THE CO-ORDINATION OF LIGHT RAPID TRANSIT AND LAND-USE:
AN EXAMINATION OF THE INSTITUTIONAL FRAMEWORK IN EDMONTON

by

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B.A. University of Alberta, 1981

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF ARTS
in

THE FACULTY OF GRADUATE STUDIES
SCHOOL OF COMMUNITY AND REGIONAL PLANNING

We accept this thesis as conforming
to the required standard

THE UNIVERSITY OF BRITISH COLUMBIA
MARCH, 1987
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ABSTRACT

Land use and transportation are dynamic processes continually reacting to the pressures of urban development and societal change. Although the theoretical literature supports the notion that land use and transportation should be planned and managed in a co-ordinated fashion, the empirical evidence suggests that land use and transportation decisions are still made largely independent of each other.

The thesis maintains that an emphasis on the substantive approach in the planning process has led to a misunderstanding of the manner in which the institutional framework can influence the co-ordinated development of land use and transportation.

Several institutional factors are involved including; the organizational framework, the process of integration within the framework, and the strategies developed to implement societal goals and objectives. Specific concerns include; fragmentation of authority, lack of authority, a reactive planning process, and the lack of formal mechanisms for implementation.

An adaptive, process-oriented model of institutional integration is proposed that blends two elements of an effective planning process: the co-ordinated development of land use and transportation and the integration of organizational components within the institutional framework. The thesis suggests that one cannot successfully implement strategic change without making compensating and reinforcing changes to the process and structure. The degree of risk and uncertainty within the environment is the qualifying factor that maintains a proper
'fit' within the planning process.

The latter part of the thesis examines the institutional framework responsible for the development of the City of Edmonton's Northeast light rapid transit system. The analysis reveals that although rapid transit was seen as a means of accomplishing compact growth and development little redevelopment has occurred along the transit corridor, particularly at the level envisaged by the city planners. A number of institutional factors have contributed to the lack of development including; a dynamic and complex environment, a reactive planning process, the lack of formal integrative mechanisms, separate and, at times, independent land use and transportation planning processes, and disincentives towards redevelopment such as the redevelopment levy and zoning freeze.

The application of the integrated institutional model suggests the need for a number of integrative mechanisms that were not evident within the institutional framework responsible for Edmonton's light rapid transit system. The study reveals that the institutional framework influences the effectiveness of land use planning along a rapid transit corridor and that integrative mechanisms are required within the planning process in order to effectively co-ordinate the development of land use and transportation.
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ACKNOWLEDGEMENTS

I will be forever indebted to a number of people for the writing of this thesis. My advisors, Professor's V. Setty Pendakur and Brahm Wiesman have shown enduring faith and support, and their insights have both challenged and enhanced the final outcome. To the City of Edmonton, many thanks are due. First, for providing me the opportunity of employment which ultimately led to the subject of this thesis. And, second, for the assistance and encouragement which I received from the staff at the Planning Department. Special thanks are due to: Armin Preiksaitis, Bob Caldwell, and Gary Leobold. I am particularly indebted to my parents who have always believed that dedication and commitment are worthwhile goals, and whose skills I have inherited to complete this task. Finally, to my wife, Bianca, for her support and encouragement of this project, and for accepting the sacrifices necessary for its completion.
CHAPTER 1
INTRODUCTION

Cities develop through the necessity to provide a means of interacting among goods and people. A land-use pattern together with a transportation network provides the foundation for this interaction. This relationship has been conceptualized by Kahn in the following diagram:

Figure 1

Land Use—Transport Interaction: The Impact Groups


The diagram depicts a complex, dynamic process that impacts all sectors of society. Given the highly integrative nature of the system, planning theory suggests that land use and transportation should be planned and managed in a co-ordinated fashion.

Although the public sector is but one component within this complexed system it is a primary impact group since governments, particularly in North America, are largely responsible for the provision of public transportation and the management of land
use. This responsibility is administered through an institutional framework made up of Federal, Provincial, Metropolitan, and Civic agencies and departments.

Since land use and transportation should be co-ordinated, and governments maintain a central role in their development, it follows that the co-ordination of these two elements should be an integral part of the institutional framework. However, the optimism in planning theory is sharply contradicted by empirical evidence. A burgeoning literature is questioning traditional planning methods claiming that the planning process has been ineffective in co-ordinating the development of land use and transportation.

The writings of practitioners and the empirical evidence suggests that land-use and transportation decisions are still made largely independent of each other. Several institutional factors are involved. They include: the organizational framework, the integrative process within the framework, and the strategies employed to implement land-use and transportation decisions. Specific concerns include: fragmentation of authority, lack of authority, lack of an integrated approach, a reactive planning process, and the lack of formal mechanisms for implementation. This thesis is therefore concerned with the discrepancy between the optimistic viewpoint that maintains land use and transportation should be co-ordinated and the pessimism found in the empirical evidence and evaluative literature.

The principal argument of this thesis is that one of the fundamental reasons for a lack of an effective co-ordinated
approach in the development of land use and transportation lies in the lack of understanding about the interface between the institutional framework and the dynamic urban system which the framework is intended to influence.

The purpose of this thesis is: 1) to examine, in a general context, the nature and relationship between land use and transportation; 2) to examine the impact of the institutional framework on the co-ordinated development of land use and public transportation; 3) to present a model of institutional integration by developing a contingency approach to organizational development, adaptation, and change; and, 4) to test the practical application of the model by examining the institutional framework responsible for the development of light rapid transit in the City of Edmonton.

To suggest that particular institutional arrangements inevitably lead to certain strategies is so doubtful that it is not even offered as a hypothesis. Instead, the following hypotheses are suggested:

- The nature of the institutional framework influences the effectiveness of land use planning along a transportation corridor; and,

- There are identifiable positive and negative components to any given institutional framework vis-a-vis land use and transportation planning. It is possible to increase the positive and decrease or minimize the negative in light of Edmonton's LRT system.

LRT is now considered by many North American cities as an effective and efficient form of public transportation both, from
the perspective of moving people and as a catalyst for directing development. There is every indication that this trend will continue:

*LRT is presently operating in Edmonton, Calgary, and Vancouver. Proposals for LRT in Hamilton, Winnipeg, and numerous other North American cities suggests its importance as a viable mode of public transportation.

*Edmonton and Calgary are planning to construct extensions to their respective systems. Vancouver also proposes extensions which will continue well into the next century. Therefore, further examination of this expanding technology is timely.

This research is relevant to the City of Edmonton for a number of reasons:

*Edmonton was the first North American city to utilize LRT. Perhaps other cities will be able to learn from Edmonton's experience.

*Although Edmonton's plans and policies suggest that intensive development is to occur along the LRT corridor, particularly adjacent to the LRT stations, very little development has occurred thus far.

*Proposed extensions to the Southwest should consider the impacts of the NELRT line.

Moreover, the findings of this study will make a useful contribution to the planning literature on the co-ordinated development of land use and public transportation in general both from the perspective of administration and implementation. Although special attention will be given to the Edmonton experience, the
use of this research may be easily applied to other cities, particularly those considering the use of Light Rapid Transit.

The traditional planning approach to developing land use and transportation has focused on the substantive point of view by examining such factors as financing, modal choice, location of services and operations performance. Chapter 2 reviews some of the deficiencies of this approach and argues that greater emphasis should be placed on the procedural aspects of the relationship by concentrating on organizational structure, process, strategy and forums for interaction.

The emphasis on a procedural approach in the co-ordinated development of land use and transportation suggests that many of the issues raised are increasingly governmental ones. Chapter 3 examines the more salient features of the institutional framework with a focus on the specific organizational components of environment, structure, strategy, and process. The chapter maintains that the key to effectively implementing a chosen strategy is contingent upon the congruence or 'fit' between the organizational components that constitute the institutional framework.

The concept of co-ordinating the development of land use and transportation discussed in Chapter 2 and the idea of administrative integration examined in Chapter 3 are combined in Chapter 4 through the development of a model of institutional integration. The model is an attempt to depict the concept of fit and congruence among the organizational components as it relates to the land-use/transportation planning process. The concept maintains that a co-ordinated approach to the development of land use and transportation will be ineffective unless it is
compatible with and supportive of an integrated institutional framework.

The thesis shifts from a review of pertinent literature and the development of a model of institutional integration to a case study in Chapter 5. A review of the development of light rapid transit in Edmonton, Alberta was selected as a planning exercise that attempted to co-ordinate the development of public transportation and land use. The case study examines the structure, process, and strategies used in implementing the rapid transit system in Edmonton and focuses on the way the institutional framework had treated the questions of implementation and responsiveness to adaptation and change.

An analysis of the case study is presented in Chapters 6 and 7. Chapter 6 focuses on the application of the model to the case study and develops proposed measures to be taken by senior public officials and personnel in obtaining a more efficient and effective use of Edmonton's LRT system. The final chapter summarizes the analysis and concludes with observations regarding the practical application of the integrated institutional model.
CHAPTER 2

THE CO-ORDINATION OF LAND-USE AND TRANSPORTATION

Transportation and land-use are dynamic processes continually reacting to the pressures of urban development and societal change. It is generally accepted in the planning profession that these two activities should be planned and managed in relation to each other (Berechman; 1976, Engelen; 1974, Goldberg; 1972).

Indeed, the issue at hand is not whether transportation and land-use are related. Rather, at issue is the nature and extent of this relationship and how this relationship should be recognized and incorporated into the urban and regional planning process (Altschuler; 1979, Garrison; 1979).

Kahn has developed a conceptual definition of this interaction between land-use and transportation (1974) (see Figure 2).

**Figure 2**

![Diagram of the Land Use and Transport System](dummy)


Kahn points out that this interactive process is broad in nature,
operating at all levels of society and spatial scales. Furthermore, it is an ongoing, dynamic process involving the physical, social, environmental, economic, and institutional processes of urban society.

In this chapter, a conceptual framework of the land-use - transportation linkage is presented by reviewing these functions from a theoretical, historical and practical point of view. Part 1 discusses the theoretical considerations of land-use and transportation. Part 2 examines the recent attempts at modelling this relationship. Part 3 traces the attempts at co-ordinating these activities through the transportation and land-use planning process in North America. The chapter ends by addressing the impact of Light Rapid Transit (LRT) on urban development based on the understanding obtained in parts 1 and 2.

Part 1. LAND-USE AND TRANSPORTATION IN THEORY

Urban areas are places where large, intensive amounts of labour and capital are combined with relatively small amounts of land in order to produce and distribute goods and services (Mills;1972). The role of transportation within this dynamic process has been the topic of discussion in the field of urban economics for decades. Similarly, the effect of transportation on land values and location has been a common theme throughout the literature on location theory. There are two advantages to examining the theoretical basis of this relationship:

...theory is both positive and normative. It is positive in the sense that it describes how the world works- generally in abstract and aggregate patterns - and it explains why things behave the way they do; it is normative in the sense that it represents an ideal or optimum against which to measure and evaluate de-
Transportation and land-use have long been recognized as crucial determinants of both the formation of cities and the spatial distribution of economic activity. This recognition is founded on the works of two men in particular—Johann von Thunen (1826) and A. Weber (1909). Their works, commonly referred to as location theory, describe and operationalize the process of location decision making (Winkelmans;1980). The ultimate objective of location theory is the minimization of production costs, through selecting sites with the lowest costs of production (i.e. land, labor, capital, and transportation). This objective is not unlike those of similar theories in economics (Mills;1972).

Von Thunen's writings represents the first serious attempt at describing the relationships and patterns in economic space. Although his analysis is based on the agricultural sector, a number of his principles have been applied to cities. Von Thunen's appreciation for the effects of transportation are based on the costs associated with distance and its effect on the production of agricultural goods. His most important contributions to urban location theory were introducing the concepts of accessibility, economic rent, and the effects of transportation improvements which make some sites more attractive than others (Yeates;1976).

In 1927, Robert Murray Haig developed the concept of friction of space whereby transportation costs and rents were presented as balancing forces. He also examined the concept of accessibility which he defined as "contact with little friction"
These early theorists suggested that transportation was a cost and therefore a dispreference in the decision to locate. At that time, the interaction between land-use and transportation was by in large seen as a one-way relationship. The epitome of this notion is Mitchell and Rapkin's book entitled, *Urban Traffic: A Function of Land-Use* (1954).

Weber added to these basic principles by suggesting that transportation costs were relative to a particular location's attributes and not solely on the "friction of distance" (Weber;1909). In 1954, Losch drew upon the relationship between land-use and transportation as a dynamic process of interdependencies that decide on the 'best' use at a particular point in time, "Dynamically there is no best location because we cannot know the future" (Losch;1954;16). Finally, in 1956, Isard introduced the notion of transportation as an input:

Isard's change in opinion was in fact the result of becoming conscious that not only 'distance' but also additional factors, such as terminal facilities; are important in view of site location.

(Winkelmans;1980;206)

Since the 1960's, two men in particular have had a major impact on our present day theories of land-use and transportation - Lowden Wingo Jr. (1961) and William Alonso (1964). Their works were the first comprehensive attempts at analyzing the relationship between land-use and transportation in an urban setting.

Alonso suggested that residential location behaviour of the individual was the result of competition in urban space. This competition was a function of income, access, housing, and transportation. However, he still argued that transportation was a
dispreference which directly affected the rent of a given location:

If transportation costs are changed, the rent gradient changes; since land uses and rents for land are tied to each other by market processes, land use potentials are changed. The causality is clear. (Alonso;1964;59)

Therefore, according to Alonso's theory, a change in accessibility will result in a shift in household location, consumption of land, and the amount of rent paid.

Wingo (1961) developed the notion that transportation had a unique relationship with land use and location both as an influence on government policy and because of its special qualities (i.e. accessibility, a land-user, and as a price competitor in the market place). Key aspects of Wingo's work relative to the co-ordination of land-use and transportation are summarized below:

1. An emphasis on the critical role of transportation in the urban planning process:

That the urban transportation system should be assigned this crucial role in a model whose purpose is to tell us something about the distribution of persons and the value of land in the urban region is certainly consistent with what we know about the impact of transportation innovation on the spatial organization of the City. (Wingo;1961;23)

2. The role of accessibility:

The quality of location, or 'accessibility', is the dominant factor in determining the uses of land and their intensity. (Wingo;1961;23)

3. The effects of Public Policy:

Public policy seeking to modify the urban structure by manipulating such technical variables as the transportation system and the supply conditions of the market for land will succeed only by accident unless it considers the time and space preferences of the popula-
Recent studies have concentrated specifically on the interaction of land-use and transportation by analyzing past theories and drawing on common doctrine.

Douglas B. Lee Jr., in his report titled *Transportation and Land Use Theory*, examined five partial theories, extracted the key principles from the theories, and developed a general framework theory which specifically examines the co-ordination of transportation and land-use.

Lee begins his discussion with a simplified theory - spatial equilibrium in a single market - and relaxes his assumptions as he develops a general model. As one moves away from the market, costs incurred by the entrepreneur are a function of distance and transportation. Transportation costs rise linearly because the rate is initially held constant. The result is a cone shaped land rent function typical of the bid rent functions described in the theories of Von Thunen, Alonso, and Wingo (figure 3).

**figure 3**

Rent Gradient and Land Use Intensity Gradient

The concept of intensity is then introduced into the model. Intensity is referred to as "... the amount of activity or the level of capital investment per unit of land". (Lee Jr.; 1978; 5) He further recognized that transportation is also a land user and hence competes with other land users for scarce resources, "... in built-up areas of cities the street system occupies about 30% of the land area". (Lee Jr.; 1978; 10) Lee suggests that one should strive to balance intensity of use with the price of land:

High priced land should be served by intensity models, a result achieved by matching intensity of transportation and land use to intensity of productive land. (Lee Jr.; 1978; 12)

He also describes the mechanism by which the benefits of a particular location are transformed into the value of land. He refers to this mechanism as capitalization:

The benefits might be the consequences of a rapid transit station or freeway interchange, raising the level of access and hence the optimal intensity of use as well as the ability to pay rent for the location. (Lee Jr.; 1978; 14)

Based on this analysis, Lee extrapolates a set of observations which summarizes the relationship between land-use and transportation:

* The more accessible the location the more intense the land will be used and the higher the value of land.
* Land use intensity follows the shape of the rent gradient, decreasing at a decreasing rate with increasing distances or decreasing access.
* Other things being equal, urban land values are determined by the access of the site to other sites of interest.
* The same factors of social cost (supply) and social
benefit (demand) determine whether the best use of a site is for transportation or for some other use, at all locations. In this sense, there is no difference between land used for transportation and land used for other purposes.

Because of the highly abstract nature of these observations, a number of criticisms have been raised concerning the relevance of theory. These are summarized below:

1. The preoccupation with a single focal point and a radial population distribution. (Wingo; 1961)

2. The tendency towards a focus on static equilibrium models which cannot cope with the highly dynamic nature of the process.

3. Locational decisions are not always made by 'rational' man and are often a complex matter of choice and tradeoffs. (Wingo; 1961)

4. Little attention is given to the effects of the institutional structure and the decision making process. (Kahn; 1978)

5. Theory assumes away price discrimination, government regulation, negative externalities, and taxation which distort the free market. (Lee; 1978)

6. The absence of a theory which explains the effects of public policy and expenditure decisions on different modes of transportation. (Alcaly; 1976)

Nonetheless, an examination of the theoretical considerations does provide a measure from which to judge empirical evidence. Moreover, these theoretical considerations provide the foundation
for models which attempt to portray the relationship between land-use and transportation. The following section will examine the nature and impact of models and their applications to transportation and land-use planning.

II. Modelling the Land-use / Transportation Relationship

Models attempt to bridge the gap between theory and practice. (Putman; 1975) As Branch suggests:

A Model is developed to simulate the functioning of the object, activity, or force under consideration in a way that is meaningful for studying, operating, or manipulating the original phenomenon. (Branch; 1966; 7)

Models that attempt to describe the land-use/transportation relationship can be grouped into one of three categories:

* Descriptive
* Predictive
* Process-oriented

1. Descriptive Models

Descriptive models are typically classified as qualitative spatial models that analyze and describe the characteristics of land-use and transportation from historical trends and present spatial patterns. I shall examine three such descriptive models that have considered land-use and transportation. The first is Burgess' concentric zone model developed in the early 1920s. The second is Hoyt's sector model (1939) and finally the Ullman/Harris multiple nuclei model (1945). Based on the principles of these models, a general descriptive model is then presented.

The concentric zone model describes five concentric zones, each
defined in terms of economic activity, sociological patterns, and the ability to pay for the costs of transportation. The rings are formed around a focal point (e.g. central business district) and expand or contract as activities vie for position. As shown in figure 4 below, this model has application to the principles developed in the theories of Alonso and Wingo. (Yeates; 1976; 211)

Source: Yeates; The North American City; 1976.
Hoyt's sector theory is based upon the movement of residential neighborhoods, particularly emphasizing the outward movement of high-rent paying neighborhoods which can afford the additional commuting costs in exchange for comfort and privacy. (see Figure 5)

![Figure 5](image)

The changing pattern of high-rent areas in American cities, 1900-1936.

Source: Yeates; *The North American City*; 1976.

Ullman and Harris base their multiple nuclei concept on the premise that activities attract and repel each other into spatial nucleations which will locate near functions they require (e.g. transportation routes) (Yeates; 1974) (see Figure 6)

![Figure 6](image)

Yeates extrapolates the main principles from each of these models and develops a general model shown in figure 7.

**Figure 7**

![Idealized structure of urban areas.](image)

Source: Yeates; *The North American City*; 1976.

This model describes spatial structure as having nucleations, sectors, and rings of economic and residential activity interspersed around a central business district.

There are a number of telling criticisms of these descriptive models. By their very nature, they describe rather than explain or predict the interactive processes in spatial structure. As well, they are simplistic, depicting specific zones as if physical boundaries 'wall-off' certain areas for specific activities.

2. **Predictive Models**

Predictive models attempt to resolve these criticisms by forecasting the development of urban areas based on a set of pre-chosen variables. Since the development of the 'workable' computer in the late 1950's, a number of authors have attempted to quantify the land-use/transportation relationship. These models assume a fixed value for the transportation network and,
based on this assumption, attempt to forecast a future distribution of land-uses. Putman explains their operation:

The overall system of models had to be highly integrated with respect to model inputs, outputs and feedback loops. By this integration the model package would attempt to eliminate the principle failing of contemporary land-use and transportation studies, by explicitly stating these feedback loops. (Putman; 1975; 199)

I. S. Lowry developed such a model in 1964. It is heralded as being the most functional of its type. (Kahn; 1974, Hutchinson; 1974) The Lowry model examines the major spatial features of an urban area based on three broad activity sectors; the basic employment sector, the population-serving employment sector, and the population or household sector. (Hutchinson; 1974)

Through a set of equations, Lowry quantitatively forecasts the proportion of these three sectors for a given spatial area and transportation network. (An example of its practical application can be found in Hutchinson's article "Tools for Urban Land Use - Transport Strategy Planning" (1974) where he applies the model to the Hamilton-Wentworth area of Ontario). Lowry's model has been particularly useful in forecasting land-use patterns, land-use succession, and market processes. (Kahn; 1974)

By the 1970's, the use of simulation modelling had been divided into three general categories; economic activity, demographic activity, and transportation facilities. The first two categories tend to analyze only specific aspects of spatial structure. (Putman; 1975) The third category, commonly referred to as urban transportation network models, typically examine four primary aspects; trip generation, trip distribution, modal split, and trip assignment. Even here, analysts have had a tendency to
disassociate themselves from the land-use aspect, "Very few urban land-use models ever have any direct connection to the network package." (Putman;1975;198)

Generally speaking, predictive models have two advantages: 1) they ascertain the advantages of alternative planned improvements to transportation facilities; and, 2) planning can use these findings to prepare plans which correspond to a pattern of equilibrium between land-use and transportation. (Berechman;1976)

Nonetheless, there are a number of deficiencies with the predictive approach:

* There is no attempt to explain the causal relationships between the variables. (Berechman;1976)

* Although the analysis usually contains the major elements of the relationship under study, other forces may have profound affects on the resultant process. (Putman;1975)

* Many do not formally analyze the principle variables prior to modelling and thereby assume each variable has equal weight.

Nonetheless, taken as a whole, and given the technical advancements in this area in recent years, predictive modelling may have potential:

Even though the individual models may have their deficiencies, there is much to be learned from integrating them and studying the properties of the whole system. (Putman;1975;201)

3. Process-oriented Models

Typical of this final category of models is the urban growth model developed by Kahn in 1974. Kahn's qualitative model draws upon the common elements of the theories described earlier in
this section. (see figure 8) The model reflects the functions of land-use and transportation through travel performance (e.g. service cost) and accessibility.

**Figure 8**

A Model of Urban Growth


He presents a cyclical process whereby land requirements and traffic demand have a reciprocal effect on the land-use/transportation network. Kahn develops two hypotheses:

1. That urban growth in aggregate terms is primarily influenced by the urban and regional economy.
2. That land use and transportation in a given area, which can be shaped partially by public policy, affects the urban and regional economy. (Kahn; 1974)

Although considerably simplified, this model addresses a number of important elements. First, it suggests that the land-use/transportation relationship operates within an open system affected by exogenous growth factors. Secondly, it provides an explanation of how public policy can influence the pattern of
growth. Thirdly, it incorporates the behavioral aspects of location decisions by the private and public sectors of society.

Moreover, Kahn's model appears to support the views that are explicitly stated in the economic and location theories that were earlier presented. It incorporates the role of access as a function of land-use (Wingo). It also views location behaviour as a result of competition for urban space based on income, housing, accessibility, etc. (Alonso).

In sum, the relationship of transportation and land-use has been the topic of theoretical and modelling concerns for the better part of a century. These endeavors have had limited success in establishing direct cause and effect relationships between land-use and transportation. Perhaps their greatest asset has been the exhaustive examination of the optimum or normative situation from which we can judge empirical findings. This somewhat unconvincing history is due in part to the dynamic process involved:

Transportation and land-use planning are still essentially parallel activities without accounting for their dynamic interaction. Although urban development modelling has experienced rapid evolution, it has still a long way to go before it is policy sensitive and renders results of practical value. (Kahn;1974;125)

III. Historical Development of Co-ordinating Land Use and Transportation in the Planning Process

There are two approaches to analyzing the co-ordination of land-use and transportation in the planning process; substantive and procedural. The substantive approach examines such factors as: financing, model choice, location of services, and operations performance whereas the procedural approach
concentrates on organizational structure, strategy, and process, authority and responsibility and forums for interaction. (Gakenheimer;1973)

Generally speaking, substantive approaches have utilized a quantitative analysis while the procedural approach has moved towards a more qualitative approach. Historically, there has been a tendency towards an emphasis on the substantive, quantifiable aspects of transportation/land-use policy and planning:

This temptation comes from the long unsatisfactory history of intensive work on procedure in transportation planning, invariably overlain by meaningless general statements of substantive 'goals and objectives'. (Gakenheimer;1973;130)

Gakenheimer suggests two historical phases of development in North America that have contributed to the emphasis on the substantive aspects of the land-use/transportation planning process. The first phase, from 1945 to 1960 was a period of rapid expansion in urban transportation investment, particularly highway and freeway building due to a rapid increase in car ownership.

As a result, the embryonic concern for co-ordinating land use and transportation in the planning process originated in the U.S.A. and was largely in response to the sharply accelerated highway programs authorized by the U.S. Federal Highway Act of 1956. This Act gave particular attention to:

...the relationship of the highway plan to the plans for transportation and land-use, and to the roles of the various levels of government in the development of such plans. (Mitchell;1959,iii)

There was little opposition to this policy throughout the 1950's in both the United States and Canada.
However, by the end of the 1950's, it was apparent that freeway improvements had a major negative impact on existing facilities which created bottlenecks, noise and air pollution, and spillovers into adjacent communities. (Gakenheimer;1973) This resulted in the development of Phase 2 in the transportation/land-use planning process and the advent of the environmental movement in the early 1960's.

Highway building which was too disruptive to the environment resulted in a movement by citizen groups and affected communities for remedial action. Professionals countered by pushing for analytical association between land-use and transportation which would justify the heavy costs associated with highway planning. (Gakenheimer;1973)

The movement towards establishing a fully systematic methodologically rigorous approach to land use and transportation planning was a result of two events:

1. With the latest technological breakthroughs in computers, the relationship was quickly regarded as quantifiable. (Gakenheimer;1973)

2. The immediate need for answers by government resulted in large amounts of funding for anyone who attempted to tackle the problem. (Alcaly:1976)

However, a number of events in the 1960's had a strong impact on further research in this area. There was a new mood in public policy that had shifted its emphasis from highways to a greater role for public transportation. (Altschuler;1979) Decentralization was no longer as rapid as the upper and middle-class moved back to the inner cities. (Altschuler;1979) Moreover, most of the freeway programs were completed and their impacts were now
'on display'. (Yeates;1976, Gakemheimer; 1973)

Since this impasse, recent debates have centered on the reverse roles of land use and transportation in the planning process. This is particularly evident with the recent technological advances such as light rapid transit which is now seen as a catalyst for compact growth and development. Moreover, recent debates have focused on the procedural aspects of the land-use/transportation relationship:

Indeed, in general, transportation and land-use are physical expressions of the outcomes of deeper matters. The terms 'transportation' and 'land-use' are surrogates. The actual basic matters that these terms raise are the ways in which individuals and institutions organize and control their activities, make claims on resources, and use resources. A richer statement would call on institutions and individuals to change in ways affecting their use of land and transportation. (Garrison;1979;521)

If we understand the gist of this relationship, the question then raised is, what is blocking its resolution? Garrison suggests four such 'hinderances':

1. Knowledge- which includes the understanding of relationships and sufficient data so that issues and problems can be identified and evaluated.

2. Instruments- which includes appropriate institutions and technologies necessary for problem solving.

3. Consensus- which involves public interagency agreement with respect to goals which are represented by laws, regulations and plans.

4. Articulation- which refers to co-ordinating the various instruments necessary to development. (Garrison;1979)

This suggests that an examination of transportation and land use should be regarded as a means rather than an end in accomplishing broader societal goals:

In the past, better mobility through transportation improvement was viewed primarily as a goal or end in
itself and was undertaken quite independently of the likely effects on other goals or issues. Other goals are more important than improved mobility and that future transportation development policies must be integrated and co-ordinated with them. (Gamble; 1976; 18)

Gamble cites such goals as better land-use, community development, housing, employment and managed growth as far more important societal goals than mobility. Goldberg (1972) emphasizes Gamble's latter goal by suggesting three factors which contribute to sound development and a managed growth policy:

1. Transportation should be planned for as a land-use just as any other land-use is planned for.

2. Transportation must be in balance with other forms of development and must contribute to the capability of a region to meet the needs of its residence.

3. Development in an area should not exceed the capacity of the infrastructure, of which transportation is but one element, to serve it.

Having considered these issues, Engelen (1974) visualized the problem as a lack of a sense of urgency in the need for co-ordination. He suggests this is due in part to a general lack of understanding in this area. If a greater understanding of how important the co-ordination of transportation and land-use is to solving a number of larger societal concerns, then possibly one could establish a 'sense of urgency' within the organizations and institutions that have the responsibility and authority to act.

To summarize, the attempt to co-ordinate transportation and land-use in the planning process has had a somewhat unconvincing history. This stems in part from the over-emphasis on the substantive approach to the problem and the fruitless attempts at quantifying a largely intangible process. A quote by Wilford Owen
eloquently summarizes the gist of this section:

The so-called transportation problem is only half a transportation problem. Half the problem is to supply the facilities for moving. The other half is creating the environment in which the transportation system has a chance to work. (Owen;1976;16)

We must now focus greater attention on this second half of the transportation problem by emphasizing the procedural aspects of co-ordinating land-use and transportation.

IV. The Impact of LRT on Land-Use

The development of Light Rapid Transit (LRT) is a relatively new phenomena in North America. It typically caters to the medium-sized city of 500,000 to 1,000,000 people or as part of the intermodal system in a major metropolis. It is highly adaptable to areas previously dominated by the private automobile. It can run on a variety of right-of-ways from guide separated to shared, or a combination of both. Its low cost relative to other forms of rapid transit makes it particularly attractive in the 1980's. (Pushkarev;1982) In fact, a number of North American cities have built or are in the process of building a Light Rapid Transit system. Pushkarev suggests the overall purpose of this type of transportation system is:

...to improve the movement of people in a lightly settled area, to do so in an environmentally and aesthetically attractive manner, and to provide capacity for future growth. A less direct but no less important reason is to enhance the magnetism of the city's downtown. (Pushkarev;1982;xv)

The attainment of these objectives depends on whether the concentration of land-use actually occurs. Pushkarev maintains that three conditions must be met for greater density to occur:

1. It must significantly improve the ease of existing travel.
This results in greater accessibility which translates into higher land values.

2. Zoning regulations and community attitudes must exist favor compact development.

3. The existence of favorable growth prospects of the urban area in question.

Against this background, the purpose of this section is to describe the theoretical, methodological, and historical implications for co-ordinating land use and LRT. This analysis will provide the foundation from which to judge the empirical evidence discussed in later chapters.

1. The Impact of LRT in Theory

Wingo discusses the effects that a transportation improvement has on the spatial distribution of activity. The improvement of such facilities is a result of the perceived need for greater efficiency. This involves three technical objectives:

* Increasing the velocity of flow.

* Increasing the capacity of the system.

* Mitigating congestion. (Wingo; 1961; 111)

Wingo further suggested that if these objectives were met, they would have two effects; 1. it would make commuting easier, and; 2. it may make it less expensive. He argues that both of these effects have a tendency to reduce the steepness in the slope of the bid price curve (see figure 9).
Wingo concludes that prices will be lower at the center and higher at the periphery. This will raise the price of land and, at the same time, increase the acquisition of land at locations where major changes in access have occurred. (Wingo; 1961)

Douglas B. Lee jr. (1978) applied his general framework theory to the impact of a major increase in access at a given location due to the construction of a rapid transit station. Suppose this change occurred at $x_1$, in Figure 9, which resulted in a level of accessibility at that point which was previously enjoyed by land at point $x_0$. The effect would shift the rent and intensity gradient outward from the market. Land values would increase at all locations outside of $x_1$. However, the largest increase would take place immediately adjacent to the access point $x_1$. An important point that Lee notes is the increase in value at $x_1$ is a result of a proportional decrease in value in areas outside the immediate impact area of $x_1$. (Lee; 1978) That is, a rapid transit station will redistribute growth rather than create additional growth in the region.

The impact of rapid transit has also been examined through the
use of models. Of particular interest are the computer drawings derived from a mathematical model of land-use/travel mode relationships as shown in figure 10. (Pushkarev; 1982, Hamburg; 1970)

**Figure 10**

Population distribution governed by two rapid transit lines, with all other movement on foot.

Half the population distribution governed by two transit lines, the other half by automobile access.

Population distribution governed by automobile access alone.

Source: Pushkarev; Public Transportation and Land Use Policy; 1977.
These models explore such variables as centrality, magnitude of growth, and density. Hamburg concludes that public rapid transit increases the centrality, density, accessibility at given points in the urban region however, such impacts will occur only immediately adjacent to the rapid transit station.

The Historical Development of Rapid Transit and its Impact on Land-use in North America

The first city to introduce rapid transit to North America was Chicago in 1892. (Yeates;1976) At that time, it was the primary mode of travel and had a direct impact on urban development:

The development of rapid transit had a great impact on the form and structure of the City. This impact can be seen particularly in its emphasis on the radial or sectoral growth of the City, and by the rise of the area around local transit stations as centers of activity. (Yeates;1976;192)

In 1930, E.H. Spengler conducted a study which investigated New York's rapid transit system and its effects on land values. Spengler's general conclusion suggested that transit was but one of a number of forces which, if in place, would lead to further development. If one compares the impact of the Chicago system to the New York study, something other the rapid transit was having an even greater impact on urban development. That 'something' was the private automobile:

When the automobile allowed travel with greater ease than the streetcar over a much wider area, a great many sites became about as equally accessible, and the incentive for clustering was dramatically diminished. (Pushkarev;1982;33)

In fact, a number of authors have concluded that no technology has or conceivably ever will have a greater dominance over the development of our urban areas than the private automobile.
Knight argues that one cannot clearly establish a causal relationship between rapid transit and changes in land-use and development patterns. Furthermore, such changes would occur in the presence of other favorable conditions such as:

* Supportive local land-use policies.
* Development incentives.
* Availability of developable land.
* A good investment climate.
* The social and physical characteristics of the area.
* Ease of land assembly.
* Community support. (Knight;1980)

Engelen points out that the integration of rapid transit with these other favorable conditions has been particularly discouraging:

Even in the area of transit station location and design—where co-ordination is virtually essential to efficiency and effectiveness—relatively little real co-ordination is being achieved. (Engelen;1974;1)

Altschuler maintains that if the land-use effects of rapid transit appears remarkably weak, the reason is that policy makers have not created strong enough land-use and transportation measures:

Rapid transit construction makes sense in the current period only as an accompaniment of far more powerful instruments for shaping land use. To act on the premise that transportation improvements can do more than play a supporting role where other conditions are favorable to development, however, is simply to invite frustration. (Altschuler;1979;423)
Knight concludes that there are only two ways that future transit improvements will have the impact that the auto has had on the built environment:

1. As yet unforeseen innovations that will exceed the advantages of the automobile.
2. Through greatly increased co-ordination of transit with other complimentary forces vis-a-vis land-use development. (Knight; 1980)

Perhaps planners, administrators, and senior management should direct their energies away from the precise extent of rapid transit investments and instead focus on the role it could play in an overall strategy for reaching larger urban goals. This suggests a further examination of the present planning process.

V. Summary

The purpose of this chapter was to review the land use and transportation relationship from a theoretical, historical, and practical point of view. The chapter begins by tracing the theoretical basis of the relationship. It was pointed out that the role of transportation in the production and distribution of goods and services has been the topic of discussion in the field of urban economics for decades. Similarly, the effect of transportation on land values and location through accessibility and distance has been a common theme throughout the literature on location theory.

The attempts at modelling this interaction has had little success in establishing direct cause and effect relationships. This is due in part to the planning processes emphasis on the substantive approach and the fruitless attempts at quantifying a
largely intangible process. The chapter maintains that the planning process should give greater attention to the procedural approach which concentrates on organizational structure, process, and strategy, and forums for interaction.

The chapter ends by reviewing the impact of light rapid transit on land use. Theoretically, the introduction of rapid transit should increase the compactness, density, and accessibility, at given points in the spatial region. However, such impacts will occur only immediately adjacent to the rapid transit station.

From a practical point of view, the literature argues that LRT may redistribute growth rather than create additional growth in the region. Even then, such changes will only occur in the presence of other favorable conditions such as; supportive local land use policies, development incentives, availability of developable land, and community support. Hence, many of the factors that affect the land use/transportation relationship are increasingly governmental ones.

The next chapter will focus on this latter point through an examination of public institutions emphasizing the process of organizational development.
Chapter 3 The Institutional Framework

Organizations are complex dynamic entities comprised of people, processes, structures, and strategies. (Galbraith and Nathanson; 1978, Beer; 1980) The public organization is unique since it develops and manages the norms of our society:

"Contributing to an organization becoming an institution is its linkages with other organizations, institutions, and the public ... [and is] ... more nearly a natural product of social needs and pressures, and develops as an organic part of a society or community. (Smerk; 1977; 513)

The existence or mandate of a public organization is based on a set of goals and objectives. The goals are operationalized by the processes within the organization which in turn affects the strategies used to achieve the objectives. The public organization is further shaped by its external environment (i.e. social, political, and economic conditions).

The previous chapter concluded that the co-ordinated development of land use and transportation, particularly light rapid transit, would only occur in the presence of other favorable conditions such as, supportive local land use policies, zoning regulations which favour compact development, and a procedural approach to planning the land-use/transportation relationship. Hence, many of the issues raised are increasingly governmental ones. That is, to react or adjust to new transportation technologies requires action by some governmental entity be it at the Federal, Provincial, Regional, or Municipal level.
Moreover, new technologies such as light rapid transit, often requires a spectrum of approaches to cope with its impact on the existing institutional framework and society in general.

In this chapter, we turn to a discussion of the more salient features of institutional arrangements related to land use and public transportation. Part 1 traces the origins of the public organization. Part 2 examines the characteristics of the public organization. The chapter ends by examining the means of integrating the institutional framework and the impact that an innovative technology such as LRT can have on the performance of the framework.

PART 1 Origins of the Public Organization

During the late 1800's, both public and private organizations grew in size and complexity. No longer could all decisions be made by one manager. Moreover, with the dawning of the industrial revolution, the need for specialization in technical knowledge required a new organizational form:

And so large organizations had to be divided up into subunits, each of which had a specialized function and each managed by individuals who held the knowledge to oversee that particular function. (Eddy; 1981; 22)

Hence the 20th century brought with it the introduction of the bureaucratic organization. Max Weber, a German sociologist is renowned for his work on the bureaucratic organization. Weber observed that organizations were made up of a number of offices which he coined "bureaus". These offices worked together, each with a defined set of tasks and goals in order to achieve the organizations overall mandate.
Weber's essay entitled "The Theory of Social and Economic Organization," written in 1947, is a classic in the field of organizational theory as it signalled the initial development of public administrative analysis. Weber described the key features of bureaucracies as having:

1). Division of labor.
2). Hierarchy of Authority.
3). Specialized Administrative staff.
4). Written Rules and Regulations.
5). Selection and promotion of employees according to objective criteria. i.e. seniority, educational qualifications etc.
6). Lifetime careers for most officials.
7). Pecuniary compensation.

Other key features that Weber examined were linkages with the environment and between the 'bureaus' as well as the need for technical specialization and the power positions of bureaucracies within the political framework. Weber was also emphatic that bureaucracies have rational-legal authority and hence a justifiable effective and efficient organizational structure.

However, Weber does not specify whether there would be functional interrelationships among the divisions. He also assumes that rules would be administered fairly and impartially through the bureaucratic framework. This he coined the "normative principle of fairness". Thompson points out the limitations of this principle:
The normitive principle of fairness is so embedded in bureaucracies that everyone who makes a decision— that is implements a rule— must have authority, and, at least in principle, be accountable for his action. Organizational structure is thus constructed by assigning only limited responsibilities to officials and requiring that the work of each be reviewed by a superior who is then also accountable. (Thompson;1961;22)

In its purist form, Webers bureaucratic model appears well suited for its purpose of administering fairly. In Webers own words:

Precision, speed, unambiguity, knowledge of the files, continuity, discretion, strict super and subordination, these are raised to the optimum point in the bureaucratic type of organization, and especially in its monocratic form. (Weber;1946;214)

From Webers works came a host of followers that examined specific aspects of the bureaucratic form of organizations. Most notably, W.A. Rushing (1976) and V.A. Thompson (1961) examined the interrelationships within and between subunits of the organization commonly referred to as coordination.

Institutional Integration in Theory

W.A. Rushing (1976) maintained that interdependence is a key component within the institutional framework. Rushing developed the concept of three forms of interdependence:

1. POOLED INTERDEPENDENCE - whereby each part (department) contributes to the collective whole.
2. SEQUENTIAL INTERDEPENDENCE - assumes ordered interdependence where each part builds consecutively on the former.
3. RECIPROCAL INTERDEPENDENCE - whereby outputs of one part become inputs of another and mutually adjust
for the benefit of the collective whole.

As Rushing points out, how well these interdependencies work depends on the degree to which they are co-ordinated. He identifies three devices for achieving co-ordination:

1. **STANDARDIZATION** - establishes routines or rules which create consistency with those in the interdependent relationship. It assumes a set of rules is internally consistent and the situations it is applied to are relatively stable and repetitive. (Standardization is the form of coordination that Max Weber discusses with respect to the bureaucratic model).

2. **CO-ORDINATION BY PLAN** - establishes schedules for interdependent units to meet and consult. This form does not require the same high degree of routinization and is therefore appropriate for more dynamic situations.

3. **CO-ORDINATION BY MUTUAL ADJUSTMENT** - based on the bargaining process or, as Rushing states, "coordination by feedback". This form requires negotiation and trade offs amongst the different 'bureaus' of the organization.

Rushings analysis not only suggests that interdependence is critical to an effective organizational form but that there are also a number of forms from which to choose.

V.A. Thompson (1961) makes two astute observations about interdependence within organizations. Thompson notes three distinct
parallels between the three types of interdependence and the three types of coordination that Rushing developed:

With pooled interdependence, coordination by standardization is appropriate; with sequential interdependence, coordination by plan is appropriate; and with reciprocal interdependence, coordination by mutual adjustment is called for. (Thompson; 1961; 43)

Thompson further suggests that the three forms of coordination in the order introduced above results in increasingly heavier burdens on communication and decision-making and, as a result, "There are very real costs involved in coordination." (Thompson; 1961; 43)

Thompson stressed the role of interdependence and coordination within the bureaucratic organization. He further points out that neglect of this factor was a major shortfall of Weber's analysis:

What Weber did not realize was the tendency of bureaucracies to grow due to increasing interdependencies in modern society and the need for rules to govern those interdependencies. (Thompson; 1961; 23)

For bureaucracies to work efficiently, as Weber suggested, the principle of firm division of authority and lines of responsibility are paramount. This is best achieved when an organization remains stable and permanent.

However, it is inevitable that growth will occur. To compensate for growth, the above principle suggests a need for further levels within the organization and an increasing number of specialized subunits. As Thompson suggests, "For government organizations as a whole, the result is proliferation of hierarchy." (Thompson; 1961; 23)

The symptoms of "proliferation of hierarchy" are the common day
problems of fragmentation, lack of responsibility, non-communication, non-integration, and absence of common goals or outcomes:

Our present day use of the term [bureaucracy] to connote an overly cumbersome and rule bound system has derived from some of the side effects of such an organization. (Eddy; 1981; 22)

Hence, the effectiveness of the bureaucratic form of organization may be self limiting and self defeating since it requires continual reorganization that is rarely achieved in the public sector.

Thompson concludes by suggesting a paradox between Webers theory of bureaucracy and the empirical evidence:

Whereas bureaucracy arises due to demands for fairness and impartiality in administration, which are attained through rules and strict accountability, growth of bureaucratic structures results in proliferation of hierarchy and fragmentation of the environment such that effectiveness may be self-limiting and periodic reorganization is needed to restore the environment-organization correspondence. (V.A. Thompson; 1961; 41)

Bureaucracies can be an effective organizational structure and process provided their environment is stable and unchanging. However, the public organization typically is slow to react to changes within its environment since bureaucracies usually lack the feedback mechanisms to signal the required changes. Moreover, public organizations typically operate as though they are a closed system which can ignore environmental change.

The following section examines in greater detail, the components of the public organization.

Part 2. Organizational Components

There is growing evidence that a public organization's ability
to achieve its goals is directly related to the components that make up that organization. (Lawerence and Lorch; 1967, Miles and Snow; 1978) The existence or mandate of a public organization is based on a set of goals and objectives. The goals are operationalized by the processes within the organization which in turn affects the structure and strategies used to achieve its objectives. The organization is further shaped by the environment (i.e. social, political, and economic conditions) within which it operates.

This section examines the four generic components of the public organization; structure, process, strategy, and the environment which determine its effectiveness.

1. Structure

An organization's structure can be defined as, "the design of an organization through which the enterprise (corporation) is administered." (Chandler; 1962; 14) Galbraith and Nathanson define structure as:

"...the segmentation of work into roles, the recombining of roles into departments or divisions around functions and the distribution of power across this role structure."

(Galbraith and Nathanson; 1978; 5)

Hence, there are two fundamental aspects to structure, the lines of authority and communication between different administrative components and the information and data that flow through these lines of communication and authority.

There are several readily identifiable structural types:

A. Centralized Organization - whereby power, authority, and responsibility is concentrated at the top of the organi-
B. Decentralized Organization - power and decision-making is found within the lower levels of the organization and responsibility is shared.

C. Functional Organization - usually more centralized, however, departments are specialized and arranged by function such as, transportation, land-use, engineering, and finance.

D. Multi-Divisional Organization - generally more decentralized than the functional organization because the departments are further separated according to policy areas.

E. Matrix Organization - reflects both a functional and policy oriented approach which, in theory optimizes integration within the organization.

Weber's bureaucratic structure presented earlier, exemplifies structural functionalism. That is, each department, division, or section, has a different and specific task to perform for the administration to achieve its goals. Eddy describes the characteristics associated with such a structural type:

1. Permeable boundaries - that is, accessibility from outside sources, pressures, and influences.
2. Separation and poor communication between departments.
3. Diversity of functions.
4. Influence of boards, commissions, and other regulatory agencies.
5. Increasing size and complexity.
The bureaucratic structure is the traditional and most common means of organizing within the public sector. Most metropolitan governments have organized their administrations around specific functions such as planning, engineering, transportation, etc. Each has specific tasks to perform in order to achieve the organizations overall goals and objectives. However, as I will argue later in this thesis, many of today's issues and projects (such as light rail transit) do not "fit" into one specific department nor is there a formal or legitimate means of handling these issues in the present structures of municipal governments.

Eddy argues that government structures are not always created for effective or efficient allocation of resources:

In the public arena, structures are sometimes created for reasons other than legitimate functional needs. Visibility to voters, the need to exert greater control over a certain unit, or pressure to set up a politicians pet project may also be behind structural changes. (Eddy;1981;102)

As a result, governmental organizations are particularly susceptible to having their structures criticized. Such criticisms include the infamous "redtape", the multiple levels of government, the "politics" of the system, and the lack of communication:

For one thing, the structure and those who inhabit the higher levels of the hierarchy are clearly visible...too few people are assigned to a given problem area, it may appear, or too many, or the rules and procedures have not been updated to fit new circumstances...In addition, the problem may be made more difficult by political decision makers who mandate the structures but don't have to run them. (Eddy;1981;74)
Perhaps the most telling criticism of the bureaucratic structure is its unwillingness to change:

once you do create a structure, it is extremely difficult to change because it tends to develop its own dependent constituency of supporters who benefit from its existence. (Eddy;1981;102)

Chandler (1962) theorized that organizations do not change their structures until they are provoked by inefficiency to do so, "in part, this is because the formulator of strategies is rarely the creator of organizations." (Chandler;1962;14) As a result, much of what goes on internally is due to the dynamics or 'process' of the organizations system.

2. Process

Process can be defined as:

The direction and frequency of work and information flows linking the differential roles within and between departments of the complex organization.

(Galbraith and Nathanson;1978;5)

Hence, process is the interaction, both formal and informal, between internal and external forces that affect the performance of the organization. Process includes; resource allocation, information systems, cross-departmental lines of communication, and personnel factors such as leadership, career paths, and compensation systems. (Galbraith and Nathanson;1978)

Organizations undertake a myriad of activities in allocating their resources. In the public sector, these activities are usually labeled as budgeting and planning processes. Galbraith and Nathanson argue that most of the research on resource allocation is of a general descriptive nature:
Although a great deal of scholarly attention has been devoted to methods of allocating resources rationally from an economic viewpoint, much less attention has been given to examining the decisions as organizational and political processes. (Galbraith and Nathanson, 1978:77)

Wiesbord (1981) argues the most important "helpful mechanism" in the organizational process is co-ordination. Co-ordination links and orders the activities of people and tasks into a logical rational sequence in order to produce the desired outcome. Poor co-ordination results in people working at cross or dual purposes, wasted motion and energy, lack of adequate information, and ultimately organizational inefficiency and ineffectiveness. Poor mechanisms within public organizations include red tape, ineffective or unproductive meetings, and arbitrary or outdated rules, strategies, and structures.

Information systems and lines of communication are crucial within the bureaucratic form of organization due to the high interdependence amongst the divisions or departments that are created. Be they formal or informal, relationships are the direct source of communication and information exchange within the organization.

Weisbord further maintains that leadership plays a significant role within the organizations process. It is essential to have a leader who monitors these components and ensures that they are in balance and functioning properly. This involves building cooperation, trust, and resolving conflicts in order to maintain the coordinative measures required to ensure the process runs as efficiently and effectively as possible.

In the public municipal organization leadership may involve
both council and senior levels of the administration. A critical role of leadership is monitoring and adapting to changes in the environment through continual evaluation of the organizations performance.

There are both formal and informal mechanisms that influence the public organizational process. Formal mechanisms include policies and legislation which are officially endorsed by authorities at all levels of government and cannot be changed except through certain prescribed ways (i.e. resolution of council, plebiscite, provincial or federal legislation). Informal mechanisms include how policies are perceived and interpreted and how they are applied in practice. This is a critical area of concern since a policy statement may be interpreted three or four different times from one department to the next as well as within each department.

Finally, it is important to note that the literature on organizational process has given little attention to matching variations in these systems with variations in strategy and structure. (Galbraith and Nathanson; 1978) The direct consequence of this lack of attention results in organizational ineffectiveness:

When these are not congruent, organizational members show frustration which may be a function of their inability to meet personal needs, satisfy their expectations, or utilize their skills. The frustrations may also be a function of their inability to get the job done easily and efficiently. (Beer; 1980; 5)

3. Strategy

Strategy can be defined as:
...a specific action usually but not always accompanied by the development of resources to achieve an objective decided upon in strategic planning. (Galbraith and Nathanson; 1978; 4)

Hence strategy is the operational tool in fulfilling a desired goal or set of goals. As well such design variables as the environment, mechanisms for co-ordination, and lines of authority have a pronounced effect on the effectiveness of a chosen strategy and ultimately in choosing an effective strategy.

Chandler (1962) theorized that organizations do not change their structures until they are provoked by inefficiency to do so which is usually the result of an incorrect or improperly used strategy.

Galbraith and Nathanson maintain that in comparison to structure and process, strategies are typically the first component of the organization to be adjusted since they require the least amount of effort and rarely effect the status quo. However, innovations such as light rail transit create new administrative problems which require a new reorganized structure and process. This second phase of change is often never achieved, and as a result, the new strategy may be ineffective.

Thompson (1967) has attempted to model this causal relationship through what he describes as the "Analytical Reduction Matrix". Thompson argues that decisions or strategies can be viewed as having two dimensions;

1. Belief about cause/effect relationships.
2. Preference regarding certain outcomes.

These dimensions can be depicted as shown in figure 12.
Where goals are clear and the means of achieving those goals are clear, cell A, or a conceptual decision strategy is appropriate. This is the goal of most organizations since risk and uncertainty is kept to a minimum.

In cell B, the goals are uncertain and therefore a compromise strategy is required. Where the goals are known, as in cell C, but the means of achieving those goals is uncertain, it is necessary to use professional judgement. Finally, when everything is uncertain, as in cell D, an inspirational strategy is required to achieve results.

Thompson suggests that innovations (e.g. light rapid transit) tend to fall initially into cell D. This is a result of the risk and uncertainty inherent in an innovation and its associated impacts in the environment and the organization.

As more information about the impacts and outcomes are gathered, the strategy changes and moves through the appropriate cell blocks. However, this orderly sequence does not often occur.
The political system has a tendency to push innovations into cellA, attempting to analyze comparable data and therefore justify its choice.

The demand for accurate analytical data to back the decision pushes the debate from the politicians to the administration where professional knowledge goes unchallenged. This need for success and results effectively inhibits the organization from adjustment to the innovation:

The analytical reduction as a further consequence leads to the limitation and often the rejection of restructuring or revolutionary ideas. First, the analysis is done by so-called experts who are usually part of the subsystem that benefits from the existing paradigm. Second, the analytical methods used by the experts are likely to be appropriate to the existing paradigm and prevents a proper analysis of the new proposal. (Thompson; 1967; 280)

Further to Thompson's paradigm of strategic choice and performance is the tendency for the public organizations to have a multiplicity of strategies, each the responsibility of a different department or departments. For an overall corporate strategy to be effectively implemented, therefore requires mechanisms to control, prioritize, and coordinate the activities within the organization. Moreover, the key to an effective strategy for a public organization is its congruence with the organization's external environment.

4. The Environment

James D. Thompson states in his book Organizations in Action that organizations both shape and are shaped by their environments. Environment can be defined as, "The external conditions..."
with which the organization must deal with." (Beer;1980;5)

There are two primary forms of environment, the dynamic and the stable environment. The dynamic environment is constantly changing resulting in a high degree of uncertainty and risk associated with the organizations components (i.e. structure, strategy and process). The stable environment, on the other hand, is continual, gradual, and thus more predictable. (Thompson;1967)

The critical problem in the examination of public organizations is the uncertainty associated with its environment. In fact, of the four organizational components, the environment is perhaps the most difficult to evaluate and monitor. It includes such intangible factors as political decisions by other levels of government, lobbying; financing, economic and social conditions, etc., all of which contribute to the risk and uncertainty.

A second important concept concerning the environment is that of open vs. closed systems as formulated by V.A. Thompson in 1961. The open system view focuses on the environment within which it must operate:

The open, natural, or organic system is viewed as complex, subject to inputs from the environment, and possibly unpredictable.  
(Thompson;1961;26)

Hence, the organization which utilizes the open system view draws from its environment when formulating its structure, process, and strategies. It is often applied when environments are threatening or uncertain.

The closed system neutralizes or otherwise disregards the effect of the external environment upon its performance:
The closed or mechanistic setting is one where behavior is programmed in advance, the environment intrudes minimally and is neutralized when it does, and a modicum of technical rationality prevails. (Thompson;1961;26)

By using a systems approach in discussing an organization's environment, Thompson develops two models that depict the organization/environment relationship, the causal model and the feedback model.

The causal model suggests that the environment shapes the organization's goals, which in turn results in a formal pattern or structure. The result is a causal path between the structure of an organization and its goals. Hence, the organization requires a shift or change in the environment before there can be a shift in the goals and ultimately the structure.

The feedback model also suggests that the environment shapes the organization's goals, which in turn gives rise to a certain structure. However, the organizational structure is adaptable in order to maintain performance or attain its goals. Therefore changes may occur irrespective of changes in the environment. (Thompson;1961)

Weber's bureaucratic model discussed earlier in this chapter is typical of the "closed" system approach. He says very little about how external forces affect organizations and how these forces should be incorporated. Moreover, the typical public organization adopts the "closed" system view since it favors the status quo and tends to avoid change.

Hence, the environment has a tremendous impact on the cause-effect relationship within the public organization. In fact,
Beer defines organizational effectiveness as, "... the extent of fit between the organization's environment and all the internal components of the social system." (Beer; 1980; 39) Beer further suggests that the more congruity that exists between the internal components of the organization and the environment, the more likely it is that any changes in the environment will be favorable to the organization.

It is not surprising that Beer concludes that adaptation, flexibility, and mechanisms for co-ordination are crucial to an efficient, effective organization. Hence, the variables which may be regarded as the most important to the ultimate success of the public organization are the mechanisms for integration and the process of fit.

5. Integration in Organizations

Chandler's research in 1962 on strategy and structure suggests that as organizations change their strategies (i.e. to cope with innovations such as light rapid transit), new administrative problems arise that are solved when the organizational structure is refashioned to fit the new strategy. Chandler maintains that redesigning is necessary since each structure requires a certain set of processes that must also fit with the selected strategy. He concludes by stating that alternative organizational forms make a difference.

The underlying theme throughout Chandler's work and that of others (Thompson; 1967, Beer; 1980) is the degree to which the design variables (i.e. strategy, structure, process) are integrated with the environment:
The most effective firms are those that differentiate their functions to the extent needed to adapt to functional sub-environments, while simultaneously finding mechanisms to integrate these differentiated functions. (Galbraith and Nathanson; 1978; 75)

Hence, the means of dealing with issues related to overall corporate performance are the integrative mechanisms of coordination. For instance, although the administration of land use and transportation are distinct in most larger cities in Canada, and at times independent of one another, integrative mechanisms can provide the means for a co-ordinated approach to land use and transportation planning.

Integrative mechanisms range from the informal spontaneous meeting to elaborate matrix structures. The key to choosing which mechanisms will be the most effective for the situation can be based on an analytical, rational, decision-making process. This results in first identifying the processes, relating them to a given structure thereby identifying conditions under which different processes should be chosen in order to effectively implement a given strategy. There are three principle forms of integration; process-oriented, structural-oriented, and strategic-oriented.

1. Process-oriented Integration

Organizations have developed a number of mechanisms to integrate activities. Lawerence and Lorsch (1967) were among the first to examine integrative mechanisms and their role within the organization. They determined that for a firm to be effective, two processes were required:
A. Functional differentiation.

B. Mechanisms to integrate the differentiated functions.

They developed a list of specific process-oriented mechanisms used to enhance interdepartmental co-ordination:

- Hierarchy of Authority
- Rules
- Goal Setting
- Direct Contact
- Interdepartmental Liaison Roles
- Temporary Task Forces
- Permanent Teams
- Integrating Roles
- Integrating Departments

In the bureaucratic model, Hierarchy of Authority is the principle mechanism used to resolve interdepartmental concerns. Issues, problems, strategies, etc. are referred upwards to a common superior who oversees all departments affected by the situation. Rules or procedure, is substituted for hierarchy when the problem arises more frequently. Goals are a more permanent means of addressing organizational problems and are established by way of the planning process. Exceptions to the goals and rules are referred to the hierarchy or resolved on the spot by Direct Contact between the affected departments.

These first four mechanisms are the most commonly used forms of integration in today's public organization. The remaining forms, interdepartmental liaison roles, temporary task forces, permanent teams, integrating roles and integrating departments, usually occur under conditions of diversity, uncertainty, or when the usual integrative mechanisms fail to resolve the problem. (Galbraith and Nathanson; 1978)

Organizations select from the list those mechanisms that will
permit them to implement their strategy. The selection, however, is not random, choice makes a difference:

The list of coordinative mechanisms is an ordered list. Each stepdown the list represents the commitment to a more complicated and more expensive mechanism for coordination. [Galbraith and Nathanson; 1978; 66]

Normally, mechanisms at the bottom of the list are added rather than substituted for mechanisms at the top. Moreover, an innovation or new technology, such as light rapid transit will also affect choice:

The higher the level of technology and uncertainty, the more the hierarchy needs to buttressed with cross-departmental coordinative mechanisms. Therefore, those organizations pursuing strategies characterized by interdepartmental activity, high uncertainty, and high diversity, will select mechanisms further down the list than those organizations pursuing strategies characterized by low uncertainty and diversity. [Galbraith and Nathanson; 1978; 67]

Some departments require more mechanisms for integration than others depending upon their relationship with other departments, their environment, the degree or level of uncertainty, the level of technology, the existing strategies, and the type of structure. However, even the most costly or complex forms of integration are often a more efficient and effective means of achieving an organizations strategy:

Integrating roles represents one of the principle means with which to implement diversification strategies without full scale reorganization. [Galbraith and Nathanson; 1978; 68]

2. Strategic-oriented Integration

As stated in the previous chapter, the co-ordinated development
of land use and transportation can only occur in the presence of other favorable conditions such as:

* Supportive local land-use policies.
* Development incentives.
* Availability of developable land.
* A good investment climate.
* The social and physical characteristics of the area.
* Ease of land assembly
* Community support for the project. (Knight; 1980)

Governments have considerable influence over the above conditions through the legislative process and the plans and programs they establish. Hence, such instruments as the General Municipal Plan, area redevelopment plans and local land-use by-laws, must incorporate policies and strategies to attain the above favorable conditions. One of the primary tools for accomplishing this objective is the use of Joint Development.

Donald E. Priest in his book titled Joint Development: Making the Real Estate - Transit Connection (1979) examines in detail the theoretical and practical uses of joint development adjacent to rapid transit stations. The books primary objective is to translate the concept of joint development into projects that are practical and successful. The study is centered on several case studies including: Philadelphia, Washington D.C., Montreal, Boston, and Toronto.

Priest defines joint development as:

Real estate development that is closely linked to public transportation services and station facilities and relies to a considerable extent
on the market and locational advantages provided by the transit facility. (Priest;1979;1)

Such development often requires close co-ordination between public sector agencies and private developers. Examples where joint development can be utilized includes; the use of air rights, ground leases, co-ordinated design efforts, project construction, shared access facilities, and operating arrangements. (Priest;1979) As Priest points out, transit planning must be sensitive to the way route alignment, station location, and access arrangements will affect joint development potential:

For example, a station entrance placed on a parcel that meets requirements for redevelopment (for example, having sufficient size, clear ownership, good market conditions, and being underutilized) is much more likely to encourage joint development than a station entrance located on a site having a poor configuration, clouded title, and engineer-problems. (Priest;1979;5)

Based on the case study experiences, Priest identifies four related aspects to joint development:

1. Co-ordination of Zoning and Land-use Planning
2. Station location and Access
3. Institutional Arrangements
4. Public Land Assembly

1. Co-ordination of Zoning and Land-use Planning

Priest identifies two levels of planning where co-ordination is required; regional planning and site specific planning. On a regional level, many cities have identified transit facilities as a mechanism in achieving their desired growth strategy:

On a regional level, joint development offers opportunities to encourage higher density in the structure of metropolitan areas, but only if transit
route alignments and station locations are co-ordinated with a metropolitan policy which supports growth management goals through zoning, infrastructure procedures, and other public decisions. (Priest; 1979, 6)

The advantages of such a growth strategy include, land conservation, reductions in auto travel and time, more economic infrastructure, and greater realization of redevelopment opportunities. The case studies that Priest examined confirm this approach.

Where regional growth policies called for the concentration of new development in high-density corridors and nodes and had the necessary zoning and land-use policies in place, such as in Toronto and Montreal, urban development and redevelopment has occurred along its transit corridor. (Priest; 1979)

However, in cases such as BART in San Francisco where there is poor regional co-ordination, there has been little public or private investment:

This fragmentation of metropolitan growth decisions will reduce, at least in the short run, the metro systems ability to help create a more efficient metropolitan land-use pattern. (Priest; 1979; 183)

The second crucial level of planning is site specific where strategies for development opportunities at transit stations are essential. Such strategies should permit the use of air rights and ground leases, on publicly owned lands, joint venture developments, co-ordinated design efforts, and mixed-use and high density development.

The timing of land-use changes is as crucial as the strategies and planning in place:
If difficulties in site development can be detected early enough, routes and station sites can be re-aligned to areas where joint development is more likely to occur. Moreover, where there is certainty of performance and the zoning is in place, private developers are more likely to justify involvement. The key is to consider zoning and development potential during the location and design decision-making stage.

(Priest, 1979, 184)

2. Station Location and Access

Station locations and access has a direct affect on: the cost of joint development, the cost-sharing of construction, the configuration of development, and the commercial value of the project. This is particularly evident in the location of downtown stations:

Generally, the closer the spacing of stations in the central business district (CBD), the more effective the transit system is in providing good internal circulation. This in turn has a positive influence on real estate development and on the efficient functioning of the downtown. (Priest, 1979, 7)

The location of station access also affects the potential for joint development:

To promote joint development and an efficient transit system, entrances should be placed upon sites with strong existing uses or redevelopment potential. (Priest, 1979, 7)

3. Institutional Arrangements

Since the public sector is directly responsible for light rapid transit, it has a crucial role to play with respect to the success of joint development:

The important role played by the public sector is that of a co-ordinator of the transit and real estate development efforts. To function successfully, the public sector should possess the necessary legal authority and the appropriate professional resources to cope with
Key agencies that may influence the performance of joint development are: the transportation department, planning department, public works department, transit authority, and land development authority. Priest suggests that the ideal institutional arrangement would be to consolidate these groups into one public entity which he refers to as the 'development corporation'.

Such an entity would be responsible for planning, co-ordinating, and implementing real estate development along transit corridors and would include control over land-uses and powers of land assembly and development. Priest identifies the following specific responsibilities and resources that this development corporation would possess:

* Personnel with experience in real estate and urban development.
* The financial capability to receive grants, and acquire and sell land.
* The authority to enter into agreements and contractual arrangements.
* The authority to alter zoning designations.
* The authority to offer incentives such as; tax write-offs, density bonuses, and land cost write-downs.
* The authority and ability to effect and enforce intergovernmental and interagency co-ordination.

While such an arrangement may have the greatest potential for achieving joint development opportunities, there are costs associated with success:

* The development corporation does not eliminate the need for
the existing institutional arrangements that must manage and
develop the transportation system and land-uses outside the
jurisdiction of the rapid transit corridor and therefore results
in a duplication of manpower, costs, and 'beaucracy'.

*Provincial and local governments may be unwilling to endorse
so much autonomy for a single entity.

4. Land Acquisition Policies

Land acquisition is an integral part of the planning for joint
development. Therefore policies should be developed which allow
for; the complete taking of parcels, the placement of entrances
in difficult assembly situations, the encouragement of land
assembly by the private sector. Priest identifies four areas where the public sector should be involved:

*During the planning process, transit authorities should
analyze the areas around proposed stations and consider using
land acquisition to avoid joint development assembly problems.

*When taking property, planners should consider complete
rather than partial takings of property.

*Where possible, officials should locate station entrances on
sites with simple ownership patterns and avoid difficult assembly
situations.

*When the transit authority cannot affect the land assembly
question, local governments or agencies should be encouraged to
aid in acquisition. (Priest; 1979; 193)

To summarize, joint development is a specific strategic tool
that permits and realizes the potential of rapid transit station development and, in some instances can achieve a number of overall growth objectives of the community:

Joint development projects can be successful and can make major contributions in terms of urban amenities and efficient and co-ordinated use of public and private resources. In fact, joint development could be one of the most promising forms of public/private cooperation in the development field because of the strong logic behind linking transit with real estate development. (Priest;1979;vii)

3. Structure-Oriented Integration

The range of integrative mechanisms which organizations can manage uncertainty and new technologies suggests that there are a number of transitional phases in maintaining effectiveness within the public organization. As Galbraith and Nathanson point out, each step down the list of process-oriented mechanisms represents a step towards a more product [or project] oriented structure. In other words, if an innovation or new technology is so influential that it impacts virtually all aspects of the organization, the organization may find it more advantageous to orient itself around the technology rather than retaining a functional approach to land use and transportation planning.

As the following model points out, the change from departmental-oriented to project-oriented structure can be an evolutionary process.
Generally speaking, increasing interdependence among departments favors a more project oriented approach whereas independent departments favors a functional orientation. However, the size of the "bureaucracy" is a qualifying factor. (Galbraith and Nathanson;1978). The larger the organization, the more likely the establishment of independent departments whereas the smaller the organization, the more likelihood of integrating departments. Longevity of the innovative technology is another crucial factor:

The longer the life cycle of the product [project], the more likely it is that a self-contained division will be created. [Galbraith and Nathanson;1978;72]

Factors that favor a project-oriented organization.

1. Innovative Technological introductions.
2. Increasing interdependence amongst organizations.
3. Diversity of special needs.

Factors that favor a functional, departmental organization.

1. Economies of scale which mitigates breaking departments up and distributing the parts amongst specific project offices.
2. The status quo.

As stated earlier, the bureaucratic structure exemplifies structural functionalism. (Eddy; 1981; 73) That is, each department, division, or section has a different task to perform for the organization to achieve its goals and objectives. Hence, the departments have a tendency to be specialized and arranged by function such as planning, transportation, parks and recreation, engineering, etc.

The point at which the department and project office are of equal importance is called the matrix organization. Such an organization establishes two lines of authority, the departmental and the project. Both are of equal importance to the performance of the organization. The following diagram illustrates this relationship in a typical public organization.

This structure creates multiple sources of diversity, each one having equal importance. (Galbraith and Nathanson) Management of the organization is handled through team processes and joint responsibility. The most extensive and critical change occurs in the role of the chief executive officer, or city manager whose major role is that of facilitator and co-ordinator.

The matrix organization is also referred to in the literature
as 'polycentric' (Boschken;1982) or non-hierarchical (Eddy;1981). Boschken regards this organizational form as an intergovernmental structure of specialized jurisdictions which "... utilizes an interdependent but nonhierarchical network of interest-and-knowledge-specific agencies." (Boschken;1982;12)

The process in this organizational form emphasizes 'mutual adjustment':

Mixes of these agencies are consequently drawn together around specific land use proposals or issues as interdependent decision-making units. (Boschken;1982;114)

Boschken suggests that the polycentric [matrix] form of organization is ideally suited to today's public bureaucracy:

With incomplete authority over any proposal or issue, individual agencies have a need for ongoing and predictable intergovernmental relations in order to carry out their individual statutory responsibilities. (Boschken;1982;13)

However, as Boschken astutely points out, there is a cost associated with this structural form:

The nonhierarchical approach incurs a different set of costs from the unitary hierarchy. Where the latter runs the risk of under representation, judgemental error, and oversight, concurrent [polycentric] government has the problem of more costly forms of integrating different agency perspectives and mandates. Nevertheless, the incentive for such a system to coordinate and operate efficiently stems from the interdependency of jurisdictions and the power of reciprocal review among participating agencies. (Boschken;1982;12)

The matrix form is certainly not the ultimate form of structure for integrating specific tasks or projects. Rather, it should be regarded in the context of what the corporation is attempting to
achieve. It should be adopted when conditions warrant and discarded when conditions are not favorable. The structure adopted. However, it is unrealistic to consider full scale reorganization as a viable alternative. As Eddy points out, the inertia of the status quo, the cost of reorganization, and the uncertainty associated with new technology tends to maintain traditional bureaucratic structure.

In fact, Eddy suggests that the bureaucratic structure is the only form of organization that we know of for managing large complex systems:

We may tinker with the structure in various ways in order to improve performance. For example, we may cut out some of levels to make it flatter in order to speed up response time from the bottom to the top [a more horizontal organization]. Or we may reorganize by moving the boxes [units] around from one area to another in order to achieve better coordination or control. Or we may assign fewer units or people to a given official in order to allow for more direct supervision [narrowing the span of control]. Or we may even institute a participation program in which a more democratic decision-making process takes place. But, under all these variations the organization is still a hierarchical bureaucracy. [Eddy; 1981; 74]

The question then raised is when does technological innovation necessitate organizational change. The following section examines the LRT technology and its impact on the public organization.

3. The Impact of LRT on the Institutional Framework

Technology can be defined as; "A technical method of achieving a practical purpose, the totality of the means employed to provide objects necessary for human sustenance and comfort." [Websters Dictionary; 1979].
In her book *Innovation and Public Policy*, Burke argues that technological innovation generates conflict because it enhances some values and damages others:

Technology can never be socially neutral; it inevitably brings disadvantages and costs as well as new opportunities and benefits. It opens choices and imposes constraints. In almost all cases, the political, social, and economic consequences of technological innovation tend to fall differentially on various groups. [Burke; 1979: 32]

Burke develops a matrix of organizational scope and depth change that measures the impact of technological innovation on the institutional framework and applies the model to San Francisco's B.A.R.T. system—a form of rapid transit.

Burke defines structural depth as, "...the depth of technological penetration into the system structure", and scope as, "...the horizontal impact of the technology across structures, which can affect the whole community [a real impact] or it can have a limited impact on particular subcomponents [segmental impact]" [Burke; 1979: 32]

Within the institutional framework, light rail transit is part of the transportation/land-use subsystem which has a common concern with the movement of people and the use of land. The linkages within this subsystem have two primary components—money and authority (Burke; 1979). Burke points out that a characteristic of this subsystem is the uneven distribution of these two resources.

Since LRT affects only a subcomponent of the institutional framework, it cannot be classified as being a revolutionary technology. It is revolutionary only to the departments that
constitute the public transit/land-use subsystem. Other organizations or departments may not be greatly affected.

However, major structural changes may be required within the land use/transit subsystem to accommodate the impact of LRT. Burke's analysis suggests that LRT will result in an incremental change within the land-use/transportation subsystem with minor changes to the societal or "institutional" system. She also points out that resistance to change will come from the "status quo" where traditional methods of management and administration are more acceptable. Two alternatives are suggested to elicit support:

1. Macro-political acceptance; and,
2. An alternative subsystem with responsibility.

Macropolitical attention may be achieved through a major event or crisis, for example the lack of performance. However, it is difficult to obtain full acceptance due to the costs involved and the conflicting issues at hand. Burke therefore favors the latter alternative:

An alternative subsystem with a specific mission to assess and develop new technologies..., may be more appropriate for governments which wish to encourage technological innovation. [Burke;1979;305]

The alternative subsystem could then be enhanced or limited to specific innovations [LRT], to specific geographic areas [LRT corridors], to specific issues [coordination], and to specific strategies [joint development]. Moreover, the alternative subsystem is flexible enough to adapt to the original structure once the technological change is no longer an innovation.

Burke identifies a number of institutional factors which limits
the adoption of an alternative subsystem:

1. A fragmented political-administrative network:

We have a tendency to discuss urban affairs as a series of problems that are identified and associated with particular institutions. Public transit is the problem of the transit operator, crime is a police problem, education is a problem for the schools. There is not always a good fit however, as problems overlap institutional policy space, and potential solutions fall outside the domain of any existing organization. [Burke;1979;76]

2. Interlocking network of existing interests and plans:

a] Overlapping jurisdictional boundaries with sometimes four levels of government involved and having there own jurisdictions, monies, and authority.

b] Variety of planning and consulting agencies with varying and frequently overlapping domains.

c] The question of 'prudent design' defined as doing what has been done before. It reinforces standards and risk/uncertainty of trying something new.

This leads Burke to summarize that weak departments with small budgets will be unlikely to support restructuring as it may threaten their already fragile power base while extremely strong and secure departments are unlikely to see a need for restructuring since their success appears to make change unnecessary. She further suggests that a lack of resources [ie. funding and authority] may preclude innovative developments while an excess of resources allows organization to cover up mistakes and therefore reduce the need to innovate.

These institutional problems create what Burke coins a "turbulent environment". In a turbulent environment, the network linkages are so interrelated that the understanding of key relationships becomes impossible. Turbulence can be measured
according to five factors:

1. The number of people involved in transit/land-use issues.
2. The number and level of governments involved.
3. The number of departments involved.
4. The number of alternatives generated for consideration.
5. The amount of data being generated.

The ability to deal with technological innovations such as LRT in this type of environment merely adds greater confusion and ambiguity to the land/use transportation subsystem:

> It calls into question existing goals and objectives and the knowledge regarding possible outcomes. It also postulates new cause-effect relationships as it presents new means of achieving new outcomes.

[Burke;1979;317]

Although one of Burkes conclusions maintains that the status quo is one of the chief reasons why organizational change does not occur, she does suggest four reasons why change is possible:

1. Turnover of elected officials and senior management.
2. The growing awareness among professional planners and practitioners that the present structure, strategy, and process is inadequate.
3. The possibility of alternative systems with power to develop and implement.

The next section examines the practical experiences in land use and transportation planning and management.

Part 3. Public Institutional Experience

According to Colcord (1974), a universal institutional response to the transportation/land-use interface has been:

1. Functional reorganization at the metropolitan level, and;
2. An increase in the sharing of this responsibility with higher levels of government. (Colcord;1974)
The result has been a reduction in local autonomy and increased beauracratisation of decision-making. As Colcord points out:

A basic problem everywhere,... continues to be the absence of a viable government congruent to the territorial need, i.e. metropolitan. One particular problem this raises is the difficulty in relating transportation planning (metropolitan) to land use planning (typically municipal). (Colcord;1974;iii)

Colcord analyzes this problem through the research on thirteen urban areas; Atlanta, Miami, San Francisco, Boston, Minneapolis-St. Paul, and Seattle in the U.S.; Montreal and Toronto in Canada; and Stockholm, Amsterdam, Hamburg, Manchester, and Leeds in Europe. These areas were chosen by the author for their representation of the metropolitan transportation problem and for their innovation in developing improved institutions for transportation and land-use planning.

Colcord's analysis leads to the development of three generic institutional forms based on; the U.S., Canadian, and European experiences. All three have developed as a result of the political, economic, social and cultural subsystems of that country or region.

The U.S. Experience

The U.S. experience is typical of the "top-down" approach to institutional development. The federal government is the primary funding source for transportation improvements and with that has come the authority to develop policy's and programs for transportation development. However, land-use planning has typically been the responsibility of the local or state levels.

As a result, metropolitan planning evolved before any legislative authority had developed at that level. Areas such as
Atlanta, Detroit, and Baltimore developed the notion of a Council of Governments or COG's. By the late 1960's, nearly every metropolitan area in the U.S. had developed bodies with the dual function of planning and implementation. (Colcord;1974;21)

The COG's authority came from the state rather than local legislation which resulted in a lack of co-ordination at the regional level:

These COG's do not ordinarily have authority to review the general plans of their constituent municipalities or of functional agencies operating within the region, nor do they have the legal ability to require that the general plans of these bodies conform to goals and objectives of the regional plans generated by the COG. (Colcord;1974;21)

As a result, Colcord concluded that the U.S. experience has yet to succeed in fully integrating transportation planning (Federal, state, and regional function) with land-use planning which remains a municipal and county function:

Separate bureaucracies are almost universal and commonly they are not even at the same level of government. Typically, highway decision-making has its center of gravity at the state; transit decisions are made by semi-autonomous transit bodies; and land-use planning is a municipal responsibility though with some limited metropolitan inputs. (Colcord;1974;38)

The Canadian Experience

The Canadian experience varies from the U.S. model in dominant role of the province in local decision-making and planning. (Colcord;1974;31) In fact, Colcord suggests that the provincial level behaves more like the "parent" government in Canada then the federal government when it comes to municipal affairs:
The provinces have evidenced both a willingness to involve themselves — indeed to interfere — in the reform of local government when the need has become apparent and to involve themselves directly in the total (including land-use) planning process.

(Colcord; 1974; 31)

As a result, goal setting is the responsibility of both the provinces and the local governments. In fact most provinces require that all local plans must be submitted to a provincial agency concerned with land-use and transportation planning for approval.

A unique aspect of the Canadian model is the "formal" authority of the metropolitan government through its representative structure. Provincial, regional and local representatives are usual members of this metro government — all having a voice in the development of land-use and transportation within the region. This has, as Colcord concludes, resulted in the goal setting process being linked with the decision making process and a relatively high degree of responsiveness and comprehensiveness:

There certainly is a growing tendency, more advanced in the Toronto area, toward regional land-use planning with the expectation that these overriding objectives will govern the transportation decisions of the future.

(Colcord; 1974; 39)

The European Experience

Colcords review of the European countries suggest a typical "grassroots" approach to institutional development where there is a strong tradition of local government. An inherent problem has resulted in bringing the local political process and local institutions in line with the realities of metropolitan decision-making. (Colcord; 1974; 34)

Up until the early 1970's, there was virtually no regional or
co-ordinating council in England, Sweden or the Netherlands. In fact, typical of the European model is the single agency at the local level responsible for both land-use and transportation:

All of the key functions traditionally have been handled within a single jurisdiction, often times within a single department, and always reporting directly to a responsible political official, a member of the governing body. (Colcord;1974;39)

As well, most of the funding for transportation initiatives also came from the local level. However, recent initiatives in nearly all the nations that were examined suggest a trend towards a regional form of government for planning and a reliance on the national government for funding.

To summarize, the Colcord study suggests that from the institutional perspective, the means of co-ordinating land-use and transportation concerns from the institutional perspective is as varied as the number of cities and metropolitan regions that were studied. Moreover, Colcord attributes the differences more to the historical, cultural, and social characteristics of the region than to the transportation and land-use concerns.

This suggest that the institutional framework is not static. Indeed the process is continually changing, reacting to the pressures of economic, technological, and societal change. This leads to the second aspect of Colcord's study, the evolution of public institutions.
2. The Evolution of Public Institutions

Colcord's analysis on the experiences of co-ordinating land-use and transportation suggests that as a result of policy changes, population growth, political changes, and technological change, institutions have, over time evolved through a number of stages. In its simplified form, figure 14 depicts this evolutionary process which may follow several different paths.

Figure 14
The Evolutionary Institution

BEGINNING STAGES
A. FRAGMENTATION

TRANSITIONAL STAGES
C. LIMITED METROPOLITIZATION

FINAL STAGES
E. CENTRALIZATION
F. DUALIZATION

B. UNIFICATION
D. LIMITED CENTRALIZATION
G. DECENTRALIZATION
H. FRAGMENTATION

Source: Colcord; Urban Transportation Decision-making: Summary; 1974.

A. Fragmentation - fragmented local governments from both a funding and authority point of view resulted in the fragmented provision of services. Colcord suggests that most Canadian and U.S. cities originated at this institutional stage.

B. Unification - originated where all or most services were provided by a single local government. Cities in this category had to be large enough in terms of both population and territory to be considered as truly unified. Colcord maintained that at
least 50% of the total urban population and 50% of the total metropolitan area had to be the domain of the central city to be regarded as a unified institution. Colcord notes:

We were able to describe the 'original' institutional form as unification because, to all intents and purposes, none of the parent [state] governments we are concerned with here involved themselves in urban transportation at all in 1945. All of these governments had highway departments, but their activities excluded urban areas except in unusual circumstances.

(Colcord; 1974; 77)

The post-war period saw state governments assume more responsibility for urban transportation planning. In the U.S., the federal government assumed this responsibility whereas the provinces became more influential in Canada.

C. Limited Metropolitization - resulted in the introduction of area-wide institutions for land use planning and transportation. This stage saw the parent government involved to some degree usually at the policy level.

D. Limited Centralization - occurred where the parent government assumed greater responsibility for funding with a move towards greater involvement in transportation and land-use planning.

E. Centralization - the organizational form in which the parent government plays the dominant role in the planning and programming of transportation.

F. Dualization - results where the parent government feels the metropolitan processes threaten to compete with the parent government for funding and authority. Colcord maintains that the dualization stage is the ultimate resting place for urban areas which have experienced both the metropolitization and centralization processes discussed above:
Thus dualization is a finely tuned and carefully observed balance. It is an inherently competitive system, and the forces of metropolitization must take great care not to upset the delicate equilibrium. The parent government holds all the cards; because it has created the metropolitan government, it can always act to reduce its creations powers or to assume greater authority itself if it feels sufficiently threatened. (Colcord; 1974: 79)

Colcord notes that Toronto has achieved this organizational form with a strong metropolitan government and assertive provincial government. Colcord maintains that the competitive nature inherent in the dualization form is a healthy situation:

The system, as best it can be observed at present, can lead to highly creative policies. Its very competitiveness keeps its participants alert to new programmatic potentialities. (Colcord; 1974: 80)

This built in system of checks and balances ensures that policies and program development are not created within a vacuum. G. Decentralization - results when the parent government divests itself of its powers because a capable decision-making institution has been created at the local level. However, Colcord contends that such a move must take place at the metropolitan level with both funding and programming authority.

Colcord points out that this organizational form has a tendency to develop in areas where local government has traditionally been so strong that even when there is an increased parent government financial role, decision-making and policy development remains at the local level.

H. Fragmentation - develops where areas have come full circle with little or no improvement to the problems of fragmented jurisdictions, authority, and levels of responsibility over land-use and transportation. The symptoms of such a resting place is
a lack of co-ordination, comprehensiveness, and responsiveness in the planning process and becomes visible when technological innovations are implemented.

To summarize, Colcord has demonstrated that the institutional framework is clearly a ubiquitous process continually reacting to outside pressures. Colcord maintains that the dualization approach meets his criteria for an effective and efficient institutional framework—comprehensiveness, and responsiveness with emphasis on creating a level of government that is responsible for land use and transportation planning with funding and authority:

Even under the dual approach to decision-making—which seems the most appropriate and probably in most instances the only feasible approach in a federal system of government—it is clear that the state must increasingly move into the land-use planning area. (Colcord;1974:91)

3. The Impact of Policy Change on Institutional Change

Colcord's review of the U.S., Canadian, and European experience shows that in virtually every city there have been major policy changes in the postwar period in the transportation and land use planning. A further finding was that in all instances, these were followed by institutional changes.

Colcord further maintains that the most responsive and comprehensive institutional form is the dualized structure that has funding and authority over land use planning and transportation.

Colcord also examined the notion that certain institutional structures led to particular policy outputs. However, the evidence suggests otherwise:
The overall policies of the cities studied appear to be more the product of available finances, population density, and structure of the city, historical accidents, leadership patterns, and so forth, than the institutional structures present at the time the policies were decided upon. (Colcord;1974;83)

However, there was considerable evidence to suggest that institutional changes were required in order to implement the policy or program:

In effect, policies were already changed, and the institutions were altered to make these changed policies more feasible for implementation. Thus the steps seem to have been: 1) change of policy; 2) alteration of institutions; and 3) implementation of policy. (Colcord;1974;84)

This held true for U.S., Canadian, and European experiences. There was a definite and clear order to effectively implementing policy (technological) change:

Most cities (or their parent governments) have altered their institutions not as a precedent to policy change but rather to allow or foster the implementation of that policy change. Clearly the creation of new or modified institutions did not cause the policy change. (Colcord;1974;85)

Other findings of Colcord's study are:

1. Institutional changes, in most instances, have been aimed at overcoming fragmentation and creating a more comprehensive and responsive structure. (Page 85)

2. After greater comprehensiveness and responsiveness has been achieved, there is higher capability of the system to move with the times and to alter policies quickly when required. (Page 86)

3. While fragmented political institutions have not prevented changes in policy, they have greatly deterred the effective implementations of these changes. (Page 86)

4. There is a great deal of evidence to suggest that a single comprehensive agency is not necessarily the most effective. In a metropolitan region there is evidence to suggest that a system of Dualization may be the most comprehensive and responsive structure.
Summary

This chapter examined the nature and characteristics of the public organization. The bureaucratic organizational form is the oldest and most typical organizational form in existence today. Key features of this organizational type are; division of labor, hierarchy of authority, written rules and regulations, and functionalized departments. Hence, for the bureaucratic organization to operate effectively, interdependence is a key component.

However, the effectiveness of the bureaucratic organization maybe self limiting and self defeating since it requires continual reorganization that is rarely achieved in the public sector.

The chapter further maintains that a public organizations ability to achieve its goals is directly related to the internal components that make up the organization i.e. environment, structure, process, and strategy.

Strategies are typically the first component of the organization to be adjusted since they require the least amount of effort and rarely affect the status quo. However, new technologies such as LRT create new administrative problems which may require a new or at least reorganized structure and process.

The key to effectively implementing a chosen strategy is therefore contingent upon the congruence or 'fit' between the organizational components that constitute the institutional framework. Integrative mechanisms are an essential component.
The chapter identifies a number of integrative mechanisms from which to choose. The list, however, is an ordered list with each mechanism representing a more complicated and more effective means of implementation.

An empirical examination of public organization suggests that institutions evolve over time, continually reacting to pressures of economic, technological, and societal change. The literature further suggests that a dualization approach where both funding and authority for land use and transportation at two governmental levels is the optimum organizational form.

The introduction of an innovative technology influences institutional performance. The degree of institutional change, however, is dependent upon the level of impact that the innovative technology has on the institutional framework. In the case of LRT, it was seen that most of the impact would occur within the land use/transportation subsystem and therefore wholesale reorganization would not be necessary. However, major changes within the subsystem may be required.

The literature further suggests that the most effective means of implementing technological change is: 1) change of policy, 2) alteration of the institution, and 3) implementation of the policy. However, certain institutional structures do not necessarily lead to particular outputs.

The following chapter builds on these conclusions through the development of an institutional model that emphasizes the use of integrative mechanisms to effectively implement a chosen strategy.
CHAPTER 4

A CONTINGENCY MODEL OF INSTITUTIONAL INTEGRATION

The preceding chapters developed the thesis that the planning and development of land use and light rapid transit should be co-ordinated and that an examination of this relationship should move away from a substantive, quantitative approach towards a procedural process-oriented approach. Such an approach would concentrate on organizational structure, strategy, and process, authority and responsibility, and forums for interaction. This approach in turn suggests that many of the issues raised in co-ordinated development of land-use and transportation are increasingly governmental ones. Hence the ability of an institutional framework to co-ordinate land-use planning and LRT development depends largely on the organizational components that constitute the framework and their 'fit' with the environment.

The degree of change depends on the impact the technological innovation has on the existing institution. If the innovation becomes a permanent part of the institutional framework, the restructuring or 'fit' will become a major undertaking that takes on 'evolutionary' qualities and develops over time.

This chapter offers an institutional model of co-ordination which summarizes the thinking of others (Beer;1980, Galbraith and Nathanson;1978) and builds on the empirical evidence. The model is based on several assumptions and criteria:

1. It assumes that the present institutional framework recognizes the need to co-ordinate the planning and development
of land-use and light rapid transit.

2. It assumes that integration of the organizational components is critical to an effective organizational form.

3. It assumes that the public sector has and will continue to play an important role in determining land-use policies and the development of transportation facilities.

4. The model should be process-oriented thereby reflecting the dynamic, constantly changing aspects of the land-use/transportation planning process.

5. There are a number of forms of coordination from which to choose, each having its own set of costs and benefits.

Given the above, the degree of coordination can be depicted in the following manner:

\[ C = f(E + ST + P + SR) \]

where; \( C \) = the degree of coordination

- \( E \) = the environment
- \( ST \) = strategy
- \( P \) = process
- \( SR \) = structure

Hence, the degree to which the planning and development of land-use and rapid transit are coordinated is dependent upon those factors that constitute the institutional framework. The above statement together with the empirical findings suggests a contingency approach to institutional integration. The contingency approach maintains that there is no one best way of integrating land-use and transportation within the institutional framework but that all ways of coordinating are not equally effective. That is, choice makes a difference. The 'choice' however, depends on what goals and objectives the institutional framework is trying to achieve.

Moreover, the empirical evidence suggests that a congruence or 'fit' among the organizational components is required. In other
words, the degree or effectiveness of the co-ordinated development of land use and transportation is contingent upon a 'fit' between the institutions environment, strategy, process, and structure.

One cannot successfully implement technological change (i.e. introducing light rapid transit) without making compensating reinforcing changes to the process and structure. A proper fit between the organizational components leads to high organizational performance. (Lawerence and Lorsch;1967, Galbraith and Nathanson;1978, Beer;1980) The degree of change depends upon the impact that the technological change has on the present institutional framework.

The following model is an attempt to depict this process of fit and congruence among the organizational components as it relates to the land-use transportation planning process.
The adoption of integrative mechanisms and the ability of the institutional framework to manage diversity (i.e. the introduction of technological change such as light rapid transit) suggests that there are a number of transitional phases between the introduction of the technology and the eventual re-orientation of the framework.
In fact, each step along the list of integrative mechanisms represents a step towards a more project-oriented framework ultimately depicted as the development corporation that manages both the land-use and transportation aspects of the rapid transit corridor. Hence, each move into the model increases the institution's ability to cope with change and diversity. Moreover, each move 'builds' on the previous mechanisms. In other words, an institution which favors the use of a temporary task force will still require interdepartmental liaison roles, direct contact, goal setting, rules, and hierarchy of authority as part of its organizational process.

Therefore, alternate paths are possible depending upon the impact of the new technology upon the existing institutional framework. This impact can be measured using Burkes' matrix for the scope and depth of change that measures the impact of technological innovation on the institutional framework. Hence, not every institution is going to develop as a matrix organization or development corporation as a result of the introduction of LRT. In fact, a feature of this model is that the institution can stop anywhere along the process once the appropriate 'niche' is found. A move through the model therefore requires a rational decision-making process. This process first identifies the environment and conditions in which the framework must operate, relating the strategy to a given process thereby identifying conditions under which different processes should be chosen in order to effectively implement a given strategy and finally, reviewing the structure in order to ensure there is a
proper 'fit' between the four design variables. The following flowchart depicts this decision-making process.

Figure 17
The Decision-making Process

STEP 1: DEFINE THE PROBLEM

Source: Macdonald; "The Productive Supervisory"; 1985. (Modified)
STEP 2: IDENTIFY POSSIBLE SOLUTIONS

1. COLLECT INFORMATION
2. SORT DATA INTO FACT, INFLUENCE AND ASSUMPTION
3. IDENTIFY WHICH DATA ARE RELEVANT TO THE PROBLEM
4. HAVE ENOUGH DATA?
   - NO
   - YES
      WORK UP LIST OF SOLUTIONS
5. GO TO STEP 3

Source: Macdonald; "The Productive Supervisor"; 1985. (Modified)
STEP 3: SELECT THE MOST PROMISING SOLUTION

- IS THE SOLUTION WORKABLE?
  - YES
  - NO

- IS THE SOLUTION AFFORDABLE?
  - YES
  - NO
  - ELIMINATE

- LIST FEASIBLE SOLUTIONS

- ARE ALL ALTERNATIVES CHECKED?
  - NO
  - YES

- LIST PROS AND CONS. FOR EACH FEASIBLE SOLUTION

- SELECT THE MOST PROMISING SOLUTION

- GO TO STEP 4

STEP 4: APPLY THE SOLUTION

- IMPLEMENT CHOSEN SOLUTION

- MONITOR RESULTS

- IS THE PROBLEM RESOLVED?
  - NO
  - YES
  - GO TO STEP 1

- DOCUMENT SOLUTION

Source: Macdonald; "The Productive Supervisor"; 1985. (Modified)
Each step through the flowchart requires the planner to address a number of factors.

ENVIRONMENT *Investment climate
  *Social/Physical characteristics
  *Community support
  *Impact of LRT - Local? Regional? Provincial?
  *Level of Risk/Uncertainty
  *Long term financing - Local? Regional?
    - Provincial?
  *Support of parent governments
  *The level of technology
  *Longevity of the technology as an innovation
  *Level of scope and depth of change (see Burke Pg. 74)

  *Leadership patterns

STRATEGY *Supportive/unsupportive land use policies
  *Development incentives
  *Availability/use of developable land
  *Availability/use of Public land
  *Supportive growth strategy
  *Supportive regional and/or local planning
  *Certain/uncertain goals and objectives
  *Certain/uncertain strategies/policies
  *Use of joint development
    -use of air rights
    -ground leases
    -co-ordinated design efforts
    -shared access facilities
    -operating arrangements
    -route alignment
    -station location/spacing

  *Timing of land-use changes

PROCESS *Level of departmental/interagency co-ordination
  -hierarchy of authority
  -departmental rules
  -goal setting
  -direct contact
  -interdepartmental liason roles
  -temporary task forces
  -permanent teams
  -integrating roles
  integrating departments

  *Approval process

STRUCTURE *Responsibility for funding
  *Responsibility for authority
  *The number and levels of government involved
  *The number of departments involved
*The type of institutional structure
  - fragmented
  - unified
  - limited metropolitan
  - limited centralized
  - centralized
  - decentralized
  - dual

*The type of administrative structure
  - centralized
  - decentralized
  - functional
  - dualized
  - matrix
  - alternative subsystem
  - development corporation

*Size of the organization

*Level of comprehensiveness

*Level of responsiveness

This chapter presents a contingency model of institutional integration based on the premise that there is no one best way of co-ordinating development of land use and rapid transit but that choice does make a difference. The model identifies a number of integrative mechanisms within each organizational component i.e. environment, strategy, process, and structure. The list of mechanisms ranges from supportive policies and hierarchy of authority to joint development, integrated departments, and development corporations. It is assumed that a move towards a more projected-oriented organization increases the institutions ability to cope with change and diversity. However, the impact on the status quo, and the increased cost associated with higher forms of co-ordination are the qualifying factors.

The organization must therefore choose from this list based on a rational decision-making process. Organizations pursuing strategies associated with high uncertainty and diversity with high levels of interdepartmental activity will select mechanisms further down the list than organizations pursuing strategies
characterized by low uncertainty and diversity. The choice becomes whether to give priority to the project or to the department. Factors which favor a move to the project side include; diversity, the introduction of new technologies, increasing interdependence among functional departments, and the depth and scope of influence. Factors favoring a departmental organization include; maintaining the status quo, centralized funding and authority, and the long term maintenance of existing strategies.

**Part 2. Organizational Development: A Diagnostic Tool**

The above model suggests that an organization's capacity to achieve its goals is a function of the extent to which there is a 'fit' between its internal components of strategy, process, and structure and the external environment. But, how does one determine when change is required, and how does the institutional framework adapt?

The emergence of organizational development presents a means through which an organization can improve its effectiveness. Michael Beer in his book entitled *Organization Change and Development: A Systems View* (1980) reviews and clarifies the nature of organizational development. Beer defines organizational development or, "OD" as:

A system - wide process of data collection, diagnosis, action planning, intervention aimed at: 1) enhancing congruence between organizational structure, process, strategy, people, and culture; 2) developing new and creative organizational solutions; and 3) developing the organization's self-renewing capacity.

(Beer; 1980; 10)

Beer outlines the merits of OD in comparison to other approaches used in improving organizational performance:
1. OD seeks to create self-directed change to which people are committed. Obtaining collaboration of people in the change is the means for obtaining commitment.

2. OD is a system-wide change effort. It starts with the assumption that organizations are complex systems and that its subunits, levels of management, and components (process, people, structures, etc.) are all interdependent. Changing one means that change in the others is inevitable.

3. OD typically places equal emphasis on solving immediate problems and long-term development of an adaptive organization.

4. OD emphasizes a collaborative process of data collection, diagnosis and action for arriving at problem solutions.

5. OD often leads to new organizational arrangements and relationships that break with traditional bureaucratic patterns.

The model presented in part 1 does not specify specific linkages between the various components partly because of the large number of options and partly because of the circular cause and effect relationship between them. Hence the contingency view of organizational development makes it difficult to assess the effectiveness of a particular integrative approach since any number of fit combinations between the various components of the institutional framework may be equally good (Beer; 1980):

No managerial action or organizational change program can be evaluated in the abstract. We have to know whether it leads to a goal or outcome or state of affairs that has been previously agreed to as indicating success or effectiveness. (Eddy; 1981; 104)

However, Beer maintains that the concept of fit does allow for the use of more general criteria which can help to determine the organizations ability to react and adapt. Such criteria are 1) efficiency, 2) effectiveness, and 3) health.


Efficiency

This criterion may be defined as the extent of fit between the internal components of the social system. The more congruity exists between these components the more the organization will function smoothly. (Beer; 1980; 39)

Hence an efficient organization is one in which strategy, structure and process are congruent. And, if the environment is not an influence in its performance, individual and organizational performance may be high. (Beer; 1980)

Effectiveness

Effectiveness can be defined as:

The extent of fit between the organization's environment and all the internal components of the social system. (Beer; 1980; 39)

In spite of rational quantitative techniques for measuring organizational performance, effectiveness is still a subjective measure in the public sector. In the private sector, the most often used indicator of effectiveness is profit. Such a mechanism is readily identifiable and quantifiable. In the public sector, there is no such indicator. Rather the successful implementation of the goals and objectives established by elected representatives has been used as the yardstick to measure effectiveness. (Eddy; 1981, Galbraith and Nathanson; 1978)

Hence, agencies are evaluated on the basis of whether they fulfill their policy mandates. As Eddy points out, in practice, this is often easier said than done:

Policies change to meet public wants or needs or to respond to political demands. Sometimes, conflicting policies are handed down. At other times, the policy statements are so broad and open-ended that it is very difficult to know whether the agency has fulfilled the policy. This leaves room for varying interpretations of the level of an agencies
effectiveness and thus provides opportunities for friends to praise and enemies to criticize the same system. (Eddy;1981;105)

Such an indicator relies heavily on the very organization that created it to achieve justifiable results. This however, is often not the case:

Policies are formulated and enacted by legislative bodies comprised of individuals of differing views, incomplete information, and vested interests. Therefore they [policies] can be ambiguous, unattainable, and changing. (Eddy;1981;131)

Organizational Health

Organizational health may be defined as:

The capacity of an organization to engage in ongoing self-examination aimed at identifying incongruities between social systems components and developing plans for needed change in strategy environment, structure, process, people, culture, and the dominant coalition.(Beer;1980;40)

Beer argues that a 'healthy' organization is more likely to maintain efficiency and effectiveness over the long term. Beer cites four factors that prevent an organization from adapting to its environment:

1. Lack of Delegation by Top Management - top management may become too involved in day-to-day operations to appreciate or understand the longer-range needs of their organization.

2. Invalid Data and Diagnosis - there may be limited valid data available about the environment or internal organizational problems. Limited data about the environment may be a function of environmental uncertainty and complexity.

3. Top Managers lack of Adaptability- organizational changes may not occur if they threaten management's personal position, power, or security.

4. Ineffective Management of Change - ineffective management of change may occur if the implications of the change for people hasn't been fully understood by management. (Beer;1980)

As Beer points out, "An organization may or may not be high on all of these system level performance criteria at any one time."
The performance of an organization largely depends upon the environment within which it must operate:

An organization can be very efficient if it has people with low needs for responsibility managed with a highly directive management style. There would be little frustration or dissatisfaction, but the organization would not necessarily be effective. This would depend on the demands of its environment. In a rapidly changing market environment the organization would be ineffective, but in a more stable environment it would be quite effective.

On the other hand, an organization that has introduced a matrix structure to deal with a dynamic environment would be quite effective, but until behavior and other practices become consistent with the structure, it would be inefficient. Either of these organizations could be unhealthy if an ongoing process of self-examination is not institutionalized.

Eddy argues that in the public sector, efficiency should only be a contributing factor towards an effective organization.

However, this is not always the case:

... a public agency that puts most of its attention into efficiency programs, such as fiscal controls and audits, may protect itself from criticisms of 'inefficiency' from the media, but may wake up to find it has lost its political support because it no longer is relevant to the needs of its constituents.

Eddy further maintains that the difficulties in measuring policy effectiveness has led to an emphasis on efficiency as a substitute criteria. Administrators are more preoccupied with whether the agency is wasting funds rather than if the agency is accomplishing its tasks. Hence efficiency can be a two edged sword if the 'good of the public' is sacrificed for other outcomes such as longevity and political acceptance.

To summarize, organizational development is a process of clarifying the choices based on a diagnosis of the current state.
of fit between the organizational components and the outcomes that could be expected with alternative arrangements. It should be pointed out that organizational development cannot specify exactly what an organization can do to improve its effectiveness, efficiency, and health; however, it can help to clarify choices. The next chapter will review the institutional framework responsible for the planning and development of the City of Edmonton's North East Light Rapid Transit system.
CHAPTER 5

CASE STUDY: EDMONTON'S NORTHEAST LIGHT RAPID TRANSIT SYSTEM

PART 1 Socio-economic Characteristics

Since the end of the second world war, the city of Edmonton has continued to develop as one of the fastest growing metropolitan centres in Canada, expanding at a rate of 11,134 persons per year.

<table>
<thead>
<tr>
<th>Year</th>
<th>Persons/Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1940</td>
<td>2,000</td>
</tr>
<tr>
<td>'45</td>
<td>4,000</td>
</tr>
<tr>
<td>'50</td>
<td>6,000</td>
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<tr>
<td>'55</td>
<td>8,000</td>
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<tr>
<td>'75</td>
<td>16,000</td>
</tr>
<tr>
<td>'80</td>
<td>18,000</td>
</tr>
<tr>
<td>'85</td>
<td>10,000</td>
</tr>
</tbody>
</table>

Source: City of Edmonton Planning Department

The total population of the Edmonton metropolitan area in 1986 was estimated at 782,500, an increase of 50% in the past decade. Of this overall figure, 560,000 persons or, 71% of the total population, lives in the corporate limits of the City. (1986 Edmonton Regional Plan) As is the case with most North American cities, the central city's percentage of the total population has declined. Edmonton's share of the total regional population growth which in the early 1960's was as high as 85%, had dropped too 30% by the mid 1970's and has since recovered to the 71%
Housing units in Edmonton are being constructed at a rapid pace to keep up with the increasing population. Single detached housing is the most common form of housing, due to the availability of land and expansion of the city's suburbs. During the past two decades, a tremendous increase in population has followed the construction of major roads into the suburbs. Since 1978, the suburbs have accounted for an increasing proportion of the city's population. The following Table shows the population and percentage increases of the inner city versus the suburbs.

<table>
<thead>
<tr>
<th>Year</th>
<th>Inner City Population</th>
<th>Inner City %</th>
<th>Suburbs Population</th>
<th>Suburbs %</th>
<th>Total Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>1978</td>
<td>302,751</td>
<td>63.3</td>
<td>175,315</td>
<td>36.7</td>
<td>478,066</td>
</tr>
<tr>
<td>1979</td>
<td>292,736</td>
<td>59.6</td>
<td>198,623</td>
<td>40.4</td>
<td>491,359</td>
</tr>
<tr>
<td>1980</td>
<td>287,441</td>
<td>57.0</td>
<td>218,332</td>
<td>43.0</td>
<td>505,773</td>
</tr>
<tr>
<td>1981</td>
<td>286,480</td>
<td>55.0</td>
<td>234,725</td>
<td>45.0</td>
<td>521,205</td>
</tr>
<tr>
<td>1982</td>
<td>285,387</td>
<td>52.0</td>
<td>265,927</td>
<td>48.0</td>
<td>551,314</td>
</tr>
<tr>
<td>1983</td>
<td>258,217</td>
<td>46.0</td>
<td>301,868</td>
<td>54.0</td>
<td>560,085</td>
</tr>
</tbody>
</table>

Source: City of Edmonton Planning Department

By 1983, the suburbs had passed the inner city population. This trend should continue well into the next century given the recent decision of the provincial government to approve the annexation of nearly 500 sq. km. of land from the surrounding counties to the City.

Edmonton is the Provincial capital and the centre of public administration for the Province of Alberta. Approximately 35,000 people are employed by Federal, Provincial, metropolitan and civic governments. (Alberta Transportation; 1984) While govern-
ment is Edmonton's major 'business' the agriculture, energy and petrochemical industries are of equal importance. Since the 1950's, Edmonton's local economy has strengthened and diversified as a result of industrial activity generated by the production and processing of oil, natural gas, and other natural resources.

Oil field servicing is a major component of Edmonton's economic base with plant facilities developed and operated by companies such as Shell, Imperial Oil, and Petro Canada. Edmonton's manufacturing sector focuses on the food and beverage industries, metal fabrication, and transportation equipment.

Today the region is a dominant industrial, financial, and institutional centre for western Canada. The rapid increase in growth and prosperity for the region has resulted in a number of perceived negative externalities including: the dominance and reliance on the private automobile, massive road and infrastructure expenditures, the deterioration of inner city neighborhoods, and the loss of agricultural land as the suburban developments continue to press outward into the surrounding districts.

Hence, the need to move people, and goods efficiently and effectively is a critical provincial and regional concern. A primary objective is the provision of a transportation system which is not at the expense of socio-economic and environmental concerns:

The municipalities of the region have on numerous occasions, heard social, environmental, arguments against over-dependence on the automobile and have recognized that there is a need to encourage the development of public transportation systems that offer attractive alternatives to the private automobile. (ERPC; 1977; 14)

The city of Edmonton has long history of supporting alterna-
tives to the private automobile through the development of its public transportation system. The following section reviews the development of public transportation, specifically rapid transit, in Edmonton.

PART 2 The Development of Public Transit in Edmonton

Public transportation has always played an important role in the transportation system in Edmonton. The Edmonton Radial Tramway Act, passed in 1908 in premature expectation of massive growth in Edmonton, ushered in the era of public transportation and rapid transit in Edmonton. The Act gave the city the opportunity up to 1913 of constructing a 'municipal street railway system to any point not more than eighty miles from its corporate limits'. (City of Edmonton Transportation Dept.; 1984)

Hence the Edmonton radial railway was established in 1908 with service provided by 6 electrically powered streetcars operating on 12 miles of track. The service expanded rapidly over the next 6 to 8 years and then remained fairly constant until the early 1930's. In addition, a regional interurban rail car service developed from 1912 to 1915 between Edmonton and St. Albert but was discontinued when fire destroyed the barns and cars.

By 1932, the first trolley bus service was introduced which rendered the streetcar obsolete and resulted in their conversion to the trolley bus system. In 1951, the streetcars were officially retired with public transportation provided primarily by buses and trolley buses. However, by 1960 city council was once again considering the feasibility of a streetcar system.
The city examined several rapid transit proposals through the 1960's - all of which for one reason or another - were shelved. (The City even submitted an unsuccessful bid for Montreal Expo's rapid transit cars in 1967). Finally, in 1973, council approved the construction of a light rapid transit line from downtown Edmonton extending Northeast along an existing CNR right-of-way. But, why light rapid transit?

After world war II, automobile ownership increased dramatically. As a result, emphasis was placed on improving and extending the urban and provincial roadway network. As well, Edmonton and Calgary were experiencing high growth rates which made peripheral areas of the city more attractive for urban development:

The proliferation of the automobile combined with the economic recovery and population growth of the post war period accelerated development of suburban areas. (ERPC Position Paper #11; 1977; 12)

The expansion of the suburbs went unchecked for nearly three decades and led to a number of associated problems in Edmonton.

1. Traffic volumes which the central areas of the City were unable to accommodate.
2. The increase in the number of automobiles coming into the central area resulted in parking problems, traffic control problems, and congestion along bus routes.

The studies that originated during the late 60's and early 70's examined a number of options. The first option maintained the status quo by widening existing arterial roads and constructing
new freeways between the suburbs and the downtown. The disad­
vantages cited included; increased gasoline consumption— a non-
renewable resource, more air pollution and greater noise levels
in the downtown, large scale land acquisition for road right-of-
ways, and the social disruption of established neighborhoods.

A second option emphasized the role of public transit and, in
particular, rapid transit. The mass transit idea had been
refined over the years to the present day solution of light rapid
transit which overcame the problem of obtaining right-of-way
since LRT was compatible with existing railway corridors.

In 1971, a University of Alberta practicum on rapid transit
introduced the concept of LRT technology. With the conclusion
that bus and roadway alternatives were too costly and disruptive,
and with Canadian National Railways receptive to the use of their
right-of-way for a nominal lease, city council gave authority for
the construction of the Northeast line in 1973. With that
decision, Edmonton officially became the first North American
city to utilize LRT technology.

The rapid transit system was designed to move commuters to and
from the suburbs to the downtown during peak hours. A number of
advantages to a LRT system operating within a separated or
exclusive right-of-way in comparison to a street/bus system were
identified:

1. Higher passenger carrying capacities

   LRT 64 seated, 98 standing for a total of 162.
   Bus 50 seated, 25 standing for a total of 75.

2. "The greater potential for land-use development because
   of the permanence of the LRT system in comparison to a
bus system. By example: subway construction in Toronto has strongly influenced the subsequent patterns of urban development in that city" 

(Alberta Transportation;1984;78)

3. Service reliability and higher average speeds since less interference with automobile traffic.

4. Peak hour/peak direction ridership levels in the order of 6,000 to 7,000 passengers per hour. LRT is less expensive than bus service over the same route.

The disadvantages cited at the time were:

1. Higher operating and maintenance costs.
   
   LRT - $250/service hour
   Bus - $30/service hour

2. Higher capital construction costs.
   
   LRT - 1.3 million/car
   10 to 15 million/Km
   500,000 /station

   Bus - $140,000/unit

3. Less flexibility to adapt LRT routes to changing land use and ridership levels and patterns.
   
   Implementation of LRT routes measured in years.
   Implementation of bus routes measured in weeks.

4. The need for feeder buses to get to and from LRT stations.

   However, given the approval and commitment by city council, the Province of Alberta allocated the necessary public transit capital funding in 1974. An "Alberta City Transportation Policy" was adopted by the province providing increased financial assistance for municipal public transit systems.

   The initial section of Edmonton's LRT system was constructed between downtown and Belvedere to the Northeast between 1974 and 1978. Of the five original stations, 2 were underground and 3 were at street level. The line was 7.2 Km of double track of which 1.6km was underground. 17 LRT vehicles were ordered with
initial costs in order of $75 million. The line officially opened on April 23, 1978 in time for the commonwealth games.

Between 1979 and 1983, a 2.2 km extension was constructed from Belvedere station to Clareview town centre along with 2 additional underground stations in the downtown and the purchase of 20 cars. The present system has daily ridership of 25,000 to 30,000 with peak hour/peak direction of 3,000 passengers. (City of Edmonton Planning Department) The following diagram depicts the rapid transit line along with the area redevelopment and area structure plans that have occurred along the corridor.
Figure 17
Edmonton's Northeast Light Rapid Transit System

Source: The City of Edmonton Planning Department; 1983.

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Both Edmonton and Calgary are planning future extensions up to the turn of the century. The high capital costs, right-of-way purchases, tunnelling, maintenance, and storage costs means that expenditures must be spread out over an extended period of time. City council recently authorized additional construction taking the line from Jasper Ave. underground to the government centre area with further plans to extend from government centre south across the North Saskatchewan river along a new LRT dedicated bridge to the University.

Although the line was successfully constructed on time and within budget, it has not been the complete success that had been hoped for. Although seen as a catalyst for growth and development and a means of successfully implementing the city's General Municipal plan, very little, if any, positive redevelopment has occurred along the northeast leg of the system. As early as 1978, the year the system officially opened, doubt about its potential to stimulate growth had surfaced:

For the casual observer looking at the line, there doesn't seem much out there yet besides these facilities So, for the time being, park-and-ride lots and feeder buses will be relied on for riders. While no doubt the line is intended to stimulate development, the immediate financial prospect looks bleak..."  
(City Magazine;1978;23)

Since 1978, the period of expected high growth never materialized due to an uncertain economic climate plagued by high interests rates and lack of petroleum industry activity due to national and international oil policies. Moreover, with lower land costs, development costs, and demand for lower density housing, the suburbs continued to develop at will.

As recently as 1986/87, funding for the project remains un-
certain. With the Provincial government estimating a 3 billion deficit, a new austerity program in Alberta has cast a shadow of doubt over the long-term future of the system:

'The provincial', said the premier, 'must not be the only government in the province to tighten its belt'. This naturally implied major cuts in transportation spending. Transportation Minister J. Allen Adair, for instance, did not deny that expansion of Edmonton's one-legged LRT system might be stopped, as would construction on the capital city's ring road. ( Alberta Report Magazine; 1986; 4)

To summarize, public transit has always played an important role in the transportation system in Edmonton. Since the early 1970's, both the province of Alberta and the City of Edmonton have emphasized the development of LRT both as an alternative to the auto dominated transportation system and as a means of accomplishing larger urban goals such as compact growth and development.

However, the underlying questions of whether redevelopment along the LRT corridor will eventually occur along with the uncertainty of funding for the project questions the long-term viability of rapid transit in Edmonton. Hence, the fundamental question is whether LRT will continue to be used as a means of providing an alternative form of transportation in Edmonton and, if so, will it continue to be used to accomplish larger societal goals. The former question is largely a political decision. However the latter, as noted in previous chapters is largely influenced by the existing institutional framework. The following section reviews the institutional arrangements in Edmonton as it relates to the LRT system.
Part 3 The Institutional Framework for LRT in Edmonton

As noted in chapter 3, the provinces have the 'legal authority' over local decision-making Colcord notes four major features of the Canadian nation that have largely determined the character of its governmental structure and process:

1. It is a federation of ten provinces and two northern territories;

2. The system of government is parliamentary, fashioned greatly after the British model and drawing from Britain its basic concepts of constitutional freedom:

3. The nation is comprised of two major, different cultural populations, French and English; and,

4. It shares a 3,000 mile border with the U.S.A., and maintains close cultural, economic, and other co-operative ties. (Colcord; 1974; 47)

Established in 1867, Canadian federalism was founded with the adoption of the British North American Act by the British Parliament. The Act, which was revised in 1981 and is formally known as the Canada Act, places municipalities under the "exclusive power of the provincial legislation". To this end, the federal government has virtually stayed out of urban affairs. However, the provinces have held fast to their rights regarding urban areas.

The provinces have, however, delegated much of this responsibility to municipalities through the legislative process. In Alberta, the Planning Act, 1981 sets out the responsibilities that shall or may be carried out by a municipality. This delega-
tion is particularly evident in Alberta with respect to land-use and transportation. The following sections reviews the structure, process and strategies that constitute the framework for the provision of land-use planning and rapid transit services in Edmonton.

1. Structure

As pointed out previously, funding and authority are the two primary factors that shape the structure of the institutional framework. The Canada Act defines the structure of government in Canada and the powers and responsibilities of the different governmental levels. Important to this study is paragraph 92 of the Act which outlines the powers of the provinces. Two of the 'powers' are particularly relevant with respect to land use planning and transportation:

1. The Provinces have the power of "direct taxation" within their respective jurisdictions in order to raise revenue for provincial purposes, and;

2. The provinces have the power to create or dissolve "municipal institutions in the province".

With respect to transportation, "lines of steam and other ships, railways, canals, telegraphs, and other works and undertakings connecting the province with any other or others of the provinces, or extending beyond the limits of the province" falls within the jurisdiction of the federal government. All other forms of transportation and communication are the responsibility of the provincial governments. Hence, not only does the province have the legal authority over municipalities, it also has the
ability to generate revenues from direct taxation.

On the other hand, the role of the federal government is quite limited at the metropolitan level particularly with respect to land-use and transportation. Specifically, two federal agencies have limited roles in urban transportation and land-use; The Ministry of Transport, and the Canadian Transport Commission.

A. The Ministry of Transport

The Ministry of Transport, through its various agencies is responsible for all transportation related operations that involve the Federal government. Their responsibilities concentrate on air and water transport but are directly involved in maintaining the trans-canada highway system and in operating the Canadian National Railways.

Their primary role at the municipal level has been to provide funding for research and development. For example, during 1976, the Transportation Development Agency financed an analysis of the potential usage of an electronic signalling system for the Edmonton Rapid Transit system. As well, CNR was directly involved in right-of-way leases and air rights for the development of LRT stations. (EMRPC;1977;Position Paper #11)

B. The Canadian Transport Commission

The CTC is a regulatory body that reports to the Ministry of Transport but operates as an autonomous agency. Its primary responsibility is the regulation of air services, railways, water transport. The CTC also distributes federal aid for transportation developments where applicable. For example, the cost of railway grade crossings in urban areas is assumed jointly by the railway, the Federal government, and the affected municipality.
The Province of Alberta, empowered through the Canada Act has the primary responsibility over urban areas. However, the province has divested much of its responsibilities through the Planning Act. The Provincial departments of Municipal Affairs and Transportation, Regional Planning Commissions, and civic departments are the primary bodies that enforce the provisions of the Planning Act.

Within this decentralized system, the province establishes its own urban land-use and transportation priorities through the provision of conditional and unconditional grants. This is in sharp contrast to the United States system where most transportation funding is the responsibility of the Federal government.

Funding for Edmonton's LRT system was administered by the Department of Transportation through the urban transportation assistance program. Through the 1950's and 1960's the first priority was road building. However, by 1974, Alberta transportation had re-evaluated its policy and moved towards a more balanced approach that included the advancement of new public transit technologies. (EMRPC; 1977; Position Paper #11)

The provincial program for LRT was announced on January 10, 1976. Approximately 750 million was committed over a six year period to the development of urban transportation systems and facilities. By 1984 the funding program was increased to 930 million due to inflation, population increase, and increased funding for major continuous corridor projects. The funding was divided into 9 grant programs and classified according to unconditional, conditional, and project-oriented.
LRT funding was considered a conditional grant subject to provincial approval. Calgary and Edmonton received a total of 667 million of the total 920 million. Specifically, Edmonton received 120,175,000 for public transit capital which included the development of LRT over the six year period. The transportation program is presently in its final year of commitment. Recent throne speeches have hinted that major cutbacks may be necessary in the area of capital funding for transportation projects during the present period of fiscal restraint. The province therefore continues to play an indirect role in public transit planning and development and, ultimately in shaping the growth and development of Edmonton in the future.

With respect to land-use planning at the provincial level, the Department of Municipal Affairs oversees the planning related functions. There are a number of branches and divisions within the department all with specific roles and responsibilities. The Planning Branch for example, handles all regional planning matters for that part of Alberta currently outside the jurisdiction of regional planning commissions. The Branch also provides planning consultative services to those communities that are not members of regional planning commissions.

The inter-agency planning branch provides planning advisory services to regional planning commissions and government agencies and promotes interdepartmental liaison and coordination on land use planning matters. (Dept. of Municipal Affairs; 1980) The branch also coordinates the review of regional plans by various provincial departments.

The Alberta Planning Board operates as the subdivision
approving authority for the province, administers the Alberta Planning Fund, and reviews and approves regional plans. The Local Authorities Board is empowered to rule on annexation and expropriation applications and has considerable power to examine the financial status of municipalities and authorize debenture borrowing.

However, once the municipality applies for and receives its own subdivision approving authority, many of the specific responsibilities are delegated to the municipality. Since the City of Edmonton has assumed most of the land-use planning responsibilities at the local level, the Department of Municipal Affairs primary role is its approving authority for the regional plan, general municipal plan, and in its capacity as the local authorities board.

The next level within the structural hierarchy is the regional level which is the responsibility of the Edmonton Metropolitan Regional Planning Commission. The commission and its jurisdiction is established by the Planning Act. Local councils are represented on the commission:

This is done to ensure that the land use decisions made by the regional planning commissions reflect the collective views of the local municipalities.

(EMRPC;1985;79)

The commission is financed through the Alberta Planning Fund with 20% is contributed by every municipality in the Province and the remaining 80% by the Province. As such, the planning commission has no legal authority to raise its own revenues. The mandate of the commission, as set out in the Planning Act is:

1. Preparation and adoption of a regional plan which regulates
land development within the region;
2. Advice and assistance to municipalities; and,
3. Review and approval of subdivision applications.

The most important role of the EMRPC in the structural hierarchy is that all local land use plans i.e. general municipal plan, area structure/redevelopment plans, outline plans, and site plans must comply with the objectives and strategies of the regional plan.

However, the role of the EMRPC outside the scope of the planning process is minimal, particularly within the city of Edmonton. This is particularly evident with respect to public transit. In 1978, in light of the development of LRT within the region, the EMRPC prepared a transportation policy paper which stated the following:

To date, the Commission's involvement in public transportation policy development for the Edmonton region has been minimal, since the Commission does not operate or directly regulate public transportation services. This function has been and will continue to be handled by member municipalities, the Alberta and Federal governments and the transportation operators. (EMRPC; 1978;i)

Hence, the EMRPC's role within the hierarchy is land-use oriented with a minor role in transportation through its assistance as a technical resource.

The City of Edmonton is a diverse organization which provides a variety of local government services. The City is unique in that it is also heavily 'utility-oriented' with its involvement in the generation, transmission and distribution of power, the operations of telecommunications utility (Edmonton telephones), the provision of municipal airport services, and the provision of
The City of Edmonton has recognized the fact that with such a diversified organization, the co-ordination of programs and services is critical:

The effective management of an organization of this size requires long-range planning at all levels of management. Further, a coordinated planning process is essential to guide the operation of the city as a whole. This process ensures that the programs and services under the control of City Council are planned, coordinated and phased so as to provide the greatest benefit to the community from the available resources. (Local Policy Plan; 1981:1)

A key document in this planning process is the 'Local Policy Plan', a five year corporate blueprint which is reviewed and updated annually. The Local Policy Plan is, "A frame of reference for making current decisions which are consistent with long-range development strategies". (Local Policy Plan; 1981:2) The city services are organized according to 'product lines' and are categorized into eight functional areas:

1. Federal Government Services;
2. Protective Services;
3. Transportation Services;
4. Environmental Health Services;
5. Public Health and Social Services;
6. Environmental Development Services;
7. Recreation and Cultural Services; and,
8. Utility Services

Those areas directly involved in the planning and implementation of LRT and land-use are highlighted below.

1. Transportation Services
Goal: The provision of the facilities needed to enable citizens and visitors to travel and move goods in safety about the City of Edmonton and the surrounding districts with a minimum of delay, expense, consumption of non-renewable resources and detractions from the quality of urban life.

The transportation services function is further divided into five administrative units: Transportation Systems Design, Engineering Department, Edmonton Transit, Parking and Meters, and Boulevard Maintenance. Three of the above functions are directly involved in the development and implementation of LRT:

(a) Transportation Systems Design Department

Mandate: To develop, program and maintain a comprehensive Transportation Plan that will enable the City to implement the strategies and provide the facilities needed to enable people and goods to move safely throughout the Edmonton area in an efficient and environmentally and socially responsible manner using all major modes of transportation.

(b) Engineering Department (excluding airport)

Mandate: To design, construct, maintain and operate roadways and related facilities required for surface transportation.

(c) Edmonton Transit

Mandate: To provide an attractive, reliable, safe, efficient and cost effective public transit service for Edmonton residents at a sufficiently high level of service to attract the maximum number of passengers and offer a viable and competitive alternative to automobile travel.

(Local Policy Plan; 1981; 39)

These three departments are responsible for the planning, construction, operations and maintenance of the rapid transit system in Edmonton. Funding for capital projects is made available from debenture borrowing, the Provincial Urban Transportation Assistance Program and special levies authorized for transportation purposes. However, as pointed out in the Local
Policy Plan, these funding sources are inadequate to undertake all the programs and projects required to provide an adequate level of service:

Therefore, allocation of transportation expenditures must be made in those areas where maximum benefits result. This requires emphasis on the development of cost-effective strategies and better evaluation of all aspects of transportation management prior to establishing priorities for expenditures. (Local Policy Plan; 1981; 40)

The Transportation System Plan, discussed later in this chapter, provides for the long range transportation strategies for the City. However, the policy plan identifies the use of exclusive transit rights of way and the promotion of increased transit usage as key elements of the corporate strategy.

2. Environmental Development Services

Goal: To design, develop and manage City buildings, to purchase, manage and sell land and to promote, guide, coordinate and regulate land use and business development in a manner which will assist the community in attaining its goals. (Local Policy Plan; 1981; 56)

Environmental Development Services is further divided into three functional departments two of which are involved in the land-use planning and development process.

(a) Planning Department

The primary responsibilities of the planning department include; the processing of land-use and subdivision plans, the preparation of area, district, and city-wide plans, and the negotiation and implementation of development agreements.

(b) Real Estate and Housing Department

Real Estate and Housing is responsible for the purchase, sale, development and management of city-owned property
and the development and implementation of City housing policies.

To summarize, the institutional framework responsible for the land-use and transportation planning process in Edmonton is a decentralized, functionally oriented bureaucratic system with funding over capital improvements shared between the city and the Province. Direct authority over the planning and development of both LRT and land-use is the responsibility of the city while the province and Edmonton Regional Planning Commission act in a technical advisory capacity. The organizational structure at the local level is typically bureaucratic with responsibilities separated into functional sub units. Since the responsibility for planning and developing Edmonton's LRT system and accompanying land-use considerations is primarily at the city level, the process and strategy sections of this chapter concentrate on this level.

2. Process

The organization is hierarchical in nature, facilitating the upward flow of information to senior administration such that corporate decisions can be made. The system uses the more 'traditional' lines of communication such as hierarchy of authority, departmental rules, goal setting, and direct contact as the principle means of providing information. (Planning Department; 1987)

As a result information gradually becomes more generalized and thus filtered, rather than permitting lateral moves across functional subunits. This upward channelling of information and decision-making also results in information flows that follow 'product lines' which unavoidably separates policies and programs
into functional categories. Consequently there has been two relatively separate planning processes for land-use and transportation.

The Transportation Planning Process

The planning and implementation of transit services involves many phases and participation of several agencies and interest groups. The following figure schematically depicts the sequential and hierarchical nature of this process.
Figure 18
The Transportation Planning Process in Edmonton

LONG RANGE PLANNING, TRANSPORTATION SYSTEM PLAN AND TRANSPORTATION SYSTEM BYLAWS

GOALS, OBJECTIVES AND POLICIES (GENERAL MUNICIPAL PLAN)

SYSTEM MONITORING

TEN YEAR PLAN AND PROGRAM

CONSTRUCTION

FIVE YEAR PROGRAM

FUNCTIONAL PLANNING

DETAILED DESIGN

Source: City of Edmonton; Transportation Systems Plan; 1981.
Consistency with overall goals and objectives are established at the initial phases through the general municipal plan. The approval process (shown below) involves a myriad of departments and committees each responsible for a specific function.

**Figure 19**

Edmonton's Transportation Approval Process

Source: City of Edmonton; Transplan; 1981

The primary responsibility for the preparation of transportation Goals, Objectives and Policies, the Long Range Plan, the Ten Year Plan and Program, Functional Planning and System monitoring rests with the Transportation Systems Design Depart-
ment with input from the Engineering, Edmonton Transit and Planning Departments. (Transplan;1981)

The Planning Department is responsible for preparation, updating, monitoring and implementation of the General Municipal Plan, Area Structure Plans, Neighborhood Structure Plans, District Plans, and Area Redevelopment Plans which are inputs to the transportation planning and implementation phases of the process.

Three major committees comprising of representatives from the Transportation Systems Design Department, Engineering Department and Edmonton Transit, ensure coordination between various transportation and land use plans. These committees are; The Functional Plan Review Committee to ensure feasibility of the functional plans, the Engineering Transportation Technical Committee to ensure the protection of the physical and operational integrity of the transportation facilities in conjunction with land use development, and the Operational Coordination Committee which coordinates the minor miscellaneous construction programs and research and development priorities. (Transplan;1981)

The Interdepartmental Transportation Committee, established by the Municipal Planning Commission (the legislative body responsible for planning and development within the City), comprises the branch managers of the involved departments, and is responsible for ensuring that the transportation proposals are consistent with overall City Policies.

The Technical Review Committee, established by the Municipal
Planning Commission, is responsible for resolving conflicts between land use and transportation. Meetings are only held as required and conflicts are reviewed prior to submission to the Municipal Planning Commission.

The Municipal Planning Commission, and its sub-committee the Technical Advisory Committee, receives the major transportation proposals from the Interdepartmental Transportation Committee. Further input is received on whether programs are consistent with overall City Policies.

The Transportation System Management Committee consists of the Commissioner of Public Affairs, The General Managers of Edmonton Transit, Transportation Systems Design Department, Engineering Department and the General Manager of the Planning Department in an advisory capacity. It is responsible for reviewing transportation policy.

The Commission Board is responsible for relating the transportation proposals and programs to the management policies of the City and in turn relating these proposals to the capital and operating budgets and ensuring City Council's policies are carried out.

City Council is responsible for approving transportation proposals, received from the Commission Board, by council resolution or other appropriate mechanisms.

Alberta Transportation plays a role at general stages of this process. It reviews the Transportation System Bylaw for compliance with Alberta regulations and makes appropriate recommendations to the Minister of Transportation, before submission to the Lieutenant Governor in Council for Approval; reviews and
agrees in general with the City's Ten Year Plan and Program; approves the contents and recommendations of functional planning studies; and administers the Urban Transportation Assistance Program, which not only lays out the policy through which programs are funded, but the dollar amounts allocated.

This process is used for all major transportation facilities under the jurisdiction of the City including LRT lines. It is clear that the transportation planning and implementation process as it exists in Edmonton is complex, lengthy, incremental in nature and involves a large number of participants with often opposing opinions on what is required.

The Land-use Planning Process

The planning department is divided into four subunits; Long Range Planning, Area Planning, Planning Implementation, and Land Development Coordination. Each section is administered by a section manager who reports to the general manager of the department. partly because of a substantial increase in size since the early 1970's, the department has become increasingly hierarchical. For example, in 1974 in the research and long range planning branch there was only one intervening level (the director) between a planner and the departments general manager, whereas in 1985 there are four or five levels. The primary vehicle for co-ordination are the department manager's. However, most communication even among the branches is informal and spontaneous.
The formal planning process consists primarily of a hierarchical system of plans as shown in the following diagram:

Figure 20
Edmonton's Land Use Planning Process

Source: City of Edmonton; General Municipal Plan; 1981.
The broadest and most general level of planning is the regional plan—prepared by the Edmonton Metropolitan Regional Planning Commission with input from the province and the municipalities. The plan establishes guidelines for the magnitude and distribution of growth for all rural and urban areas within the region. It is interesting to note that the EMRPC is not part of the transportation planning process outlined earlier in this chapter.

The General Municipal Plan establishes policies on how growth will be accommodated within the City and develops strategies on how much growth will occur, where it will occur, and when and what types of support services must be provided.

The district level plans for growth and development in specific areas or neighborhoods of a district are based on the constraints and opportunities within a number of neighborhoods. Area redevelopment Plans and Area Structure Plans are the fourth level of detail which identifies the design of roadways, traffic circulation, and the local distribution of land uses by intensity.

The fifth and final level of detail is the site plan which considers such factors as placement of buildings, parking, walkways, etc. The 1981 General Municipal Plan explains the reasoning behind this system:

The purpose of such a system of plans is to work down, in gradually increasing detail, to guidelines for development on specific sites. Ideally, each plan would inter-mesh by implementing the policies of the broader plan preceding it and by establishing more refined policy direction for the detailed plan to follow. (GMP;1981;3.2)

A departure from the more 'traditional' planning process is the use of district level planning which is intended to bridge the
gap between the GMP and neighborhood planning thereby providing a better context for the application of general planning policies and a more equitable basis on which neighborhood planning issues can be resolved. (GMP;1981;3.4)

However, there is a cost associated with this additional level of planning which is noted in the General Plan:

Such an approach, however, would lengthen the overall planning process and impose additional public and private costs which would not serve to meet the immediacy of detailed planning for the purpose of creating certainty in public policy. (GMP;1981;3.4)

The GMP therefore suggests that in developed areas of the city, district plans will be used in place of neighborhood plans with a qualifying factor with respect to LRT stations:

It is recognized that situations may arise where area or site specific land use plans may be desirable in developed areas of the city to account for factors such as building height and massing relationships. An example where such specific land use plans may be required is in planning proposals for light rail transit station areas. (GMP;1981;3.4)

Integration of the transportation and land use planning processes is the responsibility of the corporate planning office. The primary means of accomplishing its task is through the annual preparation of a five year forecast and budget. Hence, the corporate planning office performs a matrix management function - linking line departments through cross fertilized issues. The office is as a monitoring agency ensuring that policies and programs are consistent with corporate direction from council.

The foregoing review shows that the planning process in Edmonton follows the traditional methods of interaction and plan
development. It was further pointed out that the transportation planning process and the land use planning process operate relatively independent from one another whereby the transportation administration is in an advisory capacity to the land use planning process and vice-versa.

3. Strategy

The system of plans discussed in the previous section are the primary means of establishing and implementing strategies that relate to the development of LRT and Land-use. The Planning Act recognizes the Regional Plan as the plan to which all other plans must conform and hence to which all other strategies must conform. Hence the Edmonton Metropolitan Regional Plan, adopted in 1984, is the primary document in the hierarchy of plans.

The document is a blueprint for the physical development of the region over the next 20 to 25 years. The objectives of the plan as it relates to LRT are:

1. Regional growth to be centred in Edmonton as the dominant community in the region; and,

2. A land use pattern that allows for the provision of transportation and utility services in a way which reinforces the city-centred region concept. (EMR Plan;1984;13)

Hence, the Plans strategy is to maintain the City of Edmonton as the dominant community, promote balanced growth, and provide for the planned expansion of urban land use. The plan envisions the implementation of such a strategy through the development of local general plans.

The transportation strategy, on the other hand, is not seen as a regional responsibility, particularly with respect to the
development of LRT. In fact, a policy paper on public transporta-
tion policy was clarified by stating:

The policy statements relating to municipally
owned and operated public transit systems were
qualified to accommodate concern that the com-
mission should not 'dictate the design and location
of future rapid transit terminals'.

(EMRPC Policy Paper #11;1977;49)

Therefore, the primary responsibility for the development and
implementation of strategies with respect to LRT and land use is at the local level in Edmonton through the General Municipal Plan.

Adopted in 1981, the GMP sets out the the goals, objectives, and the policy and program commitments required to achieve the objectives. The GMP was designed for a 15 year growth period with the strategies intended to be accomplished in that time frame. The Plan's strategy was a reversal from the 1971 GMP which advocated a continuance in the prevailing trends of suburban and regional growth and expansion.

Such a philosophy was criticized for its lack of imagination:

The suburbs are being criticized for contributing to sprawl, for being monotonous and lacking innovation, for inappropriate mixing of apartments, town houses, and single family dwellings, for contributing to high housing prices. (GMP;1981;2)

The 1971 plan was also criticized for failing to integrate new development into established neighborhoods and exerting pressure on local services. Should this trend have been allowed to continue, the 1981 Plan argued that the City would run out of residential land by 1991.

In assessing these implications, the 1981 Plan adopted a concentrated growth strategy which emphasized the role of LRT
in redirecting growth within the City. An 18 point growth strategy was formulated which emphasized the role of public transit:

* Increasing compactness of residential development;
* Priority upon existing developed areas;
* A viable, strong downtown;
* Office decentralization to town centres and LRT stations;

LRT was singled out as playing an important role in implementing the strategy:

* Office decentralization would be achieved through the upzoning in key locations along major transportation routes such as LRT stations. (GMP;1981;2.5)
* Energy conservation in land use and transportation planning by emphasizing public transit. (GMP;1981:2.5)
* Council commitment to directing growth around transit corridors/nodes in advance of service. (GMP;1981;2.6)

An assessment of the individual policies that specifically relate to LRT and the development of adjacent land uses will help to determine just how successful the concentrated growth strategy has been to date.

**Residential Policies**

**Policy 5.B.5**

The City will, as part of the District Planning process, assess the feasibility and desirability of establishing 'density nodes', or concentrations of higher density residential development, adjacent to or as part of activity centres. Activity centers will be highly accessible by private automobile
and public transit and in particular, will be the location of major public transit transfer points and existing or proposed commercial retail and office development.

Discussion:

As pointed out in Volume II of the General Plan, the tendency for activities to concentrate around points of high accessibility is desirable and can be used to strengthen the implementation of decentralization and transportation efficiency objectives. The plan states that to achieve such an objective, areas selected for higher density must be related to high access points i.e. activity centres or transit transfer points.

Assessment:

Although the 1981 local policy plan suggested that the district planning process would be implemented in 1981, the process is well behind schedule. Therefore, the connection between District Planning and the feasibility of establishing density nodes remains in the planning stages.

However, a number of planning documents have supported the concept of high density nodal development including the GMP, The Northeast Light Rapid Transit Study, and the area redevelopment plans that have been approved along the rapid transit corridor.

Commissioned in 1977, the Northeast Light Rapid Transit Study assessed the environmental impacts, site suitabilities for redevelopment, and land use considerations of the LRT system. The information and recommendations from the study were used in developing the policies and strategies in the GMP as well as the area redevelopment plans for the Belvedere, Coliseum, and Stadium stations.
The NELRTS study advocated a nodal concept for higher density residential and commercial development immediately adjacent to the transit stations with the gradual scaling down of densities as distance from the station increased. This concept was reaffirmed with the approval of the Belvedere, Stadium, and Coliseum station ARP's. All three plans advocated mixed-use development with the highest densities closest to the station with progressively lower densities in the surrounding blocks.

The concept of nodal development has been consistently endorsed throughout the planning process. However, the implementation of the concept has been less than satisfactory. No nodal development has occurred to date in any of the station areas as envisaged in the planning documents. Evidence of this has been the lack of any population increase in the NELRT plan area. In fact, since 1978, (the same year that LRT was introduced), there has been a consistent decline in the level of population in the LRT plan area as shown in the following table.
Table 3

<table>
<thead>
<tr>
<th>YEAR</th>
<th>POPULATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1978</td>
<td>59,972</td>
</tr>
<tr>
<td>1979</td>
<td>57,510</td>
</tr>
<tr>
<td>1980</td>
<td>56,756</td>
</tr>
<tr>
<td>1981</td>
<td>56,740</td>
</tr>
<tr>
<td>1982</td>
<td>56,393</td>
</tr>
<tr>
<td>1983</td>
<td>53,720</td>
</tr>
</tbody>
</table>

Source: City of Edmonton Planning Department

Policy 5.B.6(a)

The City will use the following density guidelines in establishing density nodes:

an increase in the density of development should be limited to a radius of 365 m. (1,200 feet) or 3 blocks, whichever is greater, from the center of a light rail transit station.

Discussion:

The General Plan states that the guidelines have been set to encourage an integration between the density node and surrounding areas. The concept of transitional development is used as a means of integrating the development into the area. With a maximum proposed density of 325 units per residential hectare (131.5 units per acre), LRT station nodes have the highest potential densities outside the CBD in Edmonton.

Assessment:

Substantial increases in the housing densities are envisaged in the Coliseum and Stadium station areas. The following table, taken from the Coliseum/Stadium background report outlines the existing number of units by neighborhood and, based on the proposed density increases, the maximum number of units that are anticipated.
Table 4
Densities Adjacent to LRT Stations

<table>
<thead>
<tr>
<th>Housing Type</th>
<th>Coliseum Station ARP</th>
<th>Stadium Station ARP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Existing</td>
<td>Max</td>
</tr>
<tr>
<td>Low-rise Units</td>
<td>195</td>
<td>699</td>
</tr>
<tr>
<td>Medium-rise Units</td>
<td>-</td>
<td>600</td>
</tr>
<tr>
<td>High-rise Units</td>
<td>-</td>
<td>3,279</td>
</tr>
<tr>
<td>TOTALS</td>
<td>195</td>
<td>4,578</td>
</tr>
</tbody>
</table>

Source: Coliseum/Stadium ARP Background Report; 1983

The background report states that the maximum projected unit increase is the ultimate number that could occur under total redevelopment as permitted under the land use bylaw:

In reality, this would not likely take place due to the economic situation and viability of existing buildings. The probable maximum listed above is a more realistic total, based on the likelihood of development on each parcel within the plan area, and taking existing uses into account.

(Coliseum/Stadium ARP; 1983; 27)

The following map outlines the development activity in the Coliseum and Stadium plan areas. New construction has been of the small scale and not directly adjacent to the LRT stations where the higher densities are permitted. The substantially higher densities simply have not been sufficient incentive to warrant redevelopment.
Figure 21
Development Activity Adjacent to Coliseum/Stadium Stations

Source: City of Edmonton; Coliseum/Stadium ARP; 1983.
Commercial Policies

Policy 6.A.2

Decentralized growth will be directed to locations which have high accessibility not only by private automobile, but also by public transit, preferably express bus routes or light rail transit lines.

Discussion:

Three problems commonly associated with decentralized office space are poor accessibility by transit, the lack of amenities and shopping opportunities for employees, and poor connections with the downtown. Therefore, decentralized office development should be directed as much as possible to locations where these problems are minimized. (GMP; 1981; 6.12)

Assessment:
The ARP's covering the areas have done so by proposing the inclusion of office development immediately adjacent to the stations (See figure 22)
Illustration 7
High Density Development
Near Coliseum LRT Station

Illustration 8
High Density Development
Near Stadium LRT Station

Figure 22
Proposed Mixed-use Development adjacent to LRT Stations

Source: City of Edmonton; Coliseum/Stadium ARP; 1983

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It is proposed that such development would be part of a mixed use comprehensive development which includes residential, commercial, transit and parking uses. In other words, office decentralization will not occur unless a project the size envisaged by the ARP is proposed. Since there has been no development of this nature to date, the implementation of this policy has not occurred.

Policy 6.A.7

The City will endeavor to identify possible incentives for office decentralization, through ongoing liaison with the development liaison committee and other interested groups.

Discussion:
Ongoing liaison will enable more sensitive and efficient implementation of the strategy.

Assessment:
Although there was informal discussions with the Edmonton chapter of the Urban Development Institute, there was no formal development liaison committee. Clearly a process-oriented measure that was identified in the GMP as a necessity for implementation which was never instituted.

Policy 6.A.8

The City will advise the Provincial Government of the City's strategy regarding office distribution and encourage the Provincial Government to assist in implementing this strategy.

Discussion:
If the Province accommodates part of its future office space requirements at locations outside the Downtown, it will give a major impetus to the City's office decentralization strategy.
Assessment:

Although seen as a means of providing the necessary 'impetus' in achieving the city's policy and strategy with respect to office decentralization, the planner's associated with the development of the ARP's adjacent to the NELRT line are unaware of any lobby effort to encourage provincial office development in the NELRT corridor. There has been no provincial office development within the corridor to date.

Policy 6.E.1

The City will encourage the development of planning town centers in new suburban areas and will combine the following uses and facilities:

v) a transit centre which acts as a focus for local feeder bus routes and provides direct connections to the downtown and/or other major activity centers by light rail transit, trolley, or express bus routes.

Discussion:

The provision of a transit centre is important in order to cope effectively with the large number of trips generated by the retail, office, and housing components of the centre. Using the centre as a transfer point will enhance its importance within the district.(GMP;1981;6.24)

Assessment:

In February, 1979, a master plan for the Clareview Town Centre was commissioned. It was proposed that the NELRT system would ultimately end at this town centre. With respect to the joint development of land use and LRT, the centre was touted as:
...the first 'seed' project in the City of Edmonton. It provides all of the uses suggested for such a centre in the North East Corridor Study. As such, the project is well timed to serve as an example of good transit oriented development in the future. (Clareview Town Centre;1979;4)

The Town Centre proposal established the transit centre as the hub of the development:

To accomplish this, a mixed use centre has been located over the LRT station. This centre will include regional shopping facilities, offices, a hotel, and high density housing. (CTC;1979;26)

Figure 23
The Clareview Town Centre Concept

Source: City of Edmonton; Clareview Town Centre Master Plan;1979.

The city administration fully supported the project which
provided for an integrated development with compatible land uses with a transition in density away from the transit station. Unfortunately, the Town Centre has yet to develop with little commitment by the developers to date. Moreover, there has been little shown in the way of 'city encouragement' to date other than the construction of the LRT line to the town centre site.

Policy 6.F.3

The development of medium to high intensity office nodes outside the Downtown will be subject to required accessibility by transit. The proposed development must be within five minutes walk of an approved transit centre or a potential LRT station along one of the alignments approved in principle by City Council for long-term extension of the LRT network; with the feasibility of a station to serve the proposed development to be assessed in detail by the City at the time of application.

Discussion:

The priority upon areas with direct access to transit centres of LRT stations is intended to increase the ridership on the transit system and maximize the accessibility of employment opportunities. The opportunity for intensive development in an LRT corridor before the alignment and station areas have been finalized allows for the construction of developments which will contribute to the feasibility of LRT extensions. (GMP;1981;6.32)

Policy 6.F.5

Approval for the development of a medium to high intensity office node which is outside the Downtown but is not part of a planned town centre will be contingent upon the approval or amendment; as the case may be, of an area structure plan, area
redevelopment plan, or outline plan.

Discussion:

The approval of a statutory plan is necessary as part of the review process for development of this intensity. The requirement will not lengthen the review period; since the development of these employment nodes will require re-zonings in any case which can be processed concurrently with the statutory plan.

Assessment:

Two somewhat contradictory policy statements, two points raised in the discussion sections are worthy of further discussion. The discussion with respect to policy 6.F.3 suggests that the City would permit intensive development in the vicinity of the LRT corridor before the alignment and station areas had been finalized which the GMP maintained would "contribute to the feasibility of LRT extensions" (GMP;1981:6.32) This clearly has not occurred. In 1976, City Council imposed a zoning freeze on all residential communities and industrial areas adjacent to the LRT line until land use planning recommendations could be formulated through the ARP process.

The City was willing to lift the freeze however, two processes had to occur; the applicant must first receive city council's approval to lift the zoning freeze and second, if the applicant receives approval to lift the freeze, they would apply to rezone through the standard redistricting process. A lifting of the freeze does not automatically result in approval at the second phase. The risks and costs in both time and money to the developer are obvious disincentives:
The redistricting freeze has created a disincentive for redevelopment to occur and therefore the number of approved developments is less than what may have otherwise been the case.

(Coliseum/Stadium ARP;1983;25)

A second disincentive is the planning process itself. The notion that a rezoning application and the approval of a statutory plan could be processed concurrently as suggested in the discussion of policy 6.F.5 does not happen. A rezoning — without a zoning freeze, generally takes from 8 - 12 weeks to receive approval. The area redevelopment plans, specifically the Coliseum and Stadium plans where redevelopment potential is greatest took nearly six years from the time council authorized their preparation (1978) to the effective date of approval (1983). These disencentives helped create a less than positive development climate —a factor that has tremendous influence in the decision making process of the development industry.

Transportation

The introduction to the transportation strategy section states:

As part of the total urban system, land use and transportation are inextricably inter-related, with changes on one component having definite implications upon the other. The existence and type of transportation facilities play important roles in determining the attractiveness of areas for development and, hence, may cause a shift in activity patterns or affect the city's overall patterns of growth.

(GMP;1981;8.1)

The plan goes on to state that a key component to the growth strategy is public transit:

In the case of the Edmonton General Municipal Plan, the growth strategy was developed with the objective of enhancing the utility and efficiency of the transportation system, in particular, emphasizing the transit components of the system. Although it is recognized the most effective transportation system is an integrated system which provides for the use
of each mode where it is most efficient, a strong emphasis on transit is essential if the types of goals for the urban system envisaged in the growth strategy are to be achieved. Moreover, the land use implications of the transit system - in particular, compactness of residential development, continued support for a viable downtown and the focussing of development towards the transit network - are more desirable than the land use implications of a lower density, dispersed strategy which encourages the use of the automobile. (GMP;1981;8.1)

Hence, the transportation system, and in particular, public transit, plays a particular role in implementing the growth strategy of the general plan.

Policy 8.A.1

The City will develop a transportation system plan which determines the most efficient use of resources to accommodate the travel demands generated by the growth strategy.

Discussion:

Given that the City has a limited source of funds to undertake transportation system extensions and improvements, the Transportation Systems Plan must identify and give priority to those extensions which are the most efficient in serving the travel demands generated by the land use pattern and are the most cost-effective from an economic, social, environmental and service perspective.

Assessment:

The Transportation plan has never been officially adopted by City Council. The idea of developing a 10 and 20 year transportation plan complete with a chosen strategy and means of coordination with land use has literally been shelved. Rather, a 5 year transportation program was approved by Council in 1985. The 'program' is essentially a 5 year capital works program which
through the identification of capital works projects and priorities, could be construed as an implicit policy statement. The document identifies LRT as the major object of capital construction over the next five years. However, there is no formal planning document that integrates the capital works program with other civic objectives.

Policy 8.D.3

The City will strive to develop land use plans for existing communities which minimize conflicts between community activities and approved transportation facilities.

Discussion:

The land use configuration should be such that those uses requiring high accessibility or generating high demands for transportation facilities should be located adjacent to the arterial roadway network and transit focal points. Conversely, low density residential uses or other uses sensitive to transportation impacts should be situated in the interior of neighborhoods. Developing land use plans in this manner should minimize the impacts of transportation upon adjacent land uses and should maximize accessibility to the transportation system with a minimum of conflict.

Assessment:

The original Coliseum and Stadium station ARP's contained objectives for roadway circulation which would require a restructuring of the Northeast arterial roadway system such that traffic would be re-routed to the periphery of neighborhoods.

However, the roadway network analysis undertaken by the
Transportation Systems Design department indicated that the roadway objectives as proposed could not be implemented at the present time because of levels of congestion in certain components of the arterial roadway system. (This issue was one of the underlying factors that lengthened the plan approval process to six years) (Coliseum/Stadium ARP Background Report:1983)

As a result, the plan was amended thereby retaining the existing arterial roadway system with the original objectives to be given future consideration. Policy 8.D.3, which was a clear attempt at coordinating the development of land use and transportation has received little support at the ARP level in the North east rapid transit corridor.

Parks and Recreation

The General Plan identified the lack of adequate provision for open space in the inner city as a critical issue in the redevelopment to higher densities in association with the implementation of LRT:

The trend towards higher density redevelopment is placing more pressure on existing limited facilities, and the high cost of land requires the expenditure of considerable funds to acquire land for even a small park. Given high land costs, shortages of suitable available land, and higher density redevelopment pressures, it will be exceedingly difficult to alleviate this problem. (GMP;1981;10.4)

The strategy to compensate for the lack of open space is stated in the following policy:

Policy 10.A.4

The City will impose a redevelopment levy to assist in the acquisition of land for parks and schools in areas undergoing redevelopment within the City through the adoption of Area
Redevelopment Plan by-laws.

Discussion:

The Planning Act, 1977, provides for the imposition of a redevelopment levy in areas undergoing redevelopment, as a means of collecting funds for the acquisition of land for parks, schools, and new or expanded recreational facilities. By altering the original development to higher density, there will be a need to offset the loss of private amenities. The levy can only be imposed upon adoption by council of an area redevelopment plan.

Assessment:

The Planning Act provides the legislative authority for council to impose a redevelopment levy where an area redevelopment plan has been adopted by bylaw. The provisions of the Act provides council with the authority to establish such levy to classes of land uses within the redevelopment area as council deems necessary. (Redevelopment Levy Policy Paper; 1981)

The purpose of the levy is to create a source of funds to acquire land for recreation or school purposes where it is anticipated that the provision of higher densities will result in the increased need for open space and related amenities. The levy rate structure was set at $800 per dwelling unit and $9 per square meter on commercial, industrial, or office development.

On the positive side, the levy serves to reduce the deficiency of parkland in some neighborhoods or districts of the city as identified in the Parks Master Plan and also provides capital for new schools where increased student populations is forecast.

However, with respect to the development industry, the negatives far outweighed the benifits. The levy was seen as an added
cost to development that simply could not be afforded. Implementing and administering the policy was uncertain as was the effectiveness of such a policy. The rate in the bylaw simply was not enough to cover the land acquisition costs even though it had a major impact on the cost of the project. Generally speaking, a commercial development of 1,000,000 sq. ft. would be required to pay a levy of $1,000,000.

The levy was included in both the Coliseum and Stadium area redevelopment plan bylaws. The development industry's reaction was 'shock', 'unbelievable', and 'outrage'. (Edmonton Journal; 1981) Moreover, the redevelopment levy was a major reason for the implementation of the zoning freeze - another disincentive to redevelopment. Since the levy could not be collected until an adopted ARP was in place and the city did not want to lose out on any contributors to the fund the zoning freeze continued for the duration of the plan approval process - nearly six years.

Finally, in 1984, council withdrew the redevelopment levy. However, the damage had already been done - a contributing factor to the lack of redevelopment adjacent to the NELRT system.

Implementation

The General Plan states that implementation and monitoring are essential factors throughout the planning process, "A General Plan, by itself, cannot be meaningful or effective if its policies are not implemented and monitored." (GMP; 1981; 15.1)

The GMP identifies a number of mechanisms that will be utilized to implement the policy directives including; the land use bylaw,
area structure/redevelopment plans, subdivision planning, and the local policy plan. The following policies deal specifically with implementation and co-ordination.

Policy 17.A.2

The City will establish the General Municipal Plan Implementation Program to coordinate, in conjunction with the Corporate Policy Planning office, the delegation of responsibility to program managers to implement the policies of the General Municipal Plan.

Discussion:

The GMP Implementation Program, together with the Corporate Policy Planning office, will help to maintain continuity between the GMP and directives to specific departments regarding requirements, to ensure appropriate and thorough programs are established. (GMP; 1981; 15.3)

Assessment:

Discussions with city planners responsible for the ARP's adjacent to the LRT line indicates that no formal implementation program was instituted. Moreover, the Corporate Policy Planning Office and its directives through the local policy plan, were intended to provide the coordinative role within and between line departments. However, the Office and policy plan was disbanded in 1984 leaving a major gap in the coordination of GMP directives and the continuity of programs at the departmental level.

Policy 17.A.3

Specifically, the City will also establish the following new programs:

a) District Planning Program;
b) Development Industry Liaison Committee; and,
c) General Municipal Plan Monitoring Program.

Discussion:

The District Planning Program is intended to bridge the gap between new and old areas of the City and will enable special programs and projects such as LRT to be effectively implemented.

Assessment:

The district planning program appears to be taking the same route as the ARP's. The Planning Department has been working on the program since 1982 without formal approval by council. It is estimated that another two years will have lapsed before the district program is implemented.

The role of the Development Industry Liaison Committee is central to the implementation of the Growth Strategy. Formal consultation with the development industry from the outset of detailed land use policy formulation can ensure support of the business sector in meeting municipal objectives.

Assessment:

As stated earlier, the Urban Development Institute was informally associated with the planning process of the coliseum/stadium ARP's, however, no formal 'Development Industry Liaison Committee' was ever established—another process-oriented means of coordination that was never fully implemented.

The General Plan Monitoring Program is a means to maintain the plan's relevance. The program was to become the responsibility of a branch of the planning department. It was further suggested the analytical and evaluation function would be
presented as an annual report to council.

Assessment:

Although formally included as one of the responsibilities of the long-range planning branch, the plan has yet to see any amendments even though the implementation of its concentrated growth strategy has been less than a success story.

To summarize, the 1981 plan was critical of the 1971 GMP "go with the flow" strategy whereby the city would continue to expand outwards into the suburban areas. Hence, with the opportunity to utilize LRT as an impetus for inner city redevelopment, the plan advocated a concentrated growth strategy whereby the downtown would maintain its dominance with nodal points developing at major transportation access points such as LRT stations. However, a review of the population and housing trends indicates that the rate of increase in the suburbs has actually increased similar to what was proposed in the 1971 plan.

Moreover, the policies that relate to the development of LRT and the coordination of land use and transportation have been ineffective. There has been no visible signs of redevelopment along the NELRT alignment. Although market and economic conditions, among others, have an impact on whether development will occur, the Edmonton experience suggests that the institutional framework also has an impact on the success of implementing larger societal goals (i.e. compact growth). Some of the most noticeable factors include: a reactive planning process, the introduction of disincentives, and the lack of formal mechanisms to implement new strategies and technologies.

Summary
The City of Edmonton is a dominant industrial, financial, and institutional centre for western Canada. With nearly a billion dollar annual budget due to the ownership of major utilities, the City has one of the largest bureaucracies in the country, certainly the largest in relation to the population it serves. The Planning Department alone employs in excess of 200 full-time employees.

The City has always emphasized the role of public transit in the transportation system. However, it wasn't until the introduction of Light Rail Transit in 1978 that public transit was seen as a means of shaping urban growth in Edmonton.

The institutional framework is typically bureaucratic with civic responsibilities divided into functional 'product' lines with established lines of authority. Although the Province is the primary funding source for LRT, the framework is decentralized to the point that the City is responsible for developing and managing transportation and land use considerations. The Edmonton Metropolitan Regional Planning Commission plays a minor role in the development of land use policy but has virtually no input in the development of LRT.

The planning process is characterized by the more traditional forms such as hierarchy of authority, rules, goal-setting, and direct contact. The introduction of LRT had little impact on the existing structure and process in Edmonton. LRT was simply 'added' to the existing system and incorporated into the mandates of specific departments.

The primary changes to the institutional framework occurred at
the strategy level where LRT was seen as a catalyst in redirecting growth into the inner city thereby implementing the concentrated growth strategy as envisaged in the 1981 General Municipal Plan. In assessing the policy statements that relate to LRT, it is obvious the Plan has been ineffective in implementing this growth strategy.

In fact, inner city populations immediately adjacent to LRT have actually declined since 1978 while the suburbs have consistently increased their share of the City's population. Institutional factors that have contributed to this lacklustre performance include:

1. The District planning process has yet to be implemented;
2. The local policy plan was disbanded after the 1981 draft;
3. A reactive planning process for land use and transportation that took nearly six years to complete after the introduction of LRT;
4. The Clareview Town Center has yet to develop;
5. Other than increases in density and the acquisition of lands adjacent to the LRT stations, there has been no incentives available for development adjacent to the LRT line.
6. The Development Liaison Committee was never formally established;
7. The introduction of disincentives such as the rezoning freeze and the redevelopment levy;
8. No formal adoption of a transportation plan and related process and strategy.
9. The lack of a formal implementation or monitoring system.

Clearly the environment that has developed over the past 8
years since the opening of LRT has been less than positive and has inhibited the co-ordination of land use and LRT.

The following chapter applies the model developed in chapter 4 to the City of Edmonton case study to identify proposed measures to be taken by senior public management and personnel in obtaining a more efficient and effective use of Edmonton's LRT system.
CHAPTER 6
APPLICATION OF THE INSTITUTIONAL INTEGRATION MODEL

The model depicted in chapter 4 maintained that a proper 'fit' between the environment, structure, process and strategy was necessary in order to effectively implement societal goals and objectives. It was further argued that one cannot successfully co-ordinate the development of land use adjacent to light rapid transit without compensating, reinforcing changes to the process and structure. The underlying question is how does one determine when change is required and what type of integrative mechanisms are appropriate?

It was suggested that the planner must address these questions through a rational decision making process combined with a diagnostic tool commonly referred to as organizational development. This chapter presents a practical application of the model of institutional integration by examining the implications of the case study discussed in chapter 5.

Assessing the Problem

In reviewing the City of Edmonton case study, it is evident that the introduction of LRT was seen as a means of accomplishing larger societal goals. The city's 1981 General Municipal Plan adopted a concentrated growth strategy which emphasized the role of LRT in redirecting growth to 'nodal points' along the transit corridor. This strategy was a reversal from the one advocated in the 1971 General Plan which promoted the continued growth and expansion of the city's suburbs. Hence a major strategic change had accompanied the introduction of LRT in Edmonton.
In so doing, a number of policy directives were established. In assessing these directives, it is concluded that the planning process had been ineffective in implementing the growth strategy. Population has continued to increase at an accelerated rate in the suburbs while inner city population continues to decline. Moreover, there has been no noticeable signs of redevelopment along the rapid transit corridor, particularly at the scale proposed in the redevelopment plans. Some of the more noticeable factors identified include: a reactive planning process, the implementation of disincentives, the lack of development incentives, lack of communication among the departments responsible for land use and transportation planning, and the lack of formal mechanisms to implement the new strategies and technology. Furthermore, there was no evidence that the introduction of LRT in 1978 had any noticeable impact on the institutional framework that existed at that time. LRT was merely added to the organization and physical infrastructure like any other transportation project.

In assessing the situation, it appears the city emphasized the substantive aspects of the planning process i.e. financing, modal choice, location of services, and operations performance. To this end, Edmonton's LRT system was successful. The line was implemented on time and within budget.

The problems that have surfaced over the past eight years appear to have stemmed from the procedural aspects of the planning process i.e. organizational structure, strategy, process, and forums for interaction - or lack thereof. There is a clear
problem of 'fit' between the organizational components.

Although market conditions, among other things, has had an impact on development activity the lack of institutional integration has affected the development potential adjacent to LRT and ultimately the effectiveness in achieving the city's growth strategy.

In reviewing the 'organizational health' of the city i.e. ability to adapt and react, Edmonton appears to have emphasized organizational efficiency (operations performance, budgeting etc.) over organizational effectiveness (achieving goals and objectives). As discussed previously, efficiency should only be a contributing factor towards an effective organization.

Environmental Assessment

Conclusions drawn from the previous chapters suggests that the best way to organize for land use and LRT is to determine the amount or level of uncertainty and diversity within the environment. The design problem is to identify and implement the integrative mechanisms which can cope with this level of uncertainty and diversity.

Economic

Since 1973, industrialized nations, including Canada, have been experiencing economic difficulty in coping with periods of high inflation and recession. In the period from 1973 to 1981, oil prices were rising and Alberta's economy grew at a rapid rate. Although this period meant growth and prosperity for Alberta, in Canada, both the private and public sectors were increasingly concerned with the uncertainty and instability associated with this inflationary period.
To compensate for this uncertainty, the National Energy Policy was introduced in 1980 as a means of reducing the upward spiral of oil prices. This program, which lasted until 1984, had a major impact on the petroleum-producing sectors of the country and effectively eliminated exploration and research around the Edmonton region.

More recently, the sharp decline in the price per barrel of oil to a low of $9.00 in 1985/86 has compounded the economic uncertainty of the petroleum industry.

Unemployment rates continue to hover around 10% in Alberta, and with a loss in oil revenues, the government has lost its triple 'A' borrowing rating. Recent economic forecasts indicate that this economic climate of uncertainty will continue at least until 1992 with modest economic performance, relatively low oil prices, and moderate unemployment rates of 10 to 12% (Edmonton Planning Department; 1987)

Political Assessment

The greatest challenge at the Federal and Provincial levels continues to be the lack of a formal energy program and policy that will induce the economic recovery of this key sector of the Alberta economy. Although the NEP was officially terminated in 1985, no new programs have been introduced at the Federal level to further stimulate the petroleum industry.

The Federal decision to reevaluate its commitment in supporting the Husky Oil Bi-provincial upgrader in Lloydminster and its lack of financial support for the Syncrude Tar Sands project reflects the Federal Governments position regarding long-term energy self
At the Provincial level, the Progressive Conservative party has dominated the Alberta political scene for the past two decades. This long term mandate should help to add stability to an otherwise uncertain future. However, recent Federal and Provincial budget cuts add to the uncertainty of funding for LRT in the future.

At the local level, the City Commissioner form of local government was replaced by an executive committee of council in 1983. This new form of government is intended to place more of the decision making authority with elected officials. A City Manager was hired in 1985 with the optimism that a more effective and efficient legislative and administrative organization will develop. However, there have been no major changes to the organizational framework at the departmental level.

Taking the period of LRT as a whole (1978-1986), the most striking feature has been the increased complexity within which the organization must operate. The investment climate has been less than positive. High interest rates, land costs, and construction costs has increased the level of risk associated with the development of large scale projects in Edmonton.

The physical characteristics of northeast Edmonton has also had an impact. The line developed along and existing rail right-of-way which historically had served the industry in the area. As a result, the corridor is virtually undeveloped. The immediate population base is a nominal 50,000+, hardly the trade area required to support major commercial developments.

Community support has been less than enthusiastic as shown in
the following articles:

   Alderman Buck Olsen discusses the lack of ridership.

   "There's nothing in those plans to encourage a developer to go out there"

   Lack of funding and confusion over location of next alignment.

   referring to redevelopment levy imposed on land adjacent to the LRT line.

5. "We don't Need an Overgrown Street-car System"
   Edmonton Journal; 1982

The lack of certainty regarding route alignments and the apparent lack of support from alderman, editorialists, and developers has resulted in only moderate community support for the project.

Perhaps the most crucial factor has been the uncertainty surrounding long-term financing of the LRT project. The initial five year program was 100% provincially funded. In 1984, the provincial contribution dropped to 75% and, a recent article in the Alberta Report suggests the province may further reduce its contribution to the project given a projected provincial deficit of nearly 4 billion dollars in 1987:

This naturally implied major cuts in transportation spending. Transportation Minister J. Allen Adair, for instance, did not deny that expansion of Edmonton's one-legged LRT system might be stopped.

(Alberta Report; 1986: 4)
Commitment to funding has plagued the project since its inception. In 1979, the province requested a study of the Rapid Transits performance to date before any additional provincial funds would be considered. (Edmonton Journal; 1979; B1)

A 1981 article in Alberta Report typified the uncertainty regarding a provincial commitment to the project:

The unresolved debate in both Edmonton and Calgary about future LRT expansion has left provincial authorities leery about funding commitments. In the legislature last week Eric Musgreave (PC, Calgary-McKnight) sounded an ominous warning: 'If local politicians want to bankrupt the system, that's their prerogative. But I think we should make it clear we're not going to bail them out.

(Alberta Report; 1981; 22)

A 1982 article titled "Looks Like the End of the Line For LRT", echoed the same sentiment at the local level:

As in Edmonton, where southward extension of the LRT is on hold, Calgary cannot afford to proceed either a southern addition or a proposed northwest route. The problem in both cities is a lack of money. (Alberta Report; 1982; 14)

Trends

A recent report titled "Managing Urban Change" prepared by the long range planning branch of the Edmonton Planning Department, suggests that the economic prospects for Edmonton equate to two words - recession and slow recovery. A number of strategic issues were discussed in the report which will have an impact on growth and development in Edmonton to the year 1997.

The report projects an annual population growth rate of 1.3%, well below the 2.6% growth rate experienced between 1976 to 1981. It is suggested that this slower growth rate is attributed to an increase in out-migration with a corresponding decrease in in-migration. This in turn may result in the underutilization of

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existing facilities in Edmonton. Indicators of excess capacity are evident throughout the Edmonton economy:

* rental vacancy rates in excess of 4%;
* downtown office space vacancy rates in excess of 18%;
* serviced industrial land in excess of 970 Ha. (a 14 yr. supply);
* unemployment rates averaging 11.5% in 1986.

The report suggests that, "The slow population growth, combined with existing surpluses for many facilities suggests that new investment activity over 1987 to 1992 will remain below the boom year peaks" (Edmonton Long Range Planning Branch; 1987; 10)

Other key issues raised in the report that will compound the uncertainty regarding the potential for redevelopment in the LRT corridor are:

1. Market preference for single family housing will fuel suburban growth. Forecasts for housing starts to 1992 indicate the single family dwelling will account for 95% of the total. This emphasis on new residential development and investment will increase the disparity between old and new neighborhoods at the expense of the prevailing growth strategy of compact residential development.

2. Inner City population is expected to continue to decline during the period 1987 to 1992. The impact for mixed use development adjacent to LRT as proposed in the redevelopment plans is obvious- no population, no trade area, no trade area, no development activity.

The following points highlight the environmental impacts with
respect to the redevelopment of land use adjacent to LRT in Edmonton since its introduction in 1978:

* The uncertainty and risk associated with the petrochemical industry - the driving force in Edmonton's local economy.
* Periods of high unemployment, inflation and interest rates.
* A period of rapid increases and decreases in the price of oil.
* A period of fiscal boom (1978-1984) and bust (1985-).
* The introduction of a technology never before implemented in North America.
* Moderate community support.
* Uncertainty regarding long-term funding commitments to LRT.
* Projections of continued recession and slow growth 1987-92.
* An oversupply of existing facilities in Edmonton; housing, industrial, and commercial space.
* The market preference for peripheral suburban development and single family housing.
* The continued decline of inner city population.

An assessment of these factors indicates an environment that is highly dynamic, constantly changing with a high degree of complexity, uncertainty, and risk, particularly with respect to the development of LRT. Moreover, a reduction in the level of uncertainty is unlikely for at least the next five years.

In fact, given the uncertainty regarding long-term funding, the institutional problems discussed above suggests LRT may be operating within a 'turbulent environment' where the lack of resources i.e. funding and knowledge may preclude the ability to achieve the City's goals and objectives. Introducing a techno-
logical innovation such as LRT in this type of environment merely adds confusion and ambiguity to the land use transportation subsystem and calls into question existing goals and objectives.

The institutional model would lead us to predict a need for more sophisticated integrative mechanisms to cope with the increased complexity and uncertainty associated with the introduction of an innovative technology and revised growth strategy. Furthermore, the longevity of LRT within the transportation system (extensions to the system are proposed well into the next century) suggests that a reorganization or 'fit' should be designed such that it takes on permanent qualities within the framework. Therefore a review of the organizational components is appropriate based on the impact that LRT has on the present institutional framework.

**Strategy**

Given Edmonton's commitment to reversing the trend in residential development by adopting a concentrated growth strategy using an unproven technology as the catalyst for redirecting growth during a period of high uncertainty, the model predicts that the use of joint development is required as one of its strategic initiatives. Such an approach uses land use and the transit station itself to develop a comprehensive, integrated facility. Air rights, ground leases, supportive zoning and land use planning, public land assembly, coordinated station locations and access, and development incentives are all required in order to create the most positive environment possible.

Hence, joint development is a specific strategic tool that
permits and realizes the potential of rapid transit station development as well as the overall growth strategies. In order to effectively implement joint development, supportive federal and provincial legislation may be required.

The strategic mechanisms for integrating land use and rapid transit in Edmonton were limited to supportive plans and policies. Even at this lowest level of integration there was evidence of a number of disincentives i.e. zoning freeze, redevelopment levy, and a planning process that took nearly six years to complete, and had an immediate impact on the development potential within the LRT corridor.

The City did, however, have supportive land use policies and had actively assembled lands adjacent to the LRT stations which provided the impetus for joint development. However, the lack of development incentives and institutional arrangements meant that instituting joint development was simply outside the scope of the existing institutional framework.

Process

The thesis maintains that successful strategic change requires compensating reinforcing changes to the process and structure. Given the emphasis of LRT in achieving the concentrated growth strategy, the model predicts the need for a higher degree of interdependence among those departments directly responsible for implementing the strategy. This leads to the need for cross-departmental process oriented mechanisms.

Given the permanence of LRT within the transportation system and the long term commitment to developing the adjacent land to higher density mixed-use developments, it is likely that the
organization would have moved towards permanent teams and integrated roles or departments in order to achieve strategic performance.

In Edmonton, the traditional process-oriented mechanisms such as hierarchy of authority, rules, goal setting, and direct contact were used before and after the introduction of LRT. There is no evidence to suggest that the higher forms of process-oriented mechanisms were ever attempted. In fact, the case study pointed out that the departments responsible for transportation and land use actually developed their own independent processes with only advisory or token input from the other.

The introduction of permanent teams or integrated roles would have certainly improved the communication between the two departments. The move towards these higher forms of integrative processes could have been transitional with liaison roles and temporary task force used during the initial phases of LRT, developing eventually into permanent teams within the framework. Once LRT had blended into the system and the concentrated growth strategy had been successfully implemented, the more traditional process-oriented mechanisms may be all that would be required.

Structure

A measure of the impact that LRT has had within the institutional framework can be examined by using Burke's matrix of scope and depth change presented in Chapter 3. The matrix measures the level of penetration into the system structure as well as the horizontal impact across the functional departments.

In Edmonton, LRT is part of the land use transportation sub
system and has penetrated into the fourth or local level of government. Since funding and authority are also at the local level, its horizontal impact is minimal, affecting primarily those departments responsible for land use and transportation i.e. Planning Department, Real Estate and Housing, Transportation Systems Design, and Edmonton Transit.

Since LRT affects only a subcomponent of the institutional framework, it cannot be classified as a revolutionary technology. It is revolutionary only to the departments that constitute the public transit/land use subsystem. Therefore, the model predict only minor changes to the organizational structure as a whole, with the primary focus of change within the land use/transportation subsystem.

Given the environmental conditions and the proposed changes to the strategy and process, the contingency model lead us to conclude that an alternative subsystem or development corporation should have been instituted in order to accomplish the concentrated growth strategy.

Since Edmonton maintains at least 50% of the total urban population and encompasses at least 50% of the total metropolitan land area, authority and funding should be the responsibility of the local government. Therefore, the development of an alternative subsystem or development corporation should be confined to the transportation/land use subsystem at the local level.

Such an entity would be responsible for the planning, coordination, and implementation of land use development and the LRT. The subsystem would ideally possess the necessary funding and authority including control over land uses and powers of
land assembly and development to ensure the successful implementation of the growth strategy. It is critical that this subsystem be initiated at the development stages of LRT to take full advantage of the integrative measures such as joint development.

In assessing the case study, the introduction of LRT had little impact on the organizational structure. The organization continued as a typical 'bureaucratic' structure characterized by structural functionalism whereby each department, branch, and section has specific responsibilities. LRT was simply added to the transportation network while the land use considerations were incorporated into the planning process.

Virtually all the factors that usually inhibit an alternative subsystem or development corporation from being adopted did not exist at the time LRT was introduced in Edmonton. The responsibility for funding and authority was at the local level, there were no overlapping jurisdictions boundaries since LRT was purely a local transit system, and the city had acquired virtually all the developable lands adjacent to the LRT stations. Therefore, the 'critical path' that developed through the application of the model may have been an effective means of implementing both LRT and the concentrated growth strategy since the impetus was already in place.

Summary

During the period prior to LRT, the City of Edmonton operated in a relatively stable, simple environment where the private automobile was the dominant form of transportation and the accompanying strategies emphasized suburban development and
investment in road construction.

Under these conditions, the model lead us to predict a relatively unsophisticated organization with traditional integrating mechanisms and a high degree of centralized decision making. There seems to be support for this prediction. The departments were functionally oriented with each department focusing on a single well-defined task. The need for interaction was therefore limited.

Integration was achieved primarily through supportive plans and policies, hierarchy of authority, rules and procedure, goal setting, and direct contact. Scrutiny of programs and projects was handled through the budgetary process.

Taking the period of development of LRT in Edmonton as a whole (1978-1986), the most striking feature has been the increased environmental complexity brought on by political, economic, and technological uncertainty. As we have seen, the contingency model of institutional integration traces organizational ineffectiveness to a mismatch between the design of the organization and its environment. Ineffectiveness appears to develop as a result of a failure to perceive and therefore react to environmental change. Such was the case with the City of Edmonton and its implementation of the LRT.

In the Edmonton case study it is also apparent that the institutional framework failed to address the needed changes to the process and structure in order to effectively implement the change in direction at the strategic level. The model predicts that given the dynamic and at times turbulent environment coupled with the city's commitment to a concentrated growth strategy, the
following organizational changes should have taken place:

**Strategy** - Use of Joint Development
- Development Incentives
- Supportive Plans and Policies

**Process** - Integrated roles/permanent teams
- Interdepartmental liaison roles

**Structure** - Development Corporation and/or Alternative Subsystem

The qualifying factor in implementing this list of mechanisms is cost. The environmental trends suggest that the City of Edmonton will continue to have high levels of environmental uncertainty coupled with growth trends that predict continued suburban growth and single family housing development coupled with a declining inner city population.

The City therefore has two options:

1. Revise the growth strategy to reflect the status quo and implement LRT simply as a means of moving people, or;

2. Develop LRT as a means in accomplishing broader societal goals such as efficient use of land and managed growth.

The cost-effective approach would favor the former while this thesis argues the latter. With the investment of hundreds of millions of dollars in capital improvements, a community should take advantage of its potential to improve the total urban environment. The cost of improving organizational health is minimal compared to the ultimate benefits. Clearly, the proposed integrative mechanisms should have been implemented prior to the opening of LRT in 1978. That does not, however, preclude them from being implemented under today's conditions. Their effectiveness however would not be as since most of the transportation infrastructure is in place.
Moreover, implementing the list of integrative mechanisms does not automatically guarantee that redevelopment will take place nor does it guarantee the City would be successful in implementing its concentrated growth strategy. Therefore, a critical phase in the planning process is the final step - monitoring.

A framework as complex and dynamic as the one proposed requires continual feedback. If the problem continues, a re-evaluation of the chosen and potential solutions is required. Therefore, it is essential to have a manager in place with the ability to monitor the progress to ensure that the organization is in balance and functioning properly. This involves building co-operation, trust, and resolving conflicts in order to maintain the coordinative measures required to ensure the process operates efficiently and effectively as possible. In the public organization such leadership may involve both council and senior levels of administration.

A critical role of management is monitoring and adapting to changes in the environment through continual evaluation of the organization's performance in achieving societal goals and objectives. The contingency model of institutional integration is designed to assist in unraveling this complex and dynamic process.
CHAPTER 7
OBSERVATIONS AND IMPLICATIONS FOR CHANGE

Summary

This study examined the theoretical and empirical relationship between land use and transportation in urban areas. The evidence supports the notion that land use and transportation are interrelated and impact virtually all aspects of urban life as such they should be planned and managed in a coordinated fashion. However, little attention has been given to the effects that the institutional framework has on these two activities.

The planning process has typically examined the land use/transportation relationship from a substantive point of view i.e. financing, modal choice, location of services, and operations performance with attempts to quantify an often intangible process.

The study concludes that the planning process should concentrate on the procedural aspects of the land use/transportation relationship such as organizational structure, process, and strategy, authority and responsibility, and forums for interaction since many of the issues raised are governmental.

The bureaucratic organization is the most typical organizational form in the public sector. This type of organization exemplifies structural functionalism. That is, each government within the structure has a different and specific task to perform. The result are separate lines of authority and communications systems. In fact, the evidence supports the argument that land use and transportation decisions are made largely indepen-
dent of each other. It was further noted that the bureaucratic organization is most effective when its environment is stable and unchanging.

However, a change in the environment as a result of political, social, economic, or technological change will have an impact on the performance of the organization. New technologies such as LRT often create new administrative problems which may require a new or at least modified structure and process.

It was argued that the ability of an organization to effectively implement innovative technologies is contingent upon the congruence or 'fit' among the components that constitute the institutional framework. Hence, integrative mechanisms provide the impetus in maintaining both an effective and efficient organization.

The study points out that there are a number of integrative mechanisms from which to choose, all having different impacts on the organization. A contingency model of institutional integration was developed that maintains there is no one best way of co-ordinating land use and the LRT but that all ways are not equally effective.

The 'choice' depends on what goals and objectives the organization is trying to achieve. The environment plays an essential part in determining which integrative mechanisms are required. An organization that operates within a stable, unchanging environment will not require elaborate and sophisticated forms of integration to accomplish its goals and objectives as one that is operating within a dynamic or turbulent environment.
Alternative paths are therefore possible depending upon the nature of the environment and the level of impact that the technological innovation has on the existing institutional framework.

The City of Edmonton's North East Light Rapid Transit system was used as a case study to test both the hypothesis and the practical application of the model. Its review indicates that LRT was seen as means of implementing a newly devised growth strategy that concentrated growth within the inner city and at 'nodal points' of high activity.

The City's organizational framework is typically bureaucratic and utilizes the traditional forms of integration. Moreover, the introduction of LRT had little impact on the institutional framework and had been simply added to the existing system. A critical examination of the growth strategy's lack of success points to a number of institutional factors that had inhibited the ability of the organization to achieve its objectives.

Given the complex and dynamic nature of the environment and the role of LRT in implementing the growth strategy, the model predicts the need for a number of sophisticated integrative mechanisms that, if instituted, could have created the positive environment required to successfully implement Edmonton's growth strategy. The study concluded that implementing any or all of the co-ordinative mechanisms does not necessarily guarantee an effective organizational structure. Effectiveness depends on constant monitoring of the design variables and in particular the environment such that the organization has the ability to adapt and react as required.
Implications for the Planner

The actual application and monitoring of such a process is in all likelihood the responsibility of senior administrative personnel and council and therefore outside the scope of the planners mandate. However, it is imperative that the planner understand and acknowledge this process so that the plans and strategies that are developed coincide with the resources that are available within the framework.

In the Edmonton case study a complete reversal in the philosophy of growth and development occurred with very little assessment of how that strategy would impact on the other organizational components. The result was a strategy with no means of implementation. In fact, the rate of growth in the suburbs has actually increased while inner city populations continued to decline and no redevelopment, particularly of the magnitude proposed by the planners is evident today. As a result, Edmonton's planning process has been scrutinized by administration, council, and the public for its lack of performance.

It is therefore suggested that a greater understanding and awareness of the impact that the institutional framework has on the planning process will create the effectiveness and performance that we, as planners should strive for.

Conclusion

It was suggested in two hypothesis that: 1) the nature of the institutional framework influences the effectiveness of land use planning along a transportation corridor, and 2) there are positive and negative components to any given institutional
framework for land use and transportation planning. It is possible to increase the positive and decrease or minimize the negative components in light of Edmonton's experience.

This study of organizational development through the use of integrative mechanisms has been developed from a managerial perspective. It has shown that the nature of the institutional framework can have an influence on the effectiveness of land use planning along a transportation corridor. Furthermore, by examining the land use/transportation relationship in this context, it is possible to identify the positive and negative aspects of the planning process. Moreover, any theoretical model of this framework must be able to cope with a highly dynamic, constantly changing process if it is to make a contribution to the field of organizational development in the public sector. In this respect, the contingency model appears to offer positive insight into complexity of organizational adaptation and change.

However, the approach still requires refinement. The public sector organization is but one component in the land use transportation subsystem. The private and household sectors, property owners, user groups, special interest groups, and society in general as described in figure 2, page 10 of this study all have an impact on the relationship in question. Any attempt to incorporate all of these factors is simply inviting frustration. So long as this remains the case, the ability of this approach to predict with complete certainty the absolute 'critical path' must be qualified.

As well, the model presents integrative mechanisms that have
been specifically designed to co-ordinate the development of land use and light rapid transit. A more generic format that co-ordinates land use and transportation in general may have practical applications and therefore warrents further study. For example, a generalized institutional model of integration may provide a community considering the co-ordination of land use and the introduction of a bus system the means of assessing the impacts on the institutional framework.

Accepting then, that the scope of this study has been limited, a final assessment of the practical application of the contingency approach to co-ordinating land use and LRT remains to be seen. However, in reviewing the case study it appears the approach has a lot to offer. Through its application, we have been able to:

1. Relate to the dynamic, complex relationships within the transportation/land use network.

2. Determine the positive and negative components within an existing institutional framework.

3. Relate certain integrative mechanisms to the level of environmental complexity.

4. Identify where environmental changes may actually reduce the effectiveness of an organization if corresponding changes to the organization are not implemented.

5. Explain how procedural aspects of the planning process can affect the outcome of proposed strategies.

6. Explain organizational ineffectiveness through the process of organizational 'fit'.

The contingency model of institutional integration is a means
of providing a framework for decision making at the level of organizational design. "Other factors", as always, will be significant in the final outcome. Nevertheless, the dynamic nature of the concept is capable of providing useful insight into the complexities of the co-ordinated development of land use and transportation.
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