URBAN TRANSPORTATION PLANNING IN LOW-INCOME AREAS
--A Case Study of Appropriate Transportation Technology--

by

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ABSTRACT

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Submitted to the Department of Urban Studies and Planning on January 29, 1980 in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

There is tremendous worldwide need for adequate techniques to provide infrastructure, particularly transportation systems, in the rapidly growing urban areas. In both developed and developing countries, urban communities are growing much faster than urban services and the capability of institutions responsible for their support. Housing and infrastructure lag far behind need, resulting in an overall decline of environmental quality and waste of economic resources. In the area of housing, particularly in developing countries, individual households have filled the gap left by the failure of urban institutions by building their own homes. In the area of infrastructure, however, it has generally been accepted that individuals are unable to provide for their own needs and it is assumed to be a public responsibility to provide these services.

The questions addressed by this thesis are the following: What are the problems and needs of transportation for urban poor in terms of their settlements' locations and topography; and, what transportation mode or strategies are available and appropriate to the urban poor in relation to their spatial distribution in Seoul? The major tasks of this research are to identify the major factors causing urban transportation problems for low-income areas; to analyze government efforts to deal with these problems; and to suggest alternative forms of urban transportation systems to meet most effectively the needs of the poor in Seoul.

Case studies of the squatter settlements' location in relation to transportation were conducted in 9 areas. The information obtained from this field work was supplemented by government documents. In addition to case study work at the community level, the thesis presents a detailed analysis of the portion of the transportation supply sector (transportation service, institutional environment, and manufacturing) that affects the implementation of a strategy for transportation for urban poor people and an appropriate transportation technology adaptation strategy.

It was found in this research that the spatial pattern of squatter settlements in Seoul has four characteristics: 1) initial settlement began and reached earlier consolidation primarily in the inner city areas; 2) subsequent settlement diffused outward over time toward the periphery due to the saturation in the inner areas of the city; 3) government policy appears to have played a major role in the dispersion of the settlements;
and 4) the mountainside areas constitute the most predominant form of the squatter settlement in Seoul.

Partly as a result of these factors, the poor live in four concentric zones — inner city flatland/streamside transitional slums, inner city mountainside older ring of squatter settlements, periphery mountainside relatively new settlements, and urban fringe flatland/streamside new and poorest settlements. Nevertheless, high land prices and already high levels of crowding in more established low-income settlements often induce low-income families, particularly new arrivals, to settle at the growing periphery.

The research results also suggest that the following four major factors cause transportation problems for the poor: 1) the complexity of auto-oriented transportation technology; 2) the problems of technical, economic, and institutional constraints apparent in the application of public transit to squatter areas; 3) the profit-oriented privately owned common carrier transportation systems; and 4) economic unaffordability and general lack of information on transportation system. The government has failed at a massive scale to provide adequate transportation services for the poor. Policies such as squatter relocation, subway construction and highway development have shown a systematic bias against the millions of residents of squatter areas.

In terms of the overall spatial structure of squatter settlements in relation with transportation service, the following conditions appear to hold: 1) mountainside areas as a "consolidator" class show higher rates of employment outside the community and greater proportions of motorized transportation utilized to reach work. On the other hand, flatland/streamside areas show much higher rates of employment within the community as well as non-motorized forms of transportation to reach work, either through walking to work or working at home; and 2) both areal catagories the gradient declines with distance from the city center.

Apart from a general perception of informal sector activities of the urban poor, this thesis recommends a cycle-based non-motorized transportation mode. The use of such a system in combination with a community-based development of industry utilizing self-help strategies in production, maintenance, and operation of such system. Further, this activity could be used as initiation of organizing and coordinating schemes in the provision of employment opportunities in the community.

The proposed mode of transportation is only one form of range of possible alternatives. If the present conditions in squatter settlements are to be improved, and if the residents are to be able to contribute positively to society, organizing themselves and choice of appropriate technology are essential. Planning efforts should encourage the process of organizing and coordinating community action such as self-help rather than dictating their welfare. With this notion, the function of transportation technology could not only meet users' transportation needs in a more effective way, but also to help initiate a process of development by stimulating the innovative forces and mobilizing idle labor forces which exist in any community in developing countries.

Thesis Supervisor: Ralph A. Gakenheimer
Title: Associate Professor of Urban Studies and Planning and Civil Engineering
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By writing this dissertation I have incurred many debts. In particular, I would like to thank my academic advisor, Professor Ralph A. Gakenheimer, for heading my dissertation committee; for his guidance through a new field, and for his flexibility about my work commitments. I owe a great deal to his patience and understanding of my need for freedom and independence during my graduate study at Massachusetts Institute of Technology. Without his support, I could not have arrived at this point.

I am very grateful to my undergraduate advisor, Professor Leonard G. Buckle, for the privilege of enjoying our friendship since 1973. I would like to acknowledge his objective perspective about my dissertation and his unfailing enthusiasm about the topic. Without him and Professor Suzanne R. Thomas-Buckle's collective understanding and continuing sense of humor it would undoubtedly still be unwritten. Their encouragement and trust in me fueled my drive to overcome my trials and tribulations of developing academic entrepreneurship. Their belief that I could write this dissertation within my time limit was a critical factor in its completion.

I am also grateful to Professor Michael D. Meyer for his support and useful guidance throughout the various stages of this dissertation. I have benefited from my discussions with him and am indebted for his comments and suggestions. My special thanks goes to him for serving on my committee and who was the only member around at Massachusetts Institute of Technology struggling with my stubbornness while two other members were on leave. His kindness, willingness and energetic responses helped me to complete my dissertation on time.

Beyond this circle of principal faculty members, I wish to express my gratitude to my friends. Acknowledging the assistance of my friends is difficult because so much is owed to so many that it seems impossible to know where they leave off and I begin. I would like to single out a few of the individuals who have been of particular assistance: Terry Lee, Charlie D. Yie, and Chong Y. Yoon.
Since 1969, when I entered as a freshman, I have been fortunate to hold several fellowships and to receive awards from Massachusetts Institute of Technology. The field survey work was funded through the Eloranta Fellowship and the Class of 70 Research Award.

While acknowledging with gratitude all the assistance and support I have received during the past years, I would like to make clear that full responsibility for the final product and any errors and misinterpretations it may contain remains, of course, entirely mine alone.

I dedicate this work to:

My folks in Two Sentry Hill Place
My family who gave me name:
My inevitability
My honorable mentors:
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CHAPTER I: INTRODUCTION

1.1 Scope of Thesis

This thesis analyses the provision of transportation service to low-income areas, with special emphasis on the application of technology to the transportation of residents of squatter settlements in Seoul, Korea. The major tasks of this research are to identify major factors causing urban transportation problems for low-income areas; to analyze government efforts to deal with these problems; and to suggest alternative forms of urban transportation systems to meet most effectively the needs of the poor in Seoul.

In particular, in the process of my research, I will suggest a more appropriate approach--community based industrial development--which can be a spin off from a transportation technology to enable individual squatter households and communities to improve their own conditions without having to depend on government action. In this context of squatters' needs and government default, I will propose community development using a transportation strategy and greater use of self-help in organizing communities for better employment opportunity in the community. The causes of transportation problems of the poor lie beyond the transportation technology. The haphazard location and arrangement of urban activities and the lack of physical relationship among housing, jobs, and services mean that conventional cities must rely on travel to compensate for disorder. "Transportation problems will have to be cured in part by non-transportation solutions." Particularly for the squatters, the current situation calls for
community based industrial development that emphasizes organizing community resources and focuses on improvements in squatters' accessibility rather than their mobility.

National and international programs aimed at improving the conditions of squatter settlements have traditionally emphasized the eradication of existing settlements and the construction of new housing units for the displaced families. This solution, usually implemented at only a token scale, has at best poorly duplicated at great expense the abilities of the squatters to construct their own housing. Most families in the world live in housing roughly commensurate with their income -- in many cases that income is simply too low to provide for "standard" housing. For example, an AID study shows that in Kenya "the average annual earnings of an urban laborer are well below the cost of a site with service (a shower and a toilet) and are less than 20% of the cost of Kenya's minimum standard of a two-room house for a family."\(^3\) Although this rate varies from nation to nation, the problem is universal.\(^4\) Poor housing is a symptom of poverty and an inequitable social and economic system, and attempts to "solve" it directly are rarely successful. A broader approach is needed.

The problem of the unemployed and underemployed among the urban poor overlaps with their other problems such as lack of education, skills, health, and political power. The problem of getting to where the jobs are (whether the problem is due to poor transportation or because the poor live in squatter settlements) is part of the larger problem of the lack of accessibility of the poor. "The social benefits of high labor mobility have been recognized since Adam Smith, in *The Wealth of Nations.*"\(^5\) Yet, in spite of the large literature on labor mobility, the physical problem of getting to work does not seem to have been considered until the McCone
Commission which studied the Watts riots in Los Angeles determined that one of the causes of the riots was poor accessibility of Watts area residents to work opportunities. The Kwangju squatter settlements relocation areas' riot in 1971 (described in appendix A) was a similar case. The major cause of the riot was that government-promised employment sources (industry) did not locate in the area early enough and there was an inadequate transportation link between the area and Seoul where the jobs for the poor existed.

This thesis argues that the existing transportation system in Korean metropolitan centers of the late twentieth century provide an unsatisfactory link between job sites and the residences of the poor, forming a barrier to their employment or better source of income. Strategies for improving low-income areas can be viewed from two perspectives. One is focused on the area itself, and the other focuses on the relationship between the area and the rest of the city. This thesis will focus on indirect intervention in the low-income areas with respect to transportation infrastructure by identifying their needs and suggesting transportation mode technology suitable to those needs. This focus was chosen because the amenities of the city are out of the reach of many low income residents since the ability to travel is not equal for people in Seoul, and, indeed, some people do not have access at all. Successful intervention in the low-income areas, in general, means giving top priority to easing constraints and developing supports for appropriate residential locations in accordance with changing demands of different social sectors as well as to the promotion of land and services through infrastructure -- in this thesis, transportation service.

The central issue of concern in this thesis are thus:

1. What are the problems and needs of transportation for urban poor in terms of their settlements' location and topography?
2. What transportation modes and strategies are available and appropriate* to the urban poor in relation to their spatial distribution in Seoul?

1.2 Relevant Areas of Study

The basic assumption underlying a commitment to the urban low-income community is that low-income communities in a Korean context have a strong developmental function in the urbanization process. These communities represent the channel through which rural people are introduced and assimilated into the urban culture. Moreover, moving away from the traditional definition of the slums, I see these areas, though initially of poor physical condition, as differing in two very important aspects. Often, as squatter colonies, these settlements represent initial developments on land previously unoccupied which, often within periods of three to five years,

* There appears to be an absence of a generally accepted definition of what constitutes an appropriate, low-cost, intermediate or alternative technology. What is most apparent in the literature is the ambiguity surrounding this issue. Perhaps this ambiguity is justified because there can be no single set of criteria and no single concept of appropriateness. For the most part, if there were such an acceptable definition it would perhaps be open to subjectivity, i.e., value judgments, many of which themselves are inappropriate or at least in conflict with the more objective circumstances.

In general, technology can be viewed as that component of a peoples culture which enables them to extend their human, physical and mental powers in order to adopt, utilize and ultimately control the physical and social environment for the sustenance of daily life and its continued survival. The United Nations makes the following observation on the appropriateness of technology:

"The criteria of appropriateness that are pertinent to the choice of technology cannot be appreciated in terms of technology alone. The choice is affected by value judgements as to the economic features that characterize a good society. Accordingly, questions of appropriateness can be raised in connection with solving each of the three basic economic problems that face any society: What is to be produced; How is it to be produced; and for whom is it to be produced." The above three questions are considered distinct by some planners; in this thesis, this view is used to determine appropriateness.
develop into fairly stable lower middle class communities. Thus there is strong indication that the internal structure of these communities is much more vital and healthy than in what might be devined as a "normal" slum. Recent observations have tended to confirm initial findings in that there often is structural continuity within many communities and often of a more definitive nature than simply a rural ethos.

1.2.1 Focus on Squatter Settlements

Janet Abu-Lughod in her study of urban migration in Cairo, points out that these communities often serve as active social institutions designed to protect the migrants from the shock of anomie -- the overwhelming shock involved in a rapid switch from a rural to urban ethos. In terms of social action this fact has proven to be of enormous significance. Community action workers have usually encountered strong willingness to cooperate at the community level in diverse activities such as making community improvements and even organizing to demonstrate for better housing and relocation procedures from city hall. Reinforced by strong primary group relations, community members often share an astonishing willingness to cooperate and work toward what they feel to be their legitimate claims in an urban environment.

Community members generally also evidence a high desire for social and economic improvement, often viewing their present condition as only temporary until they are able to either build a better house or move to a higher status neighborhood. Thus we are faced with a situation that presents us with not so much a problem to be removed but a potential resource to be nurtured until it is able to participate more fully in the give and take process vital to an urban existence.

Taking this new perspective, the squatter "problem" can not be viewed
simply as a problem of physical deterioration or environmental pollution, which would be succumbing to the situation on a superficially problematic or visual basis rather than on a more insightful evaluation of the roles that these communities, including such a large portion of the population of the city of Seoul (2.5 million people is roughly 35% of the population of Seoul, and equivalent to the size of Pusan the second largest city in Korea). This alone warrants that this problem be taken more seriously in terms of the implications that this large sector of the urban population can have for urban growth and how urban systems can work to integrate them into the general socio-economic fabric to elicit their maximum contribution and participation in the urban decision making process. To the extent that policy makers overlook the economic, political and social efficacy of this group they are ignoring a huge potential force for constructive development and continue to perpetuate a theory of development that may have more relevance for itself than for the people for whom the development should be designed. The simple fact that such a large number of people should command such a small portion of the city's economic, social and political prerogatives is an indication of the extent to which these people are not taken seriously as potentially contributory members of a dynamic and indusive society. Policy shortsightedness of this nature is probably more a problem of ignorance than of indifference and that in the continuing and expanding role of academic institutions one of the main functions should be to create more of an awareness -- problem consciousness -- among responsible policy makers and community members of the true nature and function of these groups. This is essential if any substantial shift in policy is to be expected and the role of these communities re-evaluated within the context of developing cities. Thus this research will hopefully bring before the public and
policy makers the basis for a new appreciation and awareness of these people and public policies to integrate them more fully into the urban matrix.

One strong index of the governmental attitude toward squatter settlements is evidenced in the manner in which they have carried out their housing and squatter upgrading programs. These programs which are based primarily on low-income or urban renewal type housing and squatter relocation programs have consistently taken the position of the squatter settlements as a manifestation of environmental pollution or physical blight and have tended to overlook the existence of the strong social and economic fabric of these communities. By doing so, in the process of removal they have destroyed tremendous numbers of complexly interwoven family structures and many healthy sources of income. The oversight of some of these programs is sometimes tragic for in many instances in not only social structures but economic structures, numerous commercial and economic facilities that exist as integral parts of the physical environment have also been destroyed.

The economic importance of these communities becomes significant when it is realized that a great part of the cottage and service industries, over 50% in Seoul, are located in these areas. Observations in Seoul have shown that substantial numbers of slum dwellers run cottage and service industries within their communities and moreover often invest capital returns from these industries in improving and building up their homes and communities, often without even the rudimentary security of any kind of land tenure. But perhaps the most serious of all are the consequences that result in the unemployment and the underutilization of the potential labor force who live in the communities. Lisa R. Peattie, in her "Some Notes on the Strategies of Generating 'Informal Sector' Employment," points out that one of the high priorities in these communities is to maximize access,
through location and transportation links, of low-income areas to sources of employment. 16

The objective of this research is to analyze transportation problems in low-income areas and to identify the appropriate (economically, politically, and socially feasible) modes of transportation and methods to delivering them to the urban poor with socially and environmentally acceptable transportation service at a cost they can afford. This is important because transportation facilities expand the options for work and give access to health, educational and other amenities which, because of scale economies, can often be effectively provided only at centralized facilities in urban areas. The facilities can effectively be utilized only when one has an efficient transportation mode. In the squatter community environment where the physical development of the community functions as a direct correlate of the economic status of its members, the concept of exterior physical environment and accessibility develops as a natural consequence of economic growth. For instance, pride in the appearance of the home and its surroundings is usually a factor of the level of economic and personal investment that the home owner has put into his home.

Thus the appearance of the environment is a functional correlate of the ability and willingness of the dweller to maintain that environment. The causes of the environmental problems in squatter settlements are not physical conditions of the houses but the lack of provision of adequate transportation service to sources of employment in order to increase economic capacity.

1.2.2 Theories of Economic Development

Any interventionists in the technology of urban infrastructure, in facing any specific situation, is confronted not only with physical infra-
structure problems but more importantly with the currently ignored problem of development of the people for whom the infrastructure is planned. Development does not start with goods but people. First I will start with general issues of development and narrow down to the squatters' location and transportation problems.

What is "development?" This term varies with the many contexts in which it is used. In this study, the context is that of the third world nations as seen through the eyes of their policy makers. The development goals set forth by those leaders, such as raising national output, increasing national income, and improving the standard of living, have principally been aimed at lifting the people out of poverty and toward a better life.\(^{17}\)

The realization of this kind of development entails changes in the existing modes of production. It also means changes in the structure of many human institutions. Social and economic relationships are faced with an inevitable transformation under the stimulus (or disruption, as the case may be) of development. Gunnar Myrdal put it, "in the final analysis, we have to insist that development is always a human problem."\(^{18}\)

Theories of development have been devised primarily to guide planners in underdeveloped countries. In order to be scientific they deal with statistical abstractions such as national output, consumption and investment. Underlying these analyses are assumptions about people: their needs, motivations, and aspirations in life. Any theory that deals with human institutions, whether politics, economics, or education, necessarily embodies a view of human nature and human goals. This is a fact ignored by many present day economists who try to reduce economics to a quantifiable science by eliminating the "non-economic" factors. They want their analyses to be value-free. I agree with Schumacher that, "economics has only become
scientific by becoming statistical."^{19}

In this section I shall examine the assumptions about human nature and goals implicit in two economic development theories. It is my opinion that current development theories can be divided into the Human Model of Development and the Western Model of Development. These two economic development theories have had the greatest influence on planners in developing countries. I will try to show that these assumptions are not inconsequential but are, in fact, essential to understanding the kind of development one will achieve with each of them. Quality of life in squatter settlements cannot be measured by a quantifiable science. It is my assumption that for a short term possible strategy to solve squatters' problem, there are needs for technological innovation for the way of life of squatters.

1.2.2.1. The Human Model of Development

Economists like Schumacher have called for a shift of focus from the development of goods forward to the development of people. People, he holds, are physical beings in that they have certain basic needs without which happiness does not seem possible. But they are also beings endowed with spiritual needs, the need to be creative, to be productive, to be needed, and to have a hand in their own and their country's destiny. The promotion of their material welfare must be viewed in the context of their total development as human beings.

Furthermore, in a country with limited capital and natural resources, unbalanced development can mean dire poverty and hopelessness for a large proportion of the population. Thus a heavy emphasis on a balanced development of leading and lagging areas is essential to realizing the human potential of every member of society.

The most critical task facing development planners, then, is to create
new workplaces for the poor or to provide transportation services to link employment sources. For a poor person this is one of the most important needs. The issue of production technology is pertinent in this case. The capital-intensive technology installed in the modern sector clearly does not maximize job opportunities. The fulfillment of a goal of maximizing job opportunities calls for the use of a relatively unsophisticated technology. Sophisticated modern technology is disfavored by poor, unskilled people because it uses very little labor, requires too much capital and too much training to get started. On the other hand, too low a level of technology will not have an adequate productive raising effect. A reasonable compromise is the use of an intermediate level of technology that is cheap enough to create many workplaces, and simple enough to introduce easily, but sophisticated enough to increase a worker's productivity to a reasonable level.

The major weakness of the human model of development is that insufficient knowledge exists about its usefulness. The kind of theoretical tools and practical experience needed for implementation, however, seem to fall into three interdependent categories: economic prediction, technological devices, and social acceptance.

From a national point of view, the first category, economic prediction, is critical. A nation will not commit a sizeable portion of its capital resources without having a rather good idea of what is going to happen. A planner must have the tools to make reliable predictions about how much investment is needed, how long it will take, and what the benefits will be if his ideas are accepted.

From a technological point of view, methods must be developed for choosing and tailoring existing technology to suit a particular area's
resources and limitations, people's human goals, and existing engineering resources (what kind of technology can be developed to meet people's particular needs?).

The final category deals with the social and political environment in a given area. How can these changes be integrated into the existing institutional structures? Where resistance to change is strong, how can we overcome it and encourage local initiative?

1.2.2.2 The Western Model of Development

The drive for economic development in underdeveloped countries started after the Second World War. Most postwar literature and development plans have been produced by the industrially advanced countries, and, not surprisingly, they have been dominated by the experience these countries have had in the course of capitalistic development. These theories were often uncritically adopted and applied to problems in underdeveloped countries without regard to the differences in context.

Using the western model, very few developing countries including Korea have made impressive economic gains in terms of aggregate national output and national income. For example, Korean GNP growth was tripled within 15 years using western model of development. Yet, there were only 3.3% of wage earners in Korea having more than U.S. $600.00 per month income in 1978. But those gains have not trickled down to people at the bottom. More than 70% of Korean wage earners have income below U.S. $100.00 per month at present. Those who are most in need of help have gone unnoticed. In many places the poor are getting poorer, while the rich are getting richer. The wide disparity between regions in their course of development has produced what Schumacher calls "a process of mutual poisoning." The industrial development in the cities destroys the economic structure of the hinterland,
and the hinterland takes its counter action by mass migration into the cities, poisoning them and making them utterly unmanageable. So even when the economy as a whole has improved, positive development in the sense of raising the poor out of their poverty has not occurred.

The western model holds that an economy can develop most rapidly through competition among private enterprises. Most planners who believe this western model of development at present think that if each individual enterprise acts to maximize its profit, then the total economic pie will be enlarged.\textsuperscript{25}

John Gurley claimed that this pursuit of efficiency and private profit would favor the development of the few most efficient at the expense of the many because it is almost always most profitable to build on the best.\textsuperscript{26} The planners find development efforts based on the western model concentrated in big cities where it is easiest to establish new industries, gain access to modern equipment and highly skilled workers, and to markets for the products. They also see a tendency to concentrate resources in an attempt to gain higher profits.

The role of education in this model provides a good illustration of the problem. Education is labelled as an investment in human resources, implying that it is valued for its productivity-raising potential. Where education does pay off, it is used. Where it does not bear a direct relationship to profits, it is ignored. This criterion focuses education on those few who are best qualified to be educated, and selects them for that education which will lead to the best rate of return on the investment.

This helps to explain the heavy emphasis on mechanization in Korea and similar developing nations, because from a production point of view it often proves to be more profitable to invest in physical capital than in
education for workers. 27

It is not by accident that this development model is obsessed with quantitative achievement; it is the only kind of achievement the model sees. In this picture there are no levels of being. Human beings are not higher beings with creative power and noble aspirations, but are hollow beings forever reacting and adjusting to the forces in their external environment. They seek security and fulfillment through material gains, and not in the less tangible gains associated with love, beauty, creativity, goodness, etc. This model assumes that material comforts are the end of each person's striving; then it follows that more and more output is each person's goal and so the goal of the whole economy. In the zeal for increasing production, each person is reduced to a factor in the production process, a means to increase the total economic pie. Ironically, increasing the total economic pie does not guarantee more for each person, so that the western model can be failing to achieve even this limited end while showing healthy signs of growth.

There is need for qualitative achievement in the course of development. Public policy for the development ignores the presence of "invisible" factors such as quality of life of the people and welfare. So far major priorities of public policy in the field of urban low-income problems in developing countries have been directed mainly toward the "superstructure" (e.g., numerous housing programs through the building itself, its lay-out, materials and construction). Very little work has been done on the "infrastructure (e.g., transportation, water-supply, sanitary service and schools). 28 The causes of poverty in squatter settlements are not only the physical location of the settlements but also the provision of transportation services and other amenities. However, policy makers have neglected
They viewed the squatters' problem as a housing problem and saw the provision of more standard housing the only solution. The elitism of policy makers has overruled the squatters' needs. They give importance to the visible part and quantifiable economic factors; that is why they solve the squatters' problem by forced eradication and housing programs.

1.2.3 Theoretical Background On Squatters' Spatial Formation

This research is the logical extension of work done in recent years by John Turner and Anthony Leeds who were attempting to develop an explanatory theory of squatter settlements. The literature resulting from this work has been discussed in depth and has been responsible for increasing acceptance of the positive aspects of squatter communities and the enormous potential of their residents. This shift in attitude has included recognition of the mis-match between centralized, high-technology systems and the needs of squatter areas.

This extensive squatter and self-help housing literature unfortunately makes only passing reference ot the need for housing support systems. Mention of transportation service system is usually limited to commenting that such service must depend on the initiative and good will of government, and is of high priority of the squatters.

This thesis is intended to extend Leeds' and Turner's work to the situation of poor urban communities in Seoul, and attempt a further synthesis toward what transportation mode might be suitable under what kind of development stage and location of the communities.

In his article, "The Significant Variables Determining the Character of Squatter Settlements," Leeds attempts to develop an interpretative model in which he specifies what he considers to be the significant
variables affecting the form, characteristics and state of development of squatter settlements. Using essentially an inductive approach, he looks at a variety of communities and attempts to pinpoint regularities at the level of generalizable "laws." He tries to define on theoretical ground a number of variables that can explain the existing structure and at the same time check such predictions against the range of empirical data about which generalizations are to be induced. Thus, through adequate specification of the variables and their interaction, he tries to account for all the empirical varieties observed from different systemic states of the variables.

The basis of Leeds' model is easily recognizable as a variant of the classical land rent gradient in which land rent falls off with distance from the city center. The model describes essentially a set of economic trade-offs in which the real wealth of the households is increased through lower land costs at the periphery and higher potential for expenditures on housing and other consumption. Households disperse throughout the city area according to the amounts available to spend for occupying land, transportation and housing costs. Leeds claims that the essential tradeoffs exist between density, transport costs and land, the higher cost of transport being exchanged for more land. Equilibrium is reached at that point where the proportions spent on travel, land, and other expenses match their income and expenditure preferences.

While addressing the issue of relative indices or criteria for development of given community types, Leeds gives less attention to the fundamental issue implicit in the entire Alonso model, that of income. Tradeoffs between land and transport costs become possible only when household incomes have risen to the extent that accessibility requirements diminish, that is, higher transport costs are affordable for the amenities of more
land. That poorer communities exist in the center city is largely a function of higher accessibility to work requirements.

Evidence from the work of John Turner also shows that central city areas perform a vital function in the process of urban assimilation. Recent migrants often pay high rents in the form of key money or monthly payments to be able to rent accommodations in the center city in order to be close to jobs.34

Leeds does touch upon the critical factor of proximity to labor markets as a variable in the choice of community location, although in a limited and generally descriptive fashion. He begins by observing a correlation between the type of labor market and the development of adjoining communities as a whole. However, his observations are limited to looking at the spatial correlations between different qualities of community types and the nature of the surrounding labor market.35 Thus he presupposes a functional relationship between the level of development of a particular community and the nature of the surrounding labor market. The problem with this analysis is that while it is true that labor markets would affect the nature of nearby communities, he limits himself to situations of spatially adjacent labor markets, primarily giving examples of central city communities in metropolitan areas, while neglecting the issue of peripheral communities. The issue with Leeds' analysis is that while he gives us a "typology" of communities, he fails to produce an interpretive theory that places each of these types within the larger framework of urban growth is far different from saying what its actual function in the growth process is.

At a more qualitative level, Leeds claims a picture of community development largely determined by the size of community, rate of internal economic and social differentiation and level of physical development.
Better developed areas are generally on the perimeters and poorer and more spatially constrained areas are in the center of the city. However, while centering his analysis on the nature of community types and their capacity for development, he gives less attention to the dynamics of integration. Through his analysis one has an impression of low-income communities with their adjacent labor markets in many ways cut off from the larger social economy of the city.

John Turner develops an alternative model that looks more closely at the relationship between the dwelling environment and the overall process of socio-economic mobility. The structure of Turner's model consists of two interacting sets of variables, one composed of the "functions" of the dwelling environment which he defines as location, tenure and amenity. The other set is composed of the "social situations" of households, the momentary positions people occupy on their chosen geographic households. Their combinations and emphases will vary widely in accordance with the socio-economic conditions and expectations of the household.

In this relatively simple model, by emphasizing the behavioral aspects of the locational decision making process, Turner further manages to incorporate into what is essentially again the rent gradient model the dynamics of upward mobility and its consequences for the spatial distribution of low-income communities in the city at large. The fact that "status" considerations for the higher income family play an important role in the process of upward mobility is also critical in that it highlights the essential integration process that occurs through upward mobility, thus the long term goals of households can be more readily understood in terms of assimilation into the urban economy. Moreover, communities are now seen more in terms of their particular relevance for certain classes of poor people in various
stages of socio-economic development. This places the entire model in a more dynamic framework in which particular types of communities are seen as responses to particular needs, and the spatial implications of community formation follow as a consequence of these responses. Thus while arriving at essentially the same form of spatial diffusion as described by Leeds, Turner manages to infuse into his model a more coherent structure of locational decisions based upon the behavioral dynamics of socio-economic mobility.

Thus both Turner and Leeds arrive at essentially the same consequences of urban poor communities though through very different models, Turner assuming a more behavioral historical approach and Leeds trying to isolate certain critical explanatory variables. In general, the result is basically a diffusion model of urban low-income community formation where communities in central city areas are of generally poorer quality and of highly transient status. Moreover, expansion and development is constrained in these areas due to scarcity of available land and competition with other more highly valued urban uses. Because of their high value in terms of location, however, these areas continue to thrive because they fulfill a high demand for cheap temporary shelter for recent migrants and poorer families unable to afford the costs of long term investment in housing. As socio-economic conditions improve and households become able to afford the higher costs of commuting and more desirous of stable equity and long term security, gradual migration towards the periphery begins to occur. That this form of consolidation does not occur in the center of the city is due to the uncertainties of government action (e.g., slum clearance, renewal, etc.), competition with higher valued uses, and the consequent high risk of long term investment in housing under highly unstable development conditions. Other
contributing factors include the unavailability of land and the greater concern for liquidity of resources for poorer families, since they are more dependent on the flexibility of their housing status in relation to job locations. The net result is a concentric structure of low-income communities with higher income households successively moving toward the edges, and poorer households occupying the more central zones, the poorest presumably in the middle.

Thus upon preliminary inspection, it seems that settlement formation in Seoul has been subject to considerably more complex spatial dynamics than that proposed by the Leeds-Turner model without the assumption of topographic complexity. Both Leeds and Turner give insufficient consideration to the importance of topography in their analyses (because most of the examples discussed were cities in which topographic differentiation was relatively unimportant -- Brazilia and Lima). However, instances in Seoul, where numerous pockets and hills abound in and around the city center, represent what appears to be a totally different set of dynamics. The critical assumption implicit in both Leeds' and Turner's analysis is that, while higher incomes may demand more security of tenure and housing related amenities, given the constraints operative in inner city settlements, these priorities cannot be satisfied within the structure of existing arrangements, and therefore areal expansion to the periphery occurs. Thus the pressures of greater socio-economic mobility cause an expansion of peripheral urban territory devoted to squatter housing because these demands cannot be met within existing inner city housing arrangements, and insufficient land exists close to the city center to provide what these households desire in the form of more land and stable tenure. However, the existence of large mountainside areas in and around the city can radically alter the spatial
structure of squatter settlements. Mountain areas represent essentially the same order of response as peripheral lands to socially mobile households, with the important advantage of being located closer to the city center. They constitute large tracts of land close to and in the city, unusable for alternative commercial and industrial uses, and generally unserviced due to the limitative nature of intrastructural technology. Thus, to the upwardly mobile poor household, they combine both the advantages of peripheral lands in that they are free from the pressures of competitive land uses and probably safe from government removal; they are generally large, with ample land for consolidated settlement and large communities with all their economies of scale (in political as well as economic terms), and they maintain their proximity to urban labor markets. To the upwardly mobile household, therefore, they represent a double form of savings; first, in terms of savings in transportation costs, and second, in terms of tenure for housing. Hence, under conditions of topographic diversity, it may very well be that patterns of urban poor settlement formation consist of highly consolidated and developed settlements in the central city rather than in the periphery.

1.2.4 Urban Transportation Planning

Literature in the field of urban transportation planning for developing countries, another source relevant to this research, is sparse, highly technical, and oriented toward large scale systems: highway projects, mass transit system, and transportation/land-use studies based on quantitative models of land development and travel demand. The technology involved is capital-intensive, adopted directly from the technology of developed nations with little thought as to its appropriateness to the different needs and constraints of developing nations. The needs of the vast segments of the populations of these countries presently without transporta-
tion service remains virtually unmentioned in this literature. The metropolitan and regional systems discussed do not fit the needs of the squatter areas for a variety of physical, political, and economic reasons. For example, transportation infrastructure provision is an area where present government policies actively discourage squatter initiative in Seoul. The traditional view of squatter areas as hopelessly squalid, illegal conglomerations of lawless prostitutes and potential revolutionaries has led governments to discourage vigorously the formation and stabilization of such settlements. Refusing to recognize the inevitability and positive aspects of such settlement patterns, governments have also refused to legitimize these settlements, fearing that such a policy would merely encourage accelerated growth. Moreover, granting land tenure, the first step in a policy of legalization, directly contradicts the self-interest of the government and ruling class -- owners of the land on which the squatters have settled. Legalization of the settlements also legitimizes the demands of their residents for municipal services -- a fact not lost on the squatters as is documented in case studies of the Rio de Janiero favelas. Mangin has observed that residents of Lima's barriadas have even expressed an eagerness to pay taxes as this would signify an official recognition of their tenure. Without tenure, and in the face of constant official opposition, it is not surprising that there has been limited local initiative to develop transportation systems.

For decades households have lived in squalor because, in theory, no solution was technologically or politically possible. These impossibilities have reinforced and perpetuated each other, locking millions into an environment of poverty and immobility. Now we have reached a point where it is possible to develop solutions which are politically palatable, or,
more important, an opportunity to move beyond the bounds of conventional
transportation technology to develop new organizational and institutional
solutions employing new mixes of technology. Winblad has stated the situa-
tion well: "Conventional infrastructure systems based on the technology
and standards of developed countries are simply irrelevant to developing
countries today and in the foreseeable future. The great majority of the
people of these countries are not likely to be able to afford any installa-
tions other than those which they can build for themselves." 40

Action in the provision of transportation service must include a broad
range of possible solutions. The lack of activity, both government and self-
initiated, in the past has been in part the result of the demands of the
conventional technology. The time has come to look beyond these convention-
al solutions to new technology and new institutional arrangements. It is
appropriate and necessary to develop a range of decentralized solutions to
the transportation needs of the rapidly growing urban squatter areas of
developing countries. Given the situation of governmental default, it is
particularly important to focus on systems which can be initiated, in-
stalled, maintained, and managed by a community with minimal external
support.

Local planning for public transportation is dominated by an institu-
tional approach which generally applies conventional transit services as
the singular alternative to the automobile in developed countries. There
has been little attempt to look beyond conventional public transit, (mainly
bus and subway systems), to alternative, unconventional solutions (e.g.,
para-transit, motor assisted bike, and three-wheel non-motorized alterna-
tives). Remarkably little attention has been devoted to the potential of
transportation modes other than the private automobile and the conventional
transit services of the scheduled common-carrier bus or fixed rail system. Given the current interest in transit as a concept, a re-examination of some of the prevailing institutional thinking in public transportation is warranted.

In an attempt to identify the factors influencing the urban poor's choice of transportation mode, this thesis compares conventional transit with unconventional transit and non-motorized alternative. As can be seen from the previous discussion, in this thesis, it will be necessary to bridge the gap between the social science literature discussing squatters, their needs, priorities, and their distribution over urban space and the urban transportation planning literature with focuses on the development of high technology, capital-intensive systems at the metropolitan or regional scale.

Matching people's priorities to supply social services is a recurrent theme in development. In the transportation area especially, it should be evident that no physical, economic, or social planning can be made without realizing people's needs and priorities. I re-emphasize that the purpose of such an exercise is not to introduce the substance of "transportation" but rather to present a framework of thinking about national aspects of economic and social development policy. This is a method of thinking that should be equally appropriate to other fields of social service. Investments that serve people's needs and contribute directly or indirectly to economic development should be encouraged to insure adequate social services in the future.

1.3 Methodology

The methodology for this research is based on the field survey and document survey. In order to be able to show empirically the major factors
causing transportation problems and needs which build upon transportation technology for urban poor, selected data were drawn from the results of a household questionnaire survey carried out for 1,893 low-income households located in nine areas. These were stratified with respect to topography and location in the city and grouped as follows:

- **Group I**: central city mountain areas
- **Group II**: peripheral mountain areas
- **Group III**: central city flatland/stream areas
- **Group IV**: peripheral flatland/stream areas

In addition, data were gathered concerning the aggregate movements of low-income households over time as a function of location and topography. The data included metropolitan wide statistics gathered from the Seoul Municipal Government.

Several variables were selected out of the sample to show patterns of transformation of urban poor communities that will affect the location of the communities and travel pattern. These are variables in spatial diffusion and consolidation, indices of physical and economic differentiation between types of settlements, and locational variables having to do with travel patterns. These variables were selected out of the survey sample which was conducted during the summers of 1974 and 1975 in Seoul. Any attempt to define the process of social mobility and its implications for spatial form and transportation problems should select some set of key variables that would affect the process of linkages of low-income, poor household settlements with the rest of the urban system within the overall context of socio-economic assimilation. The variables will be used to show that most poorer squatters could not afford to live in areas of the Seoul Metropolitan region served by public transportation (subway). Where public transportation is not available or the poor cannot afford existing trans-
portation services, squatters live only in high-density areas where many opportunities are available within walking distance. If squatters live in low-density, periphery areas without public transportation service, they must live within walking distance of their work (often within the community they live) but this walking distance is usually a very long one.

Under this identification of transportation problems and needs in the low-income areas, specification for transportation technology will be formulated for the squatter settlements. Transportation technologies to be evaluated are not limited to conventional, motorized transportation services only. All available transportation technologies -- nonmotorized to motorized modes of transportation as well as conventional and nonconventional modes -- are included in this evaluation.

The remaining chapters of this dissertation will focus upon the argument presented here. Chapter II describes the present transportation problems existing in Seoul, reflecting both the physical aspect of the transportation problem in general and the unique institutional characteristics of transportation planning.

Chapter III describes the squatters' present transportation situation and their patterns of transportation among the different locations and topographies in Seoul. Also described is the role of transportation in squatter settlements as a background to understanding and identifying the squatters' transportation needs. Based on the experiences described, conclusions are drawn with respect to the need for non-motorized forms of transportation technology.

Chapter IV describes the development of the transportation service industry in Seoul and the transportation manufacturing industry with the relevant government policies of Seoul, Korea. This section also explores
the institutional arrangements of traditional government responses in transportation service, land use, and transportation projects. In this section, we discovered that there exists no institutional support for the urban poor. In other words there is not a single strategy that could be generated from the public sector to resolve the squatters' problems within the existing system.

Chapter V describes the existing transportation technology and criticizes auto-oriented transportation technology. Further documentation is needed for self-help and alternative technologies. Described are the characteristics necessary for such technologies. Based on these specifications, existing technological solutions are presented. It will become clear that transportation technology alone cannot solve the urban poor accessibility problem. Therefore, a scenario for resolving this problem using a development-based solution is presented in Chapter VI. Chapter VI describes a sketch plan for the urban poor community including both community organizing model and a proposed technical solution. This section explores the possible advantages of this solution and suggests incorporation with the existing institutional arrangements in Seoul. Based on the result of Chapter V, a community based industrial development strategy is proposed.

Chapter VII summarizes the arguments for self-help, non-motorized solutions to the transportation needs of squatter settlements and sets forth recommendations to the audience (decision makers in developing countries) to whom the dissertation is addressed.

1.3.1 Definition of Self-Help

It might be better to define self-help because this notion underlies the proposed transportation mode and community development strategy. Self-
help can be broadly defined to include any activity which depends largely on the input of initiative, labor, and other resources of those who will directly benefit from the results of the activity. Most self-help projects are small scale and decentralized; they may range from the scale of an individual household to an entire community. Self-help components may be included in projects initiated by central authorities or those involving substantial outside technical assistance, equipment, organization or capital.

Most traditional systems for housing and infrastructure systems in rural and pre-industrial societies were self-help to the extent that the units were constructed by their occupants with the assistance of friends, relatives, other members of a small community. With the advent of modern, industrialized, urban society complex organizational and technological systems beyond the control of individual households and communities have developed. Even within this complex society, households have continued to piece together their own housing, using materials and labor at hand in an informal self-help technology.

More formally, the term self-help has recently been applied to projects involving user-participation in housing construction -- such as those presently being funded by the World Bank. Although the experience of formal "self-help housing programs" has important implications for infrastructure programs, it is a mistake to view all self-help activity in the light of these projects. Unfortunately, the problems of bureaucracy, mismanagement, technology transfer, etc. common to conventional housing programs have also been a part of many government sponsored self-help programs.

In this dissertation I will use "self-help" in the more general sense -- any activity which depends principally on the input of those who will
directly benefit from the product.

The notion of self-help technology can be explained by examining the following components of any technology: labor, capital, material, equipment, and level of technology. Of prime importance in self-help is the substitution of excess local labor for capital costs. We can divide technology into two portions: one is labor-intensive technology and the other is capital-intensive technology. The ideal self-help technology would be a labor-intensive technology with local material and a low level of technology using locally available equipment. Figure 1.1 illustrates this, having the following spectrum:

<table>
<thead>
<tr>
<th>Level of technology</th>
<th>simple ---------- sophisticated</th>
<th>need of professional's supervision and assistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labor</td>
<td>individual -------- community</td>
<td>scale of organization</td>
</tr>
<tr>
<td>Capital</td>
<td>none or -------- intensive</td>
<td>capital requirement</td>
</tr>
<tr>
<td></td>
<td>minimum</td>
<td>need</td>
</tr>
<tr>
<td>Material</td>
<td>local -------------- import</td>
<td>availability</td>
</tr>
<tr>
<td>Equipment</td>
<td>hand tool -------- power tool</td>
<td>availability</td>
</tr>
<tr>
<td></td>
<td>traditional</td>
<td>traditional</td>
</tr>
<tr>
<td></td>
<td></td>
<td>modern</td>
</tr>
</tbody>
</table>

The role of land and space requirements and time for construction are important in determining the success or failure of the system's implementation.
CHAPTER II: PRESENT CONDITION

2.1 Urbanization

In the last two decades, Korea has had a relatively fast rate of urbanization. In 1960, 37% of the population lived in urban areas, 28% in cities; by 1975, the proportions had increased to 59% and 48%, respectively. The population of rural areas has been declining in absolute numbers since 1966.

In 1960, the population of the principal cities, Seoul and Pusan, was 3.6 million or 14% of the national population (see Table 2.1). In 1975, these cities contained 27% of the national population. Seoul had grown to a size of 7 million people (20% of the national population) and, if one included the urban settlements around Seoul, to about 30% of the national population.

Table 2.1: Urban Population (1960-1975)
(in million persons)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Seoul</td>
<td>2.4</td>
<td>3.8</td>
<td>5.5</td>
<td>6.9</td>
</tr>
<tr>
<td>Pusan</td>
<td>1.2</td>
<td>1.4</td>
<td>1.9</td>
<td>2.5</td>
</tr>
<tr>
<td>Other Cities*</td>
<td>3.4</td>
<td>4.5</td>
<td>5.5</td>
<td>7.4</td>
</tr>
<tr>
<td>Towns*</td>
<td>2.3</td>
<td>2.6</td>
<td>2.9</td>
<td>3.7</td>
</tr>
<tr>
<td>Total Urban</td>
<td>9.3</td>
<td>12.5</td>
<td>15.8</td>
<td>20.5</td>
</tr>
</tbody>
</table>


* Urban areas have been defined here to include cities with population of more than 50,000 and towns with population of 20,000 or more.
The principal determinants of the pace and patterns of urban growth are those which are found elsewhere: the tremendous growth of industry in relation to agriculture and the wide disparities in the quality of economic infrastructure and cultural amenities resulting in concentration of industry in Seoul and Pusan. Another factor that has been particularly important in Korea has been the rather extreme concentration of quality higher education in Seoul which, with the relatively high social importance of education and the high degree of mobility in Korea, is regarded as one of the major causes of concentration in Seoul.\(^2\) This has added to the normal attraction of the capital city as the seat of political and economic power.

The concentration in Seoul of Korea's economic and political power is viewed as increasing Korea's vulnerability to external aggression. Considerations of national security have been among the main motivations for decentralizing the population since about 1970.\(^3\) Several strategies have been tried to handle the particular problem of the size of Seoul in the broader context of the distribution of population. The most effective strategy appears to be the strict enforcement of zoning regulations restricting the growth of manufacturing activities in major cities, including the establishment of "green belts" around cities and, in Seoul, locating new projects on the south bank of the Han river, which flows through the city. Industrial estates near metropolitan areas have flourished whereas locations far removed from Seoul metropolitan areas have not generally been successful in attracting industry. The most successful industries are generally located in the Seoul-Inchon and the Seoul-Suwon areas which are also the areas of maximum urban and industrial concentration. (see Figure 2.1)
Figure 2.1: Seoul Metropolitan Areas

Scale: 0 10 20 25km
2.2 Transportation Problems in Seoul

A. Development and Dominance of Seoul Cause Traffic Congestion in the City

Metropolitan Seoul is one of the most dominant primate cities in the world -- much as Mexico City, Bangkok, Santiago, and Bogota are -- and enjoys the status of a "high-income" city in the developing countries with a per capita income of $800 (U.S.) per year in 1978. Its dominance increases as national development proceeds. Twenty-one percent of Korea's people live there. Its population is about three times the size of the next largest city in the nation. It contains about half of Korea's motor vehicles (see Table B.1), and 40% of its telephones, generates 44% of its domestic taxes and 33% of its GNP, holds 50% of its universities and 42% of its manufacturing facilities with more than five employees. All of these shares have remained steady or have risen over the last two decades.

The city of Seoul is administered by a municipal government which has powers and functions corresponding to a province. Seoul is under the direct supervision and tight control of the Central Government; its major policies are shaped by the mayor yet the heads of the municipal administrative bodies are appointed by the Central Government.

Very badly damaged during the Korean War, 1950-53, Seoul has undergone an extensive reconstruction. New Broad avenues have greatly opened up the city, and many new multistory modern buildings have been constructed -- office buildings in the downtown area, and apartment buildings in many quarters of the city. The new broad avenues are laid out roughly in the form of a large rectangular grid, with major movements in the east-west directions. The city was constructed in 1394 in a large basin (36.18 square kilometers) surrounded by a ring of low mountains. It has been
expanded to 627.06 square kilometers with an average density of over 20,000 persons per square kilometer in 1975.6

In addition to being the political and administrative capital of the nation, Seoul is the chief industrial, commercial, financial and cultural center of the country. With ready access to its intensely cultivated agricultural hinterland, it has various food processing industries as well as newer manufacturing industries such as textiles and clothing, and various metal-working industries. It is, of course, a major focus of the nation's road, rail and air transportation systems. According to government statistics approximately 423,000 people commute in and out of Seoul to satellite cities and towns in the metropolitan region everyday in 1975.7

Another cause of traffic problems in Seoul is the existence of a curfew. It is one of the major factors in the increase in traffic accidents in the city. The curfew which is in effect from midnight to four o'clock in the morning creates great confusion in the city. It is claimed that about 80% of traffic accidents occur during the midnight rush usually starting at 10:30 p.m.8

B. Seoul has increased roadspace, yet automobile ownership and usage are growing far more rapidly than expansion, and new construction of street networks cannot accommodate the automobile population in the future.

Given the road space in the city and the growth in automobile use, the existing transportation system will not be able to facilitate an increase of vehicle population. (see Table B.2) For the last ten years road capacity in Seoul increased 240%, while automobile ownership increased by 420%. (see Table 2.2) When the factor of motorization is considered, travel conditions are aggravated even further since more cars in the city
will require more roads if speeds are to be maintained within the same travel period. According to the World Bank Transportation Sector Policy Paper, "if motorization levels were to increase from 5 to 10 cars per 100 inhabitants, the road density would have to be increased from 0.42 to 2.49, namely a sixfold increase." In conditions such as those of Seoul, average road speeds in the central business district have been 16 kilometers per hour. The peak traffic pressures now extend with remarkably little variation over periods of more than 12 hours a day. As seen in the Table 2.2, Seoul has increased roadspace 2.5 times while automobile population increased 4 times during a decade. This trend shows that there should be some strong measures to solve the congestion and road construction investment problems in the future.

Table 2.2: Increase of Road Space and Vehicle Population

<table>
<thead>
<tr>
<th>Year</th>
<th>Area (square km)</th>
<th>Number of Vehicles</th>
</tr>
</thead>
<tbody>
<tr>
<td>1966</td>
<td>17.83</td>
<td>100</td>
</tr>
<tr>
<td>1967</td>
<td>23.36</td>
<td>130.5</td>
</tr>
<tr>
<td>1968</td>
<td>29.91</td>
<td>167.2</td>
</tr>
<tr>
<td>1969</td>
<td>32.35</td>
<td>180.8</td>
</tr>
<tr>
<td>1970</td>
<td>34.85</td>
<td>194.8</td>
</tr>
<tr>
<td>1971</td>
<td>38.16</td>
<td>213.3</td>
</tr>
<tr>
<td>1972</td>
<td>39.36</td>
<td>220.0</td>
</tr>
<tr>
<td>1973</td>
<td>39.86</td>
<td>222.8</td>
</tr>
<tr>
<td>1974</td>
<td>40.62</td>
<td>227.1</td>
</tr>
<tr>
<td>1975</td>
<td>43.11</td>
<td>241.0</td>
</tr>
</tbody>
</table>

The high growth rate of private automobile ownership (see Table B.2) and usage creates serious problems of congestion in the central city where most streets are designed for the pre-automobile era. Parking facilities are unable to keep pace with the demand and where parking is available, it tends to be located where congestion is already acute (i.e., in the central business district) instead of in a less congested area. Where parking facilities are inadequate or completely lacking, then automobiles can be found parked in a haphazard fashion. Perhaps the most important aspect of the private automobile is the future levels of ownership and usage which, unless they are projected with some degree of confidence, will result in inefficient and wasteful investment of public resources. Most observers believe that the automobile ownership market in Korea is not saturated but that there is a latent demand for automobiles that is currently held back by government taxation policies. If taxes, tariffs on imported equipment, licensing, petroleum, and other automobile-related inputs are lowered, then the increase in automobile ownership and its consequence on the urban transportation system could be phenomenal.

C. Seoul's traffic problem leads government to initiate numerous counter measures which cause difficulties of travel and transport in many low-income areas.

Rapidly expanding populations in urban centers have placed an enormous responsibility on governments to provide public infrastructure which meets acceptable standards. The impact on cities in Korea is especially critical since the vast majority of new families in urban areas have very low incomes and consequently are generally unable to procure adequate urban services for their communities.

Seoul has experienced great congestion and pollution caused by traffic.
Compared to cities in industrialized countries, Seoul has a relatively low level of private automobile ownership, but congestion is already severe in daily duration and in the size of the areas affected.

The acute congestion and air pollution of Seoul led the Government to take drastic measures aimed at reducing congestion by the relocation of major traffic generators such as markets, intercity bus terminals, industries, and schools outside of the C.B.D. As part of this policy, Seoul's population and employment is being encouraged to relocate at new urban centers south of the Han river (YoungDong and GangNam areas). 11

A limited supply of desirable land in the face of booming demand generates, according to basic economic rules, an intense inflation in urban land and housing markets, and strong pressures towards sprawl. 12 Despite strong measures by the government to prevent land speculation, prices have risen dramatically in recent years. Compared to 1963, Seoul's land price had risen 60 times on average by 1978 and the Gang Nam area had increased 180 times! 13 Those groups most affected are also those without automobiles, with less opportunity to locate on cheaper land on the periphery of the city. Their housing situation is becoming desperate, despite the general economic boom.

Environmental controls on mobile sources of pollution (vehicles) are currently enforced through spot checks on vehicle emission levels rather than through legislation designed to make the combustion engine more efficient and hence less of a pollutant. As a result of this policy and the age of the bus and taxi fleet, there is a large number of recorded pollutant violations but little progress towards any improvement in environmental conditions. There were, for example, 15,862 violations in August 1973. 14

Seoul is thus threatened by an intense housing crisis, traffic strangu-
lation, air pollution and uncoordinated, sprawled corridor development in its region. These problems reinforce the difficulty of travel and transport in many low-income areas of Seoul. Long, harassing and uncomfortable journeys to work are commonplace in Seoul, while many potential workers cannot afford motorized transport of any kind. Studies in Seoul and Pusan show that between one-third and one-half of all trips are made on foot and that walking to work over long distances is usual. (see Table 2.3) An important part of the total of personal trip-making is composed of all walking trips and, to a lesser extent, bicycle trips; thus, "non-motorized" trips predominate in the city. Any prediction of mechanized trip-making, therefore, must account for transference of these trips to mechanized modes. The potential importance of this for Seoul is seen in Figure 2.2. This takes motorization as a proxy for income and compares total person trips for different cities as motorization increases. Seoul's position is not far

Table 2.3: Comparison of Travel Characteristics, Seoul and Pusan

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-mechanized trips</td>
<td>0.350</td>
<td>0.271</td>
<td>0.494</td>
</tr>
<tr>
<td>Private mechanized trips</td>
<td>0.030</td>
<td>0.083</td>
<td>0.069</td>
</tr>
<tr>
<td>Public mechanized trips</td>
<td>0.864</td>
<td>1.031</td>
<td>0.720</td>
</tr>
<tr>
<td>(buses and taxis)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(subway)</td>
<td>-</td>
<td>0.064</td>
<td>-</td>
</tr>
<tr>
<td>Total Mechanized Trips</td>
<td>0.894</td>
<td>1.178</td>
<td>0.789</td>
</tr>
<tr>
<td>Other</td>
<td>0.045</td>
<td>0.008</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>1.289</td>
<td>1.457</td>
<td>1.283</td>
</tr>
</tbody>
</table>

different from what one would expect allowing for its exceptionally low level of motorization, because at that level, walking, in any case, greatly affects total person trip-making.

Figure 2.2: Total Person Trips/Person versus Motorization


That pedestrians and non-motorized modes account for the second largest of all urban trips has important implications for urban transportation system planning. Yet, the municipal government restricts the use of bicycles and motor-assisted bicycles on the major roads for a safety reason. The domination exercised by motorized transport has also been reflected in the curtailment of sidewalks.

D. Walking and public transport are the dominant modes of transportation in Seoul and the existing public transportation system is deficient to meet the transportation need of the poor.

In Seoul, the poorest walk, those slightly better off use a bus or a subway, then a taxi or jitney; and the richest own automobiles. There are also other modes like the scooter, three wheel vehicles, animal drawn carts and bicycles.

Public transportation is provided by both the private sector and the
public sector in Seoul. But there is no noticeable degree of coordination or security, even though the city was stated to have control over routes, schedules, headways and fares of all the public transport system operations. As a result, the quality of service is very uneven across the city's districts. Lucrative routes are attractive to private operators and thus a high level of service is provided there to the serious neglect of unprofitable routes in poor areas, which are exactly where public transport is most needed. The lack of any central coordination of private transport companies and the unpredictability of government policies toward licensing and regulation of public transportation creates an atmosphere of insecurity which results in marginal investment and improvement of the private rolling stock.

Large segments of the population in the metropolitan area lack personal mobility because they are denied convenient access to urban services and facilities. Today, Seoul's public transportation system does not provide flexible and responsive service to the poor areas on the city's periphery. The rather haphazard pattern of routes -- so called "zigzag routes" (137 of the 157 routes in Seoul cross the C.B.D.)\(^{16}\) -- on the whole, exclude the poor from the urban transportation grid and thus impair their personal mobility and their access to the basic things in life such as employment and medical care. The extent to which a transportation system can serve to lower the barriers to urban opportunities, by offering those who are disadvantaged improved personal mobility, may therefore be one of the chief measures of a transportation system's performance.

Even in those low-income areas where reasonable public transportation is possible, the poor are often denied access to the system by a combination of physical and financial factors. The locational characteristics of spontaneous squatter settlements, often on hill-sides, in streamside areas
and at the periphery of the city, exclude them from connection with the city street network; so do the unregulated patterns of housing which do not allow sufficient space for a street network. (see Figure 2.3)

Table 2.3 shows that the city experiences a very high proportion of public transport use. It is, however, the combination of high car taxes and relatively low income levels rather than the quality of public transportation in Seoul that does this. Apart from taxis and subway, conventional bus service is the dominant form of public transport provided in Seoul. The bus service has three major characteristics. First there is an obvious overloading of vehicles, with buses operating above their seating capacity even in the off-peak period on many routes. Second, the designed capacity of Korean buses is high (the average seat capacity being sixty and crush capacity, almost one hundred). Third, there is an absence of bus priority measures such as lane reversal, bus lanes, bus priority through signalization, and other such measures designed to use the existing road space and road improvements to the advantage of public transport users.

The bus services in Seoul are provided by a large number of private bus companies (91 companies) licensed to operate by the Ministry of Transportation. Most bus companies are loose associations of individual owner operators, and only 15 of the total 91 companies are integrated enterprises which own their own equipment and operate it under direct management. Close to 78% of individual owner operators have less than 50 buses and only 2% of them own more than 100 buses. These figures show that the bus companies are financially constrained by their small size and high degree of competition.

The urban transportation problems in Seoul can be summarized as follows:
Figure 2.3 Bus Routes and Squatter Settlements

- Squatter settlements
- Bus route
1. congestion -- compared to cities in developed countries there exists relatively low levels of private automobile ownership. However, there is heavy congestion and pollution caused by traffic in large urban areas.

2. difficulty of travel and transport in many urban low-income areas due to the physical locations and topography.

3. deficient public transport system -- the low level of service reflected by extreme overcrowding during long periods of peak traffic as well as in the areas served. It is badly managed, and financial constraints prevent expansion at a rate rapid enough to accommodate the growth of the city.

2.3 Difference in Urban Transportation Planning Between Korea and Developed Countries

Developed countries and a developing country like Korea are faced with different types of transportation problems. The tendency has been for Korea to adopt -- perhaps also adapt and modify to reflect the Korean condition -- the theories, techniques and methodologies of urban transportation planning prevailing in the developed countries. The successful application of plans designed in one country could mean disaster for the next country which opted for the same design without first tailoring it to the needs of that country. For example, in the urban transportation area, United States and Canadian planners have identified para-transit as a potential solution to some urban transportation problems. The para-transit mode falls between private automobile and conventional transit, and is composed of distinct types of services: "hire and drive" services closest to the private automobile in service characteristics, "prearranged ridersharing" services closest to conventional transit, and, in between, "hail and phone" services. The recently termed "paratransit" by the Urban Mass Transportation Administration ranges from the rental care, minitar, taxi and dial-a-ride to the jitney, car pool, and subscription bus. The study, "Para-
transit: A Summary Assessment of Experiment and Potential by Ronald F. Kirby, has identified four major applications of para-transit services which could contribute to improving the efficiency and effectiveness of urban transportation system in developed countries.

1. high-density home-to-work travel;
2. low-density travel demand;
3. feeder service to line-haul transit; and
4. mobility within business and commercial districts.

In developing countries like Korea potential applications of para-transit services can improve the accessibility of the urban poor. First, para-transit service to serve periphery low-income areas where there is low density travel demand, particularly where the demand is uneconomical for conventional transit has great potential application. Second the para-transit service can be used for providing complementary feeder service to bus and rail transit as well as their potential as substitutes for conventional transit and the private automobiles. Finally, these modes can supplement conventional transit in rush-hours and help to alleviate congestion, pollution, and energy consumption.

While the general conditions in developing countries like Korea require special attention, the urban transportation systems in the large cities such as Seoul also pose unique circumstances not found in developed countries. The multiplicity of transportation modes — pedestrian, bicycle, scooter, jitneys, taxis, buses, ox-carts, three-wheel petty trucks, autos — makes traditional methods of traffic analysis and control inappropriate. Too often, transportation planning methods developed in the context of developed countries are applied by foreign consultants with little sensitivity to the prevailing local conditions and needs. Not surprisingly, such studies produce recommendations and design standards which closely resemble trans-
portation systems found in developed countries.

The rapid growth of urban population and the economy in Korea means more private automobiles and better public transport services are required in the city. It implies that the structural growth of the city will be unpredictable and unmanageable. This factor of instability makes transportation trend and demand forecasting very difficult.

The existing large informal sector* provides "floating" employment, which has no fixed place of work but operates in the city and is itself heterogeneous. This factor alone makes the application of current urban transportation planning in developed countries, which was developed to treat only the formal sector of a city, quite different and difficult to use in urban transportation planning in Korea. The need to study informal sector transportation separate from the formal sector seems unavoidable.

The role of public authorities when decision-making is delegated to one

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* I describe the traditional-modern division of economy as being the "formal" and the "informal" sector. In my opinion, both sectors are modern; both are the consequence of the urbanization that has taken place in Korea over the last 60 years. One important characteristic of formal sector is its relationship to the government. Economic activities formally and officially recognized. This sector obtains the direct benefits of access to credit and a formidable list of benefits that reduce the cost of capital in relation to that of labor. The formal sector is characterized by large enterprise, sophisticated technology, high wage rates, high average profits and foreign ownership.

The informal sector, on the other hand, is often ignored and in some respects helped and in some harassed by the authorities. Enterprises and individuals within it operate largely outside the system of government benefits and regulation. Thus, they have no access to the formal credit institutions and the main sources of transfer of foreign technology. Many of the economic agents in this sector operate illegally, though often pursuing similar economic activities to those in the formal sector -- marketing foodstuffs and other consumer goods, carrying out the repair and maintenance of machinery and consumer durables and running transport, for example.
high authority with great power to change has special meaning to planners in Korea. In this situation, planners are "forced" to produce a politically favorable plan. This also means governmental policy on pricing and taxation could change unprecedentedly, i.e., increasing taxation on automobile ownership 100 percent or even higher. This also raises a question in the area of implementation of urban transportation projects. Much of the staged implementation that occurs in Korea is in direct response to budgetary and political constraints, and is not a consequence of a planned implementation strategy. In Korea, awareness of external impacts (i.e., environment) and citizen participation are not as pronounced as they are in developed countries. Therefore, criticism on external impacts is minimum. There is much more strength in the public authority in executing land use- and transportation-related policies than in the developed countries.

There are very limited studies on urban transportation in Korea. For Seoul, there are only two comprehensive transportation survey studies, for Pusan, only one study, and for other cities, none exist. In theory, transportation planning raises such issues as land-use patterns, economic activities, and spatial relationships employing the mathematical tools of location-al analysis, and transportation modelling in Korea without extensive modification is not relevant due to the high cost, low data availability, long preparation time, and impracticality.

In summary, difficulties of urban transportation planning in developing countries like Korea are distinctly different from planning in developed countries due to the following factors:

1) rapid population and economic growth rates
2) the coexistence of highly modernized (i.e., metro) and indigenous traditional (i.e., animal drawn cart) transportation modes
3) the coexistence of formal and informal sectors
4) a centralized public authority with great power
5) limited existence of urban transportation studies and difficulty in getting data.

These factors are intertwined and their relationship with urban development is a complex one. These factors contribute to segment modal subsystems in the urban transportation system. There appears to be an integrated situation in planning; the three factors -- technological change, institutional environment, and economic growth -- are so intertwined that it is impossible to talk merely in terms of the effect of one on the others. Policies set up by the institutional environment of a city requiring economic expansion have been reflected in the particular forms of technology through which the policy has been achieved.

Given the situations in the large metropolitan areas of developing countries with spontaneous squatter settlements, the need for para-transit and improved non-motorized transport services must be examined carefully. Evaluation of these potential technological options as a solution to the urban transportation problem must have its examination and priorities individually tailored to the specific environmental, political, social, and economic status of each local situation.

Given the current interests in modern mass transit as a popular concept of policy-makers in developing countries, a re-examination of some of the prevailing technologies in public passenger transportation is warranted. "Perhaps no aspect of urban transportation planning has been talked about so often but examined so poorly as the cost of providing comparable urban transport services by different kinds of technologies."22

The improved public transportation system does not guarantee a success-
ful solution to transportation problems. The evaluation of the existing and potential transportation technologies for a wise choice of solution needs a well-established set of criteria. The identification of the criteria which will entail appropriateness of a transportation technology is a rational process of selecting transportation technology and forming a strategy. The following section discusses criteria for an appropriate transportation technology.

2.3.1 Criteria for Transportation Technology

Assessing appropriateness according to the three questions, what is to be developed; how is it to be developed; and for whom is it to be developed (see page 3) suggests that there is no transportation technology which is universally appropriate. However, one transportation technology may be better than another in a given situation. The following set of criteria is described to specify what transportation technology would be appropriate under what circumstances.

2.3.1.1 Technical Criteria

A) **Flexibility and ability to use existing facilities.** The technology should be capable of expansion in small increments in response to demand. The technology should make the most intensive possible use of physical capital and transportation infrastructure, especially that already existing. Ability to adapt to difficult topography and settlement patterns without disrupting the existing settlement unduely is an important consideration.

B) **Power source and resource requirements.** It is important to consider whether the power and resources employed are renewable or non-renewable (i.e., petroleum) and the local availability of these resources (i.e., labor skill requirements and capital resources for manufacturing, maintaining, and operating). The scarcity of capital resources has been an important
factor in the lack of transportation service provided to squatter communities. Even when a government has the will to provide infrastructure, if the only means of doing so is to import technology, the project can be prohibitively costly from a balance of payments point of view. In such a situation, local labor-intensive technologies should be considered, the latter having the advantage of being labor absorptive as well.

2.3.1.2 Economic Criteria

a) Affordability to the user. The initial investment and operating costs should be compatible with the economic resources of the users. The economic criteria comprise directives of an economic character that must be satisfied before an investment can be made, operations maintained or transportation services altered. Also, financing and subsidy arrangements can be within this category when users cannot enjoy the technology within their resource.

b) Employment generation for national economies. Many technologies have been unable to tap into the substantial pools of under- and unemployed labor. The reason is that to do so usually require far more organization and social discipline than is generally available. This labor pool is and can be enormously productive, ingenious, and resourceful to national economies of developing countries.

2.3.1.3 Institutional Criteria

a) Scale of organization. The operating scale of the technology should be appropriate to the needs of the situation. For example, the needs of the individual household may be met with a different technological mix than those of the city. In order to develop a strategy for a transportation technology at a scale larger than the individual household some level of organization and mutual cooperation is necessary. If the community is not
socially and politically organized it may be better to choose a technology by which each household is able to operate relatively independently of the decisions of its neighbors.

b) **Who controls the technology.** This can specify what kind of legal and institutional changes are necessary to introduce a new transportation technology or to build up an existing transportation mode (i.e., legalize an existing informal transportation mode). One cannot ignore the importance of some control over technologies relating directly to daily life. However, the loss of personal control and of convenience of access generally would be considered inappropriate.

2.3.1.4 Socio-Cultural and Environmental Criteria

a) The technology should be compatible with the local culture and religious practices. The technology should be capable of addressing social needs of the local situation. This would mean to organize and to achieve a social development goal with regard for the implications for the future choosing and using of a certain technology.

b) The technology should keep pollutants and unsightly conditions to a minimum. The technology should conceive non-renewable resources to the greatest extent practical in use of local renewable resources for manufacturing and maintaining of the technology, and use of local labor.

These various criteria will be in conflict to a lesser or greater degree. The first thing is defining for whom it is that transportation technologies are to be designed. This will be the subject matter for the next chapter. We will consider how the urban poor are distributed spatially in Seoul, what have been the major factors causing the distribution, and the importance and role of the transportation for the poor are discussed. This initially defined local situation (i.e., resource, capability, needs)
and community development goal will be interpreted in Chapter V. The examination of existing transportation technology in Seoul presented in the Chapter IV aims to be specific and to let readers be aware of constraints and opportunities for adaptation of an appropriate transportation technology in Korea. The criteria discussed in this section will be further refined for the description of technology characteristics and utilized for development of an alternative transportation technology as an answer to the question, what is to be developed.

The community based industry which is spun off from the proposed transportation technology is documented in Chapter VI to show how it is to be developed and integrated in Seoul.
CHAPTER III: URBAN LOW-INCOME AREA'S SPATIAL FORMATION
AND TRANSPORTATION

3.1 Introduction

Squatter settlements house Seoul's laborers, who contribute immeasurably to the workings of the city, especially to labor-intensive activities. Collection of night soil and garbage, and the transportation of goods by bicycles or back are examples. These activities are important particularly because they are essential to the maintenance of Seoul's living environment.

The fact that the squatter settlements contain a large segment of the city's population suggests that special consideration be given to the economic improvement of these communities. An economic assessment of these settlements should be an essential component of a policy towards assisting squatters. My previous studies indicate that the improvement of access to transportation and provision of water-supply, sewers, and better road access will have a greater beneficial impact on the economics and environment of squatter settlements than the expansion of lot sizes.

What follows are my observations of Seoul's squatter settlements in general:

Almost all houses in the squatter settlements are single-story dwellings. Most have one or two rooms plus a cooking lean-to built against an exterior wall. The quality of construction varies greatly. Many are rudimentary shacks of scrap materials. Many others are two- to three-room, solidly constructed cement-block buildings with roofing of asbestos tile or even of the red clay tile used on most of Seoul's smaller legal
buildings.

Most larger and more visible settlements are of two types: flatland/stream areas and mountain areas. The flatland/stream areas generally are dilapidated single or double lines of shanties, although they may include a few well-built houses. The mountain areas vary. New areas, often located at the tops of mountains, look raw and poor. Older settlements are predominantly small cement-block houses, often with red tile roofs and sometimes gaily painted. Households with a bit more space and money prefer to enclose their houses and tiny patios with high walls.

Virtually all settlements have communal water taps and electric lines. Almost all houses in the squatter settlements have no indoor plumbing. In well-developed areas, each house has its own latrine; in many settlements, several households or a small segment of the settlement share a latrine. Some of the older, larger, and better developed areas have paved main roads and bus service. In most, however, roads are unpaved and too narrow to admit motor vehicles. Therefore, fire protection is a serious problem, particularly in settlements where many of the houses have wood and tar paper or canvas roofs.

3.2 Empirical Studies in Seoul

Concerning the empirical evidence of the problem and needs of transportation for the urban poor, several variables were selected from the sample survey to show patterns of transformation of urban poor communities, indices of physical and economic differentiation between types of settlements, and locational variables having to do with home to work travel patterns.

First, I will address the dynamics of low-income community formation
in the city from an historical perspective then relate them to the bodies of theories in order to justify my grouping of the communities and their socio-economic situation, by examining the critical variables of job location of the main supporter and the method of transportation to reach his job.

Following are two major findings of the survey:

(1) The better developed mountain areas showed relatively high home-to-work distances due to their economic/occupational status and settlement stability. However, given the conditions of spatial proximity, these home-to-work patterns would tend to increase toward the center city areas. The better developed households, while being closer to labor markets, would have a greater flexibility of home to work choices given their higher occupational status. The same holds for central flatland/stream areas in relation to peripheral flatland/stream areas.

(2) The more peripheral areas, poorer in terms of income/occupational status and exhibiting higher irregularity of employment are forced to rely more heavily on jobs inside the community. Thus, better developed areas have greater latitude of choice regarding work location, while poorer areas at the periphery exist under more severe spatial constraints, and are forced to spend more on transportation cost in relation to their income than the other areas.

An examination of the relative importance of transportation expenditures stratified by location and topography reveals the inequalities in transportation costs relative to household incomes. Thus expenditures on transportation were forced to be higher in proportion to their income among the poorer peripheral areas than the better developed areas.

Before going any further, it is important to define transportation
demand for the urban poor, so as to gain a clearer idea of its characteristics. According to F. Barreto and R. Gilbert, the demand is understood as the set of necessities which a specific population considers indispensable for an urban life compatible with its aspirations.\textsuperscript{2} This concept of needs places the accent on the aspirations of the community and underlines the importance of analyzing the demand formation process. Within the demand side for urban transportation, the variables stated above are essential in establishing two major distinctions with respect to the formation of demand. The first relates to the income structure, and the other to the actual supply in the light of its patterns. Taking this view, potential demand is converted into effective demand according to the population's payment capacity, so that the low-income households have little chance of seeing more than a minimal part of their potential demand satisfied.

3.2.1 Dynamics of Low-Income Community Formation

For the purposes of analysis, the nine (later eleven) Gu districts were divided into two geographic groups.\textsuperscript{*} The first group or inner Gu districts are the four most centrally located and defined the central business district within a five kilometer radius of the city center. The remaining five (later seven) outer Gu districts extend from the central area to the administrative boundaries of the city, roughly 15 kilometers in radius. According to the Seoul Statistical Yearbook: 1975,\textsuperscript{3} the concentration of land in the inner Gus occupies a small percentage of the total city area; only 7.1\% as compared to 92.9\% in the outer Gus. However, densities in the inner Gus are 2.2 times higher or 56,725 persons per square kilometer as compared to 25,612 persons in the outlying Gus.

\textsuperscript{*} At the time of my field survey Gwan Ak Gu was a part of Yung Dung Po Gu and Gang Nam Gu was a part of Sung Dong Gu.
Looking at the overall distribution of low-income community formation according to the year of first settlement as shown in Table 3.1, for the city at large the greatest number of squatter (low-income community) formations occurred before 1945. Thus, approximately one third of all Dongs experienced low-income communities (squatters) prior to the end of the Japanese colonial administration in Seoul. After 1945 a general tapering off in new settlements occurred until the early 1960's when a substantial increase in new low-income community formation began. This stemmed in large part from the first large waves of rural to urban migration that occurred during that period roughly concurrent to the end of the First National Five Year Development Plan. Up to 1970, poor community formation began to fall off, probably due to consolidation and growth of areas already in existence. Since 1970 the population in the city is beginning to level off, and industrialization of the nation has reached a peak. As Turner put it "as

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Inner Gus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chong No Gu</td>
<td>15</td>
<td>2</td>
<td>6</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Choong Gu</td>
<td>0</td>
<td>7</td>
<td>7</td>
<td>4</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Ma Po Gu</td>
<td>4</td>
<td>9</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Yong San Gu</td>
<td>12</td>
<td>4</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Subtotal</td>
<td>31</td>
<td>22</td>
<td>17</td>
<td>7</td>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>

| Outer Gus               |             |           |           |           |           |           |
| Dong Dae Mun Gu         | 8           | 10        | 8         | 5         | 2         | 1         |
| Sung Dong Gu            | 17          | 6         | 6         | 3         | 7         | 5         |
| Sung Buk Gu             | 8           | 5         | 5         | 1         | 20        | 6         |
| Suh Dae Mun Gu          | 8           | 9         | 4         | 8         | 9         | 3         |
| Yung Dung Po Gu         | 2           | 5         | 8         | 8         | 12        | 5         |
| Subtotal                | 43          | 35        | 31        | 25        | 50        | 20        |

Total: 74 57 48 32 52 24

Source: Gu Office Records, Seoul Municipal Government, 1973
Figure 3.1: Distribution of Gu Administrative Districts: Seoul

A. Inner Gus

1. Chong No Gu
2. Choong Gu
3. Ma Po Gu
4. Yong San Gu

B. Outer Gus

5. Dong Dae Mun Gu
6. Sung Dong Gu
7. Sung Buk Gu
8. Suh Dae Mun Gu
9. Yung Dung Po Gu
10. Gwan Ak Gu
11. Gang Nam Gu
national productivity and personal incomes rise and as national institutions develop — especially those providing credit and social security — the pressures for squatting naturally decrease.\(^5\) The proportion of migrants in Seoul is appreciably less and is dropping. The poorest are now no longer so poor as they were ten years ago. The inner ring-low-income communities that abounded in Seoul a generation ago are fewer and no longer provide cheap, temporary accommodations for the very poor. It seems that the squatter settlements that originally housed the poorest, along with the old inner city tenements, have become rather stable lower-middle-income communities. Looking at the spatial distribution of communities, inner Gus showed generally earlier formations. Up to 1954, in the period immediately subsequent to the Korean War, the inner Gus still experienced most of the low-income community formations. Most of the settlements in the outer Gus during that period were located along the fringe of mountain areas that surround the central city and maintain a relative proximity to the city center. Thus, although located in the outer Gus, these areas nevertheless were still very strongly oriented toward the city center.

Subsequent to 1954, however, the rate of new settlement formations in the inner Gus tell down while the outer Gus experienced roughly 2.7 times as many squatter area formations as the inner Gus. This suggests that, subsequent to the Korean War, and during the post-war reconstruction period, up to 1970, the majority of squatter development occurred in areas peripheral to the central city. Central areas experienced no major additions after that period. This was most likely due to the decreasing availability of marginal lands in inner city areas.

Thus, given the heavy concentration of markets, as well as industrial and commercial activities in the central business regions, the initial
patterns of low-income community formation in the city were largely responses to the location of industrial and commercial labor markets located in the inner city regions. For example, Chong No Gu, the most centrally located Gu with respect to industrial and commercial development, already experienced most of its squatter formations before 1945 and by the end of the Korean War. Mapo Gu and Yong San Gu in the western and southern portion of the city, moreover, had also experienced most of their squatter formations by the end of the Korean War. Both of these areas were the centers of major commercial and industrial development in the center of the city. In terms of low-income community formation, therefore, as judged by the year of first settlement, the evidence shows that settlement dynamics initially favored heavy concentration in central city areas with high accessibility to employment and industrial centers.

In addition to the analysis based on the year of first reported settlement in each Gu, an examination of aggregate increases over time can also be useful in explaining not only where the first urban poor settlements occurred but also their relative rates of growth. Looking at the rates of squatter increases on an aggregate basis in Table 3.2 from 1966 to 1970 (the only years for which data are available), it is apparent that net growth rates contrasted markedly between the inner and peripheral Gус. During that time, settlements in inner Gус actually fell by 0.2% while growth in outer Gус radically increased by 45%. In terms of total new units appearances (not including removals) inner Gус experienced a total of 15,965 new appearances during the four year period while outer Gус experienced 124,631 new squatter unit appearances or roughly 7.8 times that of the inner Gус. Thus by 1970, settlement in the inner Gус had more or less stabilized while growth was proceeding at a phenomenal rate in the peripheral areas.
### Table 3.2: Increase of Squatter Units by Gu (1966-1970)

<table>
<thead>
<tr>
<th>Administrative District</th>
<th>Existing Units (1966)</th>
<th>% of Total Existing Unit (66)</th>
<th>% Total Appearance Unit New Unit Existing</th>
<th>Removals</th>
<th>Total New Unit</th>
<th>% Unit Increased (A-B)</th>
<th>Existing Units (1970)</th>
<th>% of Total Units (70)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inner Gus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chong No Gu</td>
<td>4117</td>
<td>3.0</td>
<td>2287</td>
<td>55.6</td>
<td>2842</td>
<td>-555 -13.5</td>
<td>3562</td>
<td>1.9</td>
</tr>
<tr>
<td>Choong Gu</td>
<td>2105</td>
<td>1.5</td>
<td>1165</td>
<td>55.3</td>
<td>1783</td>
<td>-618 -29.4</td>
<td>1487</td>
<td>0.8</td>
</tr>
<tr>
<td>Ma Po Gu</td>
<td>8452</td>
<td>6.2</td>
<td>5349</td>
<td>63.3</td>
<td>4923</td>
<td>426 5.1</td>
<td>8878</td>
<td>4.7</td>
</tr>
<tr>
<td>Yong San Gu</td>
<td>8787</td>
<td>6.4</td>
<td>7164</td>
<td>81.5</td>
<td>6468</td>
<td>696 7.9</td>
<td>9483</td>
<td>5.0</td>
</tr>
<tr>
<td>Subtotal</td>
<td>23,461</td>
<td>17.1</td>
<td>15,965</td>
<td>68.0</td>
<td>16,016</td>
<td>-51 -0.2</td>
<td>23,410</td>
<td>12.4</td>
</tr>
<tr>
<td>Outer Gus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dong Dae Mun Gu</td>
<td>16,129</td>
<td>11.8</td>
<td>22,615</td>
<td>140.2</td>
<td>10211</td>
<td>13,404 76.9</td>
<td>28,533</td>
<td>15.2</td>
</tr>
<tr>
<td>Sung Dong Gu</td>
<td>24,884</td>
<td>18.2</td>
<td>16,385</td>
<td>65.8</td>
<td>9394</td>
<td>6,990 28.1</td>
<td>31,874</td>
<td>17.0</td>
</tr>
<tr>
<td>Sung Buk Gu</td>
<td>23,641</td>
<td>17.3</td>
<td>24,085</td>
<td>101.9</td>
<td>12753</td>
<td>11,332 47.9</td>
<td>34,903</td>
<td>18.6</td>
</tr>
<tr>
<td>Suh Dae Mun Gu</td>
<td>29.525</td>
<td>21.6</td>
<td>28,571</td>
<td>96.8</td>
<td>24890</td>
<td>3,682 12.5</td>
<td>33,207</td>
<td>17.7</td>
</tr>
<tr>
<td>Yung Dung Po Gu</td>
<td>19,010</td>
<td>14.0</td>
<td>32,975</td>
<td>173.5</td>
<td>16428</td>
<td>16,547 87.0</td>
<td>35,557</td>
<td>13.1</td>
</tr>
<tr>
<td>Subtotal</td>
<td>113,189</td>
<td>82.9</td>
<td>124,631</td>
<td>110.0</td>
<td>73,676</td>
<td>50,855 45.0</td>
<td>164,144</td>
<td>87.6</td>
</tr>
<tr>
<td>Total</td>
<td>136,650</td>
<td>100</td>
<td>140,596</td>
<td>102.9</td>
<td>89,692</td>
<td>50,904 37.2</td>
<td>187,554</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Housing Improvement Section, Seoul Municipal Government
As is also evident from the table, government removal policies were already exercising a considerable influence on the pattern of the settlement formation. During the four year period, a total of 89,692 units were removed by the government. Although data does not exist that specifically pinpoints removals and settlements in other areas as a result of dislocation it is evident that settlement formation throughout the city was significantly affected by government policies, and that contributed probably as much to the dispersion of new settlements to the periphery as new migration.

Hence, in regard to the total spatial pattern of settlement, it is apparent that: (1) initial settlement began and reached earlier consolidation primarily in the inner areas of the city, (2) subsequent settlement diffused outward over time toward the periphery, and (3) government policy appeared to have played a major role in the dispersion of poor settlements.

Before beginning a detailed examination on a settlement-by-settlement basis, it will be necessary to examine another important factor, that of topography. Topographic complexity in Seoul has allowed a wide range of marginal lands close to the city center suitable for squatter settlement. This has led to enormous concentrations of inner city squatter development, especially on mountainsides and streams. Mountainside areas in this regard, are unique, in that, in addition to possessing the benefits of locational proximity to center city labor markets, they are not under the same competing pressures from other urban land uses as flatland areas and therefore offer greater and more secure opportunities for long term consolidation. This capacity to accommodate higher concentrations of large inner city settlements has great significance in view of the higher access to city functions and the greater opportunities for consolidation in the city precincts that it allows.
An examination of Table 3.3 reveals that as of January 1972, 87,500 units of the total poor population of Seoul were to be found in Dong's predominantly mountainous character. Streamside areas were the second highest with 41,698 of the total housing units while flatland areas were next with 27,629 units. Thus, initially it can be seen that mountainside areas constituted the most predominant form of poor settlement in Seoul.

3.3 Typology of Communities

3.3.1 Survey Area Descriptions

In this section I will describe in terms of their area groupings, the nine areas in which the survey was carried out. Before getting into the actual findings, I will attempt a detailed description of the nine areas with maps and photographs in order to orient the reader to the more apparent physical differences to be found in an initial overview of the range of squatter area types. In this section aerial maps are shown of the nine squatter areas delineating the boundaries of the community and the actual areas in which the surveys were conducted. Aerial photographs (see Figures B.1 to B.4), on the other hand, will be used to illustrate the typical characteristics of each of four area groups. (Maps and aerial photographs were obtained from the Aerial Mapping Bureau of the Seoul City Hall. Accuracy of the maps is estimated to be high.)

The nine areas were selected by the following steps:

1) The official Dong registration records in the prospective survey areas were studied.

2) The prospective survey areas were visited by a staff member of the study for confirmation of the geographical locations and for designing the schedule for the field survey.
<table>
<thead>
<tr>
<th>Administrative District</th>
<th>Area Topography by units</th>
<th>Total Units</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mountainside</td>
<td>Flatland</td>
</tr>
<tr>
<td><strong>Inner Gus</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chong No Gu</td>
<td>2584</td>
<td>345</td>
</tr>
<tr>
<td>Choong Gu</td>
<td>159</td>
<td>728</td>
</tr>
<tr>
<td>Ma Po Gu</td>
<td>5269</td>
<td>1208</td>
</tr>
<tr>
<td>Yong San Gu</td>
<td>3772</td>
<td>1683</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td>11784</td>
<td>3964</td>
</tr>
<tr>
<td><strong>Outer Gus</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dong Dae Mun Gu</td>
<td>7368</td>
<td>2006</td>
</tr>
<tr>
<td>Sung Don Gu</td>
<td>18242</td>
<td>8099</td>
</tr>
<tr>
<td>Sung Buk Gu</td>
<td>20411</td>
<td>3229</td>
</tr>
<tr>
<td>Suh Dae Mun Gu</td>
<td>18912</td>
<td>5235</td>
</tr>
<tr>
<td>Yung Dung Po Gu</td>
<td>10983</td>
<td>9086</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td>75716</td>
<td>23665</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>87500</td>
<td>87629</td>
</tr>
</tbody>
</table>

Source: Compiled from Gu office records and Dong office interviews, Seoul Municipal Government
Figure 3.2 Survey Areas in Seoul

Group I: Central City Mountain Areas
1. Sang Do Dong
2. Ok Su Dong

Group II: Peripheral Mountain Areas
3. Hyun Jeo Dong
4. Hong Eun Dong
5. Su Saek Dong

Group III: Central City Flatland/Streamside Areas
6. Choong Wha Dong
7. Tab Sib Ki Dong

Group IV: Peripheral Flatland/Streamside Areas
8. Yang Pyung Dong
9. Mang Won Dong
As a result, two areas of central city mountain areas, three areas of peripheral mountain areas, two areas of central city flatland/stream areas, and two of peripheral flatland/stream sites were chosen for the field survey.

The survey areas are stratified with respect to topography and location in the city and grouped as follows:

A) Group I: Central City Mountain Areas
   1. Sang Do Dong
   2. Ok Su Dong

B) Group II: Peripheral Mountain Areas
   3. Hyun Jeo Dong
   4. Hong Eun Dong
   5. Su Saek Dong

C) Group III: Central City Flatland/Stream Areas
   6. Choong Wha Dong
   7. Tab Sib Ri Dong

D) Group IV: Peripheral Flatland/Stream Areas
   8. Yang Pyung Dong
   9. Mang Won Dong

3.3.1.1 Group I: Central City Mountain Areas

As mentioned in the previous part, the two areas in Group I exhibit the highest physical development. Detailed characteristics of each area are as follows:

1. Sang Do Dong

Because of its location in Yung Dung Po, south of the Han River, Sang Do Dong exhibits slightly dissimilar characteristics from Ok Su Dong. However, in terms of general overall physical status it is one of the most highly developed areas, exhibiting qualities not unlike most middle class
residential areas. In terms of its relationship to the central business
district of Yung Dung Po, it is similar to Ok Su Dong.

Sang Do Dong was first established during the April 19th Revolution
in 1961 by North Korean War refugees seeking a separate settlement of their
own. Because of the political confusion at the time, this area received
tacit government approval to remain, and has since become a very substantial
residential area. Located on the outskirts of Yung Dung Po just south of
the Han River it occupies a hillside surrounded by concentrated market and
residential activities below.*

* In the maps, the actual survey area is outlined by heavy dotted lines.
In mountainside areas the light dotted lines indicate the ridge tops.

Scale: 0 (m)
Chung Ang University is also located here just on the border of the squatter area. There are two major market facilities in the area, one in Sang Do Dong and one in the neighboring area of Hok Seuk Dong. However, because the former serves primarily the wealthier middle class residents of the area, most squatters use the latter market. Residents in this area apparently are extremely wealthy compared to residents of other areas. Some homes had private gardens and many had television antennas -- both visible signs of a much higher economic status than is typical of squatter housing. Moreover, the high quality of housing was evident with most houses constructed of clay brick and having tile roofs.

2. Ok Su Dong

Ok Su Dong represents a portion of one of the largest mountainside squatter concentrations in Seoul. With the neighboring areas of Kum Ho Dong and Yak Su Dong, it covers several square kilometers of mountains and valleys in the south central perimeter of the city.

Ok Su Dong was first settled after the Korean War in the early 1950's and has since undergone heavy settlement consolidation. Housing characteristics are very good with most of the houses on the lower slopes of the hills built of concrete block and having tile roofs, although in quality they are not as high as the houses in Sang Do Dong, which in some respects is a more integral and well defined area. Ok Su Dong represents an enormous but rather ill-defined region in which many thousands of houses are clustered together on the landscape. On the higher slopes many homes of lower quality built of wood or scavenged materials with canvas roofs are scattered among the better quality homes.

Commercial facilities in the region are rather extensive. Being separated from the rest of the city by a high mountain ridge, development
has been relatively unhampered since the Korean War, and in much of the lower regions intensive market and commercial areas have developed, to the degree that, if judged by physical appearance, it would be no different from many downtown situations observable in other parts of the city. Because of the better economic conditions in the lower portions of the region, squatters in some instances were able to purchase their land from the government, effecting very high levels of development and commercial activity. Moreover, industrial facilities are common in this region and many employ residents in the immediate area. For those who work in the city, there are municipal bus lines serving the area with their main terminals located here. Thus, although somewhat isolated from the rest of the city, because of its tremendous scale, this area has developed a somewhat independent existence of its own and in some ways can be considered a small city unto itself.

Figure 3.4: Ok Su Dong
3.3.1.2 Group II: Peripheral Mountain Areas

This group, although composed of hillside areas, exhibits slightly different characteristics. The three areas of this group are Hyun Jeo Dong, Hong Eun Dong, and Su Saek Dong. They are all located on the north-western fringe of the city in the relatively new developing areas of Suh Dae Mun Gu. In terms of location, Hyun Jeo Dong is closest to the central activities of western Seoul, while Hong Eun Dong and Su Saek Dong are in the middle and outer peripheries respectively. All three are relatively newer settlements compared to the previously described areas and show very high densities and generally poorer physical conditions. Su Saek Dong was most heavily settled area around 1969, when major government housing relocations took place. Many familier moved there from previous locations in the central city. As a consequence of the government housing relocation policy, many families moved out from the previous locations in the central city. However, it is important to note that such pattern of movement was spontaneous.

3. Hyun Jeo Dong

Located along the main artery leading to northwest Seoul, Hyun Jeo Dong is situated on a steep rocky cliffside surrounded on the lower fringes by middle income housing. Generally similar but somewhat poorer in condition than Ok Su Dong, this area is highly overcrowded and has poor physical facilities. Most of the houses have no electricity. Water is only available in the lower sections of the hill making it necessary for those living above have to carry their water from below. In terms of market facilities, because of the higher isolation of this area, food stores and other commercial facilities are commong although most major purchases are made at the main market in Suh Dae Mun Gu (Yong Chun), approximately fifteen minutes walking distance from the area. Small scale cottage industries are
frequently observed such as the manufacture of paper envelopes, the weaving of rope and other small handicraft businesses. Because of the steep gradient in this area, access conditions are hazardous and particularly dangerous in times of rain or snow. Because of the lack of water, sanitary conditions are generally bad and garbage is often seen accumulating in open drains. However, its close location to public transportation facilities and neighboring markets makes the area important to its residents, who expressed strong concerns about remaining there and improving their existing conditions.

Figure 3.5: Hyun Jeo Dong

4. Hong Eun Dong

Located on the same artery as Hyun Jeo Dong but farther north, Hong Eun Dong is another area which has experienced the larger part of its settlement within recent years. However, unlike Hyun Jeo Dong, it is located within a major suburban residential and commercial area. Thus, it is surrounded by newer middle and upper income housing as well as intensive commercial developments at the foot of the hill. As seen on the map, although the major concentration is around the commercial center on the southern slopes of the hill, there are also large concentrations in the small valleys and hills directly north. General physical conditions are
also quite poor as the level of density is extremely high and water facilities are unavailable on the upper hillside. Because of the intense commercial activities in the market place at the base of the hill, little commercial activity is seen within the area and most major shopping for food and household items is carried out at the foot of the hill. As in the former area, it is also well situated to public transportation systems and is readily accessible to downtown areas.

Figure 3.6: Hong Eun Dong

5. Su Saek Dong

Of slightly different character than the two former areas, Su Saek Dong represents a peripheral mountainside area that received most of its major settlement within the past few years as a result of government removals in
central city areas. Conditions are also somewhat poorer with some overcrowding and generally poorer housing, although because of its relatively recent status, density levels are lower and open spaces around homes are more apparent. However, physical conditions do remain relatively poor. One particular factor is its proximity to a military base which has stimulated significant small scale commercial activity in the immediate area. Also many factories are here because of the major railroad depot nearby, and they employ large numbers of community residents. Access to the central city is relatively easy by public transportation.

Figure 3.7: Su Saek Dong
3.3.1.3 Group III: Central City Flatland/Stream Areas

The third group is composed of streamside and flatland areas found directly within the city center. These areas include Choong Wha Dong and Tab Sib Ri Dong. They are located in the parts of Dong Dae Mun Gu and Sung Buk Gu that adjoin the eastern fringes of the city center and comprise the major industrial and commercial sections of the city. Hence, these areas are characterized by high densities, and poor physical conditions. However, because of their desirable locations, physical conditions of the dwellings are less important than their higher economic utilization for rental and cottage industries. Hence the consolidation and stability evident in the mountainside areas are not apparent in these areas where transiency is much more the case.

6. Choong Wha Dong

Situated in the northeastern periphery of the central city region, Choong Wha Dong can be seen as representative of similar areas that exist along the many tributaries that lead southward into the Han River. This particular area was selected for its proximity to the commercial and business functions along the main road that connects into the central city. Despite the poor physical conditions, this area exhibits very high commercial and business activity.

Because of the particular physical configuration of the stream the settlement patterns are generally very well defined with the main road along the top of the bank usually serving as a very active commercial strip lined with restaurants, wine shops and small stores. Hence, the social interaction is observable. Moreover, because of the configuration of the smaller alley ways that lead off perpendicularly from the main road, small neighborhood clusters are built around houses that open onto common
alley ways. Thus the spatial characteristics of the areas lend themselves very well to intensive social interaction as compared to the more complex and less structured mountainside settlements. In addition, heavy public movement along the main roadway is important in stimulating the very intense forms of commercial activity in these areas.

Figure 3.8: Choong Wha Dong

7. Tab Sib Ri Dong

This area is adjacent to very intensive commercial and industrial activity, and in turn contains much activity itself. Hence, cottage industries abound which find their retail outlets in the surrounding market areas. Also, there are many small factories adjoining the area utilizing labor from the community. Not surprisingly, housing conditions are extremely poor. Secondary uses of housing, high rentals and transiency of settlement make settlement conditions much less stable than in other areas.
On the other hand, because of its central location, services are very good.

Figure 3.9: Tab Sib Ri Dong

3.3.1.4 Group IV: Peripheral Flatland/Stream Areas

The fourth group is composed of peripheral settlements of generally much poorer physical condition. They consist more of recently settled migrant households or those removed from other areas in the city. Settlement consolidation is very low, and housing conditions are generally poorer than many other areas, except central city streamside areas. Moreover, because these areas are farther away from the central city, there are even fewer economic opportunities available in the vicinity. However, by the same token, the cost of living is lower and residential stability is higher than in central city areas.

8. Yang Pyung Dong

Although generally similar in physical conditions to other peripheral areas Yang Pyung Dong is slightly better off because of its location close to the intensive industrial activity in Yung Dung Po Gu. However, housing conditions are very bad with severe overcrowding sometimes reaching up to three and four families per house. Utilities in these areas are also poor with little electricity and piped water. As is true with most stream oriented areas, there is also the constant danger of seasonal floods during
the late spring and early summer, which often destroy many homes.

Figure 3.10: Yang Pyung Dong

9. Mang Won Dong

Exhibiting somewhat similar conditions to Yang Pyung Dong, Mang Won Dong is located on the southern periphery of Ma Po Gu very close to the Han River. Constituting a dense and very long linear settlement along the levees adjacent to the Han River, this area exhibits rather poor conditions. It was heavily settled in recent years due to government removals. It is also rather isolated although the formerly privately owned paddy lands in the vicinity are gradually being developed for middle income housing. In the map, the areal characteristics of Mang Won Dong can be seen in terms of the Han River to the west and open rice paddy fields to the east. As this land is privately owned, settlement is forbidden, and houses generally cluster in a linear fashion along the bank. Recent developments in these areas generally show a spread of middle income residential neighborhoods in the former paddy areas. Much more peripheral in location and isolated from central city functions, Mang Won Dong's commercial activities are limited and residents generally work either within the community at small informal tasks or in the surrounding vicinity. Also as in other streambank areas of this nature, sanitary conditions are extremely poor. There are
no facilities for removing wastes. Consequently in many of the lower areas large pools of stagnant water are visible, constituting a great health hazard.

Figure 3.11: Mang Won Dong

3.3.2 Survey Results

Many characteristics of poor urban communities are also characteristic of other areas in the city, so it is difficult to make clear sociological distinctions between one type and another. The variation and overlap are so extensive that one needs to develop schemes of interpretation which can reduce the mass of information to graspable order. Moreover, any attempt to define the process of social mobility and its implications for spatial form and transportation problems and needs should select some set of key variables that would affect the process of linkages of low-income household settlements with the rest of the urban system within the overall
context of socio-economic assimilation. In order to do that, the following variables were selected out of the survey sample which I conducted summers of 1974 and 1975 in Seoul:

(1) Set of variables in spatial diffusion and consolidation:
   * Length of stay of the family in Seoul
   * Number of moves in the city before settlement in the present area
   * Length of residence in the present area
   * Ownership status of the house

(2) Set of variables for settlement differentiation by physical factors
   * Rooms and facilities in the house
   * Total floor space of the house
   * Construction materials of the house
   * Present estimated value of the house
   * Improvements to the house

(3) Set of variables of the relation of transportation to the economic structure
   * Total population by occupational status by area type
   * Occupation of the main supporter
   * Monthly income of the main supporter
   * Employment stability of the main supporter
   * Location of job of main supporter
   * Transportation mode to reach job
   * Transportation costs as monthly expenditure

3.3.2.1 Demographic Characteristics of Population

The total sample squatter population of 9,833 persons exhibited a sex ratio (male/female) of 1.07, a dependent population ratio of 42.2 percent, and a productive age group ratio of 57.7 percent. Breakdown by the four
area groups shows that all area types are essentially similar, although some slight differences occur.

In relation to the population distribution curves for all groups (see Figures B.5 to B.8), all groups generally conformed to the overall characteristics of the total sample population configuration. All areas exhibited the same general predominance in the 30 to 40 age range for males and the 25 to 35 age range for females, a general reduction in the 20 to 30 age ranges for both sexes, and a high rate for children for both sexes in the 6 to 15 range, implying generally a younger nuclear family structure. However, slight variations in this pattern are evident in that older groups like central city mountain area tend to show more even curves with less distortions implying more developed family structures, while newer areas as in group II and IV (peripheral areas) show higher distortions in the middle ranges which imply a younger nuclear family structure. On the other hand more complex area such as in group III (central city flatland/streamside area), which contain older settlemtnts, but with high transiency of settlement, tend to be less clear, containing probably a mixture of older consolidated as well as newer, younger families. To a lesser degree group II

Table 3.4: Population Characteristics by Area Types

<table>
<thead>
<tr>
<th></th>
<th>Total Population</th>
<th>Total Households</th>
<th>Males</th>
<th>Females</th>
<th>Sex Ratio</th>
<th>Dependent Population</th>
<th>Productive Population (15-59 age group)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group I</td>
<td>2,262</td>
<td>421</td>
<td>1,166</td>
<td>1,096</td>
<td>1.06</td>
<td>40.7%</td>
<td>59.0%</td>
</tr>
<tr>
<td>Group II</td>
<td>2,418</td>
<td>461</td>
<td>1,227</td>
<td>1,191</td>
<td>1.03</td>
<td>43.9%</td>
<td>55.9%</td>
</tr>
<tr>
<td>Group III</td>
<td>2,754</td>
<td>531</td>
<td>1,394</td>
<td>1,360</td>
<td>1.02</td>
<td>41.6%</td>
<td>58.1%</td>
</tr>
<tr>
<td>Group IV</td>
<td>2,399</td>
<td>480</td>
<td>1,289</td>
<td>1,110</td>
<td>1.16</td>
<td>41.7%</td>
<td>58.0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>9,833</strong></td>
<td><strong>1,893</strong></td>
<td><strong>5,076</strong></td>
<td><strong>4,757</strong></td>
<td><strong>1.07</strong></td>
<td><strong>42.2%</strong></td>
<td><strong>57.7%</strong></td>
</tr>
</tbody>
</table>
(peripheral mountain area) should also be seen this way, as they generally represent established areas that received heavy settlement in more recent years due to pressure of migration and dislocations in central city areas.

3.3.2.2 Spatial Diffusion and Consolidation

After examining the variables in terms of overall spatial movement, the process appears to be as follows (see Tables B.5 to B.8):

(1) Mountain areas settle and gradually spread outward over time, the more central areas eventually converting to rental stock and the more peripheral areas continuing to maintain their original populations. Thus, entrance conditions are generally limited to peripheral areas on the basis of available lands for consolidated settlement. In this case, therefore, households are seen to settle initially on the fringes and either to remain there or move toward the center.

(2) Flatland areas both in the center and periphery become the primary entrance points for new migrants. Subsequent household mobility patterns are then possible in two different ways: (a) households from central flatland/stream areas would move either to central or peripheral mountain areas, although it appears that they would tend to move to the central areas given the differential rates of intra-urban migration experienced by central and peripheral mountain areas, and (b) households from peripheral flatland/stream areas would probably move to central city flatland/stream areas for which the evidence seems stronger.

(3) The presence of large pockets of land within the city begins to relieve the high pressure for consolidated settlement that would ordinarily be forced to the periphery if this land were unavailable. Moreover, because of higher levels of consolidation and development in these areas relative to the age of settlement, as well as because the older more
central areas begin to experience tenure conversion as original settlers move out, filtration of upwardly mobile households moves more toward these areas than to the periphery. A similar process, though under different conditions, occurs in flatland/stream areas. Consequently, what occurs is a process of settlement conversions with upwardly mobile households replacing original settlers in central mountain areas while peripheral mountain areas of more recent settlement remain stable over time with less intra-city migration moving into these areas. It would appear therefore, that topography is an essential variable in describing the process of urban squatter formation.

3.3.2.3 Settlement Differentiation by Physical Factors

If intra-city movement patterns do in fact result in more consolidated settlements in central city areas, then it could also be expected that observable differences would also emerge in terms of physical characteristics of the community. This section below will review results of the selected indices of physical development with respect to community types (see Tables B.9 to B.13).

Indices of housing quality as measured by the completeness of housing facility arrangements were divided into two categories: the first contains up to the basic multi-purpose sleeping room, kitchen, outdoor toilet and courtyard; and the second contains all of the basic house facilities with the addition of a traditional sitting room (maru). The difference between the two categories is that in traditional building styles, the sitting room generally becomes the nucleus for additional adjoining sleeping rooms and thus implies a larger house. In the former category, the sleeping room doubles also as a family room during the day and therefore implies a smaller and less developed house.
The result shows that housing quality is clearly stratified in terms of topography and location with mountainside areas showing higher proportions of houses in the second category and proportions of better developed houses decreasing with distance from the city center. Flatland/stream areas and more peripheral mountain areas show higher proportions for houses in the first category. Looking at the smallest basic poor urban house composed of one room and an adjoining cooking area, generally outside the house, there is a clear increase of this type of house with distance from the city center.

Housing quality was clearly higher in mountain areas with a declining gradient from the city center. Mountain areas consistently showed higher proportions of houses utilizing high quality construction materials in the second category and lower proportions of the materials in the second category than flatland/stream areas. On the other hand, an interesting difference arises when looking at flatland/stream areas. Although as a class they are lower in general housing quality than mountain areas, there appears to be an increasing quality gradient from the center of the city with central areas showing slightly lower quality housing materials than peripheral areas. This correlates with previous findings concerning the tenure structure of settlements where central city flatland/stream areas were seen as showing extremely high rates of transiency whereas more peripheral areas more stable tenure conditions with significant rates of recent initial settlement. Thus, in flatland/stream areas, high transiency of settlement appears to be correlated with generally more rudimentary and subsistence forms of housing. This is corroborated by the fact that these areas are also utilized more heavily for their locational characteristics rather than their levels of environmental amenities.
Moreover, mountain areas, while showing similar dynamics in terms of tenure structure with higher rates of rentals in central city areas showed a much more consolidated pattern of settlement and housing quality levels that consistently decreased with distance from the city center.

Seen as primarily an index of house expansion in terms of the addition of extra rooms, the tendency toward housing expansion appears to predominate in more centrally located mountain and flatland/stream areas. Hence, central city areas in both the mountain and flatland areas showed higher rates of housing expansion than more peripheral areas while the differences between the topographic types appeared to be insignificant.

In terms of the estimated value of the house, mountain areas were consistently higher than flatland/stream areas, while central city areas in both categories consistently showed higher values than more peripheral areas. Thus house values ranged from a high of $1,020.52 (400 won per dollar as of 1974) in the central city mountain areas to a low of $322.00 in the peripheral flatland/stream areas.

In summary therefore, evidence concerning the physical development of the community tend to reinforce the previous findings concerning the overall movements of squatters in the city. Conversion rates as measured by tenure structures and housing expansion were the highest in central mountain and flatland/stream areas with mountain areas showing a longer term residence pattern and more stable rental structure.

This is further corroborated by the levels of physical development found in the different settlements with indices of housing quality and density generally declining from the city center, and central areas experiencing higher levels of improvements and additions to the house, apparently linked to the higher rates of conversion to be found in these areas.
The one exception to this was in flatland/stream areas where the qualities of the construction materials used tended to be slightly lower in central city flatland areas. Seen in relation to the high rates of recent settlement in these areas and the high rates of rentals, this would imply that observable physical conditions in terms of quality of construction would be lower in areas of extremely high instability of tenure. However, keeping in mind that central city flatland/stream areas were also higher in terms of actual housing facilities as well as post-occupancy additions to the house, it appears that the kind of housing investment that occurs in those areas is more geared to maximizing rental profit than building stable equity. Thus, what might appear to be exceptionally poor conditions in the central city areas actually belies the true social function that these areas maintain as entrance points into the urban settlement system.

3.3.2.4 The Economic Structure of the Community

Thus far we have been able to establish the correlative patterns of physical development that both appear to coincide with the patterns of intra-city movement, and express spatially the pattern of socio-economic mobility experienced by squatter households.

In this section we will examine how these patterns of settlement differentiation and change express themselves in the economic structure of the community as measured by occupation, income and employment characteristics in order to examine the transportation mode choice of home to work relationships that result under the conditions of transportation needs and problems (see Tables B.14 to B.20).

Looking at the structure of occupations in the settlements, it is clear that patterns of occupational stratification correlate strongly with patterns of physical development. Mountain areas dominate in the white
collar occupations including professional, managerial and clerical occupations with a declining gradient from the center to the periphery. The same holds for skilled labor professions, either self-employed or employed. Moreover, commercial, unskilled labor and service occupations, all occupations that tend to be more informal and irregular, show an increase toward the periphery. Thus, there appeared to be a clear correlation between the level of development of the community and the kind of occupational structure to be found in it.

Flatland/stream areas showed similar trends with a decline in white collar occupation and an increase in unskilled and service occupations toward the periphery. The only exception was the high level of commercial occupations to be found in central areas, which can be seen as a direct response to the high concentration of market and commercial activities found in central city.

Examination of the income structure of these areas verifies the patterns of occupational stratification discussed above, in that monthly incomes are generally higher in mountain areas and show a declining gradient from the city center. Thus, in mountain settlements average monthly incomes ranged from a high of $55 in the central areas to $46 in the periphery, while in flatland/stream areas, incomes ranged from $47 in the center to $40 in the periphery. This provides clear evidence that higher incomes, occupational structures, and level of physical developmental cluster toward the center while poorer regions are pushed to the periphery.

In addition to occupational and income differentiation, indices of employment stability as measured by regularity or non-regularity of employment and the duration of the main supporter at his present job,
clearly indicate declining gradients from the city center with mountain areas higher than flatland/stream areas.

Thus, indices of economic mobility clearly show declining gradients from the city center with mountain areas generally higher than flatland/stream areas showed higher incomes than peripheral mountain areas. This also suggests that stability of tenure is not in fact related to income. As mentioned previously, it is in central mountain and flatland areas where tenure is in fact more heterogeneous and incomes higher than in more peripheral, and homogenous, areas although it should be kept in mind that different conditions attach to mountain and flatland/stream areas.

3.3.2.5 Transportation Factors Relating to the Economic Structure

Concerning the locational characteristics of home to work patterns, the first clear trend that one notices upon examination of the data is that mountain areas as a class show higher rates of employment outside the community and greater proportions of motorized transportation utilized to reach work. On the other hand, poorer flatland/stream areas show much higher rates for employment within the community as well as non-motorized forms of transportation to reach work, either through walking or working at home.

Given our previous analysis concerning the income and occupational stratification of communities, in terms of the utilization of spatial resources in the city, given the factor of topographic complexity two processes are seen to occur: (1) better developed innercity communities, composed of higher income and occupational mixes as well as reflecting higher levels of physical development, appear to command the greatest spatial resources in terms of location to labor markets, whereas poorer areas are placed in a much more disadvantageous position in relation to locational
amenities, and (2) given the higher occupational levels of central city areas the tendency is to reflect more heterogeneous home to work patterns with greater numbers of households finding jobs outside the community, while poorer peripheral areas, lacking the spatial resources of proximity to labor markets are forced to rely on the more meager resources of the community for economic support. The result is an under-utilization of locational resources in central areas and an under-utilization of labor resources in peripheral areas.

It is seen that poorer flatland/stream areas in general show a higher utilization of the environment for economic purposes than mountain areas. Thus, in general, it appears that higher income, occupational status tend to correlate with a lower use of the community and immediate environment for jobs and employment. However, the other trend revealed by the data and critical for our present analysis is the fact that, for both sets of areas, the importance of the neighborhood is highest in centrally located areas and declines with distance from the center of the city.

On the other hand, given the marginal differences between areas in terms of the locational resources available to them, the larger percentage of households in all communities continue to work outside their immediate community, either in their immediate environment or farther away. Thus transportation costs remain as a major expenditure item in the household budgets of most households. An examination of Table B.20 reveals the differential weights given to transportation expenditures in poor households stratified by location and topography. As can be seen in the table there is a clear tendency for transportation expenditures to increase with distance from the city center. Thus, relative to the lower incomes of more peripheral households the importance of transportation costs relative to
to other expenditures clearly increases, and it is apparent that poorer households on the periphery are forced to pay a greater portion of their incomes on transportation costs than better developed households in the central areas. On the other hand, it is also apparent that better developed areas are able to afford a greater latitude of consumption expenditures for the purposes of supporting a higher standard of living while being able to save on transportation costs. The fact that material consumption expenditures clearly declined while transportation expenditures increased toward the poorer communities on the periphery indicates the patterns of inequality generated by this type of spatial system.

3.3.2.6 Summary

Stability of tenure is related to income except in the inner city stream areas. Noticeable discrepancy occurs in flatland/streamside areas in central city which seem to show a rather erratic settlement and employment behavior, yet have higher economic standing than either the periphery mountain or the periphery flatland/stream areas.

A. Central City Mountain Areas:

(1) stability in rental structure
(2) outer community employment -- underutilization of location and use motorized transportation

**Economic factors:**  - higher living expenditures
  - employment stability
  - white color workers

**Physical factors:**  - housing quality is best among the squatter areas
  - expansion inclined
  - conversion rates to tenure is highest

**Spatial diffusion:**  - highest level of consolidation

B. Peripheral Mountain Areas:

(1) maintenance of original population with some indications of movement towards the center.
Economic factors: - poorer than flatland/streamside central city areas or mountain areas in central city

Physical factors: - houses are smaller and poor in quality

Spatial diffusion: - some were moved from the central city areas after government eradication

C. Central City Flatland/Streamside Areas:

(1) best utilization of location
(2) highest mobility inward and most transition settlement
(3) strongest indications of social and economic amelioration

Economic factors: - mostly employed in intracity commercial activity
                 - higher income than mountain periphery or flatland periphery

Physical factors: - houses are of lower quality
                 - expansion oriented

Spatial diffusion: - primary entrance points for newcomers with small families or better key money

D. Peripheral Flatland/Streamside Areas:

(1) inner community employment

Economic factors: - poorest expenditure
                 - inner community economic activity

Physical factors: - motorized transportation is hardly used
                 - lowest physical environment and quality

Spatial diffusion: - primary entrance points for new poorest or large family newcomers then migration to central city flatland/streamside areas or peripheral mountain areas.

Given our previous analysis concerning the income and occupational stratification of these areas, the immediate implication is that areas showing higher levels of income and occupational status will also show greater distance in home to work patterns. This is consistent given the spatial logic of occupational stratification where it might be expected that more formal white collar occupations would be located in the city proper outside the settlement, while more informal occupations such as vending, small scale
commercial establishments, manual labor and service occupations, all of which tend to be more irregular forms of work, would tend to be found more around the immediate environs of the community if not within the community itself. Skilled professions, on the other hand, to not have such clear spatial constraints. Jobs such as carpenters, electrical workers and other forms of work requiring moderate training and skill might tend to be found either outside or within the community. Thus, given the form of occupational stratification discussed above, there appears to be a correlation between occupational structure and the tendency to find work outside the community, in that, as social mobility increases, the community tends to be utilized less and less as a base for jobs and employment. In view of the fact that more central areas, commanding greater resources in terms of proximity to labor markets and higher incomes, do not utilize and reflect these advantages in a higher utilization of the community for economic purposes, the result is an underutilization of locational resources from a social point of view. On the other hand, it is also evident that poorer areas at the periphery in both mountain and flatland areas tend to show an increase in employment within the community. This would seem inconsistent given their greater distance from central city labor markets. If, however, seen in terms of the occupations stratification of these areas as well as the lower levels of income, it would appear that a greater percentage of households in poorer peripheral areas are being forced to exist on the poorer resources of peripheral areas distant from central city labor markets. The result in this case is an under-utilization of labor resources relative to the poorer locational conditions. Thus a form of "mismatch" is occurring with poorer peripheral areas characterized by lower and more informal occupations having to rely on poorer locational resources, while
better developed central areas, composed of generally higher occupational mixes, under-utilize the full resources available to them. The only exception to this trend appears in the most centrally located of the mountain areas where it is seen that utilization of the community for economic purposes tends to be higher. In this case, home to work patterns do appear to reflect directly the locational advantages of central city location, although significantly, not for the poorest of the squatters but in fact, for the most wealthy.

Thus, in terms of the utilization of spatial resources in the city, given the factors of topographic complexity and high rural to urban migration two processes are seen to occur: (1) better developed central areas, composed of higher income and occupational mixes as well as reflecting higher levels of physical development, appear to command the greatest spatial resources in terms of location to labor markets, whereas poorer areas are placed in a much more disadvantageous position in relation to locational amenities, and (2) given the higher occupational levels of central city areas the tendency is to reflect more heterogeneous home to work patterns with greater numbers of households finding jobs outside the community, while poorer peripheral areas, lacking the spatial resources of proximity to labor markets are forced to rely on the more meager resources of the community for economic support. The result is an under-utilization of locational resources in central areas and an under-utilization of labor resources in peripheral areas and dis-equilibrium in the structure of urban squatter settlements.

3.4 Importance and Role of Transportation Service

What is important to the urban poor concerning transportation in Seoul
differs from what is important to the urban poor in the industrialized countries. For example, comfort and high speed are secondary attributes in comparison to the availability of transportation services which they can afford. Thus home-to-work journey has a different pattern and creates demand for different service requirements based on squatters' jobs. A poor person involved in commercial activities needs to carry goods for sale. This person and shoppers of households require baggage-carrying capacity in the transportation service rather than time reliability. Where the urban poor live is of equal and at times greater importance to them than the conditions under which they live. Accessibility to job opportunities is at least as vital to the casual worker and the underemployed as it is to the regular employed low-income. More important still is the ability to search for and find employment and other income-earning opportunities—to the extent that they exist. In low-income communities, there are often more than one worker in one household, and family income is derived from a variety of jobs. Typically, the locations of these jobs within urban areas are also varied and include manufacturing, trade, the service sectors, domestic service and part-time irregular labor.

Since the issue of low-income community location involves the entire urban area and not merely a few sites, the severity of the transportation problem of the poor increases as city size gets larger. In Seoul with population 7.5 millions, the transportation problem for those persons on the fringe becomes acute. The cost of long bus trips, long walking, or bicycle riding efforts constrain access of the poor to employment. The poor live on the periphery and thus must travel long distances; they may not be able to afford daily work trips unless they can find employment at an intermediate location. Some are thus effectively shut off from employ-
ment in the city center; others walk up to two or three hours each way to work. Many opportunities for secondary earners may be ruled out. Efficient and diversified private "intermediate" for-hire transport system using modified jeeps or trucks can mitigate these problems somewhat. The emergence of the intermediate ready-made, for-hire transport (i.e., the jeepney in the Philippines, the silor and samlor in Thailand, the becak, bemo and jitney in Indonesia) could be considered as a spontaneous response to this need for transportation, yet these systems are more expensive than local bus transportation system for users.

Most opportunities for service jobs and other low-skill labor work are concentrated in the commercial center in Seoul. Figure 3.12 shows the location of commercial and industrial areas in Seoul. From the C.B.D., south and east corridors developed intermediate commercial areas as the overspill of economic activity is to a varying degree a natural consequence of growth. In this case jobs are created that relate to the needs of residents, and home industries develop in conjunction with new urban growth.

Partly as a result of these factors and government policies, the poor live in four concentric zones — inner city flatland/streamside traditional slums, inner city mountainside, an older ring of swuatter settlements, periphery mountainside, relatively new settlements, and urban fringe flatland/streamside, the new and poorest settlements. Nevertheless, high land prices and already high levels of crowding in more established low-income settlements often induce low-income families, particularly new arrivals, to settle at the growing periphery. Certainly, they are not always worse off in these locations, for despite the high cost of transportation they may be able to acquire less expensive housing than in more favored loca-
tions. To the extent that there are sufficient job opportunities near enough, as in the case of Yang Pyung Dong, this added transport expense is worthwhile.

If large numbers of people are housed at a given location their transport demands may be more easily met, with a beneficial impact on the operation of the transportation network. The benefits of concentration depend on the location of economic activity and the type of employment at these locations. However, a long term solution will usually involve the promotion of numerous decentralized employment centers to which commuting costs, by whatever means, can be kept within reach of the poor.

Figure 3.12: Location of the Survey Areas and Major Commercial and Industrial Districts in Seoul

- commercial district
- industrial district

1-9 survey areas
CHAPTER IV: Urban Transportation System in Seoul

4.1 Introduction

The goal for transportation planning is to maximize benefits for all individuals and for society. Each individual acts so that he encounters minimum inconvenience and cost. What is best for the individual is not always best for society as a whole. In such instances the individual must be influenced by society in a positive direction. The most efficient use of street space is achieved if each vehicle in some way is forced to carry its real total costs including indirect costs to other road users and to society.

In a relatively few years, if no actions are taken, urban quality will deteriorate significantly in Seoul as pointed out in Chapter II. The central street network is not able to meet projected rapid growth of car traffic (see Table B.2). Even with the construction of more roads, it will become more and more congested. More and more spaces will be filled by parked cars. The environment will be seriously damaged by pollution and noise. Accident rates may increase.

Non-motorized transportation and pedestrians will be the most endangered and will have difficulties crossing streets. The paradox of this situation is that the increase in the standard of living which brings increased car traffic will lead to decreased mobility for people. The price of this kind of development is damaged environment, accidents, and waste of time and money.

Seoul is facing an acute crisis in urban transportation requiring immediate action. An attractive, efficient public transportation system is necessary to provide transportation for the vast majority of people who cannot
afford private automobiles and to permit measures necessary to control and regulate car usage.

For low-income people, public transportation should serve following purposes:

1) Create greater freedom of choice (within acceptable limits) to live and work in preferred areas.
   
   (a) Provide the inhabitants of the periphery areas with possibilities to reach services and employment in Seoul.
   
   (b) Contribute to the prevention of concentrations of development where they are undesirable.

2) Make it possible to travel by public transport to and from all points with access to public transportation by short walking distances and few transfers.

This chapter examines the situation of Seoul Metropolitan area transportation system and the extent to which the poor use it. Further study of existing institutional arrangements is carried out to examine traditional government responses in transportation for the urban poor and to suggest transport strategies for the poor as well as to improve the existing transportation situation in Seoul. There appears to be an integrated situation in transportation supply; the three factors—transportation service industry, institutional environment, and transportation manufacturing industry as a source of supply.

Policies set up by the institutional environment of a region, requiring changes in service industry have been reflected in the transportation manufacturing industry through which the changes in the urban transportation system and policy have been achieved. Given the situations in Seoul with squatter settlements, section 4.3 explores available urban transportation system and their service characteristics for urban poor. Then the institutional environment
is analyzed to identify major actors and organizations to shape transportation policies and projects. Also the character and degree of flexibility of transportation strategies in regard to the poor are examined through careful review of the pricing, management, and project development process. In section 4.5, the transportation manufacturing industry is analyzed to find out what transportation problems are caused from a source of supply.

The next section describes a historical development of transportation service industry in Korea. This will make the readers familiar with the context of the transportation situation in Seoul. The overall picture of the city's transportation service is illustrated in Figure 4.1.
Figure 4.1 Development of Urban Transportation Service in Seoul

<table>
<thead>
<tr>
<th>Year</th>
<th>1900</th>
<th>1920</th>
<th>1950</th>
<th>1960</th>
<th>1970</th>
<th>1980</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mode</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Motorized Conventional Urban Transportation System

1.1 Rail System

a) Subway
b) Tramway

1.2 Road System

a) Bus
i) Municipal bus
ii) Regular city bus
iii) Express bus
iv) Urban model bus
v) Ensured seat bus

b) Hapsung (jitney)

c) Taxi cab
i) Regular taxi
ii) Individual taxi
iii) Airport taxi

2. Motorized Unconventional Urban Transportation System

2.1 Road System

a) Charter Bus
b) Car Rental
c) Shared Taxi

3. Non-Motorized Transportation System

a) Rickshaw
b) Bicycle
c) Cart & Animal
d) Hand-Trolley
e) Pedestrian
4.2 Development of the Transportation Service Industry

In this section I give an historical overview of the city's urban transportation services. More detailed description and analysis will be given in section 4.3, Urban Transportation System.

The first mechanized public transportation service in Seoul was in April, 1898 when the Korean royal family and two Americans established Kyungsung Electric Company with eight tramway vehicles on a 4 kilometer route. The automobile common carrier businesses were initiated in 1912 when a Japanese businessman started "passenger car charter business" with two American made Dodge sedans. Prior to this, the dominant modes of urban transportation in Seoul were walking, a rickshaw pulled by a person and an animal drawn carriage. By 1933, there were 261 common carrier business establishments with 360 vehicles and four tramway companies with 307 vehicles to meet urban passenger transportation demand in Korea. However, toward the end of World War II most vehicles were mobilized for military purposes. After the Liberation, U.S. army trucks and jeeps were converted to taxis and buses for public use. Along with these converted vehicles, the tramway system was running in Seoul. There were three tramway operations in Seoul owned previously by the Japanese, disposed to Koreans. Since automobiles were scarce, the tramway was the dominant motorized mode of transportation in the city. The trams were owned and operated privately.

During the Korean War most of these development were destroyed. Though most of the tramway facilities were destroyed during the War, some of them were recovered and the Seoul Municipal Government set up the Tramway Transit Authority in 1954 to municipalize the tramway and commuter rail service. Road transportation systems such as the bus and taxi were privately operated
as it is in the present system. Vehicles used as taxis were called "Sibal" which were converted jeeps. Later in 1962 bigger versions of "Sibal" model taxis and smaller versions of buses were formed into a new transport service -- "hapsung" (omnibus system with ensured seat on fixed routes) -- this service had a variety of vehicle models including station wagon capable of carrying 8 passengers, converted jeeps which could carry 12 passengers, and converted 3/4 ton trucks which could carry up to 25 passengers. In 1956 the Tramway Transit Authority obtained a permit to operate buses to complement the tramways, but this lasted only a year. The Tramway Transit Authority was closed down and tramways were run by the Korean Electric Company. Yet, the 20 municipal buses competed for two years with conventional regular city buses and express buses. The municipal buses were managed by the Division of Transportation in the city's Bureau of Interior. The express buses were introduced in 1954 for two hours of morning rush hours only at the beginning.

In 1957, tramways carried 137,353,763 passengers with 198 trams; buses carried 169,949,921 passengers with 1,122 vehicles; and taxis carried 27,076,722. In 1962, tramways carried 196,362,432 passengers with 213 vehicles which was a 20% increase from 1961 (158,141,178 passengers with 199 vehicles). At this peak period there were about 200 trams running on 54.1 km of track in Seoul according to the Seoul Municipal White Paper: 1962, 1964, and 1969. These statistics show that the tramway was the most utilized mode of transportation in the 1950's and early 1960's. However, the ridership of tramway decreased from 1963 on, and on June 1966 the municipal government took over the tramway operation from the Korean Electric Company. Finally on December 1968 the city decided to cease operation, and that was last time the trams existed
in the city.\(^14\)

The bus service seems to have taken over the transportation service in the city from the "hapsung" (see Table B.3). The "hapsung" service run by 24 small private enterprises on fixed routes carried about 107 million passengers at its high point with 1,194 "hapsung" vehicles\(^15\). This mode carried approximately one third of the total passengers in public transportation in 1965. Nevertheless, this mode was banned in 1969 when the Korean automobile assembly and manufacturing industry started to mass produce buses from 1968\(^16\). Even since 1965 when the Ministry of Commerce and Industry issued an ordinance on vehicle assembly facilities the "hapsung" service had decreased due to the government's refusal of license renewal and the unavailability of new vehicles\(^17\).

The bus service in Seoul had an interesting development history. In 1963, the government recognized the Seoul City Bus Association through Ministry of Transportation Decree Number 37\(^18\). At that time there were 20 bus companies with a total of 150 buses\(^19\). All the bus companies have joined the Association. It is expressly stated in the articles of the association that it engages in the following activities:

(i) Making suggestions to the government about policies of bus transportation service.
(ii) Instructing and assisting the purchase of equipment and procurement of capital and labor.
(iii) Joint research for increase in productivity and efficiency, and rationalization of business administration.
(iv) Executing government instructions and orders.

We see in the articles a great control over the member companies. Yet, this Association is only an interest group and there is no strong tie to pressure these members to conform to the Association's rules. The bus companies -- the members of the Association -- are loosely incorporated to procure bus
operation licenses from the government, but each vehicle is controlled by its owner, and therefore, the head of a company does not have the power to control the company's vehicles. It is reputed, however, that the Association has functioned as a powerful pressure group in Seoul. For example, in 1958 the Association succeeded in easing a regulation on qualifications of bus drivers from age 30 with over 5 years driving experience to minimum age 28 with 3 years. In 1959, government appointed controllers -- disabled ex-service men -- were withdrawn and the Association managed to supply its own controllers. The Association killed the express bus service in 1963. The express bus service was a competitor and did not have an interest group like the Seoul City Bus Association. After this incident, common carrier companies formed similar associations according to the categories and guidelines given by the Ministry of Transportation and specified by the Common Carrier Cooperatives Act in 1962.

On May 1966, the city reinitiated municipalized bus service under Seoul Municipal Ordinance Number 440, "Municipal Transportation Service Task". The city started service to newly developed suburban middle income areas with 50 ensured seat buses. In 1968, after the city stopped the tramway service, it increased municipal bus service with 200 vehicles and two area offices. In 1972, one area office was closed and 54 vehicles were sold due to managerial and financial problems. In 1974, this service ended with large sums of financial debt to the city.

On November 1965, the express bus service was revived in Seoul. This time all the express buses had ensured seat service with higher fare than the regular city buses. There were 14 companies with 295 buses running on 19
routes. Later this service was developed as "ensured seat bus service" to take over "hapsung" system's routes when the "hapsung" service was abandoned. This service founded its own Association earlier but was recognized by the government in 1970, when there were 51 members and 2,266 buses.

We now turn to the taxicab industry. In 1957, the government recognized the Korea Taxi and "Hansung" Association. On November 1962, Seoul's taxicab industry founded its own Association -- Seoul Taxicab Association -- under the Common Carrier Cooperatives Act, Number 916. The number of members and vehicles rose a great deal, from 55 members with 2,750 taxis in 1963 to 212 members with 11,906 taxis. In 1967, the government eased its policy to allow the issuance of licenses to owner operators of one vehicle taxicab service. On May 1970, these operators formed their own interest group -- Seoul Individual Taxicab Association -- and became independent of Seoul Taxicab Association. The government issued licences to owner operators of one taxi when an operator qualified with the minimum age requirement of 25 years old and had over 5 years of no accidents in driving experience. In 1972, the government recognized the increase in foreign tourists and initiated the airport taxicab service. The airport taxicab service has a strict code on drivers and vehicles. Drivers have to understand English and Japanese, while the vehicles have to be less than a year old. In addition, the airport taxicab has to go to airport at least once a day in order to be an airport taxicab. The number of owner operators of taxicabs and airport taxis declined from 780 and 1,287 in 1974 to 657 and 731 in 1975 respectively. It should be noted that the use of vehicles in the taxi industry and the bus industry is reflected in terms of what models of vehicles were produced in Korea. The "Sibal" model gradually disappeared.
within two years in Seoul after the mass assembly of Sae Nara model sedans.
Converted vehicles have no longer been used for bus service in the city since 1969. When the "urban model" bus (large version of over 50 persons capacity) was manufactured in 1970 smaller buses soon disappeared by the government's rigorous old vehicle transfer program. The ensured seat bus service has changed its buses into the "urban model" buses in 1976, and the ensured seat bus service was converted to the "urban model" bus service. Microbuses became an important part in the charter bus service industry. This industry was mainly registered as a tour transportation service for groups of tourists. Recently the charter bus industry lent their services to business firms for home-to-work commuting during rush hours.

There also exists a car rental service in Seoul. It was started with 30 vehicles in 1976. In the beginning, this service was mainly for foreign visitors but in recent years the market for this service has grown as more people have obtained their driver's license and are economically better off. Yet, it is a very small portion of the public transportation service. In 1978, Dae Han Rent Car Company with 190 vehicles -- the only car rental service company in Seoul -- provided its service to 38,544 customers.

In 1974 the first subway system was introduced in Seoul. This is, in a way, an extention of the municipal government's tramways and bus services in earlier years. The subway system in the city has 9.54 km of track and connects to the existing metropolitan regional rail system of Seoul-Inchon and Seoul-Suwon. However, it had to overcome the initial disadvantage of making large demands on the most scarce resources: capital and imported capital goods. The vehicles were imported from Japan, and U.S. $20 million of foreign loans
were invested for the construction of this system.\textsuperscript{44} The total cost for this system was 31.6 billion won (U.S. $79 million).\textsuperscript{45} However, the government wishes to expand the subway system throughout the city. Last year the government announced that they committed a large amount of investment for the expansion of 133 km subway and the elevated rapid transit system (including the existing system, the whole rapid transit system will be 5 lines of 142.54 km track length) by 1985 (see Figure 4.2).\textsuperscript{46}

In rail public transportation, supplies for transport service and operation policy comes mainly from the municipal government. By contrast, where road public transportation is concerned, the service suppliers and operation policy managers are not usually identical.
4.3 **Urban Transportation System for Urban Poor People**

4.3.1 **Typology and Available Modes of Urban Transportation for the Poor**

For the moment, we do not really know what types of transportation technology (mode) and what the service level should be to meet the particular conditions of the low-income areas in Seoul. The growth of transportation industry as a Korean development strategy is used as a symbol of progress. In Korea it has been closely linked with the steady increase in the size of transportation production and with continuous imitation as well as adaptation in transportation technology process. As a result, large scale and high technological sophistication seem to be among the main imperatives of efficiency, and there have been very few incentives to explore other approaches which reconcile efficiency with small size and technical simplicity.

One of our best examples of transportation technological spiral is seen in the development of the automobile. The original invention met a need. Therefore, a commitment was made to street construction and paving. Paved streets made cars more useful and convenient. More automobiles were made. Soon many people had automobiles, and the streets became crowded with them. Planners began their work; they reshaped the street patterns to carry the increased traffic. Wide streets, boulevards, highways, and tunnels were built. The number of cars again increased. Streets became slow, clogged, and unsafe. Super highways and Freeways were invented. They cut through the city, and opened its structure. Traffic moved again. People spread out. However, even in its new amorphous form, the city began to congest. Today the air is bad, filled with noise and smog; witness the spectacle of Los Angeles. People call for a return to public transit but it is too late. In the city's new
form, public transportation systems cannot reach enough people to pay for themselves. The city is now too dispersed for anything but an automobile solution.

The epitome of technological sophistication is urban transportation technology itself. For it is the technology of cities which make urban concentration possible. At the same time, urban concentration is continual source of new problems, congested transportation being among the most service. The answer to this is seen in improved technology of the same kind: more roads in this use. In the western model of development, the city sees solutions for transportation problems in terms of the very technology which makes the problems.

There is a clear mismatch between the needs of the present situation in Seoul and the technological solutions commonly suggested. If the urban low-income areas are ever to receive adequate transportation service, it will be necessary to broaden the range of technological alternatives by which transportation service may be provided. The bicycle is certainly less complex than an automobile, and the animal drawn cart makes little sense in automobile dominated boulevards where slow traffic is unsafe and such technology seems inferior. But for the majority of the population in the cities of developing countries, who cannot afford the amenities of the consumer society and who has been left out of the development process, they would represent a big step forward as well as a means of meeting, more effectively, some of the basic needs for employment, housing, and other activities.

The function of transportation technology, however, is not only to meet these needs in a more effective way, but also to help initiate a process of
development by stimulating the innovative forces which exist in the low-income areas in the city.

The definition of transportation technology is by no means clear. Yet, there is near universal agreement that technology should include hardware (physical artifacts) and software (physical activities and actions). This means transportation technology is transportation infrastructure (road, rail, terminal, and other facilities), transportation modes, and institutional arrangements. In this section I will emphasize transportation modes.

Many modes of urban transportation exist, and research activities are continually trying to improve existing modes and to develop new ones. A typology of the available public transportation modes is outlined as following:

1. Motorized Conventional Urban Transportation System
   1.1 Rail System: a) Subway b) Tramway
   1.2 Road System: a) Bus b) Hapsung (Jitney) c) Taxicab

2. Motorized Unconventional Urban Transportation System
   2.1 Road System: a) Charter Bus b) Car Rental c) Shared Taxi

3. Nonmotorized Transportation System
   3.1 Road System: a) Walking b) Bicycle c) Others

Car rental, charter buses, and illegal transportation services such as using small freight carriers and private automobiles acting as pirate taxicabs, are a small portion of the total passenger transportation supply and difficult to get data about. From the point of view of the urban poor, car rental, charter bus services and private automobile pirate taxicab services are too expensive. Therefore, in this section I will not expand on their role and characteristics of operation.
4.3.2 Service Characteristics and their Options for Low-income Use

4.3.2.1 Subway

The subway is a form of rail transport specialized to serve large flows of passengers in dense urban areas. It utilizes large heavy vehicles which are operated in trains along double track corridors. Up to 5 vehicles can be connected, offering capacity to carry 7,200 - 28,440 passengers per hour in each direction in Seoul. The rail line is used exclusively for passenger trains and must be completely separated from other traffic. There are 9 stations on the line and the train stops along the main rail level passenger platforms have been built.

Subways usually have steel wheels on steel rail. However, a number of recent designs include rubber-tired vehicles which run on concrete pathways. Monorails, based on a different rail configuration, use vehicles which are suspended from a single overhead rail or which straddle a single rail underneath. Other variations incorporate non-traction propulsion such as linear electric motors.

A subway operates in line-haul service for carrying large numbers of people with stops at all or a few stations along the way (local and express services). The basic technology has existed for about 100 years. Improvements have concentrated on vehicle design and construction and on improvement and automation of operational controls.

The construction of Seoul's subway system started on April, 1971. Its first line was completed on August, 1974. Several characteristics of Seoul's subway are the following: 1) its tracks are the same as that of the existing rail roads, and therefore, the Seoul Rail Road Station to Inchon
and Suwon can be extended without changing vehicles; 2) it is running underground within the inner city area and on the surface and on elevated tracks in the outer city area to minimize construction costs and to utilize the existing rail system of the city; and 3) subway stations in the inner city area can be utilized as emergency shelters and the underground stations are used as shopping malls.

The vehicle's passenger capacity is 160, but in rush hours these can carry up to 250% of this capacity due to the interfor structure. Average speed is 44 km/hour and the maximum speed is 110 km/hour. There were 60 trains and vehicles in 1974 and there will be 170 by 1981. The expansion of the subway system is described in Figure 4.2. The average time between consecutive trains with 5 vehicles was 5 minutes in 1974 on rush hours, but on average it is 7.5 minutes. The operation costs for the subways in 1976 were as follow: (in 1970 price)

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labor</td>
<td>260 million won</td>
</tr>
<tr>
<td>Electricity, repair and</td>
<td></td>
</tr>
<tr>
<td>maintenance</td>
<td>571 million won</td>
</tr>
<tr>
<td>Purchase of vehicles and</td>
<td></td>
</tr>
<tr>
<td>trains</td>
<td>569 million won</td>
</tr>
<tr>
<td>Asset for construction of</td>
<td></td>
</tr>
<tr>
<td>system</td>
<td>1,748 million won</td>
</tr>
<tr>
<td>Total</td>
<td>3,148 million won ($6.5 million)</td>
</tr>
</tbody>
</table>

This subway system was constructed to solve the inner city transportation problem but after the system began operation more people were coming in from Inchon, Suwon, and the suburban areas of the city. The initial plan was that this mode would take 70% of inner city traffic, however, user's patronage was far less than what the plan expected.
FIGURE 4.2: Seoul's Subway System

1st line: completed in 1974
2nd line: under construction, expected to be completed in 1985
3rd line: under construction, expected to be completed in 1979
4th line: expected construction time, 1981-1985
5th line: expected construction time, 1981-1985

The major reason was that buses were running very long routes in what is called a "zig zag" form from one end of the city to another through C.B.D. areas and the subway system could not compete with this coverage of the buses. The government officials believed that after the 5th line was completed their initial goal would have been met. However, without a comprehensive integrated transportation program with the subway and other modes of transportation this goal might be difficult to achieve.

Annual passenger rates after completion of the first line of Seoul's subway system are shown in Table 4.1.

<table>
<thead>
<tr>
<th>Year</th>
<th>number of passenger carried</th>
<th>fare revenue (in 1,000 won)</th>
<th>electricity cost (in 1,000 won)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>innercity</td>
<td>extension</td>
<td>total</td>
</tr>
<tr>
<td>1974</td>
<td>16,081,910</td>
<td>8,284,625</td>
<td>24,366,535</td>
</tr>
<tr>
<td>1975</td>
<td>34,288,094</td>
<td>45,692,109</td>
<td>79,980,203</td>
</tr>
<tr>
<td>1976</td>
<td>34,067,512</td>
<td>55,184,469</td>
<td>89,251,981</td>
</tr>
</tbody>
</table>

Source: Seoul Subway Transit Authority, 1976

The subway fare in the innercity area is same as the bus fare, a 35 won flat rate. Calculation of fares for the extension of the subway on existing railroad track is 4.2 won per km times the travel distance from point of origin to destination. This is a little bit less than the express bus fare from Seoul to Inchon and Suwon. The Korea National Rail Road Authority issues commuter pass books which are cheaper and convenient. As shown in Table 4.1 more passengers use the extension service than use the inner city subway service. This means that the subway system subsidizes suburban well to do and wealthy
to come in the inner areas of the city rather than improves the transportation situation of the poor. The subway system provides frequent service during peak periods on specific heavily travelled corridors, but tends to be extremely constrained in the areas covered. Thus, the location of the stations becomes a barrier to low-income people even though the subway system has good information service and normally is reliable. Due to the areas covered, the subway is more limited in flexibility than any other road transportation mode.
4.3.2.2 Tramway

The tramway is a smaller scale, lighter version of rail transport. Vehicles are generally smaller and are generally not connected into trains more than two vehicles. Capacity along one line is 15,000 - 20,000 passengers per hour. Electric power for operation is collected from an overhead distribution system. Thus the railway on which trams run does not need to be separated from other traffic. They are usually built along streets, with or without segregation from automobile traffic. Stations are often little more than a section of the track where passengers step on or off of a vehicle.

Tramways like subways have steel wheels operating along steel tracks. Tramways share with subways the basic characteristic of linehaul service. The major difference is the volume of passengers served and the average speed.

Tramway technology is old and well-established. The worldwide trend has been a decline in total length of lines and vehicles, although recently there has been a revival of interest in tramways as a light rail transit.

This was a dominant mode of transportation in the early 1960's. The operation of the system is shown in Table 4.2.

<table>
<thead>
<tr>
<th>Year</th>
<th># of vehicle</th>
<th># of service vehicle-frequency/year</th>
<th># of passenger carried per day</th>
</tr>
</thead>
<tbody>
<tr>
<td>1961</td>
<td>211</td>
<td>969,681</td>
<td>429,379</td>
</tr>
<tr>
<td>1962</td>
<td>210</td>
<td>1,062,591</td>
<td>483,178</td>
</tr>
<tr>
<td>1963</td>
<td>217</td>
<td>1,040,953</td>
<td>456,976</td>
</tr>
<tr>
<td>1964</td>
<td>213</td>
<td>1,016,821</td>
<td>428,962</td>
</tr>
<tr>
<td>1965</td>
<td>213</td>
<td>1,025,864</td>
<td>440,928</td>
</tr>
<tr>
<td>1966</td>
<td>201</td>
<td>969,728</td>
<td>479,459</td>
</tr>
<tr>
<td>1967</td>
<td>200</td>
<td>1,060,845</td>
<td>498,840</td>
</tr>
</tbody>
</table>

There were 1,415 employees in tramway operation in 1967. In 1968 this mode went out of service. The main reason given by the municipal government was that the surface track presented obstacles to other road transportation in the C.B.D. areas. Neither a study of how to improve this service nor the legitimate justification for the abandonment of their service ever existed.

Ridership and route mileage figures are among the few hard data available to describe existing systems but they are unfortunately very misleading and irrelevant in analyzing and understanding the adequacy of existing transit system service. Travel by transit cannot be assessed just by the existence of subway and tramway routes, though this mistake is often made by planners. Information on frequency of service, running times, and many other facts need to be assembled before understanding of ridership volumes and trends can begin.

It seems reasonable to say that fewer people of low income residing in inner city areas are as well served by rail transit as they were in earlier times; the longer routes have been accompanied by decreases in total vehicle mileage and less frequent service. Unlike many of the transport in inner cities, who do not travel because of information barriers, the communities at the periphery transport poor cannot travel because of a lack of supplied transportation service of any kind, especially in rail transit. Many factors combine to explain the transit industry's failure to provide quick and cheap access to and within low density, periphery areas. It is important that experts recognize the magnitude of technological, managerial, and legal obstacles to transit innovation and improvement.
A bus is an automotive vehicle which runs with rubber tires on ordinary streets. The diesel bus which is predominant carries its own power source and propulsion system. A bus is very flexible in that it does not have to stay on a special guideway. The trolley bus has electrical propulsion and a power supply system similar to the tramway. Gasoline, battery and other systems also exist.

Buses are available in a wide variety of sizes. Smaller buses for 15-30 passengers are usually called minibuses. Conventional buses generally have a passenger capacity of approximately 50 and operate on a fixed route on a fixed schedule basis.

Bus operations are very flexible and can be structured in a wide variety of ways -- local service with many stops, express service with few stops or direct service with no stops. The desired structure depends on passenger demand and can be modified over time to adapt to changing conditions.

In Seoul there were 91 companies with 4,803 buses in 1975. The vehicle capacity is 60 passengers but during rush hours passenger use over-run capacity by 200%. Bus routes and bus stops are concentrated in the CBD area. For example, the distance between bus stops is 480 meters in the CBD area and there are about 30 bus stops within 5 square kilometers of the CBD area.

From Table 4.3 it is seen that bus transit supplies most of the motorized trips in Seoul. The bus systems are operated by numerous private entrepreneurs. The service is acceptable since most riders do not have an adequate alternative means of transportation. However, the service suffers from over-
lapping, duplicated, unorganized, and frequently unreliable operations.

Table 4.3  Bus System in Seoul

<table>
<thead>
<tr>
<th>Year</th>
<th># of company</th>
<th># of vehicle</th>
<th># of passenger carried</th>
</tr>
</thead>
<tbody>
<tr>
<td>1965</td>
<td>27</td>
<td>1,253</td>
<td>467,707,311</td>
</tr>
<tr>
<td>1968</td>
<td>69</td>
<td>3,204</td>
<td>581,624,502</td>
</tr>
<tr>
<td>1969</td>
<td>86</td>
<td>3,025</td>
<td>709,414,201</td>
</tr>
<tr>
<td>1970</td>
<td>88</td>
<td>3,867</td>
<td>1,162,028,040</td>
</tr>
<tr>
<td>1971</td>
<td>89</td>
<td>4,271</td>
<td>1,203,470,311</td>
</tr>
<tr>
<td>1972</td>
<td>88</td>
<td>4,313</td>
<td>1,247,600,989</td>
</tr>
<tr>
<td>1973</td>
<td>90</td>
<td>4,447</td>
<td>1,383,478,290</td>
</tr>
<tr>
<td>1974</td>
<td>92</td>
<td>4,635</td>
<td>1,520,979,909</td>
</tr>
<tr>
<td>1975</td>
<td>91</td>
<td>4,803</td>
<td>1,743,099,813</td>
</tr>
</tbody>
</table>


There once was a municipally owned bus system. In 1966, the Municipal Government started a bus service with 50 ensured-seat buses. This was a demonstration project to teach private bus companies that the bus routes do not have to pass the CBD in order to make profits. The major areas of operation for municipally owned buses were suburban middle-income residential areas with regional activity centers. Yet financial and management problems inhibited this service causing the city to reduce the size of fleet and in 1974 this service went out of transportation system in Seoul. The operation of this system is outlined in Table 4.4.

Table 4.4  Municipal Bus Service

<table>
<thead>
<tr>
<th>Year</th>
<th># of vehicle frequency/year</th>
<th># of passenger carried</th>
<th>total km operated</th>
<th>total consumption of gasoline(liters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1969</td>
<td>55,967</td>
<td>40,720,888</td>
<td>13,805,941</td>
<td>6,988,402</td>
</tr>
<tr>
<td>1970</td>
<td>56,866</td>
<td>36,336,028</td>
<td>13,588,625</td>
<td>7,160,076</td>
</tr>
<tr>
<td>1971</td>
<td>66,172</td>
<td>43,348,930</td>
<td>16,204,222</td>
<td>7,197,785</td>
</tr>
<tr>
<td>1972</td>
<td>53,029</td>
<td>47,269,025</td>
<td>17,002,647</td>
<td>6,805,751</td>
</tr>
<tr>
<td>1973</td>
<td>40,650</td>
<td>38,628,102</td>
<td>11,699,093</td>
<td>4,867,546</td>
</tr>
</tbody>
</table>

Source: Seoul Municipal Yearbook: 1974, pp.166-167
Bus fare increases in Seoul are shown in Table 4.5.

<table>
<thead>
<tr>
<th>Date</th>
<th>Bus Service Type</th>
<th>Fare</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1961.3.11</td>
<td>Buses</td>
<td>5</td>
<td>zonal fare</td>
</tr>
<tr>
<td></td>
<td>Hapsung</td>
<td>8</td>
<td>&quot;</td>
</tr>
<tr>
<td>1966.5.1</td>
<td>Hapsung</td>
<td>12</td>
<td>&quot;</td>
</tr>
<tr>
<td>1966.5.11</td>
<td>Buses</td>
<td>8</td>
<td>&quot;</td>
</tr>
<tr>
<td>1967.10.11</td>
<td>Hapsung</td>
<td>20</td>
<td>flat rate</td>
</tr>
<tr>
<td></td>
<td>Buses</td>
<td>10</td>
<td>&quot;</td>
</tr>
<tr>
<td>1970.10.6</td>
<td>Hapsung</td>
<td>25</td>
<td>&quot;</td>
</tr>
<tr>
<td>City Bus</td>
<td>15</td>
<td></td>
<td>&quot;</td>
</tr>
<tr>
<td>Ensured Seat Bus</td>
<td>25</td>
<td></td>
<td>&quot;</td>
</tr>
<tr>
<td>1972.2.1</td>
<td>City Bus</td>
<td>20</td>
<td>&quot;</td>
</tr>
<tr>
<td>Ensured Seat Bus</td>
<td>30</td>
<td></td>
<td>&quot;</td>
</tr>
<tr>
<td>1974.2.4</td>
<td>City Bus</td>
<td>25</td>
<td>&quot;</td>
</tr>
<tr>
<td>Ensured Seat Bus</td>
<td>35</td>
<td></td>
<td>&quot;</td>
</tr>
<tr>
<td>Urban Model Bus</td>
<td>30</td>
<td></td>
<td>&quot;</td>
</tr>
<tr>
<td>1975.7.1</td>
<td>City Bus</td>
<td>30</td>
<td>&quot;</td>
</tr>
<tr>
<td>Urban Model Bus</td>
<td>35</td>
<td></td>
<td>&quot;</td>
</tr>
</tbody>
</table>

Source: Transportation Yearbook: 1976

On December 1975, the total number of employees in the bus industry in Seoul was 25,945. The total number of administrators was 2,893; bus drivers, 9,964; conductors, 8,664; repair personnel, 2,998; and others, 1,524. There existed controls on entry imposed by the government in terms of fleet size, operation schedules, and route.

Managerial limits in the bus industry is common in Seoul as mentioned in an earlier section of this paper. Many bus companies are small independent operators under tenuous government supervision. Many managers had little
professional training, and they mostly learned by on the job training. Management has cut costs often by reducing service but has lost revenue in the process. Its desire to minimize losses makes it very wary of undertaking improvement programs (such as readjusting routes, changing from the gasoline engine to diesel, and incorporating in order to lower operation costs) to help the poor rider who cannot afford to cover the cost of his ride.
4.3.2.4  Jitney

In general, jitneys provided a form of taxi service limited to relatively fixed routes (but allowing occasional slight variations from the main route) and open to group riding. Usually, service has not been formally scheduled, but headways are short. A potential jitney passenger can hail a jitney with vacant capacity anywhere along its route or at designated stops. Usually jitney services charge a flat fare and disembark passengers at any other point along the route. Therefore, jitney service is an intermediate personal transport service between taxi and bus transit service.

In Seoul, the Hapsung was a form of jitney service. Its rise and fall is expressed in Table 4.6 in the number of companies and vehicles. The major reason given by the government was its unsafe conduct of operation.72 This service was completely abandoned in 1972 by systematic bias against this mode principally by the government.73 The government did not renew their licenses and did not approve the expansion of fleet size in the early 1970's. There were about 100 routes along major streets in the city with buses.74 They had a fixed route and designated stops, but they could stop in mid-block if requested and deviate from the route if a passenger paid more money. The fare was 25 won which was a flat rate with fixed schedules like ensured seat bus service with smaller vehicles (see Table 4.5).

This service can operate profitably for the city of Seoul in both a financial and social sense. This service also has great potential to serve in low-income areas which are inadequately served by bus and taxi. Instead of changing Hapsung service from a smaller vehicle to a bigger bus as was done in Seoul which has low level and narrow size road network systems, the
Jitney might have usefully played a still wider role in urban transportation.

Table 4.6 Hapsung System in Seoul

<table>
<thead>
<tr>
<th>Year</th>
<th># of Company</th>
<th># of Vehicle</th>
<th># of Passenger Carried</th>
</tr>
</thead>
<tbody>
<tr>
<td>1962</td>
<td>26</td>
<td>1,099</td>
<td>54,761,430</td>
</tr>
<tr>
<td>1963</td>
<td>24</td>
<td>1,259</td>
<td>81,140,610</td>
</tr>
<tr>
<td>1964</td>
<td>26</td>
<td>1,287</td>
<td>85,392,339</td>
</tr>
<tr>
<td>1965</td>
<td>24</td>
<td>1,193</td>
<td>106,954,360</td>
</tr>
<tr>
<td>1966</td>
<td>27</td>
<td>1,258</td>
<td>266,760,096</td>
</tr>
<tr>
<td>1967</td>
<td>-</td>
<td>1,168</td>
<td>-</td>
</tr>
<tr>
<td>1968</td>
<td>-</td>
<td>784</td>
<td>-</td>
</tr>
<tr>
<td>1969</td>
<td>-</td>
<td>526</td>
<td>-</td>
</tr>
</tbody>
</table>

Source: Transportation Yearbook: 1971

Jitneys, communal taxis, auto-rickshawa, and minibuses are within the category of intermediate personal transportation services. They are designed to carry paying passengers over a regular or flexible route according to a flexible schedule. They are well suited to meeting many of the needs of the low-income people in richer cities.

They can be operated like taxis but with slightly lower operating costs, and lower capital costs than large bus service. They provide better service than a bus at a slightly higher cost to the passenger. Since the vehicle carries only a few passengers, there are fewer time consuming loading stops.

When this service was formally recognized in Seoul there were 5,920 employees and some of the taxi and bus industry moved into the Hapsung service in the early 1960's. The number of passenger carried, vehicles, and companies were shown in the Table B.3 in order to compare with other public transportation services from 1962 to 1969 when this service existed.
4.3.2.5 Taxi

Taxi is used here in its usual sense to denote a form of transportation service by which individuals may hire a vehicle and driver to transport them directly by road from one point to another as specified by the passengers. Typically the contract for the hire is an informal ad hoc one, made by street hail or by telephone. Most commonly, passengers pay a fare for this service based on the distance (and sometimes duration) of the ride.

There is entry control in the form of numerical limitations on taxicabs, and restrictions on the number of taxicab firms, similar to those which apply to buses in Seoul. Taxicabs are also regulated on the type and quality of service they provide. As discussed earlier, there are three types of services: regular city taxicabs, airport taxicabs, and call taxi for foreigners (operated by Korea Tourism Corporation). With respect to regular city taxicabs, there are two separate regulations on ownership, driver qualifications, and direct entry controls -- owner operating "individual taxicabs and incorporated taxicabs." The numbers and their growth are given in Table 4.7. In Seoul,

Table 4.7 Taxicab System in Seoul

<table>
<thead>
<tr>
<th>Year</th>
<th># of Company</th>
<th># of Vehicle</th>
<th># of Passenger Carried</th>
</tr>
</thead>
<tbody>
<tr>
<td>1965</td>
<td>61</td>
<td>3,051</td>
<td>95,560,801</td>
</tr>
<tr>
<td>1968</td>
<td>152</td>
<td>6,105</td>
<td>268,614,589</td>
</tr>
<tr>
<td>1969</td>
<td>168</td>
<td>6,155</td>
<td>348,259,816</td>
</tr>
<tr>
<td>1970</td>
<td>233</td>
<td>8,594</td>
<td>264,722,028</td>
</tr>
<tr>
<td>1971</td>
<td>230(3)</td>
<td>10,140(3)</td>
<td>343,640,160</td>
</tr>
<tr>
<td>1972</td>
<td>262(10)</td>
<td>11,379(10)</td>
<td>305,619,017</td>
</tr>
<tr>
<td>1973</td>
<td>766</td>
<td>12,421</td>
<td>454,293,836</td>
</tr>
<tr>
<td>1974</td>
<td>-</td>
<td>12,592</td>
<td>377,571,908</td>
</tr>
<tr>
<td>1975</td>
<td>776(554)</td>
<td>12,460(554)</td>
<td>402,987,240</td>
</tr>
</tbody>
</table>

( ) ... indicate individual taxicab companies and vehicles.
Source: Seoul Municipal Yearbook and Transportation Yearbook
inadequacies in existing public transportation services have been great enough to give rise to and to support extensive taxicab services operating without formal authority. For example, shared taxicab riding is prohibited in the city, but it is nevertheless very common there. Private automobiles and small freight carriers also lend their services to taxi patronages illegally. Taxicab fares have increased continually, yet it is very difficult to get taxicab even in the CBD area during the non-rush hours in Seoul.

Table 4.8 Taxicab Fare Change in Seoul

<table>
<thead>
<tr>
<th>Year</th>
<th>Basic Fare (first 2km)</th>
<th>Additional Fare (each 500 meters)</th>
<th>other</th>
</tr>
</thead>
<tbody>
<tr>
<td>1960</td>
<td>20 won</td>
<td>negotiated</td>
<td>-</td>
</tr>
<tr>
<td>1962</td>
<td>30 won</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>1966</td>
<td>60 won</td>
<td>10 won</td>
<td>-</td>
</tr>
<tr>
<td>1970</td>
<td>80 won</td>
<td>each 300 meters 10 won</td>
<td>-</td>
</tr>
<tr>
<td>1972</td>
<td>90 won</td>
<td>each 500 meters 20 won</td>
<td>-</td>
</tr>
<tr>
<td>1974</td>
<td>160 won</td>
<td>30 won</td>
<td>each 10 min. wait:150 won</td>
</tr>
<tr>
<td>1975</td>
<td>200 won</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
</tbody>
</table>

Source: Transportation Yearbook: 1975, Seoul, p.191

There were 20,535 people in Seoul's taxicab industry in the end of 1975. There were 184 executives; 1,075 administrators and controllers; 196 taxicab driving education and training specialists; 176 repairmen; and 18,904 drivers. The number of employees in the taxicab industry is given on Table B.3 to compare with other modes of public transportation.

Taxicabs are an important urban transportation service for the poor. Taxicabs provide many of the advantages of the automobile without the disadvantage of a high total quality: taxicabs are flexible and can be used intensively by many people; they are especially useful for emergency trips and trips in bad weather; they minimize walking by providing door-to-door service.
Taxi trips may be viewed as compensatory consumption by the poor. A taxi ride is a form of indulgence and one of the rare situations where the poor receive relatively good personalized service. If a group of friends or a large family shares a cab, taxicabs can be not much more expensive than bus.

There are, however, serious problems associated with taxis. Legal restrictions on their total number in Seoul make them hard to find at certain times of day. Taxi drivers are reluctant to go into squatter settlements or low-income areas in a city, and many squatter communities in the outskirts of the city do not generate enough demand to encourage taxi operations in the first place.
4.3.2.6 Non-motorized Transportation System

Given that many people walk and bicycles are widely used, it is startling to note how little attention has been given to urban transportation planners for low-speed road users. Michael Tyler pointed out that this is not because of a low potential economic pay-off. He uses the example of Bengal where the effects of sharing of motor carriageways by bullock carts are so detrimental to capacity that 100 bullock carts per hour require about six times as much road space as the same number of cars. Heavy carts also have very harmful effects on the road surface. In Seoul portions of goods being channeled from distribution centers to local stores are transported by small-scale local enterprise using hand-trolleys, carts or bicycles. It is very difficult to get information on how much freight is being distributed through these modes. Even though the traffic police restrict these slow moving modes on major streets in Seoul, they are allowed to certain parts of the city because the government realized the importance of these modes of transportation (e.g., market areas were permitted to use animal carts and hand-trolley). Although this paper's focus is urban passenger transportation, I will discuss freight movements to point out their importance and function in urban transportation.

Bicycles in Seoul are used as local freight distribution vehicles. Unlike bullock carts, bicycles make very efficient use of road space and cause little wear. There have been considerable studies on pedestrians and bicycle users in developed countries. There are numerous examples of segregated bicycle right-of-way. However, there seems to have been little work on the transfer of these technologies to developing countries, where they could be even more useful. Since there is no immediate future prospect in the abandonment of these
modes, it might be beneficial to reduce conflicts between high and low speed traffic by providing vehicles with suitable road surfaces -- bike route or segregation. This strategy could improve the utilization of road investment considerably according to Michael Taylor beside the benefits from reduced 82 accidents.

There is virtually no studies on the vehicle design of these modes which could produce considerable benefits. For example, cities in Indonesia have "betcha" (a modified bicycle with 3-wheel uses as a petty cab) for urban passenger transportation and bicycle rickshaws in Hongkong, Taipei and some other cities in South East Asian countries.

Table 4.9 Bicycle and Autobike System in Seoul

<table>
<thead>
<tr>
<th>Year</th>
<th># of Bicycle</th>
<th># of Motor assisted Bicycle</th>
<th># of Autobike</th>
</tr>
</thead>
<tbody>
<tr>
<td>1961</td>
<td>14,083</td>
<td>355</td>
<td>404</td>
</tr>
<tr>
<td>1962</td>
<td>20,934</td>
<td>534</td>
<td>437</td>
</tr>
<tr>
<td>1963</td>
<td>24,053</td>
<td>479</td>
<td>560</td>
</tr>
<tr>
<td>1964</td>
<td>29,395</td>
<td>1,091</td>
<td>1,173</td>
</tr>
<tr>
<td>1965</td>
<td>31,888</td>
<td>610</td>
<td>928</td>
</tr>
<tr>
<td>1966</td>
<td>30,399</td>
<td>755</td>
<td>1,004</td>
</tr>
<tr>
<td>1967</td>
<td>26,935</td>
<td>653</td>
<td>1,396</td>
</tr>
<tr>
<td>1968</td>
<td>-</td>
<td>805</td>
<td>16,569</td>
</tr>
<tr>
<td>1973</td>
<td>-</td>
<td>-</td>
<td>51,308</td>
</tr>
</tbody>
</table>


The number of bicycles and autobikes in Seoul are shown in Table 4.9. Recent figures are not available, but knowing that the bicycle and autobike manufacturing industry in Korea produce about a million units of bicycles and autobikes per year the numbers are expected to be high. 84

There is tendency to change the bicycle into a motoized vehicle. As reflected in the number of autobikes in Seoul as shown in Table 4.9 , it
is clear that, because the number of autobikes is increased while bicycles decrease there is an important practice of converting bikes to autobikes.

Little is known about the walking trips of the poor. No procedures for summarizing the large number of possible walking trips destinations, even within a neighborhood, have been prepared. Desired information on walking trips might include guidelines for transportation plans that involved walking as one phase of a trip. In particular, this information would help transportation planners to be able to estimate good bus stop spacing and route coverage in an area, based on people's tolerance for walking -- controlled by the walker's income age, trip purpose, time of day and year, topography, the number and age of traveling companions, and weather.

The ability to walk between two points depends on more than sidewalks, topography, or street safety. In studying the use of various modes by the poor, one should not assume that the poor have healthy feet, comfortable shoes, or protection against the weather. Poor people stretch their limited budgets by walking barefoot, buying cheap shoes or sneakers, wearing shoes that do not fit properly, and sharing shoes among children in a family.

Walking exposes the traveler to the elements and demands some minimal protection if health is to be preserved; the lack of boots, raincoat, umbrella, or winter clothing for each household member may alter travel plans. Together, the lack of good footgear, healthy feet, and proper clothing place special hardships on many of the poor.

Bicycles are often overlooked as a transportation option for some of the transport poor. The average cyclist on a standard bicycle travels about ten
miles per hours. 85 Within a range of about six miles, it is less than half an hour ride and has greater feasibility in urban setting. It is a relatively cheap form of transportation, in terms of both cost of ownership and cost of operation. Among the advantages bicycles offer are the healthy exercise, freedom of movement, and simple maintenance; among the disadvantages are reduced safety in bad weather, vulnerability to theft and damage, and limitations on access (movement) to existing road facilities. One of the major obstructions to bicycle circulation in some area is the long hill.

Autobikes are more dangerous, faster, more expensive, and noisier than bicycles, but they are still far less costly than automobiles, and their status and prestige may prove them to be more acceptable to urban poor people.
4.3.2.7 Summary

The economic development and prosperity of recent years have not only seen large investment in automobile manufacturing industry but also an expansion of the street network. In 1960 the rate of vehicle ownership (all motorized vehicles) was about 4.8 vehicles/1,000 inhabitant -- or a total of 11,411 vehicles, of which 3,222 (28%) were private cars. By 1975 this had increased to 12.4 vehicles/1,000 inhabitants -- or a total of about 85,248 vehicles of which about 53,535 (63%) were private automobiles. As a point of comparison, the vehicle ownership in fully motorized societies is often about 350-450 vehicles/1,000 inhabitants. Seoul is now in the early stages of a motorization process.

The street network is used by two main kinds of traffic -- the movement of goods and services and the movement of people -- and for parking as well. As the level of economic development rises and the spatial extent of the city expands, movements are more and more motorized.

In general there is no segregation of traffic within the street network. Slow-moving and fast-moving traffic, public and private passenger vehicles are mixed together. Due to the growing number of vehicles and the mixture of traffic, the number of accidents is increasing. In the year 1960 there were 247 fatalities. In 1975 the number of fatalities increased to 845. Traffic accidents are not only tragic and expensive for those involved, but also causes great costs in medical care and losses in productivity.

Street congestion often misleads decision makers to overinvest in streets, parking facilities and fixed rapid rail transit. These resources could have been more efficiently spent on other transportation projects or for other
purposes. The present public transportation system is operated by a large number of different companies, and there is little coordination among them with regard to fare structure, time schedules, terminals and maintenance facilities. There are restrictions on the size of repair areas and parking facilities for buses and taxicabs, but there are few skilled mechanics and no stock of even everyday spare parts. Spare parts are ordered only when required. This wastes time and delays putting a vehicle back into operation. Poor maintenance causes quick depreciation of buses and taxicabs so that they are taken out of service after only five or six years of operation. With proper maintenance, vehicles can operate more than ten years. The total number of companies, vehicles, employees, and passenger carried by Seoul's public transportation system is summarized in Table B.3.

Table 4.10 compares the typical service characteristics of urban transportation modes with that of the "typical" private automobile and the "typical" conventional bus. Particular attention should be paid to the comparability of service characteristics between the unconventional modes and the conventional bus. Understandably, of the unconventional transportation modes options, the Hapsung and taxi compare most favorably with the automobile.

In treating individual modes and groups of modes in terms of their distinctive service characteristics, I have regarded the particular vehicle or technology used to provide the service as a secondary consideration. The reason for this is that the same vehicle can provide different services at different times. For example, taxi and bus changed to jitney (Hapsung) service in the early 1960's.
Table 4.10 Service Characteristics Comparison

<table>
<thead>
<tr>
<th>Service Attribute</th>
<th>Subway</th>
<th>Tramway</th>
<th>Hansung</th>
<th>Taxi</th>
<th>Charter Bus</th>
<th>Car Rental</th>
<th>Bicycle</th>
</tr>
</thead>
<tbody>
<tr>
<td>*Start from and end at any location</td>
<td>-A,=B</td>
<td>-A,=B</td>
<td>-A,=B</td>
<td>=A,+B</td>
<td>-A, +B</td>
<td>=A, +B</td>
<td>=A, +B</td>
</tr>
<tr>
<td>*Availability at all times of day</td>
<td>-A,=B</td>
<td>-A,=B</td>
<td>-A,=B</td>
<td>=A,+B</td>
<td>-A, -B</td>
<td>=A, +B</td>
<td>=A, +B</td>
</tr>
<tr>
<td>*Waiting time before journey</td>
<td>-A,+B</td>
<td>-A,=B</td>
<td>-A,=B</td>
<td>-A,=B</td>
<td>-A, +B</td>
<td>=A, +B</td>
<td>=A, +B</td>
</tr>
<tr>
<td>*Overall average speed in vehicle</td>
<td>+A,+B</td>
<td>-A,=B</td>
<td>-A,=B</td>
<td>=A,+B</td>
<td>=A, +B</td>
<td>=A, +B</td>
<td>-A, -B</td>
</tr>
<tr>
<td>*Fare known before trip?</td>
<td>-A,=B</td>
<td>-A,=B</td>
<td>-A,=B</td>
<td>=A,-B</td>
<td>-A, +B</td>
<td>=A, -B</td>
<td>-A, -B</td>
</tr>
<tr>
<td>*Privacy and general comfort</td>
<td>-A,=B</td>
<td>-A,=B</td>
<td>-A,+B</td>
<td>=A,+B</td>
<td>-A, +B</td>
<td>=A, +B</td>
<td>-A, -B</td>
</tr>
<tr>
<td>*Ability to do other things while travelling</td>
<td>+A,=B</td>
<td>+A,=B</td>
<td>+A,+B</td>
<td>+A,+B</td>
<td>+A, =B</td>
<td>=A, -B</td>
<td>=A, -B</td>
</tr>
<tr>
<td>*Ability to carry luggage</td>
<td>-A,=B</td>
<td>-A,=B</td>
<td>-A,=B</td>
<td>=A,+B</td>
<td>-A, =B</td>
<td>=A, =B</td>
<td>-A, +B</td>
</tr>
<tr>
<td>*Convenience in coping with luggage</td>
<td>-A,=B</td>
<td>-A,=B</td>
<td>-A,=B</td>
<td>+A,+B</td>
<td>-A, =B</td>
<td>=A, +B</td>
<td>-A, +B</td>
</tr>
<tr>
<td>*Need for parking space at destination</td>
<td>-A,=B</td>
<td>-A,=B</td>
<td>-A,=B</td>
<td>-A,=B</td>
<td>-A, =B</td>
<td>=A, -B</td>
<td>=A, -B</td>
</tr>
</tbody>
</table>

Key: A denotes typical private automobile
+ denotes better than, higher than
- denotes poorer than, less than
B denotes typical conventional bus
= denotes roughly the same

Example: Waiting time for a taxi before a journey is poorer than for an automobile, but is roughly same as for a bus.

Adapted from Kirby, _Para-Transit: Neglected Options for Urban Mobility_, pp. 78, 186 and 238.
4.4 INSTITUTIONAL ENVIRONMENT

The study of an appropriate transportation technology for squatter settlements requires careful examination of existing transportation services which can extend their service to the poor. The study of the institutional environment is a necessary prerequisite to suggesting options and strategies for obtaining adequate accessibility for the poor through the transportation system. A better understanding of the transportation manufacturing industry, and its relationship to transportation services completes a detailed analysis of transportation systems in the city. Yet this research will go further to identify broader organizational solutions for the mobility problem of the squatter settlements, because the transportation problem is only a symptom of poverty and a broader approach must be adopted (see ChapterVI).

The institutional environment of urban transportation planning and implementation must be tailored to the local situation and cannot be described in the abstract. Metropolitan Seoul's transportation planning and implementation involves many national and local government agencies as well as private establishments of transport operators. Although the various components of the urban transportation system are interdependent on each other, the authority over existing facilities and services is dispersed among a number of agencies and organizations that function independently of one another. Bus and taxi services are operated exclusively by the private sector, rail transit services are operated by a special transit authority for the city and commuter rails are run by the National Railroad Authority. Parking, driver's license, and traffic regulations are enforced by the Traffic Police Division in the city Police Department, tolls and common carrier operation license are under the control of the city Bureau of Transportation. Finally, road construction and maintenance programs...
are under the Bureau of Construction with programs being planned by the Bureau of City Planning.

4.4.1 Actors and Roles

Institutions involved in urban transportation planning and implementation have different capacities that can be categorized into four general types of institutional roles:

1. Institutions that function primarily in the initial planning and approve proposed projects on urban transport facilities and services. The institutions involved in providing funds, setting policies, and coordinating implementation are in this category. Their roles are derived largely from the urban transport planning process and the kinds of transportation resources affected rather than from the specific project activities.

2. Institutions that carry out designated transportation projects, such as operating transit services, enforcing traffic regulations, or managing road construction projects. Their roles are determined by the specific kinds of activities selected for the urban transportation plan.

3. Institutions that take no active part in carrying out the urban transportation planning and implementation, but represent the interests of special groups whose concerns may be affected by the project. These include welfare-oriented agencies, public transport operators associations, and politicians representing certain affected groups. Their roles are a function of the political and social characteristics of the particular affected interest group.

4. Institutions that take the role of evaluation for urban transportation projects and policies. These include Board of Audit and Inspection and National Assembly as well as research institutions. They do not participate in urban transportation planning and implementation but they
evaluate programs and make recommendations to other involved institutions.

An institution's involvement with the urban transportation planning and implementation is not confined to one of these roles. In fact, it is well acknowledged that some agencies or organizations have more than one role. It is also noted that each institutional role is fluid and changes with the political and socio-economic state of the country. The major actors and their formal institutional responsibilities are described below and their relationships are illustrated in the following page (see Figure 4.3).

4.4.1.1 National Government

A) The President is the supreme decision maker and the main symbol of the national will. He rules as well as reigns. The President issues presidential decrees, initiates legislative proposals, and issues ordinances having the effect of law when it is necessary for national security. He can also dissolve the National Assembly at will and take any constitutional amendment directly to the people, bypassing both the National Assembly and the National Conference for Unification. He appoints the Premier, members of the State Council, Heads of government agencies, Mayor of Special City, provincial governors, justices, judges and other senior public officials.

The President's involvement in the urban transportation sector concerns national development. Major projects, such as putting a subway in Seoul, have to be approved by the President. Since all the power comes from the President he has a potential role in the urban transportation sector as well as overall policies and projects.

B) Economic and Scientific Council was created in 1964 as a constitutional organ to advise and make recommendations to the President on major
Figure 4.3 Government Institutions Involved in Urban Transportation Planning and Implementation In The Seoul Metropolitan Area

National Government
- National Assembly
  - Board of Audit and Inspection
  - Economic Planning Board
  - Ministry of Finance
  - Ministry of Science and Technology
  - Ministry of Commerce and Industry
  - Ministry of Home Affairs
  - Ministry of Transportation
  - Ministry of Construction
  - National Railroad Authority

Local Government
- Governor
  - 9 Provinces
- Mayor
  - Pusan Special City
  - Seoul Special City
- Planning and Coordination Office
- Police Department
- Bureau of Housing
- Bureau of Environment Protection
- Bureau of City Planning
- Bureau of Construction
- Bureau of Transportation
- Subway Transit Authority
policies and projects pertaining to the national economy and science. The President is the chairman of the Council, the Premier vice chairman and Members of the Council are appointed by the President. Innovative urban transportation policies and technology assessment are the Council's primary interests in transportation sector.

C) **Board of Audit and Inspection** is an independent watchdog organ charged with auditing the accounts of central and local government agencies and state-controlled agencies. The Board reports its findings to the President and the National Assembly. Its power has significantly been strengthened under the new "Revitalizing Reform" constitution. The loss by the National Assembly of its traditional power of government inspection under the new constitution has further enhanced the importance of the Board as a watchdog agency of the administration. Its role in the urban transportation sector is as an investigator for urban public transport problems in Seoul. It also audits all projects in all levels of government.

D) **State Council** is the highest policy-making organ of the nation. It is composed of the President, the Premier, the Ministers of fifteen government ministries and two boards (the Economic Planning Board and the National Unification Board). The Council in its capacity as the consultant to the President deliberates on important state affairs and policies that fall within the scope of the power and responsibility of the President. The Council finalizes the national budget which is submitted from the Economic Planning Board and must be eventually approved by the National Assembly. Most government policies are discussed and finalized by the State Council.

E) The **Premier** in practice takes direct responsibility for administrative actions and affairs. He is accountable to the National Assembly for
government policy on national affairs. The Premier is Vice Chairman of the State Council. It is he who recommends members of the State Council for appointment and dismissal. The Premier supervises the administrative activities of individual ministries. The Special City of Seoul government administration comes under his supervision. He has presumed the role of a local council to Seoul after the coup in 1961.

F) The Ministry of Transportation controls the railroads, land and sea transportation, aviation, and tourism. The National Railroad Authority is under the Ministry's control. Its Bureau of Land Transport is where urban transportation policies and projects are managed. The Ministry is also the official representative of the transportation sector within the national government. It is responsible for transportation planning, although it is not directly involved in its implementation. The implementation of transportation planning activities occurs primarily in the local governments (except in the case of the railroad). Implementation involves setting standards for transportation companies and pricing. The Transportation Coordination Office in the Ministry is the pricing and finance policy body of government owned transport enterprises and has the additional duty of identifying and developing improved transportation systems. The Ministry is responsible for the supply of public transport and approve local government's proposals for transport regulations, transport fleet size change, and promotion of local transport service industry's projects. In addition, the Ministry has an advisory role in reviewing all transportation related projects.

G) The Economic Planning Board takes charge of matters related to the overall planning for the development of the national economy, formulation and execution of the government budget, overall coordination of plans for mobilization of resources, investment, technical development and economic
cooperation with foreign countries and international organizations. The Board is the cabinet-level organization and the Vice Premier is the head of the Board. It controls the Bureau of Price Policy which sets all public transportation prices. The Bureau of Budget is responsible for preparing the annual national budget for submission to the National Assembly for approval. This authority allows the Board to play a major role in the determination of which projects will be implemented at a specific time.

H) The Ministry of Home Affairs handles matters related to local administration, election, national referendum, local finance, internal security, fire prevention, marine police, and exercises the Local Administration Bureau and National Police Headquarters. The Ministry serves as a channel for budgets and finance projects to the local governments. This Ministry approves projects initiated by local governments by coordination and its power to approve the budgets for the cities and provinces.

I) The Ministry of Finance deals with matters pertaining to the state treasury, currency, finance, national bonds, accounts, taxation, customs, foreign exchanges of the government and the control of state-owned and vested properties.

The Ministry ultimately exercises certain control over the allocation of funds for transportation facilities. It is also responsible for the insurance and banking industries. It controls the automobile tax which is one of the Ministry's tools to restrict private automobile ownership.

manufacturing, automobile part imports, and fuels are controlled by this Ministry. Thus, it has a significant role in urban transportation planning to supervise and direct manufacturing industries related to the transportation vehicle production. It also controls the supply of fuel.

K) The Ministry of Construction is responsible for establishing and coordinating plans for national land development, and the control, preservation, utilization, and renovation of land, development of water resources, and construction of cities, roads, highways, ports, harbors, and houses. Its Bureau of Housing and Urban Planning and the Bureau of Public Roads are assuming a project implementor role in the transportation sector. All national roads are under the responsibility of this Ministry. However, from 1974 the Korea Highway Corporation (a government owned establishment) was construction and maintaining the highways of Korea.

The Ministry coordinates and supervises the preparation of all master plans for metropolitan areas as well as regional areas. It also prepares master plans for national development. It is a very influential institution with respect to physical transportation projects (transportation facilities and roads).

L) The Ministry of Science and Technology handles matters related to the development and application of science and technology. It supervises management of industrial and technical manpower. Use of foreign consulting and foreign technical supervision has to be approved by this Ministry. This Ministry has funded and initiated several transportation technology projects.

M) The National Assembly, which is unicameral, is the supreme law-making body of the Korea. With two thirds of its members elected by popular vote and the rest elected by the National Conference for Unification which
votes en bloc on list of names submitted by the President, the National Assembly is constitutionally mandated to exercise the legislative power exclusively. The term of popularly-elected members of the National Assembly is six years while that of those elected by the National Conference for Unification is three years. It has 219 members, among whom 73 are chosen by the National Conference for Unification.

The National Assembly examines and approves the annual government budget. It has 12 standing committees, one of which is the Committee on Transportation and Communication, which oversees the transportation sector. The Committee on Commerce and Industry oversees the transportation manufacture and fuel industries while the Committees on Construction and Finance examine projects on urban transportation facilities and tax bills. When a bill is introduced in the National Assembly, it is referred first to one or more of its appropriate standing committees for preliminary deliberation, and the committees in turn report the results of their deliberations to the plenary session. Each committee examines and deliberates on bills, petitions and other matters which come under its respective jurisdiction.

The Assembly's involvement in the urban transportation sector concerns the national budget, which, after preparation by the State Council, is approved by the Assembly. It also evaluates government policies and projects. Each member of the National Assembly has the right to introduce a bill in the National Assembly with the consent of at least ten or more members for the bill. This right could be a valuable tool for this institution to play a major role on the urban transportation and the urban poor. Yet, there are no bills ever introduced for improving the transportation system for the poor.
4.4.1.2 Local Government

Seoul and Pusan are categorized as Special Cities and as such act as project implementors of urban transportation planning and projects. The Metropolitan Government of Seoul has access to the State Council through the Premier. Since Seoul was the capital of Korea from 1392, it is not under the direct supervision of the Ministry of Home Affairs unlike other cities and provinces. It is divided into eleven Gus (wards) and the Gus are further divided into 317 dongs.

A) The Bureau of Transportation is one of the subdivisions of the Metropolitan Government, and the official representative of Seoul's transportation planning and management institution. This agency approves the city's public transportation route changes, vehicle structure changes, and public transport fleet changes. The bureau also issues vehicle inspection, common carrier licenses, vehicle registration, and permit to operate automobile maintenance and repair shops in the city. It has the additional role of transportation related project advisor. Its major function is administration of public transportation and traffic management.

B) The Bureau of Construction is responsible for public facility construction in the city. This bureau constructs roads, bridges, sewage plants, public facilities, and upgrades the Han river basin. It is also involved in managing public safety by controlling flood areas. This bureau maintains municipal roads and supplies the infrastructure to communities in the city. This bureau is also involved in operating and managing public parking facilities and collecting tolls from city highways and tunnels.

C) The Bureau of Environment Protection regulates pollution in the city. It operates the street cleaning division which cleans Seoul's streets and
collects Seoul's wastes. This bureau enforces vehicle emission standards. Vehicles emitting more than these standards permit are supposed to cease operation but enforcement, which is carried out by a small number of officials, is usually not done.

D) The Police Department is the enforcement agency in the city. The department's Traffic Division carries out traffic patrol, issues parking tickets, and handles traffic accidents. The traffic flow management is responsible for this division. This includes traffic signals and the installation of temporary roadblocks during project construction. It manages drivers' license examinations in Seoul. It is also a public relations agency in transportation safety and public transport information.

E) The Bureau of City Planning is responsible for Seoul's master plan. This bureau plans transportation facilities, land use, and urban development. It issues building permits and initiates transportation facility projects such as intercity bus terminals and moving freight trunk terminals. It is the plan making agency in the city government. After discussion with various departments, it prepares public works project each year, and its budget is submitted to the city's Planning and Coordination Office.

F) The Planning and Coordination Office is responsible for preparation of the city's annual budget to be submitted to the Ministry of Home Affairs. It is a coordination agency to develop the capacity to manage the city's affairs. It also acts as a legal counsel to the city's various agencies.

G) The Bureau of Housing is the implementation agency for housing projects and community development. It controls squatter settlements. It has adopted an aerial photo technique to expose new squatters and unauthorized building repairs. When it picks up those violations, it sends demolition teams from the Ku district to clear the site. It is involved in low-income
housing construction and community facilities. Housing relocation for transportation projects is also under this bureau's responsibility.

H) The Subway Transit Authority is responsible for operating Seoul's subway system. It is a special transit authority for the city to manage subway lines within the city boundary. The subway is connected to the regular railroad network. The National Railroad Authority operates extension lines from Seoul to Incheon and Seoul to Suwon. The Subway Transit Authority is responsible for supervising the development of the proposed three other subway routes projects.

4.4.1.3 Interest Groups

The following institutions are interest groups that make demands on the urban transportation facilities and policies in Seoul metropolitan area.

A) Seoul City Bus Association;
B) Seoul Ensured Seat Bus Association;
C) Seoul Charter Bus Association;
D) Seoul Taxicab Association;
E) Seoul Individual Taxicab Association;
F) Seoul Small Freight Carrier Association;
G) Seoul Truckers Federation (Seoul District Freight);
H) Seoul Automobile Manufactures and Automobile Part Manufacturers Cooperative; and
I) Most of the National Association headquarters.

The Korean transportation service industry has numerous business associations. At the national level, there is the Korean Transportation Service Association. Later this association was subdivided into the Korea City Bus Association, Korea Taxicab Association, Korea Intercity Bus Association, Korean Taxi-Hapsung Association, Korea Freight Federation, Korea Small Freight Carrier Association, Korea Charter Bus Association, Korea Hearse Transportation Association, Korean Automobile Manufacturers,
Automobile Manufacturers, and Automobile part Manufacturers Cooperative. These institutions have their branch offices in two special cities (Seoul and Pusan) and 9 provinces. There are approximately 50 transportation service associations in Korea classified by mode, service area, and operating rules. With the inclusion of repair and related associations and cooperatives, there were 70 such institutions existing in Korea in 1975. Associated with these institutions are labor unions (which are severely suppressed by the government) and the Korea Automobile Association, which is the only government sponsored automobile insurance company in Korea. All the labor unions' rights provisions are subjected in the Korean constitution to an ever present "if law so provides" clause. To cite a few examples:

"Art. 18 No citizen shall be subject to restriction of freedom of speech and the press, or freedom of assembly and association except as provided by law.

Art. 29 (1) The right to association, collective bargaining and collective action of workers shall be guaranteed within the scope defined by law.
(3) The right to collective action may be either restricted or may not be recognized in accordance with the provisions of law for public officials and workers engaged in state, local autonomous governments, state-run enterprises, public utility businesses, and enterprises which have serious influence on the national economy."

The major concern of most of these associations is to change their old vehicles into more modern ones and in the case of buses, to change from the gasoline engine to diesel. However, their financial status makes them difficult to do so. These institutions ask the government for subsidies, and permission to increase transport fare and negotiate with the government on transportation regulations and standards specifying conditions for operating their businesses. The government uses these associations as an implementation agency for government instructions and
orders dealing with transportation service. There is heavy pressure from government as well as the hidden hand of government. These institutions do not have direct involvement in transportation planning nor project initiation. Each organization is recognized by the government after it obtains permission from the government to organize and act as a representative body for the members. They are working to protect their interests and to bargain with government to ease regulations and increase transportation fares.

In sum, the institutions of the national and local government involved in urban transportation planning, project development, and implementation are numerous. The institutional roles and responsibilities are described in general terms but their performance and levels of involvement can vary greatly from one plan or project to another.

Although the organizational structure and distribution of responsibility are changing with time, it is clear from the description of institutional responsibility that no one government agency or private institutions is involved in the planning of urban transportation projects and policy for low-income citizens.

4.4.2 Transportation Licensing System

The Government licenses private firms which operate for hire services in Korea's road transport system. Road transport licenses are issued for scheduled services along established routes (buses and trucks) or for nonscheduled operations within a defined area (taxis and trucks). There is no commodity licensing for trucks; however special licenses are issued for tractor trailers, tanks and container trailers. The types of road licenses and the issuing authorities are summarized in Table 4.11.
Table 4.11 LICENSING AUTHORITIES FOR BUSES AND Taxis

<table>
<thead>
<tr>
<th>Kind of License</th>
<th>Service Area</th>
<th>Licensing Authorities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buses</td>
<td>intraprovincial</td>
<td>Governors of provinces and Mayors of special cities</td>
</tr>
<tr>
<td>Line licenses</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>interprovincial,</td>
<td>Ministry of Transportation</td>
</tr>
<tr>
<td></td>
<td>expressways and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>designated industrial roads</td>
<td></td>
</tr>
<tr>
<td>Taxis</td>
<td>intraprovincial</td>
<td>Governors of provinces and Mayors of Special cities</td>
</tr>
<tr>
<td>Area licenses</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


In 1975, about 1,150 licenses were outstanding for operation of motor vehicles for hire in Seoul, as shown in Table 4.12. This figure is about 50% of total licenses in Korea.100 Table B.1 shows the place of registration for road transport vehicles in Korea and indicates clearly the concentration of vehicle registrations in the two large metropolitan areas; 68% of cars and jeeps; 41% of all buses and 55% of the largest buses; and 47% of all trucks and 52% of trucks under 5 tons. Only the larger trucks are spread more evenly throughout the country. In the bus operation the average fleet per licensee ranges from 50 to 60 units.101 However, some firms are much larger than the average. Two companies have more than 100 buses in Seoul. Twenty companies out of 91 bus companies have more than 60 buses which operate in Seoul.102
Table 4.12: MOTOR VEHICLE LICENSEES

<table>
<thead>
<tr>
<th></th>
<th>Number of Licensees</th>
<th>Number of Vehicles</th>
<th>Vehicle/Licensee</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Buses</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intracity</td>
<td>91</td>
<td>4,833</td>
<td>53</td>
</tr>
<tr>
<td>Charter</td>
<td>28</td>
<td>509</td>
<td>18</td>
</tr>
<tr>
<td><strong>Taxis</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Owner operators of one vehicle</td>
<td>554</td>
<td>554</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td>212</td>
<td>11,906</td>
<td>56</td>
</tr>
<tr>
<td><strong>Trucks</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>223</td>
<td>10,330</td>
<td></td>
<td>46</td>
</tr>
<tr>
<td><strong>Others</strong></td>
<td>35</td>
<td>565</td>
<td>16</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1,143</td>
<td>28,697</td>
<td>25</td>
</tr>
</tbody>
</table>


The authorities follow a similar procedure in licensing road operators. They attempt to lay down minimum requirements which licensees must meet in the case of road transport, the licensee must operate a minimum number of vehicles:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Minimum Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taxis (Seoul and Pusan)</td>
<td>50 Units</td>
</tr>
<tr>
<td>Taxis (other cities)</td>
<td>20 Units</td>
</tr>
<tr>
<td>Taxis (outside cities)</td>
<td>5 Units</td>
</tr>
<tr>
<td>Buses (other than local buses outside cities and other than charter buses)</td>
<td>30 Units</td>
</tr>
<tr>
<td>Local Buses (outside cities other than charter buses)</td>
<td>10 Units</td>
</tr>
<tr>
<td>Charter Buses (Seoul and Pusan)</td>
<td>20 Units</td>
</tr>
<tr>
<td>Charter Buses (outside Seoul and Pusan)</td>
<td>10 Units</td>
</tr>
</tbody>
</table>

Taxi and truck licensing requirements have recently been relaxed to allow the issuance of licenses to owner operators of one vehicle, to allow the waiver of the 30 unit fleet requirement (schedules and unscheduled in Seoul and Pusan) in appropriate cases and to exempt pickup trucks and three wheel small trucks from licensing completely. The minimum fleet
requirement for road transport does not mean that the licensee must own the requisite number of vehicles; frequently vehicles are owned individually and licenses are issued to a loose association of single owners. Road transport licensees must also have certain minimal office and parking facilities and provide their own capital for roughly 30% of their assets. 105

The licensing authorities attempt to match licenses capacity to demand. In the case of road transport, surveys are made annually to determine the number of passengers carried per day by taxis and buses and the number of km that trucks are moving each day. If the utilization factor exceeds a set daily standard (for buses 29 persons and for trucks 170 km) additional capacity is licensed. 106 This system obviously is based on fairly uniform vehicle sizes and makes no allowance for improvements in productivity either through smaller vehicles or better utilization of equipment.

The licensing authorities have tried to maintain the number of licensees stable and to achieve added capacity by authorizing additions to existing fleets by proportionate increases in the fleets of all licensees to maintain the relative position of licensees to each other. Over the past few years the number of bus licensees have fluctuated in a range between 23 and 91 and that of taxi licensees, between 53 and 778; in both cases the total number of vehicles has increased steadily except 1961 and 1962 (see Table B.3). 107 Where licenses are issued by routes (there are about 157 bus routes in Seoul) capacity assessments are made route by route and additional vehicles assigned accordingly. The licensing authorities also control the number of daily runs to be offered by each bus licensee on a particular route;
the exact time of these runs is selected by the operator and is only reported to the Government. New routes are authorized when a demand has been demonstrated for this service. 108

In summary, the Government restricts entry into the "for hire" road transport industries. However, the restrictions have not been so onerous as to discourage growth of these industries or to prevent infusion of additional capital. On the other hand, the mechanisms to control entry may hinder increased efficiency and entry of small new enterprises. Road transport is privately owned but the government licenses all enterprises offering services for hire. Licensing policy seeks to limit licensed capacity to demand but concentrates on "for hire" operations without considering the continued growth of private ("Own account") operations in road transport. 109 Licensing practices also may inhibit improved productivity in the transport industries.

Most road transport licensees are loose associations of individual owner operators and only about 20% of the licensees are integrated enterprises which own their own equipment and operate it under direct management. 110 Although very little information is available on the physical and economic performance of the road transport industry, the Government wishes to move the industry to the direct management system (where the assets are owned and controlled by a single management). 111 This change would interrupt the present system of supplying capital to the road transport industry and should only be made after a thorough survey of the industry.
4.4.3. Description of Pricing System

The Government has broad powers to regulate prices in the economy. While the application of these powers varies widely among sectors, the Government fixes all prices in the transportation industry. Prices for publicly owned transport enterprises such as the railways are proposed by enterprise management to the Minister of Transport and he in turn submits the proposals to the Economic Planning Board. The Price Bureau of the Economic Planning Board analyzes the proposals and presents them to a Government committee on utility prices. The recommendations of that committee are then presented to the cabinet. Prices of privately owned transport enterprises are subject to the same review except that proposals originate in one of the Divisions of Ministry of Transport, who act on the basis of representations made by industry organizations. 112

The regulatory pattern 113 differs considerably among the modes. Road passenger services include taxis at W*100 to W 60 per vehicle-km (depending on distance) and buses of various categories. City buses charge a standard W 35 per seat while intercity buses on unpaved roads charge W 5.79 per passenger-km and on paved roads W 5.18. Buses which travel on the expressway system have a fare of W 5.27 per passenger-km for trips up to 200 km; the charge declines to W 4.39 on trips over 400 km, just somewhat more than the highest rail passenger fares (W 4.2 per km). Railway passenger services are classified from the fastest express which costs about W 4.2 per km to local trains charging only W 2.5 per km.

In addition to explicit regulation of transport prices, Government indirectly affects prices in this sector by taxing policies, subsidies

*W = abbreviation of won; 500 won = U.S. one dollar as of 1976.
to various transport operators and user charges for Government furnished facilities, such as airports and roads. However, the procedures for setting transport prices generally do not apply to these other Government actions which may affect prices in the transport sector.

The system for regulating transport prices concentrates on standard line haul charges, the easiest and most obvious point to apply regulation. The system gives only limited attention to the numerous special prices which are used by Korea's transport agencies and which inevitably play a major role in any complex transport operation. Regulations are based on cost data characterizing the modes generally, not detailed costs for point to point movements. Moreover, none of the modes has comprehensive costing systems and, for highways and coastal shipping, the Government negotiates with industry representatives on the basis of cost data supplies by them. The regulatory system thus cannot make subtle distinctions; this is not necessarily a fault but a limitation to be considered in evaluating the system. 114

The extent of regulation varies among the modes. In some modes and for some services, the regulation determines the rate (for instance, all railway services and bus fares) while in other cases (such as highway freight) the Government's rate constitutes a maximum only and may be negotiated downward. Truck rates may be as much as 40% less than the official tariff. 115

While coordination of pricing is one of the aims of regulation, institutions have not yet been developed not has information become available to meet this aim effectively. The Transport Coordination Office in the Ministry of Transport could play an active part in this work but
so far has not done so. The regulatory process also does not take adequate account of the many transport activities which are not subject to regulation but inevitably affect the regulated sector. These activities include the operation of cars, buses, trucks and ships by nontransport companies for their own account.

In summary, while the Government nominally controls all prices in the transport sector, prices actually charged for transport services may diverge considerably from Government norms. The regulatory system for transport prices has only limited access to cost data and does not have access to any mechanism for intermodal review of prices. The Transport Coordination Office in the Ministry of Transportation should have the responsibility and staff to ensure that Government decisions on prices are based on proper cost information and full intermodal comparisons, and the Office should establish a work program for this purpose.

Although a major aim of Government price regulation is to assign traffic to the most economical mode, regulation appears not to have had a major effect on modal choice. As modal choice involves complex cost calculations as well as subjective factors, Government policy in pricing and finance should be redirected to objectives which are the Government's most immediate concern and over which the Government has most control. These are pricing and finance of Government-owned transport enterprises and identification and development of improved transportation systems. The promotion of improved transportation systems should be the joint responsibility of the Economic Planning Board and the Transport Coordination Office.
4.4.4 Decision Making in the Urban Transportation Sector

4.4.4.1 Road Investment

This is probably the most clearly defined function within the transportation sector, although there are some major points of uncertainty with respect to functional responsibilities and investment criteria. At the national level, the Economic Planning Board is responsible for the national budget proposal, allocation and dispersal. The budget proposal task itself is delegated to two National ministries, the Ministry of Home Affairs and the Ministry of Construction. 116

The Ministry of Home Affairs is responsible for the co-ordination and approval (but not formulation) of the budgets of the cities and provinces which are presented for each sector, while the Ministry of Construction generates many of its own project and budget proposals at the national level.

The budget proposals of the cities reach the Ministry of Home Affairs by the following process. 117 Proposals are generated by the City Master Planning process, itself the responsibility of the Bureau of City Planning. Depending upon city size these master plans are then taken to the National Planning Review Committee or Provincial Planning Review Committee for approval. Once approved the projects and an implementation programme are included in the city's annual budget proposals prepared by the city's Bureau of Construction which are forwarded to the Ministry of Home Affairs. Cities other than Seoul forward their budget proposals to the Provincial Government. The agreed city/provincial budget and the projects within each sector are then sent to the Ministry of Home Affairs, which is responsible for the coordination of city/pro-
vincial budgets at the central Government level. With respect to the allocation of investment across sectors, in Seoul for example, approximately 50% of the City's current annual budget is given over to infrastructure and housing, 52% of which is devoted to new road construction. The self-sufficiency of small and medium cities in respect of their budgets is in the order of 48%, although in the case of Seoul the figure is close to 99%. The balance of each city's budget requirement is made up through a central government subsidy, but clearly there is considerable pressure on the cities to keep the level of this subsidy low.

The cities are totally responsible for the planning, construction and maintenance of two of the three types of roads within their boundaries: provincial roads and city roads. National roads are the responsibility of the Ministry of Construction. Where a section of a national road crosses a city, although the project responsibility rests with the Ministry of Construction, its costs are met from three sources: a Ministry of Construction subsidy, the City's own budget and a national tax subsidy (share of tax) allocation by the Ministry of Construction. In addition, the Ministry of Construction will occasionally contribute directly to the funding of major urban road projects.

4.4.4.2 Land Use Policy

Insofar as the urban transportation sector is concerned, the formulation of each city's land use policy is the responsibility of the Bureau of City Planning, which in turn receives its guidelines for the preparation of these plans (e.g., extension of the green belt to avoid urban sprawl) from the Planning Review Committee of the National City Planning Bureau.
of the Ministry of Construction. The Bureau of City Planning is also responsible for the City's strategic transportation planning. However, a number of land use decisions are also made outside this framework. In Seoul, for example, there is a special urban planning committee to deal with short term problems. Their recommendations go directly to the Mayor for approval and then to the National Ministry of Construction. These short term problems and proposed solutions invariably relate to the reduction of special traffic generators, and the prohibition of new building permits.

4.4.4.3 Public Transport and Taxis

The Ministry of Transportation has national responsibility for regulating the supply of pricing policy for buses and taxis. The operation of the public transport service is controlled by licensing through the Ministry of Transportation. Fares are regulated nationally by the Ministry and in case of buses the routes are fixed by the Municipal Bureau of Transportation. Recent legislation has compelled bus operators to incorporate. Their decisions to change the sizes of their fleets are also subject to regulation.

Pricing and regulatory policies for taxis mirror those for public transport. Fares are set uniformly on a national bases, while the number of companies and vehicles in each city are regulated through a licensing policy which is applied and monitored in the same manner as bus transport. Shared rides are currently prohibited in Korean cities to avoid what is regarded as excessive profiteering on the part of the taxi drivers.

The National Ministry of Transportation delegates the responsibility for the implementation and monitoring of regulatory policies to the
Municipal Bureau of Transportation, while the selection of new operators is, in principle, delegated to the Provincial governors for the cities other than Seoul and Pusan (Seoul and Pusan are delegated to the Mayor). 122

Fare changes recommended by the Ministry of Transportation are subject to review by the Economic Planning Board, to ensure that they are consistent with national economic policy. Taxi and bus operating companies applying for licenses have to give proof of assets.123

4.4.4.4. Car Ownership and Use

The pricing of car ownership has been the single most effective urban transport policy instrument to date in discouraging private travel demand in Seoul. Taxes are levied on the purchase of cars by the Ministry of Finance, as are the annual usage taxes with the exception of license fees. Licenses are regulated by the Municipality. The basic regulatory tool is that of pricing. The taxes and other imports together set an exceptionally high price on car ownership. In 1975 for example, the taxes payable on the purchase of an average car (e.g., small passenger car -- a Pony), amounted to 42% of the factory price.124 (See Table B.4). Taxes levied annually (motor vehicle tax, defense surtax and license) amount to an additional 11.7% of the base factory price. A use tax is also levied on petrol. The time series structure of these ownership and use taxes is set out in Table 4.13 at constant 1970 prices for those years for which the data is available, on the average family car.
Table 4.13 TAXES ON OWNERSHIP AND USE FOR THE AVERAGE KOREAN CAR

<table>
<thead>
<tr>
<th></th>
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<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1966</td>
<td>967,000</td>
<td>1,296,247</td>
<td>129,625</td>
<td>-</td>
<td>25,925</td>
<td>278,820 - 48,257</td>
</tr>
<tr>
<td>1967</td>
<td>967,000</td>
<td>1,217,884</td>
<td>121,788</td>
<td>-</td>
<td>24,358</td>
<td>261,965 - 45,340</td>
</tr>
<tr>
<td>1968</td>
<td>872,000</td>
<td>1,016,317</td>
<td>101,632</td>
<td>-</td>
<td>20,326</td>
<td>193,939 - 41,958</td>
</tr>
<tr>
<td>1969</td>
<td>1,177,619</td>
<td>1,366,147</td>
<td>136,615</td>
<td>-</td>
<td>27,326</td>
<td>181,659 - 39,301</td>
</tr>
<tr>
<td>1970</td>
<td>1,400,374</td>
<td>1,400,374</td>
<td>323,163</td>
<td>-</td>
<td>28,008</td>
<td>166,400 - 36,000</td>
</tr>
<tr>
<td>1971</td>
<td>1,390,548</td>
<td>1,225,152</td>
<td>282,727</td>
<td>-</td>
<td>24,503</td>
<td>146,607 - 31,718</td>
</tr>
<tr>
<td>1972</td>
<td>1,784,260</td>
<td>1,407,145</td>
<td>324,726</td>
<td>-</td>
<td>28,143</td>
<td>131,230 - 28,391</td>
</tr>
<tr>
<td>1973</td>
<td>1,890,194</td>
<td>1,445,102</td>
<td>333,485</td>
<td>-</td>
<td>28,902</td>
<td>101,835 - 11,009</td>
</tr>
<tr>
<td>1974</td>
<td>2,416,439</td>
<td>1,386,125</td>
<td>342,951</td>
<td>-</td>
<td>29,723</td>
<td>81,919 - 8,856</td>
</tr>
<tr>
<td>1975</td>
<td>2,350,132</td>
<td>1,153,722</td>
<td>186,084</td>
<td>37,219</td>
<td>23,074</td>
<td>98,085 29,426 7,069</td>
</tr>
</tbody>
</table>


The Government also levies an National Highway Bond of $1,000.00 on the purchase of a car, on which the Government pays interest. The purchase usually finances this bond through a loan raised on the commercial market, and on which he pays the difference between the Government and commercial rates of interest. Finally, the Government has imposed Value Added Tax at a rate of 10% on the factory price less input cost from 1978. This is in addition to the existing taxes on ownership.

4.4.4.5 Traffic Management

One of the major reasons for the ineffectiveness of traffic management in Korean cities lies in the absence of clearly defined responsibilities
for the planning and implementation of traffic management policy. At the municipal level, the responsibilities of the Bureau of Transportation include the monitoring of traffic conditions, regulation of bus and taxi licensing and fare policy, road maintenance and traffic management. The traffic police are responsible for traffic regulations, safety, traffic signals and enforcement. In practice, however, a good deal of confusion exists with respect to the specific responsibilities of the Bureau of Transportation and Traffic Police.

4.4.5 Summary

The government controls all prices and entry into the "for hire" road transportation industries in the transportation sector. All road transportation is operated by the private sector while infrastructure and rail transportation are supplied by the government. Most urban transportation plans are initiated and implemented by government agencies; thus the private sector does not have much power to direct transportation policy. There is virtually no single institution to address the problem of low-income residents' transportation either the government or the private sector.

There are strong means of enforcement and various regulations concerning the minimum number of vehicles in public transit service and the pricing of public transportation. Yet, there is no reasonable justification provided for how the government sets transportation regulations and policies. The division of responsibility in local government is not clear to the agencies involved in traffic management. It would be desirable that the agencies or organizations that will perform the activities called for in urban transportation be involved in a coordinated planning process.
Moreover, it seems to be that the success of any cooperative undertaking that is actually carried out can be attributed to the strong leadership of an individual representing one of the participating institutions. This institution -- the Presidency, presently but hopefully some other in the future, then takes on the responsibility for many key functions. It coordinates planning, seeks funding assistance, lobbies for essential changes in existing laws and regulations, and most importantly, persuades other public agencies and private organizations to participate in or give their approval to the urban transportation program for the low-income population. The participation or approval such institutions is essential to the successful implementation of the urban transportation program for low-income areas. This idea is further explored in the Section 7.2.2, "Creating Metropolitan Transportation Authority". However, a variety of practical and perceptual problems, such as the lack of sufficient funds and personnel, legal and regulatory restrictions, or vested interests, may stand in the way of obtaining this support. Some of these problems seem to be generated by the particular circumstances of a given urban area -- its existing transportation resources, environmental problems, and political structure. Yet, there is no one government or private institution that acts consistently in support of the urban transportation program for low-income areas.

The next section, "Transportation Manufacturing Industry: A Source of Supply," examines how the Korean transportation manufacturing industry has developed and what were the major causes of the industry's transformation. We will explore this topic in order to identify a manufacturing capability of an appropriate transportation technology. Also, this section will be useful in understanding how informal sector activity -- small-scale
assemblies and repair shops -- has been affected by the development of mass productions transportation manufacturing industry in Korea.

4.5 **Transportation Manufacturing Industry: A Source of Supply**

This section deals with relationships between the transportation manufacturing industry and the choice of transportation mode. There is some empirical evidence about the strong influence exerted by the transportation manufacturing industry on urban transportation mode in the city. The policy on transportation industry and its effects in mode choice will be identified for future transportation planning.

4.5.1 **Development of Transportation Manufacturing Industry**

In this section I give an overall picture of the Korean automobile manufacturing and assembly industry, which we will define as a manufacturing institution which produces an automobile as a final output either from assembly, conversion or manufacturing. The first stage in the Korean auto industry was the Liberation from Japan in August, 1945, and the disposition to Koreans of productive facilities owned by the Japanese. Only one of the four existing vehicle manufacturing firms was established by Koreans before the Liberation as an automobile parts manufacturing firm. After the Liberation several firms were established as automobile assemblers and part manufacturers. They had been small scale repair garages and part dealers before the Liberation. Most of them came into existence with productive facilities owned previously by the Japanese.

The second historical event is the Korean War, 1950-1953. None of the manufacturing firms at that time were free from the ravages of the war. It was total disaster! Yet, the war brought great importance and progress to the automobile part manufacturing and repair industry. Since most military vehicles were brought from overseas, there was a great need for abundant parts reproduction and automobile repair in Korea. In 1952, the Korean
The Korean motor industry virtually began in 1955 when the Sibal Automobile Company commenced the assembly of passenger cars -- Sibal model (jeep). However, progress was extremely slow, as shown by the total output of only 2,235 units in the following eight years. In 1962, Sibal was superseded by the Sae Nara Motor Company which assembled Nissan Bluebird models from imported "complete knocked down" kits. This was due to the government (military government after 1961 military coup by the current President Park) effort to develop the automobile industry as a strategic
industry from the point of view of national defense and industrialization. The government made the first five year plan in 1961 and passed an Automobile Industry Protection Act #1079 which stated "an objective to protect automobile industry to develop modern comprehensive automobile manufacturing facilities." After the coup, the military government imported 400 units of Nissan Bluebird models and sold them in the domestic market to finance the government. The Sae Nara Motor Company was the first company to build a large scale mass assembly automobile plant in Korea. It was late in 1962 when Sae Nara Motor Company commenced assembling small passenger cars (Sae Nara models) from components and parts imported from Japan in completely knocked down condition in their factory at Bupyung near Seoul. However, scarce foreign exchange and the heavy dependency on import made maintaining the same production level impossible. Production in 1962 amounted to 1,310 units, but in the middle of the following year the country's trading position deteriorated so badly that the situation regarding foreign exchange reserves made it impossible to import the kits; as a result, output in 1963 fell to 1,063 units. In addition, the political involvement of Sae Nara Motor Company with the Democratic Republic Party (formed by the members of the military coup) scandal contributed to the shut down of their factory in late 1963.

In November, 1963, Shin Jin Motors manufactured the Shin Sung jeep. The quality of this jeep was far better than converted jeeps but it did not compare to the Sae Nara. This first manufactured vehicle failed in the area of marketing. At that time most urban taxi companies changed their vehicles from jeeps to sedan (Sae Nara) and a strong enough market did not exist for the Shin Sung. Later, Shinjin Motors bought the bankrupt Sae Nara Motor Company's factory. Passenger car output started again by the Shinjin Motor
Company in 1964, but the volume was initially negligible -- 216 units in 1964 and 88 units in 1965. Shinjin Motor invested large sums of money after arranging a joint venture with Toyota. Toyota became involved in the licensing and technical arrangement of Shinjin. Shinjin imported "complete knocked down" kits from Toyota to assemble the Corona and Crown models. Buses and trucks were also added to the company's range, and in 1969 the assembly of Jeeps commenced under an arrangement with Kaiser. The recession of 1971 resulted in a termination of the link with Toyota, but the following year the company formed a link with another powerful partner -- General Motors.

In 1965, the Ministry of Commerce and Industry issued a regulation on automobile assembly and manufacturing which practically threw out small assemblers and automobile converting firms. There were about thirty small and medium size hand producing automobile assemblers before the regulation. This regulation established a minimum size and financial capacity for an automobile manufacturing factory. At that time most of these small and medium factories could not meet the ordinance. They changed their manufacturing facilities to automobile repair and parts manufacturing.

At this time the government pushed the Korean big business circle to get involved in the automobile industry. Asia Automobile Company Limited arranged for technical assistance from Fiat in Italy. By 1967, Asia Automobile Company and Hundai Motor Company have obtained the necessary clearance from the government to begin the assembling of passenger cars. Up until October 1968, Shinjin was the only company in Korea assembling passenger cars. This monopoly was broken by the entry into the market of Hundai, which obtained assistance from Ford; and then in the following year Fiat set up in business as the Asia Automobile Company. Shinjin's reaction
to this new competition was to enter into a U.S. $48 million partnership, on a 50/50 basis, with General Motors, thereby establishing GM Korea.148

About the same time Kia Industry which was an automobile part manufacturer before the Liberation produced bicycle, motorcycle, and trucks, similarly entered into a partnership with Honda.149

However, these developments have been eclipsed by Hyundai’s manufacturing its own car, known as the Pony, to supplement its assembly operations.

4.5.1.1 Production and Capacity

The output of vehicles by the Korean manufacturers is far below the installed capacity. The industry was badly affected by the recession in 1971 and 1972 when output of four-wheelers fell below the 20,000 units level to 18,005 and 14,744 respectively. In 1973 production recovered to 23,839 -- but this compares poorly with the combined annual assembly capacity of the four motor companies, which at the end of 1974 stood at 63,000.150

Table 4.14 The Output of Motor Vehicle in Korea

<table>
<thead>
<tr>
<th></th>
<th>Passenger cars</th>
<th>Trucks</th>
<th>Buses</th>
<th>Total (four wheel)</th>
<th>Three-wheel vehicles</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td>13,084</td>
<td>5,545</td>
<td>3,807</td>
<td>22,436</td>
<td>5,998</td>
</tr>
<tr>
<td>1971</td>
<td>11,512</td>
<td>3,191</td>
<td>3,302</td>
<td>18,005</td>
<td>5,940</td>
</tr>
<tr>
<td>1972</td>
<td>8,856</td>
<td>3,309</td>
<td>2,579</td>
<td>14,744</td>
<td>2,304</td>
</tr>
<tr>
<td>1973</td>
<td>12,632</td>
<td>7,723</td>
<td>3,484</td>
<td>23,839</td>
<td>2,381</td>
</tr>
<tr>
<td>1974</td>
<td>31,230</td>
<td>24,973</td>
<td>7,147</td>
<td>63,350</td>
<td>--</td>
</tr>
</tbody>
</table>


4.5.2 The Vehicle Assemblers and Manufacturers

There are four vehicle assemblers: GM Korea, Hyundai Motor Company, the Kia Industry and the Asia Automobile Company, and one automobile manufacturer in Korea, Hyundai Motor Company.
A) **GM Korea** Following Shinjin's link with General Motors, the company now assembles the Chevrolet 1700 and the Rekord 1900. In the case of the former model, parts are sourced from Australia, while those for the Rekord come from West Germany. The company's facilities at Bupyong, where trucks and buses are also assembled. Shinjin has a capacity of about 25,000 vehicles per year. There is in addition capacity for about 50,000 engines per year.

B) **Kia Industry** This firm, which began as a manufacturer of automobile parts and bicycles, became an assembler of motorcycles and three-wheel trucks under an agreement with Honda. In 1973, a new U.S. $8.3 million plant was opened at Sihung, near Seoul. This contains capacity for nearly 30,000 engines and 14,000 trucks per year. Kia assembles the Brisa (Kia sedan), B-1,000 Pick-up (0.5 ton), New Taitan B-2,000 (2.5 ton), Disel Taitan E-2,700 (2.5 ton) and Boxer E-4,100 (4.5 ton) trucks.

C) **Asian Automobile Company** Fiat's challenge in the market began in 1968 with the establishment of the Asia Automobile Company. The plant is located at Kwangju, about 170 miles south of Seoul. Assembly commenced in the following year with the Fiat 124 model but this model was put a stop to assemble in 1973. Asia has assembled buses and special vehicles since 1972.

D) **Hundai Motor Company** It was established in 1967 by the Hundai Group which has wide ranging interests covering engineering, ship-building, construction and international trading. The company has been assembling passenger cars, trucks and buses using imported "complete knocked down" kits which have been supplemented with locally manufactured items.

Hundai's current assembly facilities are located on a site of 300 acres at Ulsan. The annual capacity is about 17,000 vehicles, but output in 1975 totalled only 7,000 vehicles, of which about 5,500 were passenger...
cars and 1,500 buses and trucks. With the passenger car manufacturing factory at Ulsan on a 464 acre site commenced in January 1975 and completed by the end of the year, Hundai became a comprehensive automobile manufacturing company in Korea. Facilities include an engine plant, casting, forging and stamping shops, and an engineering center. The manufacturing project was U.S. $101 million investment. This was financed by Barclays (£17 million), the Banque de Suez (F59.5 million) and Hundai itself which was contributing the equivalent of U.S. $20 million in local currency.

Volume production began early in 1976, with an output figure of about 60,000 units in the first year. The car which Hundai manufactured has been designed by the Italian stylist Giorgiaro. Known as the Pony, it is a compact sedan with four doors. The 1,250 cc engine was supplied initially by Mitsubishi, but is being made under licence in Korea. Subsequently coupe and pick-up versions of the Pony have been marketed since the middle of 1976. The retail price of the Pony (see Table B.4) was U.S. $4,600.00 without tax in domestic market in 1976, while it was kept at U.S. $2,500.00 in world market.

4.5.3 Government Policy and Future Prospects

The influence of government on the structure and development of the Korean automobile industry has been (and is likely to remain) crucial. For example, the government in the past has used a quota system to encourage the use of local components, and has banned the importation of passenger cars with a few exceptions. Furthermore, investment in new plant for assembly or manufacture has to be sanctioned by the government. Also the timing of the investment must correspond with the government's overall economic planning policy.

The government has determined to establish the country on a viable economic footing through industrialization and export. The Hundai's manu-
facturing passenger cars -- the Pony -- must be viewed in this context. The Government is well aware of the additional short-term burdens that this will cause, but is probably looking forward to a time when it envisages that Korea will be the major source of vehicles to the growing economies of southeast Asia. Despite the undoubted potential of the domestic market, the Pony manufacturing project has been carried out with exports in mind. The government's commitment to an aggressive export strategy and cheap labor has already been made obvious when examining such diverse products as textiles, plywood and electronic goods. The Pony exports have been made to the Middle East, Latin America, and European countries since 1976. 159
CHAPTER V: ALTERNATIVE TECHNOLOGY

5.1 Introduction

The poor are considered to have limited mobility because they lack money and because of the inequitable urban transit service provided to their communities. The purpose, then, of improving accessibility of the urban poor is largely to give them access to employment. Rail rapid transit has been sold partly on its potential for serving the poor, but a cursory inspection of the service provided shows that it is the middle and upper income suburban dwellers who benefit most from this type of service. The government strives to achieve higher productivity and higher efficiency for Seoul's transportation system by introducing more modern types of technology. This, then creates the problem: the need to "modernize" the city in the face of the inability to forsake the more traditional ways, which often manifest themselves in the form of what has become identified as the "informal sector."\(^1\)

In light of this problem, this chapter addresses the question of what technical methods of transportation will produce a relevant and feasible solution for the urban poor. Unfortunately, the stock answer -- i.e., the simply quantitative provision of more and bigger version of existing public transport technology -- is not acceptable. As seen in Section 4.2, the subway and buses with bigger vehicle size do not alleviate transportation problems for the poor. It is not acceptable because it has not been planned nor implemented for the benefit of the urban poor. This is so because the urban poor lack political and social influence as well as
economic resources. This being the case, planners and engineers have tended to shy away from dealing with the transportation needs of the poor. In their view, the problem has been solved. All that is needed is institutional support in the form of adequate resources and the political will to implement existing solutions. But if the will is not there or if the resources are not forthcoming, can the planners and engineers simply shrug and move on to the next problem? Is there any further role for the planners and engineers to play?

This dissertation argues that there is. It suggests that if the resources are not at hand, nor on the horizon, that then the technological challenge is to do the job with fewer resources, and perhaps also with a different mix of resources.

This alternative, or what I have called "the technological challenge," forms the theme of this chapter. This dissertation identifies unskilled, uncoordinated, individually motivated and controlled self-help labor as a potential resource that might be brought to bear on the problems of the millions of urban households presently unreached by existing municipal infrastructure.

Infrastructure is generally defined as the facilities and services that support human settlement. One of the most acutely felt strains upon the existing urban infrastructure is in the transportation system. The modern technology associated with urban transportation services in urban settings generally has been assumed to be under the control of fairly large collectivities, while showing a systematic bias against the poor urban inhabitants, particularly against the millions of squatter inhabitants, have failed to provide adequate service for urban dwellers in their countries.
Squatters have provided for themselves many small-scale and "irregular" substitute elements of infrastructure, such as narrow alleys, informal markets, various forms of "ready-made, modified bicycles and motorcycles." However, government regulations on transportation services have opposed small-scale and irregular attempts by individual households or small clusters.

5.2 Transportation Need and Related Issues

Different settlement types require different needs of transportation. The high utility travel (journey-to-work) and locational choice of squatters are constrained largely by their occupations and economic status in relation to the existing transportation system. In terms of their choice of mode to reach their jobs, it can be seen in Table B.19 that flatland/streamside areas showed a much smaller home to work radius than mountainside areas. For instance, flatland-streamside areas showed higher rates of respondents who carry out their occupations in their homes. Central city flatland/streamside areas showed an average of 13.4% of their main supporters as working at home. Moreover, in terms of jobs that are within walking distances it can be seen that the central city and peripheral flatland/streamside areas showed a much higher proportion of those who walk to their jobs than did mountainside areas. On the other hand, mountainside areas showed the greatest rate of use of motorized forms of transportation to work, predominantly public bus transportation.

In this instance, it would be relevant to note that the factor of job location, in addition to being influenced by a factor of simple proximity to areas of economic activity, is probably related to occupations and economic status. In the previous section it was shown that the location of jobs within or near the community was related to particular occupations
such as commercial, and unskilled labor occupations, while white collar or skilled occupations showed much greater distance in terms of job location. Hence, it could be said that the general tendency for the squatter area to depend on the surrounding area for jobs and economic support is also related to the economic conditions of the residents themselves. It would then follow that peripheral flatland/streamside areas, although peripheral in the sense of being relatively isolated from areas of intensive economic activity show a considerable rate of occupational location in and around the community itself. On the other hand, peripheral mountainside areas show a high level of employment outside of the community. Thus, proximity to jobs appears to become less important as economic status levels increase, and can be seen as greater need for better transportation service. Consequently, it is important to realize the increased significance given to poorer areas in terms of the available transportation facilities as a form of support they receive, and the activity they generate within the surrounding environment.

Conventional efforts to determine actual levels of urban area trip generation are limited to assessments of existing trip patterns. These assessments, commonly made with the use of survey data, merely record existing trip volumes, with the implicit assumption that the associated constrained demand is reflective of the travel needs of the community under study. If the nature of tripmaking which is adequate for actual travel needs (high utility trip such as work trips, medical facility trips, etc.) is denoted by the term "transportation need" then the following relationship defines latent demand:²

Constrained Demand + Latent Demand = Transportation Need

That is, latent demand is represented by the potential for trip-making
volume which would be necessary to raise constrained demand to some ideal level of trip making.

The discrepancy between constrained demand and ideal demand may be explained by a variety of environmental and behavioral factors. Hoel and others have suggested four specific components of latent demand:

1. Trips which are not made due to the fact that adequate transportation is not available.
2. Trips which are not made due to limited awareness of the available transportation system options.
3. Trips which are not made because their trip ends are beyond the socio-economic sphere of normal household activity.
4. Trips which are not made because trip ends are priced beyond the financial capabilities of households.

The squatter settlement residents face the conditions described in these explanatory components because of the financial difficulties as well as the information barrier about better possibilities for their economic condition. Peripheral flatland/streamside areas residents have to walk long distances to take a bus. The public bus transportation service to the periphery areas is infrequent, transit routes are limited and transfers are highly restricted. A person with a good range of facilities near at hand has less need to travel than someone in a poorly served area.

Using these assumptions and seeking to maximize informal sector (squatter) activities, I will make a distinction between mobility and accessibility in order to identify the transportation needs. In his book Energy and Equity, Ivan Illich sets out explicitly the case against mobility at high speeds. This view forms part of his general vision of society, in which small-scale human institutions would replace existing large and formal structures, integrating into communities the functions now performed in bureaucratic fashion.

Conventional economic wisdom would suggest that increased consumption
leads to increased satisfaction, but this may be true for the individual only in the short run. The goals of community development for urban poor in relation to transportation must be 1) to maximize the accessibility to employment opportunities for the unemployed and underemployed; 2) the integration of the concept of human capital -- i.e., investment and development in people -- as part of the overall process of community development.

According to Schumacher, "for a poor man the chance to work is the greatest of all needs, and even poorly paid and relatively unproductive work is better than idleness." Schumacher based his original suggestion not only on the material but also on the spiritual needs of the individual. In transportation, basic human needs of movement to and from the human activities are important, but, just as important, though transportation technology people can obtain sense of potential and control over their environment. The essential function of the transportation system is to link points distributed in geographic space, thus providing a means for conveying people or goods from one place to another. Thompson has described those technologies that connect people, places, and things as mediating technologies.

The degree to which the poor are limited in their mobility in relation to available transportation service is not yet clear. To understand their situation, then, it may be better to replace the concept of "mobility" with that of "access." One factor which hinders the determination of transportation needs is the extent to which transportation problems of the urban poor vary according to occupation, income, wealth and geographical location; indeed, significant differences in travel behavior of the poor can be found even with the same -- largely homogeneous -- squatter settlement. Another complication is that stated difficulties with transportation are
not necessarily related to the need to make more trips. The poor person who travels to the doctor by bus and is intensely dissatisfied with bus service will not go to the doctor more often if bus service is improved or if taxi service is made available, if he is currently going to doctor as much as he needs to. In his case, the available alternative is to improve the quality of his travel, not to increase his mobility. The individual who says he would go out for social purposes more if transportation were available, in fact might not be able to afford the cost of entertainment or might not have any friends to visit. In this case, the expression of a latent demand for taking certain kinds of trips does not necessarily correspond with what would occur if transportation were made available.

The central city settlements and one area of peripheral mountainside settlement (Susaek) have more public transportation options (i.e., commuter train, bus and more taxis, etc.) but the bus transportation service is predominant in use by these squatters. In the previous analysis concerning types of occupations and locational patterns, it was pointed out that commercial occupations and unskilled labor markets showed the highest rate for job locations within the neighborhood. This is quite important, as it substantiates that fact that these less developed areas show a much higher need to have a cheap, point-to-point off-peak transportation system which can accommodate goods-carrying capacity. Better developed areas, on the other hand, consistent with the higher occupations to be found there, showed higher rates for employment outside the community. These areas need a cheap public transportation system with better information about the system or community-operated transportation modes for high density home-to-work travel.
5.3 Traditional Government Response to Squatter Needs

The mobility of the urban poor is a relatively new consideration in fighting poverty, joining a growing list of problems such as housing, employment, and education. Few meaningful observations have been recorded about it. Because transportation, unlike some other problems, is dependent on the time of day, week, and year, it is not easily quantified into absolute measures of performance. The traditional responses by government to the need for improved transportation in low-income areas have been to act positively by providing bus or rail transit services; to act negatively by eliminating the squatter settlement; or, most often, not to act at all.

Where government has responded to the physical needs of low-income communities with positive action, the form of the response has varied depending on the resources of the government and the particular constraints of the situation. However, with infrequent exceptions, the proposed solution has been to extend conventional transit route to the community at a token scale. This is unfortunately very misleading and irrelevant in analyzing and understanding the adequacy of transportation solution for the poor. Many times the residents in a squatter community have incomes too low even to afford the physically available public transport. The jobs of the poor, and hence their other activities, are frequently at odd shift hours, weekends, and holidays. In general, existing transportation services are not tailored for the special needs of the urban poor. This is largely the result of an incorrect assumption on the part of the auto-oriented Western industrialized policy makers who believe modernization lies in copying Western society's experience. The infrastructure service has almost exclusively depended on the whim of some external group. In this situation of government default in Seoul, squatter communities are
forced to continue under immobile conditions or to consider self-help solutions.

The self-help solutions for transportation service are individual or community initiated efforts, unsanctioned and unsupported by the central government. There are numerous examples of community or individual action providing other types of facilities without government approval or support. Examples include access ways, motor assisted bicycles, modified bicycles and motorcycles, and housing. Moderately successful efforts have also been made in installing electricity by illegally tapping into the municipal system.

The area in which communal self-help has been the least successful and least frequently attempted is the provision of transportation service. This is in large part due to the constraints of conventional auto-oriented perception, institutional arrangements for operation (i.e., drivers license, registration and inspection of vehicles, and entry control), required road network, and the difficult topography as well as location of the community.

The experiences in providing transportation service proposed for low-income areas have almost exclusively been applications of the auto-oriented solution; dependent on a central government system to operate, and vulnerable to the whims of the central government. This dependency is true whether the action is initiated by the government or the community, whether the action is legal or illegal. As will be discussed in the next section, such solutions are expensive for the poor and inappropriate to the rapidly growing urban areas of developing countries. Their implementation, particularly in squatter areas, is constrained by a variety of political, economic and physical factors. It is clear that successful community-initiated
solutions will continue to be rare exceptions until the monopoly and constraints of auto-oriented conventional technology are cast off.

5.4 Analysis of Conventional Auto-Oriented Transportation Systems

The standard response to the urban transportation problems of developing countries has been to apply conventional auto-oriented technology (i.e., bus or rail rapid transit) from industrialized countries where it can be afforded, and to bypass vast portions of urban areas where such service cannot be afforded or where it is considered unimportant to provide service.

Of all the areas of building technology the most established, most heavily capitalized, and least responsive to the changing needs of society is the technology used to provide transportation service in urban areas. To receive this service a community must adapt itself to the requirements of the technology. Public ways of sufficient width to accommodate vehicles, stations, maintenance and operation of roadway/railway, and sufficient demand for the service all are mandatory in an area served by a conventional auto-oriented transportation system.

The costs of urban transportation by different modes are displayed in Table 5.1. Automobile based and urban rail based systems are generally characterized by roadway/railway network. Two characteristics are fundamental to the conventional auto transportation modes under conditions of rapid growth in the communities of Seoul: first, that shortage of space in urban areas is rapidly intensifying and land costs are rocketing; and second, that resources are very restricted. The effective C.B.D. space has been increased by a relatively speedy underground subway system needing little surface area. But as has been noted, the cost of subway installation and operation is very high. Public transit systems are large vehicles
### Table 5.1 Illustrative Costs of Urban Transportation by Modes

<table>
<thead>
<tr>
<th>Track, per foot-width</th>
<th>Persons per foot-width per hour</th>
<th>Track capital costs 1) per hour</th>
<th>Track maintenance costs 2) per vehicle per season</th>
<th>Vehicle operating costs 3) per vehicle per season</th>
<th>Total costs per hour</th>
<th>US costs per mile</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Footway, 4 feet wide</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Car with driver only</td>
<td>12</td>
<td>120</td>
<td>0.4</td>
<td>0</td>
<td>13.0</td>
<td>0.02</td>
</tr>
<tr>
<td>Taxi with 4 passengers</td>
<td>8.6</td>
<td>120</td>
<td>0.4</td>
<td>0.2</td>
<td>14.6</td>
<td>0.02</td>
</tr>
<tr>
<td>Minibus with 10 passengers</td>
<td>7.5</td>
<td>120</td>
<td>0.6</td>
<td>0.3</td>
<td>20.0</td>
<td>0.03</td>
</tr>
<tr>
<td>Bus with 30 passengers</td>
<td>6.7</td>
<td>120</td>
<td>0.6</td>
<td>0.4</td>
<td>24.0</td>
<td>0.04</td>
</tr>
<tr>
<td><strong>Bicycle, 4 feet wide</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Car with driver only</td>
<td>15(1)</td>
<td>29</td>
<td>4.1</td>
<td>0.4</td>
<td>13.0</td>
<td>0.02</td>
</tr>
<tr>
<td>Taxi with 4 passengers</td>
<td>10</td>
<td>51</td>
<td>2.4</td>
<td>0.4</td>
<td>14.5</td>
<td>0.02</td>
</tr>
<tr>
<td>Minibus with 10 passengers</td>
<td>10</td>
<td>150</td>
<td>0.8</td>
<td>0.6</td>
<td>20.0</td>
<td>0.03</td>
</tr>
<tr>
<td>Bus with 30 passengers</td>
<td>8.6</td>
<td>300</td>
<td>0.4</td>
<td>1.0</td>
<td>50.0</td>
<td>0.07</td>
</tr>
<tr>
<td><strong>Urban expressway (capacity per foot-width is independent of width)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Car with driver only</td>
<td>15(2)</td>
<td>39</td>
<td>3.1</td>
<td>0.4</td>
<td>13.0</td>
<td>0.02</td>
</tr>
<tr>
<td>Taxi with 4 passengers</td>
<td>10</td>
<td>160</td>
<td>0.8</td>
<td>0.4</td>
<td>13.6</td>
<td>0.02</td>
</tr>
<tr>
<td>Minibus with 10 passengers</td>
<td>10</td>
<td>220</td>
<td>0.5</td>
<td>0.4</td>
<td>15.4</td>
<td>0.02</td>
</tr>
<tr>
<td>Bus with 30 passengers</td>
<td>8.6</td>
<td>410</td>
<td>0.3</td>
<td>1.0</td>
<td>50.0</td>
<td>0.07</td>
</tr>
<tr>
<td><strong>Metro (22,500 passengers per hour)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Car with driver only</td>
<td>40</td>
<td>180</td>
<td>5.0</td>
<td>0.4</td>
<td>11.0</td>
<td>0.02</td>
</tr>
<tr>
<td>Taxi with 4 passengers</td>
<td>40</td>
<td>720</td>
<td>1.2</td>
<td>0.4</td>
<td>11.2</td>
<td>0.02</td>
</tr>
<tr>
<td>Minibus with 10 passengers</td>
<td>40</td>
<td>1,200</td>
<td>0.8</td>
<td>0.6</td>
<td>17.0</td>
<td>0.03</td>
</tr>
<tr>
<td>Bus with 40 passengers</td>
<td>40</td>
<td>2,000(2)</td>
<td>0.4</td>
<td>1.0</td>
<td>43.0</td>
<td>0.07</td>
</tr>
<tr>
<td><strong>Urban railway (22,500 passengers per hour)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Car with driver only</td>
<td>30</td>
<td>1,700(2)</td>
<td>4.4</td>
<td>0.7</td>
<td>37.0</td>
<td>0.06</td>
</tr>
<tr>
<td>Taxi with 4 passengers</td>
<td>30</td>
<td>4,400(2)</td>
<td>2.8</td>
<td>0.7</td>
<td>37.0</td>
<td>0.06</td>
</tr>
<tr>
<td>Minibus with 10 passengers</td>
<td>30</td>
<td>1,600(2)</td>
<td>2.2</td>
<td>0.7</td>
<td>37.0</td>
<td>0.06</td>
</tr>
</tbody>
</table>

1) Track costs per hour, which are subject to wide variation, have been calculated on the basis of a 2,000-hour per year track utilization, infinite track life, and a 12.5% per year interest charge. Figures given are for a strip one mile long and one foot wide. Urban street is assumed to cost US$240,000 and urban expressway US$1,650,000 per 12-foot lane-mile (exclusive of land and services). Capacity of expressway is assumed to be 2,200 PCU per lane per hour.

2) Maintenance costs are assumed sufficient to keep track in good condition indefinitely, and also include the costs of lighting, cleaning and traffic control. Figures are based on data collected by Alan M. Voorhees and Associates in the Bank-financed Caracas Road User Charges Study.

3) Vehicle operating costs, which include depreciation and interest charges, are also subject to wide variation. The 13 cents a mile for a car represents a U.S. "compact" car under relatively favorable road conditions. Taxis are assumed to have the same costs as cars, plus drivers' wages of 70 cents an hour. Minibuses are represented by the 14-seat H-700 of the "Public Light Bus" and costs are adopted from Richard Butler's "Bus Operation in the Colony of Hong Kong." Bus costs are assumed as in Kuala Lumpur's 40-seat buses. As calculated by Alan M. Voorhees and Associates, railway operating costs, which relate to London, are supplied by London Transport. Speed reductions from 15 to 10 miles per hour are assumed to cause operating costs by 35% in the case of cars and railways, 15% in the case of minibuses, and 25% in the case of buses. Speed rises from 15 to 40 miles per hour are assumed to result in vehicle operating cost increases of 15% in all cases.

4) Data on footways are obtained from "Movement of Pedestrians on Footways in Shopping Streets" by S. J. Older, *Traffic Engineering and Control*, August 1955.

5) Mixed traffic on urban streets are assumed to move at 15 or 10 miles per hour. Taxis are assumed to stop 1 minute, minibuses 2 minutes, and buses 3 minutes per mile traveled.

6) Bus-on-expressway figures are based on observations on the I-455 bus-lane leading to the New York Port Authority bus terminal, recording 375 buses in one hour. Higher rates of flow were observed over five-minute periods. Railway passenger flows are based on conditions on Mexico City's Metro, actual average loads are assumed to be 62 people per car equipped with 60 in London. These volumes should not be taken as maximum capacities of mass transport: passenger loads in excess of 60,000 per hour have been observed in New York and Paris subways, under conditions of crush loading. Similar volumes of passengers, even all seated, could be moved by high capacity buses on exclusive lanes. Few traffic controls generate such volumes.

and can serve many passengers. However, such systems require a high degree of social and technical organization and a tremendous initial capital investment. In a typical squatter settlements with irregular housing patterns, scarce resources, and a lack of public commitment, such systems are wholly inadequate and inappropriate.

5.4.1 Problems of the Auto-oriented Transportation Technology

Government policy for the provision of transportation service for squatter areas has been characterized in the past by its non-existence. Transportation system technology, as currently implemented in developing countries is directly imported from developed countries. Rapid rail transit systems have been planned, installed, and managed by foreign consultants or foreign-trained local engineers whose professional background and training has led them to accept one and only one way of providing service to residential areas. Such an approach ignores the clear differences in resources and needs of developing and developed countries. The inherent problems of the auto-oriented conventional transportation technology are allowed to go unquestioned, as is the inherent inapplicability of such systems to rapidly expanding urban areas. These conventional systems automatically preclude non-motorized and decentralized efforts by individual households or communities to provide for themselves.

The problems of the auto-oriented conventional transportation technology for the urban poor include the following:

A) High Cost for the Poor

For the majority of the squatter inhabitants, speed and comfort are certainly of low importance compared with fares. The cheapest public transportation service in Seoul costs 30 won per trip (local bus). At present, most households in squatter communities have a monthly income of
21,000 won. A round trip cost for a primary wage earner in a typical household would be 70 won per day or about 10% of his total monthly income. The use of motorized transportation mode in better developed communities is limited to about ten percent of inhabitants in the community (60% of the primary wage earners home to work journey). The rest of the squatter inhabitants stay within the community or have to walk due to their limited economic resources.

The cost of essential journeys will continue to be prohibitive to the very poor who cannot afford to locate near job opportunities. This economic factor of affordability will continue, since the present patterns of land use and settlement location behavior will be inevitable. The minimal bus cost figures are likely to increase as traffic congestion worsens with city growth. As more street space is taken up by the unrestrained growth of private cars, mass transit costs will increase.

B) The Physical Inappropriateness of Settlements to Admit Motor Vehicles

Even in those communities where reasonable bus transportation is possible, the poor are often denied access to the system by a physical factor. The haphazard growth of slum settlements often on hillsides or in gulleys excludes them from connection with the city street network; so does the unregulated patterns of housing which do not allow sufficient space for a street network. Some of the older, larger, and better developed inner city mountainside squatter settlements (i.e., Oksu Dong) have paved main roads and bus service. In most, however, roads are unpaved and too narrow to admit motor vehicles.

C) Financial Deficiencies of Existing Transport Systems

In a rapidly growing city, the expansion of the transport system into
the newly settled areas is an important factor to the lower-income groups who settle at the periphery. However, many public transportation systems are heavily regulated in terms of fleet size, fare structure, entry control, and operating standards without subsidies from the public sector. The government's emphasis has been on simply keeping down fares and not on reducing costs of operation of public road transportation in Seoul. The reluctance to permit fare increases when fuel costs and other operating costs have risen results in all privately operated public transportation services, in the decapitalization of the companies even with extreme overcrowding of serviceable vehicles. The consequent lack of financial resources is a major cause of the continued use of obsolete vehicles, very high rates of breakdown, and workshops concentrated on emergency repairs to the exclusion of routine maintenance. Local bus companies employ two to three workers per bus. The management of the bus and taxi industry in Seoul provides further evidence of financial shortcomings in their method of organization to acquire government permits to operate. Financial constraints prevent expansion of the public transportation system at a rate rapid enough to accommodate the growth of the city. In the late 1960's intermediate public transportation service -- Hapsung -- had developed to overcome some of the shortcomings of the bus and taxi services. Unfortunately, the cost of this alternative was higher than could be provided by an efficient bus transport system.

D) Non-renewable Resource Requirement

The lack of metals and petroleum in Korea invites serious balance of payments difficulties to promote and maintain auto-oriented transportation technology. In Korea, the most salient aspect of foreign exchange requirements of transportation is the consumption of petroleum. The implications
of auto-oriented transportation technology, both in terms of foreign exchange stringency and fuel conservation requirements, hence become considerably more important.

The resource required to create a road/rail network to meet the increasing demand of auto-oriented vehicles is great. Urban transport infrastructure is long-life and costly. Ever higher levels of public investment in transport are contemplated in Seoul. A recent K.I.S.T. study indicates planned subway expansion investment of 22.2 billion won a year, or 20% of projected public investment expenditures over the next ten years. This allocation substantially exceeds those to other sectors including public housing, sewerage, education and health in Seoul.

E) Lack of Control Over Facilities and Service

One cannot ignore the importance of direct control over facilities and service relating directly to mobility of a person. For example, most squatter residents do not have driver's licenses. The cost of obtaining a driver's license in terms of time, money, and getting to places to learn is very high. There is insufficient demand for public transportation to control service frequency. In the case of auto-oriented transportation service is virtually taken for granted in the case of urban poor.

F) Summary

The complexity of auto-oriented transportation technology, the problems of technical, economic, and institutional constraints apparent in its application to squatter areas, and the appalling record of government default as well as that of profit oriented private owned public transportation systems make clear the need for alternative means by which households and communities may provide their own transportation service if necessary. Unfortunately, squatters tend to inhibit enactment of trans-
portation programs. The reasons are complex but may include the following:

1. Efficient vehicles and adequate road system are very expensive.
2. People generally are unwilling to pay for improving community roads someone else will use.
3. An effective municipality wide program is almost impossible because of the insecurity of squatters' tenure and complex legal and jurisdictional conflicts existing among government agencies and private sector organizations.

There is a clear mismatch between the needs of the present situation and the technological solutions commonly suggested. What is needed is not so much a "technological breakthrough" but rather an effort to reconsider imaginatively the applicability or adaptability of existing technologies to the needs of presently unserviced areas. It is about time to put aside the constraints of the auto-oriented conventional technology, to consider explicitly the demands placed on any system which is able to service squatter areas, and then to identify existing systems that have some or all of the characteristics necessary to meet these demands.

5.5 Characteristics of Technology

A necessary step toward developing alternative means for the provision of transportation service is to state explicitly the characteristics such a service system must have. It is important to keep in mind that the term "squatter settlement" covers a wide range of situations -- some cling precariously to steep hillsides, while others are built on flat plains; some are incredibly dense, some are comparatively spacious; some are peripheral, others located at the city's center. The relative importance of each of the points discussed below will vary depending on the particular conditions of the settlement needing service. Some characteristics will be
more universally important than others.

There are five types of characteristics that are important in the successful performance of a transportation system, most of which are not provided by the auto-oriented technology, making it unable to meet the needs of squatter settlements. These are physical characteristics, cost, socio-cultural characteristics, environmental characteristics, and technical complexity.

5.5.1 Physical Characteristics

A) Flexibility and ability to meet irregular settlement patterns of existing squatter settlements. The system should be capable of expansion in small increments in the same manner as the settlement itself expands. This would allow service to expand gradually in response to demand, thus dividing the costs of initial underutilization of the system.

B) Scale and self-sufficiency: The system should allow households and small groups to meet their own needs even in the face of government default or disorganization within the larger community. This implies a small-scale, self-sufficient system. The ability of the system to operate self-sufficiently would also permit service to even peripheral communities. These communities are presently unserviced because their distance from the city center would result in high costs to expand route-oriented transportation services.

5.5.2 Cost

The initial investment required for a system should be compatible with the resources of the squatter community contemplating the investment. The ongoing operating costs and life of the system should also be compatible with the resources of the users.
5.5.3 Socio-cultural Characteristics

Methods of transportation should be compatible with the local culture and custom of the community. The implementation of the system should not demand a level of social or political organization not already present or easily attainable by the community in question.

5.5.4 Environmental Characteristics

The system should conserve resources to the greatest extent practical, including conservation of petroleum, use of local renewable resources for construction and maintenance of the system, and use of local labor. The system should be energy saving and non-polluting.

5.5.5 Technical Complexity

A) Imported vs. indigenous technology: As far as possible, existing methods of production should be used, as this eliminates the need to overcome cultural barriers to sell a new, foreign technology. The decision to use an imported technology usually involves the hiring of foreign consultants and foreign technicians, buying foreign materials and foreign equipment, and adapting foreign repair and maintenance systems, all at great expense of scarce resources.

B) Servicing and maintenance requirements: The system should have minimal requirements for servicing and maintenance -- both in terms of technical expertise and specialized parts. Skills and materials required to operate the system should be found in the environment in which it is to be used.

C) Suitability for self-help: A specific application of the previous point is the ability of the users to install and operate the system with a minimum of outside assistance. This is a critical characteristic in the many squatter communities where it is clear that outside help will
not be forthcoming in the near future.

These criteria for a suitable transportation system appropriate for installation at the household or small community scale suggest that bicycle or two wheel transportation modes are the most promising. The issues of scale, cost, and resource conservation all at least suggest consideration of non-motorized systems for community use.

5.6 Proposed Transportation Technology for the Squatters

The limitation of technological patterns is a constant factor in the creation of the urban transportation supply. It is evident, from the type of construction and the forms of urban services considered necessary (for example, the priority given to private automobiles through the building of urban road networks), that the patterns generally adopted are imported and are in keeping with a more homogeneous type of demand similar to the developed western countries. It is therefore clear to utilize existing technologies and search for technologies which has following framework:

(1) The interrelationships between each of the various transportation modes and urban poor people should be recognized; and,

(2) The choice of the technology and the strategies must make the most intensive possible use of already existing facilities.

The idea of technology utilization is that the value of a technology lies not only in its economic viability and its technical soundness, but in its adaptation to the local situation. Assessing the appropriateness of a technology necessarily implies some sort of value judgement both on the part of those who develop it and those who will be using it, and when ideological considerations come into play, as they often do, appropriateness is at best a fluctuating concept.
The question of appropriate technology seems to imply an approach for identifying a specific set of characteristics and their combinations. The role of transportation technology is to meet the potential demand in a more effective way than the existing transportation service. At the same time, the transportation technology should help to initiate a process of development by stimulating the innovative forces and mobilizing under-and unemployed labor forces in the squatter settlements.

The mode of transportation for the squatters is subject to cost constraint in many situations. There are not many strategies for the squatters to adopt. There are two strategies which seem the most feasible: one is to utilize existing public transportation and the other is to obtain a transportation mode for a household or community. Given the distance required to travel, bicycle and modified motor-assisted cycle oriented transportation seem the logical choices in the beginning for a small cluster of squatter settlements.

Although considerable international effort has been put into establishing transport systems in developing countries, most of the work has gone into constructing low-cost roads, and little consideration has been given to the design of simple, appropriate vehicles. Consequently, the tendency has been to introduce cars, buses and lorries into urban areas and then to design road systems to suit them. The vast majority of people in developing countries, however, cannot afford such vehicles, and the low-cost vehicles that are available often have shortcomings in design which make them inefficient. For these reasons, this section has focused on the design, manufacture and operation of "simple" means of transportation such as:

1) pedal-driven vehicles (bicycles, cycle trailers, tricycles, etc.)
2) motorcycle-based tricycles

3) wheelbarrows and handcarts

This research has been concentrating on the low-cost end of this range to meet the needs of the squatters. The proposed transportation technology is an example and is depicted in Figure 5.1.

The proposed mode, then, is primarily modified bicycle transportation technology. The design is based on a standard bicycle frame with certain novel features added to overcome some of the limitations of the existing designs of cycle rickshaw. This mode is intended to be a safer and more efficient vehicle capable of local manufacture. The price of an average new bicycle in 1975 was 30,000 won (U.S. $60). This roughly represents the cost of Kia industry's #3,000 Ri model (including the tax). A motor could be attached and the cycle modified to a three-wheeled configuration. Modification of the Kia 3,000 Ri to a tricycle with a small motor would cost an additional 5,000 – 10,000 won ($10 – $20). However, these costs are still well lower than two years accumulated bus fares of 70 won per day for home-to-work travel without transfer.

This mode of transportation could be provided by collective financing of several households. This can be operated for the participant's benefit as well as offer the member operator more employment. With local lively self-help industry promoting converted conventional cycles or light vehicles would serve the participants' personal travel requirements and bring their products and raw materials to and from a market area at low transportation cost.

This can possibly be achieved in squatter settlements due to the following unique factors:

1) they do not depend on wider road infrastructure network;
2) the service is incremental and there are no critical thresholds;
3) the initial investment is relatively small compared to other trans-
portation modes and can be cheaper with a vehicle put together from
junked parts;
4) there is no formal skill or training needed to operate these modes
(compare automobiles which require licence to drive and registra-
tion);
5) the service can change rapidly to meet new demand and controlled by
participants according to their needs; and
6) it is not perceived as a major threat to existing services given
the situation of transportation system in Seoul.

The non-motorized transportation system has the necessary physical
characteristics to be utilized in squatter areas: ability to operate in
irregular road network, autonomy to control and repair within the tech-
nical capacity of squatters, flexibility and capacity for incremental
expansion. The household owning a vehicle strategy has the additional ad-
vantage of having high availability of transportation means and to a high
level of accessibility. The community owning several vehicles require at
least a minimal organization of service management and possible parking
space.

A technology such as the one just described is only one possible
technology from a range of alternatives. If the present conditions in
squatter settlements are to be improved and if the residents are to be
able to contribute positively to society and the economy this greater
flexibility of technology choice is essential.

The implementation of the proposed technology for servicing squatter
squatter communities is discussed in Chapter VI. Although the essence of
the message to be conveyed to each community is the same, the strategy involved in conveying it and the chances of success vary considerably. The function of transportation technology to meet squatters' needs and to help initiate a process of development is sketched in the next chapter.

Figure 5.1 Proposed Transportation Technology for the Urban Poor

Transportation Mode and Operator Dimensions

- Width: 1.5 meters
- Length: 2.0 meters
- Height: 2.5 meters minimum
- Vertical Pedal Clearance: 0.2 meters
CHAPTER VI: TECHNOLOGY ADAPTATION AND COMMUNITY DEVELOPMENT

6.1 Appropriate Transportation Technology Adaptation Scenario

The analysis in the last chapter indicates that the proposed transportation technology is the most appropriate modal choice for the squatter settlement in Seoul. This chapter explores some of the political realities of implementing this mode of transportation and integrating an intra-city transportation system. The number of vehicles were formulated in the Section 6.1.3.4. Now, I will pay special attention to the implementation issues related to production and make recommendations to the existing institutional environment of institutional transportation.

6.1.1 Production of the Proposed Technology

As shown in Section 4.3, the production of bicycles and autobikes in Korea is well over a million units in 1973. The small-scale factories in Seoul alone produced 8,278 units of bikes and automobiles in 1965. All these figures confirm that the production of 51,500 vehicles would take less than a half year if existing modes of production were utilized to produce the proposed technology. Just considering local small-scale producers alone would take only about 6 years at the 1965 production level in Seoul.

The auto-oriented transportation systems have heretofore prohibited production of automobiles in small-scale self-help industries. By contrast, if the proposed technology, as an example, were to be developed, it would make a much wider range of solutions and technologies increasingly possible. This kind of new system (or, perhaps more precisely, utilizing existing systems through modification) allows decentralized activity, encouraging
initiative on the part of individual households and communities to improve their own conditions -- an option which was previously impossible. As demonstrated in the subway system, a technology introduced in a society comes with an inextricable institutional package. Auto-oriented transportation technology has its own support mechanisms and organizational arrangements by which the potentials of the self-help industries and squatters were systematically bypassed. While individuals and small groups are able to build and operate non-motorized transportation modes themselves, they have, because an auto-based transportation technology has been advocated, been unable to create non-motorized transportation oriented transportation systems. They have labor but no political power and capital, they have access to raw materials and ingenuity to build but not the means of production to suit the auto-oriented transportation technologies. As Richard Bender has said, "they are surrounded by a technology which is outside their reach. They are not important enough for the system to respond to them." Therefore, why not initiate a system which can be built and used by them? So far production of automobiles has been -- and probably always must be -- limited to a few big industries (as discussed in Section 4.5), yet non-motorized transportation is -- and for at least a century, has been -- available as the only transport technology in which a self-help production strategy could be adopted. The production of the proposed technology alone would generate substantial number of employment opportunities without considering repair and maintenance. Further, operation of their mode would generate a minimum of 77,000 employment opportunities (assuming only 1.5 employees per vehicle even though its operation requires substantial human energy).

This technology could be implemented and utilized immediately in Seoul.
There is a void in non-motorized transportation mode administration. The operation of this mode is harrassed by the current traffic policy, but, in terms of administration, there are not the entry controls nor restrictions on standards which apply to motorized vehicles. Presently, under 700 cc autobikes are exempted from registration, licencing, and for example, annual taxation requirements.\(^3\)

6.1.2 **Recommendations to Municipal Government**

Successful implementation of the proposed transportation technology will depend on modification and extensions of current local regulations on non-motorized transportation modes. Non-motorized modes are seldom considered in the planning or metropolitan transportation systems, largely because their potential role in urban transportation is poorly understood and they are much less visible than large scale conventional bus and rail systems. The legal and institutional framework is very fragmented in Seoul. Transportation service is regulated by several agencies within different levels of government. The responsibility is first divided by function such as transit planning, implementation, policing, licensing and pricing. At the same time the responsibility is also divided by geographical political units.

The efficient operation of the proposed technology can be achieved in many ways if the government is arranged in such a way to encourage this mode of transportation. Basic production and operation of these vehicles is unlikely to require direct government attention; however, increasing their usage will eventually create congestion. To improve the possible congested situation the proposed mode might generate, I propose the following measures of transportation control:

1) Limitations on the use of non-motorized transportation mode on the
major streets in Seoul should be modified as staggering road use by hours so that the streets could be utilized during the non-peak period.

2) Providing separate streets or travel lanes for non-motorized and motorized vehicles to assure all a fair access.

3) Measures to improve public transportation facilities probably work best when used in conjunction with some form of vehicle restraint in the city center.

While road pricing may not be a practical proposition, differential advolarem taxation rates to discourage large cars and generally high auto usage tax to discourage all private automobiles are more feasible alternatives for reducing overall congestion by eliminating the least space efficient vehicles.

The options open to municipal administrators to alleviate transportation problems are numerous and wide ranging in their effects. There needs to be a co-ordinated policy on the transportation system. The integration among transportation modes through establishing the right role for each mode and providing the right facilities are important for effective traffic management and vehicle restraint. This point will be discussed further in Section 7.2.2.

If the proposed mode were causes of the serious movement difficulties then the development of exclusive bike routes should be an answer. However, congestion is due to the over-concentration of social and economic activities in the city center. It should be viewed that the non-motorized transportation modes suffer from the over-concentration of the city center, but are not the cause of congestion.

Recently international bodies previously unwilling to acknowledge the existence of the squatters have increasingly recognized the inevitability
of spontaneous settlement, its positive aspects and the potential for government intervention in guiding this growth. This attitude is illustrated in the Report of the U.N. Seminar on the Improvement of Slums and Uncontrolled Settlements in 1973:

"Despite their poverty, the people of these settlements make a substantial contribution to the economy of the urban centre; they have a sense of community and a drive for social improvement that is often hard to parallel. Any investment expenditures programmed in the slum community can thus be expected to yield economic returns proportionately greater than equal expenditures in the urban centre. The immense human and social potentials in these areas provide a unique basis for the rejuvenation and restructuring of some of our outmoded social institutions and concepts... It is time to end unproductive negativism in attitudes and approaches to the problem of slums and uncontrolled settlements."

Such a changing attitude should be adopted by municipalities because it would provide opportunities which have not previously existed for planning new growth. This kind of changing situation would provide a new opportunity to move beyond the bounds of conventional auto-oriented technology to develop new organizational and institutional solutions employing new mixes of technology. For decades households have lived in squalor because, in theory, no solution was technologically, economically, or politically possible. These impossibilities have reinforced and perpetuated each other, locking millions into an environment of isolation, inaccessible, and blocked from their opportunities. Now we have reached a point where it is possible to develop solutions which are politically palatable, or, more important, do not depend on massive investment and assistance from the government.

For the government, the growth center concept is a relatively new concept in Korea. When this concept is translated into policy, it calls for the selection of urban centers with a significant potential for growth where regional funds are to be pooled instead of being spread too thinly over
larger areas. The pooling of development funds, it is argued, would not only spur the dormant economic forces in designated growth centers, but also generate externalities that would help attract new economic activities from the already developed centers where the diseconomies of growth have already set in. Further, it is hoped that these growth centers would curb the outflow of natural resources, capital and labor from their respective regions and eventually stimulate economic growth in areas surrounding them. In short, the creation of micro growth centers in squatter settlements would be an effective tool for vitalizing lagging sections of the city on the one hand, and checking the spiraling growth in larger metropolises on the other. In the section, "Community Development", this concept has been translated into an action program. It is my belief, that the squatter settlements with reorganized production activities would help deal with poverty, in the urban areas, and that they ought be brought afore in the making of decisions for investments in self-help industries, and social and technical infrastructure.

6.1.3 Sketch Plan

The application of the proposed transportation technology to the existing squatter community is examined in this section and a scenario is developed as in illustrative example of how one city might implement the principles presented here.

The primary income earners of poor urban households are found in virtually all types of employment. They are in wage employment as well as in self- or family-employment and are across all major types of urban activities. The socio-economic situation of the classes of settlements in the typology presented in Chapter III is different. For example, inner city settlements have the advantage of better accessible transportation
facilities. Marketing and other urban activities are readily available to innercity settlements and they also have the advantage of more accessible transportation facilities when compared to peripheral communities. The transportation demand and existing transportation service characteristics of the different area, in the typology is summarized in Table 6.1.

### TABLE 6.1 Survey Area Typology and Transportation Demand

<table>
<thead>
<tr>
<th>Group</th>
<th>Group II</th>
<th>Group III</th>
<th>Group IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing demand</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>motorized conventional Transport</td>
<td>222</td>
<td>259</td>
<td>191</td>
</tr>
<tr>
<td>motorized unconventional Transport</td>
<td>11</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>non-motorized transport mode (excluding walking)</td>
<td>3</td>
<td>3</td>
<td>21</td>
</tr>
<tr>
<td>Potential Demand*</td>
<td>1,350</td>
<td>1,354</td>
<td>1,597</td>
</tr>
<tr>
<td>Density (population/km²)</td>
<td>103,808</td>
<td>87,385</td>
<td>113,876</td>
</tr>
<tr>
<td>Airline distance from nearest major industry-commercial activity center</td>
<td>2.3km</td>
<td>4.5km</td>
<td>1.1km</td>
</tr>
<tr>
<td>Average household income</td>
<td>$55/mo.</td>
<td>$46</td>
<td>$47</td>
</tr>
</tbody>
</table>

*Potential demand in this case means counting total population in productive in productive age group, assuming they will obtain some form of employment in the future.

According to the results of the survey presented in the previous chapters, the important characteristics of Seoul's transportation system and squatter settlement formation are following:

* the concentration of activities in or around the CBD, as well as in subcenters located along the main radial axes of east and south which converge on the CBD.

* the extremely high proportion of bus-dependent families in terms of motorized transportation.
* the high-coverage of the bus network; only Group IV (peripheral flatland/streamside areas) has about a 2 km distance from settlement to bus stop while other groups are within one kilometer distance or so.

* the recently arrived presence of a subway line overlaps a good part of the most congested and important bus corridors.

* Public transportation is provided eighteen hours a day, seven days a week by private companies.

6.1.3.1 Assumptions

A number of simplifying assumptions were required in order to make a sketch plan. The first element to be considered is the extent of demand in communities. We assume that potential demand is the same as the demand generated by the productive labors in the communities. This assumption proposed a range of daily demands from 1,350 to 1,597 persons round trip to work per day for each community. The transportation service for the proposed technology must be provided on an eight-hour day, six-day-a-week basis. A planning period of ten years is feasible in this study. A discount rate of 10% is appropriate for the Korean economy of 1980. Service levels are uniform throughout the day without adjustments for peak or off-peak periods. (Present data make it difficult to estimate peak demand.)

6.1.3.2 Value of Time

Much literature on transportation costs claims that cost of time wasted during travel is an important factor rather than costs out of pocket for public transportation users. However, the value of time is based on the assumption that in capital intensive economy, the value of time which could be put to productive use is valued highly in the formal sector of society. Within such an economy the values of time in monetary terms for different segments of the community will vary. This argument says that the low-income person value his opportunity to earn money or his leisure time just as the
rich people do, yet the rich person is able to pay more to save time spent in transportation. Therefore, according to the planners who use time variable for their analysis, value of time is a misnomer. Cost of time is used for planners' purpose in terms of willingness to pay or ability to pay. Thus, they believe value of time is dependent on income. This assertion never proved for urban poor in developing countries; in fact, it seems of more concern to planners that this variable be taken as applicable to Seol than that actual accessibility of the poor as established in this research be measured. The findings of this research suggest that increasing the availability of numerous affordable transportation system concerns the urban poor person more than achieving more mobility by speeding the rate at which he gets to his destination. This evidence and common sense suggest that value of time is not a critical factor to include in cost estimation for the poor, and this study consequently sets the value of time in terms of the reliability of each available transportation mode for all practical purposes.

6.1.3.3 Cost and Service Characteristics of the Proposed Transportation Mode

The cost and service characteristics of the proposed transportation mode are summarized in Table 6.2. The capital cost of the proposed transportation mode is relatively high for the poor, but since the mode operate at the household level the investment decision may be made by the individual use without committing the entire community to a large capital expenditure. Operating costs are minimal for the proposed technology, since this system does not require the use of substantial gasoline power.
TABLE 6.2 Cost and Service Characteristics of the Proposed Transportation Mode

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seat Capacity:</td>
<td>two passengers</td>
</tr>
<tr>
<td>Average Speed:</td>
<td>15 km/hour</td>
</tr>
<tr>
<td>Residential Maneuverability:</td>
<td>good</td>
</tr>
<tr>
<td>Capital Cost Per Vehicle:</td>
<td>$70-$80</td>
</tr>
<tr>
<td>Vehicle Life:</td>
<td>ten years</td>
</tr>
<tr>
<td>Operator's Wage*:</td>
<td>$2/day</td>
</tr>
<tr>
<td>Vehicle Potential:</td>
<td>30 person-km/vehicle-hour</td>
</tr>
</tbody>
</table>

*This is a high estimation when we compare it to the average income of squatter households.

The variable costs for the two-passenger modified cycle assume 2,800 annual hours of operation (eight hours a day for 350 days).

6.1.3.4 Number of Vehicles Required for Communities to Meet the Potential Demand

Group I (central city mountainside areas):

1,350 potential round trip demand x (2.3 km each way x 2) = 6,210 person-km/day.

6,210 person-km/day ÷ (30 person-km/vehicle - hour x 8 hr./day) = 25.9 vehicles.

Group II (peripheral mountainside areas): 1,354 x (4.5x2) ÷ (30x8) = 50.8 vehicles.

Group III (Central city streamside areas): 1,597 x (1.1x2) ÷ (30x8) = 14.6 vehicles

Group IV (peripheral streamside areas): 1,391 x (9.8x2) ÷ (30x8) = 113.6 vehicles.

In order to meet these potential demands we need 206 vehicles for the squatter settlements of 9,833 residents. For the city with about 2.5
million squatters (206 vehicles x 250 =) 51,500 vehicles would solve squatters transportation problems.

6.1.3.5 Advantages

The utilization of the proposed technology has the following advantages:

1) provides mobility in the area where no such mobility was available.

2) the mode is convenient despite its reasonable price for its route can be selected by the customer, i.e., door-to-door service is possible.

3) provides jobs, i.e., operators and workers in the assembly plant, within the community.

4) the formation of the industry of assembling the vehicles inside the community makes the community better off.

5) no improvement in the existing road network is necessary.

Mountain areas are communities that need home-to-work travel improvement. They are in the "consolidator" stage and their economic potential could be easily tapped by the proposed system through a small group financing scheme to own and operate the proposed technology for the participants' benefit. It is similar to a club concept in transportation. The use of small, modified three-passenger riding vehicles has great application for short trips for internal circulation within the community where most travel demand is served largely by walking. Innercity mountainside households could increase their accessibility for secondary wage earners and the availability of a transportation mode would increase their search for better jobs. This vehicle could be an asset for the owner. Its disadvantage are immobility during bad weather and investment constraint.

Peripheral mountainside areas depend more on this mode and their benefits from utilizing this mode are greater. This area's transportation expenditure is largest among the communities studied. The control over this
transportation mode for this community would mean an ease of the barrier to better employment opportunity. The key to the proposed transportation technology seems to be high utilization potential if currently unskilled labor were operating this mode for participants as well as neighbors who are willing to pay for its usage. Its seat capacity and its ability to cover a high density areas will achieve sufficiently high utilization to overcome the costs of initial investment.

Streamside areas have some different applications for home-to-work travel by this mode of transportation. The squatter settlements located in the innercity streamside areas are due to the locational factor of labor market proximity. In this situation a community's home-to-work travel problems might be small compared to that of other communities. They are in the midst of all municipal services and near to their employment. For them it may not be increased transportation that is needed, but improving their capacity to utilize these existing resources the location of the community has to offer. This type of community is also very transitional in nature, and organizing the financing of the vehicle would be difficult.

Peripheral streamside areas are isolated from transportation facilities at present. Compared to other types of communities this area has low density and is further away from most major employment opportunities. There are two roles for the proposed transportation technology. One is to act as a feeder service to conventional bus transit and the other is to increase the sense of community organization through its financing and operating stages. The availability of transportation would give residents a better chance to assimilate to urban life since most new migrants come to these peripheral streamside areas. This mode provides a means of responding in a flexible manner to variations in travel demand by time of day, week or
year, as well as better accessibility than public transportation.

I will propose an action program for community development in the next section. Transportation alone cannot alleviate the problem of the urban poor. Therefore, the proposed program is a spin-off from the application of the proposed transportation mode. Introducing a rather familiar transportation technology would provide job opportunities for repair and modification in the cottage industry as well as for operators.

The most fundamental set of questions posed by this transportation-based approach to squatters problem deals with establishing the significance of transportation in helping the poor raise their standard of living. Assuming that transportation, by itself, is not likely to alter drastically even minor poverty problems, what is the role of transportation relative to community development? should transportation become another sub-element in a process of community development? How? These questions are explored in the next section.

6.2 Community Development and Transportation Action Program

This chapter outlines a supplementary strategy, a process of organizing community industries for community development and using the function of transportation to achieve it. The community industries are the industries whose essential characteristics (ownership, wages, technology, product prices and the product itself, etc.) are determined by and for the community [the reader should bear in mind that in this paper the community is a squatter settlement.

The process as a whole is composed of four distinguishable elements, each requiring a certain level of social capability for its organization:

(a) The development of small-scale technologies.
(b) The organization of industries -- utilizing these technologies -- which produce goods and services for the community.

(c) The development of a "communal" economy -- which among other things, determines the essential characteristics of such industries (the results being "community products") -- and of a community based on cooperative rather than competitive relationships.

(d) The development of the skills and entrepreneurial abilities of under-utilized (unemployed and/or underemployed) people in the community through a substantial process of wage and skill redistribution within the community -- carried out as part of this communal economy --; and through this, the development of their capacity to contribute to the community's economy.

In this chapter, the four "elements" are integrated into one inseparable process for communal economic development. These elements roughly correspond to the central concerns of the organizational tasks. Also, this concept relies on the following premises and assumptions:

1) The supportive environment required for sustained, significant skill and wage development of large numbers of poor people cannot be found in the formal sector of society;

2) the required supportive environment can only be developed within communities or community systems -- that is, it has not been developed in politics as large as the municipality or the nation -- and these communities must be specifically reorganized to provide this support;

3) industries which can compete in the market systems outside these communities are necessary, but primarily to bring money into the community to support the community industries;

4) the communities have some experience with productive collective activity (i.e., self-help housing and the community's informal social networks) in which some informal organizations resulted; and,

5) the community must know from experience -- in construction of squatter's housing, for example -- that it can work together and that it needs to go through the struggle for the sake of a better life for everyone involved.

It has been recognized that the mobilization and development of manpower in developing countries is not only vital to economic growth but also essential to the sustenance of a social environment conducive to economic growth.
Idle labor is ostensibly undesirable socially as well as economically. The sheer volume of the potential labor force is enough to warrant a most sensitive and responsive development policy. A comprehensive and responsible development policy should integrate its manpower mobilization and development strategy with its overall policy for resource mobilization. A practical and realistic manpower strategy should aim not only at short-term goals such as temporary reduction of unemployment but also at the development of skilled and motivated labor force at the right place, the right time and in the right scale for overall economic growth.

We will now look at the location relationship between squatter communities and their employment opportunity in order to understand how transportation may affect the supply of labor for economic activities in the community. Transportation allows the opening of the economic system through the tapping of a wider range of material resources and markets. For urban manufacturing entrepreneurs, availability of proper transportation is a basic necessity for production. This is even more important in Seoul where transportation networks (for goods and passengers) has been developed quite unevenly within the metropolitan area. These entrepreneurs are unable to provide their own transportation network if such is not given as infrastructure.

If a large number of squatter residents can have employment within the community, their ultimate transport demands may be smaller than existing demands. If economic activity is concentrated and created at the community where squatters live, better coordination of employment opportunities with labor availability is likely to be realized. In effect, it would be cheaper to transport raw materials and finished products from communities to the existing market areas than to transport workers from the communities to
potential labor markets. It would be better, then, for society to create employment opportunities within the communities for the overall development of community and residents.

6.2.1 Action Program: Five Organizational Tasks

The process is laid out in a set of five basic organizational tasks to be carried out by the community:

**TASK 1. The preparation of the community and of the purchaser groups.**

This task begins with the important consideration of the community's consumption patterns -- where it spends its money, on what goods, who gets the money spent on the goods, etc., -- and of the critical social difference between producing goods specifically for the community's consumption and producing goods for sale outside the community. This should help both to begin a communal understanding of what its economic base is and to set some initial guidelines for the selection of the product(s) to be communally produced. This task concludes with a very important consideration of the identification of community products and potential purchaser groups for the products.

I suggest these initial steps to start the process moving: (a) getting a clear, detailed picture of the range of products that community residents buy; (b) thinking about where these products are made and purchased; (c) doing a first-cut product selection; and (d) considering the organization of specific purchaser groups.

The knowledge of the people of the community and the existing community network must be translated into an organizational plan for development and the plans for the community development programs (community service and industries).
Technology in relation to this task should be non-alienating and stress close relationships between the individual, the tools with which he works, and the objects that he produces. At the same time the technology should underline the importance of communities being bound together by collective experience and enable the desires and needs of all its members to be met. In other words, technology should be accessible to control by the community, and should not provide a means of exploitation or dominance of its members. This could mean an emphasis on small-scale, workshop size production units. "What is needed," writes Paul Goodman in his book Communitas "is the organization of economic democracy on the basis of the productive units, where each unit, relying on its own expertness and bargaining power of what it has to offer, co-operates with the whole of society." 8


The employees will be concerned that 1) they are providing for a community which is interested in what it's buying; 2) they understand the consequences of their work for community industries.

The single most important aspect of this task -- given that some preliminary wage ranges can be agreed upon -- will be the discussion of how skill development will take place. The resources required for each given technology will be discussed in the next task, and it cannot be elaborated here except to suggest how the process could go, as its best. The list of possible products and projects to be carried out will be worked out here in the first stage of a communal production contract.

TASK 3. Organizing and Provision of Technical Assistance.

The community organizer probably needs technical assistance from outside the community. Technical assistance brings to a person the skills necessary to enable him to use his own capacity in achieving the next step
in his development. The byproducts of technical assistance, such as the
development of skills with side applicability, the development of latent
capacity (i.e., entrepreneurship) are important.

**TASK 4 The Rest of the Economic Support System**

Once the technology has been identified, the community organizer may
find the material inputs to that technology already produced in his community.
The community organizer certainly wants access to the resources of the
financial and governmental institutions, no matter what kind of technology
the community may select.

**TASK 5. The Communal Contract Task**

In the final stage of the process, all the participants organized in
the previous tasks join to decide communally on the price of production
factors (labor, finance, etc.), the pricing of the consumer goods, and the
other communal control understandings.

The detailed description of how to achieve each task and move to the
achievement of the next must be the responsibility of the organizations in
a given community. The purpose of this chapter is to lay out these tasks
as simply and clearly as possible and with just enough detail to show the
possibilities for organizing a community to achieve a goal of community
development.

6.2.2 **Implementation of the Action Program**

Cheap labor is the comparative advantage for industrial development
in the squatter communities. Labor availability and squatters locations in
Seoul were results of the pattern of urbanization in general and that of
housing in particular. Housing in this instance included the whole
process of residential settlement guided or unguided by government action.
The housing element was strong in determining the pattern of community development and occupational structure. But the impact of transportation on squatters location cannot be examined outside the context of urbanization, industrialization and social development. The physical phenomenon of squatters' location is only a physical manifestation of the underlying socio-economic logic in which the physical pattern of urbanization and transportation is but one of many related factors.

Community development is a meaningful strategy to maximize the contribution of the urban informal sector and minimize the transportation problems of the urban poor only when this large concentrated labor force is absorbed by community based industries. The following application of the program starts with review of the salient characteristics of community based small-scale industry in the context of Seoul's squatters needs and opportunities. Then I attempt to identify the major constraints which would circumscribed implementation of the action program.

6.2.2.1 The Preparation of the Community and of the Purchaser Group

The squatter settlements revealed by our survey results lead to a much more complex picture than a simple stratification by economic status. Their employment activities are restricted, particularly where locational advantage is a major determinant of earnings. The topography of the settlement also play a major role in the consolidation of communities and the type of employment it will shelter.

A. Organization

In any community, there are informal social networks which reflect patterns of relationships and integration among persons or collectivities. All the squatter settlements demonstrated this informal network through self-help, owner-builder housing. However, self-help is not limited to the
building of houses. Squatter settlements provide contexts for self-help in many domains other than housing -- for example, job-finding, cooking, shopping, clothing, and training. Through this social network the initial organization of a small nucleus of people will eventually form the community based industry. Their incentive to organize would be a better economic situation and upward social mobility.

B. Identification of Products and Processes

The kind of consumption expenditures a settlement makes reflects certain differences which illustrate the varying characters of the different types of squatter settlements. Although all areas showed the same priorities in the two highest expenditures -- basic food and side dishes -- differences emerge in the third highest expense (see Table B.20). Nevertheless, areas showed a precedence in family-related expenditures such as clothing, education, transportation and medical expenses.

People in the mountainside areas are on a higher economic status than those in flatland/streamside areas. This was reflected in occupational status, job stability and monthly income, and other relative indices of material status. On the other hand, central city flatland/streamside areas showed very strong economic characteristics, comparable to peripheral mountainside areas. Thus, while mountainside areas are better developed areas, centrally located flatland/streamside areas benefit from the nature of the steelement itself as well as from the surrounding economic environment in reinforcing their development. Yet other variables such as length of stay of the family in Seoul, number of moves, and ownership status point to the conclusion that residents in mountainside areas are more highly urbanized than residents of flatland/streamside areas. Mountainside areas can be seen as "consolidators," to use current terminology, while flatland/streamside
areas appear to be more of the "bridge header" type, providing shelter to those families in the initial stages of assimilation into urban life.

The products and processes (technology) which could be identified as appropriate for community-based industries embrace a wide range, from foods made with household cooking equipment to the highly mechanized engineering workshops turning out spare parts for motor-cars. Small establishments are found in almost every industry. To this end, I will propose some examples of products.

The central city mountainside areas would be well suited to having clothing industry because the market influences differentiated products -- for which variety is important -- so that, in industries such as appeared, low-scale enterprises prevail. The Group II communities (peripheral mountainside areas) could produce machining shop products, such as valves, bicycle components, and shoe lasts. This group's physical development and socio-economic status would benefit through simple assembly, mixing and finishing operations in which only light machinery is required and in which manufacturing operations can easily be separated and specialized.

Group III (central city flatland/streamside areas) is the most influenced by the surrounding environment. This group would be best adapted to the food industry. Products such as foods and repair services need to have the advantage of locating the industries in close proximity to consumers. The other Group IV (peripheral flatland/streamside areas) would be amenable to the waste recycling industry. Its location and economic status shows that the waste recycling industry would be appropriate since raw materials are widely dispersed throughout the region, and it is cheaper to reduce bulk by local processing. To transport the raw materials and products would imply scattered local markets and high transfer costs. The
recycling industries can be initiated on a small scale and dominated by small plants. The vast majority of manufacturing industries in Seoul are small. For example in Seoul 30% of the manufacturing industries have more than five employees. In certain industries like food, furniture, metal products and transport equipment, over 90% of the workers were in small firms with less than five employees. The lower level of technology in small-scale industries allows skills to be acquired on the job in traditional apprenticeship schemes, thus lowering the capital-to-output ratio. The machinery used in small-scale industries is generally less costly, being simpler and often bought on the second-hand market. It is employed only for major processes while secondary operations are performed by hand. The level of utilization is high because of long working hours, fewer breakdowns, relative ease of servicing and repair and ability to sub-contract to other producers in the same field.

6.2.2.2 Participation of Potential Employees in the Planning Process

Employer participation could be achieved through setting up mechanisms for pooling capital resources in the community, e.g., through rotating credit association, which would create an important advantage in gaining a foothold in business and community welfare. Rotating credit is found among Korean communities and is called "kge". A group of friends and members of a community organization pool money and start the industry. This network can provide the relationships of trust which are essential to the functioning of any business. Among the participants, an allocation of smaller scale tasks can occur, with some members responsible for the negotiation of purchase of materials, for transportation, and for selling their products. The function of these organizations would be a substantial benefit in squatter settlements where firms would have problems of access
to markets, purchase of materials expensively in small amounts, and manage-
ment of municipal ordinances of permits and licenses. The basic problem
inherent in the functioning of any community organization is the extent
to which the members have a meaningful function in the actual planning,
supervising and functioning of the program. Once that hurdle is overcome
and the members themselves assume a full share of the responsibility, then
the program ceases to have a "welfare" connotation and becomes more a
function of the indigenous, cooperative and developmental spirit of the
organization -- in other words, a spirit of self-help.

6.2.2.3 Organization and Provision of Technical Assistance

The industries and the activities carried out by the poor are often
quite closely linked to the activities of the "formal" sector. To carry
out small-scale communal industry, linkage to the formal sector is
indispensable since corresponding adjustments and improvements are required
on the part of suppliers of materials, machinery and services on the one
hand and distributors and customers on the other. In this context, one
advantage of the small-scale communal industry is that it can exploit scat-
tered raw material resources on the spot to meet small localized markets.
Big industries and wholesalers would need subcontracting for inputs gener-
ated by scavengers on municipal dumps for their raw materials and outputs
typically would be required even for street vending, small stores, artisans
and repair shops. These industries and wholesalers could be a source for
technical assistance. Moreover, capital requirements, especially working
capital, can be utilized through these "formal" sector.

6.2.2.4 The Rest of the Economic Support System

Agglomeration efforts would be vital to those small-scale industries
which do not have sufficient storage and production space, and which could
not keep skilled maintenance personnel and maintain adequate raw material stock. They require small quantities of materials to be instantly obtainable from retailers or material processors, or "borrowable" from fellow manufacturers to keep production processes from slacking at crucial moments. They may need instant repairs to the few machines they have. Their products have to be shipped away as soon as they have been produced to relieve space for further production. Such agglomerations are therefore small and compact -- usually within the community. About this time the community organizer may set up a community cooperative, to retail food and other basic necessities and consumption goods. The community would act as an organized buyer and set up various product-specific cooperatives within the community. These cooperatives may promote political development and give access to the resources of the financial and governmental institutions due to consolidated organized efforts from the community. The government enforcement of regulation may extend its long arm to the "informal" activities such as a street trading permit. The community-wide organization would have a strong political base within the community necessary to negotiate compromises or concessions from outside concerns such as the government or other agencies.

6.2.2.5 The Communal Contract Task

This task would take some time after community wide organization (cooperatives) have set up and gained enough experience with a communally-based economic system. The communal contract task may come earlier in the "consolidator" stage of squatter settlements than "bridge header" stage communities because of stability and tenure of their living condition.

At this stage the community base industries may operate on an equal footing with their "formal" sector competitors with a secured community
internal market of their own.

6.2.3 Constraints

There is very wide acceptance of the potential of promoting small-scale self-help industry as an instrument of development. Before we can translate this approach into effective policy, however, we must recognize and eliminate the constraints which have restricted its contribution in Seoul.

The self-help industry has had to rely largely on internally-generated funds for initiation, expansion, and upgrading because governmental policy has favored large-scaled capital-intensive development. A development plan which instead encouraged labor-intensive, self-help, small-scale techniques would become a means of increasing the labor-absorbing capacity of developing countries while still encouraging development. Under the existing planning approach, profitability and the incentive to invest in small-scale self-help industry have been adversely affected because they have been unable to compete on an equal footing because of governmental restrictions on self-help activity and subsidies to large-scale industry.

Formal sector industry has benefited from a variety of these subsidies, both overt and hidden. It has relatively easy access to credit at low or, taking into account of inflation, even negative interest rates. Foreign exchange has been rationed by license, and large automobile manufacturing firms, for example, have priority allocations for machinery and scarce raw materials, at prices well below their opportunity costs. They have generally not borne the full cost of infrastructural developments of which they are the main beneficiaries. They have the lion's share of free technical assistance supplied by foreign-aid programs.
Most informal sector self-help industry, on the other hand, has to pay the going market (often black market) rate for these resources and services, if they are available at all. Furthermore, because the informal sector is expected to mop up much of the surplus labor resulting from the rural-urban drift, overcrowding and under-development has ensued, with intense competition squeezing profit margins as well as incomes.

Another barrier against self-help industries has been the distrust shown by the government. The government has tended to prefer centralized, directive-planning techniques. There are several reasons for this preference -- the importance of the central government in mobilizing savings through taxation; the bureaucrats' and planners' belief that they were better able to determine national priorities than haphazard interplay of market forces; and the power and prestige accorded to those responsible for allocating resources.

Given the government's current predilection, it is not surprising that self-help industries have not figured prominently in development plans. It is much easier to evaluate and supervise a few large projects than to oversee thousands of small ones. Even reliable data on small-scale, self-help industries are lacking (thus further demonstrating the disinterest shown by the government). Under this system self-help enterprise has little political pull and even more limited capacity to recompense in tangible way the planner or provider of resources.

Self-help industries will not be able to fulfill their potential role in development until these biases are removed. Their access to scarce resources and even their right to do business depends upon personal relationships rather than their capacity to pay the market price or their ability to use the resources efficiently. Many bureaucrats in government agencies
and banks prefer to deal with their peers who have become managers in large industries. If they are required to support activities in the small-scale sector, they tend to favor cooperatives.

The same barriers exist between the staff of specialized small-scale industrial development institutions and their prospective clients. The training personnel of these institutions are generally university graduates with no direct industrial experience. They may be able to conceptualize the problems they encounter and have theoretical frame of reference, but they often do not speak the same language as the entrepreneurs they are supposed to assist. The latter are not accustomed to thinking in terms of abstract principles and find it difficult to relate generalized concepts to their own narrow product fields and technologies. The attitude of the small-scale entrepreneurs towards these government sponsored organizations may be, at best, one of apathy because they feel they have little to learn from "theoreticians" and because they have no financial stake in their own affairs tactics such as tax evasion maybe their only defense against subsidized competition from large firms.

6.2.4 Summary

We have explored in broad outline the opportunities and constraints facing small-scale, self-help industry based on community organization. Certainly there are plenty of exceptions to this generalized model and many difficulties not mentioned here. But it should be apparent that whether the opportunities outweigh the constraints, so that the squatters are allowed to fulfill their full potential role in the community and the national economy depends upon organizing and coordinating the community through a self-help strategy. Transportation can be a vital tool in a process of community development, and it could be a source of employment
at the same time, providing stabiltiy and infrastructure for the community based industry.
CHAPTER VII: CONCLUSION

The lack of understanding and perception of poverty by planners has no doubt contributed to the continued discrimination against the poor majority by the affluent minority. This dissertation has gathered together information in order to sensitize planners to the problems of transportation and limited accessibility faced by a majority of the urban residents in developing countries who are unable to drive, own private automobiles, or even, in cases, ride a bus. This research examined the overall spatial structure of low-income communities in relation to transportation service. The problems and needs of the communities present conditions that suggest that small-scale, non-motorized transportation systems are appropriate for the poor in realizing the more efficient use of local resources.

The choice of transportation mode according to the type of the settlements is not a difficult one to make. However, a planner in facing any specific situation is confronted with not only physical transportation problems but also, more importantly, the currently-ignored problem of development of the people for whom the system is designed. The provision of urban transportation has been assumed to be under the control of the public sector. This perception has dictated the auto-oriented conventional transport technology which has then dictated a centralized and network-oriented response.

The rapid urbanization of developing countries has resulted in demand that far outdistances the government's capabilities and resources to provide adequate service. The apparent complexity of auto-oriented
conventional transportation technology in its application to squatter area and the appalling record of government default in providing service make clear the need for alternative strategies by which households and communities can develop and provide their own transportation service if necessary. The purpose of this chapter is to list the major findings and conclusions of this research and to suggest recommendations to the decision makers in developing countries.

7.1 Conclusions From the Research

The urban transportation problems in Seoul can be generalized as a congested and deficient public transport system which does not even serve the needs of many urban poor people, who, as a result, have limited accessibility to employment and other activities. There are differences in urban transportation planning in developing countries like Korea from planning in developed countries because of the rapid growth of the city with mixture of various transportation modes and formal and informal activities. Further, more limited data, financial resources, and overly centralized government call for a different approach to urban transportation planning.

The institutions of the national and local government involved in urban transportation planning, project development, and implementation are numerous in Seoul. The organizational structure and allocation responsibility are changing with time. However, it is clear from the research that no one government agency or private institution is involved in the planning and implementing of policy for low-income people's accessibility. Most of urban transportation plans are initiated and implemented by government agencies. The government controls all prices and entry into the "for hire"
road transportation system, which is operated by the private sector, while infrastructure and rail transportation are supplied by the government.

There are many regulations and strong means of enforcement in pricing and licensing public transportation. Yet, there is no justification for how the government sets transportation prices, regulations and policies. The division of responsibility in local government is not clear, even to the agencies involved in traffic management. It is desirable that the agencies that will perform the activities called for in urban transportation be involved in the coordinated planning process. (This issue is further documented in the recommendation Section 7.2.)

The influence of government on the structure and development of the Korean automobile industry has been crucial. The output and the change of motor vehicle stock reveal the change of the transportation manufacturing industry and its politics. The industry has been changed from many numerous small-scale traditional production system to mass production by four big companies with technical assistance from externally-based multi-national corporations. This change has had direct impact on the public transportation service system in the city and at the same time, on the informal sector lively self-help vehicle conversion industry.

There are no transportation systems to enable individual squatter households and communities to improve their own conditions in the face of government inaction. Both governmental policy and the actions of privately owned manufacturing industry favor monopoly of production through exclusion of smaller manufacturing firms from automobile assembly and manufacturing. In this context of government default and worsening conditions, a strategy of community development through transportation and greater use of self-help
in the provision of transportation service is proposed.

In terms of the overall spatial structure of squatter settlements in relation with transportation service, the following conditions appear to hold: Indicies of development indicate two things: (1) the mountainside areas are clearly more developed and use the bus system more than flatland/stream areas, and (2) for both categories the gradient declines with distance from the city center. The major intervening factor for transport mode choice seems to be topography. Mountainside areas in this respect are consistently composed of households with longer urban experience, longer terms of residence, and motivations for settlement in these areas tend to be greater housing and environmental amenity rather than jobs and employment. This implies a later stage in the intra-city movement process, involving families further along in their socio-economic trajectories. Subsequently, occupations tend to be more stable and regular as well as reflecting higher rates of professional and skilled occupation than flatland/stream areas. Thus, as a class of settlements, mountain areas appear to resemble what Turner has described as "consolidated" settlements, primarily composed of families more advanced in their assimilation into the urban economy.

Location is also important in that mountain areas also show a declining quality gradient from the city center. Moreover, more peripheral mountain areas, while poorer in terms of income, occupational status and relative physical development, also indicate lower urban experience, higher proportion of initial settlements, and longer residence durations. In addition, home ownership rates are higher, and these areas are primarily stable homogeneous communities composed largely of original settlers. On the other hand, more central mountain areas, though older, reflect lower residence
durations, although urban experience levels and intra-city migration rates were high. In addition to the fact that these areas showed higher levels of physical development, occupations and incomes, the heterogeneous tenure structures suggest that these areas, being older than more peripheral areas, have since converted to long term lease rentals and function as targets for upwardly mobile households from other areas.

Correlated with these higher levels of development is the fact that mountain areas as a class show higher home to work distances than flatland/stream areas. The one exception is that in the most centrally located flatland/stream areas, employment within the community is high as a function of close proximity to labor markets. Otherwise, there appears to be a correlated tendency for employment outside the community to be higher and employment within the community lower in central mountain areas. This can be understood in relation to the higher income and occupational structures of the areas, in which higher rates of the formal sector professional and white collar occupations as well as nearby public transportation facilities imply greater employment outside the community.

Thus, topography can be seen as a critical variable that can reverse the whole process of spatial diffusion, with several consequences: (1) home to work distances, while still a function of socio-economic mobility as hypothesized by Turner, no longer imply the dispersion of settlements relative to a centrally located employment source. Settlements can and do converge toward the center with a dispersion of employment out of the community. Thus the particular employment implications attributed to center and periphery settlements in the Leeds-Turner model do not appear to hold in the case of topographic complexity. (2) The fact that more developed
households converge toward the center while employment moves out of the community, while more peripheral poorer settlements with households of generally lower economic and social status are forced to either find jobs in the community on a more informal basis or absorb higher transportation costs relative to their incomes, represents a misallocation of resources from society's point of view. However, similar though slightly different conditions hold with respect to the spatial implications of socio-economic development in flatland/stream areas. Central flatland/stream areas consistently show higher indices of socio-economic development than peripheral flatland/stream areas, although in terms of physical quality of construction, houses are more jerry built than in peripheral areas. This is explained, however, by the fact that tenure stability in these areas is extremely low with high rates of monthly rentals as opposed to longer term leases in central mountain areas. In addition rates of initial settlement are high indicating a high locational value attached to these areas as a function of their accessibility to job markets. This is supported by the stated motivations for settlement in these areas as well as the home to work patterns and occupational structures characteristic of these areas.

Activity, whether government or community initiated, aimed at improving conditions in urban poor communities should focus on the provision of transport services. This thesis is ultimately directed to the urban poor people; however, without changes in the perceptions and policies of national and international government and research bodies, the situation at the community level will not change. Although suggestions for community action and organization using self-help techniques are informative, these possi-
ilities are not new -- such action is presently underway in scattered communities around the world. These activities will continue to be possible but rare until change occurs in one of the following areas:

(a) Changes in the community's perception of its own power and ability to effect change. At present, provision of transport services is viewed as an arena of governmental initiative and action. As decentralized solutions and community-initiated action become more feasible and hence more accepted, they will become more frequent and vice-versa. It is a problem of changing the conventional way of viewing the need and the range of solutions.

(b) Change in attitude of national and international bodies. As governments of various levels become more willing to acknowledge the existence and potential of the urban informal sector, the supportive environment necessary for community initiated infrastructure activity will develop.

(c) Change in the available and acceptable technology. As decentralized solutions to infrastructure needs become more common and traditional technology is better adapted to urban use, technologies appropriate at the community scale will become cheaper and more generally available. This will in turn make community initiated solutions more frequent.

Changes in each of these areas will be gradual, resulting from changes initiated by the other actors. Until such changes occur self-help activity in the area of urban transportation or of infrastructure generally will continue to be the occasionally successful phenomenon it is at the present. The urban poor people in developing countries do not need to be convinced
of the need for change; however, the status quo must change sufficiently for them to believe that change is possible. Any planning must be done such a way that it will enable and produce changes for the betterment of the people for whom the plan is developed. In this research, I can conclude that the planning must be a coordinating and organizing function for communities rather than dictating function of central government. The process of organizing and coordinating community action could be beneficial by adopting a self-help strategy. The urban poor should organize their resource and governments should support a self-help process rather than dictating self-help activities.

One of the primary conclusions of this research on the urban poor is that one should not start by defining "informal" sector self-help industries as negative phenomena. The objective of public policy to assist the urban poor should be to try to maximize their opportunities through removal of constraints which limit self-help, "informal" activities unless strong economic or social arguments exist to the contrary. These activities ought to be interfered with as little as possible and be supported where resources permit.

It is not right to view most of the informal activities carried out by urban poor as "unproductive" employment. Many poor are employed in the formal sector, albeit at low wages. Moreover, (though this has apparently not been proven in any study) it is quite likely that at the low income levels prevalent in Seoul, and given the poor transportation and storage systems, as well as the absence of private automobile ownership, there is a role to be played by the transportation technology in distribution of labor and products. Any economist who accepts the test of the market as a
prima facie criterion for productivity, all informal sector activities that provide employment to the poor are "productive." Only the introduction of value judgments regarding the nature of the output (i.e., the fact that street traders obstruct traffic and present an ungainly sight to the formal sector elite) leads to the notion of informal sector activities being unproductive or undesirable.

Apart from the general perception of the informal sector activities of the urban poor, there are important role and need for transportation modes like the one proposed in Chapter V for moving people and goods over short distances. It is the simplicity of design and the ruggedness of this kind of vehicle as well as the low investment required, and almost no running expenses, that make these very valuable modes of transportation for the poor areas. The bicycle rikshaws provide employment potential to a lot of people who would otherwise be unemployed as vehicle operators, manufacturers, and repair and maintenance men. Improvement or modifications to the design of bicycle rikshaws to increase the haulage capacity and minimize human effort are required. Note also that it is being suggested that these improvements of transportation be used in those urban squatter areas where transportation of goods and people had to be made over rough and narrow roads, and where speed may not be, and is not necessarily, an important factor. It should also be borne in mind that these improved and modified modes of transportation are able to operate in conditions where motorized transportation modes like bus and taxi may fail to operate.

In transportation planning for urban poor, the importance of the local situation at the level of community development should be kept in mind, and transportation technologies which are appropriate to these local situations
Labor concentration can be meaningful when the relationship between the labor force and the employer labor market is established. A case in point is the housewife workers and unskilled laborers in the squatter settlements. If the community-based industries cannot utilize the labor quality of the housewife workers and unskilled laborers, they would not have any labor value to the industries. But the labor quality of the unskilled laborers and housewife workers can be exploited only because the introduction of community industries with this quality of labor requirement and the pattern of urbanization had created sufficient population concentrations in the community. If the squatters were scattered throughout the urban area or if no industries were available within or near squatter concentrations, then labor would not have been tapped. This would mean that either the production process would have to be changed or more likely that the unskilled or similar types of labor market would not be developed.

7.2 Recommendations for Government Institutions and Organizations

The reader now has some familiarity with the existing array of transportation services and their deficiencies relating to the mobility of the poor. There are two basic strategies to help the urban poor. One is to upgrade existing transportation systems and the other is to maximize their resources and modal options. The attempts to improve or upgrade existing squatter situations through transportation will be incremental at best and expensive financially if the auto-oriented conventional solutions are introduced. As Siefert and others have observed, "developmental efforts to improve transportation are structured to make only incremental additions to and marginal improvement in the existing transportation service. Neither
the transportation industry nor government is constituted in such a way as
to naturally and aggressively pursue innovation in transportation and be at
once technically, legally, politically and financially capable of trans-
forming ideas into reality within a foreseeable future." Until the public
and their planners realize that there are inherent limitations imposed on
transportation, both externally through technology, and legal constraints,
and internally through managerial constraints, the upgrading of existing
squatter situations will not be possible.

This section poses policy and analytic questions, most of which,
unfortunately, have not yet been raised. Although answers are not immedi-
ately forthcoming, these important questions must be raised if issues are
to be defined and specific problems resolved.

To implement the proposed mode of transportation raises a question of
how to integrate it into the existing transportation modes. At the same
time, the creation of a Metropolitan Transportation Authority is essential
to the successful implementation of any urban transportation program for
the urban poor. This could resolve some of the problems such as unclear
traffic management subdivision among institutions, inefficient administra-
tive coordination, and fragmented project development processes by organiza-
tions. This organization's function and role are discussed in the
Section 7.2.1.2.

7.2.1 Integration Among Transportation Modes

This strategy involves either a substitution of services supplied by
one mode for the services offered by another or a division of the transport
market among available modes. The first approach attempts to integrate
services of existing transport supply; the second attempts to establish a
division of services according to the function and capabilities of each mode.

It is customary in Korea to plan for a set of "transport projects" rather than to plan for a "transport system." That is each mode is considered by itself. Projects are evaluated on their own merits, their consequences not being related to other links in a transport system. A manifestation of this problem is the failure to consider the complementary nature of transportation modes. Competition among transportation modes poses other difficulties when their services duplicate each other. The hapsung and bus experience in Seoul illustrates this point. Despite the enormous investments in transport facilities there are deficiencies and overlaps in operation. The subway and numerous bus systems in Seoul duplicate one another and compete for traffic, and yet all are being improved simultaneously.

The absence of qualitative and quantitative information about existing transportation systems in Seoul and the lack of adequate coordination at both the plan formulation and implementation levels indicate the need for transportation planning. Planning can guard against the project-oriented approach and consider transport as an integrated system rather than as an aggregation of projects and modes. A transportation strategy is an approach adopted by a government of planning, operating, and maintaining its transport system. Its basic objective as an extension of a development strategy, is to maximize the accessibility of the citizens to different activities by means of economic and feasible transport performance constrained by acceptable levels of safety and convenience.

In Seoul, buses and subways compete for the long distance mass transportation market while the buses, taxies and unconventional motorized modes
compete in the intermediate distance point to point personal transportation market. For short distance travel in urban areas there seems to be a lack in the utilization of appropriate mode. From available data, the motorized transportation modes' feasible range of distance and operating conditions are similar within the given locality.

The proposed transportation mode is composed of individually-controlled vehicle carrying people and goods, thus achieving flexibility in routing and scheduling without sacrificing entirely the efficiencies of existing large scale public transportation operations. Unlike the jitney service (Hapsung) the proposed transportation mode would not grow up in competition with existing public transportation service. Yet, it would still be important to reorganize the haphazard and inadequate competition within the bus system resulted in unnecessary duplication of services in some areas and virtual absence of service in others. The integration of transportation modes cannot be achieved without an organizational arrangement. The deficient public transportation service is a manifestation of the poor coordination and regulation in transportation environment. The integration among transportation modes should be based on the function and capability of each mode. To do that a strong institution with greater power to overview urban transportation seems useful to consider.

7.2.2 Creation of a Metropolitan Transportation Authority

What is needed for the pressing problem of traffic in Seoul is a regulatory and pricing strategy to control the use of private automobiles in the congested central area. For the long-term transportation issues, a metropolis-wide urban transportation management system is desirable to coordinate the transportation-related activities being provided by various transportation operators and agencies. What is needed for the city is a
metropolitan transportation authority with powers to oversee the quality of transit services and with the capability to plan for and influence the urban infrastructure investment program of the transportation sector.

At the present time, automobiles in Seoul are generally able to park on streets without adequate charge. They do not pay the social costs of congestion, air pollution, and accidents. Moreover, for a given unit of road space, the private automobile delivers a high quality of accessibility for one or two persons while the public automobiles provides the same degree of accessibility for six to eight people. More private automobiles mean greater congestion and a lower quality of service for all transit users in the congested areas.

Pricing of automobile use can be taken one step further to the licensing of automobiles within the metropolitan area. Unlike a one-shot tariff or a tax on car ownership, the use permit can be issued annually or every two years to automobiles which are operated on the congested streets. Such a permit can be made visible on the automobile (i.e., on the windshield or bumper) to facilitate enforcement. Another approach is the banning of automobile traffic in limited areas of the city, and dedication of selected streets to pedestrian traffic.

The other aspect of the metropolitan transportation authority -- coordination and planning -- can potentially have the greatest impact on the long-range goals of having an efficient and equitable urban transportation system. Automobile restrictions by themselves cannot adequately address the need for better transportation service to the central city and other parts of the metropolitan area. An integrated approach to traffic control, road construction and public transportation operations is needed
so that a complete transportation service can be provided.

The metropolitan transportation authority, if created, can play a vital role in encouraging the provision and use of public transportation in two respects. Firstly, it can provide a measure of security and administrative centralization for private transportation operators who now must appeal to a number of agencies for various permits. The intent of centralizing the permit process is not to limit the supply of private mass transportation vehicles, but rather to create one agency responsible for overseeing their operations. For example, entry into the public transportation service market can be unrestricted in number so long as the applicant meets minimum safety standards and agrees to abide by an established code of conduct for public carriers. Secondly, the authority can be given the power to borrow money by issuing bonds or the authority to provide government guarantees on loans taken out by the public and private transit companies. By lowering the cost of borrowing, it is hoped that the existing rolling stock can be expanded and improved. Since the metropolitan transportation authority and the government would have a financial stake under this credit arrangement, it would be in the government's interest not to implement policies that would cause disinvestment in capital facilities. Also, private interests may find the benefit of lower borrowing costs as outweighing their marginal loss of independence.

An integrated traffic management strategy implemented by the metropolitan transportation authority can yield benefits to many segments of society with impressive results. At this point, however, this is only at its conceptual but interesting future research agenda.
FOOTNOTES

CHAPTER I


2. Ibid., p. ii.


7. International Workshop on Development and Dissemination of Appropriate Technologies in Rural Areas, German Foundation for Developing Countries, Seminar Center for Economic and Social Development, Berlin. Seminar held at the University of Science and Technology, Kumasi, Ghana, July 1972.


9. The traditional view of "normal" slums has been as hopelessly squalid, illegal conglomerations of lawless prostitutes and potential revolutionaries. This has led an unfortunately perjorative ring such as "squatter," "shanty-towns" or "squatment." It is my judgement that it is the lesser of two evils to continue to use the word "slum" or "squatter" with the caveat that it is intended non-perjoratively than to struggle with unfamiliar and cumbersome words and phrases. In this thesis the term "slum" and "squatter" are used to describe a resident of the areas of spontaneous settlement which have sprung up around the cities of developing countries.


13. Past experience of the Citizens' Apartment program and the Kwangju Relocation program are good examples. As a commentary on the past efforts of the government to relocate residents from their squatter areas and house them in government apartments or relocate them in Kwangju (see Appendix A), one can gain a sense of the tremendous losses incurred by a large proportion of the people, not only in terms of physical value as expressed by their existing dwelling units which were demolished, but also in terms of the destruction and fragmentation of their base of economic survival, which to a large degree depended on their particular location in the city. Also, see Janice Perlman's The Fate of Migrants in Rio's Favelas: The Myth of Marginality, unpublished Ph.D. thesis, Department of Political Science, M.I.T., 1972.


15. Ibid., p.17.


23. Ibid.


32. Ibid.


40. Winblad, Uno, Ibid., p. 11.


CHAPTER II


12. In Korea, this economic condition also generates strong pressure towards sprawl in the city, the reason being that high rise buildings are discouraged for national defense reasons.


17. Ibid.

18. Ibid., P. 57.

19. Ibid.


CHAPTER III


4. Administratively, Seoul is divided into eleven Gu districts. These districts are in turn divided into 317 Dongs. Further subdivisions of the Dong unit include the Tong and the Ban unit. The size and number of Tong and Ban units vary according to the Dong size, the smallest Ban unit usually consisting of thirty to fifty dwellings. For statistical reporting functions, the Dong unit is considered as the basic unit.


7. Households were asked to list their four highest expenditures in a month. In all areas the two highest expenditures were on basic food and side dishes. Thus major non-food expenditures only became significant in terms of the third highest expenditure.

8. These figures are confirmed with the data from three different references:
   3) Pai, Gregory, "Rural to Urban Migration, Squatter Settlement, and

11. Ibid.

CHAPTER IV

4. Ibid.
5. Ibid., p. 77.
8. Yoon, Ibid., p. 129.
10. Ibid.
11. Ibid., P. 108.
13. Ibid.
17. Yoon, Ibid., P. 158, 202, and 231.


19. Ibid.


24. Ibid., p. 344.


27. Ibid.

28. Ibid., pp. 280-281.

29. Ibid., p. 286.

30. Ibid.

31. Ibid.


34. GNA, Ibid.

35. GNA, Ibid., p. 190.

36. Ibid.

37. Yoon, Ibid., p. 197

38. GNA, Ibid., p. 145.


41. Chung-Ang Ilbo (Newspaper), Seoul: June 13, 1979, p. 3.
42. Chung-Ang Ilbo (Newspaper), Seoul: May 22, 1979, p. 3.


44. Ibid., p. 315.

45. Ibid.

46. Ibid., pp. 215-217.


48. SMG, Ibid., p. 312.

49. Ibid., p. 315.

50. Ibid.

51. Ibid., pp. 310-311.

52. Ibid., p. 314.

53. Ibid.

54. Ibid.

55. GNA, Ibid., p. 146 and for construction costs see Footnote No. 44 in this Chapter.

56. SMG, Ibid., p. 318.

57. Ibid., p. 320.

58. Ibid., pp. 319-320.

59. Ibid.

60. Yoon, Ibid., p. 251.


63. Ibid.

64. GNA, Ibid., p. 171.

65. Ibid.
66. Ibid., p. 145.
68. Ibid.
69. Ibid.
70. GNA, Ibid., p. 171.
71. Ibid.
73. GNA, Ibid., p. 169.
74. Ibid.
76. GNA, Ibid., p. 190 and pp. 192-193.
77. Ibid., p. 191.
78. Ibid.
80. Ibid.
81. Yoon, Ibid., P.279.
82. Tyler, Ibid., P.198.
84. KNA, Ibid., p. 305.
86. SMG, Seoul Statistical Yearbook: 1961, and see Table B.2.
87. SMG, Seoul Statistical Yearbook: 1976, and see Table B.2.


94. GNA, Ibid. and KNA, Ibid.

95. KNA, Ibid.

96. GNA, Ibid., pp. 167-198 and 241.


98. Ibid., p.43.

99. Ibid., p.137.

100. Ibid., pp. 139-140.

101. Ibid., p. 171.

102. Ibid.

103. Ibid., p.137.

104. Ibid.

105. Ibid., p. 138.
106. Ibid., p.135 and p.193.

107. See Table B.3.

108. GNA, Ibid., p. 171.


110. Ibid., p. 143 and p. 171.

111. Ibid.

112. Ibid., p.134.

113. Ibid., p. 170.

114. Ibid., p. 181.

115. Ibid., p. 195.

116. Ibid., p. 396.


118. Ibid., p. 476.

119. Ibid., pp. 155-161.

120. Ibid., p. 478.

121. Ibid., pp. 255-256.

122. GNA, Ibid., p.134.

123. Ibid., p. 138.

124. Interview with Dr. Byung-Lim Yoo, Transportation Research Division, Korea Institute of Science and Technology. See Table B.4.


126. Ibid.

127. Seoul Police Department, Ibid., p. 3.

128. GNA, Ibid., p. 218.


130. Ibid.
133. Ibid., p. 193.
134. Ibid., p. 192.
135. KNA, Ibid., pp. 223-224.
137. Ibid.
138. Ibid., p.206.
139. Ibid.
140. Ibid., p.223.
141. GNA, Ibid., p.243.
142. Ibid.
143. Yoon, Ibid., p.231
145. Yoon, Ibid., pp.231-232
146. Ibid., p.227.
147. Ibid., p.281.
148. Ibid., p. 322 and p. 325.
149. GNA, Ibid., p. 256.
150. Korea Development Institute, Korea's Economy, Seoul: Korea Development Institute, 1975, pp.72-73.
151. Korea Development Institute, Ibid., p. 71 and GNA, Ibid., pp. 251-253.
152. KNA, Ibid., p. 225 and GNA, Ibid., pp.256-260.
154. KNA, Ibid., p. 224; GNA, Ibid., pp. 244-247; Yoon, Ibid., p.407.
155. GNA, Ibid.
156. Ibid.


158. Korea Development Institute, Ibid., pp. 81-84, pp.108-110, and p.114.

159. GNA, Ibid., p. 246 and GNA, Korea Transportation Annual: 1978.

CHAPTER V


8. Bender, R., Ibid.

9. See Chapter III Footnote Number 8.

10. 60 percent of the primary wage earners are 12 percent of inhabitants in the squatter settlements.

11. See, for example, the case of Hapsung service in Seoul and World Bank, Task Ahead for the Cities of the Developing Countries, World Bank Staff Working Paper No. 209, July 1975, pp. 62-64.


15. Ibid.
CHAPTER VI

3. KNA, Ibid., pp. 352-353.
6. See the Section 3.3.1 Survey Area Descriptions.

CHAPTER VII

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APPENDIX A

THE KWANGJU SQUATTER SETTLEMENT RELOCATION AREA'S RIOT

This is a case of the physical problem of getting work became one of the causes of the riot in Korea in 1971. The major cause of the riot was that government promised employment sources did not locate in the Kwangju squatter settlement relocation area early enough and there was an inadequate transportation link between the area and Seoul where the jobs for the poor existed.

What follows are rather detailed analysis of the squatter relocation project development, implementation, and outcome of the riot.

---------------------------------------------
APPENDIX A:

KWANGJU Squatter Settlements Relocation Program

The Kwangju Resettlement Program had basically two policy objectives. Initially it was seen as a measure to deconcentrate population densities from Seoul, in the process creating what was to be the first link in a series of satellite cities surrounding the city of Seoul; and secondly, it was utilized as a program to relocate squatters from Seoul. Although generally conceived of initially as a squatter relocation program, it is helpful to also note the other objective as it in some ways explains the government ambivalence toward what were the eventual consequences of the program.

Roughly designed for an area of three million pyung or approximately eleven and a half million square meters of land at a location 20 kilometers southeast of Seoul, the original plan called for the allocation of 600,000 pyung* for roads, 260,000 pyung for profit generating commercial facilities, and the remaining 2,140,000 pyung for housing and industrial facilities. Based on the original target estimation of 60,000 families at a rate of 20 pyung per family, this would have allowed 940,000 pyung for industrial facilities. Up to the time of the cessation of the program in summer of 1971, roughly 27,000 families had already moved into the area. Although medium and small private industries were expected to locate in Kwangju by 1973, and employ a total of 42,000 residents, up to the time of the cessation of the program only eight had actually been built, while seven were in operation. 1/

* One pyung equals 36 square feet.
Large scale removals from Seoul began in 1969. Based on a system of land allotments, residents were to receive an allotment card upon their removal from their former areas in the city, which would be used to claim twenty pyung of land in Kwangju that was distributed in an open lottery system. The price of the land for original settlers was 3,000 won* per pyung, or 60,000 won for the parcel of land, which was repayable at 20,000 per year for five years, starting the third year after occupancy. Hence, residents were given two years free of payments in which to concentrate resources on the development of their homes before beginning payments on the land. Ownership of the land, moreover, would be retained by the government until the resident had completed his payments. In the case of alternative parties buying the land from the original settlers, the transaction would be considered invalid by the government unless a house were built on the land. If so, then the land would be renegotiated with the government at actual market value. This last consideration is important, as will be shown later, considerable amounts of land were sold to middle class owners and speculators, who were forced to build immediately on the land to keep their holdings. In large part this was the factor responsible for the later boom that ensued in Kwangju. Contrary to the observations of most observers, it was not the original settlers who were building their houses, but rather the middle income families and speculators who had purchased the land from them.

* 400 won = U.S. $1.00 in 1971.
The development of Kwanju underwent essentially two phases, first from 1968 to 1970, and afterwards during the period of Mayor Yang, Taek-Shik's administration of the city of Seoul. During the first phase, planning was grossly inadequate and water, sewage and electric facilities were not yet installed, and squatters were forced to stake out their houses and live in tents or makeshift shelters for the first few months to a year. Financial or material assistance for the construction of houses was nonexistent, and because productive infrastructure had yet to be built, employment was not to be had in the area. Moreover, bus service to Seoul at the time was both infrequent and slow. It was during this period that the largest majority of settlers sold their lands to return to squatting or doubling up with friends and relatives in Seoul. During the period after 1970, conditions improved somewhat when transportation facilities to Seoul were improved, the first industries began to operate, and large scale public works and private construction began to absorb much of the excess labor in the area. By that time, moreover, development began to gain momentum and land values began to soar. Speculation became widespread, and those who maintained their lands in the area held on to them for whatever value they could command. However, by that time, the majority of the original settlers had already moved out. It is estimated that roughly two-thirds of the total original population sold their lands to return to the city. On the other hand, during the period of land value inflation, many
original settlers also sold their lands for whatever profit was available, and because of the comprehensive controls on squatter that came into effect in Seoul in 1970, squatted on the outskirts of Kwangju, building a house and trying to survive in the economy of the satellite city. Moreover, the economic activity that was being generated during the later phases of development also began to attract many squatters from Seoul, who came to Kwangju to squat on the outskirts and soon after 1970, a considerable squatter population was developing around the outskirts of Kwangju itself.

In essence, aside from the problems of building a house from literally nothing, the problem was that of employment opportunities in Kwangju, and the high cost that commuting to Seoul involved for the limited budget of the low-income household. Although it is not known to what extent squatters were able to profit from their sale of land to be able to either buy or rent a legitimate house elsewhere, in addition to the large numbers of squatters who were renting houses and originally displaced by removals in Seoul, an enormous number of families are estimated to have been dislocated by the whole process. 2/

However, to understand the real nature of the problem from the viewpoint of the original settler, it is necessary to appreciate the tremendous dislocations and alterations in life style and economy that the resettlement of Kwangju involved. One of the basic necessities relative to the successful maintenance of job security
for the squatter is his locational familiarity with the area in which he is working. Hence, his knowledge of the people, institutions and situation of the particular area in which he works, especially as a vendor (changsha), small salesman, peddler, rear car puller or A-frame porter is intimately related to his chances of business in carrying out his daily functions. These relationships with his area in the form of personal networks affect his credibility, chances for credit, and the small face to face exchanges that determine the success of a day's labor. Radical transformation of these locational ties can disrupt his sense of locational familiarity as well as destroy the network of relationships that for him are critical to the carrying out of his trade. As was seen in previous findings in chapter 2, especially in central city streamside areas, (those areas most decimated by government removals), the importance of the area for the survival of the squatter households was seen to be of paramount importance. 2/ The Kwangju program disrupted this whole pattern by making it too expensive for him to commute back and forth, and difficult if not impossible to find work in Kwangju.

Hence, those who were relocated to Kwangju were already dislocated in the truest sense of the word. Occupational possibilities that were open to them in terms of work in Kwangju were basically four fold. 4/

1. try to find work in industries that were being established there,
2. work in public works projects that were being sponsored by the government
3. try to eke out a small living as a peddler or start a small store, or
4. try to get into the booming construction work that began up to and after 1970.
What generally tended to happen in these instances is explained below:

1. **Industry:**

   First, because of the initial high population concentration in the area, demand for industrial jobs was much higher than job availabilities, which had the immediate effect of lowering the prevailing wages for local labor. This was also exacerbated by the fact that up to 1970, there were only eight factories located in Kwangju. Moreover, because of the low vocational skills possessed by the average low-income resident, adaptability to new jobs in the form of job training was necessary and companies were often reluctant to spend the money necessary to train people. Those who did soon found out that many of the residents possessed neither the skill nor the intelligence to carry out the required functions. Hence, the jobs that the residents did get were usually the lowest paying and most menial of tasks, which was an indirect insult to the intelligence of the resident, and a hamper to his sense of personal economic freedom in which he might be able to go out and get a higher paying but less stable job on his own, and avoid the regular but low paying and demeaning job in which he was employed, as well as resultant tensions between labor and management. Moreover, those industries that were labor intensive tended to hire only young girls who were more amenable to more strenuous conditions, more docile, and would accept lower pay.

2. **Public Works Projects:**

   During the later periods and after 1970 public works projects were begun for the construction of roads and infrastructure as well
as the employment of labor in the area. However, the demand for works projects was so high that although the pay was a reasonable 500 won a day, the government was forced to resort to a system of work shifts in order to allow more people to work. Hence, a normal family head would be able to work on an average of three days a week for which he was only able to earn 6,000 won a month.

3. Private Commercial Activity:

Private employment was also rendered difficult by the fact that all low level commercial and tertiary industries were generally located in the same place in the central part of KwangJu City. Hence, there were already too many people trying to engage in the same small scale peddling, and vending activities. Also, as much of the land was held unoccupied for speculation, often ironically, with houses built but no one occupying them, the actual resident population of higher income families which would have provided the market for commercial activities was not very high. Of the two basic small scale commercial activities, small peddling or "changsha" and porter services, peddling generally being done by the women, and carrying services by the men, only the women were able to carry out a marginal occupation while the men generally remained idle.

4. Construction Employment:

Part of the large boom that accompanied the rise in land speculation was the increase in building construction that occurred at the same time. Some observers have pointed to this, in addition to the public works, as being constructive in the absorption of labor and distribution of incomes in the area. However:
1. Practically all of the larger construction work that required skilled labor was being handled by private construction firms based in Seoul. All smaller construction such as the homes of squatters, did not utilize outside labor as the families were too poor to afford it and the scale of construction was too small to require extensive labor.

2. Because all larger construction projects were based on outside firms, construction workers and carpenters as well as other skilled craftsmen were generally from the outside and worked as employees of the private firms.

3. Those who were able to get work in construction were only those who possessed prior skills in construction work. Private firms could not spend the time and money to train workers on the spot, while those non-skilled residents who did get jobs usually received the most menial and low paying tasks, which, like public works and industrial jobs were generally relevant only to those persons willing and able to accept hard labor and low wages. The generally prevailing rate of unemployment in the area tended to further exacerbate the whole process.

The immediate result economically was the inability of the resident families to eke out a living in the new environment. If they were to try to work in Seoul, the transportation costs generally on a monthly
aggregate basis were prohibitive. For instance local bus transportation generally costs 60 won for a round trip with the ride taking one and a half to two hours. On a monthly basis this would be roughly 1,800 won. Others able to afford it used the express bus which, while faster, taking approximately an hour to reach Seoul, cost 80 won for a round trip for 2,400 won a month. Transportation costs, therefore accounted for one-tenth to one-quarter of the monthly family income, which was too high for most families. On the other hand, although some families may have been able to have the family head remain in Seoul, with other family members working in Kwangju to supplement their income, the general percentage of this happening tended to be relatively low.

On August 10, 1971, 30,000 residents of Kwangju staged a mass demonstration protesting government policy in the area. Destruction was widespread resulting in the burning of four government automobiles, the local police substation and complete destruction of the branch office of the Seoul Municipal Government. The complaints of the demonstrators involved the sorded living conditions being experienced by the residents at the time.

Subsequent investigations into the situation by the mass media revealed that at the time of the demonstration, of the total population in the city of 120,000 persons, original settlers numbered only 42,000 or roughly one third of the total. Of the remaining two-thirds, 21,600 or 18 percent were newcomers, or higher income people who had bought the land from the original settlers for their own use, and the remaining 56,400 persons or roughly 50 percent were those who had moved into the area "illegally."
These were primarily speculators who were holding the land for future sales. 6/ In all, of the 120,000 persons who had been moved into the area from squatter shacks in Seoul, two-thirds had already left the area, having sold their lands to other parties. Moreover, while the government had planned to locate 100 industrial plants in the area by 1973, at the time of the demonstration, only seven were in operation, employing 1,570 persons. City records at the time revealed that 40,000 persons were unemployed in the city. Aside from the enormous problems of unemployment, subsequent investigations into the area revealed that general living conditions for many of the residents were also appalling. Squatters moving into the area generally faced the prospect of having to purchase materials for the construction of their house at inflated prices higher than what was available in Seoul. Most of the families, having previously had their former homes destroyed, had no money and simply sold their land allotments in order to have money to buy food. 7/ In some of the peripheral areas of the city, where temporary tent shelters were constructed, people were suffering from large scale malnutrition and starvation. 8/ Many families had somehow managed to survive the bitter winter living in tents with no heat. Deaths were commonly reported.

Government reaction to the demonstration, in the face of widespread political criticism, although immediate, was not without its irony. Remedial measures were essentially the following: 9/

1. to distribute 2,500 tons of grains to more than 20,000 needy residents to support them until the coming winter is over,
2. to reduce the provincial government imposed taxes on the residents,
3. to set up several employment guidance centers in the area,
4. to complete the construction of 40 industrial plants presently under way in the area, as well as facilitate the construction of roads, piped water and a sewage system in the near future.

The government also took measures to elevate the status of Kwangju resettlement area from that of a town to a city named SungNam and to turn over jurisdictional and administrative functions to Kyunggi Province, the neighboring province in which Kwangju was located.

In short, the Seoul government had eradicated the problem by changing its name, and left administrative responsibilities to the province of Kyunggi.

Ultimately, the government decided to stop transporting squatters to the new town because in their words, "it would only serve to stimulate the outbreak of similar incidents." Consequently concern is now being expressed more for the stabilization of squatters already existing in Seoul rather than their removal. In a published interview, an official of the branch office of the Seoul municipal government in Kwangju noted that,"the residents should forget the idea that they live in a new town and realize that they still live in Seoul." 

Alternative studies of the Kwangju program, on the other hand, have been more sanguine in their observations, noting for instance that in terms of creating a satellite city and deconcentrating population from Seoul, the program should be seen as highly successful. As a result of improvements instituted during the regime
of Mayor Taek-Shik Yang, such as the initiation of public works projects, augmented bus service to Seoul, and the offering of substantial tax incentives to businesses and industries to locate in Kwangju, conditions were seen as a decided improvement over the time of the former Mayor Hyun-Ok Kim, under whose regime the program began.

NOTES


3. See Chapter 2, Section; Squatters' Location and Survey Findings, Location of Main Supporters Job.

4. Information for this portion was gathered through field interviews in Kwangju in 1974.


8. Ibid., September 11, 1971; and interview with members of Seoul National University's Kwangju field investigation team.


10. Ibid., September 12, 1971.

11. Ibid.

APPENDIX B

Figure B.1  Aerial Photograph: Sang Do Dong (Group I)
Although clustered primarily around the large commercial and market facility visible in the lower portion of the photograph, much recent settlement is visible along the northern stretches of the stream and in the hills and ravines to the north. These areas tend to be of more recent settlement, while the high density cluster to the south around the market is generally older. Despite the peripheral nature of its location, it can be seen that access to the main road and public transportation is relatively easy in this area.
Visible on the northern and southern banks of the Chung Gye Chun stream, these areas show the extremely high concentration and poor quality of housing that can be found in centrally located areas of this nature. On the other hand, the very high integration of these settlements into the heavy commercial and industrial environment gives them an economic function far beyond the simple provision of physical shelter.
Much more peripheral in location and isolated from central city functions, these areas generally tend to reflect more recent settlement and poorer conditions. In the photograph, the areal characteristics of Man Won Dong can be seen in terms of the Han River to the west and open rice paddy fields to the east. As this land is privately owned, settlement is forbidden, and houses generally cluster in a linear fashion along the bank. Recent developments in these areas generally show a spread of middle income residential neighborhoods in the former paddy areas.
Figure B.5 Population Composition for Group I Population: Male 1,166
(Central City Mountainside Areas) Female 1,096
Total 2,262

Figure B.6 Population Composition for Group II Population: Male 1,227
(Peripheral Mountainside Areas) Female 1,191
Total 2,418
Figure B.7  Population Composition for Group III Population: Male 1,394
(Central City Flatland/Streamside Areas)  Female 1,360
Total 2,754

Figure B.8  Population Composition for Group IV Population: Male 1,289
(Peripheral Flatland/Streamside Areas)  Female 1,110
Total 2,399
### Table B.1 Vehicles by Province and Type as of June 30, 1975

<table>
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<tr>
<th>Type of vehicle</th>
<th>Seoul</th>
<th>Gyeonggi</th>
<th>Gangwondo</th>
<th>Chungbuk</th>
<th>Chungnam</th>
<th>Jeonbuk</th>
<th>Gyeongnam</th>
<th>Gyeongsangbuk</th>
<th>Jeju</th>
<th>Total</th>
</tr>
</thead>
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<td>3,859</td>
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<td>945</td>
<td>3,933</td>
<td>1,940</td>
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<td>703</td>
<td>1,625</td>
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<td>760</td>
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<td>Cortina</td>
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<td>232</td>
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<td>558</td>
<td>354</td>
<td>458</td>
<td>1,530</td>
<td>783</td>
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<td>See Hexa</td>
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<td>10</td>
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<td>17</td>
<td>17</td>
<td>17</td>
<td>17</td>
<td>17</td>
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<td>26</td>
<td>26</td>
<td>90</td>
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<td>180</td>
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<td>462</td>
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<td>16</td>
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<td>183</td>
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<td>1</td>
<td>-</td>
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<td>177</td>
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<td>486</td>
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<td>135</td>
<td>193</td>
<td>221</td>
<td>202</td>
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<td>829</td>
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<td>28</td>
<td>9</td>
<td>17</td>
<td>42</td>
<td>-</td>
<td>6</td>
</tr>
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<td>For 25 persons &amp; under</td>
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<td>10</td>
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<td>6</td>
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<td>For 17-25 persons</td>
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<td>For 41-50 persons</td>
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<td>165</td>
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<td>263</td>
<td>227</td>
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<td>44</td>
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<td>84</td>
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<td>33</td>
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<td>112</td>
<td>109</td>
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<td>81</td>
<td>37</td>
<td>69</td>
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<td>-</td>
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<td>3</td>
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<td>71</td>
<td>84</td>
<td>91</td>
<td>202</td>
<td>692</td>
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<td>84</td>
<td>91</td>
<td>202</td>
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<td>139</td>
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<td>-</td>
<td>257</td>
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<td>2</td>
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<td>5</td>
<td>7</td>
<td>87</td>
<td>82</td>
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<td>3</td>
<td>20</td>
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<td>10</td>
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<td>89</td>
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<td>119</td>
<td>76</td>
<td>91</td>
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<tr>
<td><strong>Total special</strong></td>
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<td>92</td>
<td>20</td>
<td>180</td>
<td>92</td>
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<td>227</td>
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<td><strong>Grand total</strong></td>
<td>83,589</td>
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<td>6,380</td>
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<td>6,141</td>
<td>9,370</td>
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-285-
Table B.2: Registered Motor Vehicles in Seoul

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<tbody>
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<td>passenger car</td>
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<td>46,256</td>
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<td></td>
<td></td>
<td>4,566</td>
<td>1,616</td>
<td>500</td>
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<tr>
<td>bus</td>
<td>1,993</td>
<td>1,433</td>
<td>4,805</td>
<td>6,634</td>
<td>8,800</td>
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<td>2,647</td>
<td>4,099</td>
<td>19,325</td>
<td>28,307</td>
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<td>181</td>
<td>1,442</td>
<td>2,585</td>
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<td><strong>total</strong></td>
<td>11,411</td>
<td>16,625</td>
<td>60,442</td>
<td>85,248</td>
<td>123,800</td>
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<tr>
<td><strong>government</strong></td>
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<td>277</td>
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<td><strong>private</strong></td>
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<td>55</td>
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<td>others</td>
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<td></td>
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<tr>
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<td>6,690</td>
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<td>83,850</td>
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<td><strong>commercial</strong></td>
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<td></td>
<td></td>
<td></td>
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<td>4,983</td>
<td>11,505</td>
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<td>16,000</td>
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<td>3,956</td>
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<td>bus</td>
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<td>2,185</td>
<td>10,241</td>
<td>10,741</td>
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<td>truck</td>
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<td>47</td>
<td>131</td>
<td>233</td>
<td>350</td>
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<tr>
<td>others</td>
<td></td>
<td></td>
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</tr>
<tr>
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<td>6,817</td>
<td>8,581</td>
<td>25,833</td>
<td>28,526</td>
<td>34,850</td>
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* Korea Institute of Science and Technology.
Table B.3 Summary of Seoul's Public Transportation Service Industry

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<th>Year</th>
<th>Number of Company</th>
<th>Number of Employee</th>
<th>Number of Vehicles</th>
<th># of Passenger Carried*</th>
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<tr>
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<td>Taxi Tram-way</td>
<td>Bus Hap-sung</td>
<td>Taxi Tram-way</td>
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<tr>
<td>1957</td>
<td>35</td>
<td>101</td>
<td>4310</td>
<td>2992 1320</td>
</tr>
<tr>
<td>1959</td>
<td>29</td>
<td>75</td>
<td>4276</td>
<td>4963 1402</td>
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<td>1961</td>
<td>27</td>
<td>62</td>
<td>4294</td>
<td>7464 1423</td>
</tr>
<tr>
<td>1962</td>
<td>23</td>
<td>26</td>
<td>5415</td>
<td>3466 3303</td>
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<tr>
<td>1963</td>
<td>27</td>
<td>24</td>
<td>55</td>
<td>6527 3820</td>
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<tr>
<td>1964</td>
<td>24</td>
<td>26</td>
<td>56</td>
<td>6644 4895</td>
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<td>1965</td>
<td>27</td>
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<td>6912 5920</td>
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<td>1969</td>
<td>86</td>
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<td>1970</td>
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<td>1972</td>
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<td>1973</td>
<td>90</td>
<td>766</td>
<td>Sub-way</td>
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<td>1974</td>
<td>92</td>
<td>- Sub-way</td>
<td>963</td>
<td>4635</td>
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<td>1975</td>
<td>91</td>
<td>776</td>
<td>25945</td>
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* Number of passenger carried is expressed in millions.
Table B.4 Total Cost of Average Passenger Car

(Pony in 1975 prices)

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<th>Percent Total</th>
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<td>Factory Price of which</td>
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<td>(a) Commodity Tax</td>
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<tr>
<td>(b) Defence Tax</td>
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<td>Registration</td>
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<td></td>
<td>2,397,000</td>
<td>45.9</td>
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<tr>
<td>Annual Fixed Costs (five year life)</td>
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<tr>
<td>Motor vehicle Tax (199,880/year)</td>
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<td>Defense Surtax (59,940/year)</td>
<td>299,700</td>
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<td>License (14,400/year)</td>
<td>72,000</td>
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<tr>
<td></td>
<td>1,370,000</td>
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<td>Operating Costs</td>
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<tr>
<td></td>
<td>5,267,000</td>
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Source: 1, Korea Institute of Science and Technology

2. In the absence of data for Korea this is estimated on the basis of a 1975 average operating cost for a 1,500 c.c. car in the UK supplied by the Automobile Association.
Table B.5  Length of Stay of the Family in Seoul

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<th>Group III</th>
<th>Group IV</th>
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<td>Subtotal</td>
<td>Subtotal</td>
<td>Subtotal</td>
</tr>
<tr>
<td></td>
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<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
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<tr>
<td>0-5 years</td>
<td>76</td>
<td>24.8</td>
<td>120</td>
<td>32.0</td>
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<tr>
<td>6-10 years</td>
<td>78</td>
<td>25.5</td>
<td>109</td>
<td>27.7</td>
</tr>
<tr>
<td>11-20 years</td>
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<td>35.6</td>
<td>128</td>
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<tr>
<td>21 and over</td>
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<td>Average</td>
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Table B.6  Number of Moves in the City before Settlement in the Present Area

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<th>Group III</th>
<th>Group IV</th>
</tr>
</thead>
<tbody>
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<td>Subtotal</td>
<td>Subtotal</td>
<td>Subtotal</td>
<td>Subtotal</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>No answer</td>
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<tr>
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<td>79</td>
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</tr>
<tr>
<td>1-2 moves</td>
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<td>281</td>
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</tr>
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<td>3-4 moves</td>
<td>99</td>
<td>23.5</td>
<td>44</td>
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</tr>
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</tr>
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<td>Total</td>
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Table B.7  Length of Residence in the Present Area

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<td>N %</td>
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<td>N %</td>
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<td>No answer</td>
<td>- -</td>
<td>4 0.9</td>
<td>- -</td>
<td>- -</td>
</tr>
<tr>
<td>0-2 years</td>
<td>130 31.1</td>
<td>102 22.1</td>
<td>219 41.2</td>
<td>274 59.1</td>
</tr>
<tr>
<td>3-5 years</td>
<td>122 29.0</td>
<td>154 33.4</td>
<td>151 28.4</td>
<td>129 26.7</td>
</tr>
<tr>
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<td>114 27.1</td>
<td>131 28.4</td>
<td>132 23.0</td>
<td>55 11.6</td>
</tr>
<tr>
<td>11-20 years</td>
<td>50 11.9</td>
<td>59 12.8</td>
<td>39 7.4</td>
<td>19 4.0</td>
</tr>
<tr>
<td>21 years and over</td>
<td>4 0.9</td>
<td>11 2.4</td>
<td>- -</td>
<td>2 0.4</td>
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<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>N</td>
<td>421</td>
<td>461</td>
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<td>480</td>
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Table B.8  Ownership Status of the House

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<th>Group IV Subtotal</th>
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<td>N %</td>
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<tr>
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<td>- -</td>
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<td>- -</td>
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<tr>
<td>Privately owned</td>
<td>292 69.4</td>
<td>337 73.1</td>
<td>321 60.4</td>
<td>308 64.2</td>
</tr>
<tr>
<td>Cheng ei</td>
<td>95 22.6</td>
<td>82 17.8</td>
<td>86 16.2</td>
<td>76 15.8</td>
</tr>
<tr>
<td>Monthly rent</td>
<td>28 6.7</td>
<td>37 8.0</td>
<td>117 22.0</td>
<td>44 19.6</td>
</tr>
<tr>
<td>Occupying rent free</td>
<td>5 1.2</td>
<td>5 1.1</td>
<td>7 1.3</td>
<td>2 0.4</td>
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<td>- -</td>
<td>- -</td>
<td>- -</td>
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<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>N</td>
<td>421</td>
<td>461</td>
<td>531</td>
<td>480</td>
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<tr>
<td>% Privately owned</td>
<td>292 69.4</td>
<td>337 73.1</td>
<td>321 60.4</td>
<td>308 64.2</td>
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Table B.9  Rooms and Facilities in the House

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<td>368</td>
<td>74.8</td>
<td>463</td>
<td>87.8</td>
<td>419</td>
<td>87.3</td>
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<td>5.4</td>
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<td>8.7</td>
<td>13</td>
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<td>Room, kitchen, madang</td>
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<td>44.8</td>
<td>237</td>
<td>48.4</td>
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<td>1.6</td>
<td>25</td>
<td>5.4</td>
<td>30</td>
<td>5.6</td>
<td>23</td>
<td>4.8</td>
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<td>97</td>
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<td>123</td>
<td>23.2</td>
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<td>26.2</td>
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<td>B. Second Category</td>
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<td>67</td>
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<td>1.7</td>
<td>8</td>
<td>1.7</td>
</tr>
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Table B.10  Total Floor Space of the House

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<td>0.6</td>
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<td>236</td>
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<td>72</td>
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<td>461</td>
<td>531</td>
<td>480</td>
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<tr>
<td>Average (Pyong)</td>
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<td>6.4</td>
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<td>Average Space per person (Pyong)</td>
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Table B.11 Construction Materials of the House

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<td>N</td>
<td>%</td>
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</tr>
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<td>22</td>
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</tr>
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<td>5 mud bricks</td>
<td>26</td>
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<td>43</td>
<td>10.4</td>
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<tr>
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</tr>
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<td>85.1</td>
<td>336</td>
<td>72.1</td>
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Table B.12  Present Estimated Value of the House

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<td>3</td>
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</tr>
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<td>0.4</td>
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<td>7</td>
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<td>75</td>
<td>16.3</td>
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<td>7 200,000-299,999 won</td>
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<td>8.8</td>
<td>65</td>
<td>14.1</td>
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<td>8 300,000-499,999 won</td>
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<td>33</td>
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<td>1.1</td>
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<td>4.0</td>
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Table B.13  Improvements or Additions to the House

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</tr>
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<td>18.9</td>
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<tr>
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<td>237</td>
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<td>173</td>
<td>36.0</td>
</tr>
<tr>
<td>X Don't know</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>421</td>
<td></td>
<td>461</td>
<td></td>
<td>531</td>
<td></td>
<td>480</td>
<td></td>
</tr>
</tbody>
</table>

N = 294
N = 338
N = 323
N = 307
N = 421
N = 461
N = 531
N = 480
Table B.14  Total Population Occupational Status by Area Types

<table>
<thead>
<tr>
<th></th>
<th>Group I Subtotal</th>
<th>Group II Subtotal</th>
<th>Group III Subtotal</th>
<th>Group IV Subtotal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Agriculture</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Skilled labor</td>
<td>160</td>
<td>28.5</td>
<td>103</td>
<td>18.5</td>
</tr>
<tr>
<td>Managerial</td>
<td>29</td>
<td>5.0</td>
<td>6</td>
<td>1.1</td>
</tr>
<tr>
<td>Clerical</td>
<td>81</td>
<td>13.7</td>
<td>42</td>
<td>7.5</td>
</tr>
<tr>
<td>Commercial</td>
<td>126</td>
<td>21.6</td>
<td>140</td>
<td>25.1</td>
</tr>
<tr>
<td>Unskilled labor</td>
<td>151</td>
<td>25.9</td>
<td>222</td>
<td>39.8</td>
</tr>
<tr>
<td>Service</td>
<td>32</td>
<td>5.5</td>
<td>43</td>
<td>7.7</td>
</tr>
<tr>
<td>Unknown</td>
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<td>1</td>
<td>0.2</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>582</strong></td>
<td><strong>100</strong></td>
<td><strong>557</strong></td>
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</tr>
</tbody>
</table>

Table B.15  Occupation of the Main Supporter

<table>
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<tr>
<th></th>
<th>Group I Subtotal</th>
<th>Group II Subtotal</th>
<th>Group III Subtotal</th>
<th>Group IV Subtotal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>0 No answer</td>
<td>1</td>
<td>0.2</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1 Agricultural</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>0.2</td>
</tr>
<tr>
<td>2 White collar</td>
<td>61</td>
<td>14.6</td>
<td>30</td>
<td>6.5</td>
</tr>
<tr>
<td>3 Commercial</td>
<td>68</td>
<td>16.2</td>
<td>95</td>
<td>20.7</td>
</tr>
<tr>
<td>4 Skilled labor</td>
<td>93</td>
<td>24.4</td>
<td>83</td>
<td>18.0</td>
</tr>
<tr>
<td>5 Unskilled labor</td>
<td>104</td>
<td>24.7</td>
<td>193</td>
<td>37.5</td>
</tr>
<tr>
<td>6 Service</td>
<td>24</td>
<td>5.7</td>
<td>33</td>
<td>7.2</td>
</tr>
<tr>
<td>7 Unemployed</td>
<td>60</td>
<td>14.2</td>
<td>44</td>
<td>9.5</td>
</tr>
<tr>
<td>8 Other</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>0.4</td>
</tr>
<tr>
<td>X Don't know</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>421</strong></td>
<td><strong>100</strong></td>
<td><strong>461</strong></td>
<td><strong>100</strong></td>
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</table>
Table B.16  Monthly Income of the Main Supporter

<table>
<thead>
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<th>Income Range</th>
<th>Group I Subtotal</th>
<th>Group II Subtotal</th>
<th>Group III Subtotal</th>
<th>Group IV Subtotal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>No answer</td>
<td>4</td>
<td>1.0</td>
<td>3</td>
<td>0.6</td>
</tr>
<tr>
<td>No main supporter</td>
<td>16</td>
<td>3.8</td>
<td>14</td>
<td>3.0</td>
</tr>
<tr>
<td>0-999 won</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1,000-1,999 won</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2,000-2,999 won</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>0.4</td>
</tr>
<tr>
<td>3,000-4,999 won</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5,000-9,999 won</td>
<td>6</td>
<td>1.4</td>
<td>9</td>
<td>2.0</td>
</tr>
<tr>
<td>10,000-14,999 won</td>
<td>34</td>
<td>8.1</td>
<td>108</td>
<td>23.4</td>
</tr>
<tr>
<td>15,000-24,999 won</td>
<td>66</td>
<td>15.7</td>
<td>121</td>
<td>26.2</td>
</tr>
<tr>
<td>25,000-49,999 won</td>
<td>130</td>
<td>30.1</td>
<td>133</td>
<td>28.8</td>
</tr>
<tr>
<td>50,000 won and over</td>
<td>99</td>
<td>23.5</td>
<td>64</td>
<td>13.9</td>
</tr>
<tr>
<td>Don't know</td>
<td>66</td>
<td>15.6</td>
<td>7</td>
<td>1.7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total %</th>
<th>100</th>
<th>100</th>
<th>100</th>
<th>100</th>
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</thead>
<tbody>
<tr>
<td>N</td>
<td>421</td>
<td>461</td>
<td>531</td>
<td>480</td>
</tr>
</tbody>
</table>
Table B.17  Length of Time of Main Supporter at Present Job

<table>
<thead>
<tr>
<th></th>
<th>Group I Subtotal</th>
<th>Group II Subtotal</th>
<th>Group III Subtotal</th>
<th>Group IV Subtotal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N  %</td>
<td>N  %</td>
<td>N  %</td>
<td>N  %</td>
</tr>
<tr>
<td>No answer</td>
<td>5  1.2</td>
<td>3  0.6</td>
<td>2  0.4</td>
<td>-</td>
</tr>
<tr>
<td>No main supporter</td>
<td>16  3.8</td>
<td>14  3.0</td>
<td>19  3.6</td>
<td>10  2.1</td>
</tr>
<tr>
<td>Less than 1 year</td>
<td>64 15.3</td>
<td>71 15.4</td>
<td>132 24.8</td>
<td>103 21.4</td>
</tr>
<tr>
<td>2-3 years</td>
<td>81 14.2</td>
<td>91 19.8</td>
<td>120 22.6</td>
<td>148 30.8</td>
</tr>
<tr>
<td>4-6 years</td>
<td>89 21.1</td>
<td>118 25.6</td>
<td>102 19.3</td>
<td>90 18.8</td>
</tr>
<tr>
<td>7-10 years</td>
<td>57 13.5</td>
<td>78 17.0</td>
<td>47  8.9</td>
<td>78 15.2</td>
</tr>
<tr>
<td>10 and more years</td>
<td>108 25.6</td>
<td>86 18.6</td>
<td>109 20.5</td>
<td>56 11.7</td>
</tr>
<tr>
<td>Don't know</td>
<td>1  0.3</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>100 100</td>
<td>100 100</td>
<td>100 100</td>
<td></td>
</tr>
<tr>
<td>N</td>
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<tr>
<td>Average years</td>
<td>5.3</td>
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Table B.18  Location of Job of Main Supporter

<table>
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<tr>
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<th>Group I Subtotal</th>
<th>Group II Subtotal</th>
<th>Group III Subtotal</th>
<th>Group IV Subtotal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N  %</td>
<td>N  %</td>
<td>N  %</td>
<td>N  %</td>
</tr>
<tr>
<td>0 No answer</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1 No main supporter</td>
<td>16  3.8</td>
<td>14  3.0</td>
<td>19  3.6</td>
<td>10  2.1</td>
</tr>
<tr>
<td>2 At home</td>
<td>30  7.1</td>
<td>27  5.8</td>
<td>51  9.6</td>
<td>37  7.7</td>
</tr>
<tr>
<td>3 Inside neighborhood</td>
<td>68 16.2</td>
<td>70 15.2</td>
<td>97 15.3</td>
<td>114 28.8</td>
</tr>
<tr>
<td>4 Outside neighborhood</td>
<td>252 59.8</td>
<td>341 74.0</td>
<td>320 68.3</td>
<td>279 58.1</td>
</tr>
<tr>
<td>5 In and out of neighborhood</td>
<td>6 1.4</td>
<td>5 1.1</td>
<td>3 0.5</td>
<td>12 2.5</td>
</tr>
<tr>
<td>X Don't know</td>
<td>49 11.7</td>
<td>4  0.9</td>
<td>41  7.7</td>
<td>28  5.8</td>
</tr>
<tr>
<td>Total</td>
<td>100 100</td>
<td>100 100</td>
<td>100 100</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>421</td>
<td>461</td>
<td>531</td>
<td>480</td>
</tr>
<tr>
<td>% Inside Neighborhood</td>
<td>23.3</td>
<td>47 21.0</td>
<td>148 27.9</td>
<td>151 31.5</td>
</tr>
<tr>
<td></td>
<td>Group I Subtotal</td>
<td>Group II Subtotal</td>
<td>Group III Subtotal</td>
<td>Group IV Subtotal</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>------------------</td>
<td>-------------------</td>
<td>--------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>No answer</td>
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<td>0.7</td>
<td>3</td>
<td>0.6</td>
</tr>
<tr>
<td>Work at home</td>
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<td>9.5</td>
<td>25</td>
<td>5.4</td>
</tr>
<tr>
<td>Walk</td>
<td>124</td>
<td>29.4</td>
<td>143</td>
<td>31.0</td>
</tr>
<tr>
<td>Bus</td>
<td>207</td>
<td>49.2</td>
<td>254</td>
<td>55.1</td>
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<tr>
<td>Taxi</td>
<td>12</td>
<td>2.8</td>
<td>3</td>
<td>0.6</td>
</tr>
<tr>
<td>Bicycle</td>
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<td>0.7</td>
<td>3</td>
<td>0.6</td>
</tr>
<tr>
<td>Motorcycle or scooter</td>
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<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Irregular depending on job place</td>
<td>18</td>
<td>4.3</td>
<td>10</td>
<td>2.2</td>
</tr>
<tr>
<td>Train (commuter train)</td>
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<td>0.7</td>
<td>2</td>
<td>0.4</td>
</tr>
<tr>
<td>Others (jitney, truck, 3-wheel vehicle)</td>
<td>11</td>
<td>2.6</td>
<td>18</td>
<td>3.9</td>
</tr>
<tr>
<td>Total %</td>
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<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>N</td>
<td>421</td>
<td>461</td>
<td>531</td>
<td>480</td>
</tr>
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<td>Group</td>
<td>Subtotal</td>
<td>Subtotal</td>
<td>Subtotal</td>
<td>Subtotal</td>
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<td>N</td>
<td>%</td>
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<td>19</td>
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<td>Basic food</td>
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<tr>
<td>Side dishes</td>
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<td>0.2</td>
</tr>
<tr>
<td>B. Housing expenditure</td>
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<td></td>
</tr>
<tr>
<td>House or land payments</td>
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<td>4.0</td>
<td>19</td>
<td>4.1</td>
</tr>
<tr>
<td>Electricity, heat &amp; utility</td>
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<td>12.1</td>
<td>44</td>
<td>9.5</td>
</tr>
<tr>
<td>C. Family expenditure</td>
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<td></td>
</tr>
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<td>Clothing</td>
<td>93</td>
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<td>79</td>
<td>17.1</td>
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<td>116</td>
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<td>Transportation</td>
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<td>17.1</td>
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<td>Medical expenditures</td>
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<td>4.9</td>
<td>26</td>
<td>5.6</td>
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<tr>
<td>D. Others</td>
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</tr>
<tr>
<td>Taxes</td>
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<td>-</td>
</tr>
<tr>
<td>Personal expenses</td>
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<td>42</td>
<td>9.2</td>
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<td>Support to hometown family</td>
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<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Debts</td>
<td>29</td>
<td>6.9</td>
<td>18</td>
<td>3.9</td>
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<tr>
<td>&quot;Kye&quot; payments or savings</td>
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<td>14</td>
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<td>Miscellaneous</td>
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<td>100</td>
<td>461</td>
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