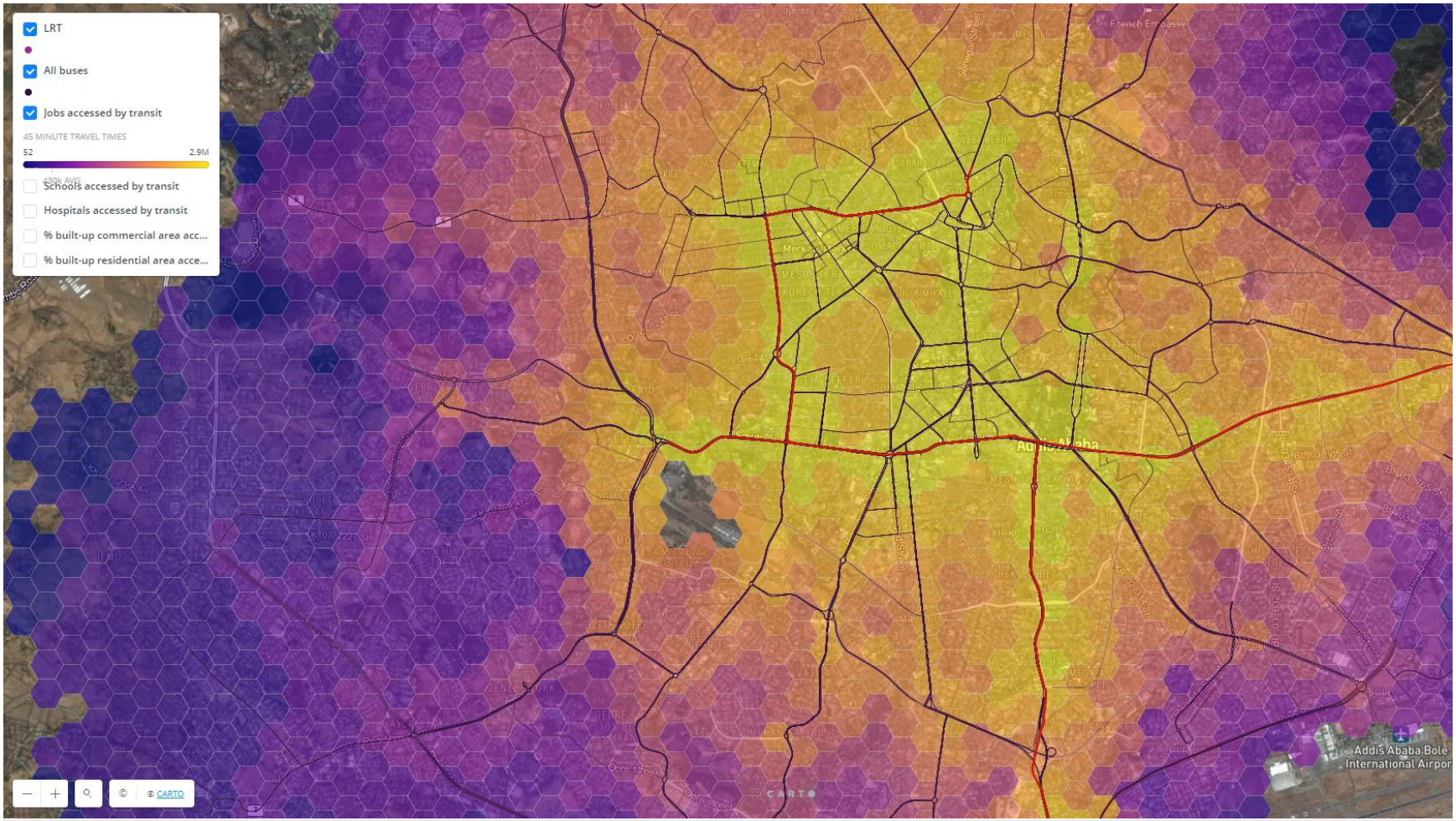
PUTTING ETHIOPIA'S TRANSIT NETWORK ON THE MAP

IMAN ABUBAKER, URBAN MOBILITY PROJECT COORDINATOR, WRI

RABRA HIERPA, INTERN, WRI

UNLOCK THE POWER OF TRANSIT DATA…

…BY CREATING AN ACCESSIBLE CITY



UNLOCK THE POWER OF DATA FOR AFRICA...

…BY BUILDING SAFER CITIES AND STRONGER ECONOMIES

Around AFRICA

THE BIG QUESTION

Is data the new oil?

With AI and machine learning on the rise across the continent, Stephen Armstrong explains why Africa is set to lead the data revolution

THE FOURTH INDUSTRIAL revolution is here – and Africa is so well placed to own it that the continent could be on the verge of transformation.

The first industrial revolution harnessed water and steam, the second gave us mass production and the third deployed digital technology, but the raw power for the fourth revolution is data – dubbed "the new oil" by Kai-Fu Lee, CEO of Sinovation Ventures and author of the book *AI Superpowers*.

Unlike oil, data is created by people, not geology, so Africa is well placed to reap the rewards of this revolution. The continent's population is the fastest growing in the world; by 2050, the UN predicts that one in every four people in the world will be African. This population boom is akin to an increase in oil reserves – something Saudi Arabia can only dream of. How should Africans take advantage of this huge potential?

First the good news: data can solve so many of the continent's problems. Health, lifestyle, financial and crime data can help build safer cities, stronger economies and healthier populations. South African non-profit Harambee, for instance, helps young people find work by combining geographical and personal preference data; Kenyan/Rwandan company Hepta Analytics is working with the Rwandan government to blend agricultural data with satellite imaging to calculate optimum planting times; and in the Democratic Republic of the Congo an app using machine learning gives early

The Lion and the Unicorn

Three African start-ups – online retailer Jumia Group, mobile company Cell C and food supplier Pioneer Foods Holdings – were valued at over $1bn this year. Meanwhile, investment in African start-ups reached record levels in 2018, raising a record $726.6m across 458 deals.

024 | Selamta

"First the good news: data can solve so many of the continent's problems. Health, lifestyle, financial and crime data can help build safer cities, stronger economies and healthier populations."

— Stephen Armstrong

"Africans should be paranoid right now. You have to create, collect and protect your data or someone else will."

— Alex Liu

Photo: Selamata Magazine

UNLOCK THE POWER OF TRANSIT DATA...

...BY CREATING A SAFE, EFFICIENT AND INTEGRATED TRANSPORT NETWORK

Photo: ITDP Africa

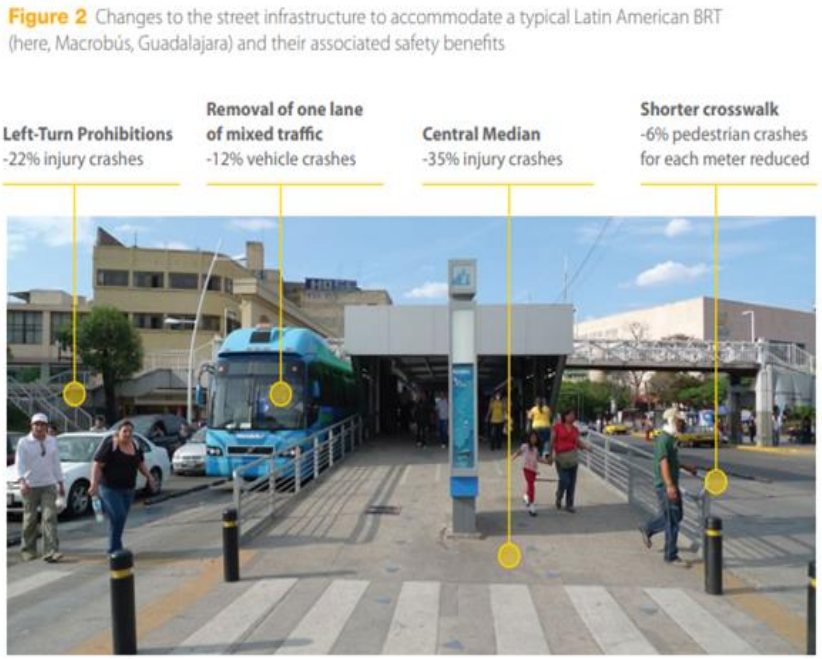
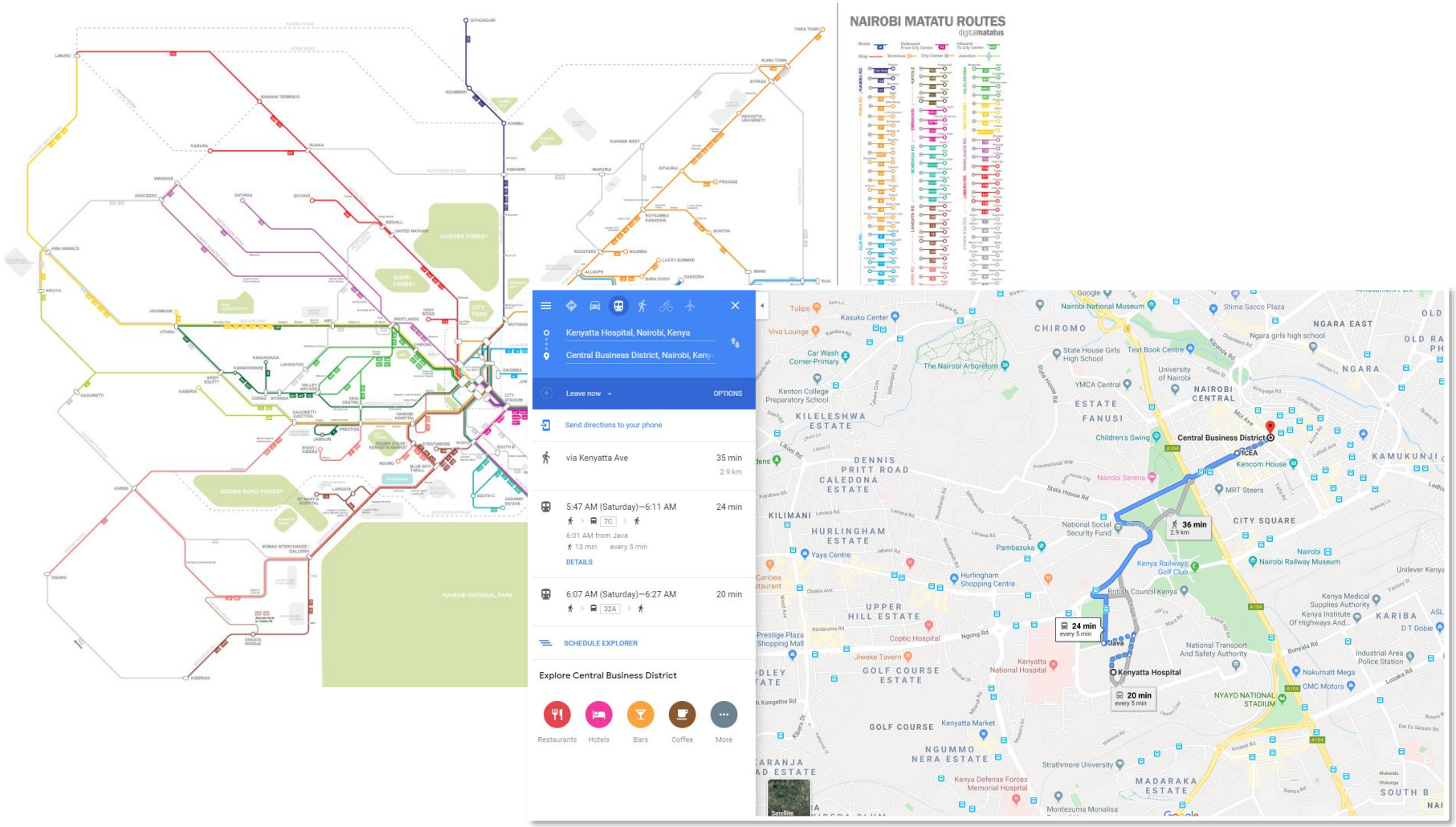


Figure 2 Changes to the street infrastructure to accommodate a typical Latin American BRT (here, Macrobús, Guadalajara) and their associated safety benefits

UNLOCK THE POWER OF TRANSIT DATA

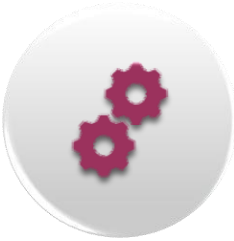
…BY MAKING TRANSIT MORE USER FRIENDLY



ETHIOPIA LEADING THE WAY

Addis Ababa is one of the handful of African cities that has digitized its public transport network in a **standard and open source format**

Using the data for transport planning purposes and development of applications



Built local capacity by collaborating with universities and local stakeholders at each step of the process

Plans to scale mapping efforts to secondary cities

DIGITALIZATION OF ETHIOPIA'S TRANSIT NETWORK - PUBLIC TRANSPORT MAPPING METHODOLOGIES

Addis Ababa Public Transport Network

Primary Data Collection

Output

- GIS Map
- GTFS Feed

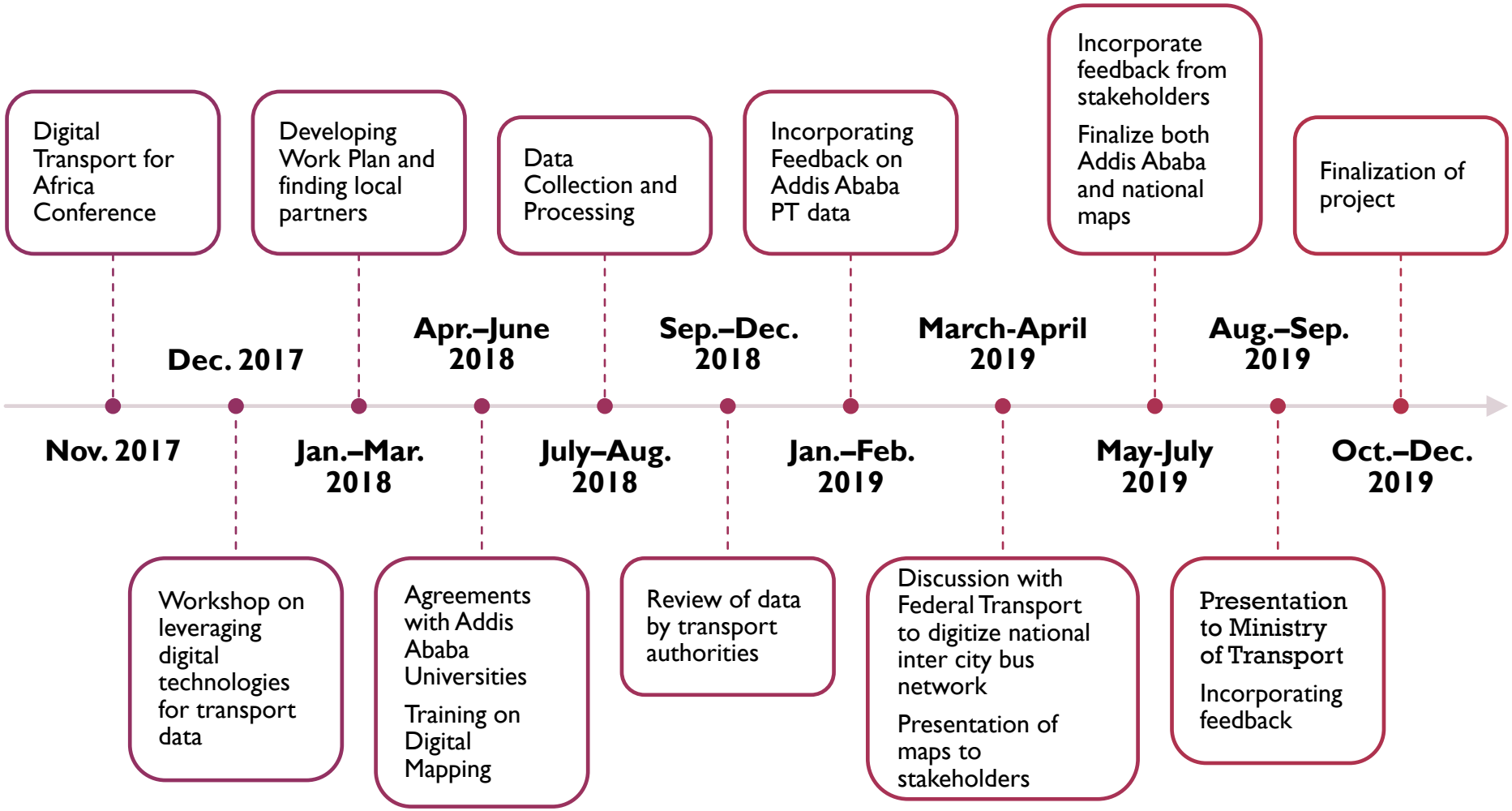
National Intercity Bus Network

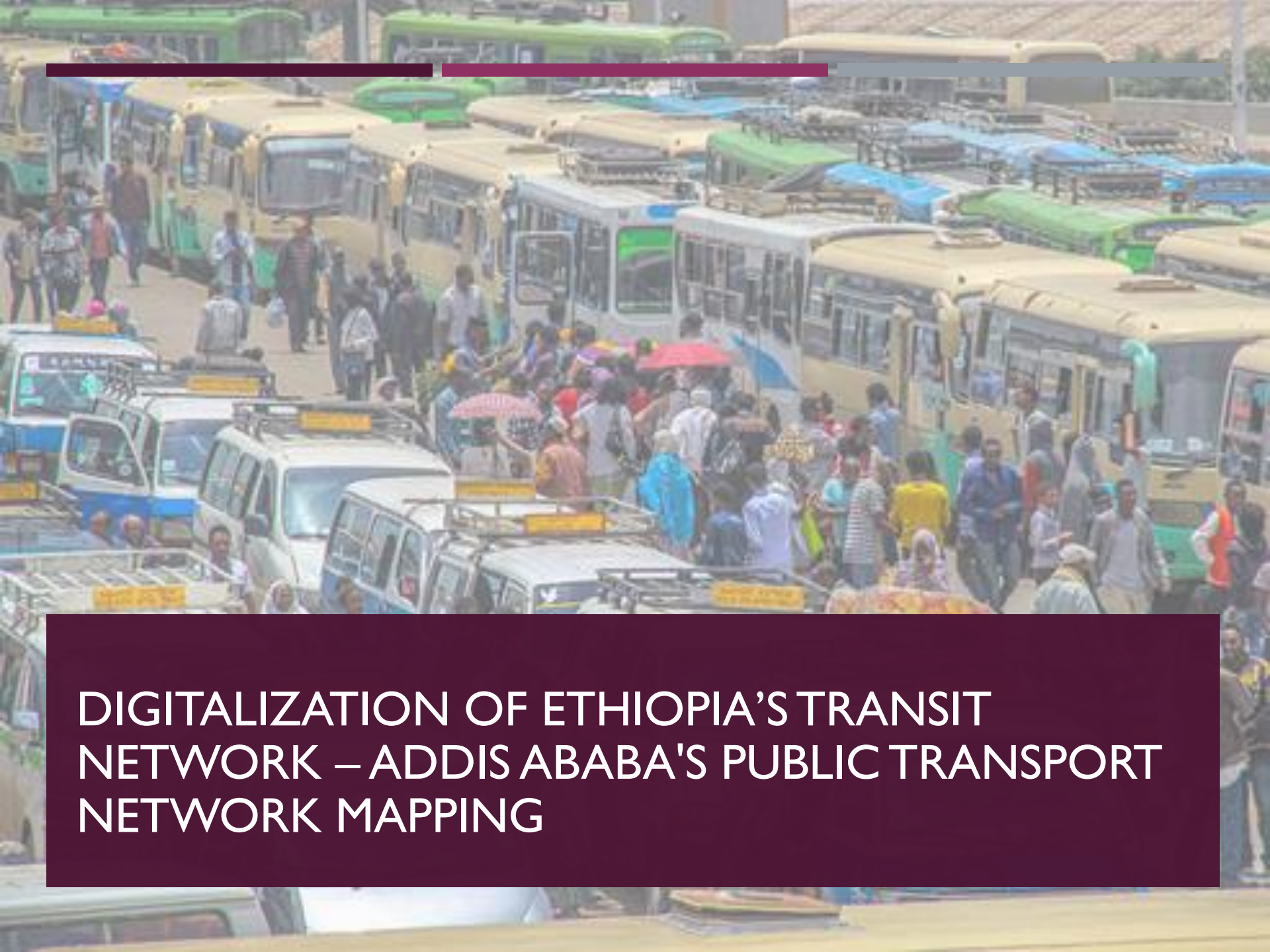
Secondary Data Collection

Output

- GIS Map

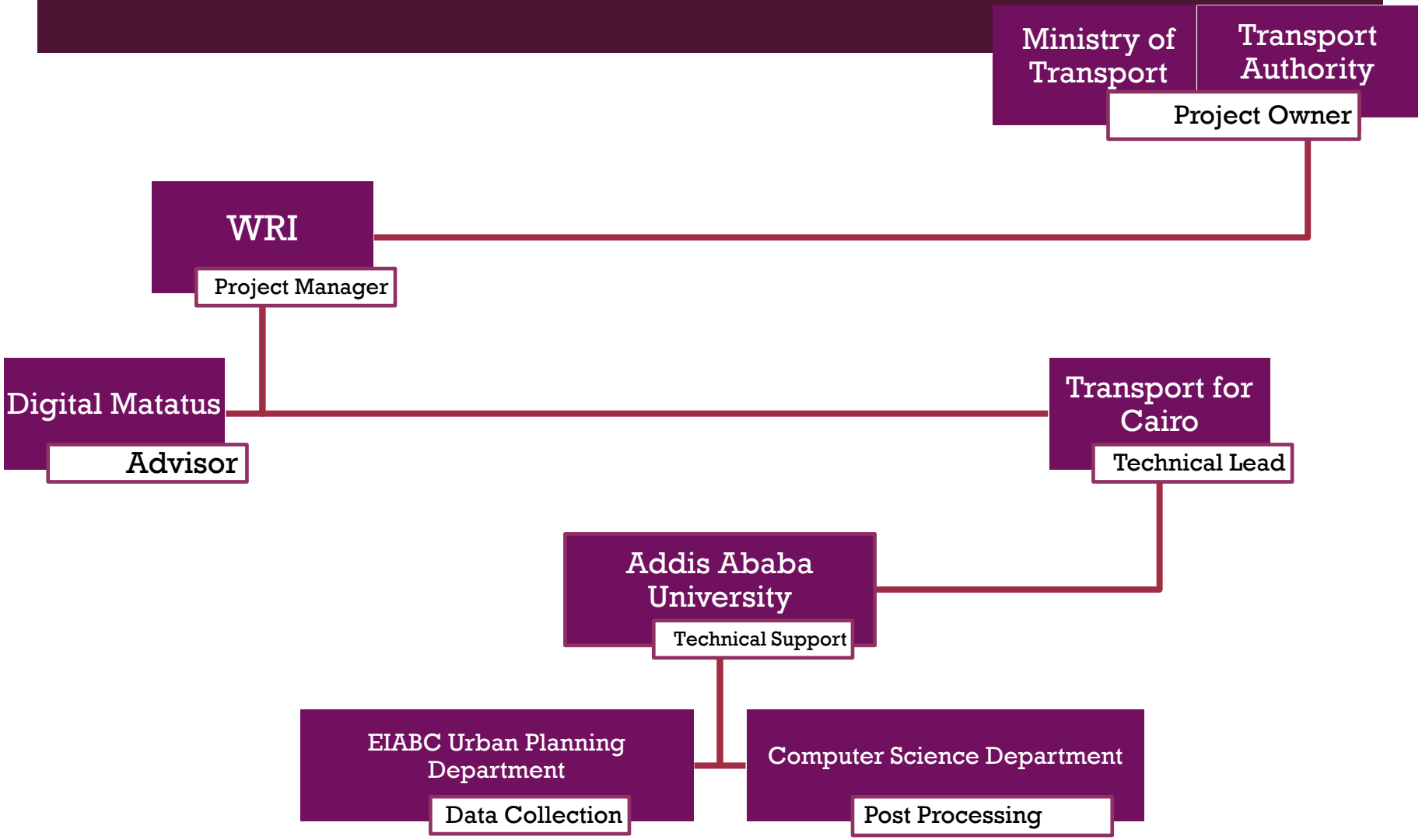
DIGITALIZATION OF ETHIOPIA'S TRANSIT NETWORK – WHERE IT ALL BEGAN





DIGITALIZATION OF ETHIOPIA'S TRANSIT NETWORK – ADDIS ABABA'S PUBLIC TRANSPORT NETWORK MAPPING

STAKEHOLDERS



OBJECTIVES

- Create a GIS map for Addis Ababa's Transportation Network
  - Sheger (54 routes)
  - Anbessa (124 routes)
  - LRT (2 lines)
  - Blue Taxis/Paratransit (507 routes)
- Create a GTFS Feed for Trip planning
- Visualize the data in a simple, informative manner

PROJECT SUSTAINABILITY

Importance of Building Local Capacity:

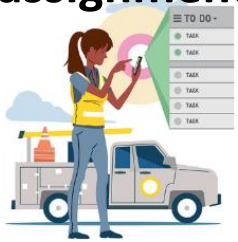
- on digitizing public transport data based on global methodologies and standards
- to maintain and update the public transport data

In the case of Addis Ababa:

- 90 students from AAU were trained in total
- 50 were active in the data collection and processing

MAPPING PROCESS

Route assignment



Field data gathering

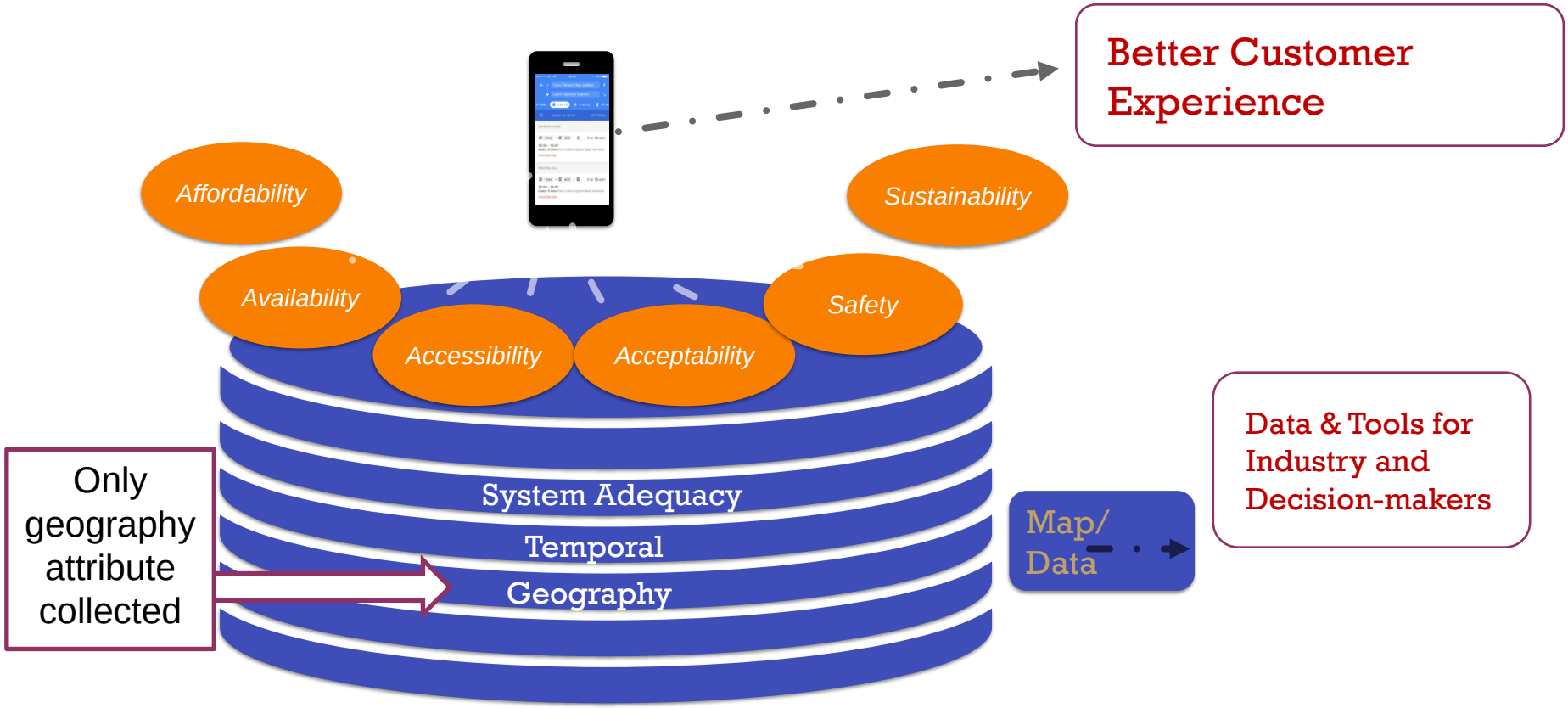
Surveying

Post processing

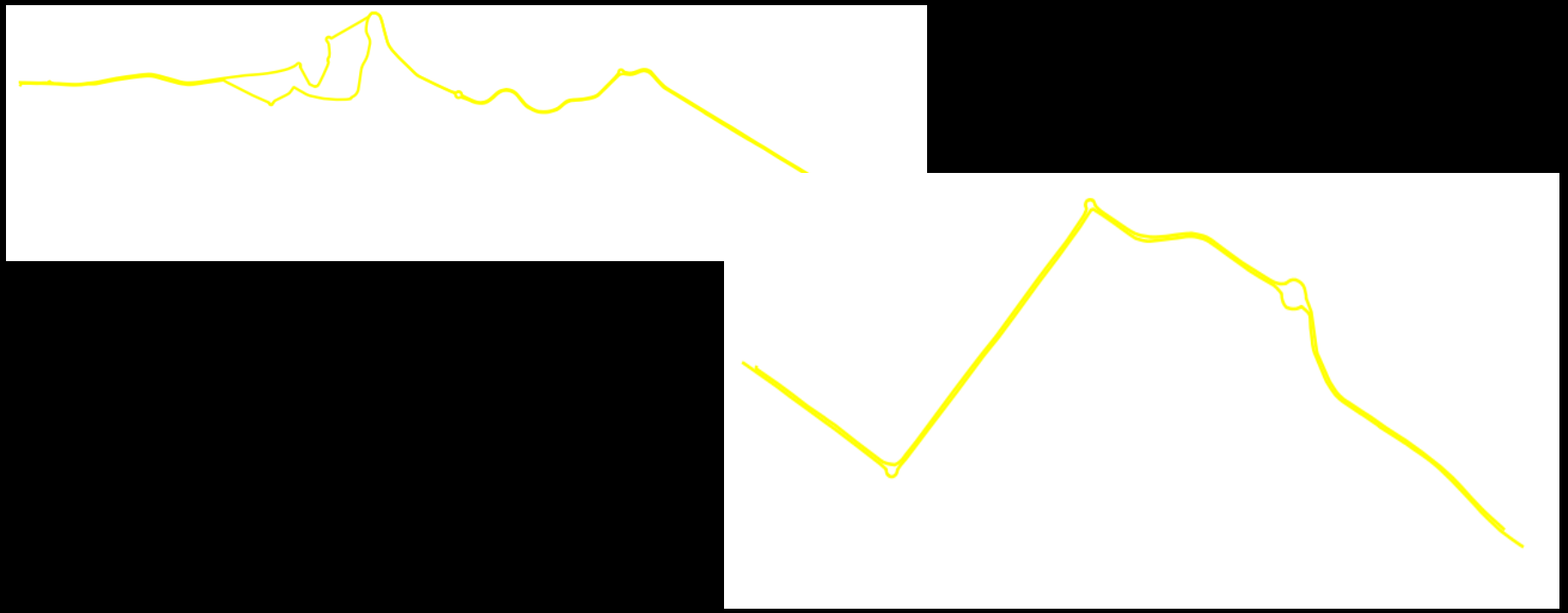
Feedback session

Quality Assurance

ATTRIBUTES



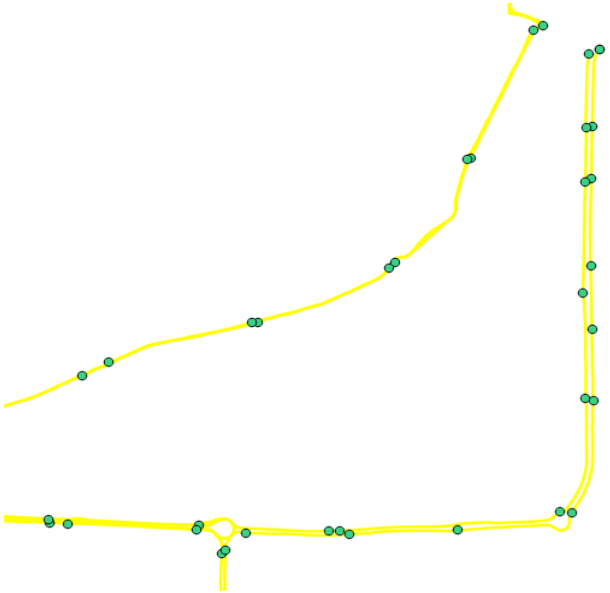
Source: TfC



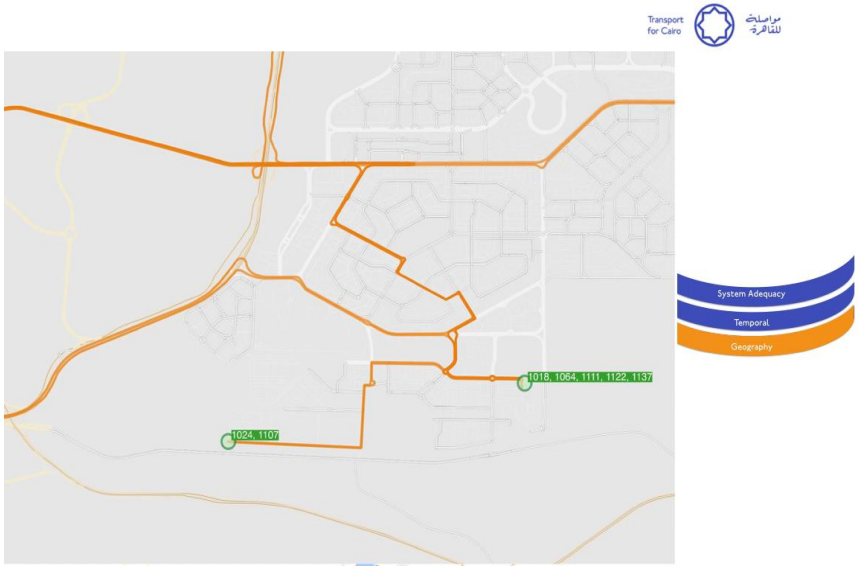
1. DATA LAYERS – ROUTES

2. DATA LAYERS: STOPS

- Single Instances per Trip



- Multiple Instances per Trip



Source: TfC

3. DATA LAYERS: TERMINALS

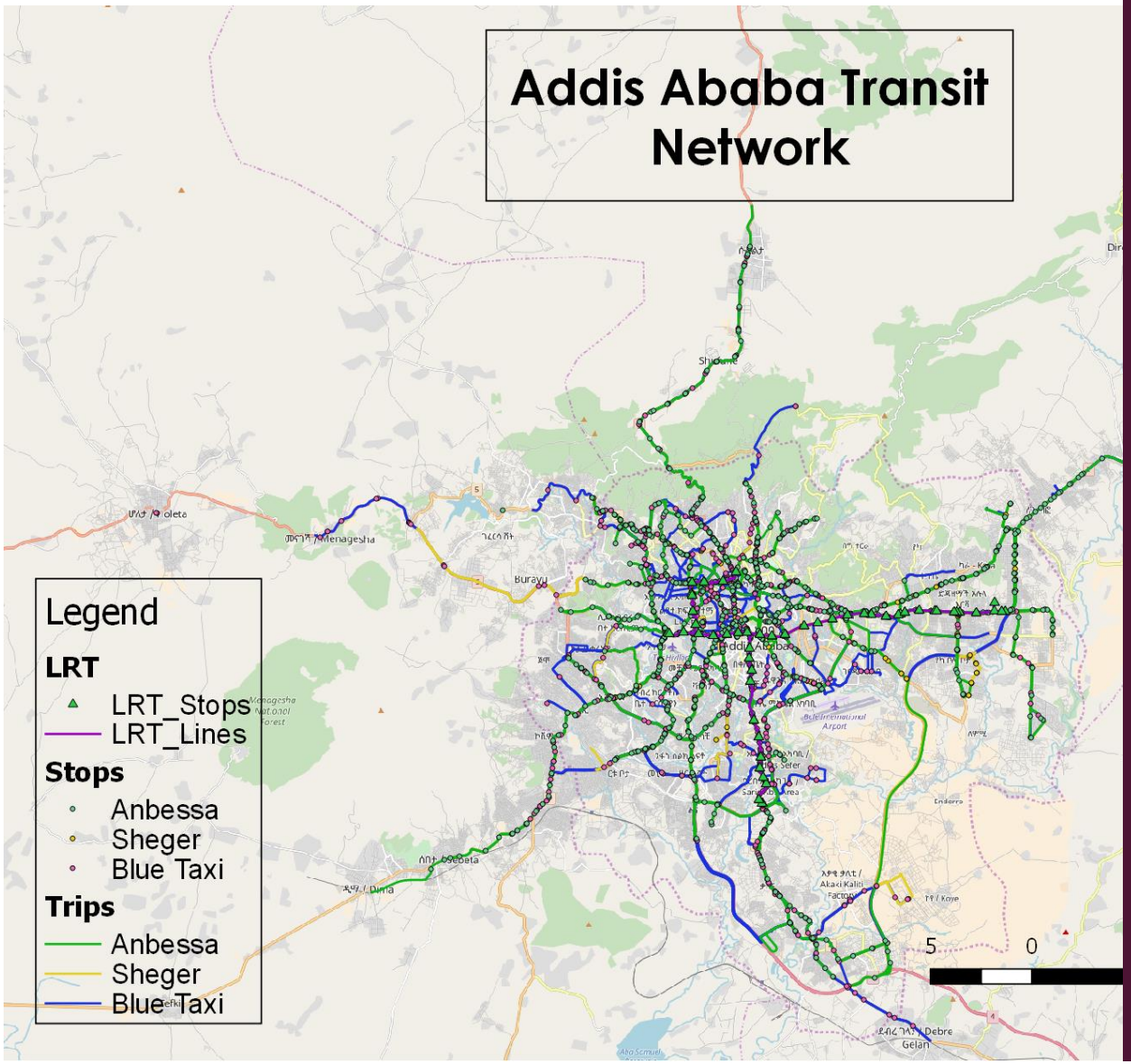
CHALLENGES & SOLUTIONS

CHALLENGES

- Time constraint
  - capacity building happening simultaneously
- Budget constraint
  - type of app selected
- Unreliability of transport services
  - inactive routes due to road closures
  - tariffs not respected by taxi drivers
- Weather (rainy season) affects GPS

SOLUTIONS

- WRI brought in experts with experiences working in similar cities/situations
- Application used - GPS Essential
- Support from the AATA and local knowledge
- Quality assurance happened at every stage so students had to re do any routes that were inaccurate
- Selection of top performing students



FINAL GIS MAP

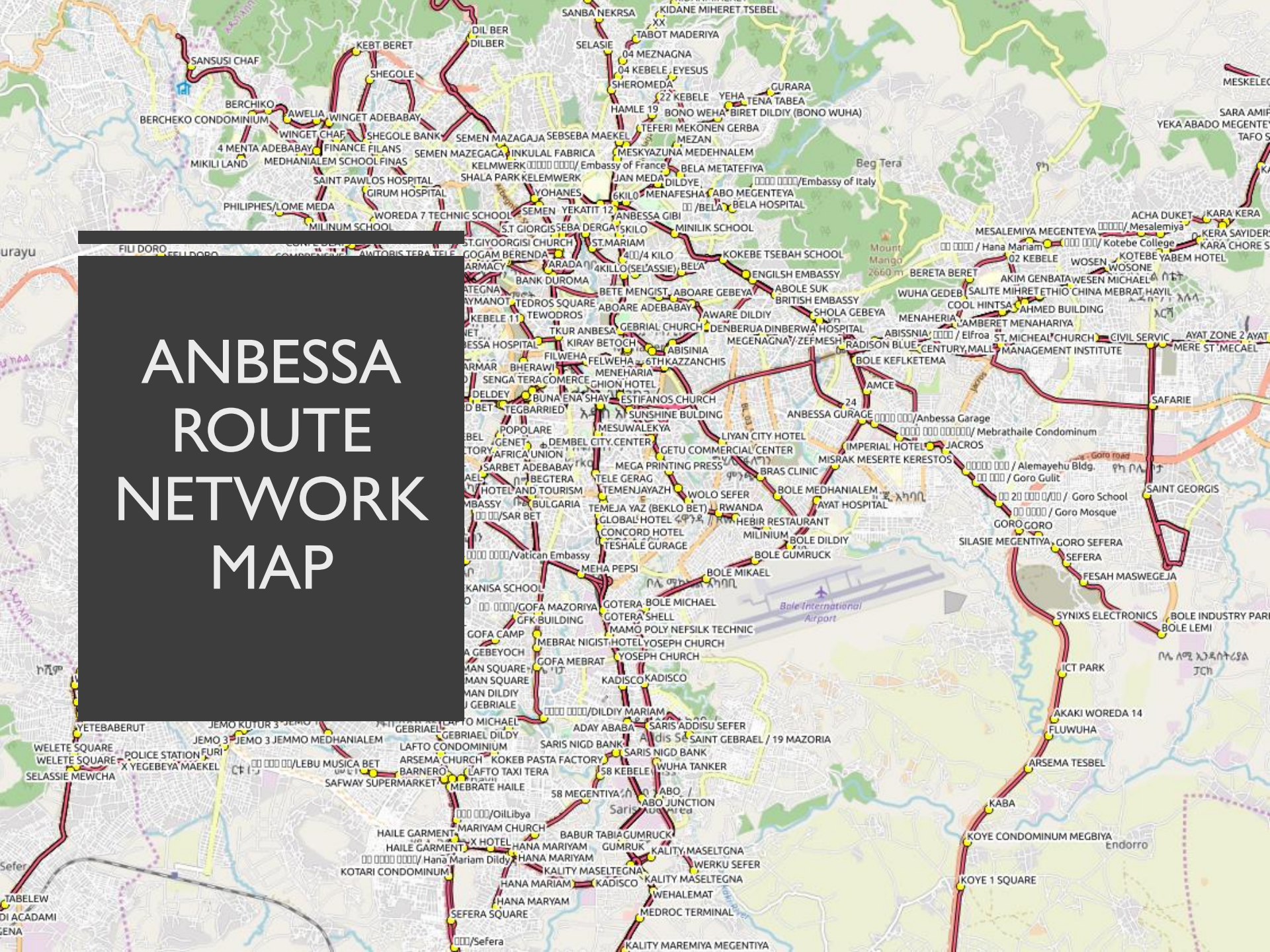
GET THE MAP

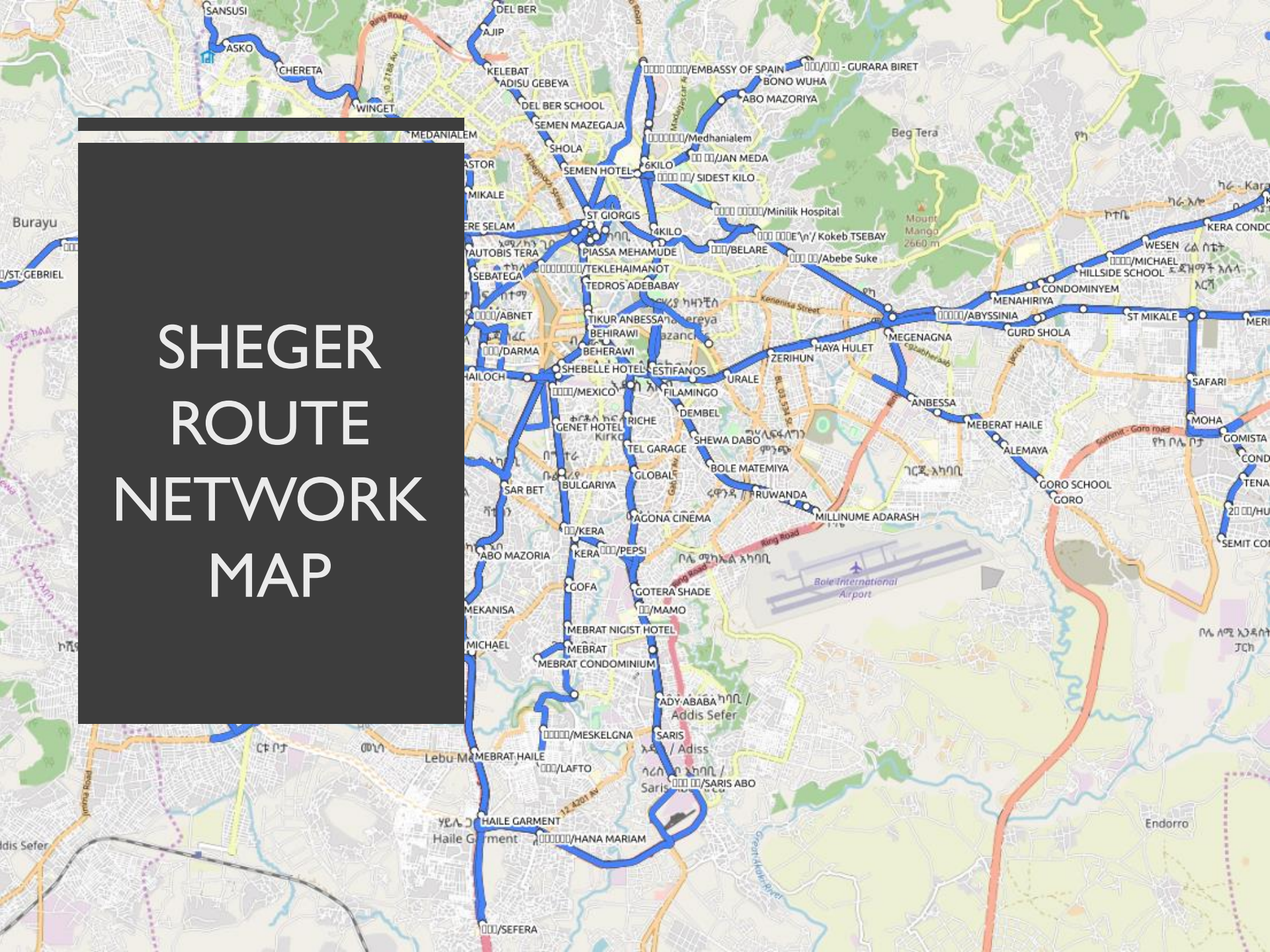
- Go to Play Store and download any QR code scanner app
- Open the QR scanner
- Scan the QR Code by taking a picture
- Open the link with your browser

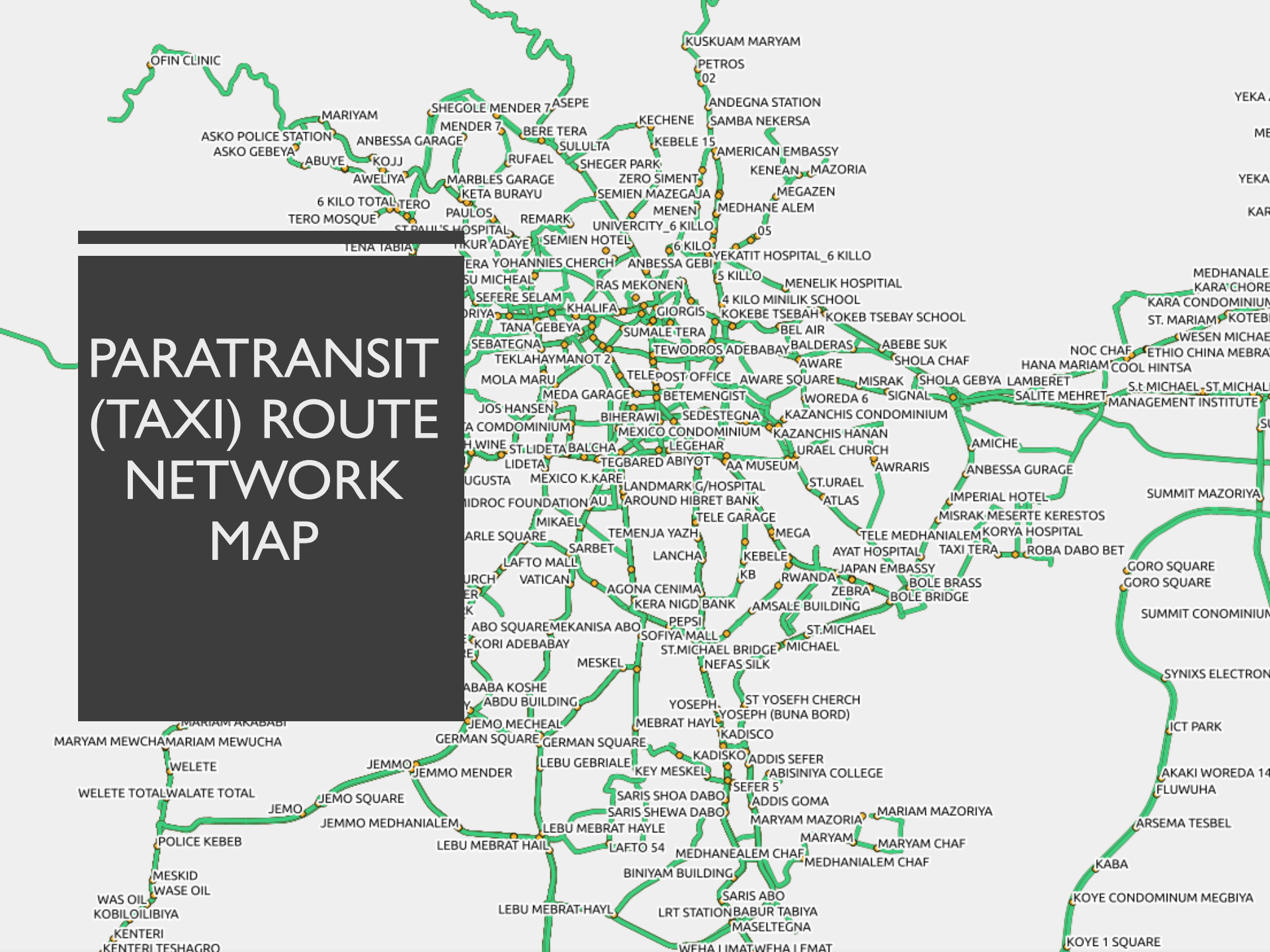
Anbessa Route Map

Sheger Route Map

Paratransit(Taxi) Route Map


ANBESSA
ROUTE
NETWORK
MAP


SHEGER
ROUTE
NETWORK
MAP


PARATRANSIT (TAXI) ROUTE NETWORK MAP
OFIN CLINIC
MARIYAM
ASKO POLICE STATION
ASKO GEBEYA
ANBESSA GARAGE
ABUYE
KOJJ
AWELIYA
6 KILO TOTAL
TERO
TERO MOSQUE
SHEGOLE MENDER 7
ASEPE
MENDER 7
BERE TERA
SULULTA
RUFAEL
MARBLES GARAGE
KETA BURAYU
PAULOS
REMARK
SEMIEN HOTEL
ADAYE
KUSKUAM MARYAM
PETROS
02
ANDEGNA STATION
SAMBA NEKERSA
KECHENE
KEBELE 15
AMERICAN EMBASSY
SHEGER PARK
ZERO SIMENT
KENEAN
MAZORIA
SEMIEN MAZEGAJA
MEGAZEN
MENEN
MEDHANE ALEM
UNIVERCITY_6 KILLO
05
6 KILO
YEKATIT HOSPITAL_6 KILLO
ANBESSA GEBI
5 KILLO
MENELIK HOSPITIAL
RAS MEKONEN
4 KILO MINILIK SCHOOL
SEFERE SELAM
KHALIFA
GIORGIS
KOKEBE TSEBAH
KOKEB TSEBAY SCHOOL
TANA GEBEYA
SUMALE TERA
BEL AIR
SEBATEGNA
TEWODROS ADEBABAY
BALDERAS
ABEBE SUK
TEKLAHAYMANOT 2
AWARE
SHOLA CHAF
MOLA MARU
TELE POST OFFICE
AWARE SQUARE
MISRAK
SHOLA GEBYA
LAMBERET
MEDA GARAGE
BETEMENGIST
WOREDA 6
SIGNAL
SALITE MEHRET
JOS HANSEN
BIHERAWI
SEDESTEGNA
KAZANCHIS CONDOMINIUM
MEXICO CONDOMINIUM
KAZANCHIS HANAN
ST. LIDETA
BALCHA
LEGEHAR
URAEL CHURCH
LIDETA
TEGBARED ABIYOT
AA MUSEUM
AWRARIS
MEXICO K.KARE
LANDMARK G/HOSPITAL
ST.URAEL
AROUND HIBRET BANK
ATLAS
MIKAEL
TELE GARAGE
TEMENJA YAZH
MEGA
SARBET
LANCHA
KEBELE
LAFTO MALL
VATICAN
KB
RWANDA
AGONA CENIMA
ZEBRA
KERA NIGD BANK
BOLE BRASS
BOLE BRIDGE
AMSALE BUILDING
ABO SQUARE
MEKANISA ABO
PEPSI
SOFIYA MALL
ST.MICHAEL
KORI ADEBABAY
ST.MICHAEL BRIDGE
MICHAEL
MESKEL
NEFAS SILK
ABABA KOSHE
ABDU BUILDING
YOSEPH
ST YOSEFH CHERCH
YOSEPH (BUNA BORD)
JEMO MECHEAL
MEBRAT HAYL
KADISCO
GERMAN SQUARE
GERMAN SQUARE
KADISKO
ADDIS SEFER
LEBU GEBRIALE
KEY MESKEL
ABISINIYA COLLEGE
JEMMO
JEMMO MENDER
SEFER 5
SARIS SHOA DABO
ADDIS GOMA
JEMO
JEMO SQUARE
SARIS SHEWA DABO
MARIAM MAZORIYA
JEMMO MEDHANIALEM
MARYAM MAZORIA
LEBU MEBRAT HAYLE
MARYAM
MARYAM CHAF
LEBU MEBRAT HAIL
LAFTO 54
MEDHANEALEM CHAF
MEDHANIALEM CHAF
BINIYAM BUILDING
SARIS ABO
LEBU MEBRAT HAYL
LRT STATION
BABUR TABIYA
MASELTEGNA
WEHA LIMAT
WEHA LEMAT
MARIAM AKABABI
MARYAM MEWCHA
MARIAM MEWUCHA
WELETE
WELETE TOTAL
WALATE TOTAL
POLICE KEBEB
MESKID
WASE OIL
WAS OIL
KOBILOILIBIYA
KENTERI
KENTERI TESHAGRO
MEDHANALE
KARA CHORE
KARA CONDOMINIUM
ST. MARIAM
KOTEBE
WESEN MICHAE
NOC CHAF
ETHIO CHINA MEBRA
HANA MARIAM
COOL HINTSA
S.t MICHAEL ST.MICHAL
MANAGEMENT INSTITUTE
AMICHE
ANBESSA GURAGE
IMPERIAL HOTEL
SUMMIT MAZORIYA
MISRAK MESERTE KERESTOS
KORYA HOSPITAL
TELE MEDHANIALEM
AYAT HOSPITAL
TAXI TERA
ROBA DABO BET
GORO SQUARE
GORO SQUARE
SUMMIT CONOMINIUM
SYNIXS ELECTRON
ICT PARK
AKAKI WOREDA 14
FLUWUHA
ARSEMA TESBEL
KABA
KOYE CONDOMINUM MEGBIYA
KOYE 1 SQUARE

DIGITALIZATION OF ETHIOPIA'S TRANSIT NETWORK – NATIONAL PUBLIC BUS NETWORK MAPPING

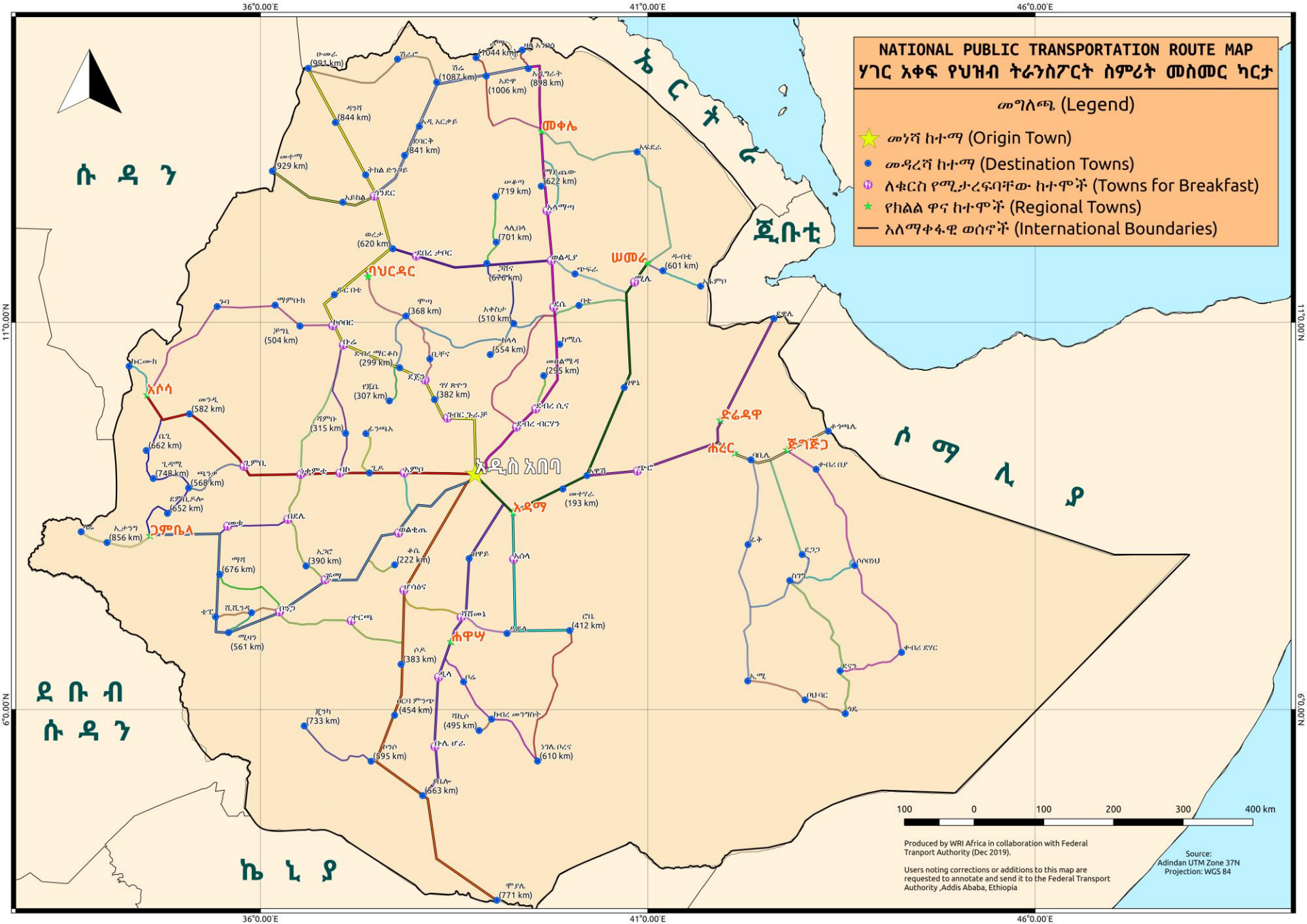
OBJECTIVES

- Recreate a GIS map for National Intercity Bus Transportation Network (map only available in hard copy)
- Update routes, stops and terminals
- Visualize the data in a simple, informative manner

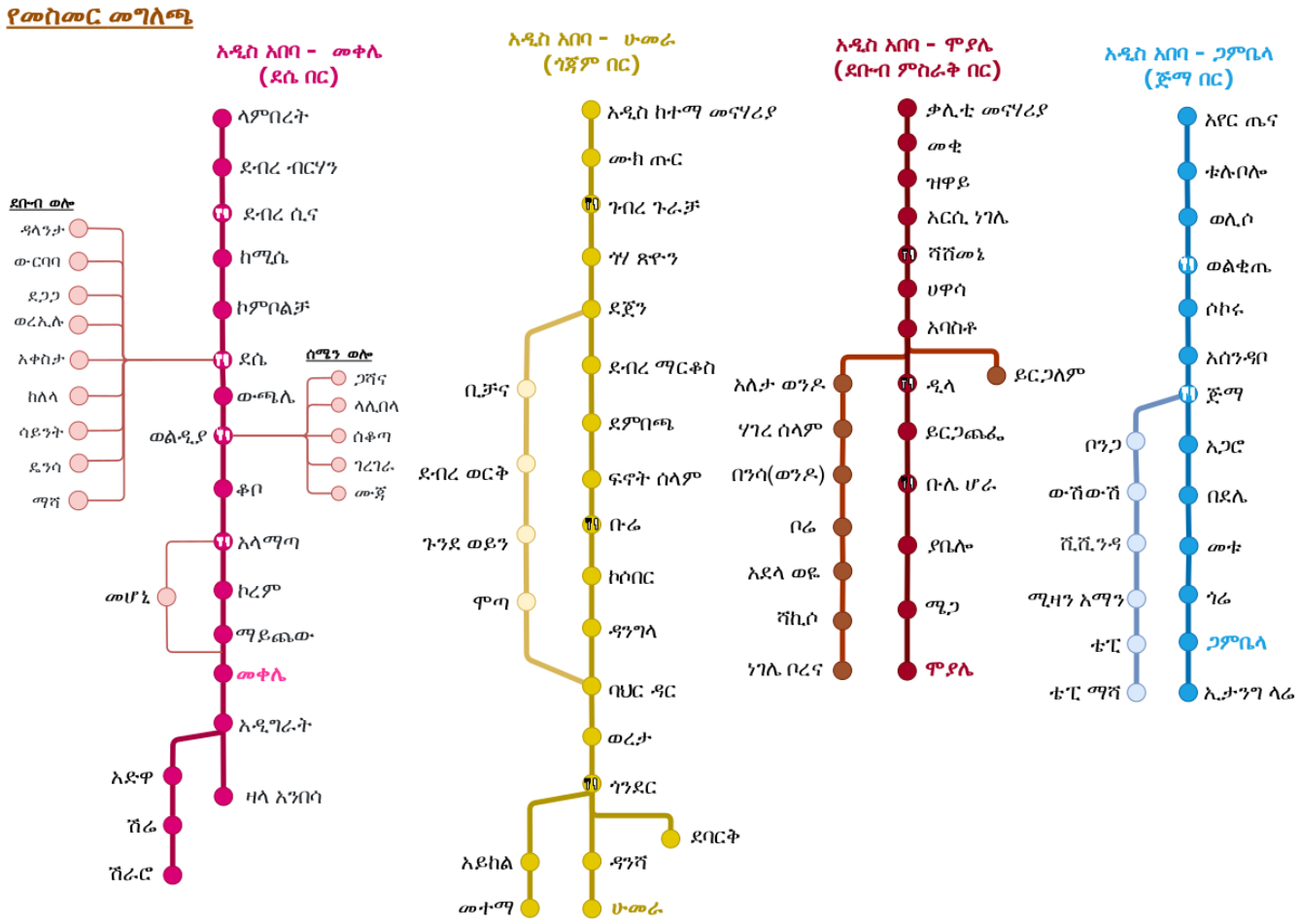
GET THE MAP

- Go to Play Store and download any QR code scanner app
- Open the QR scanner
- Scan the QR Code by taking a picture
- Open the link with your browser

National Route
Map


NATIONAL PUBLIC TRANSPORTATION ROUTE MAP
ሃገር አቀፍ የህዝብ ትራንስፖርት ስምሪት መስመር ካርታ
መግለጫ (Legend)
መነሻ ከተማ (Origin Town)
መዳረሻ ከተማ (Destination Towns)
ለቁርስ የሚታረፍባቸው ከተሞች (Towns for Breakfast)
የክልል ዋና ከተሞች (Regional Towns)
አለማቀፋዊ ወሰኖች (International Boundaries)
ሱ ዳ ን
ኤ ር ት ሪ
ጂ ቡ ቲ
ሶ ማ ሊ ያ
ደ ቡ ብ
ሱ ዳ ን
ኬ ኒ ያ
36°0.00'E
41°0.00'E
46°0.00'E
11°0.00'N
6°0.00'N
ሁመራ (991 km)
ሽሬሮ
ሽሬ (1087 km)
ሰሜ (1044 km)
ሀል አንበሳ
አድዋ (1006 km)
አዲግራት (898 km)
ዳንሻ (844 km)
አዲ አርቃይ
ደባርቅ (841 km)
መቀሌ
አፍደራ
መተማ (929 km)
ትክል ድንጋይ
ማይጨው (622 km)
ሠቆጣ (719 km)
አይከል
ጎንደር
አላማጣ
ላሊበላ (701 km)
ወረታ (620 km)
ደብረ ታቦር
ጋሸና (676 km)
ወልዲያ
ጥፍራ
ዱብቲ (601 km)
ሠመራ
ሚሌ
አፋምቦ
ባህርዳር
ዳር ቡቴ
ጉባ
ማምቡክ
ሞጣ (368 km)
አቀስታ (510 km)
ደሴ
ባቲ
ደዋሌ
ቻግኒ (504 km)
ከሰበር
ቡሬ
ደብረ ማርቆስ (299 km)
ቢቸና
ከላላ (554 km)
ከሚሴ
መሀልሚዳ (295 km)
ኩርሙክ
ደጀን
ጎሃ ጽዮን (382 km)
የጁቤ (307 km)
ጎዋኔ
አሶሳ
መንዲ (582 km)
ደብረ ሲና
ደብረ ብርሃን
ሻምቡ (315 km)
ፊንጫአ
ቢጊ (662 km)
ጊዳሚ (748 km)
ጊምቢ
ነቀምቴ
ባኮ
ጊዶ
አምቦ
አዲስ አበባ
አዋሽ
ጭሮ
ድሬዳዋ
ሐረር
ባቢሌ
ጅግጅጋ
ቶጎጫሌ
ቀብረ በያ
ጫንታ (568 km)
ደምቢዶሎ (652 km)
ጋምቤላ
ሎሬ
ኢታንግ (856 km)
መቱ
በደሌ
ወልቂጤ
ሙተሃራ (193 km)
አዳማ
ሎቅ
ደጋጋ
ሶሰበነህ
ማሻ (676 km)
አጋሮ (390 km)
ቆሴ (222 km)
ዝዋይ
አሰላ
ስገግ
ሆሳዕና
ቴፒ
ሺሺንዳ
ቦንጋ
ተርጫ
ሻሸመኔ
ሮቤ (412 km)
ሚዛን (561 km)
ሐዋሣ
ዶዶላ
ቀብረ ደሃር
ሶዶ (383 km)
ዲላ
ቦሬ
ዲሚ
ደናን
ቦሰ ቦር
ቦሬ
ጂንካ (733 km)
ቦርባ ምንጭ (454 km)
ሻኪሶ (495 km)
ከብረ መንግስት
ኮንሶ (595 km)
ቡሌ ሆራ
ነገሌ ቦረና (610 km)
ያቤሎ (563 km)
ሞያሌ (771 km)
100 0 100 200 300 400 km
Produced by WRI Africa in collaboration with Federal Tranport Authority (Dec 2019).
Users noting corrections or additions to this map are requested to annotate and send it to the Federal Transport Authority ,Addis Ababa, Ethiopia
Source:
Adindan UTM Zone 37N
Projection: WGS 84

ROUTE DETAILS



DIGITALIZATION OF ETHIOPIA'S TRANSIT NETWORK – WHAT HAS THE DATA BEEN USED FOR?

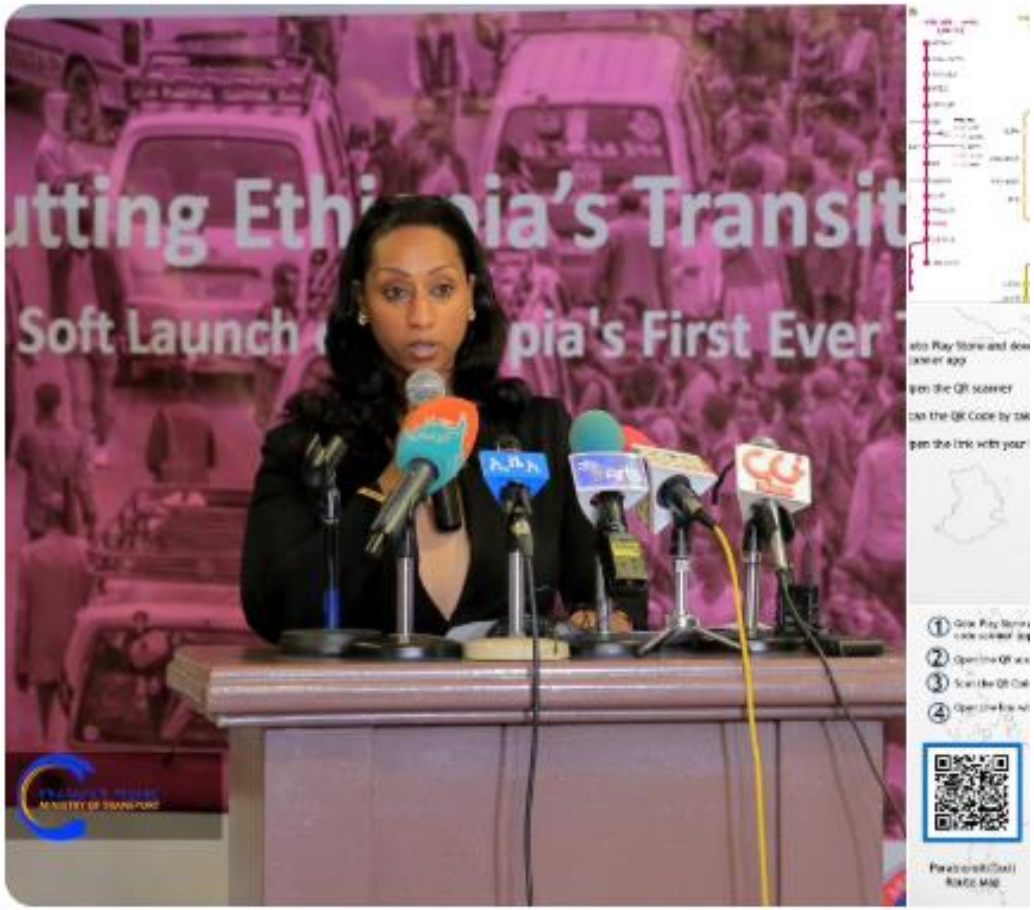
- WRI - Accessibility map of Addis Ababa
- BRT Project Unit - BRT Planning
- Alert Engineering - Merkato Accessibility Study
- Adama University – Masters Project on Access of Anbessa Bus at Condominium Sites in Addis
- AAU Computer Science Department – Routing App Development
- Logistics planning for a delivery service company

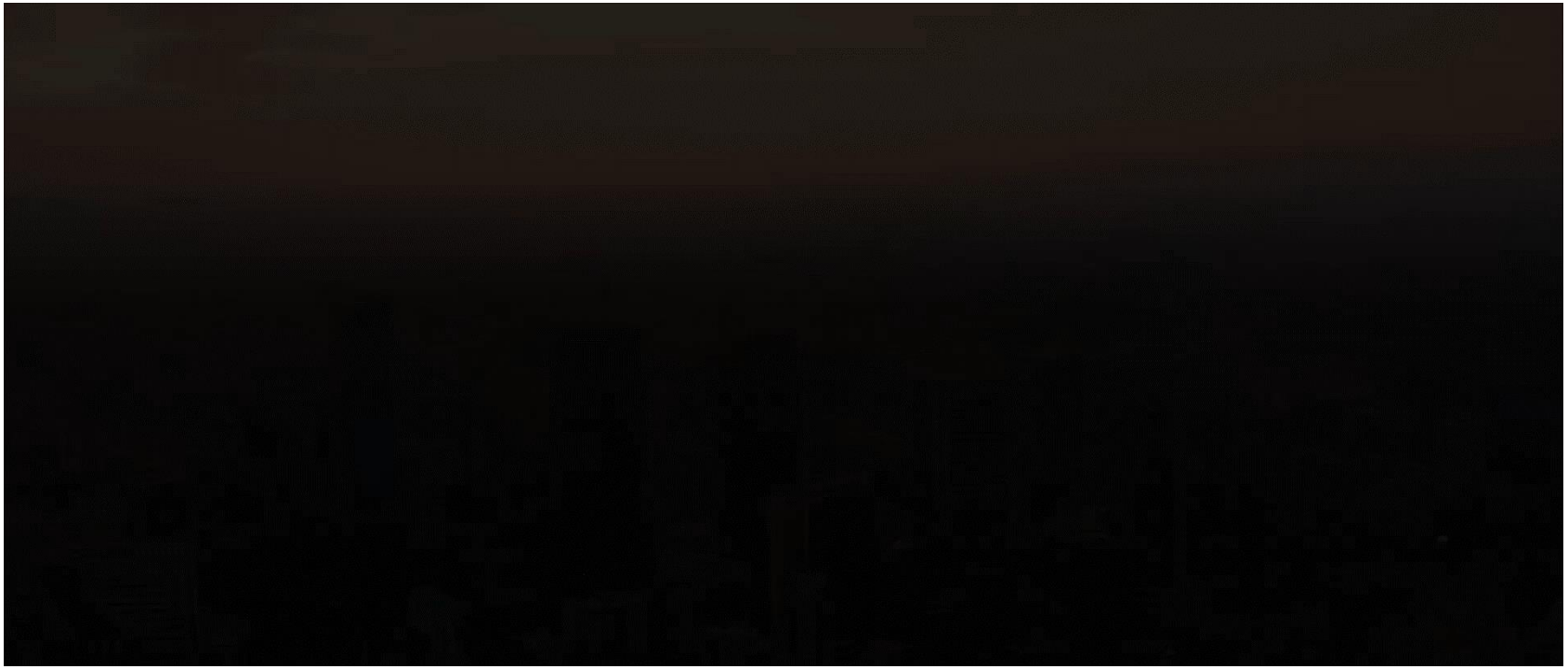
DIGITALIZATION OF ETHIOPIA'S TRANSIT NETWORK – POTENTIAL

- **Understanding Travel Activity Patterns**
  - Identifying patterns for different modes of transport
  - Motivation and Choices for travel choices
  - Origin – Destination
  - Demand – Supply
- **Transport Planning**
  - Optimizing transportation routes i.e. time
  - Plan extensions or changes to road/public transport network
  - Assess viability of new investment
  - Assess the existing transport system i.e. accessibility maps
  - Enabling street network data for decision makers and researchers
- **Development of innovative mobility solutions and applications**
  - Trip planning
  - Public Transport Hailing applications
- **Robust and Comprehensive Public Transport Data Center**
  - Collection of digital data by all cities that will be continuously updated
  - A central database center within the Ministry of Transport
  - Capacity built across the country on digital data

Dagmawit Moges @dagmawit_moges · 27 Dec 2019

Pleased to officially launch the program of putting Ethiopia's Transit o
soft launch of 🇪🇹's first ever trip planning app.The dev't of innovative
solutions such as this app is the firststep towards creating smarter, dat
mobility in 🇪🇹. @WorldResources



POLITICAL COMMITMENT FROM MINISTRY OF TRANSPORT

VIDEO BY MINISTER OF TRANSPORT