result of Ruhango car park at 71.8%. This improves good standard of living of the people. In addition, 98.6% of respondents affirmed that Ruhango car park help the district to have enough manpower.

#### 4.2.2. The benefits of Ruhango car park on surrounding people

The next objective was about highlighting the benefits of Ruhango car park on surrounding people, tables that follows reflects their answers. The researcher asked to the participants this question: “how was economic development people before establishing Ruhango car park?” the table that follows reflects their answers.

**Table 6.** Economic development people before establishing Ruhango car park (Source: Primary data)

<b>Responses</b>	<b>Frequency</b>	<b>Percentage</b>
Gaining low income	48	67.6%
Poverty	53	74.6%
They were rich	20	28.1%
Difficulty to move from one place to another	65	91.5%
High cost of transport of Agro products to the markets	62	87.3%
Lack of enough products and materials at affordable prices	50	70.4%
Lack of enough manpower	33	46.5%

From the table 6 people indicated that their economic development was poor before establishing Ruhango car park where 67.6% of the total respondents used to gain low income from their business activities, 74.6% of them were suffering from poverty due to lack of employment and high cost of transport. However, little number of the respondents (28.1%) were rich before Ruhango car park. This results from income got from other districts. Indeed, 91.5% indicated that it was difficulty to move from one place to another due to high cost of transport and few vehicles, 87.3% reported high cost of transport of Agro products to the markets before establishing Ruhango car park. Further still, there was lack of enough products and materials at affordable prices representing 70.4%. This increased high cost of living and famine among the people. Again, 46.5% indicated that there was lack of enough manpower in Ruhango district before establishing Ruhango car park.

**Table 7.** Benefits to the surrounding people after establishing Ruhango car park (Source: Primary data)

Benefits	Frequency	Percentage
Employment	69	97.2%
Starting of their own business	67	94.3%
Gaining high income	44	61.9%

From the table 7, 97.2% showed that they got employment after establishing Ruhango car park and 94.3% started their own business while 61.9% started gaining high income from different business activities. In fact, this implies that after establishing Ruhango car park, people around the park started to gain more benefits which changed their standard of living and achieved economic development.

#### **4.2.3. The contribution of these benefits of Ruhango carpark on social economic development in Ruhango district**

The third objective of this study was to find out the contribution of these benefits of Ruhango carpark on social economic development in Ruhango district. To achieve this, respondents were asked to mention contribution of these benefits of Ruhango carpark on social economic development and the findings are presented in Tables 8.

**Table 8.** Contribution of the benefits of Ruhango carpark on social economic development (Source: Primary data)

Benefits	Frequency	Percentage
Help to create new businesses	68	95.7%
Source of taxes	70	98.5%
Improved education	58	81.7%
improves good standard of living to the people	47	66.2%
Improved trading activities	56	78.8%

Referring to the table 8, 95.7% showed that benefits from Ruhango carpark helped people to create new businesses, 98.5% affirmed that benefits from Ruhango carpark enabled business operators to pay taxes which are



used to build infrastructure while 81.7% agreed that education has been improved because people were able to pay school fees for their children. Besides, 66.2% improved standard of living to the people through using benefits from Ruhango carpark and 78.8% reported that trading activities have been improved because traders used benefits got from Ruhango carpark to started new business and expand their existing businesses. Therefore, benefits from Ruhango carpark contributed a lot to the social economic development in Ruhango district.

**Table 9.** Major changes after introducing Ruhango carpark (Source: Primary data)

Changes	Frequency	Percentage
Job creation	57	80.3%
Increase of income	50	70.4%
Increase of investments	46	64.7%
Infrastructure development	41	57.7%
Availability of goods and services	43	60.5%
People mobility: Employees and traders	71	100%
Goods and materials mobility	71	100%
Transport of Agro products to the markets	65	91.5%
Availability of needed products and materials at affordable prices	39	54.9%
Availability of manpower	67	94.3%

The research carried out in Ruhango carpark with 71 respondents and came up with the following major changes after introducing Ruhango carpark; job creation which occupies 80.3%, 70.4% increased income, 64.7% affirmed that Ruhango carpark increased investments in Ruhango district while 57.7% responded that infrastructures like roads, schools, and electricity have been developed which also helped many people to gain more earnings. In addition, availability of goods and services occupies 60.5% where all respondents reported that there is people mobility like employees and traders as well as Goods and materials. 91.5% noted that it is easy to transport Agro products to the markets because of paved roads.

There is also availability of needed products and materials at affordable prices which occupies 54.9% of the total respondents and 94.3% showed that there is enough manpower as result of Ruhango carpark. Basing on these findings, there are many changes after introducing Ruhango carpark which boosted socio economic development of the people. Through interview schedules the respondents confirmed that Ruhango carpark had enabled them to access basic service provision in that it assisted them to save time, start new business, sell products to market, wellbeing enhanced and made it efficient for people to access health facilities in time of emergency and the children were able to be picked by the bus in the morning and dropped at home in the evening and reduction of unemployment rate among others.

#### 4.2.4. The Challenges facing Ruhango carpark

The fourth objective of this study was to find out the challenges facing Ruhango carpark. To achieve this, respondents were asked to mention challenges facing Ruhango carpark and the findings are presented in Table 10.

**Table 10.** Challenges facing Ruhango carpark (Source: Primary data)

Challenges facing Ruhango carpark	Frequency	Percentage
Time delaying due to car break	36	50.7%
Occasional passengers	40	56.3%
Poor services	29	40.8%
High transport cost	32	45.1%

The above-mentioned table 10 showed that there is enough evidence to conclude that Ruhango carpark has as many as difficulties to the people who use it and those who are living near of it. 50.7% of respondents reported time delaying due to car break which make people to face loss in their businesses.

The finding revealed occasional passengers (56.3%), 40.8% of respondents said that there is Poor services and passengers end up delaying while 45.1% responded High transport cost. Interviewees identified other difficulties that hinder effective transport like inadequate capital, few cars, motor taxi among others. This implies that this Ruhango carpark is facing many problems as stated above. These challenges hinder effective transportation and slow economic development in such areas where many people became jobless, low income as well as low investment.

Interviewees reported that some of the challenges facing the Ruhango carpark such as accidents caused by non-controlled and repaired vehicles and sometime accidents are caused by drivers who are drunk and those who drive at high speed, parking space is limited and not good, increased number of cars with decrease of clients, insufficient fund to renew road among others. to solve the challenges, they call upon government and people to work together to repair it.

**Table 11.** Challenges faced by other people working in Ruhango carpark (Source: Primary data)

Challenges	Frequency	Percentage
Low salary	15	21.1%
Harassment	9	12.6%
Working long hours	24	33.8%
Thieves	13	18.3%
Accidents	10	14%
<b>Total</b>	<b>71</b>	<b>100</b>

The table 11 shows that people who are working in Ruhango car pack also face some challenges where 21.1% reported Low salary, 12.6% are harassed by passengers and their employers, 33.8% indicated that they work long hours even in the night time, unfortunately they get low salary. 18.3% reported a case of thieves while 14% showed accidents as problem facing people working in Ruhango car pack. Apart from challenges facing Ruhango car pack itself, workers of it also face some difficulties which do not motivate them to work effectively and improve the economic development accordingly.

**Table 12.** Possible solutions for parking problems in Ruhango district (Source: Primary data)

Solutions	Frequency	Percentage
To repair the road and vehicles	17	23.9%
Set up affordable transport cost	21	29.5%
Offer good customer care	18	25.3%
More investment	15	21.1%
<b>Total</b>	<b>71</b>	<b>100</b>

As shown by the table 12, the 21.1% of respondents agreed that increase of investors is an interesting and profitable to promote transport and 25.3% reported good service delivery, 23.9% of respondents reported that to repair the road and vehicles in order to reduce accidents, the same as 29.5% who responded to set up affordable transport cost. It was found out that Ruhango car pack is very important in the increase of social economic of neighboring community and since those proposed solutions are effectively implemented, people will gain more benefits from Ruhango car pack and achieve developed socioeconomic development.

## 5. Conclusions

Peoples 'economic development was poor before establishing Ruhango car park where people used to gain low income from their business activities, suffering from poverty due to lack of employment and high cost of transport. Indeed, it was difficult to move from one place to another due to high cost of transport and the scarcity of vehicles. The high cost of transporting Agro products to the markets before establishing Ruhango car park. This increases high cost of living and famine among the people. However, people found employment after the establishment of Ruhango car park and began their own businesses, resulting in increased income from various business activities. In fact, this implies that after establishing Ruhango car park, people around the park started to gain more benefits which improved their standard of living and facilitated economic development. Based on the findings, these benefits from Ruhango carpark assisted people in establishing new businesses. Additionally, these benefits allowed business operators around Ruhango car park to pay taxes that are utilized for infrastructure development, and education has been improved because people were able to pay school fees for their children.

## Declarations

### Source of Funding

The study has not received any funds from any organization.

### **Competing Interests Statement**

The authors have declared no competing interests.

### **Consent for Publication**

The authors declare that they consented to the publication of this study.

### **Authors' Contributions**

All the authors took part in literature review, research and manuscript writing equally.

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