THE PROVISION OF INFRASTRUCTURE IN NAGOYA

DURING THE 1990s

by

Noël Edward Genoway

B. A., University of Calgary, 1985

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

in

THE FACULTY OF GRADUATE STUDIES

(Department of Geography)

We accept this thesis as conforming to the required standard

THE UNIVERSITY OF BRITISH COLUMBIA

September 1999

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Department of Geography
The University of British Columbia
Vancouver, Canada

Date Sept. 29, 1999
Abstract

This thesis discusses changing priorities in urban infrastructure in Japanese cities especially due to emerging pressures such as 'internationalization', the shift to 'knowledge-intensive industries', and the search for a higher urban 'quality of life'. Case studies are presented of four major projects under way in metropolitan Nagoya during the early 1990s, which the author visited as part of field studies undertaken in 1994. These are:

1) The Chubu International Airport, a national infrastructure project;

2) The Aichi Cultural Center and the International Design Center Nagoya, address the issue of 'culture' and are regional infrastructure projects;

3) The Shidami Human Science City, which was designated in the 'City's New Basic Plan' as a priority project to upgrade the city's economic infrastructure.

The research findings suggest that in the 1990s, Nagoya was indeed moving towards a new urban development strategy based around these major infrastructure projects.
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Acknowledgments

I am deeply indebted to Professor David W. Edgington, my thesis supervisor, for his comprehensive guidance and his critical comments on my research proposal and detailed comments on my drafts. The completion of this thesis and my masters program would also not have been possible without the valuable support and wise guidance of Professor Tom Hutton. Their inspiration and encouragement were critical for me to complete my Masters work. My appreciation also goes to Catherine and Bill Griffiths for their helpful comments and editing earlier drafts of this thesis. In addition, I would like to thank all of my close friends here in Vancouver (especially, Chris, Dave, Paul, and Patricia) who provided me with friendship, moral support and hospitality that I needed in the course of writing this thesis.

I would also like to thank the many scholars and my previous colleagues in Japan for their advice, hospitality, and support for my fieldwork. In addition, my colleague at the Nagoya Center for Urban Advancement, Kiyotaka Hayashi, who allowed me to access many materials in my field research. He also provided introductions, which greatly facilitated data collection. I would also like to thank Yoichiro Madokoro, Tourism and International Trade Division, Aichi Prefectural Government Division for his research guidance. Antonio Fernandez and Hideyo Matsui of the United Nations Centre for Regional Development in Nagoya, provided invaluable material for my research. I would also to express my gratitude to Canadian Airlines International for the financial support of my fieldwork.
Chapter 1 Introduction

Nagoya, with a population of 2.2 million in 1995, is the fourth largest city in Japan (Figure 1.1). Besides being a major centre of commerce and industry, this city also embodies many of the contemporary contradictions in Japan’s modern society. After many visits to Japan, it is apparent to me that Nagoya is among the better planned of Japan’s post-war urban developments. Yet despite this, and its high GDP per capita (estimated at 3.83 million Yen in 1996), Nagoya still it lacks many of the amenities which citizens of other Western cities take for granted (e.g. 100% sewage, ample parkland, and family housing at street level). This contradiction between Japan as a rich industrialized country yet having poor amenities lies at the heart of this thesis, which looks at the role of urban infrastructure in a major Japanese city. As will be revealed in detail later in the thesis, this research resonates with many of the debates underway in Japan about the future direction of its society as it enters a new millennium. Thus, even as the rest of the world was striving to copy Japanese practice to induce economic growth, important voices in Japan were engaged in earnest deliberations in the early 1990s over creating a national lifestyle standard appropriate to the world’s second-largest power (Tabb, 1995: 282).

Research Objective

The objective of this thesis is to examine in detail four major infrastructure projects currently underway in Nagoya and its environs. Details are provided of the planning, financial arrangements and stages of implementation of the four major projects: the proposed Chubu International Airport, the International Design Center Nagoya, the Aichi Cultural Center, and Shidami Human Science City. In the past 100 years, Japanese urban planning focused on providing ‘economic’ infrastructure, (e.g. roads, harbours and other projects believed crucial for the building of a new nation) to the extent that social amenities (e.g. parks, sewerage systems, and high quality housing) were neglected (Fujita and Hill, 1993: 29; McCormack, 1996: 14). As Japan moves toward the next millennium this imbalance poses a critical urban policy challenge. Contemporary topics such as: ‘internationalization,’ ‘knowledge and technology’, and ‘urban quality of life’ issues are reflected in the debate over urban infrastructure
provisions and are now at the very forefront of urban development policy. As will be shown later in more concrete terms, the city of Nagoya is responding to these issues with a new “holistic” approach to its urban planning. This sets it apart from many other Japanese cities. The four infrastructure case studies examined here exemplify a concern with Japan’s, as well as Nagoya’s direction in the 21st century.

In this introductory chapter I will begin by framing the research objective within a review of the existing literature on Japanese cities. Specifically, this review highlights Japan’s increasing urbanization since the end of the 19th century, and the role that cities played in Japan’s modernization. The subsequent section looks at the new economic and social challenges facing Japanese cities in the 1990s, which in part has been the trigger for my research interest in Nagoya’s most recent phase of urban infrastructure. Then follows a section on the importance of the city of Nagoya, and the chapter concludes with a discussion of the structure of the rest of this thesis. A more theoretical discussion of urban infrastructure in Japan follows in Chapter 2.
Figure 1-1 Map of Japan

One Hundred Years of Urbanization in Japan

The formation of a well-developed system of cities during Japan’s feudal era conditioned the emergence of urban industrial capitalism in the late-nineteenth century. According to Hachiro Nakamura (1993), Japanese feudalism nurtured three types of cities: castle towns, transportation centers and capital cities. Castle towns proliferated when commerce and trade grew up around fortification during the long peace of the Edo era (1603-1868). Transportation centers developed at the crossroads of major trade routes. There were three capital cities which stood at the apex of the feudal urban system: Edo, the political capital (renamed Tokyo in 1868), Osaka, the commercial capital, and Kyoto, the sacred or cultural capital.

While cities grew marginally during the Edo era, feudal barriers to international trade and the internal movement of people limited urbanization (Eyal, 1991). This changed during the Meiji era (from 1868 to 1930) when the proportion of urban population increased from about 10 to 24 percent (Karan 1997). During the same period, workers engaged in primary industry declined from about 80 percent to approximately 50 percent (see Table 1-1). This pattern of increasing urbanization continued in the prewar period, with the urban population in Japan increasing to 28 percent by 1945.

Table 1-1 Urban Population Increase 1889-1945 (1,000)

<table>
<thead>
<tr>
<th>Year</th>
<th>1889</th>
<th>1903</th>
<th>1908</th>
<th>1913</th>
<th>1920</th>
<th>1925</th>
<th>1930</th>
<th>1935</th>
<th>1940</th>
<th>1945</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total population</td>
<td>39,473</td>
<td>45,546</td>
<td>47,965</td>
<td>51,305</td>
<td>55,963</td>
<td>59,736</td>
<td>64,450</td>
<td>69,254</td>
<td>73,114</td>
<td>71,998</td>
</tr>
<tr>
<td>City population (Shibu) (% Share)</td>
<td>4,697* (11.9)</td>
<td>5,920* (13.0)</td>
<td>6,954 (14.5)</td>
<td>8,003* (15.6)</td>
<td>10,073* (18.0)</td>
<td>12,902* (21.6)</td>
<td>15,468* (24.0)</td>
<td>22,646 (32.7)</td>
<td>27,563 (37.7)</td>
<td>20,015</td>
</tr>
<tr>
<td>D.I.D. population (% Share) **</td>
<td>(-)</td>
<td>(-)</td>
<td>(-)</td>
<td>(-)</td>
<td>16,957 (30.3)</td>
<td>(-)</td>
<td>21,719 (33.7)</td>
<td>(-)</td>
<td>26,613 (36.4)</td>
<td>(-)</td>
</tr>
</tbody>
</table>

1) City or Shibu: an administrative area with 30,000 population or more. (*) are estimated by Ryoshin Minami, Nihon no keizai-hotten [Economic Development of Japan] Tokyo: Toyo Keizai Shimposha, 1981, p.216
2) D.I.D. is the most commonly used index of urbanization in Japan, and it is defined as a district which has more than 5,000 population, with population density 4,000 residents per km² or more. (**) The % of D.I.D. population share are estimation from Atsushi Otomo, Nihon toshi-jinko bunpu-ron [Distribution of Urban Population in Japan] (Tokyo: Taimedo, 1979). D.I.D. first appeared in 1960 census.

In the post war period in Japan, urbanization rose remarkably, from 37.3 percent in 1950 to 63.3 percent just 10 years later (See Table 1-2). The proportion of the labour force engaged in primary industry had dropped to less than 40 percent by 1955, reflecting the steady increase in urbanization. The rate of
urbanization intensified between 1955 and 1970. In 1970, urbanization reached 72 percent, a level
similar to other advanced countries. The labour force in 1970 involved in primary industries was less
than 20 percent (19.3%). In the last two decades of this century, the urban population had increased to
78.2 percent in 1995, and the labour force engaged in primary industries dropped to a low level of 10
percent. Japan joined the ranks of other developed countries as a “urbanized society”\(^1\) (Kuroda 1990).

By 1990, 44 percent of the urban population resided in three metropolitan areas (within a 50 kilometers of
the city center) of Tokyo, Osaka and Nagoya. The period from 1970 to 1990 was also characterized by
technological transformation. The Japanese industrial society underwent a transition to a post-industrial
informational society.

Table 1-2 Urban Population Increase 1950-1995 (1.000)

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Total population</td>
<td>83,200</td>
<td>89,276</td>
<td>93,419</td>
<td>98,275</td>
<td>103,720</td>
<td>111,940</td>
<td>117,060</td>
<td>121,049</td>
<td>123,611</td>
<td>125,570</td>
</tr>
<tr>
<td>City population (Shibu) (% Share)</td>
<td>31,003 (37.3)</td>
<td>50,084 (56.1)</td>
<td>59,134 (63.3)</td>
<td>66,728 (67.9)</td>
<td>74,782 (72.1)</td>
<td>84,963 (75.9)</td>
<td>89,200 (76.2)</td>
<td>92,845 (76.7)</td>
<td>95,675 (77.5)</td>
<td>98,196 (78.2)</td>
</tr>
<tr>
<td>D.I.D. population (% Share)</td>
<td>28,122 (33.8)</td>
<td>34,371 (38.5)</td>
<td>39,889 (42.7)</td>
<td>47,270 (48.1)</td>
<td>55,490 (53.5)</td>
<td>63,805 (57.0)</td>
<td>69,988 (59.7)</td>
<td>73,355 (60.6)</td>
<td>78,122 (63.2)</td>
<td>81,243 (64.7)</td>
</tr>
</tbody>
</table>

1) City or Shibu: an administrative area with 30,000 population or more.
2) D.I.D. is the most commonly used index of urbanization in Japan, and it is defined as a district which has more than
5,000 population, with population density 4,000 residents per km\(^2\) or more. D.I.D. first appeared in 1960 census.

Sources: Derived from Kuroda, (1990; 114), 1990 Population Census of Japan and Census of Japan 1999 and Karan and

Bestor (1989) and Cybriwsky (1991, 1998) reported on the initial growth of urban infrastructure planning
in Tokyo at the end of the 19\(^{th}\) century as a response to urban growth. He reports that in 1888, the Meiji
government enacted its first legislation to facilitate ‘city planning’ in the form of the ‘Tokyo Urban
Improvement Ordinance,’ a 16-point initiative that created a city planning board with responsibilities for
policy formation and execution. This empowered various improvements to infrastructure to be made, and
plans were “determined for roads, bridges, and canals, which are the fundamental needs” (Cybriwsky,

---

1 According to Kuroda (1990), an urban population exceeding 75 percent urbanization, indicates a nationwide
diffusion of urbanization, and such a society can be can be considered an “urbanized society,” a new phenomenon of
the twentieth century.
The prime objective of focusing so much on infrastructure was to solidify Tokyo's hold on its role as national capital, as well as to surpass Osaka as a center of commerce.

Since the Meiji restoration, 'modernization' has been the accepted goal of the whole Japanese society (although interpretations of this term have varied in the Japanese case) (Fujita and Hill, 1993; Dore 1958; Cybriwsky 1991, Hebbert, 1994, Zetter, 1994). It was during the Meiji restoration that the government tried to transform Japan into a Western-style society (Fujita and Hill, 1993). One aspect of this transformation was the increased role of cities in the Japanese economy.

The Role of Cities in Japan’s Modernization

Japan's transition from inward-looking feudalism to outward-looking capitalism caused a geographical shift in the location of rising and declining cities. Castle towns, once prosperous under feudal lords, began to decline and to give way to cities situated on sea trade routes (Tokyo, Osaka, Nagoya, and Yokohoma). In such cities, raw materials could easily be collected, processed into finished goods, and exported to the United States, China and India.

Karan (1997) has provided a useful four-stage chronology showing how cities were an integral part of Japan’s modernization over the last one hundred years. In the first stage, which covered a period of just over 60 years, from the Meiji era (1868) to the 1930s. During this period, the country experienced a dramatic shift in economic activity away from agriculture, mining, forestry, and fishing to manufacturing. This sectoral shift triggered by the success of export industries such as textiles encouraged large sectors of the work force to leave the rural areas for the industrial activity of the large cities. As industry was believed crucial for the building of a new nation, the national government took the lead by opening industrial exhibitions, operating model factories and mines, and devising other measures to foster industrial enterprise.

During the Meiji period (1868-1912), the population living in cities of 50,000 or more grew from less than 8 percent to more than 16 percent. According to Nakamura (1993), the top three cites in 1868 were
Tokyo, Osaka and Kyoto. Nagoya, the fourth top city, had been the castle town of a lord who was blood kin to the Tokugawa (the clan responsible for the restoration). At the time of the Meiji restoration, Nagoya had a population of 90,000. Nagoya is located at the middle of a highway connecting Tokyo with Osaka and Kyoto and therefore was subject to rapid population growth. The rapid growth of population living in cities and the increase of employment in the manufacturing sector (Karan 1997) combined to create the new urban industrial cities of Japan. By the first decade of the twentieth century it was apparent that urbanization in Japan was inextricably tied to the nation’s search for industrialization (Karan, 1997).

During the second stage (1930-50), the expansion of urban growth was remarkable, and the percentage of urban population soared from 24 percent to 37 percent. This was again coupled with a shift in economic structure and the continued decline of the labor force in the primary sector from 50 percent to 41 percent reflecting the steady advance of both industrialization and urbanization (Karan, 1997: 21). A significant aspect of urbanization in Japan during this period was the development of large metropolitan areas (Tokyo, Osaka, Nagoya and Yokohama). In 1920, Tokyo and Osaka had a population of more than a million each, and accounting for 6.2 percent of the nation’s population. By 1940, there were four cities with more than one million inhabitants - Tokyo, Osaka, Kyoto and Nagoya - and their combined population accounted for 17.2 percent of the national population.

The situation immediately after World War II was a little different due to the devastation of aerial bombardment in the mid 1940s and the evacuation of city residents. In 1945, the proportion of the population living in cities of more than one million people recorded a decline to 11.4 percent. In fact, Karan states (1997: 21) that in terms of absolute numbers, the population of Tokyo decreased from 6.8 to 2 million, due to the evacuation of residents from the larger cities.

During the third stage (1950-70), the pace of urbanization intensified along with Japan’s reconstruction and further growth of export-led industrialization and the growth of cities accelerated with high economic growth. In 1950, 37 percent of the population lived in urban areas; by 1970, this figure had increased to
72 percent (Karan, 1997: 22). During this period, the labour force in the primary sector declined from 41 percent to below 21 percent. Between 1950 and 1970, there was a massive migration of people from the rural to the urban areas (Douglass, 1987, Eyal, 1991), as economic recovery brought increasing industrialization and millions of new jobs were created. By 1960 the number of “million cities” increased to six, with the addition of Yokohama and Kobe, and the population of Tokyo and Osaka had increased to 8.3 and 3 million respectively (Glickman, 1979). Governments were ill prepared to deal with this immigration and were unable to cope with the increasing demands for housing, sewage and other public amenities (Hebbert, 1994).

The fourth stage, identified by Karan is the period following 1970, when urban population reached more than 75 percent and the primary sector labor force dropped to 10 percent and less. Industrial growth and urbanization weakened with the oil crisis of 1973. In spite of this by 1975, four more cities - Kitakyushu, Sapporo, Kawasaki, and Fukuoka - joined the “million cities” group. The population of the 10 “million cities” formed 20.8 percent of the country’s population (Karan, 1997). In 1990, all of the 11 “million cities” are located in the Japanese Tokaido Megalopolis (shown in Figure 1-1), except for Sapporo.

The period between 1970 and 1990, was marked by the shift from a technological and industrial nation, to a post-industrial information-based society (Machimura, 1992). This was paralleled with a shift into a “knowledge base” focus stage of development, where urban and regional policies emerged aimed at addressing the provision of infrastructure for ‘knowledge’-based industries and information-based services. To aid in this transformation, the national strategies for developing new technologies have involved specific complementary programs for cites and regions since the late 1970s (Edgington, 1994).

These complimentary programs reinforced Nakamura’s (1993) comments namely, that as the provider of infrastructure, a site for technical innovation and diffusion, the city underpinned the development of Japanese modern industry. He further argues that the over-urbanization thesis, held by some urbanists to characterize less developed countries today, did not fit Japan’s early industrial experience. In Japan, urban population growth stimulated rather than hindered industrial development.
In just over 100 years Japan’s urban landscape has been transformed from feudal castle towns to industrial metropolises. The rapid changes in employment sectors from primary to secondary to tertiary were condensed into 120 years. At the same time the urban population grew from 8 percent to 72 percent. These two features are intertwined as Japan moves into the 1990s.

**Japan in the 1990s**

The previous section showed that urbanization has been linked inexorably with industrialization and economic development. In the 1990s, a new set of debates emerged on the role of cities and urban quality of life. These can be usefully grouped under the three headings ‘internationalization’, ‘knowledge intensive economic structure’ and ‘lifestyle superpower’ (Tokyo Business Today 1992). As Gottmann (1989) stated as early as in the 1980’s, cities are complex of interaction between technologies, social, economic, cultural, and political forces.

1) **Internationalization**

With Japan’s ‘internationalization’ (kokusaika) there is an increased awareness of the need for Japanese cities to compete in the world economy (Kumagai 1996). The cities need to display themselves as an attractive business environment, forcing air transport and ‘global connectivity’ to the forefront of urban development policy (Boddy, Lambert and Snape 1997; Machimura, 1992; Fujita, 1991; Harvey 1989; Glickman, 1988a, 1988b, 1987). Also, the internationalization of travel meant that many Japanese people began to travel around the world in large numbers. This growing leisure travel market in Japan reinforces the phenomenon of a greater awareness of overseas urban standards. Japanese citizens have now experienced other cities in the world and have come to realize the inefficiencies in public amenities in their own cities (Cybriwsky, 1998; Llewelyn-Davis, 1996; Wegener, 1994; Fujita, 1991; Hayata, 1990; Siman and Toda, 1990). National and city-based planners recognize that if the Japanese wish to maintain affluent living standards and participate in a global economy, they will also need to upgrade their airports and facilitate a growing demand for passenger travel and air cargo.
2) Knowledge Intensive Economic Structure

'Knowledge Intensive Industries' (for example, telecommunications, computers, robotics, and so on) represent a second major trend toward a 'postindustrial society'. This shift in Japan's economy also requires new forms of urban infrastructure. In particular, the establishment of infrastructures for information networks, such as the Tokyo Teleport, is thought to be essential for sustaining the economic activities of major cities in the international arena (Machimura 1992:120). Knowledge intensive industries require new types of strategic infrastructure, such as academic cites, research parks, and corresponding social and physical infrastructures (Harvey, 1989; Edgington 1994). Moreover, to attract professional 'knowledge-intensive' personnel, Japan and its cities will have to improve the social amenities in the urban landscape, such as housing, parks and cultural amenities.

3) Lifestyle Superpower

Aspects of a 'lifestyle superpower' (urban 'quality of life'), have recently been mentioned in Japanese economic plans, and reflect changes in people's values and attitudes. Born after 1970, the members of a new ('Shinjinrui' or 'new people') impatient generation are 44 million strong, and comprise about one third of the country's population (Larimer 1999: 19). By the time they entered school, Japan had 'caught up' and was 'passing' the world in wealth (Figure 2). As Figure 2 shows Japan's GDP growth from 1960 to 1993 was the highest of the G7 countries. This new level of affluence was the catalyst for change in terms of Japanese youth values. According to sociologist, Takayama (1999) in the 1960s the focus of youth was on the needs of the family: a TV, a refrigerator, or washing machine, to provide for the 'basics' for the family. But by the 1980s, the focus of the youth had shifted from the tools of a family's needs, to the objects of individual desires: a baseball glove, a Walkman, or Nintendo (Larimer 1999). The implications of the needs for this group in terms of infrastructure provisions include higher levels of airports, cultural and 'leisure' amenities, and research and design facilities.
In addition to the *Shinjinru* or ‘new people’, the people born between the years of 1910 and 1930 are now senior citizens. The age profile of the Japanese population is rapidly changing due to a declining birth rate and an increasing life expectancy. This second group of individuals is impacting the increasing demands on infrastructure provisions in Japan. Today almost 15% of the Japanese population is 65 or older (18.5 million). The Ministry of Health estimated that in the year 2000, 17% of the Japanese would be 65 and over; 7% will be 75 and over (Sugimoto, 1997). Some of the urban infrastructure issues affecting this population group include: seniors housing, community based services, (transportation services, senior centers, clinics, art centers) and health centers (Interview with Flegal, 1999).

While Japan has modernized in the last 100 years and has caught up with western prosperity, there are a new array of challenges which require a response from Japanese planners. First, Japanese planners must respond to aspects of ‘internationalization’ and the need for Japanese cities to be ‘attractive’ business centers with a full range of public amenities. Second, the post-industrial era that Japan is moving into requires new types of knowledge intensive economic infrastructure which Japanese planners must plan for. Third, the desire for a ‘lifestyle superpower’ and preparing for the coming “gray society” bring challenges to Japanese planners. Urban development must adapt the cities themselves to these new demands by constructing more social infrastructure. In addition to being economic spheres Japanese cities, such as Nagoya, will need to be amenity-equipped sustainable communities.
The Importance of Nagoya

This study focuses on Nagoya because it has recorded the highest levels of industrial output for any single city since 1977 due to the remarkable growth in the automobile and machinery industries (Edgington, 1996). The growth in automobile production has been led by the largest automobile company in Japan, Toyota Motor, and by Mitsubishi Motor (Fujita and Hill, 1993). As a result of the development of an international automobile system, the Nagoya metropolitan area became an indispensable core for the world automobile industry. The wider region surrounding Nagoya has Honda Suzuka, Honda Motor’s Hamamatsu, Suzuki Motor, and Yamaha factories. Nagoya City has a subsidiary of the Nissan Motor group and Aichi Machine Industry (Eyre, 1982; Fujita and Hill, 1993). These companies have developed high-technology cars, automobile parts, and include advanced research and development activities (ibid.).

As the centre of the Japanese aerospace industry, the Nagoya Metropolitan Area contains Mitsubishi Heavy Industry, Kawasaki Heavy Industry, and Fuji Heavy Industry. They are the main airframe makers and final assemblers. These companies lead in advanced aerospace technologies and metal plastids, as well as processing technologies. The Nagoya metropolitan area is still far behind the Tokyo and Osaka metropolitan areas in research and development activities but is a leader in industrial output (Edgington, 1996).

Urban development and infrastructure

It is believed that city planning initiatives are universal in scope, global and ‘Western’ biased. The Japanese system of local development plans were influenced by European models, while its methods of land use zoning draw from American experience (Callies, 1997, 1993: Shapira, Masser and Edgington, 1994: 3). Aspects of distinctive local and regional culture (Yazaki, 1963, 1968 and Fujita and Hill, 1997) as it pertains to Japanese urban development, rarely enter into the literature of Japanese urban planning. As Karan (1997) points out, most contributing authors provide a comparison with American cities so that the reader can appreciate the nature, characteristics, problems, and images of Japanese cites. Words and phrases such as ‘modernization’, ‘internationalization’, and ‘quality of life’ are debated with little
reference to the local and spatial strengths. For example, we fail to see the unnatural assumption that
Western culture and Japanese culture present themselves to the Japanese as somewhat inimical
alternatives. As Dore clearly illustrates:

"It is an assumption which would seem to be confirmed by the pendulum swings of
Westernizing fervour and nationalist reaction which have characterized Japanese history
in the last eight decades, and by the fact that in popular speech 'traditional' (dentooteki)
and 'Japanese' (Nipponteki) are often used as synonyms (though 'modern' (modan,
kindaiteki) and "western (seyootteki) somewhat less so)." (Dore, 1958: 249)

The connection between public infrastructure and investment and economic development is being debated
most urgently with calls for productivity increase and improvements in the West. No short summary can
do justice to the role of public infrastructure in and to the economic development of the United States as a
major world power (Aldrich, 1980; Dunn, 1980: Pred, 1966). The following paragraphs provide a simple
sketch of a complex, controversial and significant history.

Public works are an essential first priority for any developing nation, and the United States was no
exception. Top priority went to transportation in the nineteenth century. After World War II the national
government promoted a nationwide system of airports and starting in 1956 the government paid 90
percent of the cost of a nationwide system of freeways (Lively, 1995).

Beginning in the 1960s and throughout the 1970s and 1980s, federal money supported the development of
urban transit systems, the modernization of the passenger railroads and the extension of mass transit to
non-metropolitan areas. In addition to transportation initiatives, the national government took the lead in
building dams, urban renewal programs, and federal rural electrification programs. In the 1970s, the last
large national infrastructure initiative was for local wastewater treatment plants. Grants were made
available to help the local government's meet national standards. During the 1980s, however, there was
declining national support. Some have argued that the decline in capital spending was to be expected as
America matures and major infrastructure systems were completed. A study prepared by the U.S.
Department of Commerce (1987; Perry 1995) concluded that even with structural shifts in American
economy toward sectors that use less public infrastructure per unit of production, strong growth in
infrastructure would continue to be needed for maintaining a healthy and competitive economy. History suggests that there is a strong correlation between the construction of infrastructure and economic development (Tarr: 1984, 52)

Research Questions

In the previous section of this chapter, I outlined the one hundred years of urbanization in Japan. Urbanization came much later to Japan than in the West, but was rapid and linked to industrialization. This rapid industrialization has led to internationalization and affluence. The city of Nagoya has led the country in industrial output since 1977 and is a hub for industrial spin-offs. In this thesis, I ask the questions: What has been the role of urban infrastructure in Japan’s urbanization and modernization? What are Japan’s urban infrastructure needs in the 1990s? How is this manifested itself in metropolitan Nagoya? What are the motivators behind, and administrative and financial features of the four major case studies of urban infrastructure in Nagoya in the 1990s? What implications are there for Nagoya’s future city development?

Methodology

The data collection was compiled through library research, field observations, interviews with government offices and a review of census publications. My data collection in Nagoya consisted of reviewing materials held in the libraries of United Nations Center for Regional Development (UNCRD), The Nagoya Center for Urban Advancement, the Nagoya Census Bureau, Nagoya University and the Aichi Prefecture Government Office (Tourism and International Trade Division). More detailed information was gathered with field visits to the Port of Nagoya, Nagoya University and Institute of Technology, the future site of Shidami Human Science Town, Aichi Cultural Centre, the present Nagoya Airport and other districts within the Metropolitan Nagoya. In the summer of 1994 I visited the city of Nagoya to conduct my field observations. During my stay, I visited the Nagoya City Planning offices and Economic Affairs Bureau, the Chubu International Airport Research Foundation, the Nagoya Guideway-Bus Co Ltd., the Nagoya Center for Urban Advancement, the Sakae Underground Shopping town, the
Kyoritsu Ceramic Materials Co Ltd., the Nagoya Castle, the Nagoya TV Tower, the Nagoya City Archives, and visits to the Nagoya Feminine Culture College.

Chapter Summaries

In Chapter 2, I look more concretely at the Japanese city and role of infrastructure and contrast this with the western experience. This material deals with the period from the Meiji Restoration to present day Japan (mid 1990s), with a look at the impact of the ‘bubble economy’ and the 1990s recession, and calls for ‘new’ infrastructure. Chapter 3 focuses on infrastructure provisions in Nagoya from its birth as a castle town, through its 20th century industrial growth and expansion to its post-war development and reconstruction. This material reveals the challenges for Nagoya of the 1990s and beyond, and the implications for urban infrastructure provisions.

Chapters 4, 5, and 6 are a look at specific case studies of infrastructure developments in Nagoya. I will first look at the planned national Chubu International Airport project and its role in ‘internationalization’ in Chapter 4. In Chapter 5, I examine how the needs for leisure and ‘quality of life’ issues have been reflected in the regional Aichi Cultural Center project and the city supported Nagoya Design Center. Chapter 6 is a case study of Shidami Human Science Research Town, a response by the city of Nagoya to the threat of industrial ‘hollowing-out’ and the need to change to 'value-added' production through R and D. Chapter 7 concludes the study with a summary of findings, implication for theory and suggestions for future research.
Chapter 2 Japanese Cities and Urban Infrastructure

The introductory chapter established that in the past 100 years, Japanese cities have transformed from castle towns with relatively small population levels through industrial cities, and finally to a range of complex prosperous megalopolises in the 1990s with predominantly service economies. These rapid shifts in character have required many changes in urban infrastructure development and delivery. This chapter looks at the role urban infrastructure has played in the changing cities of Japan. Beginning historically with the Meiji period when the new infrastructure was constructed to assist in modernization. Infrastructure was purely ‘economic’ in nature. The next section deals with the post-WWII era, which put extreme demands on the existing city infrastructure, and hence it could not ‘keep up’. The following section reviews the 1980s agenda of deregulation, post-industrialization, the ‘bubble economy’, and ‘industrial hollowing-out’ which set the stage for ‘new’ infrastructure demands in Japan. The last section looks at the challenges for the cities of Japan in response internationalization.

This is a major shift in urban policy of Japan from being a producer society, putting the economy first and people last, to that of being a consumer society and addressing the needs of the people with public amenities.

For the Westerner, the early impressions when visiting a Japanese city tend to superficially define it as exceedingly similar, if not identical, to other Western cities and those of technologically advanced countries. Yet, the careful Western observer, who is sensitive to cultural and behavioral nature, will soon find the distinction between the Japanese and the Western city.” (Golany, Hanaki, and Koide, 1998: xxix)

At one level- the immediate, visual level- the quotation by Golany et al affirms that the Japanese cityscape is similar, yet not totally identical to the Western City. Thus, even to the casual observer it is apparent that Japanese architecture is not dominant within the urban environment, excluding the religious temples and shrines (Karan 1997, Cotton Mather 1997). Yet with respect to the focus of this study it is important to note also that ‘urban infrastructure’ (often called the hidden ‘sinews of the city’, Tarr, 1984) has been treated in a very different way in Japan than in most western cities of similar size and heritage.
As stated in Chapter One, Japan's economic growth and modernization has differed dramatically from western experience thus in scholars such as Chalmers Johnson (1982, 1995) points out the deliberate government targeting of industrial development since the Meiji period. As shown in this chapter the timely provisions of urban infrastructure to assist enterprises was an important component of government policy in the overall goal of 'catching-up' with the west.

A geographic perspective on western approaches to infrastructure provisions is contained in the work of Harvey (1989), and Tarr (1984). For example Harvey (1989: 158), notes that

industry has to compete within an international division of labor, and its competitive strength depends upon the qualities of labor power; the efficiency and depth of social and physical infrastructure; the “rationality” of life-styles, cultures and the political process; and the geographical position and natural resource endowments.

He goes on to state the urban regions that make wrong choices lose out to their competition in much the same way that erring entrepreneurs do. The study of urbanization and the city has, like other phenomena, been directly linked to developments in the world-economy, the term ‘global’ is becoming common in book titles and in newspapers (Cohen, 1981; Friedman, 1986).

**Urban Infrastructure in the Meiji period**

During the process of change following the Meiji Restoration and the industrial revolution (1897-1911), most castle towns changed from consuming to producing and consuming centers. As the transportation system, built up, interrelations between the cities intensified, and many cities assumed specialized functions and expanded greatly in scale. The modern system of political and economic functions was enlarged and increased, wealth was concentrated as capitalism developed, and the number of establishments increased and expanded in scale (Yazaki, 1968: 371). Watanabe, Takeuchi, Nakabayashi and Kobayashi (1980) outlined that, as early as the WW I era, housing in planned suburban residential quarters was often constructed by private railway companies in response to suburbanization. A 40km zone of population growth in the Tokyo area was achieved in and the suburbanization was quite dispersive because many large-scale collective housing projects "Danchi residence" were constructed by
public housing corporations far from the city center, in low land price areas. Factories and public housing in prewar suburbanization were ‘pulled’ to the outskirts of the city.

By the way of summary, we can say that changes occurred in both, the extent and distribution of urban populations, between 1898 and 1920. These changes were due to the transformation of feudal cities from centers of consumption to production centers employing modern techniques in large-scale enterprises, and absorbing large numbers of the rural populace.

**Post-war Redevelopment**

In the post-war period the demands upon urban infrastructure changed as economy rose from utter devastation to producing 10 percent of the world’s GNP which generated an extraordinary rapid rate of urbanization. Between 1945 and 1970 Japan’s urban population grew from 28 to 72 percent. Japan compressed into twenty-five years an urban experience that spanned a century in the United States (Katz, 1998). The consequences of this rapid rate of urbanisation led to several social problems and a severe shortage of infrastructure for new residential areas. As already stated, central government policies emphasized investment in industrial infrastructure over social consumption and exacerbated pollution, housing shortages and congestion. Urban growth problems also spurred conflicts between local governments and the central state, giving rise to local environmental movements, and brought reform administrations to power in cities across the nation (Hebbert, 1994).

For example, according to a poll conducted by the Tokyo Metropolitan Government in 1987, among the most common complaints among the residents in the central ward were: too many people, small living quarters, high costs of housing. In fact this was also true of the Nagoya, according to Eyre, (1982), housing remained in chronic short supply since the war. The National government was so focused upon economic growth that only limited attention was paid to housing. So in 1992, *The Development of Local Growth-Pole Cities and Promotion of Relocation of Industry and Business* was passed, which provided for special measure to implement urban infrastructure in major regional centers, to deflect urban pressure away from the major centers.
In the post-war period government spending switched away from defense expenditure - naturally enough- and towards subsides to local governments for public works. In fact government spending for public works projects in Japan has been disproportionately generous. Thus Calder (1986) noted that in the early 1990s, the percentage of GNP that Japan directed to public works spending was twice that of France and quadruple that of the United States. Although the Japanese government’s total expenditures are relatively low (owing to smaller outlays for defense, education and health) its fixed capital formation - concentrated in public works - far out paces other advanced countries. Still much of the spending has been made for more roads and economic based works (e.g. ports and harbours, which facilitates trade and coastal industrial sites for heavy industries). While outlays for urban infrastructure for residents - such as sewage, local roads and park lands has been limited, as well as works for data communications and service and technology sectors.

**Economic Growth and Urban Infrastructure**

To understand the present situation, it is important to look at the 1960s, 1970s and 1990s in terms of economic growth and its relation to public investment. Figure 2.1 shows the relation between GNP and public investment over a longer 10-year time-scale. During the high economic growth period of the 1960s, the amount of public investment increased by 3.4 times, far surpassing that of real GNP, which grew 2.7 times (Ibid.). In the same period, the Tomei Expressway was completed and the Shinkansen (Bullet Train) began operations. The average ratio of public investment to GNP during this decade was 8.7%.
High economic growth reached its peak in the early 1970s. Public investment increases continued due to the 'Retto Kaizoron Boom (plan for the remodeling of the Japanese archipelago)'. The situation changed in 1974 when the oil crisis led to a total demand control policy and the national economy took a downward turn. During this decade, both the economy and public investment increased by 1.57 times (Hayata 1990). In other words, public investment was stagnant except during the 'Retto Kaizoron Boom' of the early 1970s, and when the government took steps to pull the domestic economy out of the post-oil crisis in late 1970s. During this decade, the public investment/GNP ratio was 8.9%, or slightly higher than that of the 1960s due to slow GNP growth.

During the stable growth period of the 1980s, reduced budgets since 1981 have reversed the growth trends of the economy and public investment. The economy grew 1.51 times during the decade, whereas public investment increased 1.20 times. Thus, the public investment/GNP ratio was 7.2%, a 1.7% decrease from that of the 1970s (Ibid.:3). According to Hayata (1990:2) public investment (i.e. public
fixed capital formation) in 1990 was 26.3 trillion Yen and was expected to be 6.3% of GNP. The ratio of public investment to GNP during the period of financial reconstruction since 1980 decreased every year from 9.6% in 1980 to 6.7% in 1985. This ratio began to increase slightly in 1986 amid calls for domestic demand expansion, but resumed its decrease in 1988. It should now be apparent that the public investment/GNP ratio has changed on a 10 years basis from the 1960s through the 1970s and into the 1980s. The preliminary results of Japan's public investment suggest that the 1990s will show a similar trend of that of the 1970s. According to The Economist (1999), the government in the late 1990s is trying to spend its way out of a recession.

The Japanese government is reluctant to set long-term goals for the ratio of public investment to GNP as this may lose public financing flexibility and reduce the independence of each economic policy. Consequently, the government has set a goal for total investment over the next 10 years to be 430 trillion Yen, and furthermore specified the goals to be achieved in each sector (see Table 2-1). The idea behind this is to steadily increase public investment on a middle-term basis to avoid inflation and financial imbalance.

**Table 2-1 Goals for public facilities improvement**

<table>
<thead>
<tr>
<th>Infrastructure</th>
<th>Goal:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing:</td>
<td>To increase quality housing stock</td>
</tr>
<tr>
<td>Sewerage:</td>
<td>The diffusion rate to be increased by 10%. Flood control measures will be taken</td>
</tr>
<tr>
<td>Parks and greenery:</td>
<td>Per capita park area to be over 7 square meters</td>
</tr>
<tr>
<td>Waste disposal:</td>
<td>To achieve a reduced waste treatment rate of around 85%</td>
</tr>
<tr>
<td>Traffic safety:</td>
<td>Increase the number of sidewalks along 25,000 additional km of road</td>
</tr>
<tr>
<td>Ports:</td>
<td>To handle increasing trade cargo and larger ships</td>
</tr>
<tr>
<td>Airports:</td>
<td>Projects will be started to meet future airline demand increases to reach the levels of other advanced countries.</td>
</tr>
</tbody>
</table>

Source: derived from Hayata, 1990

This projected 430 trillion Yen of public investment in the period from 1991 to 2000 will be a 1.63 times increase over the previous 10 year period between 1981 to 1990 of 263 trillion Yen. The ratio of public
investment to GNP will increase slightly from 7.2% in 1980s to 8.4% in 1990s. These figures however, are rather low in the eyes of U. S. demands, i.e.: 'a ratio of public investment to GNP be 9% or 10%. To fully meet this requirement, the accumulated total of public investment should be 500 trillion-Yen and annual increase rate 9%, which will far exceed that of GNP.

The 1980s and the ‘Bubble’ Economy

Despite the historically high levels of infrastructure spending by the national and local governments, emerging economic and social problems have intensified demands for new types of infrastructure. For example, there is a growing need to provide information as well as human comfort to accommodate an aging population and maturing society (Takabu et al. 1998), and to improve the quality of infrastructure and upgrade the ‘economic base’ as alluded to in Chapter One (Edgington, 1998). The cities also struggle with intensified congestion within urban areas due to demographic changes. This can be illustrated in a survey by the Tokyo Metropolitan Government (1987), where the citizens of Tokyo stated that too many people and too much traffic were their primary concerns (Cybriwsky, 1998:137). Solutions to these problems cannot be met by the further expansion of the present infrastructural systems. Instead, a new diversified infrastructure is required that is technologically advanced and information oriented.

A review of the nationwide situation (Fukui 1990; Kurokawa 1990; Toda 1990; Iwata 1991; Woodall 1992, 1996; Edgington 1998) shows that some of the supporting infrastructure related to the living environment is less advanced than in the U.S.A. and Europe, which reflects differences in the historical backgrounds of the cultures. Furthermore, from a long term point of view, it has become necessary to take into account the new problems related to an aging population, maturing society, and knowledge intensive economy and to offer solutions that will preserve the environment when preparing future infrastructures. Table 2-2 shows that Japan lags behind the other nations in social urban infrastructure.
Table 2-2 Comparison of the efficiency of infrastructure systems

<table>
<thead>
<tr>
<th>System</th>
<th>Japan</th>
<th>U.K.</th>
<th>Germany (West)</th>
<th>France</th>
<th>U.S.A.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roads Urban Area/Road Area in %</td>
<td>Tokyo 13.6</td>
<td>London 16.6</td>
<td>Paris 20.0</td>
<td>New York 23.2</td>
<td></td>
</tr>
</tbody>
</table>

Source: derived from Llewelyn-Davis 1996

In the 1990s, the present condition of social infrastructure design in Japan needs to be evaluated. Systems contained in the infrastructure, which support a city or region, are transportation, disposal and supply, and environmental. The transportation system consists of roads, ports, harbours, airports and railways. The disposal and supply system consists of waterworks, sewerage, electric power plants, gas plants and waste incineration plants. The environmental system consists of water quality, chemical safety, and air quality.

Considering the gigantic volume of industrial activities and demands of its many inhabitants, the infrastructure in Japan’s metropolitan area functions at a very high level of service and is believed to be unrivaled in its stable supply of water, gas and electric power services. However, problems still exist due to the excessive congestion in metropolitan area. These include traffic jams, water shortages, and the need for a stringent electric power supply to meet consumer demand, particularly in summer.

Although the transportation system functions at an advanced, the infrastructural systems related to the living environment are less efficient than in the U.S.A. and Europe. This is due to the fact that Japan’s infrastructure has a shorter history of development than other advanced industrialized countries. Figure 2.2 shows the ratio of social capital stock to GNP in 1970, 1982 and 1987 among four countries. In 1970, figures for all other three nations (U.S.: 79.2%, the U.K.: 113%, West German; 59.6%) were higher than that of Japan (32.8%). Even though Japan’s rate of increase was high (double), its figure for 1987 was
still 60.8% compared to 73.4% for the U.S., 113% for the U.K., and rapidly growing West Germany at 91.4%.

Figure 2-2 International Comparison of the Ratio of Social Capital Stock to GNP

Source: Hayata, 1990, 14

The geographical environment and other conditions typical of Japan, such as the large ratio of steep mountainous areas, create further obstacles for expansion of the infrastructure. Sewage systems in local cities and other infrastructural networks are twofold. On the one hand, the infrastructure's capacities are overburdened in the metropolitan areas where the population demands for various functions are extremely concentrated. On the other hand, the infrastructure is less strained in local cities where population density is low and the demands are less.
Japanese Infrastructure Needs in the 1990s

At the beginning of the 1990s it was considered that Japan’s urban infrastructure would face new demands, which could not be met by the mere expansion of the current infrastructure. First, and foremost, harmony with the natural environment is of prime necessity (Karan and Stapleton, 1997). With the growing awareness of the extensive preservation of the natural environment, not only at the regional levels but also at global levels, more sophisticated use of resources and the disposal of toxic substances are required. In order to satisfy these requirements while still meeting social demands, it is necessary to renovate the existing infrastructure and build new systems.

Second, the necessity for diversification and sophistication of services rendered by the infrastructure requires an information-oriented system based on international networks (sometimes referred to as ‘Economic Infrastructure’ (Edgington, 1998)). Not only are infrastructure functions necessary for the mere survival of urban and residential centers, but they are essential in offering new information. In the last ten years, there has been the realization that export-oriented industrial sectors (e.g. automobiles and consumer electronics) will no longer provide a suitable ‘engine of growth’ (Ibid.: 2). This is due to the ‘hollowing out’ of local industries (Edgington, 1997a; Takayoshi 1995). The creation of various types of environments will become indispensable as a response to the changes in the economic environment.

Third, the issue of the maintenance and renewal of existing infrastructures is already pressing. Concurrently with the construction of new infrastructure, the renewal of the existing infrastructure will have to be accomplished in a manner that can also meet the new needs of a maturing society. Along with the massive renewal of existing infrastructure that crossed its zenith, it has become necessary to modify and equip it with functions to meet the needs of modern times. From now on, it will become even more urgent to develop technologies that accurately judge the timing of renewal for the existing equipment and efficiently carry out the renewal in an efficient manner.

As Japan searches for more ways to protect its economic strengths, policy makers are striving to copy practices thought to induce economic growth. While the policy makers look for economic solutions,
important voices in Japan were engaged in a new debate that began in the early 1990s over creating a national lifestyle standard appropriate to the world's second-largest economic power. In an influential February 1992 article in the popular magazine of opinion and commentary, *Bungei Shunju*, Akio Morita argued that Japan must become more like other countries and develop a wider range of infrastructure to reflect Japan's current position as a highly industrialized nation.

A few weeks before Morita's article appeared, Prime Minister Kichi Miyyazawa, in his keynote speech opening the new year's session of the Diet, declared that Japan must shift from a producer-oriented society to one in which the priority was given to consumers and ordinary citizens. He advocated a priority to better housing, less time spent commuting and on the job, and more balanced regional growth. While none of this was new, politicians with elections coming up find such themes good ones to raise. At the time a series of important documents had also been coming from the permanent government stressing these themes in ways that suggested a seriousness of intent (Tabb, 1995: 283).

**Summary**

It is clear from an examination of both western and Japanese literature that urban infrastructure has played a pivotal role in urban development in the last 100 years. In the 1950's, 1960's and 1970's, large-scale manufacturing enterprises located in the major urban centers were already attracting young people to live in the big cities (Gilman, 1993:177). At the same time, the Japanese government was helping to phase out domestic heavy industry through an active plan of rationalization. In the postwar era, coal, ship building, steel and other basic industries were slowly pushed out of business through an inability to compete internationally and the government's unwillingness to support them. This rationalization process propelled more of the rural and small-community population toward life and jobs in the metropolis, crippling the economy the economy of numerous small cities throughout Japan. Simultaneously, the industries around which these regional cities were built lost their international competitive edge. The resulting combination of population drain and economic "hollowing out" in Japan is identical in many ways to what has happened in the American Rust Belt (Ibid.).
The western literature shows that infrastructure has played a critical role in urban development. The Japanese literature illustrates that Japan has had very different approaches to infrastructure problems. According to Watanabe, (1984), Western urban planning was deeply biased by an anti-urban ideology. In sharp contrast to the Western approach, Japanese planning with a strong urban tradition, and central planning powers, tried to foster the metropolis rather than to discourage it as the British did or to dismantle it as did the Americans.

Infrastructure is now important in Japan’s overall budget. The government has set a goal for total investment of 430 trillion Yen in this decade. This will be a critical factor affecting the Japanese domestic demand from that of a ‘producing’ society to that of a ‘consuming’ society. The development of the ‘concept of leisure time’ has stimulated household expenditures and has opened new markets at home and abroad.

The challenges of the 1990s have changed. City planners must respond to Japan’s internationalization, a need for knowledge-based economic infrastructure to prevent economic “hollowing out” and the Japanese citizen’s desire for lifestyle affluence and not just economic affluence.

**Table 2-3 Post War Stages of Japan’s Economy Showing Public Infrastructure Emphasis**

<table>
<thead>
<tr>
<th>PERIOD:</th>
<th>Issue:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1960s</td>
<td>Promotion of Heavy and Chemical Industries</td>
</tr>
<tr>
<td></td>
<td>e.g. steel and petrochemicals</td>
</tr>
<tr>
<td>1970s</td>
<td>Promoting a More Technological Industrial base</td>
</tr>
<tr>
<td></td>
<td>e.g. consumer goods, electronics and machinery.</td>
</tr>
<tr>
<td>1980s</td>
<td>Seeking More Creative Knowledge-Intensive Industries</td>
</tr>
<tr>
<td></td>
<td>e.g. high technology and research &amp; development</td>
</tr>
<tr>
<td>1990s</td>
<td>&quot;Toward Creating Human Values in the Global Age&quot;</td>
</tr>
</tbody>
</table>


Table 2-3 shows that Japan has shifted its economic focus as the global situation shifted. The urban infrastructure, however, still remained focussed on ‘economic’ rather than social needs.
Chapter 3 Nagoya’s Urban Development

The city Nagoya is situated in the centre of the main island of Honshu. It is also central to the Chukyo industrial region and is strategically placed on the Tokaido Megalopolis (Figure 1.1). This centrality has led to the development of a strong industrial and economic city. The chapter focuses on Nagoya’s urban development, from its earliest period to the struggles of the 1990s. From its birth as a castle town on the Osaka-Edo transportation corridor in the 17th Century to its current position as one of the highest producing urban regions of Japan, Nagoya has experienced urbanization differently from other cities in Japan and the West.

Birth of Nagoya

In 1607, Tokugawa Ieyasu, one of the three great leaders of the period, decided to build a new and more powerful castle-town and selected Nagoya as the site. This decision was based upon a military strategy requiring greater control over the daimyo of the Tokaido region (Eyre, 1982). This is the region on the eastern coastal region linking the Kanto Plain to the east and Osaka-Kyoto area to the west. The Nagoya military site was elevated and protected above the plain and had water resources of the Shonai River. The site offered easy access to coastal shipping along Ise Bay and the East Coast of Honshu (Eyre, 1982: 15).

By 1615, when construction was finished, Nagoya consisted of an imposing fortress and supporting city of some 50,000 persons. The bulk of the population consisted of the warrior class, artisans, and merchants necessary to provide military goods, luxuries, daily necessities and services. The non-warrior population of Nagoya increased after a conflagration in 1659, houses and shops spread beyond the confines of the original street grid. As a port city, Nagoya was a main port of call for small coastal ships and the terminal of a ferry service to Kuwana on the West Coast of Ise Bay. Nagoya was a post town and offered resting areas for travelers along the Tokaido highway (Eyre, 1982: 19). During its first century, Nagoya was concerned primarily with the economic affairs of the Owari han and the needs of its warriors. In the early 18th century, Nagoya rose as a key regional commercial center whose influence spread beyond the han confines. Factors responsible for commercial growth includes transportation
improvements and business generated by the money economy. According to Eyre (1982), lumber, pottery, foodstuffs and paper were main trade items. Nagoya's population grew from 50,000 in 1615 to about 75,000 by the mid 18th century (Ibid. 22).

From its conception Nagoya was a strategic site, functioning as a crossroads of transportation, communication, and goods. Because it was not a cultural, industrial, or a political capital Nagoya developed its economic strengths more from local initiatives. This independence from outside support would continue in the years ahead.

**Nagoya in the Meiji Period (1868-1930)**

The last century of Tokugawa rule brought little structural change to Nagoya vis-à-vis the central government. In response, the local government was motivated to contribute to Nagoya's industrial progress (Edgington: 1996: 12). When Nagoya was municipalized in 1889, the area of the city was only 13 km and the population was 157,000. At this time, according to Edgington (1996), Nagoya was compelled to spend more on economic rather than social infrastructure due to its limited finances.

The major factor in the fall of the Tokugawa regime was its inability to cope with the rising tide of Western influence in Japanese affairs. The Japanese were well aware of the results of the 1842 Opium War in China with the unequal treaties, treaty ports, and territorial concessions. In 1854 Admiral Perry got the Japanese to sign the first treaty opening selected ports. Yokohama became the funnel for Western influence and culture to nearby Tokyo and then out to other parts of Japan. The Japanese national government took the leadership in promoting and building new industries. Top attention went to shipbuilding and other strategic industries. The selected ports were improved for handling foreign trade, and the merchant marine expanded to handle the growing volume of imported raw materials and exported goods.

The tempo of economic growth in Nagoya quickened in the 1890s, due in part to the completion of the trunkline Tokaido Railway that linked the city with the Yokohama port facilities and the vitality of
Japan’s two growth poles, Tokyo-Yokohama and Osaka-Kobe. In 1896, the Aichi Prefecture started the construction of its own modern port in Nagoya. In 1907 it was designated an international trading port under the name of “Port of Nagoya” (Nagoya Port, 1991).

Nagoya in the Early 20th Century

By 1941, the population of the Nagoya area reached 1.3 million. When war production peaked, Nagoya produced more than 60 percent of the nation’s aircraft and, together with the manufacture of munitions; this contributed to the industrial growth of the city. These activities led to the development of machinery, metal, chemical and other heavy industries that began to coexist with the lighter industrial sectors such as textiles (Eyre, 1982:144; City of Nagoya, 1988:4). Edgington (1996) notes that while this local government priorities resulted in a spirit of regional economic independence, it also left the legacy of focusing on economic development rather than city beautification. As Eyre (1982: 35) notes, Nagoya, in the pre-WW II era was essentially an expanded castle-town and Tokyo and Osaka visitors would speak of it derisively as an “overgrown farm town,” meaning that growth in economic structure and population had not brought it commensurate class.

Nagoya developed as a munitions producing industrial city in the pre-WWII era, making up to 60% of the nations aircraft (Hayashi, 1992). After WW II, Toyota Motor closed its aircraft division and consolidated its research and development operations in Nagoya. Toyota was well positioned to prosper from the special procurement of the U.S. Army during the Korean War. Soon after the War, Toyota Motor was soon challenged to develop domestic passenger cars by policies promoted by the Ministry of Industry and Trade (Miyakawa, 1993, 1990). And in 1952, Toyota using “just in time” (Kanban seido) systems started producing automobiles.

Post-war development

At the end of WWII, a recovery programme was launched which aimed to do more than simply rehabilitate the city. It was hoped that disaster would be turned to advantage through reconstructing Nagoya as an internationally-minded cultural and industrial city. The sheer scale of the recovery plan is
reflected in such projects as the creation to 100 meter-wide boulevards and vast relocation of graves to Heiwa (Peace) Park. During the war, bombing destroyed almost one half of the city area, including the castle, and reduced the population to approximately one third of the 1941 figure. After the war, the recovery plan progressed and the population surpassed the pre-war maximums. Besides creating massive concentrations of jobs near the main assembly operations, the automotive industry stimulated production amongst thousands of suppliers and subcontractors scattered throughout Chukyo region. Most manufacturing operations supplied this burgeoning sector - including manufacturers of steel, non-ferrous metals, machinery and machine tools, rubber, plastics and textiles products, and metal castings and shaping - so that within a short time Chukyo's entire economic structure was affected (Edgington 1996).

In 1951, in response to the economic and industrial post-war growth the Nagoya Port Authority was established jointly by Aichi Prefecture and Nagoya City as a managing body to administer, operate and develop the port of Nagoya. The postwar growth of Nagoya's port was the primary reasons for the city's emergence as a heavy industrial center and its ability to sustain a high level of manufacturing activity. As in earlier periods the prefecture and the city were motivated to create a solid infrastructure to support the expanding industrialization. This independence was a key to Nagoya's continued success as an industrial port city in the post-war period. The city of Nagoya showed it initiative by implementing a "War Rehabilitation Land Readjustment Project" during the post-war period. This was the largest project on a nation-wide scale, and was developed through the efforts and cooperation of the local citizens, municipal administration and the central government. A series of comprehensive city planning projects under this scheme were among the first of their type in Japan, and brought to Nagoya the fine network of inner city streets which can be seen today. Wide, well laid-out boulevards and parkland, which parallel a subway transit system, along with new underground shopping arcades, are among the most striking results of this period of planning. The area involved in the post-war urban development scheme in total encompassed 3450 ha (City of Nagoya, 1979:68; Nishio, 1988:8; Hayashi, 1990).
Between 1955 and 1965, many cities and towns were merged into the Nagoya City metropolitan area, so that both area and population grew rapidly. The population reached 1.4 million in 1957 (City of Nagoya, 1989:8). The textile and ceramics industries contributed substantially to post-war economic revival and to the opening of overseas markets for Nagoya. The boom in textiles was so substantial that Chukyo captured the lead in textile production during the 1950s from the Osaka-Kobe-Kyoto metropolitan area. At one point, textiles accounted for more than 40 percent of the total value of the region - noticeably concentrated in the western Nobi Plain in Aichi and Gifu prefectures, and infrastructure was mostly for industry. Although the automotive and other heavy industries grew rapidly in the post-war period, some earlier manufacturing based industries declined. The highest decline was in the textile industry, with a smaller deterioration of the ceramics industry. Despite the rise and fall of these industries, the Nagoya metropolitan area grew to 325 km² and the population reached 1.9 million by 1965 (Hayashi, 1990). Jobs for the expanding work force were created in the expanding heavy industries of the post-war period.

In the 1970s, together with stabilising of the country's high economic growth, the rate population to the city showed a tendency to flatten out. Since 1969, when the population exceeded 2 million the growth rate levelled off. From 1969 to 1989, the population has remained at a fairly stable at 2 million (Hayashi, 1992). By observing the population changes within the region, it can be seen that the population increased rapidly as a result of migration during the expansion of the economy and industry after 1955, but this tendency began to level off after 1975. Among cities and municipalities between 10 km and 30 km away from the city centre of Nagoya, the population increased remarkably and the "doughnut phenomenon" was seen in the 1970s (Edgington, 1998). In the early 1980s, population flow into major cities in Japan began again, and Nagoya's population also registered a slight increase. During this period the urban infrastructure was developed to accommodate the burgeoning industrial and population growth, with constant pressures to 'keep up'. The City planning Act provided for several different types of urban development projects to deal with the increase in population and urbanisation.
Land readjustment projects (*kukaku-seiri*), implemented by the city, dominated city planning in Nagoya. Projects under the Land Readjustment Act (1954) have been implemented in about 170 areas in Nagoya City, covering a total area of 11,500 ha, equivalent to almost a third of the total area of the city. This method has been the dominant method of urban development in Nagoya City.

**Figure 3-1 Changes in Population and Area in Nagoya (1890-1995)**

![Graph showing changes in population and area in Nagoya](https://via.placeholder.com/150)

Sources Hayashi, 1992, Planning for Nagoya, 1966 and 1996

**Nagoya in the 1990s**

In the 1990s, the doughnut phenomenon was the prime cause of rush-hour congestion, as workers and students commute to and from Nagoya City. The daily inflow of commuters to Nagoya was 500,000 people in the mid-1990s. Within a 50-km radius of Nagoya, there are the automotive cities of Toyota, Kariya, Okazaki, and Suzuki, the chemical industrial city of Yokkaichi, the textile cities of Gifu and Ichinomiya, and the pottery cities of Komaki and Kagamihara. Each of these cities developed as a typical industrial city and link together to form the Greater Nagoya industrial region. The Nagoya region is now one of the Production Bases spearheading the nation's industrial economic development. It is an important economical region accounting for 12% of Japan's total production and 2% of the World's GNP. Aichi Prefecture, which contains the Nagoya industrial region, is the top industrial prefecture having held this
production rank in Japan for 12 consecutive years. Heading into the 21st century, the Nagoya region is working towards becoming a nucleus city of worldwide technology and anticipation of this "Nucleus City Nagoya" is considerable.

In the 1980s and 1990s, strategic planning initiatives had good and bad points, but in 1988 the City introduced a "Nagoya New Master Plan" for the period 1988 - 2000 which covers all aspects of city administration, welfare, health, etc. (Nagoya City, 1989). It has a basic philosophy of how to promote Nagoya as a city with a good image for permanent living, similar to the "Tokyo My Town" concept of the early 1980s (Tokyo Metropolitan Government, 1984). This image also complements the Yonzenso strategy, and envisages Nagoya as an international center oriented towards R and D activities, advanced technology facilities, international convention centers and industrial training institutes. An array of policies, to be carried out within the city administration’s twenty-three divisional or sectoral plans and each of the City ward’s regional plans, have also been set out for implementation during the present decade (Nagoya City, 1989). This is another example of the planning mechanism working from the local level out to the national policy level. Nagoya continues to develop urban infrastructure policies that reflect its particular situation.

One of the major sections of the Nagoya New Master Plan was the land readjustment project. This project is a technique through which essential public facilities in a certain area, such as roads, parks and sewage, are created and/or improved, and individual sites are made easier to use and their site utility is increased by dividing them into more regular shapes (Sokamoto, 1998: 308). Due to the limited amount of level land available, this project is useful for the creation of the new urban infrastructure within the Nagoya region.

1990s Nagoya Cityscape

The City of Nagoya has seen major changes in recent years. Its trademark 100-meter wide-thoroughfares, once seen as deserted and as broadness simply for broadness sake, are now complemented by high-rise buildings that put it in proportion and create an appealing cityscape. As a Twentieth-Century City symbolized by buildings, automobiles, shopping streets, etc., Nagoya does have challenges for the
1990s. The Twentieth Century City may appeal to the eye, but it is not necessarily a comfortable environment full of creative stimulation for those living and working there. Though it is impossible to eliminate the elements of "residing" and "living" in the city as they are among the most important elements, city development has never taken them as definitive. These basic elements have instead, always subordinated them to production and consumption, structuring cites to meet the needs of these activities. Interestingly enough, however, today's post-industrial, electro-informational society has made the former separation of work and private life impossible to maintain, and the line separating the two is not as clear as it used to be.

As Nagoya pursues the image of a Twentieth Century City, there are new infrastructure challenges being faced. Nagoya needs to make use of its internal planning mechanisms. With the assistance of regional and central governments the city can reach the goals of the Nagoya New Master Plan.

**Challenges for the 1990s and Implications for Infrastructure**

Since the mid 1980s planning for the city of Nagoya and the surrounding Aichi prefecture has been conditioned by the national government's Yonzenzo- the comprehensive development plan of Japan's National Land Agency (NLA). Under the government's plan (the fourth such plan), the entire Chubu Region centered around Nagoya is targeted to serve as an international hub of Industry and Technology (National Land Agency, 1987: 11, Outline of the Aichi Prefectural Plan for the 21st Century, 1989: 3). The context of the government's strategy is to address the over-concentration of the Tokyo region in both Japan's national and international life. This over-concentration is currently viewed as the country's major regional development problem. A major objective of the plan is to develop both Osaka and Nagoya as counter magnet centers to Tokyo. These centers can build upon each region's international activities (National Land Agency, 1987: chp.2). For the Chukyo region, this means taking advantage of its industrial strengths, and world-class technology, as well as strengthening is nascent R and D and design functions (Edgington, 1996: 24).
Nagoya is also envisaged as becoming a more sophisticated and cosmopolitan city with an international reputation based upon design, technology exchange and technical training. In addition, it is targeted to improve its communication links with the surrounding industrial hinterland, the rest of Japan, and overseas. Under such framework, Chukyo will continue to be the number three ranked region, but have broad scale functions that are complementary to those of Kanto and Kansai, (ibid.66). The national government’s current five-year national economic and social development plan (Economic Planning Agency, 1992: 67) states that in the Kansai and Nagoya metropolitan areas, an effort will be made to further devolve advanced functions, taking advantage of the distinctive features of these areas. This plan makes an effort to encourage the deconcentration of functions from the Tokyo metropolitan area, and create the distinctive evolution of a multi-polar decentralized national land. This is a reaction to globalization and the extension of regional economies (ibid. 67).

The regional structure envisaged for Nagoya by Yonzenso was further articulated in the Aichi Prefectural Plan (1989), and the Nagoya City New Master Plan (1989). In these documents, a “National Central Axis” is created with Nagoya being ‘transportation, industrial and technology capital’ (Figure 3-2) (APP, 989: 3). The Chubu Region acts as the backdrop, Aichi Prefecture and Nagoya forms as the heart of this region.

**Figure 3-2 Nagoya and Chubu Region in Yonzenso**

![Figure 3-2 Nagoya and Chubu Region in Yonzenso](source: Aichi Prefectural Government, 1990: 3)
Yonzenso, the NLA, and the Economic Planning Agency plans for Chubu make much of the need to develop key regional infrastructure, such as airports and harbors, cultural and design centers, and academic and science cities. This is in response to Japan's need to adapt to international and domestic changes, including the "graying" of its society, the "junior baby boomers" and "economic hollowing out," and the need for new infrastructure provisions in the city (Ministry of Construction, 1995).

In the next three chapters, I review four new infrastructure projects aimed at making Nagoya a world class city ready to compete on the global economic stage. The next chapter looks at the Chubu International Airport a project centrally developed with regional and city support to accommodate the increased transportation needs of central Japan. In Chapter 5 the Aichi Cultural Center, and Design Center are discussed with regard to the production of the image of Nagoya as a world class city. In Chapter six the Shidami Human Science Research City is placed within the discussion of new forms of urban infrastructure. Each of these case studies builds on the argument that Nagoya is developing innovative urban infrastructure policy, which makes it competitive with other international cities such as New York, London and Tokyo. Each of the projects focuses on a different facet of urban infrastructure but they all share some common threads. These projects are a result of government influences, public and private financing, and growing competition for transient "knowledge intensive" industry.

Summary

Nagoya has grown from castle town to thriving metropolis from when it was municipalized in 1889 with an area of only 13 km2 and a population of 157,000 to 1995 with a population of 2.2 million and area of 328 km2. This increase in population and hence industrial growth led to infrastructure stress. Historically, Nagoya was a city run by manufacturing and in the 1980s corporations in Nagoya were confronted with the danger of economic "hollowing out". When the theory supporting a conversion to a service economy became widespread, the future of Nagoya clearly looked dark. The production of ordinary items has shifted as expected to foreign countries with lower labor costs, however, what has
happened is that items which are made in Nagoya, can be characterized as new products made by new methods.

The current train of thought is that if several conditions are satisfied (as outlined in Chapter One), then Nagoya’s future is bright indeed and there is a good chance that Nagoya will fulfil its role as an Industrial and Technology center. Taking into consideration Japan’s international position, it is possible for Nagoya to take an international lead in manufacturing with the new infrastructure constructed. The next three chapters will illustrate case studies as examples of coping strategies by all levels of government and of private sector desires.
Chapter 4 The Chubu International Airport

This chapter looks at the building of the second off-island airport in Japan the new Chubu International Airport. In 1987, discussion took place among the three prefectures of Aichi, Gifu and Mie, who together commenced initial survey work, looking forward towards future construction. This was in order to provide the Chukyo region a major facility and to assist its ‘internationalization’ efforts. When constructed in 2005, it will stand as the one of the largest in Japan, next to Tokyo’s expanded Haneda International Airport and Osaka’s Kansai International Airport. This project is perceived by many as indispensable for the Nagoya region to become a Pacific hub - specifically a place of technology exchange and international technical cooperation (Figure 4.1) (Chubu International Airport Research Foundation, 1990). Figure 4.1 illustrates that Japan is gradually beginning to assume international stature along with the EC countries and the NAFTA as one of the three poles of the world economy. This figure illustrates how the airport will contribute to “building a regional society full of life, where people with different values can live together, whilst feeling affluence for their individual lifestyles”. This image reflects that its construction and spin-off developments are expected to bring a huge injection of capital into the region (Edgington, 1996). This should especially affect the nearby Chita peninsula, for example Tokoname City in Aichi Prefecture and involve complementary uses to the airport on the mainland (Figure 4.2). These are likely to include convention centers, cargo terminals, business parks, industry and hotels. In the mid-1990s, Aichi Prefecture was actively lobbying for central government designation, as this would carry with it substantial subsidies for complimentary infrastructure (e.g. approach roads and associated land readjustment).
Figure 4-1 Image of Aichi as a Global Base

Image of Aichi developing as a global base for exchange and creativity


Figure 4-2 Location of Chubu and Surrounding International Airports

Source: www.pref.aichi.jp, 1999
The proposed area for the offshore site is an area in the eastern part of Ise Bay, off the coast of the Chita Peninsula adjoining Tokoname City, (Figure 4.2). When completed, the new airport will be available for 24-hour operations and will include 4,000 meter runways, necessary to handle the next generation in jet airplanes (The Chubu International Airport Research Foundation, 1996). Passengers at this new airport are expected to reach about 15 million per annum by 2005, 8 million of them being overseas passengers (ibid. 4).

It has not escaped most air travelers that "in Japan, there is as yet no international airport that has the scale and functions commensurate with the size of its economy." This statement, from the Sakura Institute of Research's "Pacific Business and Industries" (No. 32, Vol. II, 1996), shows that historically that has always been a capacity problem at Tokyo's Narita and Osaka's International airports. Transportation theory suggest a strong correlation between good transportation linkages and urban integration at the national, regional and global levels (Owen, 1987). The importance of transport in the evolution of the capitalist world economy, is implicit in Wallerstein's modernization theory, from which modes of network growth have been developed to help explain the economic development of a country and its incorporation into the world economy (Taffe and Gautheir, 1973). Therefore for Chubu transportation's main role is to foster inter-regional or inter-urban linkages for the purpose of economic growth and expansion. Chubu, is a region with 10 million people, equivalent to the size of the province of Ontario, therefore a well equipped International Airport is absolutely vital, especially considering Yonzenso's chosen role for Chubu as a Industrial and Technological capital, as noted in Chapter 3 (See Table 4.1). It is from this idea, that the construction of the new Chubu International Airport or sometimes referred to the Central Japan International Airport is so important.
Table 4-1 Main Indices For Central Japan (Chubu)

<table>
<thead>
<tr>
<th>ITEM</th>
<th>AREA (km²)</th>
<th>POPULATION (1,000)</th>
<th>DEPARTURES (1,000)</th>
<th>GROSS PRODUCT (Billion Yen)</th>
<th>PRODUCT SHIPMENT (Billion Yen)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SURVEY YEAR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>377,800</td>
<td>124,323</td>
<td>13,579</td>
<td>469,533</td>
<td>311,199</td>
</tr>
<tr>
<td>3 Chubu Pref.</td>
<td>21,520</td>
<td>10,634</td>
<td>1,142</td>
<td>43,172</td>
<td>48,058</td>
</tr>
<tr>
<td>5 Chubu Pref.</td>
<td>42,884</td>
<td>16,531</td>
<td>1,668</td>
<td>64,792</td>
<td>70,196</td>
</tr>
<tr>
<td>9 Chubu Pref.</td>
<td>59,520</td>
<td>20,906</td>
<td>2,027</td>
<td>81,113</td>
<td>84,241</td>
</tr>
<tr>
<td>Tokyo Zone</td>
<td>13,545</td>
<td>32,007</td>
<td>5,659</td>
<td>148,102</td>
<td>72,648</td>
</tr>
<tr>
<td>Kansai Zone</td>
<td>18,577</td>
<td>17,958</td>
<td>2,125</td>
<td>70,965</td>
<td>45,960</td>
</tr>
<tr>
<td>Per-Cent</td>
<td>5.7</td>
<td>8.6</td>
<td>8.4</td>
<td>9.2</td>
<td>15.4</td>
</tr>
<tr>
<td>Age</td>
<td>11.4</td>
<td>13.3</td>
<td>12.3</td>
<td>13.8</td>
<td>22.6</td>
</tr>
<tr>
<td>Of</td>
<td>15.8</td>
<td>16.8</td>
<td>14.9</td>
<td>17.3</td>
<td>27.1</td>
</tr>
<tr>
<td>Tokyo area</td>
<td>3.6</td>
<td>25.7</td>
<td>41.7</td>
<td>31.5</td>
<td>23.3</td>
</tr>
<tr>
<td>Japan</td>
<td>4.9</td>
<td>14.4</td>
<td>15.6</td>
<td>15.1</td>
<td>14.8</td>
</tr>
</tbody>
</table>


Existing Airport and its capacity

The Nagoya Airport located northwest of the city, is the facility serving the Chubu Region. Its sole runway, 2,740 meters long, is consistently busy with international and domestic carriers, Air Self-Defense Force planes and numerous small aircraft. In 1988 alone, 1.26 million international travelers used the airport, up 46 percent from the previous year (Chubu International Airport Research Foundation, 1990). Domestic air passengers numbered 74.5 million in 1994 (a 14 percent increase over five years): international air cargo came in at 17,000 tones (an 88 percent increase) and domestic air cargo came in at 2 million tons (a 26 percent increase over five years) (Sakakibara, 1993). International passengers increased 25 percent over the same period (See Table 4.1). With this remarkable growth, many overseas-based airlines have expressed their interest to fly in and out of Nagoya, which has put a corresponding stress on the inadequate existing facilities. In 1997, a second 3,000-meter long runway extension was added to comply with an increase in demand in air travel in the Chubu region. In April 1999, the new international terminal building at Nagoya Airport opened to handle an ever-increasing number of overseas travelers. The new terminal is designed to accommodate as many as 4.5 million people annually. The building, with a total floor area of 59,600 square meters, is beside the current facility and will feature an arrival lobby on the first and second floors and a departure area on the third floor. Still this will be the last
possible expansion, as with the urbanization of the immediate surrounding area, there is no hope of
being able to further lengthen runways or to enlarge the present area for terminal facilities. In fact,
Nagoya’s existing airport operation was restricted to 7:00 a.m. to 9:00 p.m. in Nagoya in 1994. In
addition to these limitations, serious environmental problems remain (ibid., 1993).

The Rationale for a New Facility

Both the public and private sectors in Nagoya and surrounding areas have promoted a large-scale airport
in the region because of the increase in demand for air travel in Japan, especially since the mid 1980s. In
fact in 1989, the governors of Gifu, Aichi and Mie Prefectures along with the mayor of Nagoya in a
conference decided that the location “off-shore” from Tokoname in the eastern part of the Ise Bay “was
desirable” for the airport site due to its location, as well as its accessibility, because the site is but 30 km
from downtown Nagoya (Figure 4.2). The need to plan for growth of air passenger traffic into and out of
the Nagoya region is also addressed through the expansion of the present Nagoya Airport passenger
terminal which must also take on an increase in traffic expected early in the 21st century (see Table 4.3).

However, at stated earlier, further physical expansion of its present north location is impossible because
the surroundings comprise a dense residential area. The current report shows that by the turn of the
century, there will be far too many takeoffs and landings to be handled by its single runway, and that also
this cannot be extended to a 4,000-meter-length runway required to handle the large aircraft capable of
flying directly to and from the US East Coast. Still another problem is the ongoing urbanization of this
northern area, which involves further noise reduction measures at the existing airport, measures that will
be difficult to meet. At the time of my field research, Chubu Airport was still in the planning stage,
although its location had already been decided in Ise Bay, at Tokoname, a town known for its ceramics,
on the West Coast of the Chita Peninsula. Over the remainder of the 1990s and into the next century,
various feasibility studies are planned. For example, in October 1993, the first overall commission by six
ministries and agencies headed by the National Land Agency was held and in November of the same year,
the Special Committee of the Chubu International Airport Research Foundation announced the status of feasibility.

Figure 4-3 Nagoya Airport Statistics

Table 4.2 shows that from 1975 to 1994 there has been a 125% increase in domestic demand for air travel in Japan, matched by a 185% increase in international demand. It can also be seen in Table 4.2, that there has been an increase in domestic cargo (169%) and a staggering increase in international cargo (215%) during the same time period. In fact, existing international airports in Japan have been unable to meet the increasing demand for sometime and this is an issue acknowledged by Japan’s transportation planners. For instance, the airport at Narita (New Tokyo International Airport) in 1992 handled 67 per cent of the international passengers and 83 per cent of the international freight of the entire nation, with only one runway (Sakakibara 1993). With the opening up of Kansai Airport in Osaka in 1994, this number was decreased to 56 and 71 percents, respectively. By the turn of the century, it is estimated that 70 million
passengers will be flying in and out of Japan. The sheer numbers alone tend to cast doubt on the quality of service that could be provided at The New Tokyo International Airport and the Kansai International Airports, given the enormous gateway responsibilities. Still, Narita is notoriously crowded and prior to the building of the second terminal in 1992, the confusion and poor service passengers received at the airport often dismayed foreigners arriving in Japan (www.narita-airport.or.jp, 1999.)

Table 4-2 Demand for Air Travel in Japan

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Domestic # of passengers ('000)</th>
<th>% change from previous period</th>
<th>Domestic Number of passengers ('000)</th>
<th>% change from previous period</th>
<th>Domestic Tons of Freight ('000)</th>
<th>% change from previous period</th>
<th>Domestic Tons of Freight ('000)</th>
<th>% change from previous period</th>
<th>International Tons of Freight ('000)</th>
<th>% change from previous period</th>
</tr>
</thead>
<tbody>
<tr>
<td>1975</td>
<td>25,445</td>
<td></td>
<td>7,942</td>
<td>50.67</td>
<td>165</td>
<td>75.15</td>
<td>298</td>
<td></td>
<td>492</td>
<td>65.10</td>
</tr>
<tr>
<td>1979</td>
<td>41,360</td>
<td>62.55</td>
<td>11,966</td>
<td>37.45</td>
<td>435</td>
<td>45.0</td>
<td>794</td>
<td></td>
<td>531</td>
<td>49.33</td>
</tr>
<tr>
<td>1980</td>
<td>40,424</td>
<td></td>
<td>12,146</td>
<td>34.67</td>
<td>469</td>
<td>45.0</td>
<td>873</td>
<td></td>
<td>794</td>
<td>49.33</td>
</tr>
<tr>
<td>1984</td>
<td>44,717</td>
<td>10.61</td>
<td>16,695</td>
<td>46.54</td>
<td>661</td>
<td>40.94</td>
<td>1,518</td>
<td></td>
<td>1,581</td>
<td>73.88</td>
</tr>
<tr>
<td>1985</td>
<td>43,776</td>
<td></td>
<td>17,584</td>
<td></td>
<td>691</td>
<td></td>
<td>1,997</td>
<td></td>
<td></td>
<td>26.31</td>
</tr>
<tr>
<td>1989</td>
<td>60,120</td>
<td>37.34</td>
<td>29,953</td>
<td></td>
<td>746</td>
<td>7.95</td>
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<td>1990</td>
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<td>31,045</td>
<td></td>
<td>910</td>
<td></td>
<td>3050</td>
<td></td>
<td></td>
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<tr>
<td>1994</td>
<td>74,550</td>
<td>14.25</td>
<td>38,860</td>
<td>25.17</td>
<td>1080</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2000*</td>
<td>92,000</td>
<td></td>
<td>55,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2005*</td>
<td>104,200</td>
<td></td>
<td>64,400</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Source: Sakakibara, (1993:51)
*Forecast

Financing and Implementation

This project is not scheduled to begin until early in the 21st century, and is officially designated as a government approved scheme. The airport's construction is expected to be carried out by a third sector company (i.e. a joint public/private sector venture). The funding will be shared by the national government at 40 percent the total capital [27% of total fund]; local city and prefectural governments, 10 percent [7% of total fund]; private; and 50 percent [67% of total fund]; (Edgington, 1996: 25, www.pref.aichi.jp, 1999). A further loan of 460.8 billion Yen is need for a total cost of 768 billion Yen (Figure 4.4)
In its Sixth Five-Year Airport Development Plan, the Japanese Government designated The Chubu International Airport as an "Airport for actual survey." In its Seventh Five-Year Airport Development Plan Basic Approach (Interim Report), approved on August 24, 1995, the Council for Civil Aviation designated The Chubu International Airport as one of the "international hubs" and included it as one of the "urgent project tasks." Various surveys were conducted to gauge the many residents in the Chubu area and the feedback was submitted with approvals in 1997. Also, the above parties concerned believe that the processing capacity of the existing Nagoya Airport is estimated to reach its limit at the beginning of the 21st century. In the Chubu regions, it is also required to promote the development of the new airport which satisfies the air transport demands backed by the economic power of the region (www.pref.aichi.jp, 1999).

**Implementing Agencies**

The Chubu International Airport Coordination Group established in December 1995 achieved the coordination of the various public and private sector partners involved in the infrastructure. This group

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2 The term for the Seventh 5 Year Airport Plan (1996 to 2000) was extended for another two years in December 1997 and the plan was revised as the Seventh 7 Year Airport Development (1996 to 2002).

3 The objective was to meet the urgent national request for increasing the means of international exchange by air transport and extending the domestic air transport network, the development of hub airports in conurbation which will be the nucleus for the air transport network will be treated most urgently.
has an advisory board comprised of leaders and experts in local governments (Gifu, Aichi, and Mie Prefectures), the city of Nagoya, related branch offices of central governments, local business organizations and The Chubu International Airport Research Foundation. The Minister of Transport established the foundation with approval in Japan to conduct research activities, scientific and comprehensive surveys and related activities, on the airport situation in the Chubu Region, its on-going improvements. It works in close co-operation with Gifu, Aichi and Mie Prefectures, together with the city of Nagoya and local business circles. This board allows strong coordination and facilitation of the complex airport development, including issues such as access development and community relations (interview with Hirokazu Ishikawa, 1994).

The Chubu proposal has an advantage over Kansai, for it will be in a position to learn from the experience of its predecessor. However, by the time Chubu is completed, Narita and Kansai may each have three runways, and a number of other airports in Japan may take international connections. Chubu will also have to compete for international business with Seoul, Taipei, Manila, and other major airports in East Asia.

Projected Demand for Chubu International Airport

Based upon the projected demand (trial calculation) in the Seventh Five-Year Airport Plan, the Nagoya Airport will reach its limit early in the 21st century in terms of the number of takeoffs and landings possible. Virtually 40% of the people from Central Japan must now use Narita or Kansai International Airports. Needless to say, these travelers will use the Chubu International Airport the moment it is constructed (Figure 4.3). The Chubu Region has more than 20 million people and accounts for some 18 percent of Japan's GNP (see Table 4.1). And from this, the demand for the Chubu International Airport is so great, that an area where anywhere from 13 to 15 million people will be flying annually by the year 2005. Table 4.7 shows the time access comparisons to the three major airports in Japan: Narita, Kansai and the proposed Chubu International Airport. With the construction of this airport, the cities in the Chubu region will now have greater access to air travel. With the need so great, the building of a truly
international airport facility to link the Chubu Region with the world at large takes on immense significance.

**Evaluation**

Fortunately, Chubu has the benefit of being only 1 km offshore, due to the fact that the noise level of modern aircraft has been reduced. The access bridge back to the mainland will be shorter and so transportation to and from the airport will be more convenient. The sea is shallower and the seabed has been found to be more solid. One problem will be to find sufficient landfill material. Chita Peninsula is rather flat and has no mountains. Material brought in from a distance will be costly and environmental care will be needed. In spite of this, the entire cost of airport construction will be less than half that of Kansai Airport. If the cost is kept low, and the demand for airport landings and takeoffs is strong, Chubu Airport could become profitable soon after its opening, in which case it would be easy to finance it without resort to funds from the central government. The airport could be financed by revenue bonds as is being done in airport construction in other countries. Local governments could raise money through tax incremental financing or through other development instruments.

In the case of Kansai, regulations governing the airport company limit its activities to those directly connected to the construction of the airport. The company may not reclaim any more land than is strictly needed for the airport. Newly created flatlands through excavating mountains cannot be sold by the company. Instead, it has had to buy fill material from the owners of the mountains who are frequently municipal governments. In other words, the company has had to externalize external economies and internalize external diseconomies - as has been the case regarding compensation for the fishermen. Chubu should at least be able to internalize external economies. The airport will probably be constructed and managed by a stockholding company in the same way that Kansai is, although a larger part of the burden will have to be borne by local governments and private corporations in the area, because the budget constraints of the central government are expected to be tighter. This should be welcomed, because greater independence from the central government could thereby be achieved and private corporations
will be able to play a larger role. It should also be mentioned that the Chubu area, in acquiring another airport, will face the same problems as Kansai.

Summary

Chubu International Airport is being discussed under the heading of mega infrastructural development in Japan through construction in the sea. The sea seems to be the only remaining underutilized space in Japan. The above proposed and ongoing projects show that for some countries, it has become cheaper to build mega infrastructure in the sea than on land. Whether this will set a trend for the future in other countries remains to be seen. And, if indeed it does become a trend, the technology - both hard and soft - developed through the construction of the Chubu Airports would be available for utilization.

Further, a rapidly expanding and sophisticated global network of transport services and infrastructure facilities are evolving not only in Nagoya, but also around the world. The world city paradigm (Friedmann, 1986) posits a distinct role for certain cities in articulating regional and national economies in the global system. World cities develop hierarchical relationships that rise and fall over time according to their control and mediary functions in the system. As commanding nodes in the world economy, world cities are defined by dense patterns of interaction between people, goods, and information. The airline/airport linkages offer the best illustration of transport’s role in the world system for five reasons:

i) global airline flows are one of the few indices available of transactional flows or inter-urban connectivity; ii) air networks and their associated infrastructure are the most visible manifestations of world city interaction; iii) great demand still exists for face-to-face relationships, despite the global telecommunications revolution; iv) air transportation is the preferred mode of inter-city movement of the transnational capitalist class, migrants, tourists, and high-value, low-bulk goods, and v) airline links are an important component of a city’s aspirations to world city status. Therefore, the proposed Chubu International Airport will help Nagoya compete in the ranking of World cities. Table 4.3 shows a summary of the opening date of the Chubu International Airport, size and dimension of the project, operations, responsibilities and improvements to the area and areas involved.
Table 4-3 Summary of the Chubu International Airport

<table>
<thead>
<tr>
<th>Summary</th>
<th>Targets for the Chubu International Airport</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target opening date</td>
<td>2005 is the projected opening date.</td>
</tr>
<tr>
<td>Location of Runway Centre</td>
<td>Actual runway centre position shall be within the area proposed by the feasibility research study.</td>
</tr>
<tr>
<td>Scale</td>
<td>Runways: 2 (each 4,000 m in length, close parallel in design). Area: Of a scale consonant with 200,000 takeoffs/landings per year</td>
</tr>
<tr>
<td>Construction &amp; Project Costs</td>
<td>Construction costs: ca. 700 billion Yen (at opening). Project costs: ca. 800 billion Yen (at opening) (at 1994 prices)</td>
</tr>
<tr>
<td>Form Taken by Overall Airport Operations</td>
<td>Studies will be made to address and resolve various problems in this regard. The airport operations themselves will be subject to ongoing investigation.</td>
</tr>
<tr>
<td>Business Management &amp; Responsibilities of Local Governments</td>
<td>The goal is a profitable, highly competitive airport. The goal is a &quot;single-year balance in the black in 10 years, resolution of accumulated loss in 15 years, and complete repayment of debts within 30 years.&quot;</td>
</tr>
<tr>
<td>Improvements of Related Access and Involved Areas</td>
<td>Practical consideration of improvements of related access to the new airport will be considered. To improve main roads, railways and maritime access in time for the airport opening. To maintain a connection with the existing Nagoya Airport.</td>
</tr>
</tbody>
</table>

(Source) From the "Local Governments' Fundamental Approach to the Chubu International Airport," by the Chubu (Central Japan) International Airport Promotion Federation, 1995
Chapter 5 Nagoya’s Cultural and Design Centres

In this chapter, I will look at the need for ‘leisure’ in Japan and the desire for affluence. Next, an outline of Nagoya’s infrastructure is compared to Tokyo and Osaka, the two other large metropolitan centers in Japan. Last, I will outline the new Aichi Arts Centre and the International Design Center Nagoya, the two new infrastructure projects now complete in Nagoya. This will be followed by a summary of findings and conclusions.

The Need for Leisure in Japan

This chapter illustrates the addition of urban infrastructure with respect to leisure and culture through a consideration of the Aichi Cultural Center and the International Design Center Nagoya. “Quality of life,” and world class infrastructure are the main impetus of these projects. The Aichi Prefectural Plan (1990) stressed the importance of cultural and cultural centers, and in answer to this stress, built the Aichi Arts and Cultural Center, which was completed in 1992. The International Design Center Nagoya completed in 1996, by the city government was constructed to encourage design and innovation for the manufacturing sector of Nagoya. Nagoya’s particular needs for leisure and cultural infrastructure is both a response to “world city” globalization, competition and the demands of its citizenry for a more affluent lifestyle, parallel to its economic prosperity.

Zukin (1995) for example notes that cultural venues in particular, have now become necessary conditions for any city that aspires to a place on the contemporary circuits of urban tourism, including lucrative convention and conference trade. The ‘Signature’ culture\(^4\) in the urban core (such as the Aichi Cultural Center and the International Design Center Nagoya) examined in this chapter is an important means to promote Nagoya as both a cultural and a commercial centre one that can define this city as “world class”. The chapter begins by discussing Nagoya’s need to ‘catch-up’ with Tokyo and Osaka in terms of cultural

\(^4\) Signature Culture was coined by Azrieli (1998) as a recognition, that today, the interaction of commercial and cultural functions is necessary to building a world class city. Signature culture includes theaters, concert halls and museums, that which is important to the ‘image of the city’.
facilities, and then goes on to examine the financial and implementation issues relating to this point of leisure-based facilities.

**Nagoya's ‘leisure infrastructure’ compared with Tokyo and Osaka**

Nagoya has always lagged behind Tokyo and Osaka in the provision of civic facilities such as museums, art galleries and tourist attractions. As shown in Chapter 4, local government priorities in this century resulted in a spirit of regional economic independence, but they also left a legacy of Nagoya focusing on economic development rather than city beautification. Eyre (1982) notes that "until World War II, Nagoya remained essentially an expanded version of the original castle-town in layout and general appearance. Tokyo and Osaka visitors could speak of it descriptively as an overgrown farm town, meaning that growth in economic stature and population had not brought it commensurate class" (Ibid. 35). As will be pointed out later, the perception exists today that Nagoya and the wider region of Chukyo has to shake its image of being merely a manufacturing region and emulate the social amenity levels of Tokyo and Osaka. According to Murphy's survey (1993), Nagoya's city image is "conservative", "subdued and not sophisticated", it is "boring industrial city". The *Aichi Voice* (1995) and Akita (1994) surveys of views from citizens from Osaka and Tokyo found that they perceived expressed Nagoya as "lacking culture" and charm. When asking foreigners which city in Japan would you like to visit, Nagoya was not mentioned. Consequently, both Aichi and Nagoya took advantage of the 1980s economic boom period to develop plans for improving Nagoya's cultural and tourist facilities. The two major projects in view at the time of the author's field survey were the Aichi Arts and Cultural Center and the International Design Centre Nagoya (known as the Nagoya Park Building).

**The Aichi Arts Centre**

The need for a major cultural center, one, which combined an art gallery, art library, theatre and mini theater, concert hall, and art plaza, was first promoted in the Aichi Strategy Plan of 1990 and this new infrastructure was opened in 1992. In previous generations, before the Meiji Restoration, Aichi had been

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5 The list in descending order was Kyoto, Tokyo, Yokohama, Sapporo, Kobe, Nara, Osaka and Kanazawa.
not only a center of production but also a cultural crossroads nestled between Tokyo and Osaka.

Consequently, Aichi has always served as a meeting point for the nations' eastern and western cultures. Aichi Prefecture has long been progressive about absorbing outside cultural influences and making them into something all its own. One example is "Rural Kabuki," a unique form of Kabuki theater that developed in Nagoya. And the distinctive floats seen in regional festivals evolved as a fusion between making techniques indigenous to the region (Aichi Voice, 1995).

The Aichi Arts Centre is located in the heart of Nagoya City (Figure 5.1). The Arts Centre is close to public transportation for easy access and is close to the central business district for after work use. While the building itself does not speak to any one art form (Figure 5.2), the facility includes a wide range of art, from live performances to art galleries.

**Figure 5-1 Location of Aichi Arts Centre and the International Design Centre Nagoya**

[Map showing the location of Aichi Arts Centre and the International Design Centre Nagoya.]

Source: City of Nagoya, 1996
The notion of bringing “outside culture” to Nagoya is inherent in the new Arts and Cultural Center. According to government promotional brochures the role of the Cultural Center is to “enhance the vitality of local culture and forge a distinctive new identity for the region”. As the first comprehensive arts and culture complex in Japan, the Aichi Arts Center includes a full-fledged opera house, a concert hall, an art museum and an information center that provides the latest information on arts and entertainment. The Aichi Arts Center also hosts a wide variety of concerts, recitals, art exhibitions, and theatrical performances, both Eastern and Western. In fact, in the permanent collection of the art museum, non-Japanese works are restricted to European and American art (Whitehead, 1995). This is to reinforce the point that older models of internationalism and cosmopolitanism encourage engagement with other cultures on their own terms, globalism idealizes a transnational or post national culture in which difference is sanitized and made “accessible”, so that Europeans and Asians and Americans can follow the same cultural events and personalities (Whitson, 1998).
The Aichi Arts Center is located in central Nagoya by Hisaya-odori Park. The main building occupies an entire city block in downtown Nagoya and comprises 12 floors above ground, and 5 floors below ground, with a total site area: of 24,911 square meters (Figure 5.3). The construction of the facility took three years to complete beginning in March, 1989. The construction costs totaled 62.86 billion-Yen ($576 million US dollars), and Aichi Prefecture Government (including initial planning, design, construction, environmental maintenance, gardening work, construction management and organ installation) met all expenses. This is the first large multi-arts complex in Japan, and accommodates the Prefectural Museum of Art, the Art Theater, the Arts Promotion Service along with the Aichi Prefectural Library located in the Nagoya Castle area. The Museum of Art consists of Permanent Collection Rooms and Temporary Exhibition Rooms, Galleries and a Outdoor Exhibition Space. The Aichi Arts Center aim is to be a hub of dissemination and exchange of international art, with attention with attention to fine art in Aichi Prefecture. Some of the more recent performances of Opera have been performed in only Nagoya, “this was significant as it has helped dent the over concentration of cultural activities in Tokyo” (Aichi Voice, 1995:5). According to Yuzuru Yokoyama, program manager of the Aichi Prefectural Arts Promotion Service, Aichi Prefecture will become an international center of cultural activity.

Implementation of this project has been carried out by a public corporation, The Aichi Prefecture Culture Promotion Corporation established in 1992 with a fund of 2 million-Yen ($20 thousand US dollars) from Aichi Prefecture Government. It has also been responsible for managing the arts and culture operations, supporting cultural activities, as well as public relations. It has a total staff of 17, nine seconded from Aichi Prefecture Government, and 8 are newly recruited full-time staff. In 1997 it had an income of 630 million-Yen ($600,000 US dollars), including 508 million-Yen ($470,000 US dollar) subsidy from Aichi Prefecture (Aichi Arts Center, 1999).
Although it has been difficult to gauge the success of this new infrastructure, it is clear that the Aichi cultural center is a "cultural mall," one that has all the 'signature' culture that would ever be needed in a "world class" city. Nagoya appears therefore to have taken note of the importance of the city's image under conditions of intensified competition, and positioned itself at the forefront by constructing a state-of-the-art cultural center Featherstone (1991).

**International Design Center Nagoya**

The main users of design and architecture are undoubtedly private firms and corporations. When it comes to imposing, aspirational expressions of individuality and prestige, in design and architecture, Japanese companies have to see design/architecture as promotional tools ...... but they prefer to hire US or European designers (Llwyn-Davis, 1996: 233).
Yet another project which has added to Nagoya’s array of leisure and cultural facilities has been the International Design Center Nagoya completed in 1996 (for location Figure 5.1). Plans for the Design Center had been in the making since spring 1986, as Nagoya began readying to host the biennial ICSID (International Council of Societies of Industrial Design) Congress, as well as the World Exposition. Both events were held in 1989, the year that marked the one-hundredth anniversary of the city of Nagoya. As the twenty-first century approached, it was apparent that design was becoming increasingly important to the industrial sector. Design was also considered an indispensable element in the increasing the “livability” of a city that, up until the late 1980s, had concentrated on the functional element. In response, the Nagoya City Council in 1988 adopted a Design Declaration, which stated that the concept of design should be an important consideration in the future development of the city. The ICSID ’89 Nagoya Congress convened the following year with a total of 3,700 participants, a number greater than that of any previous ICSID Congress. The World Design Exposition, also held that year, welcomed 15 million visitors. Such an event gave the plans for the International Design Center the vitality to reach a successful completion.

The origin of the strategy of promoting Nagoya as a ‘design city’ can be traced to the ‘loss of face’ and the stature following its failure to win its bid to host the 1988 Olympic Games (hosted in Seoul). At that time, as recompense to the citizens, the major decided to host the Design Exhibition and International Design Conference in 1989. This consolation prize event was deemed successful, and in the same year saw the declaration of Nagoya as a “Design City.” In 1990, an International Design Center Promotion Committee was created, consisting of the city of Nagoya, Aichi Prefecture, the Nagoya Chamber of Commerce and the Central Japan Economic Association.

In 1992 International Design Center Nagoya was formed and paradoxically in a building designed by a foreign architect. The capital of the center is 12 billion Yen (US $136 million). There are 102 corporate trustees. The facility consists of a Design Lab, Offices, Seminar Room, a Library, a Design Hall, a Design Museum, and a Mart (www-art.aac.pref.aichi.jp, 1999). The cost of the center was 15 billion Yen
($170 million US) of which construction cost were 11 billion Yen ($125 million US). The Operations include R&D, Training and Developing Talents, Developing Corporations, Managing Museum, Collecting and Providing Information, and Managing Marts (Ibid.).

It is a venue for professionals and the public alike, and includes a function for exhibits, conferences, and research activities. It’s a celebration of design and its significance to culture and the marketplace. The International Design Center Nagoya has a range of activities including design business fairs and the display of new design work to design seminars for corporate executives and an upcoming international forum on design management. The building can be seen as a wider strategy to transform the image of Nagoya into a “world center for design”. Thus, since 1990 the city has also developed an annual Design Week. Held on October, this event promotes designer participation in future projects and promotional activities. Nagoya sponsors a national design competition, also held annually. In 1995, the World Interior Design Congress of the International Federation of Interior Designers was held in Nagoya, and the next year saw the inauguration of Nagoya University’s School of Design and Architecture. The city plans to welcome the new millennium by hosting the World Graphic Design.

Presently, the City of Nagoya is trying to strengthen and improve the city area, aiming at “building Nagoya into a town people would want to live in,” which they declared in their new basic plan. In their policy, in addition to reinforcement of the infrastructure, focusing on road improvements, which they have consistently promoted since the end of the war, the city is aiming at becoming a design city overflowing with sensibility. In a sense, it was the intention of the city to hold various design events, centering on the World Exposition, making the event a good opportunity for citizens to become design-minded. Of the events, the “Urban Design Seminar” achieved success due to the substantial content, which it owed to participation from diverse fields. As the 21st century draws ever closer, businesses are facing a variety of challenges, such as adopting environmentally sound processes, adapting to the networked society, and responding to the new global economy. The key to determining the ideal approach to the society of the 21st century is design. Moreover, in light of emerging social issues such as the aging
of society and the need for environmental awareness, design provides the inspiration for innovation and business development. Adopting the theme "Creating Corporate Strategies by Design," the International Conference on Design Management '99 Nagoya will bring together people from around the world who are involved in design as well as business managers who have established successful businesses that utilize design as a key component. The conference has two purposes: to discuss the significance and new role of design in the business of the future, and to investigate ways in which design management can exploit the full potential of design.

The city will host the Congress of the International Council of Graphic Design Association (ICOGRADA) in 2003. Thus, the establishment of the Design Center is actually just one event or a culmination of events in a series of design promotion initiatives launched or hosted by the city of Nagoya. The Project was financed by three sectors: the Aichi prefectural government; the Nagoya municipal government; and the local industrial community, which includes the Toyota Motor Company. The founders decided that the building housing the Center would be located in the Sakai district—the heart of the city and would be housed in a complex that would also accommodate a business center building and the Nagoya Youth Cultural Center (Figure 5.1). The choice of location was made with the belief that the Design Center should benefit not only the industry and design communities, but the public, as well. A design competition was held to choose an architecture firm and a design firm from the United States was the chosen candidate.
The majority of the functions listed above can be found in design centers in New York, London, and other places. What makes this center unique is the Design Museum whose aim is to enlighten and cultivate the “design mind” throughout the public. The displays are conceptualized as a three dimensional mediation, through sketches, models videos and other exhibits, on the course of a single idea as it percolates within the mind of the designer. There are seven such displays, and they give visitors a sense of design as a developmental process. Another exhibit, the Design History Wall, displays more than 200 photographs that offer a chronicle of modern design, from its origins during the Industrial Revolution through the postmodernism of the 1980s. The wall illustrates the way in which design has undergone change in step with social and technological development.
Since its opening, the Design Center has hosted more than 60 exhibitions, seminars, and international conferences. All kinds of design are represented, from industrial to graphic and fashion design, as well as crafts and architecture. True to its mission to serve the public, as well as the industrial sector, the Center also holds seminars and workshops aimed at non-designers. Design seminars held for managers of small and medium size business corporations have proved to be very popular, offering CAD training and lectures by noted designers, among other things.

Summary

As shown earlier in Chapter 4, Nagoya is moving to become a post-industrial city. Consequently the city is striving to encompass a new set of values and the cultural and design projects reviewed here can be seen to be an important part of that strategy. It is often said that Nagoya has little indigenous culture, but it is obviously attempting to move in a new direction (Kitahara, 1989). This direction recognizes that cites are not just for profit but “for living”. At the same time, the notion of a ‘design center’ is to use culture or creativity to help improve the city’s economic base (Figure 5.5, p. 64). Figure 5.5 illustrates how the creative design process works, from the education system to marketable products. To a large extent however, the possible impacts of the Japanese creative industries maybe constrained by Japanese ‘homogeneous’ culture and in particular by the ‘language barriers’ of not being as exposed to other languages as in the West (Llewelyn-Davies, 1996: 233). It can also be noted that “global culture” has less to do with cross-cultural understanding than with the potential profits available from franchising into new and affluent markets, and the result maybe one of ‘cultural standardization,’ around a largely ‘western’ set of practices.
Figure 5-5 The Creative Design Process - from Education to 'Marketable' Products

Source: derived from Llewelyn-Davies, 1996: 176
Chapter 6 The Shidami Human Science Town

This chapter is a case study of Shidami Human Science Town located in the northeast area of Nagoya (Figure 6.1). It is a response to the region's new focus on infrastructure provisions in Nagoya. The new development, called the 'Shidami Human Science Town' is designed to become home to public experimental and research institutions, private research institutes, and other academic and scientific facilities. In this Chapter, I will look at the rationale for the project; history of the Shidami area, planning of the R & D city, finance and implementation for Shidami Human Science Town (SHST) will face. Japan and Nagoya are notable examples of the belief that technology increases economic strength and thus is conventionally regarded as playing a role in the rise of nations (Yakushiji, 1994: 57).

Shidami Human Science Town (SHST) is a priority project, one that could play an important role in the City's industry vitalization plan (sangyo kasseika keikaku). This project is the result of a fear of Nagoya’s industrial 'hollowing-out,' one of the keys to the reversal of industrial ‘hollowing-out’ (endaka fukyo) (see Douglass, 1987; Fujita and Hill, 1989: Edgington, 1996) is Research and Development (R & D), innovation and advances in technology. Advances in technology added to Japan’s growth and total factor productivity (TFP) (Katz, 1998). R & D planning takes place in a situation of rapid shedding of labor-intensive production and assembly of high-tech products, including computers and robots. In the past, this has been the major source of Industrial exodus in the past decade to low-wage countries. It is hoped that the construction of Shidami Town will attract a number of highly paid executives, top research personal and scientists that will halt the effects of ‘hollowing out’ and maintain Nagoya’s high standard of living.

\[ \text{TFP} = \text{Total factor Productivity (output per unit of labor plus capital)} \]

It is estimated that advances in technology added up to 2 percent a year in Japan’s growth and total factor productivity (TFP) in the 1950s and 1960s (Katz, 1998).
Figure 6-1 Map of Nagoya and Surrounds - showing the Shidami Area and other R & D Facilities

Source: Edginton, 1998
Rationale for the project – response to “hollowing out”

If current trends continue, in ten years, our company won’t export a single item from Japan. Half of our sales will be overseas—a much more than the 30 percent overseas sales we have today. But what we sell overseas, we will have to make overseas (Katz: 1998: 47).

The Japanese economy is characterized by the existence of a dual structure in which efficient manufacturers and inefficient service-related sectors coexist (Douglass, 1987; Katz, 1998). Low productivity in the service sectors act as a drag on manufacturing, preventing their development and lessening their international competitiveness. This situation feeds the ‘hollowing out’ phenomenon of the manufacturing sector (Iida, 1991). According to MITI (1998), by the year 2000, Japan is expected to have 15 percent fewer factory jobs than in 1992. For instance, over the past seven years, Matsushita Electronics doubled its workforce from 131,000 to 266,000, but only 6,000 of the new hires were in Japan. Hitachi also doubled its workforce, from 171,000 to 322,000, but actually decreased its Japanese payroll by 1,000 (Katz, 1998). As Japan’s efficient sectors have shifted their capacity overseas, the domestic economy’s manufacturing job base has fallen and the Japanese economy has become more dominated by the low-productivity service sectors, such as retail. The second factor, was the appreciation of the Yen, in which the cost of production (labour) is now too high and the manufacturing jobs seek other lower cost centers (i.e. NIE’s). As a result, wages have been cut, more low-wage part-time labor is being used, and labour saving devices, particularly robots and office automation, are rapidly being adopted as a means of ‘hollowing-out’ industrial employment in the name of international competition (Douglass, 1987: 35). The following is an outline of such high-tech infrastructure in Nagoya that will heed the calls to halt the fear of industrial ‘hollowing-out’ through the investment in R and D and an increase in value-added products.

Toyota, is just one corporation in the Nagoya region that is combating the effects of ‘hollowing out’ (endaka fukyo) by carrying out the following strategies:

1. Producing - or sourcing cheaper components and parts overseas to take advantage of the lower costs of imports to Japan.

2. Kaizen or continuous cost cutting - through changing production design, sources of supply and technological improvement.
3. Changing its product mix toward higher value models and hence gaining higher profitability per unit of production (Edgington, 1996: 17).

For example, the automobile industry located around Nagoya remains unease within the region as export-oriented production has already dropped below levels existing in the mid-1980s and is unlikely to recover (Ibid.). There is also the realization that car production for the domestic market has begun to level out and eventual continue to decline into the next century. In the long term, because of continued trade friction and the pressure for increased foreign investment - together with growing competition by the Asian NIEs - the possibility of a gradual but inevitable ‘hollowing out’ of certain manufacturing sectors in Nagoya still exists. If a number of large plants, especially in the general machinery industrial sector, should also relocate substantially overseas, the shock could be transmitted through their chains of local suppliers and subcontractors with potentially grave economic consequences for the Chukyo region. This is one of main reason for the construction of the International Design Center Nagoya and Shidami Human Science Research City to combat the effects of ‘hollowing out’

In the promotion of this development its proximity to Nagoya and inter-city connections is particularly stressed, especially when compared to other research and university towns such as Tsukuba Science City (outside of Tokyo) and Kansai Science City (outside of Osaka). The City of Nagoya has recognized the importance of enhancing services for academic research, R&D and information exchange. The city regards adding high value to existing industry and creating new industry as indispensable to building a foundation for the long term development of Greater Nagoya towards the coming century, while concentrating on the flow of technological innovation, advanced information networks, internationalization and economic trends (see for example, Tatsuno, 1991, Edgington, 1994a, Simmie, 1994: Dearing 1995).

The History of the Shidami area

Shidami is proposed to be a high quality research city and residential areas on approximately 780 hectares of land in the Shidami district of the northeastern Moriyama Ward that Nagoya City plans to develop. As
can be seen from Figure 6.1 the location of this project lies 10-15 kilometers from the centre of Nagoya, and is close to Aichi Prefecture's proposed R & D zone (East-Nagoya Hillside Academic Research Town) and Gifu Prefecture's proposed Tono Seibu Science City, as well as the Expo 2005 site. It is also relatively close to the existing Nagoya airport, and the Tomei, Chuo and Meishin expressways. Set within an attractive natural environment, the new town is envisaged to be a balance of housing, R & D, manufacturing, commerce and business, sports recreation, and cultural facilities (Nagoya, 1989a:27). The town plan also includes an R & D industrial park and a Software Village - an area for information industries - to establish the town as a center for leading-edge technologies. A seminar house and other facilities for study, training, and academic conferences are being planned for the new town to serve as a venue for a wide variety of technological exchange (Fujiwara, 1992, Edgington, 1996). SHST is envisaged to provide a new type of urban community in Japan for around 50,000 people over the next 15 years. A new guideway bus system and a comprehensive telecommunications network to the Shidami corridor is being planned, and these will provide much needed access to this area (Public Works Research Institute, Ministry of Construction, 1989; Fujiwara, 1992, Economic Affairs Bureau, 1997).

Planning for a Research and Development Town by the City of Nagoya

The City of Nagoya initiated the planning of the Shidami Human Science Town. The area is included the City's Urbanization Promotion Area (shigaika kuiki) designated under the City Planning Law. But large-scale development has just started, and much remains of the paddy fields and forest typical of the urban fringe (Edgington, 1998: 9). The Shidami area comprises undulating hills along the River Shonai, and the large green zones of Shinrin Forest Park at the northeast and Mt Togku to the southeast surrounds it. Together with the former Moriyama City, this was amalgamated into Nagoya City in 1963. At that time Shidami had many barriers to its development mainly due to topographical constraints and the lack of major transport systems, including direct rail and arterial road connections. The Moriyama Ward, shaped in like a jutting thumb in northeastern Nagoya, has a hilly interior, and much of the urbanization is in the southern third where lowlands prevail (Eyre, 1982). The inhabitants and private landowners demanded improvement of infrastructure based on land re-adjustment. However, Shidami is the last remaining area
for either extensive housing or any other large-scale development within the boundaries of Nagoya City. At the commencement of the area's planning in 1989, there were four major village communities already existing in rural settlements (Fujiwara, 1992, Edgington, 1998). The area has experienced suburban sprawl in the past two decades, with an increase in population growth. For example, Kikko, close to Nagoya city centre; has experienced a 50 percent increase in the past decade (Fujiwara, 1992: 15).

The Shidami Human Science Town was designated in the City's New Basic Plan (1989a) as a priority project, one that could play a key role in the City's industry vitalization plan (sangyo kasseika keikaku). The Shidami area was defined as a priority development area and as an "international center of industry and technology" in the Yonzenso (1987), as part of Aichi Prefecture's plans for a Nagoya East Hills Research and University Town. This was in response to the economic changes (economic 'hollowing out') as outlined earlier in this chapter. The national government felt the economic structure of Nagoya was changing, and if it wanted to remain prosperous this new type of infrastructure, based on science and technology (R&D) was needed.

It is believed that this area will help Nagoya maintain technological supremacy that promotes a belief in economic rationality and efficiency (Yakushiji, 1994). Economic efficient mass production with standardized technology creates wealth and is crucial to the Chubu manufacturing region. Economic planners have high hopes that the development will attract the private research institutes that the City desires through providing researchers and their families with attractive living environments (Economic Affairs Bureau, 1997). Consequently, preserving the forested hills and upgrading the banks of the Shonai River surrounding the area is an important issue for the city. A variety of recreational activities are already clustered around Shidami, including major forest parks (Shinrin and Jokoji), the Toyosan Fruit Tree Park, the Obata Ryokuchi (green park), historic parks such as Shiratori-zuka, and Kofun, an ancient tomb (Shiratorizuka Tumulus), and privately owned recreational facilities. Besides the availability of recreational facilities, researchers can potentially enjoy adjacent working and living places, where
commuting by bicycle will be possible. Although the exact mix of housing has not yet been
determined the development is likely to favour single family residences (Hayashi, 1997, Edgington,
1998).

Figure 6.2 shows the distribution of land uses for Shidami Human Science Town. This figure shows that
the science parks are spread throughout the development in five small clusters. The mid-1990s economic
recession in Japan meant that only public sector research institutes have been recruited to the first of these
developments, the 'New Industry Creation Zone' (shin sangyo sozo zo-n) ('Area A' shown in Figure 6.2)
(Edgington, 1998). This contains the multi-purpose Research and Development Centre built in 1997. It
is a core facility containing shared laboratories and machine rooms for advanced industrial technologies,
and houses three new public research institutions: (a) the Science and Chemistry Laboratory (Rikagaku
Kenkyujyo) and the Bio-mimetic Control Research Centre; (b) the Nagoya Industrial Science and
Technology Research Centre; and (c) the Micro Mechanics Research Centre (Ibid., 1998). Other public
facilities being recruited include the Nagoya Manufacturing Technology Laboratory of MITI, and in the
'Academic Research Zone' (Figure 6.2) the second campus of the Nagoya Institute of Technology. While
all these major investments are driven by the public sector, in the long run it is hoped that private sector
institutions will also come to Shidami to find superior facilities for high science and technology, private
corporations emphasizing research and development, private research laboratories and other research
institutes. When the entire ‘town’ is completed over the next 15-20 years it is hoped that it will be one of
the three major technology centres in Japan (Ibid. 1998).
Source: Edginton, 1998
Finance and Implementation

The Shidami area is being transformed from predominantly a rural area into a modern urban development through the 'land readjustment' method (see footnote 1- Chapter 3)- a technique which requests from landowners up to 35 per cent or so of their land without any direct monetary compensation. Many land readjustment projects in other parts of Nagoya have been implemented principally by self-financed systems utilizing only a small amount of City grants or national government subsidies. In this way urban infrastructure could be brought into the suburban areas quite smoothly in advance of housing at only a small cost to the City itself (about 10 per cent of the total project cost) (Edgington, 1998).

In implementing the Shidami Science Town project, the City of Nagoya faced a number of difficulties. Thus, Hayashi (1997) provides an interesting insight into how Shidami encountered numerous financial problems that have impeded its progress. To begin with, the Shidami Human Science Town started in conceptual form in the early 1970s not as a high technology district but as a residential development (Fujiwara, 1992:17). At that time it was based on a division of the entire area into its four original communities, each having an average area of around 200 hectares. Second, there was very little enthusiasm for the improvement scheme among the original community, many of whom wished to retain the existing rural lifestyle of the Shidami area. For others the high private land contribution of around 45-50 per cent required by the readjustment method was problematic. This 'donation' was necessary due to the relatively steep topographical conditions in part of Shidami, as well as the large-scale infrastructure improvements that had to be provided. Needless to say this proposed loss of individual property itself led to many of the 11,000 landowners involved opposing the land readjustment project. Perhaps even more significant was the City's initial reluctance to provide extensive financial assistance for this project, and accordingly it stagnated for several years in the 1970s and early 1980s due to lack of external funding. In fact, the national government had to be brought in to assure the sources of this local infrastructure project.

Finally, in 1984 the City applied for a special national subsidy available for housing provision and which was available for urban infrastructure projects in the largest three metropolitan areas in Japan (Tokyo,
Osaka and Nagoya). In this way, about two-thirds of development costs could be met by the subsidy, and the land contribution required from private landowners reduced accordingly (Edgington, 1998). From this time onwards the land readjustment project proceeded more smoothly, commencing initially in the Kikko district, which was the closest to Nagoya's existing built-up area (Figure 6.2).

By 1988, the City promoted the concept of using Shidami as one core a much larger eastern Nagoya Science City development, even though by this time some parts were already underway for residential use. The major challenge then was how to secure about 100 hectares for science park use within the total project at minor cost to the City. In an ideal situation this would normally have been provided out of the 'reserve land' contributed by the private landowners through land readjustment (Figure 6.3). But regardless of this hypothetical ideal, the actuality was far different and the 'reserve land' which would have been required for the Science City plots could not be obtained from the land readjustment alone, and which were already underway. So, eventually, five separate areas of land suitable for science park uses were obtained by more direct means, partly throughout using land reserves obtained by land readjustments, and partly through direct negotiations with particular land owners. These five sites were distributed throughout the whole area in order to harmonize with the proposed residential areas (Figure 6.2). To reiterate, normally the land readjustment is not carried together with land purchase for developing specific urban infrastructure. But Shidami was an exception due to the willingness of the purchases being based upon mutual agreement and carried out 'in the open market' (Hayashi, 1997).
Table 1 indicates that land readjustment associations were commenced eventually in the other three districts of Shidami in the 1990s after the land contribution was set at about 35 per cent (i.e. much lower than the originally proposed 50 per cent). The substantial public infrastructure achieved through this method is indicated in Table 2, which also reveals that certain areas were retained for long-term farmland. Most of the 'land contribution' taken from private landowners and given to the project was used for public facilities, such as wider roads or local parks (about 20-25 per cent of the total area), while the remainder (about 10-15 per cent) was kept as a reserve for parts of the Science Park as well as for commercial shopping complexes. Table 3 indicates just how important the sale of this reserve land was to the financial viability of the entire scheme (about 65 per cent of total project cost).
As a local land readjustment project, Shidami received nearly 30 per cent of its financing through a national subsidy and the City's contribution to the project amounted to just 2 per cent. Other revenues (about 5 per cent) came from public authorities responsible for specific road and river improvements (e.g. the central Ministry of Construction). It can be said that the Shidami Special Land Readjustment Project shared the costs between public and private partnerships, which is a rather typical approach to urban development schemes in Japan.

Table 6-1 Land Readjustment Projects in the Shidami Area at Their Initial Stage

<table>
<thead>
<tr>
<th>District</th>
<th>Approved Year</th>
<th>Project Area (ha)</th>
<th>Number of Landowners</th>
<th>No. of Land Parcels</th>
<th>Built-up Ratio (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kiko</td>
<td>1984</td>
<td>213</td>
<td>1,400</td>
<td>4,980</td>
<td>10.6</td>
</tr>
<tr>
<td>Shimo-shidami</td>
<td>1992</td>
<td>160</td>
<td>1,600</td>
<td>1,080</td>
<td>23.3</td>
</tr>
<tr>
<td>Naka-shidami</td>
<td>1995</td>
<td>192</td>
<td>5,200</td>
<td>2,240</td>
<td>34.7</td>
</tr>
<tr>
<td>Kami-shidami</td>
<td>1993</td>
<td>193</td>
<td>2,300</td>
<td>1,400</td>
<td>21.3</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>758</td>
<td>11,100</td>
<td>5,920</td>
<td>21.9</td>
</tr>
</tbody>
</table>

Source: Edgington, 1998

Table 6-2 Land Readjustment Planning

<table>
<thead>
<tr>
<th>District</th>
<th>Project Area (ha)</th>
<th>Land Contribution</th>
<th>Project Cost (billion Yen)</th>
<th>Planned Population</th>
<th>Roads (kms)</th>
<th>Park/ Green Areas</th>
<th>Farmland (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kikko</td>
<td>213</td>
<td>35.3%</td>
<td>42.83</td>
<td>15,800</td>
<td>5.5 (45.85ha)</td>
<td>18 places (10.8 ha)</td>
<td>13.6</td>
</tr>
<tr>
<td>Shimo-shidami</td>
<td>160</td>
<td>33.7%</td>
<td>34.55</td>
<td>11,000</td>
<td>3.9 (33.2 ha)</td>
<td>15 places (8.0 ha)</td>
<td>9.3</td>
</tr>
<tr>
<td>Naka-shidami</td>
<td>192</td>
<td>35.2%</td>
<td>46.20</td>
<td>14,000</td>
<td>4.7 (39.7 ha)</td>
<td>17 places (9.6 ha)</td>
<td>6.0</td>
</tr>
<tr>
<td>Kami-shidami</td>
<td>193</td>
<td>34.0%</td>
<td>34.78</td>
<td>14,000</td>
<td>4.3 (38.8 ha)</td>
<td>14 places (9.7 ha)</td>
<td>2.1</td>
</tr>
<tr>
<td>Total</td>
<td>758</td>
<td></td>
<td>158.36</td>
<td>54,800</td>
<td>18.4 (157.5 ha)</td>
<td>64 places (38.1ha)</td>
<td>31.0</td>
</tr>
</tbody>
</table>

Source: Edgington, 1998
Table 6-3 Land Readjustment Project Revenue (million Yen)

<table>
<thead>
<tr>
<th>District</th>
<th>National Subsidy</th>
<th>City Grant</th>
<th>Sales of Reserve</th>
<th>Other Revenue</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kikko</td>
<td>10,000</td>
<td>1,039</td>
<td>30,921</td>
<td>865</td>
<td>42,825</td>
</tr>
<tr>
<td>Shimo-shidami</td>
<td>11,180</td>
<td>270</td>
<td>20,802</td>
<td>2,297</td>
<td>34,549</td>
</tr>
<tr>
<td>Naka-shidami</td>
<td>14,198</td>
<td>945</td>
<td>30,429</td>
<td>628</td>
<td>46,200</td>
</tr>
<tr>
<td>Karni-shidami</td>
<td>10,650</td>
<td>888</td>
<td>20,964</td>
<td>2,964</td>
<td>34,776</td>
</tr>
<tr>
<td>Total</td>
<td>46,028</td>
<td>3,142</td>
<td>102,426</td>
<td>6,754</td>
<td>158,350</td>
</tr>
<tr>
<td>Ratio (%)</td>
<td>29.07</td>
<td>1.98</td>
<td>64.68</td>
<td>4.27</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Source: Edgington, 1998

Summary

At the turn of the century Nagoya has faced many economic and infrastructural challenges, including Industrial 'hollowing-out' and lack of R and D facilities. Nevertheless, this city has responded with the proposed construction of Shidami Human Science Town. The case study shows a strong commitment to the idea of retaining long-term manufacturing in Nagoya in the face of strong competitive pressures to adjust. Thus compared to North America, governments in Japan have been disinclined to endorse a future where the service sector is too dominant, and in the spirit of 'manufacturing still matters' have been willing to implement policies to guard against eventual de-industrializing at a local level (Edgington, 1998). Certain parts of the service sector have been perceived as deficient in Nagoya's economy - namely the 'back-up' services required to support the region's considerable production prowess through design, information technology, software, and research activities - and steps have been taken to promote or secure them in Nagoya with the construction of Shidami Human Science Town.

Shidami represents the very last development area within the City of Nagoya's boundaries, and one which exemplifies the convergence of state-of-the-art urban management in Japan with a city-led strategy designed to restructure Nagoya's 'economic base'. Whether all the efforts underway in Shidami will have the effect of attracting the private research institutes and the high quality development that the planners hope for, only time will tell. Indeed, whether Shidami will become a well-balanced and vibrant
community remains to be seen. The role of higher education and academic research to innovation is important in fostering innovation. And historically, there have been few formal links between education and industry. This is due to “bureaucratic jurisdiction” with higher education being the responsibility of the State Universities and the Ministry of Education and industry being the realm of MITI and other ministries (Llewelyn-Davies, 1996: 64). Traditionally they have operated very separately and there is little synergy. There are no guarantees behind Japanese programs for industrial restructuring or innovative urban planning, even in Nagoya.
Chapter 7 Conclusions

'You wouldn't understand,' says a man who offers her a lift, 'your country's rich, but we Japanese, we're poor.'"

"I wondered whether to argue with him. But how could I tell him the rest of the world sees Japan as rich, when you had only to look out the window to see how poor it was?"

(Tabb, 1995, 169)

Against the backdrop of Japan’s tremendous economic growth in the post WWII era to the 1990s, the Japanese have a image of lacking public amenities in the urban environment, while having one of the highest standards of living in the industrialized world. Changes in Japan’s urban population and demographics have had an enormous effect on the cityscape of the modern Japanese city. Global market forces in the 1990s are also bringing changes in urban planning policy and the city of Nagoya has responded to these demands. This concluding chapter states the summary of major findings of the thesis, theoretical implications, and suggestions for further research.

Summary of Major Findings

The aim of this thesis has been to look in detail the four major infrastructure projects currently underway in Nagoya and its environs. In the past 100 yeas, Japanese City planning focused on providing ‘economic’ infrastructure to the extent that social amenities were neglected. However, as the millennium approaches, planning issues have arisen in response to issues of ‘internationalization’, ‘knowledge and technology’ and ‘quality of life’ issues, and these are reflected in the on-going debate of infrastructure provisions in Japan. As global capitalism continues to be at the forefront of industrial growth and expansion, Castells (1977, 1972) and Harvey (1973) have revolutionized the study of urbanization. The crux of their scholarship has been to link city-forming processes to larger historical movement of industrial capital. Hence, the city is no longer interpreted as merely a social ecology, subject to natural and predominantly domestic forces inherent in the dynamics of population and space; it came to be
viewed instead as a product of specifically social forces set in motion by capitalist relations of production and consumption, often initiated at the global scale.

As the century closes, Japan still maintains one of the richest standards of living in the world, as far as ‘economic’ indices are concerned (for example GDP per capita, industrial exports by country, passenger car exports, ownership of principal merchant fleets, and so on.). However, many Japanese feel that the nations affluence is not fully reflected in their daily lives. Figure 7.1 illustrates that Japan still lags behind other industrialized countries in life-related social capital such as roads, sewerage systems, urban parks and other public facilities. Achieving a better standard of living for its people is considered by many to be one of the biggest challenges facing Japan in this coming century. It should be noted that some of the life-related indices are difficult for the Japanese to achieve, for example the area of urban parks per capita. Thus, Tokyo has 2.5-m² park per capita, and it will be difficult to match the ratios of Chicago (23.9), London (30.4), or Bonn (37.4), and other industrialized cities, since Japan is 80 percent mountainous (Noh and Kimura, 1989).

**Figure 7-1 International Comparison of Social Capital**

![Diagram showing international comparison of social capital metrics](image_url)

Chapter One and Two showed that urbanization was intimately connected to Japan's modernization and rise as an economic power over the last century. It is no surprise that urban infrastructure provision has long prioritized economic development in this period, and emphasized projects such as inter-city railways and roads, ports and industrial estates. In the 1990s, however, city development and associated urban infrastructure has had to address the new themes in response to continuing 'international competition' and corresponding economic 'hollowing out'. These forces of globalization were demonstrated to be a 'world-wide' phenomenon, which the Japanese developed a unique way to cope with the changing environment.

Nagoya, Japan's third largest commercial and industrial centres was examined in chapter 3, and has not been immune from these overall trends. Urban infrastructure such as its port, road infrastructure for 'just-in-time' delivery systems, and industrial land, were shown to have been important components in its last century of urbanization and industrialization. More recently however, this city has had to rethink its infrastructure priorities to cope with greater industrial competition from nearby Asian countries (NIEs), the internationalization of its society, and the need to upgrade its cultural and design facilities. Table 7-1 illustrates the completion of major infrastructure provisions in Nagoya during this century.
Table 7-1 Infrastructure Development in Nagoya 1900-2000

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Infrastructure Provision – Nagoya</th>
</tr>
</thead>
</table>
| **Early modernization - pre War period 1868-1945** | Port of Nagoya - 1907  
                                | City water system 1914  
                                | City Library 1923  
                                | City Assembly Hall, Sewage plant and Nakagawa Canal 1930  
                                | Municipal Hospital 1931  
                                | Nagoya National Railway 1937  
                                | Botanical Garden 1937  
                                | City run human waste pick-up 1941 |
| **Industrial Growth - 1945-1985** | War Rehabilitation and Land Readjustment – 1946  
                                | Nagoya City University 1950  
                                | Nagoya Castle rebuilt 1959  
                                | First portion of subway 1960  
                                | Second section of subway 1965  
                                | Third section of subway 1967  
                                | Fourth section of subway 1969  
                                | Fifth section of subway 1971  
                                | International Exhibition Hall 1973  
                                | City trolley lines discontinue 1974  
                                | Sixth section of subway and New City Museum 1977  
                                | Urban Expressway #2 and Archeological Museum 1979  
                                | Sports Center of Handicapped 1981  
                                | Seventh section of subway 1982  
                                | Nagaya Performing Arts Center 1983  
                                | Eight section of subway 1984 |
| **Post-Industrial Growth 1985-1995** | Urban Expressway #3 1985  
                                | Urban Expressway #1 1986  
                                | **The Chubu International Airport 2005**  
                                | **The Aichi Arts Center 1992**  
                                | **The International Design Center, Nagoya 1996**  
                                | **Shidami Human Science City 200?** |

Sources: derived from Planning for Nagoya, 1996, Hayashi, 1990

Chapters four, five and six, examined details of four major infrastructure projects recently completed or in the planning stages in the greater Nagoya metropolitan region, projects which reflect the shift of concern
with urban infrastructure planning. The study looked at the proposed Chubu International Airport in chapter four, especially in terms of its overall need, implementation agents and financial arrangements, and provided an overall evaluation. The construction of this project, the second ‘off-island’ airport in Japan was seen as being crucial for Nagoya and Aichi Prefecture’s economic future as an “Industrial and Technological” Capital. The national central axis from Tokyo to Osaka, to which Nagoya is the centerpiece, is the pinnacle of Japan’s global manufacturing base.

Chapter five illustrated that Nagoya has searched for ways to emulate the cultural levels of Tokyo and Osaka, and this has led to the development of two major facilities; the Aichi Arts and Cultural Centre, and the International Design Centre Nagoya. These two centers reflect the new-found affluence found in this central Japanese city. The city hopes to rid itself of the stereotypes of being “uncultured” and “unsophisticated” (Akita, 1994). The International Design Center Nagoya fills two voids: one, of being a center for ‘innovation’ and ‘creativity’, two important elements to combat the effects of ‘economic hollowing out’, and the cornerstone of developing and design new ‘value-added products.

Chapter six focussed on the Shidami Human Science City, giving details of its rationale, planning history, and financial arrangements and implementation problems. R&D, information technology, software design, private and public industrial cooperation, and multilevel government collaboration are key ingredients for the successful implementation of this project. The strong commitment from the many levels of government, and the idea of retaining long-term manufacturing in Nagoya, in face of stiff global competition is the foundation for Nagoya’ future prosperity. This can be illustrated in Table 7.2, which indicate the above average ratio of persons involved in secondary industry in Aichi and Gifu, two prefectures in close proximity to Nagoya. This constant trend is the backdrop for Central Japan, and its strong manufacturing base.
Table 7-2 Ratio of Persons Involved in Secondary Industry by Prefecture

<table>
<thead>
<tr>
<th>Year</th>
<th>Tokyo-to</th>
<th>Osaka-fu</th>
<th>Aichi-ken</th>
<th>Gifu-ken</th>
<th>Prefectural Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td>31.8</td>
<td>38.8</td>
<td>42.4</td>
<td>43.5</td>
<td>33.6</td>
</tr>
<tr>
<td>1985</td>
<td>29.7</td>
<td>36.8</td>
<td>41.9</td>
<td>44.0</td>
<td>33.1</td>
</tr>
<tr>
<td>1990</td>
<td>28.4</td>
<td>36.0</td>
<td>41.9</td>
<td>44.0</td>
<td>33.3</td>
</tr>
</tbody>
</table>

%Change of Persons Employed in the Secondary Industry

<table>
<thead>
<tr>
<th>Year</th>
<th>Tokyo-to</th>
<th>Osaka-fu</th>
<th>Aichi-ken</th>
<th>Gifu-ken</th>
<th>Prefectural Average</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-3.4</td>
<td>-2.8</td>
<td>-0.5</td>
<td>0.5</td>
<td>-0.5</td>
</tr>
</tbody>
</table>

Source: 1993/94 Social Indicators by Prefecture, Statistics Bureau, Management and Coordination Agency, Japan p.85

The four projects represent major financing for infrastructure developments in the Nagoya area (Table 7.3). Through the successful completion of these projects, the City of Nagoya hopes to keep in pace with the upcoming new age and adequately fulfill an important role in the international society. Yet, with the current recession in Japan, this may be the beginning of the final stage of 100 years or more of large public sector financing of infrastructure. This may prove to be an important juncture as for many planners and politicians it is the very idea that public works is what holds Japan together (Tokushima, 1999). Still in light of the current poor economic environment, the Japanese public is pondering the cost of 'governments' efforts to spend their way out of the recession. One leader of an anti-dam lobby, who organized a referendum on the island of Shikoku, was quoted as stating that “we came to realize that public works are not for the public”. Between 1992 and 1998, the Japanese government has spent an estimated $750 billion on infrastructure improvements, including highways, bridges, dams, airports, and so on. According to The Economist (1999), by March of this year, the government had reassessed more than 8,000 projects and it has plans to cancel 35.
Table 7-3 Four Case Study Summary

<table>
<thead>
<tr>
<th></th>
<th>The Chubu International Airport</th>
<th>The Aichi Arts Center</th>
<th>The International Design Center Nagoya</th>
<th>Shidami Human Science City</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Motivation</strong></td>
<td>An increase of travel demand (Globalization)</td>
<td>Lifestyle superpower Need for culture</td>
<td>Lifestyle superpower Knowledge Intensive Economic Structure</td>
<td>Knowledge Intensive Economic Structure</td>
</tr>
<tr>
<td></td>
<td>Inadequate existing airport facility</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Source of Financing</strong></td>
<td>National govt. 40% Municipal govt. 10% Private 50%</td>
<td>Aichi Prefecture Total: 63 billion</td>
<td>Aichi Prefecture Total 12 billion</td>
<td></td>
</tr>
<tr>
<td>(billions of Yen)</td>
<td>Total: 768 billion</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Completion Date</strong></td>
<td>2005</td>
<td>1992</td>
<td>1996</td>
<td>2015</td>
</tr>
</tbody>
</table>

Source: derived from author’s field research

Theoretical Implications

There are a number of theoretical implications that flow from the study’s findings. Early in this thesis, I outlined the Japanese idea of the city as an important entity in Japanese economic and urban development. First, the evidence in this research supports the general thrust of cities are now domestically important and globally important. World cites are competing on a global scale for jobs, prestige and power. A principal characteristic of Japanese urbanization in the post WWII era was the rapid increase of urban population. With the particularly high rate of economic growth since the 1950s, the share of population living in Japanese cities has doubled over forty-five years from 1950 to 1995, increasing from 37 % to 78 %. Urban Theory would suggest that the Japanese approach to this rapid influx of population into the urban centers should deviate from the Western model due to a shorter historical time frame, near devastation of the major urban centers after WW II and the density and size of Japan.. Aspects of Japanese cities, such as a high urban densities, compactness, public-private financing
and organization, perplex Western urban planners, who generally provide over generous space in their development and have focused on broad urban issues such as single type land uses, zoning, retail, wholesale and or residential areas (Callies, 1997, 1994, 1993). However in the competitive fight for global capital, Japanese planners have focused on providing and retaining a strong city core in Japan, something which appears quite different than developers who favour suburbanization in the West (Hansen, 1984). Aspects of desakota and mixed land use are also more dominant in the Japanese urban environment, and are generally not experienced in the Western cites (McGee, 1987a, 1987b, 1989, 1991: Armstrong and McGee, 1995). Central to the traditional wisdom of the western urbanization process is the notion that rural and urban activities are usually treated as distinctive, separated over space, and polarized in function.

The findings of this thesis suggest that Aichi prefecture and the city of Nagoya's continue to work in unison towards a goal of urban infrastructure improvement to maintain this regions primacy in manufacturing and technological development. Both the "Nagoya City New Basic Plan" and the "Outline of the Aichi Prefectural Plan for the 21" Century" stress the continuing facet of internationalization, interchange of goods, information and people. The city and the prefecture realize that international relations are no longer seen largely as centralized "country-to-country", but "city-to-city". It is from this that the two agencies have developed infrastructure that is important for such interchange. Problems, particularly the deficiencies in urban infrastructure, public amenities and to make improvements to the quality of the urban environment are major tasks at hand for urban planning in Nagoya and also in Japan (Alden and Abe, 1994). Fooglesong (1986: 235) furthers this notion with the claim that "one can understand the history of urban planning in all its rich complexity, with appreciation for why urban planning in a capitalist society is both necessary and impossible".

**Suggestion for Further Research**

This thesis discussed the changing priorities in urban infrastructure in Japanese cities especially due to emerging pressures such as "internationalization", the shift to "knowledge-intensive industries", and the
search for a higher urban ‘quality of life’. The case study of the four major projects under way in metropolitan Nagoya during the early 1990s was a response to these pressures. The research findings demonstrate that in the 1990s, Nagoya was indeed moving towards a ‘new’ urban development strategy based around these major infrastructure projects. It is suggested that the following three points suggest where new research could be started:

1) The impact of the new mega-projects in terms of new industrial investment, tourism and economic growth in the metropolitan Nagoya area.
2) Changes in perceptions of Nagoya’s ‘vitality’ among its citizens.
3) Nagoya’s competitive position with respect to infrastructure provisions vis-à-vis other sites in East Asia.
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