

Urban Transport Data Analysis Tool (UT-DAT) USER'S MANUAL



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FOREWORD

The urban population in the developing world is expected to more than double by the middle of the twenty-first century - from 2.3 billion in 2005 to 5.3 billion in 2050. Large cities are growing very rapidly, and services are struggling to keep up. In particular, some cities have been overwhelmed by the increase in travel demand.

The result has been a turn to private vehicles, an increase in fossil fuel consumption, and a subsequent rise in greenhouse gas emissions and pollution levels. This has also led to congestion, making it increasingly difficult for goods and people to move from place to place, as well as an increasing incidence of road crashes. The net effect is a decrease in the health and well-being of urban dwellers as well as the economic efficiency of the cities that they live in.

It is essential that the growing needs of urban mobility be met more efficiently. There is an urgent need for planning for urban mobility that not only provides the required capacity to meet growing demand but does so in a manner that minimizes the energy used.

Mitigation efforts in most cities have addressed the symptoms rather than the underlying causes. Cities have tried to deal with congestion by widening their roads or building mass transit systems, without first looking at whether the city needs additional road/mass transit capacity or whether it needs other interventions like improved intersection design or improved road maintenance. High energy consumption in a given city could be due to any number of supply, demand and performance related factors, -such as excessive trip lengths, poor integration among different modes of public transport, low vehicle fleet fuel efficiency, and highly congested traffic. The precise mix of these factors will be different for each city based on its history, geography, government and local economy. An effective diagnostic tool could clearly identify the underlying causes behind the visible symptoms and would help in better targeting of the urban transport interventions.

It is in this context that the Urban Transport Data Analysis Tool has been developed to allow a systematic diagnosis of the urban transport problems in a city before designing remedial measures. It is hoped that cities and decision makers will find this tool useful in designing their policies and other interventions aimed at improving mobility in their cities.

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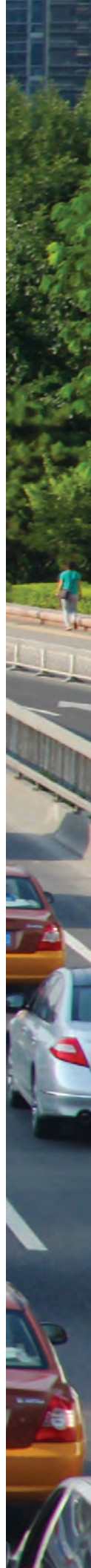


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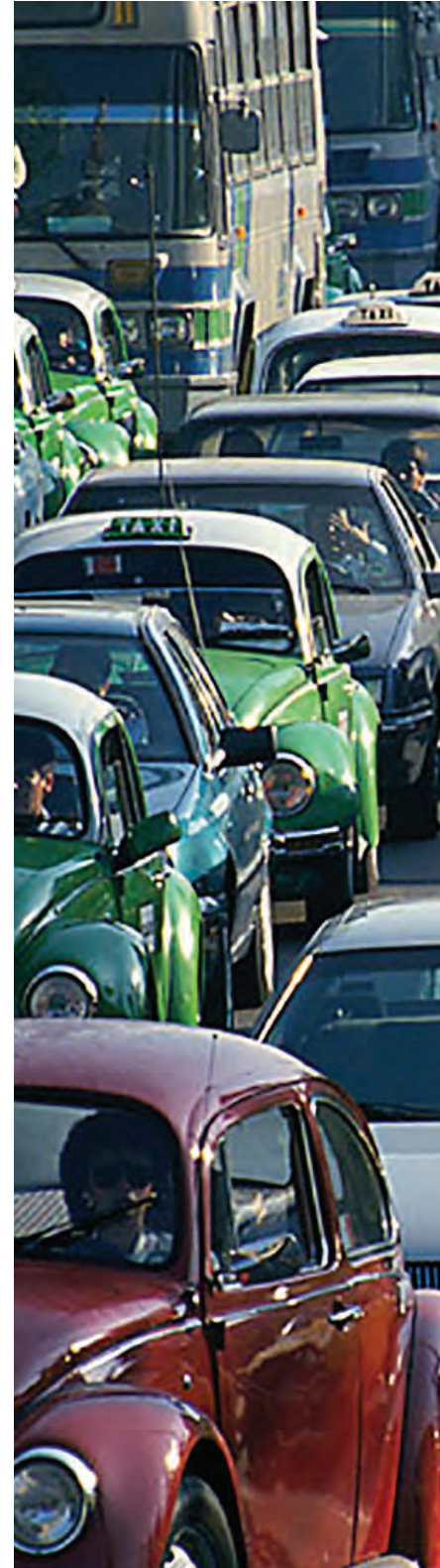
INTRODUCTION

Urbanization is a defining feature of this century. This is especially true in the developing world, where the total urban population is expected to more than double by the middle of the 21st century—from 2.3 billion in 2005 to 5.3 billion in 2050. Overall population growth and increasing urbanization have led to the rapid growth of large cities, which have been overwhelmed by the sudden increase in travel demand.

Growing demands for urban travel have led to rapid motorization. For example, in 1990, China had 5.5 million civil vehicles, of which only 800,000 were privately owned. By the end of 2012, it had 120 million civil vehicles, of which 93 million were privately owned. Similarly, the number of motor vehicles in India went up from 21.3 million in 1991 to 141.8 million in 2011. The trend in most other developing countries is similar.

Such rapid motorization has led to increased consumption of energy, especially nonrenewable energy, as well as increased emission of Green House Gases (GHG) and other pollutants. It has also led to congestion, increasing the difficulty of moving goods and people from place to place, as well as increasing the incidence of traffic accidents. These have compromised the health and well-being of the population as well as the economic efficiency of cities. Therefore, it is essential that the growing needs of urban travel be met more efficiently. There is an urgent need for effective and efficient planning for urban transport—planning that not only provides the required capacity to meet growing travel demand but does so in a manner that minimizes energy use and other negative aspects of excessive private vehicle use.

Unfortunately, most cities have addressed the symptoms rather than the underlying causes. Cities have tried to deal with congestion by widening roads or building mass transit systems, without





first looking at whether the city needs additional road/mass transit capacity or whether it needs other interventions, such as improved intersection design or improved road maintenance. Similarly, efforts to deal with air pollution have imposed more stringent emissions norms on all pollutants, without first looking at the actual cause. High energy consumption in a given city could be due to any number of system supply-, demand-, and performance-related factors, including excessive trip making and trip lengths, low public transport and non-motorized transport opportunities, low vehicle fleet fuel efficiency, and traffic congestion. The precise mix of these factors will be different for each city based on its history, geography, government, and socioeconomic characteristics. This means that an a priori diagnosis to clearly identify the underlying causes of the visible symptoms would help in better targeting urban transport interventions. In the absence of a proper up-front diagnosis, some proposed solutions may waste resources and even be counter-productive.

Urban Transport Data Analysis Tool

It is in this context that the Urban Transport Data Analysis Tool (UT-DAT) has been developed to look at critical parameters relating to urban transport in a city and compare them with peer cities, to identify the specific areas where each city performs better or worse. This is analogous to a pathologist's report that helps a doctor diagnose a patient's ailment more precisely before suggesting the right medication. A diagnostic study will facilitate a diagnosis of the urban transport problems of a city so that remedial measures can be correctly targeted.

The UT-DAT compares a series of transport-related indicators for that city (referred to as the "test city") with similar indicators for a large set of peer cities. Such a comparison allows an understanding of where a city is doing well and where it is not, vis-à-vis its peers, and thereby suggests directions for remedial action.

The tool comprises a large set of data items for several cities and allows the user to make comparisons across selected indicators and also choose the peer cities to compare against. Thus, there is a test city (the city that is being subjected to diagnosis) and peer cities (chosen for the comparison). The tool provides an output that compares the test city with the peers through graphs and charts.

The UT-DAT is a Microsoft Excel-based tool, and has been designed to be simple and user friendly. The software allows the user to (a) input data for a test city, (b) select a set of indicators to be used for the comparison, (c) select a set of peer cities to compare against, and (d) carry out the comparison and generate reports.

Indicators vs. data items

A comparison of performance is more meaningful when it uses specific “indicators” derived through computations of one or more of the data items. For example, a comparison of public transport ridership would not be meaningful, though a comparison of the share of the population using public transport would be useful. Similarly, the fare charged by public transport system would not mean much unless local income levels are also taken into account.

Therefore, several indicators that would help measure urban transport performance in a city were identified. These indicators, derived from the raw data items collected, were selected in such a way that they could be easily calculated

from the available data and for ease of comparison across cities. In all, 30 indicators were selected and have been already computed in the tool for ease of use.

Shortcomings with regard to urban transport data

Because most of the data collected for the tool came through secondary sources, comparing transport data across multiple cities, particularly across different countries and world regions, is very difficult. While some of the information is recorded in the annual statistics of public transport agencies, other data are not available from any single source and are usually scattered across several different sources. Data vary greatly from one organization to another and from one city to another. Even within a city, data are usually scattered among a large number of sources, which do not always use the same definition for a given data item. Data are also generally not available for the same year across all cities. Apart from this, several data items do not have a consistent basis for determination in all the cities.





Analytical method used to overcome data unreliability

Because there was considerable variability and unreliability in the data, it was necessary to develop an analytical method that accommodated this unreliability and yet generated acceptable results. Therefore, the tool does not try to compare cities based on absolute performance values. Rather, it tries to classify them based on their relative performance vis-à-vis peer cities. It was recognized that the numerical scores may be viewed either as indexes of relative performance (“ordinal score”), rather than a measure of absolute level of performance against some underlying value scale (“cardinal scale”). For example, given the unreliability of the data, it would be incorrect to consider that a score of 8/10 represents a level of performance that is twice as good as a score of 4/10, on some underlying value scale. Instead, a better interpretation, given the constraints, would be to consider a score of 8/10 as being worse than 9/10, and better than 7/10, which, in turn, is better than 6/10, and so on.¹ Such “rank” classification would lead to fewer errors even with relatively unreliable data. It was, therefore, decided that a ranking method would be better than absolute numbers. Further, it would give more reliable results if all the cities that scored close to each other were grouped together into one grade and not assigned a strict merit ranking.

For this reason, the tool first ranks the cities in the order of their absolute performance measures and thereafter groups them into five categories or quintiles based on their performance on each individual indicator. The placement of the city in the top quintile (1st quintile) indicates that the primary city is ranked in the top 20 percent for the selected indicator in comparison to its peers, whereas a placement in the bottom quintile (5th quintile) indicates that the city is in the bottom 20 percent in comparison to its peers. The tool lets users assess the cities’ performance across all the selected indicators based on such an analysis.

A detailed description on the use of this tool follows..

¹ An analogy may be made with the concept of “utility functions” or “preference functions” that underlie economics. The economic rationale is that while there may indeed be significant variation in strength of preferences over different consumption baskets in terms of some underlying value scale, it is cognitively extremely difficult to do more than assign relative ranks to the baskets. Also, as noted above, cardinal valuations made by different individuals are not interpersonally comparable.

USER'S GUIDE FOR THE **UT-DAT**

This manual contains step-by-step instructions for using the UT-DAT. It explains, with examples, how the outputs can be obtained and how the existing data can be updated.

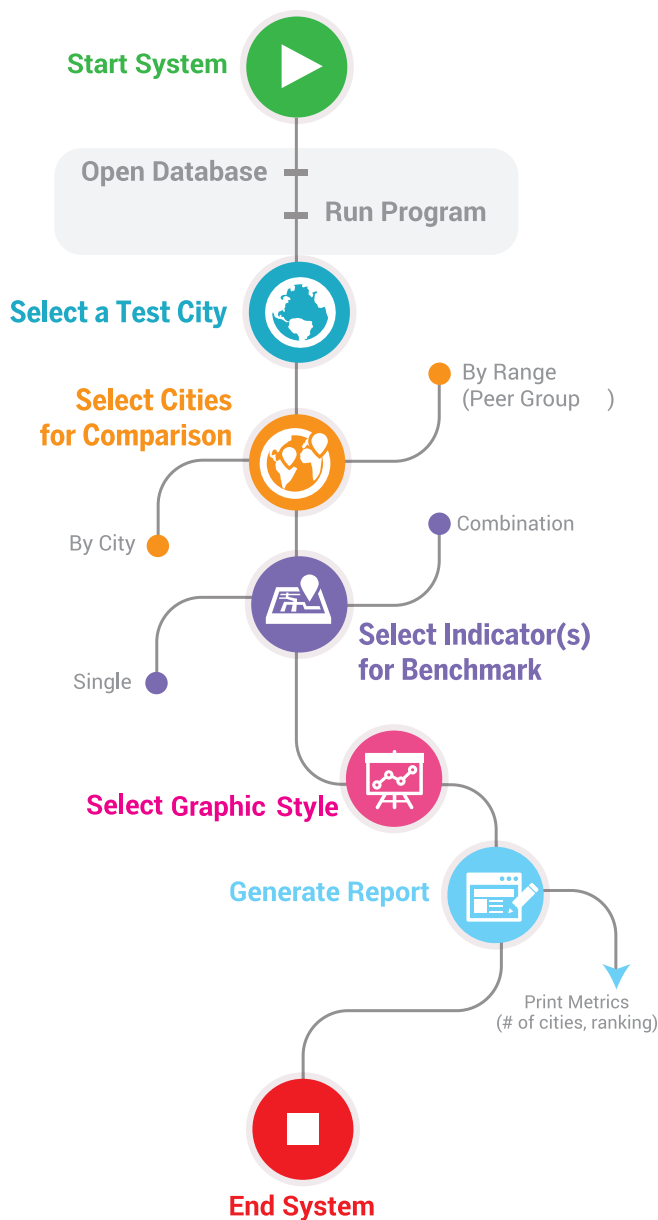
Main Features

The UT-DAT is a multipurpose tool and its main features are the following:

- A one-stop-shop database (**Matrix**) containing the most relevant urban transport data for several cities around the world. This database currently covers 144 data items for 93 cities in 42 countries. The data items were collected from secondary sources and can be broadly classified into categories such as demographics, travel demand, supply of urban transport infrastructure, energy, traffic safety, air quality, and macroeconomic data.
- The user can easily update the database and add new cities by using the **Update Form**. With the main matrix containing more than 160 columns, this feature makes updating the database easier to manage. If users want to add their city, or if they feel that they have more recent data for any parameter for their city than what is in the tool, they will be able to make changes to it before they generate a particular report. However, the actual database will be locked and any update of the database will require additional verification by the tool administrator.
- Two types of reports can be generated:
 - i) **Report 1** allows the user to easily choose a test city, manually or automatically select peer cities, and generate a bar, column, or line chart graphing the indicators chosen.
 - ii) **Report 2** allows the user to generate a scatter plot to better portray the relationship between two data items, which a bar, column, or line report cannot do.
- The user can select multiple indicators to arrive at the best combination for analysis. **Report 1** will generate a new Excel file containing the reports for all indicators chosen, and one **Status Across Indicators** report that will show a thermometer view of the test city across all indicators.

Remember that this is a benchmarking tool to assess urban transport indicators of a city by comparing it with peers. It will facilitate the analysis and diagnosis of the causes of the main issues affecting a city, and combined with other sources of data and analytical work, it will aid in the process of creating solutions for these issues.

DATA ANALYSIS TOOL— MAIN PROCESS



The running of the data analysis tool is represented by the flowchart on the right.

The steps are described below and detailed instructions follow:

1. The user starts the system
 - i) Database opens (matrix)
 - ii) The program runs in the background (macros)
2. When generating the report:
 - i) A form prompts the user to enter the test city
 - ii) The user selects the main city to be tested
3. The user then has the option of selecting the cities for comparison:
 - i) Manually, by selecting each city
 - ii) By range (or indicators)
 - e.g., "All cities with population <500K"
4. The user selects the indicator(s) to use as benchmark:
 - i) Only one indicator
 - ii) A combination of indicators
5. The user selects the output option (graph style) that is most convenient (bar/column/line)
6. By clicking on **Proceed**, the user generates the report.
7. The report is printed and comparison finalized.



USER INSTRUCTIONS

- Open the UT Data Analysis Tool using Microsoft Excel 2007 or higher.
- Once opened, enable the content of the file in order to allow macros to run properly.

The screenshot shows the Microsoft Excel 2007 interface. A yellow security warning bar is visible, stating "Security Warning: Macros have been disabled" and "Enable Content" button is circled in red. Below the warning, a data table is displayed with the following structure:

	IV	IW	IX
1			
2			Affordability In
3			
4	Particulate matteremissions/million population	Affordability index=metro fare*40*12/per capita GDP	Affordability index=bus fare*40*12/per capita GDP A
5			
6			
7	Particulate matter emissions per Mill population	Affordability index - Metro	Affordability index - Bus
8	2.95	2%	2%
9	2.90	5%	5%
10	10.68	2%	2%
11	10.10	0%	0%
12	1.90	4%	4%
13	3.60	3%	3%
14	4.96	0%	4%
15	11.88	#DIV/0!	#DIV/0!
16	9.62	1%	0%



The file contains the following sheets:

- Matrix
- Update Form
- Report 1–Graphs
- Report 2–Scatter Plots

Each sheet contains the following:

Matrix

The matrix is where all the data pertaining to each city are located. This matrix is available for viewing only and any modifications can be done only by authorized users.

Update Form

This form is to be utilized by the user to enter data on the test city. This form is also the means by which the user in charge of database maintenance updates information in the matrix.

Report 1–Graphs

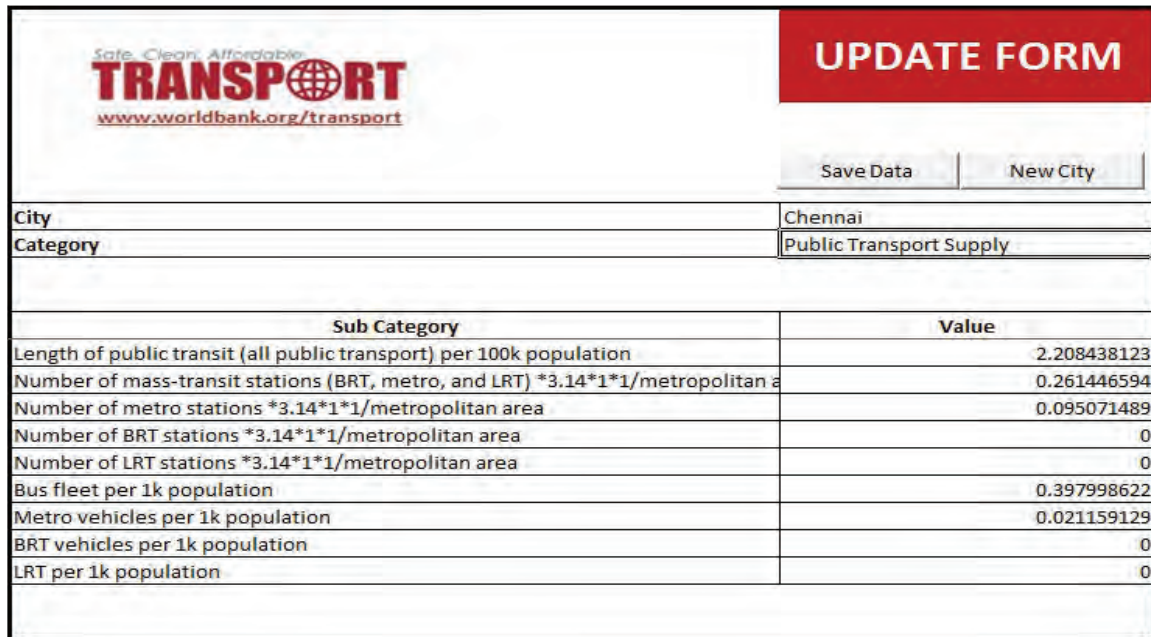
This is the main part of the diagnostic tool; it allows users to generate bar, column, or line reports using the available indicators.

Report 2–Scatter Plots

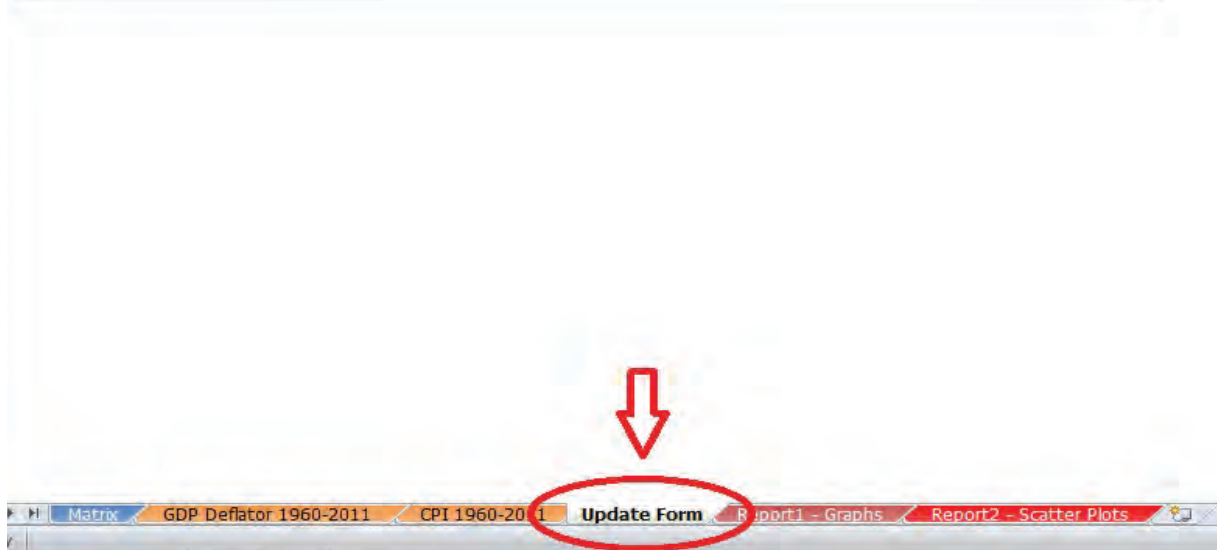
This report is used to combine data items and generate scatter plots. It is a valuable option to better portray the relationship between two data items, when a bar or line report is not adequate.

Updating / Adding Data to the Matrix

- Pull up the Update Form by clicking on the **Update Form** tab at the bottom of the tool.



Sub Category	Value
Length of public transit (all public transport) per 100k population	2.208438123
Number of mass-transit stations (BRT, metro, and LRT) *3.14*1*1/metropolitan area	0.261446594
Number of metro stations *3.14*1*1/metropolitan area	0.095071489
Number of BRT stations *3.14*1*1/metropolitan area	0
Number of LRT stations *3.14*1*1/metropolitan area	0
Bus fleet per 1k population	0.397998622
Metro vehicles per 1k population	0.021159129
BRT vehicles per 1k population	0
LRT per 1k population	0



To update and/or add data to an existing city:

- Select the city to which data will be added or updated.

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www.worldbank.org/transport

UPDATE FORM

Save Data | New City

City: Chennai

Category:

Sub Category:

Length of public transit (all public transport) per 100k population	
Number of mass-transit stations (BRT, metro, and LRT) *3.14*1*1/metropolitan area	0.261460994
Number of metro stations *3.14*1*1/metropolitan area	0.095071489
Number of BRT stations *3.14*1*1/metropolitan area	0
Number of LRT stations *3.14*1*1/metropolitan area	0
Bus fleet per 1k population	0.397998622
Metro vehicles per 1k population	0.021159129
BRT vehicles per 1k population	0
LRT per 1k population	0

- Select the category of data to be updated.

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UPDATE FORM

Save Data | New City

City: Chennai

Category: Public Transport Supply

Sub Category:

Length of public transit (all public transport) per 100k population	
Number of mass-transit stations (BRT, metro, and LRT) *3.14*1*1/metropolitan area	0.261460994
Number of metro stations *3.14*1*1/metropolitan area	0.095071489
Number of BRT stations *3.14*1*1/metropolitan area	0
Number of LRT stations *3.14*1*1/metropolitan area	0
Bus fleet per 1k population	0.397998622
Metro vehicles per 1k population	0.021159129
BRT vehicles per 1k population	0
LRT per 1k population	0

- Enter the corresponding values for each subcategory.

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TRANSPORT

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UPDATE FORM

Save Data

New City

City	Chennai	
Category	Public Transport Supply	
	Sub Category	Value
Length of public transit (all public transport) per 100k population		2.208438123
Number of mass-transit stations (BRT, metro, and LRT) *3.14*1*1/metropolitan area		0.261446594
Number of metro stations *3.14*1*1/metropolitan area		0.095071489
Number of BRT stations *3.14*1*1/metropolitan area		0
Number of LRT stations *3.14*1*1/metropolitan area		0
Bus fleet per 1k population		0.397998622
Metro vehicles per 1k population		0.021159129
BRT vehicles per 1k population		0
LRT per 1k population		0

- Click on **Save Data**.

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UPDATE FORM

Save Data

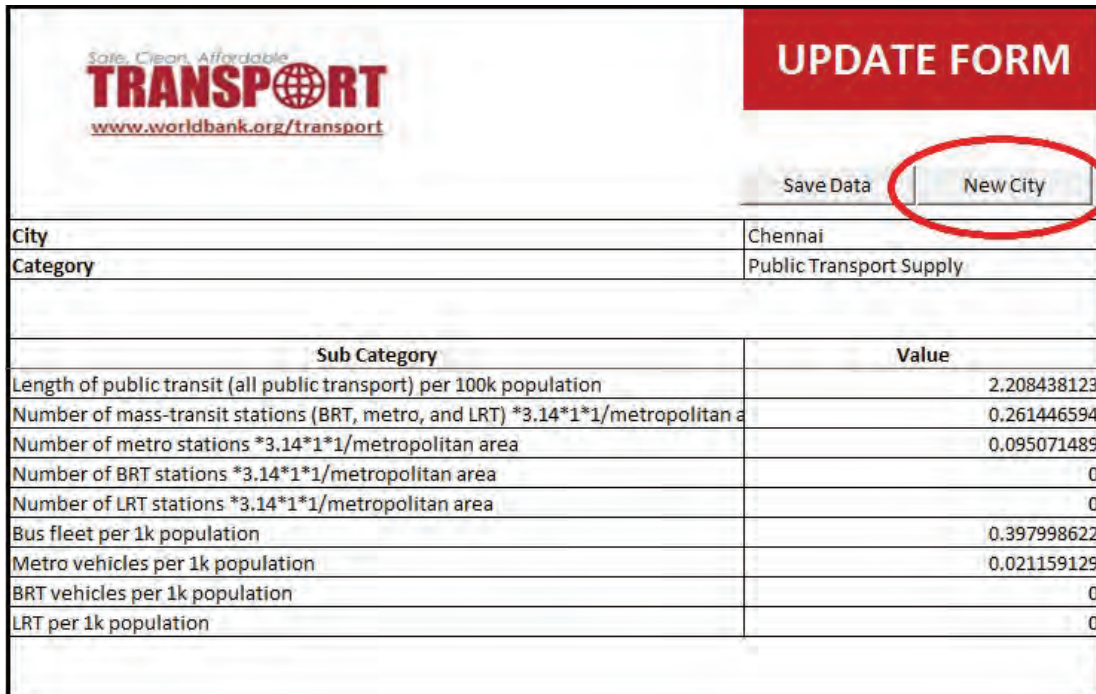
New City

City	Chennai	
Category	Public Transport Supply	
	Sub Category	Value
Length of public transit (all public transport) per 100k population		2.208438123
Number of mass-transit stations (BRT, metro, and LRT) *3.14*1*1/metropolitan area		0.261446594
Number of metro stations *3.14*1*1/metropolitan area		0.095071489
Number of BRT stations *3.14*1*1/metropolitan area		0
Number of LRT stations *3.14*1*1/metropolitan area		0
Bus fleet per 1k population		0.397998622
Metro vehicles per 1k population		0.021159129
BRT vehicles per 1k population		0
LRT per 1k population		0

The Matrix will be updated with the data entered and all reports will correspond to the new values.

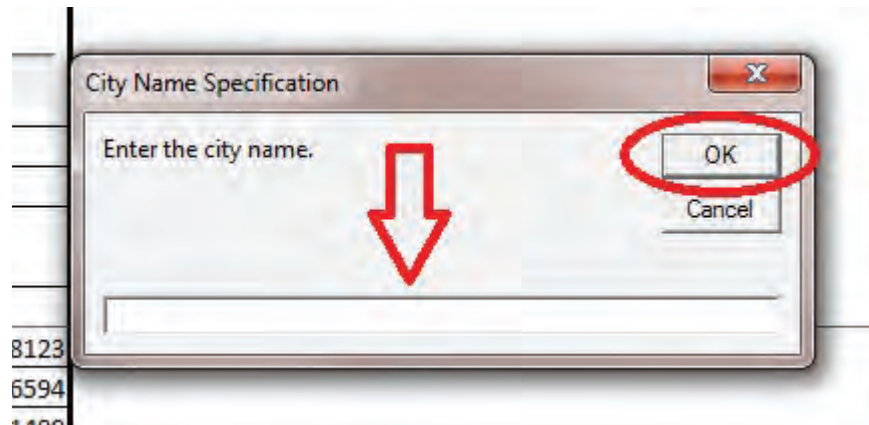
To add a new city to the Matrix:

- Click on **New City**.



Sub Category	Value
Length of public transit (all public transport) per 100k population	2.208438123
Number of mass-transit stations (BRT, metro, and LRT) *3.14*1*1/metropolitan area	0.261446594
Number of metro stations *3.14*1*1/metropolitan area	0.095071489
Number of BRT stations *3.14*1*1/metropolitan area	0
Number of LRT stations *3.14*1*1/metropolitan area	0
Bus fleet per 1k population	0.397998622
Metro vehicles per 1k population	0.021159129
BRT vehicles per 1k population	0
LRT per 1k population	0

- A form will pop up as shown below.



City Name Specification

Enter the city name.

OK

Cancel

- Enter the New City name and click **OK**.
- Add data for that city in each category as explained on pages 11-12.

The Matrix will be updated with the data entered and all reports will correspond to the new values. The new city will be available for use when generating reports.

Generating Reports—Bar/Column/Line

- Keeping the Report 1–Graphs sheet active, click on the **Generate Report** button.

The screenshot shows the 'UT Diagnostic Tool v7' spreadsheet interface. The 'Generate Report' button is circled in red. The report content is as follows:

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Generate Report

Average time of journey to work (minutes) **Rank**

Primary City	Average time of journey to work (minutes)	Rank
Cairo	46,5	3
Peer Cities		
Beijing	52	1
Shanghai	47	2
Sao Paulo	45	4
Mumbai	37	5
Delhi	30	4
Seoul	27	7
Moscow	25,5	5
Top Ranked Cities		
Beijing	52	1
Bottom Ranked Cities		
Seoul	27	7

Cairo is in the 3rd Quintile of the cities compared

Report1 - Graphs



- A form will pop up as shown below.

Primary city: Here you will select the name of the city to be tested (test city) from the drop-down menu.

Peer cities: These are the cities with which the test city will be compared. They can be selected manually by clicking each box next to them, or automatically with filter categories.

Filter category: If peer cities are not selected manually, this is where peer cities will be automatically selected (filtered).

Operator 1 and 2: These are the mathematical symbols to define the value range of the filter category. You can use one (for a single value) or both to enclose the category within a range.

Value 1 and 2: These are the desired range values for the filter category.

Filter cities: This action button will filter peer cities according to the filter category selected and values chosen.

Category: Indicators have been classified into several categories depending on what they measure. The indicator category will determine the type of indicator used in the report.

Indicators: This is the list of indicators available according to the chosen category. They are the calculated data items, and one or more can be selected at any time to generate reports.

Selected indicators: In this box the list of all selected indicators for the final report will appear. Different indicators from several categories can be selected at any time.

Delete: If an indicator was chosen by mistake, selecting the box next to it and clicking Delete will eliminate it from the list of selected indicators.

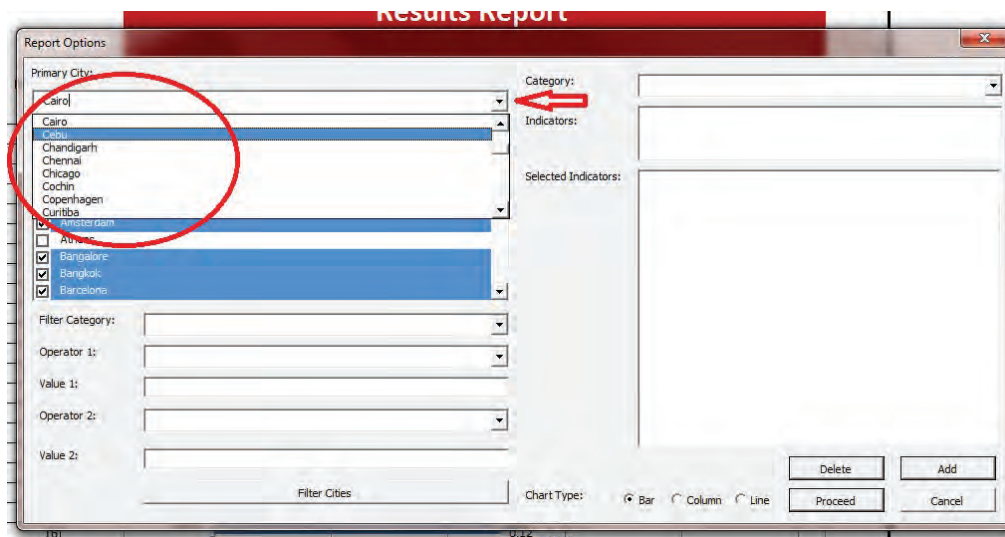
Add: This button is used to add indicators to the selected indicator list. One or multiple indicators can be selected at any time by using the CTRL key or SHIFT key.

Chart type: These are the chart options for the final report. For Report 1, a bar, column, or line chart can be selected.

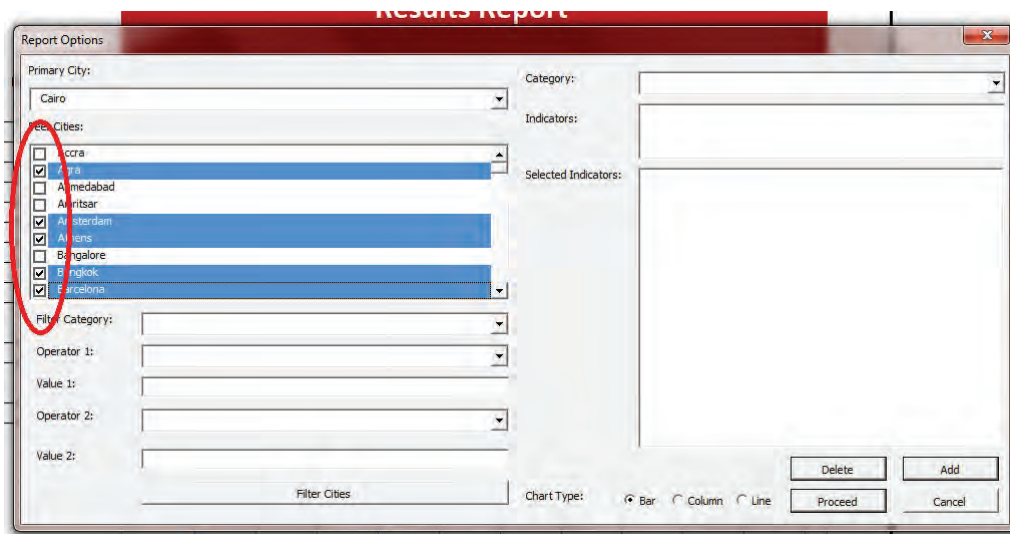
Proceed: This action button will generate the final report. It will graph all indicators chosen and generate a new Excel file containing all reports.

Cancel: Clicking Cancel will cancel the operation and reset all values. After hitting Cancel, the selected indicators will be emptied.

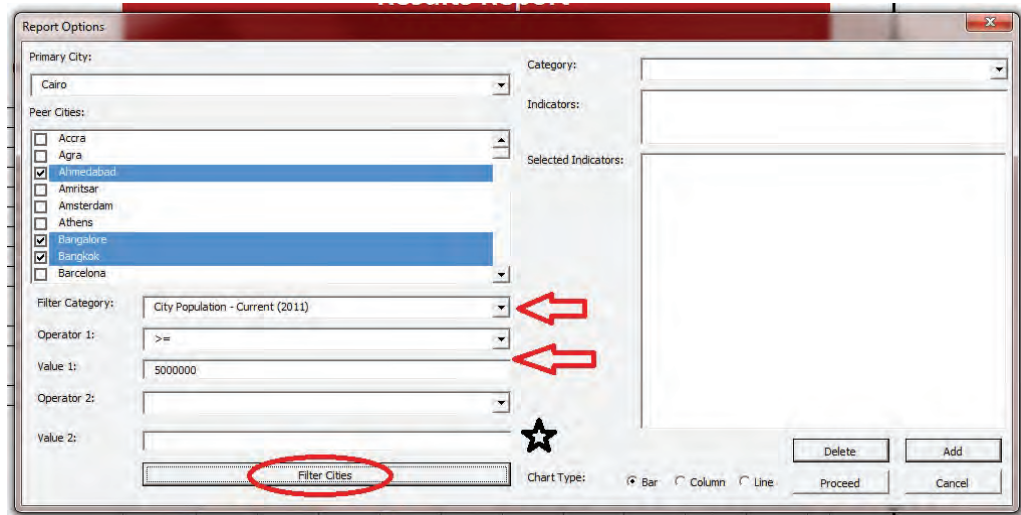
- Select the primary city (test city) from the drop-down menu. This will be the city used to compare with peers.



- Peer cities can be selected in two different ways:
 - By manually selecting the desired cities in the list:
 - Simply click inside the box next to each city.



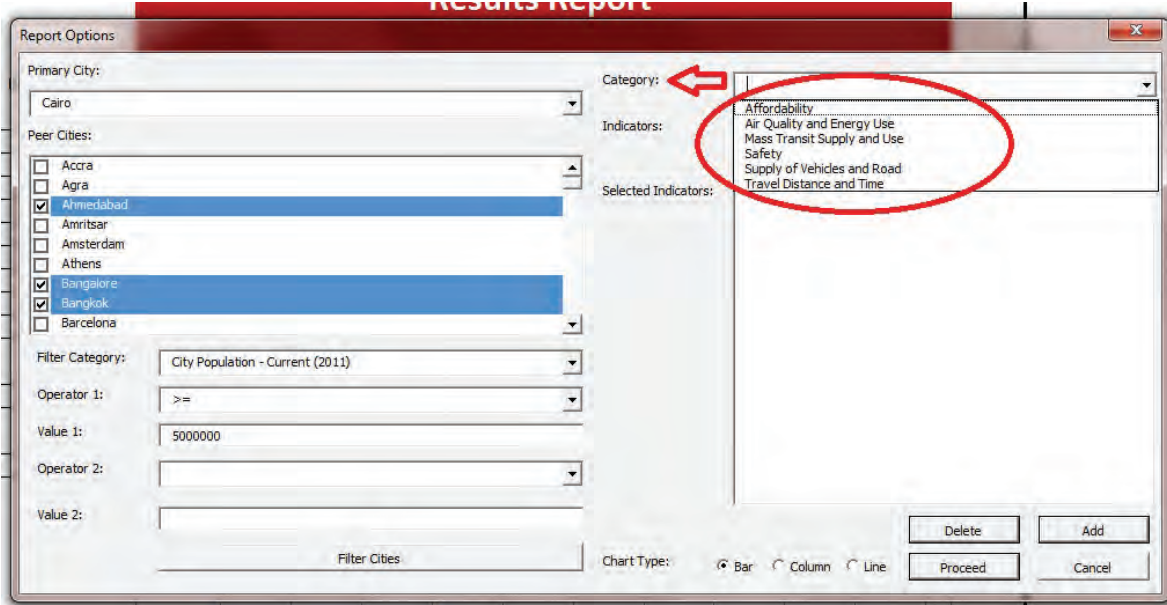
- By using filter categories:
 - Select the desired category to use as a filter. This can be income, population, area, or any other data item.
 - Choose the logic operator from the list.*
 - Click on **Filter Cities**.



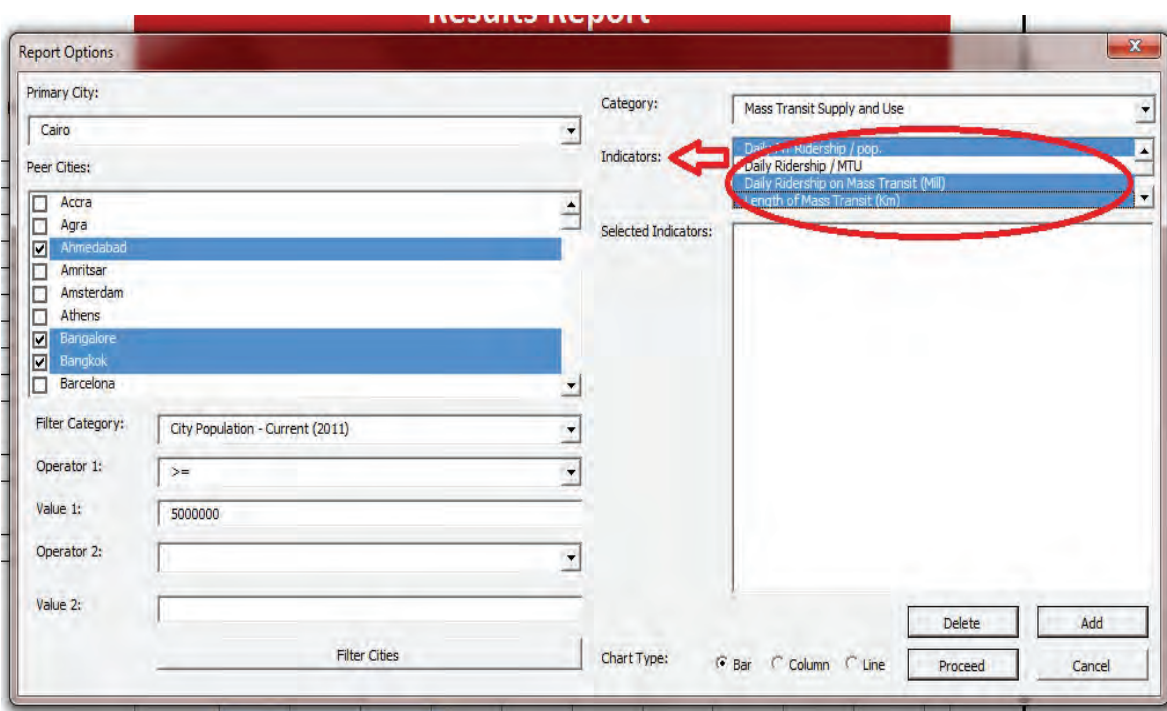
* The logic operator is the mathematical symbol that will define the value or the range of the filter category. You can use one (for a single value) or both to enclose the category within a range.

e.g.: Per Capita GDP > 5,000
 5,000,000 < City population > 20,000,000

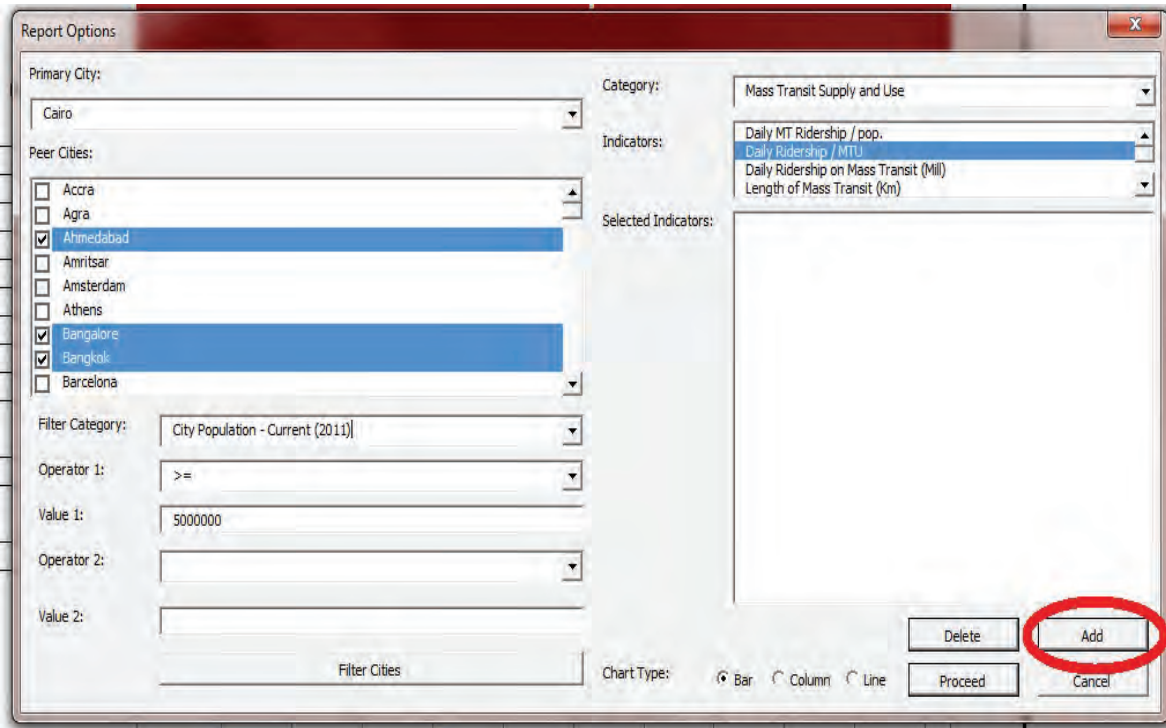
- Select the category for the type of indicator desired. Indicators have been classified into several categories depending on what they measure. Each category will have a subset of all the indicators available.



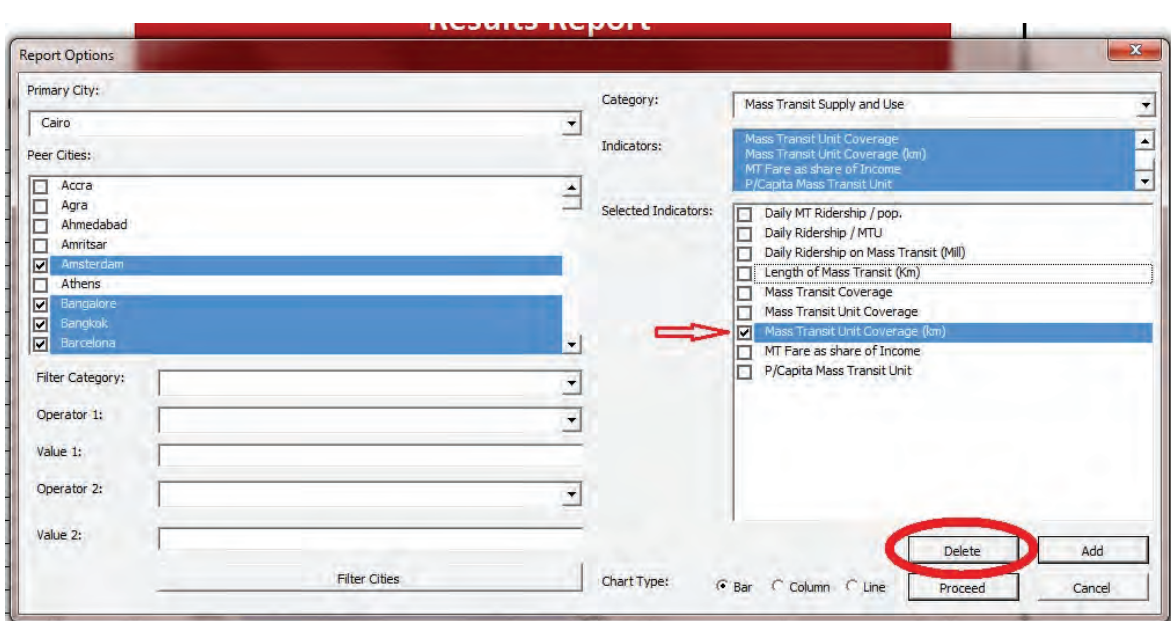
- Select the indicator from the indicator list. Multiple indicators can be selected by holding down the SHIFT key or CTRL key.



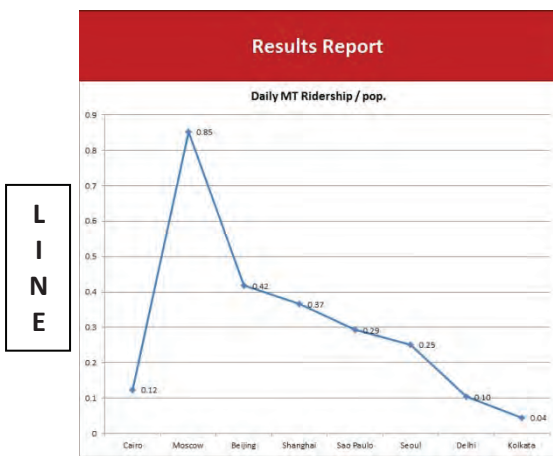
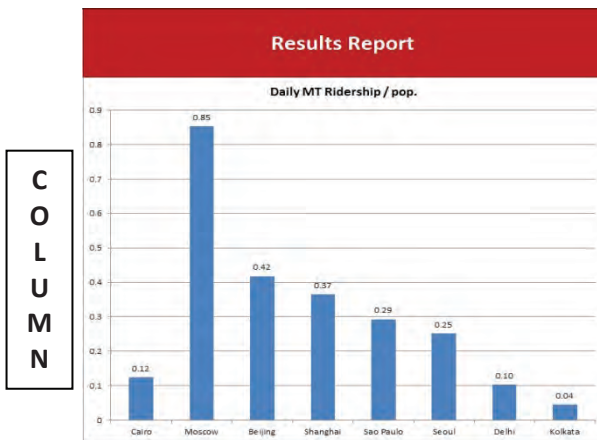
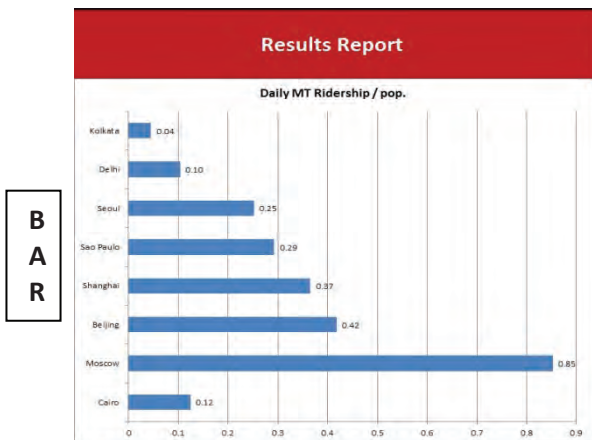
- Click the **Add** button.
Indicators from different categories can be added as necessary by repeating the previous steps.



- The **Delete** button will delete any indicator that was added by mistake.
Select the indicator to delete from the list and click **Delete**.



- Choose the desired chart type.

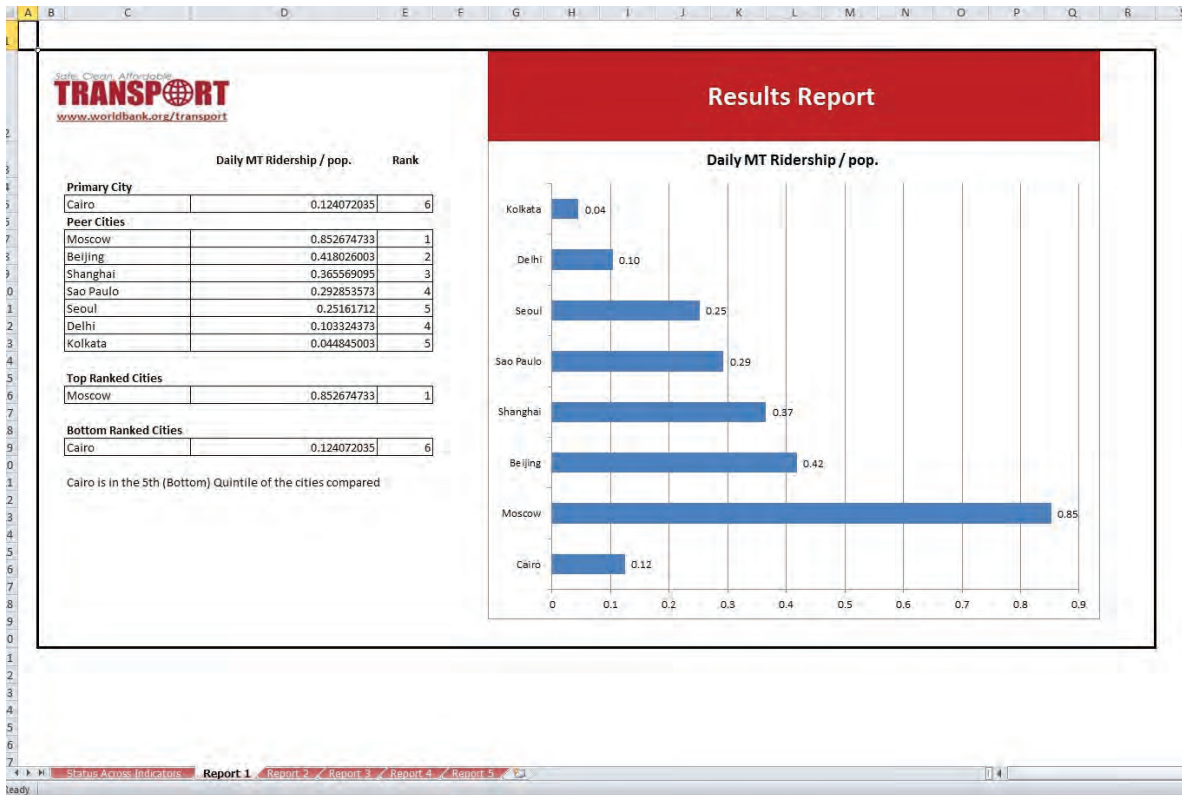


- Click on **Proceed**.

The 'Report Options' dialog box contains the following fields and controls:

- Primary City:** Cairo
- Peer Cities:** A list of cities with checkboxes: Accra, Agra, Amritsar, Amsterdam, Athens, Bangalore, Bangkok, Barcelona. Bangalore and Bangkok are checked.
- Filter Category:** City Population - Current (2011)
- Operator 1:** >=
- Value 1:** 5000000
- Operator 2:** (empty)
- Value 2:** (empty)
- Filter Cities:** (empty)
- Category:** Mass Transit Supply and Use
- Indicators:** A list of indicators: Daily MT Ridership / pop., Daily Ridership / MTU, Daily Ridership on Mass Transit (Mill), Length of Mass Transit (Km). 'Daily MT Ridership / pop.' is selected.
- Selected Indicators:** (empty)
- Chart Type:** Radio buttons for Bar, Column, and Line. The 'Proceed' button is circled in red.

- A new Excel file will be generated containing the results of the report as shown below.

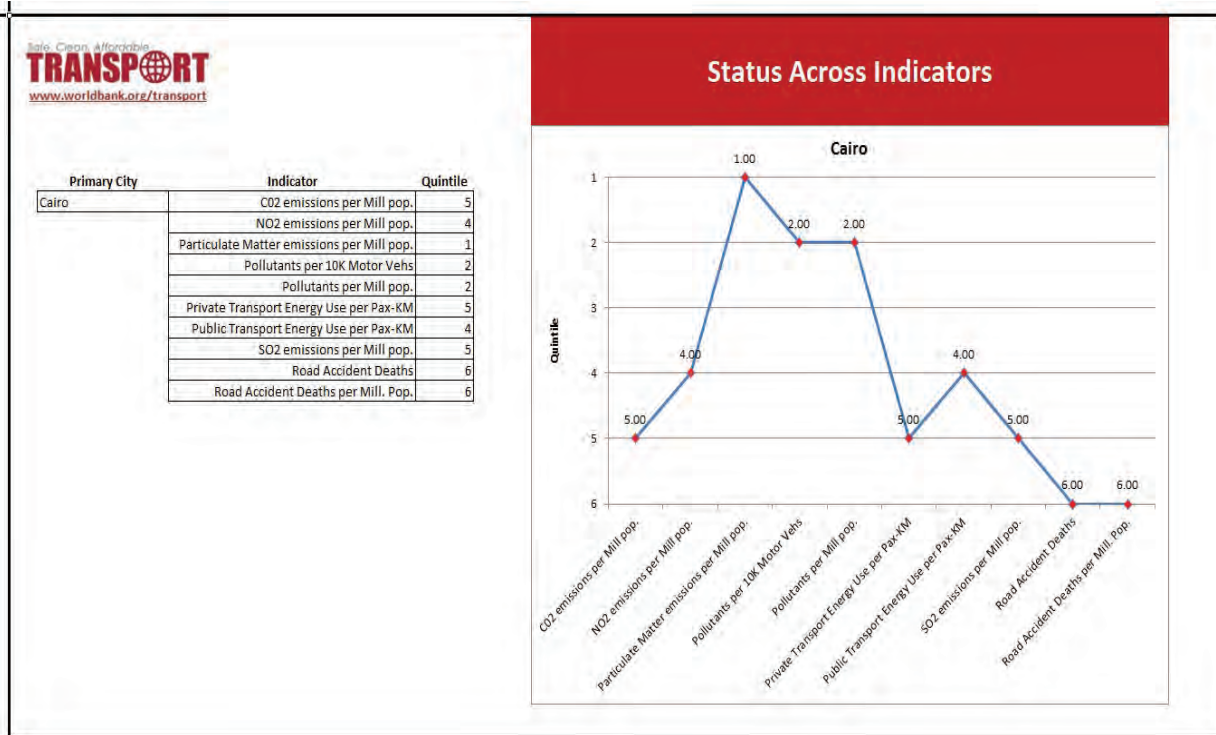


Each report contains the following information:

- The primary city
- The peer cities used in the comparison
- The value of the indicator for each city
- A ranking of each city
- The top-ranked city and its value
- The bottom-ranked city and its value
- The quintile in which the primary city is located
- A graph with the results. The basic features of the graph (colors, fonts, etc.) can be customized by the user with Excel's chart options, if needed.



Additionally, the first sheet of the new Excel file will be a report called Status Across Indicators.



The indicator values of the main city and its peers are ranked. The rankings are then divided into quintile groups (20 percent each). This report shows the quintile placement of the primary city across all the indicators reported.

A placement in the 1st (top) quintile indicates a positioning in the top 20 percent (high rank) for the indicator when compared with its peers.

A placement in the 5th (bottom) quintile indicates a positioning in the bottom 20 percent (low rank) for the indicator when compared with its peers.

This division into quintile groups is based solely on the ranking list of the indicators, and places no qualitative judgment on the result. By showing a high or low rank, the report is not indicating "Good" or "Bad"—this will change depending on the indicator selected and the judgment of the user.

Considering that, at the moment, not all data are available for all cities, a mock quintile (6th quintile) was created. When a city is placed in the 6th (no data) quintile, it indicates that the value for the indicator selected has no data available for the main (test) city, and thus cannot be compared to peers. The indicator report will nevertheless show the graph and values of the peer cities, with the main city showing a value of "0.00."

Generating Reports—Scatter Plots

This report is used to generate scatter plots if the user would like to compare the performance along one data item with changes in the value of another. It is a valuable option to better portray the relationship between two data items, which a bar, column, or line report cannot do.

The data will be displayed as a collection of points, with the value of one data item determining the position of each point on the horizontal axis and the value of the other data item determining the position on the vertical axis.

- While having the Report 2—Scatter Plots sheet active, click on **Generate Report**.

The screenshot shows an Excel spreadsheet with the following data table:

Primary City	Daily public transport boardings (million) - Metro	Stations - Metro rail
Cairo	2.145205479	55
Peer Cities		
Moscow	6.544657534	185
Seoul	5.663972603	263
Shanghai	5.161835616	282
Beijing	5.058767123	192
Sao Paulo	3.75	67
Delhi	1.868333333	146
Kolkata	0.473972603	17

The 'Generate Report' button is circled in red. The spreadsheet interface shows the 'Report2 - Scatter Plots' sheet is active.

- A form will pop up as shown below.

The screenshot shows a 'Report Options' dialog box with the following fields and settings:

- Primary City:** Chicago
- Peer Cities:**
 - Accra
 - Agra
 - Ahmedabad
 - Amritsar
 - Amsterdam
 - Athens
 - Bangalore
 - Bangkok
- Filter Category:** [Empty]
- Operator:** [Empty]
- Value:** [Empty]
- Operator 2:** [Empty]
- Value 2:** [Empty]
- Filter Cities:** [Button]
- * X Axis ***
- Category 1:** [Empty]
- Data Item 1:** [Empty]
- * Y Axis ***
- Category 2:** [Empty]
- Data Item 2:** [Empty]
- Proceed** [Button]
- Cancel** [Button]

Primary city: Here you will select the name of the city to be tested (test city) from the drop-down menu.

Peer cities: These are the cities with which the primary city will be compared. They can be selected manually by clicking each box next to them, or automatically with filter categories.

Filter category: If peer cities are not selected manually, this is where peer cities will be automatically selected (filtered).

Operator 1 and 2: These are the mathematical symbols to define the value range of the filter category. You can use one (for a single value) or both to enclose the category within a range.

Value 1 and 2: These are the desired range values for the filter category.

Filter cities: This action button will filter peer cities according to the filter category selected and values chosen.

Category 1 and 2: Indicators have been classified into several categories depending on what they measure. The indicator category will determine the type of data item that will be used in the report.

Data Items 1 and 2: This is the list of data items available according to the category that was chosen. Their values will be placed along the X or Y axis of the scatter plot.

Proceed: This action button will generate the final report. It will graph the values of the data items chosen.

Cancel: Clicking Cancel will cancel the operation and reset all values. After hitting Cancel, the selected data items will be emptied.

- Select the primary city.
- Peer cities can be selected in two different ways:
 - By manually selecting the desired cities in the list:
 - Simply click inside the box next to each city.

The screenshot shows the 'Report Options' dialog box. The 'Primary City' dropdown is set to 'Chicago'. The 'Peer Cities' list includes Accra, Agra, Ahmedabad, Amritsar, Amsterdam, Athens, Bangalore, and Bangkok. The checkboxes for Agra, Amsterdam, and Bangkok are checked and highlighted with a red circle. Below the list are fields for 'Filter Category', 'Operator', 'Value', 'Operator 2', and 'Value 2'. At the bottom, there are 'Proceed' and 'Cancel' buttons.

- By using filter categories:
- Select the desired category to use as a filter.
 - Choose the logic operator from the list.*
 - Click on **Filter Cities**.

* The logic operator is the mathematical symbol that will define the value or the range of the filter category. You can use one (for a single value) or both to enclose the category within a range.

e.g.: Per Capita GDP > 5,000
5,000,000 < City population > 20,000,000

- Select Category 1 and the corresponding Data Item 1 from the list.
This will be the data item located in the horizontal axis of the scatter plot.
- Select Category 2 and the corresponding Data Item 2 from the list.
This will be the data item located in the vertical axis of the scatter plot.
- Click on **Proceed**.

Report Options

Primary City: Chicago

Peer Cities:

- Accra
- Agra
- Ahmedabad
- Amritsar
- Amsterdam
- Athens
- Bangalore
- Bangkok

Filter Category: City Population - Current (2011)

Operator: >=

Value: 5000000

Operator 2:

Value 2:

Filter Cities

* X Axis *

Category 1: Energy

Data Item 1: Petrol price (LC) - Current

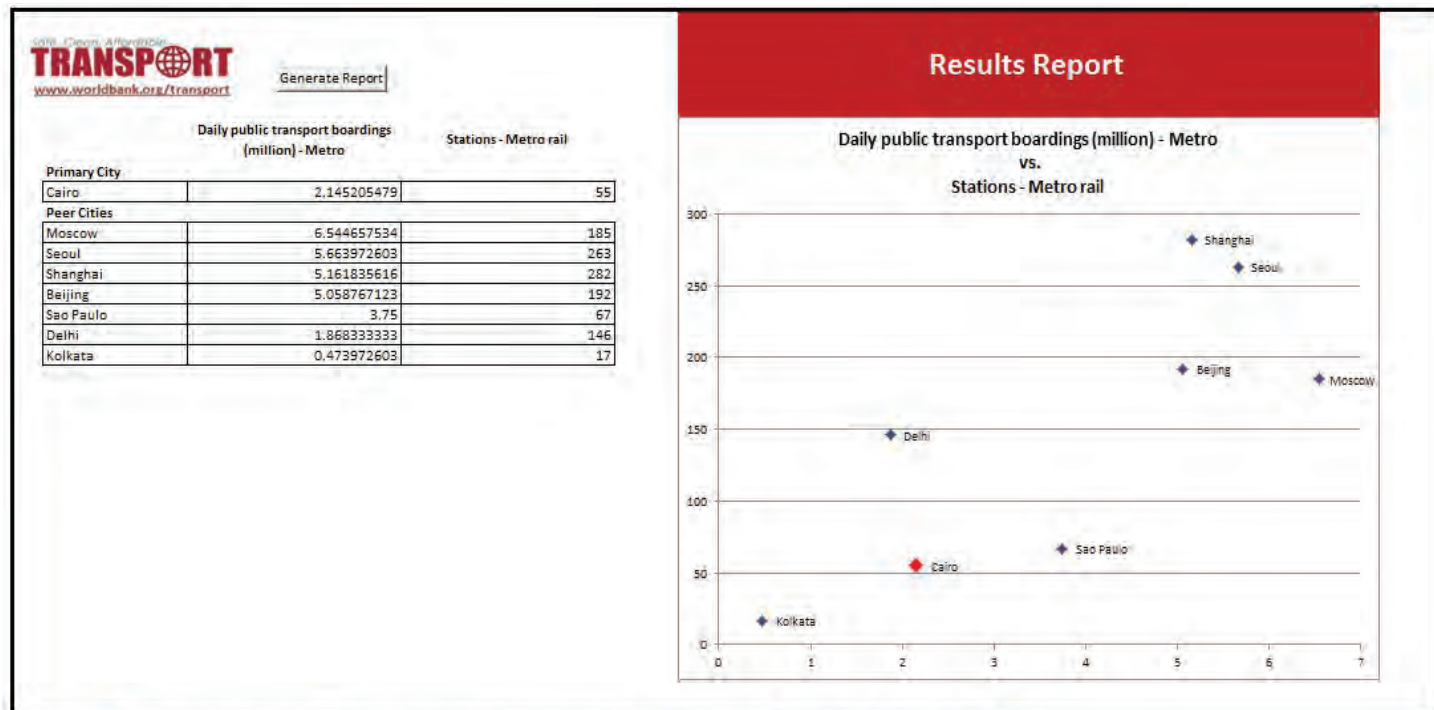
* Y Axis *

Category 2: Demand

Data Item 2: Daily public transport boardings (million) - Total

Proceed Cancel

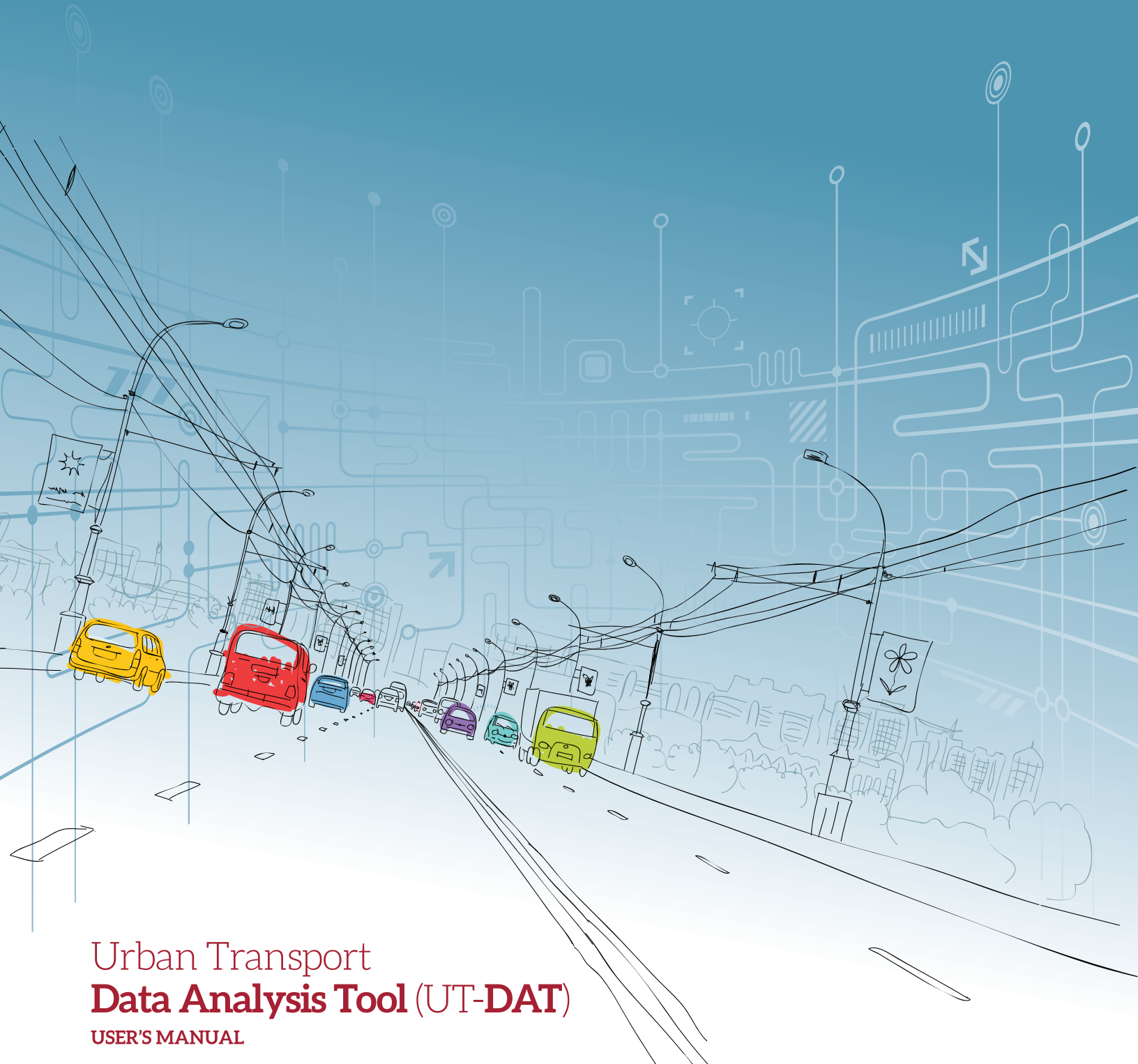
- A Results Report will be generated as shown below.



Each report contains the following information:

- Name of the primary city
- Names of the peer cities used in the comparison
- The value of the data items for each city
- A scatter plot graph with the results with the primary city location highlighted in a different color. The basic features of the scatter plot (colors, fonts, etc.) can be customized with Excel's chart options, if needed.





Urban Transport Data Analysis Tool (UT-DAT)

USER'S MANUAL

