SUSTAINABLE MUNICIPAL FREE WI-FI

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EXECUTIVE SUMMARY

Established in 2013, Project Isizwe launched in Pretoria with the simple yet ambitious goal of bringing free Wi-Fi within walking distance of every South African. A product of meaningful private and public sector partnership, the project has set up thousands of free Wi-Fi hotspots throughout South Africa.

Compared to other African countries, internet connection in South Africa costs significantly more—costing between 7% and 20% of a family's income. For this reason, Project Isizwe found it necessary to set up free hubs for internet access in one of South Africa's capital cities, Pretoria, with a population over 2.1 million.

When the project started in 2013, the project only had 35 Wi-Fi hotspots deployed with a 250 megabyte daily limit for each device. Thanks to a partnership between the government, telecommunication companies, and the project today has 1,050 free Wi-Fi hotspots deployed with a 500 megabyte daily allowance.

To enhance the relevance of these new hotspots this paper will give a summary of the flagship project in Tshwane. Models of Sustainability in maintaining and upgrading the hotspot will be explored. Additionally, the role of municipalities in the implementation of the hotspots is emphasised. Sustainable free Wi-Fi is achievable for the urban municipalities of South Africa in areas where the population density exceeds 1000 people per square kilometre.

Up to now, other municipalities have been reticent to follow the City of Tshwane. They acknowledge the significant benefit that switching on free Wi-Fi brings but they fear that the on going cost will be another line item on their already over stretched budgets. Municipalities will gain the political, social and economic benefits of free Wi-Fi so they have to accept the financial risk. This paper shows that the financial risk minimal and if managed well, there is no reason for free Wi-Fi ever to be switched off.

Project Isizwe believes that free Internet access within a walking distance for every South Africa is critical for the country and its citizens. This paper urges municipalities and governments to consider various revenue models that will assist handling the on going costs of the network; thereby empowering the nation.

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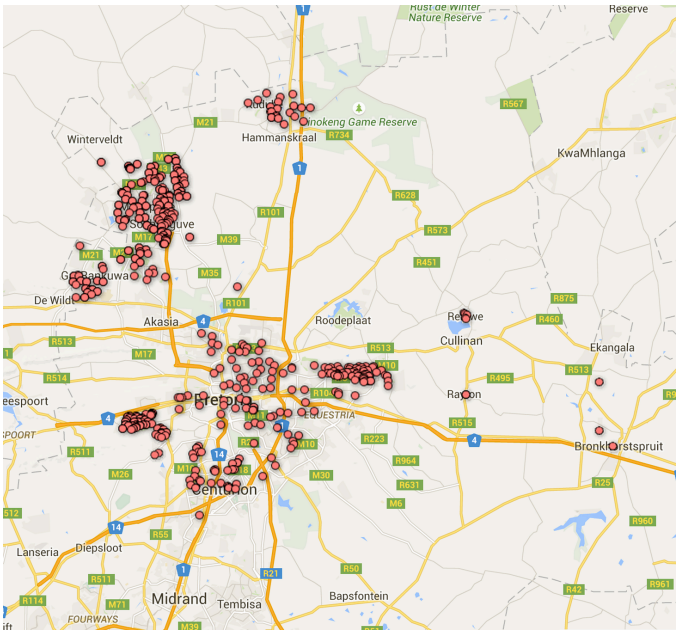
INTRODUCTION AND BACKGROUND

The vision of Project Isizwe is to have free Wi-Fi within walking distance of every citizen of South Africa. This vision took a major step towards reality when Project Isizwe was awarded the responsibility, development and support of what became Africa's largest free Wi-Fi network, Tshwane Free Wi-Fi or Tshwfi-Fi.



- Tshwi-Fi has 1050 Free Internet Zones
- Each of these zones deliver a daily quota of Internet access of 500 MB at speeds of up to 15 Mbps.
- There are over 600,000 users who actively use the network each month.
- Each day records over 350,000 user logins.

The success of the network is down to:

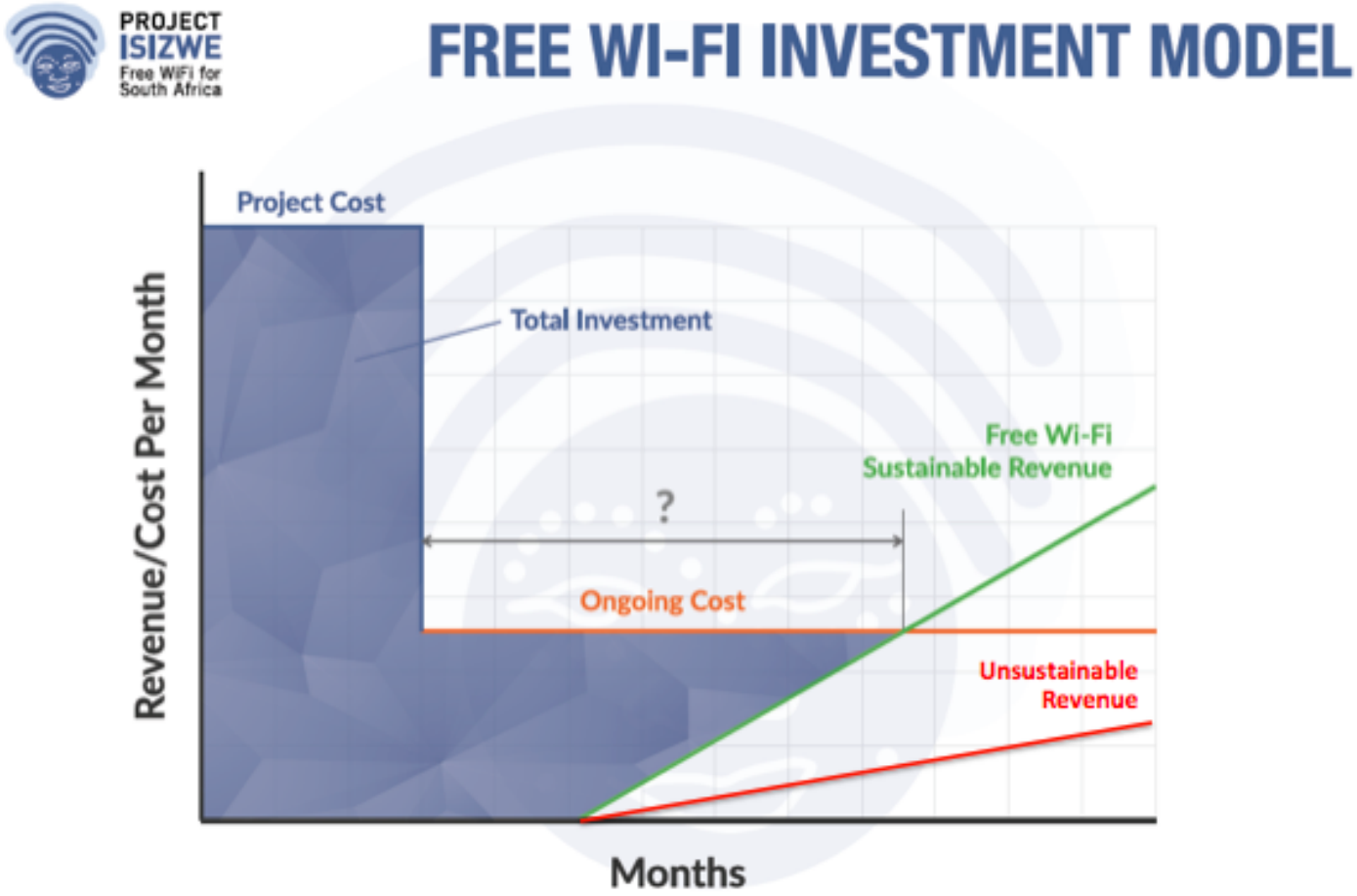
- the high level of availability
- the high level of accessibility (locations being not just the CBD but also high concentration in areas Soshenguve and Mamelodi)
- the great speeds the users enjoy
- the high level of free data each day allows them to use the Internet liberally as a resource.

The on going cost of the network is R5.85 per active user per month.

The success of Tshwi-Fi has created the awareness that once you switch free Wi-Fi on, you can not switch it off. In order for free Wi-Fi to be replicated across the country, such projects need to be self sustaining to cover the on going costs

MODEL FOR SUSTAINABLE FREE WI-FI

The model for assessing sustainable free Wi-Fi is shown below:



There is an initial capital project cost which deploys the Free Internet Zones out to the pubic spaces and builds the network to connect these zones back to the central control area and Internet breakout point.

Factors that impact the project cost are:

- Density of population
- Access and distance to the nearest available fibre network
- Bandwidth required to each Free Internet Zone
- Availability of high sites to provide network back haul whether by wireless links or fibre

There is the on going costs which covers the monthly Internet access costs, the maintenance of the network and the capacity planning and upgrading to meet the increasing demand for bandwidth.

Factors that impact the on going cost:

- Density of population and distance to travel for support
- Level of crime
- Safety of personnel in areas
- Accessibility to high bandwidth Internet access
- Choice of back haul either wireless, under ground fibre or ariel fibre
- Weather and lightening conditions

The gradient of the revenue line will be determined by:

- Density of the population
- Buying power of the population
- Number of citizens that have or have access to smart phones

Density of population becomes a key factor in all three aspects of the financial model

Project Cost	Higher density of population reduces the initial cost of the network
On going cost	Higher density of population reduces the on going cost of the network because the area of support is smaller
Revenue generation potential	Higher density of population improves the revenue generation potential because there are more people to potentially earn from in a given area

For this reason the findings and recommendations of this report are applicable to areas where the density of population is greater than 1000 people per square kilometre.

WHY MUNICIPALITIES PLAY A KEY ROLE

The key role that municipalities play in the deployment of free Wi-Fi is to ensure that it reaches those citizens who will benefit the most.

These are citizens who can not afford the current data costs and not citizens who are able to afford but want a cheaper alternative.

The roles of a free Wi-Fi deployment are shown in the diagram below. The municipality needs to represent those without Wi-Fi

The key assets that a municipality has to be able to control free Wi-Fi projects are:

- Venues
- Street poles

- Access to power
- High sites, water towers, reservoirs or other municipal venues

Municipalities need to leverage these assets to the benefit of their citizens who are without Wi-Fi.

Reason 1 - Location of Free Internet Zones

The impact surveys that Project Isizwe have undertaken on the Tshwane Free Wi-Fi network show that access to education and access to skill development is the most important benefit of free Wi-Fi.

This means that the most beneficial locations for Free Internet Zones are at schools, libraries, universities and community centres.

Private free Wi-Fi initiatives will tend to locate hot spots at places of high density population such as taxi-ranks, shopping centres and shabeens. These will not necessarily be the best places for study.

There will be a tension in location between the most beneficial location for the personal growth and for sustainable revenue. A municipality needs to moderate to ensure that sufficient locations benefiting citizens personal growth are included in the role out plan.

Reason 2 – Access for the under privileged areas

Within in any municipality there will be:

- More affluent areas where free Wi-Fi is sustainable and
- Deprived areas where free Wi-Fi is unsustainable

If free Wi-Fi is left to private initiatives then market related forces will always drive the free Wi-Fi roll outs to the affluent areas where the higher spending power of citizens can be found. This is clearly seen today in the affluent Malls and coffee shops provide free Wi-Fi but the under serviced areas being neglected with the exception of City of Tshwane.

Municipalities play a key role in moulding the conditions of roll out to be into the under privileged areas who will benefit the most from free Wi-Fi.

Reason 3 – Revenue aggregator

Sustainable free Wi-Fi is achievable. However, it is not yet achievable from one revenue source. The revenue comes from multiple sources from diverse industry segments.

For a municipality to control the deployment of free Wi-Fi to its citizens it needs to aggregate the revenue streams and then be in control of service delivery using a network service provider.

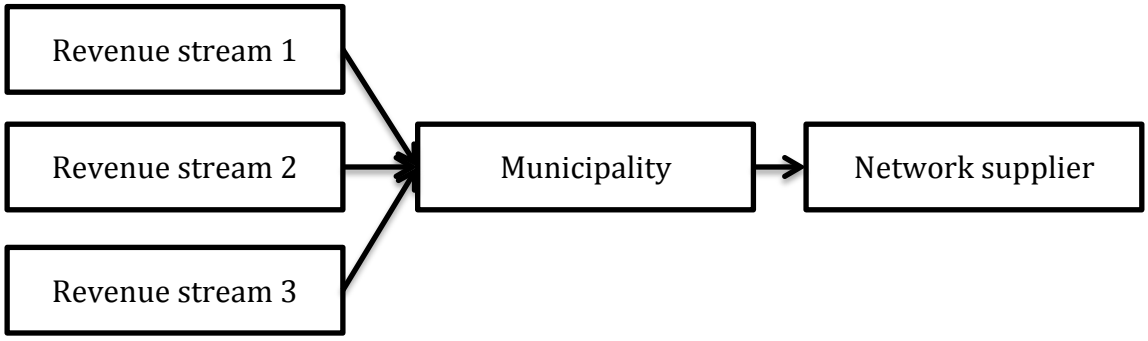
Reason 4 – Ensuring service levels are met

The challenge with a free Wi-Fi service is to ensure that the end users are getting the speed and the uptime that meets the project investment. Because the service is free, end users tend to be less included to log a support call if they do not have access.
Municipalities need to hold the payment strings to service providers to ensure that acceptable service levels are maintained.

SUPPLY CHAIN MODEL

Municipalities will gain the political, social and economic benefits of free Wi-Fi so they have to accept the financial risk. They have to be the custodians of free Wi-Fi to their citizens to ensure it benefits those who need it most.

Project Isizwe recommends the following supply chain model



The municipality rents out elements of the network to companies on a similar basis to how street pole advertising space is currently rented out.

The municipality owns the network so that it is never constrained to use a sole service provider. Any contracts written must focus on the role out project, operational service levels and exit process.

Proprietary network equipment is avoided and only network equipment that can be purchased from or serviced by at least three well known and established local service providers.

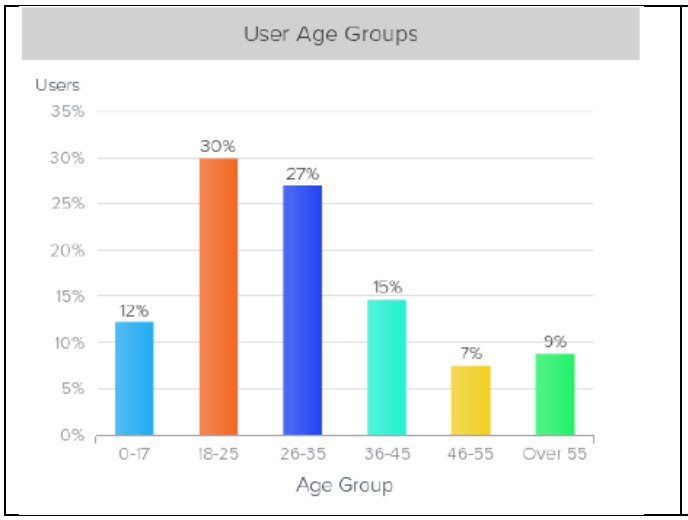
The contract to run the network is awarded to an independent company to the those who provide the revenue generating opportunities. This will allow for more currently unforeseen revenue opportunities to be added to the model as and when they arise.

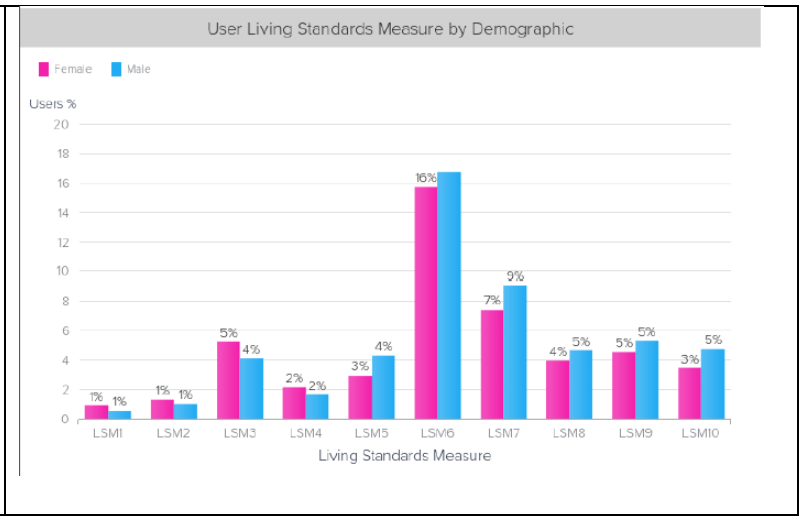
REVENUE STREAMS THAT WORK

1) Wi-Fi Advertising

Wi-Fi advertising is the revenue model for free Wi-Fi used around the world at airports and stadiums. The key is to make the user experience easy to access the network. By capturing the cell phone number and date of birth only, Project Isizwe has evidence that this did not negatively impact the number of users on the Tshwi-Fi network.

Data is given anonymity and aggregated to provide meaningful feedback to the advertisers. Information can be given on the habitation, age, gender and living standards measure of who saw an advert and who showed further interest. These sample reports are from the Tshwi-Fi network.





Project Isizwe predictions is that Wi-Fi Advertising can cover about R1,50 per user

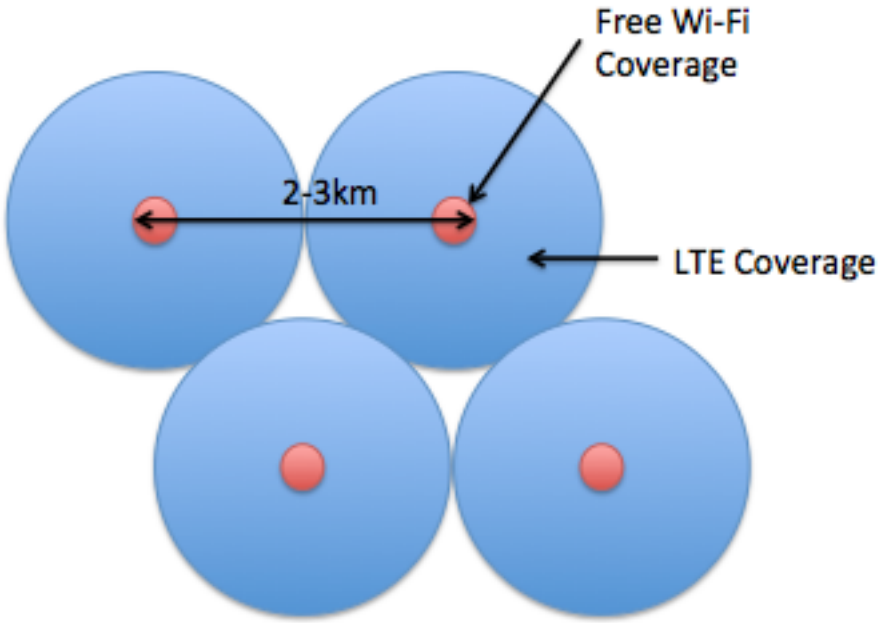
2) Mobile Network operators

Municipalities have two assets that are very important to mobile network phone providers:

- Venues
- Provision of power

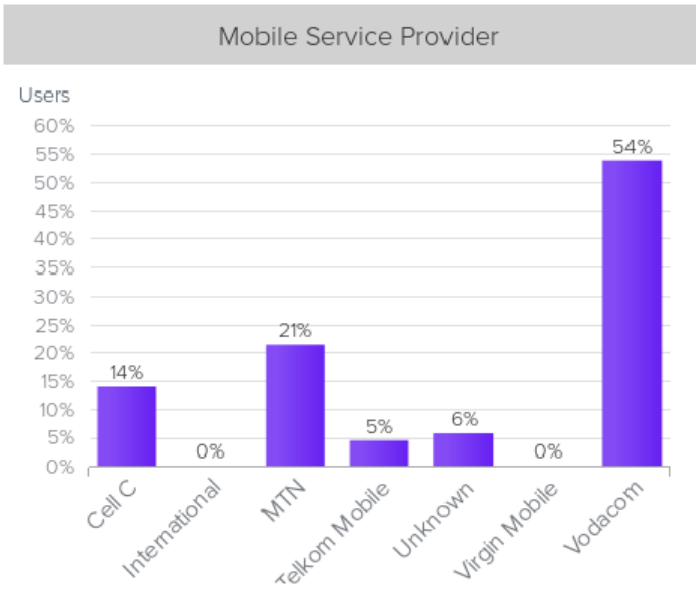
The role out of LTE has been a challenge for all cell phone companies. The penetration extent of the signal is small (2-3 km) especially when the volume of users increases. All the mobile operators in South Africa are trying to remedy dark spots in their LTE coverage particularly in urban municipalities.

The LTE coverage distance coincidently matches the Project Isizwe vision of free Wi-Fi within walking distance of every citizen.



This means that mobile network operators are very interested to co-locate LTE repeater equipment at the same place as a Free Internet Zone Wi-Fi hot spot.

The concept has been put to Vodacom and MTN and both agree that it is an excellent answer to the #datamustfall issue that they face and that it has the potential to generate more customers for them. Free Wi-Fi within walking distance of every citizen and paid for connectivity using the LTE network.



The mobile network providers of users on the Tshwi-Fi network are shown in the graph above. Vodacom and MTN make up 75% of the user base.

They have already shown interest in co-locating at about 250 of the 1050 free Internet zones. If the municipality trades permission for LTE equipment in an affluent area in exchange for rent on a free Internet Zone in an under privileged area then rent for about 500 sites could be achieved.

Mobile network operators are willing to pay about R2000 per month rental for an LTE repeater location. They will pay for power usage and network back haul in addition to the rental.

Project Isizwe predicts that mobile network operators can contribute about R1.00 per user

3) Ariel Fibre

The more affluent areas of a municipality have a growing need for fibre. Fibre to the home is the new trend. Suppliers to Project Isizwe have found that ariel fibre, very similar to copper lines on telegraph poles is not only much cheaper to deploy but also more stable and less susceptible to breakage.

Fibre roll outs will tend to be in business areas and more affluent residential areas due to the high capital cost and the need for shorter return on investment periods.

Municipalities hold the control of way leaves for such fibre deployments. They need to use this to promote rolling out Free Internet Zones to under privileged areas.

Requirements such as deploying a free Internet Zone for every five kilometres of fibre rolled can be levied.

Project Isizwe predicts that fibre operators can contribute about R0.80 per user

4) Community Portals

The Tshwi-Fi portal has been a great success of the network. The local news items produced by the Tshwi-Fi TV have received almost 1 million views. Barclays and ABSA have used the portal for a ready to work campaign that trained over 20,000 people.

Project Isizwe predicts that the community portal can contribute about R0.40 per user

5 Micro jobbing

Users of the free Wi-Fi network have a high unemployment rate. There is a growing market for reaching a work force of micro jobbers. These jobs can be anything from supplying a picture and GPS location of a pothole to

conducting a survey. The database of micro jobbers keeps record of who, when and where jobs can be done and rates the quality of the workers. They may be paid between R20 and R100 per job depending on the task at hand.

People can earn up to R10,000 a month mirro jobbing all for a subscription fee of under R10 per month to be on the database.

If 15% of the Tshwane user base register for micro jobbing at a subscription of R100 per year, the network would derive a revenue of R700,000 per month

Project Isizwe predicts that micro jobbing can contribute about R0.80 per user

6 Entertainment subscriptions

Netflix and Showmax are aggressively growing and taking over the revenues once enjoyed by DSTV. Multichoice is facing cancelations because with exception of live sport coverage most other TV shows can now be found on the Internet at a far cheaper price.

Netflix and Showmax are willing to share subscriber revenue with network operators in particular free Wi-Fi providers because they provide potential new users a low risk insight to their services.

Project Isizwe predicts that mobile network operators can contribute about R0.50 per user

7 Search Engine

Google has become one of the richest companies in the world through dominating the Internet search engine usage and deriving advertising revenue. Project Isizwe is in discussions with the fifth largest search engine in the world.

They are willing to share revenue with free W-Fi networks. The search engine can be branded to the municipality and users of the free Wi-Fi network restricted to only use this search engine. Search trends and web browsing themes can be aggregated and fed back to the municipality to provide insights on the needs of the citizens.

Project Isizwe predicts that restricting to a search engines can contribute about R1.50 per user

8 Additional data rewards

The current data restriction on Tshwi-Fi is 500 MB per day. Incentives can be deployed to allow users to type in their rate payers number and if they are up to date, further data can be released to them.

If the average debt to the municipality of a user is about R100 then a 1% improvement in debt collection from this method would contribute about R1 million on the Tshwi-Fi network.

Project Isizwe predicts that incentivising municipal rates payment contribute about R0.20 per user

9 Debt Collection

Activity on a free Wi-Fi network can show that a user is out and about and generally more willing to take a telephone call. With the process laid out in the user terms and conditions of usage this could be used for the municipal debt collection department to chase outstanding payments. Tests have shown that this increases the ability for the agent to reach the debtor by up to five times.

Project Isizwe predicts linking to debt collecting could contribute about R0.30 per user

10 Digital and pole advertising

LinkNYC is a municipal free Wi-Fi network built entirely on this revenue stream. The City of Tshwnae could deploy about 50 digital advertising boards in the CBD area and at taxi ranks. Each Free Internet Zone attracts citizens to access the data so they become an ideal space to advertise from.

Project Isizwe predicts linking to debt collecting could contribute about R0.20 per user

REVENUE STREAMS TO AVOID

1) Charging for additional data

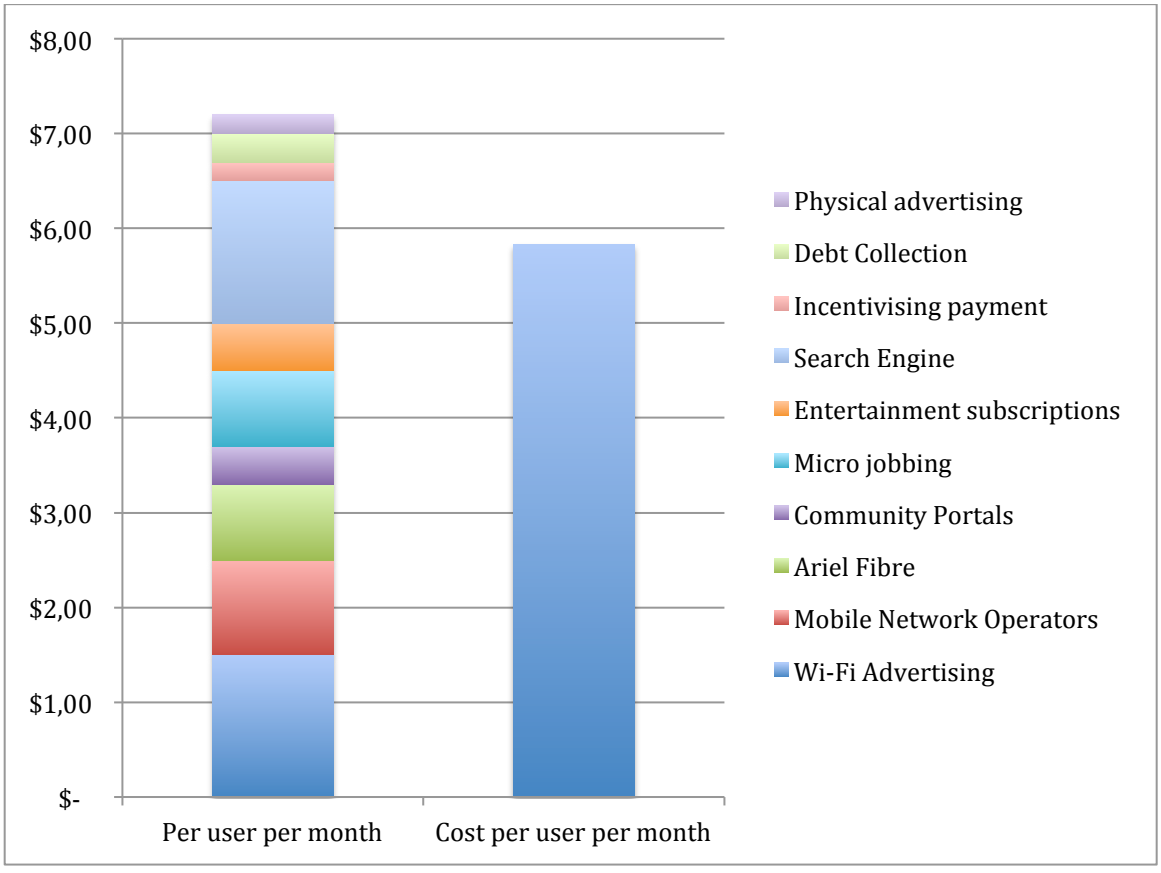
Project Isizwe have found that once users reach their cap they prefer to buy mobile data rather than more data on the free Wi-Fi network. By acknowledging this the user can be guided to the mobile operators for additional data and so enhance the relationship on that revenue stream.

2) Vouchering systems

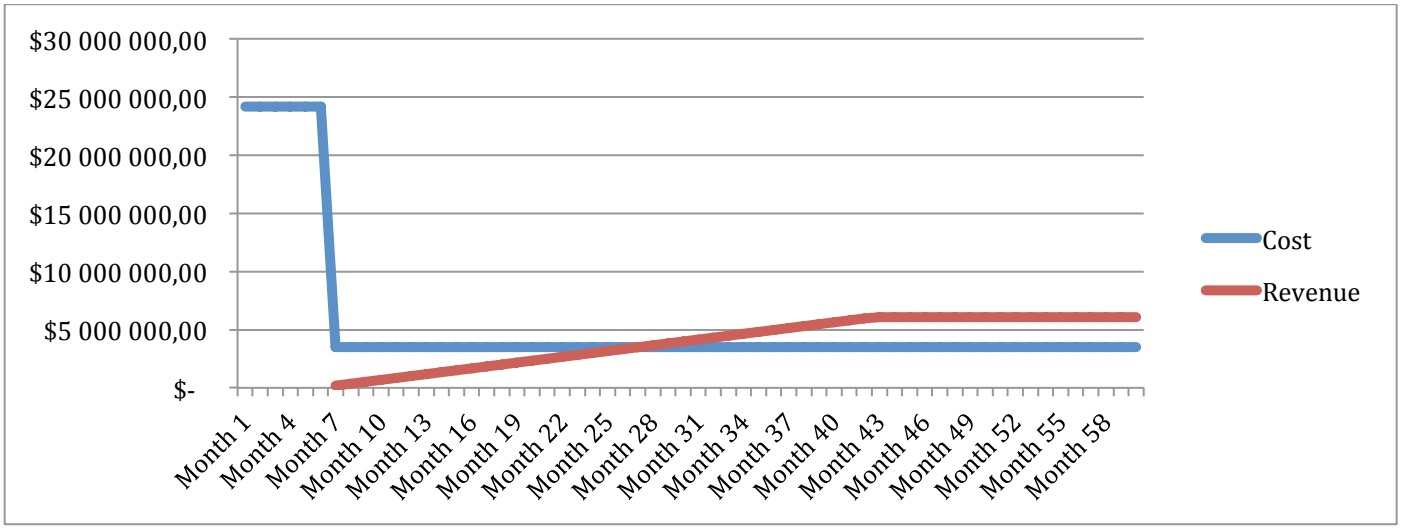
The cost of sustaining a network the size and scale of Tshwane Free Wi-fi is about R6 per user. The cost of vouchering, administration and collecting cash works out to more than R6 per user. Project Isizwe can a vouchering project in Limpopo and found that the cost of administration for the data packages users were willing to buy was not worth while.

REVENUE AND COSTS

The graph below shows that by aggregating the revenue streams together it is achievable to recover the on going costs of a free Wi-Fi network.



If this prediction is applied to the Tshwi-Fi network and it is assumed that it will take 30 months to reach these levels the following cost revenue graph can be drawn.



The conclusion is that free Wi-Fi can be sustainable but in order for the benefits to reach those who most need it, the municipality needs to be in control.

MUNICIPALITIES NEED TO WORK TOGETHER

In order for the revenue streams to really work it needs volume of users.

Advertisers and their agencies want to see numbers of users reaching 7 million and distributed across the country. If municipalities pool their revenue stream opportunities with free Wi-Fi network they can gain orders of magnitudes more than working independently.

Tshwane has achieved a user base of about 25% of the total population.

Seven million users can be reached by deploying free Wi-Fi networks like Tshwane's in the following municipalities:

Name	Area	Population	Pop. density	Monthly Users
City of Johannesburg Metropolitan Municipality	1645	4949347	3008	1237337
City of Cape Town Metropolitan Municipality	2446	4005016	1637	1001254
eThekwini Metropolitan Municipality	2556	3702231	1448	925558
Ekurhuleni Metropolitan Municipality	1975	3379104	1710	844776
City of Tshwane Metropolitan	6298	3275152	520	818788

Municipality				
Nelson Mandela Bay Metropolitan Municipality	1957	1263051	645	315763
Buffalo City Metropolitan Municipality	275	834997	303	208749
Polokwane	5054	797127	157,7	199282
Mangaung Metropolitan Municipality	9886	787803	79	196951
Vanderbijlpark	966	733445	759,3	183361
Nelspruit	7141	695913	97,4	173978
Pietermaritzburg	751	679039	904,1	169760
Rustenburg	3416	626522	183,4	156631
Thohoyandou	2642	497237	188,2	124309
Apel	5693	489902	86	122476
Mthatha	3019	488349	161,8	122087
eMalahleni	2678	455228	170	113807
Klerksdorp	3602	417282	115,8	104321
				7019186

The total cost of the investment would be R1.4 billion

After two years the sustainable revenue models outlined in this paper will cover the operational costs of running the network.

Historians will look back at providing free Wi-Fi networks to the citizens of South Africa as the most significant anti-apartheid initiative since 1994.