

# Person Trip Analysis in Kabul Metropolitan Area

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## 1. Introduction

Owing the political changes in year 2002, inhabitants of Kabul city is increasing exponentially due to rapid growth of population, return of refugees and shifting of people from other provinces to the capital Kabul. Increase in population caused lack of infrastructures including transport. Roads in Kabul are in worst conditions in regard to traffic jams. Traveling very short distance takes hours in peak periods and even in non-peak hours in the day. In order to cope with this dynamism, Government of Afghanistan decided to build a new capital city as a complement of the current city. KMA (Kabul Metropolitan Area) is consisted of current Kabul city and planned new Kabul city. As a first step of travel demand modelling of KMA for the horizon year (2025), the first three steps of travel demand modelling will be analyzed for the current conditions in this paper.

## 2. Data

The household survey in Kabul city was conducted through a relatively simple questionnaire in 2008 by Japan International Cooperation Agency (JICA) while making the master plan of KMA. The surveyor visited the randomly selected 5,000 houses to record the normal working day trips of the residents. The study area was divided into 22 current zones using each district as a zoning unit.

## 3. Analysis and Discussion

The population over 5 years old, which is 3.3 million inhabitants, generates a total of 2.72 million trips per day, with an average of 0.824 trips per person per day. Major trip purposes are those for work and school trips. Person trips by mode are distributed between all modes and the highest vehicular share is for public transport. More detail on trip purpose and mode are provided in figure.1 and figure.2.

### 3.1 Mode Choice Analysis:

Transport in the study area is characterized by a high share rate of “walking” and “public transport” (micro, mini and large busses), details are shown in figure.2. Bicycle or motorcycle use is unlikely in Kabul because of the air pollution. Taxi use is higher due to traffic jams and poor public transport. It needs to be mentioned that the high use of public transport does not mean Kabul has a good public transport system but it is because of the low economy of people and most ministries provide busses to their employee.

More than 97 percent of shopping trips are divided between public transport, walking & bike and taxi respectively (figure.3). For business trips public transport followed by taxi is the more frequently used mode. One of the reasons for high ratio of poor public transport in business trips is that businesses in Kabul are done by just above low to high income people. Walking and bike cover almost three quarter of the school trips because primary and high schools are mostly in

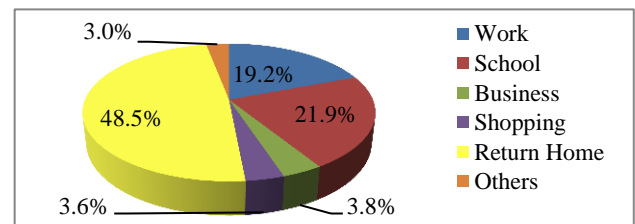


Fig.1 Trip Composition by Purpose

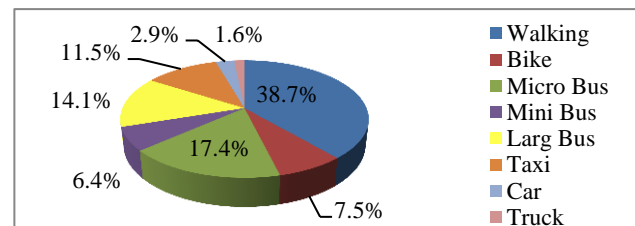


Fig.2 Trip Composition by Mode

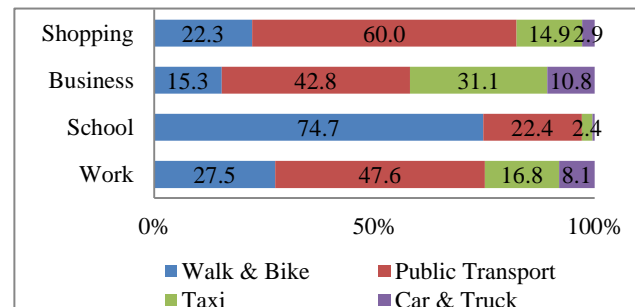


Fig.3 Mode Choice Analysis by Purpose

walking distance. Motorized mode of transportation usage for education purpose is often to universities and higher education institutes. Details' regarding mode choice analysis by purpose is given in figure.3.

**3.2 Trip Generation Analysis:** Observing the number of trips excluding the return home and others trips, districts 15, 5, 10, 4 and 11, produce more trips respectively compared to other districts. These analyses indicate that these zones have higher residential area, especially districts 15, where attraction trips are almost half of the production trips. Details on trip production by purpose are provided in figure.4.

Districts 2, 10, 5, 1, and 11 attract more trips respectively. Districts 1 and 2 attracts almost 5 times more trips than the produced trips by the mentioned zones, which shows that these areas contain more educational facilities, offices and ministries where people go to work, business and shopping. Figure.5 shows details on attraction of trips by purpose.

On the other hand, both the trip production and the attraction are small in Districts 18, 19, 20, 21 and 22 which indicates small population, limited employment, business and shopping opportunities in the area.

### 3.3 Trip Distribution Analysis:

There is a large number of person trips from all other zones to zone 1 and zone 2 (See figure.6, 7, 8 and 9). This is because the city center covers district 1 and parts of districts 2, 3 and 4, encompassing central commercial areas, old and unplanned residential areas and public spaces with buildings. Kabul University, the largest university in Afghanistan is located in zone three and Kabul Polytechnic University is located in district 4 which causes the attraction of educational trips. A very large number of trips are distributed between zone 11 and 15 and zone 10 and 15. District 11 is a mixed commercial and residential while district 10 contains mostly international NGOs and private companies offices. It needs to be mentioned that trips less than 800 is omitted in figure.6 & 7 and trips less 500 is not considered in figure 8 & 9.

## 4. Conclusion and Future Research

This research will be the first step for travel demand modelling of Kabul Metropolitan Area. Current Analysis, current road network, future (2025) zone attributes, and current and future socioeconomic characteristics will be added to the study to complete the travel demand modelling of KMA.

## 5. References:

1. JICA Master Plan for KMA, 2009
2. JICA Household Interview Survey for KMA, 2008

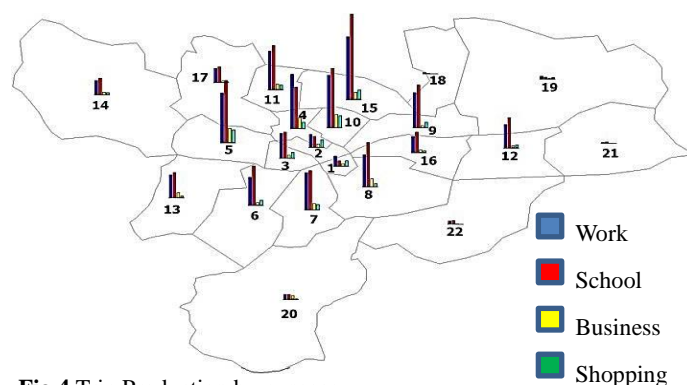


Fig.4 Trip Production by purpose

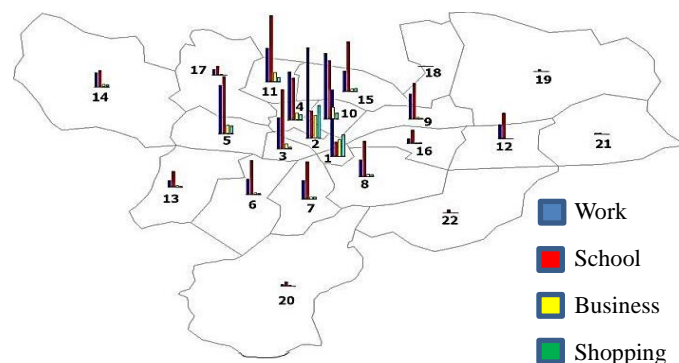


Fig.5 Trip Attraction by Purpoe

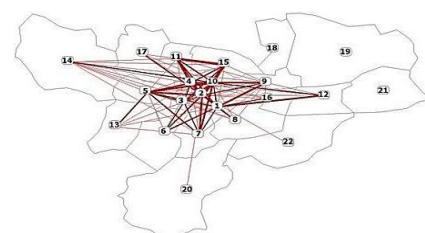


Fig.6 Work trips desire line

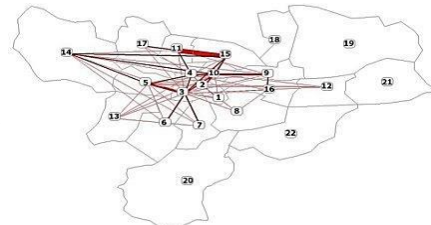


Fig.7 School trips desire line

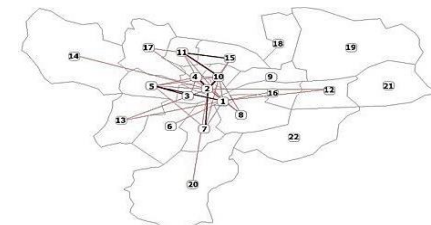


Fig.8 Business trips desire line

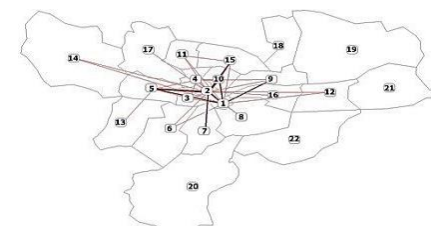


Fig.9 Shopping trips desire line