# Properties of the social networks for rural-urban migrants in China: A study in Shenzhen

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## Background

Migration from rural to urban areas has emerged as a prominent feature of China's demography since the mid-1980s. Rural-urban migration can lead to a dramatic change in lifestyle and formation of new social networks, both of which are likely to influence attitudes and behaviors of these rural-urban migrants. Social network analysis provides one approach to the analysis of demographic and sociological change due to this migration.

Generally, social networks can be divided into two types, ego network and whole network. The whole network is an essential part of the social network study. Traditional whole network analysis aims to determine network characteristics based on dyad and triad relations. The general characteristics of the whole network include density, degree centrality, out-degree centralization, in-degree centralization, betweenness centralization, transitivity, and reciprocity. Recently, network study has attracted increasing attention, especially small world networks, scale free networks, and other classes of complex network properties that include average distance, clustering coefficient and degree distribution.

## Data and Methods

### Data

The data used in this paper come form a sampling survey, “Shenzhen Rural-urban Immigrants Survey”, which was conducted in April, 2005. From the survey, the whole network for each company or construction site includes seven categories of data, instrumental support network, emotional support network, social companionship network, and discussion networks focusing on marriage, childbearing, contraception, and ageing. The whole network data were collected from 5 companies in 3 districts of Shenzhen, including three electronics manufacturing companies, Hongming Company in Buji county, Longgang District, Airmate Company and New Yongxing Company in Shiyan county, Bao’an District, as well as two construction companies, Chuangzhu Company and Shizheng Company in Zhaoshang county, Nanshan District. The number of the samples obtained for whole network analysis is 547, with a balanced sex ratio.

Hongming company, located in the northwest of Shenzhen, produces electrical equipment. Most of its workers are women aged from 20 to 30, and the network size is 200. Chuangzhu company is an construction site and its network size is 135, with most of the workers being men, many of whom change their job yearly. Shizheng company is a smaller construction site than the Chuangzhu company, and its network size is 47. Most of its workers are also men. Airmate company mainly produces electrical appliances and equipment, such as fans. About 80 percent of its workers are very young women, and 75 persons were sampled. Xin Yongxing company is a spraying shop with 500 workers, half of whom are women and most of its workers are less than 40 years old; 90 persons were selected as samples.

35 matrices are abstracted from the total data. To simplify the model, all connections between individuals in the matrices are defined as either “present” or “absent”, regardless of their connection strength.

**Methods**

Average distance, which globally measures efficiency of communication or passage time between nodes, is defined as the average number of links in the shortest path between a pair of nodes in the network. Clustering coefficient, which locally measures cliquishness of a typical neighborhood, is defined as the probability that two nodes connected to a common node are also connected to each other. It reflects the robustness of relations between network members on the whole. We have calculated the average distance and clustering coefficient for the 35 matrices and the corresponding random networks.

To some extent, the degree distribution reflects characteristics of the resource occupancy among the individuals. We have plotted the logarithmic degree distribution (namely $\log P(k) \sim \log k^{r}$ ) for each of the 35 matrices. We show that there is linear relation between $\log P(k)$ and $\log k^{r}$ for most of the 35 matrices and the value of $r$ is estimated.

## Findings

Our analysis indicates that most of the 35 networks are not random networks. Compared with the corresponding random networks, we found that most of the survey networks have a greater clustering coefficient and an approximately average length. It is proved that small world phenomena exist in most of these 35 networks.

The degree distributions of the 35 networks are more likely to obey a power law distribution (namely, fit $P(k) \sim k^{r}$ better) rather than the Poisson distribution. Accordingly, we could claim that the networks of the rural-urban migrants in Shenzhen survey are more complex than the most studied network types.

Other features can be explored, such as community structure, which will help to clarify the network structures and allow more accurate description of the networks among rural-urban migrants.

This paper also illustrates an efficient way of spreading the behaviors and attitudes among the rural-urban migrants, such as shortcuts due to the small world phenomenon or hubs for scale free features. It could thus form the basis for understanding the mechanism of cultural evolution during the process of rural-urban migration in China.