| 報告番号 | 甲 第 11179 号 |
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# 主 論 文 の 要 旨

論文題目 **Evaluating Urban Structure Based on QoL – Method and Case Study in Nanjing**

**(個人の QoL に基づく都市構造の評価—手法と南京におけるケーススタディー)**

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## 論 文 内 容 の 要 旨

Urban structure, which concerns land use, transport, and the connectivity in between, has been a long standing topic of urban studies. Population in the contemporary world is continuously aging, leading in the near future to issues such as lack of labor force, population decline, economic recession. At the same time, in most developing countries in Asia, the accelerated process of urbanization has also brought about various urban problems of transport, environment, energy use, infrastructure construction and so on, which are all related to the urban environment and are rooted in urban structure performance. Under these conditions, a sole indicator like GDP is insufficient in examining the effectiveness of urban structure. Instead, QoL (Quality of Life) index, an integrated criterion concerning people's life quality incorporating all of the aspects mentioned above, provides an alternative to examine urban structure for all urban dwellers, including population groups such as the elderly, and furthermore it can be implemented in urban planning to construct more advanced urban structure for both the present generation and future, more aged, generations.

In **Chapter 1** of this dissertation, the objective of the study is presented, providing a method for urban planning to prepare for the future when the population structure and people's needs are expected to drastically change. The main process includes: 1) investigating subjective differences in QoL perception according to people's different attributes (gender, age, income level); 2) a comprehensive comparison of attributes-based urban QoL distributions and indexes; 3) exploring

QoL performance improvement approaches for both present and future generations.

**Chapter 2** is a literature review mainly focused on the evaluation of urban structure and Quality of Life. Urban structure concerns the arrangements of public and private space in urban areas and the degree of connectivity and accessibility. Evaluation of urban structure mainly focuses on the aspects of residential location, service location, accessibility, economic growth, energy consumption, environmental burden, etc. to seek efficient and sustainable development. While all of the aspects are related to wellbeing, so far no integrated criterion has been used to evaluate urban structure, and this study uses urban QoL as a comprehensive indicator to fill this gap. Thus, this chapter also presents a review of the concepts and evaluation of QoL in both objective and subjective approaches. The literature review sheds light on the requirement for more research in this field. The chapter concludes with a description of the four main contributions that this dissertation offers: 1) a method to strengthen the linkage between objective and subjective evaluation approaches of urban structure; 2) the QoL index proposed in this study is advantageous to evaluate residential quality of urban structure, as it takes into account various quality elements (instead of only one or two life domains in conventional studies) and their diverse values by different socioeconomic groups; 3) the QoL index can capture the socioeconomic differences of each QoL element; 4) the special attention to the elderly group by this QoL index is pioneering and novel.

In **Chapter 3**, the methodology is described in two aspects. The first is the QoL indicator system. In this study, the QoL indicator system is composed of five categories: Economic Opportunities (EO), Living Opportunities (LO), Amenity Opportunities (AO), Safety and Security (SS), and Environmental Burden (EB), and each category is composed of several related factors. The second is the method of QoL evaluation. Firstly, distance effects, namely accessibility to opportunities, are measured by a potential model derived from the gravity model for accessibility measurement. Concurrently, preference effects, namely value parameters, are estimated with SP (Stated Preference) data of a questionnaire survey about local residents' choices of their location preference between two hypothetical options of residential areas with different quality indicator levels. Finally, the value of QoL was obtained by weighted summation of all factors and population groups.

In **Chapter 4**, a quantitative assessment for QoL in the Nanjing Metropolitan Area is presented. Four data sets were prepared for the assessment, including a QoL preference survey for preference effects, a travel survey for distance effects, social economic statistic data, and geocoded data. The four main outcomes in this chapter are:

(1) Urban dwellers' satisfaction levels differ between cities. Singaporeans are more satisfied with their living environment. Even living in the same city, people have different satisfaction levels according to their different attributes such as age-gender, income level, education level, household structure, housing authority, access time to the nearest subway station, and driving frequency.

(2) Dwellers' preferences for QoL factors also show different characteristics. For instance, the middle aged groups, who are probably raising children in their homes, show the highest interests in education opportunities, or the elderly group who care more about community opportunities for their increased needs of social communication after retirement.

(3) The difference in preference effects also leads to different displays of spatial distributions of QoL in the study area. The results show that the study case city was built to meet more of the middle aged groups' needs. This can be explained by the notion that these groups are the working generations, who make the decisions of how to build the city and they are the ones who in practice build the city.

(4) The final outcome of this chapter is the visualization and analysis of urban QoL for all citizens of the entire Nanjing Metropolitan Area. The features of QoL distribution show that big gaps of QoL lie between different grids and also recall the inequality caused by urban structure, namely spatially unbalanced growth.

In **Chapter 5**, the evaluation of urban structure based on QoL is analyzed in more depth by raising two questions: 1) who dominates the contemporary city; and 2) who will dominate the future city. The middle-aged population (working generation), high school/vocational school graduates, and the wealthy dominate the contemporary city. However, taking into account the aging process, in the future the needs of the elderly should be considered more in urban QoL studies. This research proposes an alternative of comparing more advanced cities with presently less developed cities to predict future generations' preferences for QoL factors. It further proposes not only that present imbalances in both spatial growth and social equality should be reduced, but also future inequalities should and can be avoided in the planning stage.

Finally, in **Chapter 6**, the main findings and conclusions are summarized and future concerns are pointed out.