

Can New IT Program be a Good Urban Policy for a Municipality? A Case of Loma Linda Community Program, California

Yoko KAWAI ^a, Yumiko HORITA ^b

^a *Penguin Environmental Design, U.S.A./Japan*

^b *Kobe University, Japan*

YKawai@PEDarch.com

Abstract: In this chapter, Connected Community Program (LLCCP) of the City of Loma Linda, California, was investigated as a case study for the IT infrastructure program by a municipal government. First, the challenge that the city is facing, which is to see the balance between encouraging the growth and preserving the character as a small town, was elucidated. Then, LLCCP's contents as well as its relationships with other plans of higher rank were examined to find out that it has a potential to create economically active highly-dense work/live community, thus to contribute to the smart growth of the city. This study showed the encouraging possibility of IT program both as an urban policy to address challenges of municipality, and as a governmental telework promotion.

Keywords: Urban Policy, Information Technology, Municipal Government, Telework, Work-at-home, Infrastructure

Introduction

In each level of the American governments, telework promotions have been carried out by different agencies/departments independently. While work-at-home by telework could affect housing, economic, environmental, and labor conditions of the society, the corporation between the related agencies/department is rarely seen in promoting telework. This lack of corporation and coordination is especially clear in the Federal promotion, and suggests that it “will not impact the telework expansion in short time of the period” (Kawai & Horita (2005)) [1].

Meanwhile, the implementation of new IT infrastructure has lately attracted much attention from the local governments in the U.S. Examples are the municipal Wi-Fi services by many such as Philadelphia, San Francisco, and Long Beach. Their deployments of IT infrastructure are often meant for the improvement of both technology and economic/environmental condition. For that purpose, municipalities are trying to find ways

to connect their new IT programs with related urban policies such as housing, transportation and land use. If they succeed in this effort, their new IT programs would not only facilitate telework directly, but also create the urban environment which fits and encourages telework, especially the one at home. Then, is it possible that this new IT program, by being more comprehensive, is more effective as a governmental telework promotion than conventional ones?

These emerging municipal IT programs, by being connected to other urban policies, also have possibility to affect the future of environment in suburban and rural towns in America. Many urban scholars, including Mokhtarian (2002) [2], discussed on the urban decentralization under the impact of IT, however, the condition at the possible destinations of this potential decentralization has been neglected so far. The municipal IT program as an urban policy might be a key to understand it.

1. Objective and Method

In this chapter, *Connected Community Program (LLCCP)* of City of Loma Linda, California was investigated as a case study for such a municipal program.

Loma Linda is one of the forty American cities that deployed fiber optics and provide services, and only one city to include fiber optic into its building code. Its service started in September 2004. The objectives of this chapter are;

1. To elucidate characteristics which set the city a part from others, and the challenges it faces as a municipal government.
2. To examine the LLCCP method from urban-planning points of view in an effort to speculate how it could contribute to address the challenges.

For these purposes, LLCCP plan and the related statistics were analyzed as well as regional plans for the city, the county, and the larger region of California. Site visit, in-person interview, and phone interview with the city officials were conducted between November 2005 and May 2006.

2. City of Loma Linda

The City of Loma Linda is located within western San Bernardino County approximately 100 km east of Los Angeles (Figure 1). The following four were examined in the first part of the chapter to clarify the characteristics and challenges of Loma Linda; 1) Social background, 2) Economic condition, 3) Housing condition, and its 4) Financial status as a municipality.

2-1. Social background

The city, small with current population of about 19 thousands, is growing fast. It expects 49% more residents in 30 years (Table 1). This growth rate is higher than that of the larger

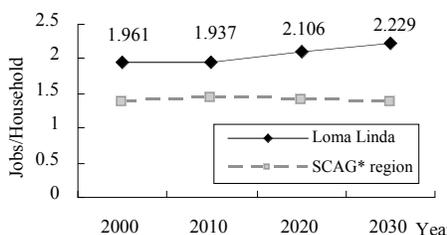
Organizational Change

region surrounding the city (; 39%) which itself is experiencing the growth due to the foreign immigration.

Since its beginning in 1890's, Loma Linda University and Loma Linda University Medical Center have been the center of economic and social activities of the city to this day. This fact is reflected to its demography (Table 2). It has large proportion of residents in the age cohort of 25-44 (university/medical students) and of 65 and order (seniors residing in or around medical facilities). The residents are highly educated with Bachelor's degree (; 34%) and with Master's or higher degree (; 21%). The majority of its household earns more than 95 % of the county median income. More than half of its residents are in management/professional occupations.



Figure 1. Location of Loma Linda



Loma Linda data was calculated by author based on data by SANBAG, 2004. *Southern California Association of Governments

Figure 2. Projected Number of Jobs per Household

Table 1. Population Projection for Loma Linda & SCAG Region

	Loma Linda*	SCAG Region**
2000	18,837	16,500,000
2010	23,648	18,000,000
2020	26,703	19,200,000
2030	28,111	22,900,000
Growth rate in 30 yrs (%)	149	139

*City of Loma Linda Draft General Plan, October 2005

** U.S. Census Bureau data for '00,'10,'20. SCAG, 2004 RTP data for 2030.

Table 2. Socioeconomic Profile of Loma Linda Residents

(unit: %)

	Loma Linda	San Bernardino County		Loma Linda	San Bernardino County
Age*			Income**		
-5	6.2	8.4	(expressed in the ratio to the county median income)		
5-19	18.0	27.2	Up to 50%	21.2	23.0
20-24	8.0	7.1	50-80%	15.8	16.0
25-44	33.2	30.1	80-95%	6.7	22.0
45-64	19.2	18.7	More than 95 %	56.3	39.0
65-	15.4	8.6			
Education*			Occupation*		
Less than high school	11.8	25.8	Management, Professional	55.0	28.1
High school	12.2	25.0	Service	15.3	15.8
Some college	20.6	25.7	Sales & Office	20.2	27.3
Assoc./Bachelor's degree	34.1	18.0	Farm./Fish./ Forestry	0.1	0.5
Grad./Professional Degree	21.2	5.5	Construct./Extract./Maint.	3.2	11.3
			Production, Transportation	6.1	17.0

* U.S. Census Bureau, Census 2000, **SCAG, Regional Housing Needs Assessment 1999

2-2. Economic condition

The same reflection is apparent in the economic condition. Nearly 70% of the jobs located in the city are for health care and social assistance industry (Table 3). The city is rich in job with almost 2 jobs per household (Figure 2), while “1.3 jobs per household is often cited as a balance between jobs and housing” [3]. Jobs in Loma Linda are expected to grow further, especially in medical services, since “due to the developed nature of Southern California, business will be forced to begin locating in outskirt areas such as western San Bernardino County” [3].

2-3. Housing condition

In the regional scale, 2004-5 annual increase rate of housing price in Riverside-San Bernardino-Ontario Metropolitan Statistical Area (; 24.3%) was one of the highest in the country (Table 4). This area also was positioned in the third in the number of single family house building permit. This is because, while the median housing price there (; \$388,900) is affordable only for 20% of residents in Southern California, this is still less expensive than in Los Angeles-Long Beach area where the price is 40% higher.

As of 2006, pre-owned homes in Loma Linda have average price of about \$400,000, and are 10 to 20 years old. There are some communities in about 15 km radius which have similar home prices and profiles of home-owners with Loma Linda including Redlands, Grand Terrace, Highland, and a part of Moreno Valley (Figure 3). The fact that the city is rich in jobs means that it has smaller number of houses than jobs, and that people are presumably commuting to Loma Linda from these surrounding comparable communities. The city does “not believe that Loma Linda needs to compete with surrounding cities for shares of the housing” because of the unique profiles of its residents, however, since “it does not provide enough opportunities for high-end housing, it loses many professionals to Redlands.”[4]

2-4. Financial Status of the Municipal Government

The city’s revenue is increasing steadily and balanced with its expenditure (Figure 4). However, since “a growing population will increase the amount of demand for municipal services” [5], some issues should be addressed.

One is that, while the city “continues to heavily rely on retail sales to fund its general governmental services” [6], with sales tax sharing a quarter of tax revenue (Figure 5), “almost every retail store merchandise category is not well presented in the City” except for “auto dealers and auto supplies” [5]. Another issue is the property tax. The city’s “General Fund property taxes have been increasing over the last seven years, with 13.8% annual increase last year” [6]. However, the “high concentration of property-tax exempt parcels,” including those of the university and hospitals, “limits the amount of property tax the city can expect in the future” [5]. Therefore, the city plans to “facilitate the development of property tax-generating and sales tax-generating uses on many parcels that are now property tax-exempt.”[3]

Organizational Change

Table 3. Number of Employees by industry / Total Jobs (%)

	Health Care & Social Assistance	Retail Trade	Professional, Scientific & Technical	Accommodation & Food Service	Others*
Loma Linda	69.08	3.94	1.40	1.64	23.94
San Bernardino County	16.85	18.35	3.62	11.95	49.23

Calculated by author based on 2002 Economic Census by U.S. Census Bureau. For total jobs for Loma Linda, 2000 data in Job projection list 2004 by SANBAG is applied.
 * "Others" include manufacture, whole sale, administrative, support, waste management, and remediation service. They are grouped as "Others" because, while the data for these industries is available for the county, there is no equivalent data for Loma Linda.

Table 4. Housing Condition in Riverside-San Bernardino MSA and Los Angeles-Long Beach MSA

	Median price 2005*	2004-05 increase rate*	Households able to afford median priced home**	Annual Single-Family Building Permits 2004***
Riverside-San Bernardino	\$388,900	24.30%	20%	43,070 (3rd largest out of 173 MSAs)
Los Angeles-Long Beach	\$553,200	22.30%	12%	11,960

* National Association of Realtors 2005 ** SCAG, "Where Will Our Children Live?", 2006
 ***National Association of Home Builders 2004

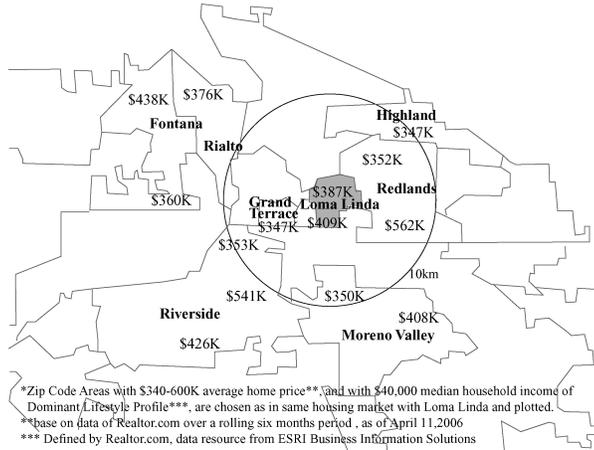
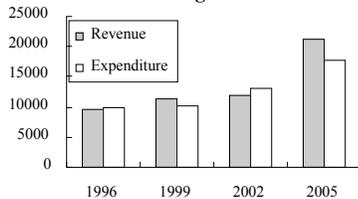


Figure 3. Communities in the Same Housing Market* with Loma Linda



Resource: City of Loma Linda, "Comprehensive Annual Financial Report", June 30, 2005

Figure 4. Revenue and Expenditure of Loma Linda

Property Tax	Sales & Use Tax	Other Tax & Assessments	Licenses & Permits	Inter-Government	Charges for Services	Other
20.86	12.23	17.20	5.35	12.37	13.09	7.28
Fines & Forfeiture			Use of Money		Development	
0.69			& Property, 4.40		Contributions, 6.54	

Resource: City of Loma Linda, "Comprehensive Annual Financial Report", June 30, 2005

Figure 5. General Governmental Revenues by Source, City of Loma Linda

2-5. Characteristics of and Challenges for Loma Linda

Loma Linda is small and has an established university and hospital as its economic and social cores. Its residents are highly-educated professionals with good income. Jobs in medical-related services are abundance, and its economy is stable. Loma Linda is a relatively self-sufficient and affluent small town.

Yet at the same time, since Loma Linda is at the periphery of metropolitan Los Angeles, it is experiencing rapid increase of the population, boiling housing prices, many housing developments, and overflow of the businesses from LA. In this sense, Loma Linda is also “a growing suburban city on expanding metropolitan fringe” as many cities are around Phoenix, AZ, or Washington D.C.

These incompatible characteristics of the city are the cause of the challenge that Loma Linda faces. Currently, “the residents are resisting to the growth (of the city)”. However, it is inevitable in the midst of the rapid population growth of the region, and the municipal government has to see what the city need “to be economically viable, be able to provide the quality services to support the community.” The challenge is “to see the balance” between encouraging economic and physical growth and preserving the character through the planning. [7]

3. Examination of LLCCP

In this section of the chapter, strategies taken in LLCCP were analyzed to show how they could contribute to address the challenges. Examination is done from the three levels; i.e. LLCCP itself, its relationship with General Plan of the city, and its link to other plans of higher rank.

3-1. LLCCP

LLCCP was documented in 2003 and started its service in September 2004. It is carried out by Department of Information Systems under the city manager [8]. LLCCP is unique in following four policies. (Table 5)

- a) It ensures the fast and secure connection by the followings;
 - Introducing fiber optic which, even with 5Mbit, is 3 times fast as DSL, and twice fast as Cable.
 - Choosing Active Optical Network which is symmetrical; i.e. same speed for uploading and downloading
 - Deploying 4 circular backbones underground which are self-healing, and distributed machine rooms through the city
- b) It intends to cover the whole city including new housing developments, apartments for the students, commercial buildings, and existing neighbourhoods¹
- c) It is positioned as a public infrastructure by;
 - Mandating to the developers to construct and deed it to the city
 - Maintaining the system by the city

Organizational Change

- Integrating its payment system with other municipal services such as water, sewer and garbage collection
- d) Its technical specification is set in the municipal ordinance (; i.e. building code).
 - Data box in master bed room and an outlet in each room

With these unique policies, LLCCP has a possibility to make two major accomplishments. First, because of its fast and secure access, as well as the complete coverage of the city area, LLCCP was designed to encourage work-at-home and small business among both existing and prospective residents. The fast steady access, combined with all-across-the-city policy of LLCCP, will facilitate doing business at homes and small offices in the city. Second, LLCCP’s complete coverage of the city, its position as a public infrastructure, and its technical standard maintained by the city’s ordinance standardizes and ensures the better amenity in its area than in adjacent cities. It will also help lifting and maintaining the property values inside the city.

Table 5. Loma Linda Connected Community Program Outline

Network Architecture	Active
Cable System	Category 6, copper-structured cabling system
Year Started	Documented in Dec. 2003, Service Started in Sept. 2004
Area/residences with Mandate Implementation	- Within each residence of any and all new residential development - Additions exceeding 50% of the original structure within Fiber Optic Master Plan Area
What the City Built	4 self healing metropolitan fiber rings under the streets, Network Operation Center
What the City Offers to Developers	Fiber design, Scope of work, Bill of materials, List of approved contractors
What the Developers Build	Developers are mandated to build the followings and deed them(except for the system - Community MDF (3 by 3 meter, dedicated room) - Data Cabinet in master bed room of each residence - Fiber from Fiber ring into MDF and Data Cabinets - An Outlet with jacks for Dara/IPTV, Data/Phone,and Coax/TV/Satellite in each room
Service Provider	Currentl the city. However it is open to any provider which follows the city's system and provides voice, video, and data.
Services	- High-speed Internet Service in 5, 10, 15 Mbit/s for residences. Max speed 1 Gps. - Colocation service for businesses. - E-mail services. Future services include web-hosting, TV, and Telephone.

Resource:City of Loma Linda "Ordinance No.629",
City of Loma Linda "The City of Loma Linda Connected Community Program and Design, Installation and Product Specification", August 2005,
James Hettrick "City of Loma Linda Connected Community Program, Fiber It's What You Need for Speed"

3-2. General Plan and LLCCP

General Plan is “the city’s most important statement regarding its ultimate physical, economic, and culture,” and “a legally binding policy document” to guide the related decisions [3]. The city is currently making a series of draft for the next General Plan. LLCCP and General Plan of the city are closely connected both in the designing process and contents of the plans.

a) Collaboration in the process of creating and carrying the plans

In making LLCCP, current master plans in General Plan are used as a base. LLCCP is also designed to fit to the future development plan as well as retro-fit to the existing developments.

In carrying out LLCCP, Department of Information Systems which is in charge of LLCCP creates specification and does inspections, while Department of Community Development which is in charge of General Plan tries to reflect the specifications to the actual developments. When a new development starts, a pre-development conference is summoned to deliver plans and ordinances of the city to the developer. Its participants include Dept. of Information Systems, Dept. of Community Development, and other related departments [7][8].

b) Coherence and Coordination between the plans

Since General Plan is the legal guide to the related policies, it is by definition that LLCCP should be coherent with General Plan. Yet in the case of Loma Linda, the relationship between the two plans seems to go beyond that mandatory coherence. General Plan often tries to take advantage of and to help the success of LLCCP, in an effort to bring its own visions into reality. Two of the key-words of its vision, to which LLCCP will be concerned, are 'technology advancement' and 'work/live community'.

In the coming draft² of General Plan, information technology, LLCCP as its core, will be highly incorporated. The city's strategy on information technology is to free its residents and businesses from "worrying about lower layer of IT's OSI model" such as connection and speed, so that they can "focus on application level." The city wants "the entire city to be technologically advanced." [7]

This advancement of technology is supposed to bring small and/or home business into the otherwise residential areas of the city, which is the largest motivation for the city to start LLCCP [8]. Followings are some of the coordination between the two plans, which are found in the recent draft of General Plan [3], to make the city work/live community.

- General Plan has Special Planning Areas in which new mixed-use developments (i.e. residential and other uses) are intended (Figure 6). Construction phasing of LLCCP's four circular backbones (Figure 7) is scheduled in a way to include largest Special Planning Areas (D,E) in earlier phases.
- In residential zoning districts of the city, various kinds of home occupation are permitted, which is a rare case in the U.S. [9]. Self-employed home-workers are asked for land-use permit and business permit, while employed telecommuters are not. [7]
- To attract business in the area, the city is to work with private sectors to identify advanced infrastructure technology. This effort includes encouraging the businesses to do the sale through the collocation service of LLCCP and physically move to Loma Linda to take advantage of LLCCP. [7]
- The city is to promote the establishment of work place alternatives, including home occupations and telecommuting. This will be done through LLCCP. For

Organizational Change

example, the city encourages the Medical Center, which is lacking office spaces, to allow the employees to work-at-home which is possible through LLCCP. [7]

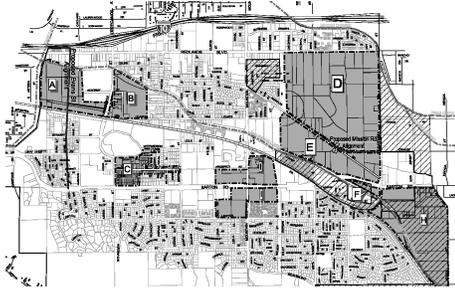


Figure 6. Special Planning Areas in General Plan of Loma Linda (Oct. 2005 Draft)

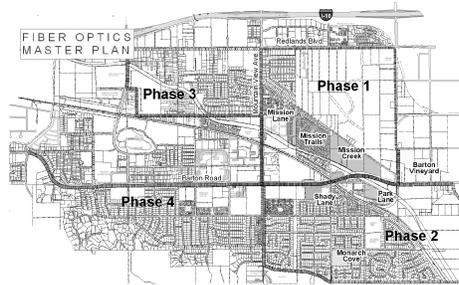


Figure 7. Phasing Map of LLCCP

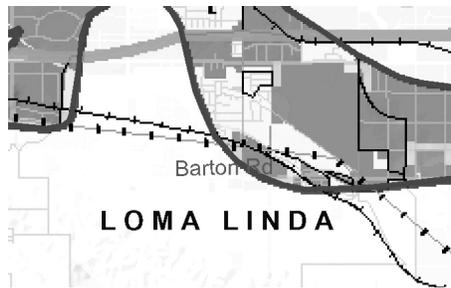


Figure 8. “the 2% Strategy” Area in Loma Linda designated by COMPASS

3-3. LLCCP in the light of Regional Plan

City of Loma Linda, in creating General Plan and LLCCP, not only follows the requirement set by the plans of higher rank, but also goes beyond the surrounding communities by introducing the concept of work/live community to control the problem of inevitable growth.

In the State of California, the implementation of General Plan is mandated to municipalities by the State law (; Governmental Code 65302). Economic portion of a General Plan must be consistent with the plan by Department of Economic and Community Development of the County. Physical and environmental portion of General Plan for each municipality should be coherent with regional plans, such as transportation, environmental, and housing plans, which are set by a regional government (Figure 9). In the case of Loma Linda, that regional government is Southern California Association of Government (SCAG). SCAG encompasses six counties including Los Angeles and San Bernardino Counties, and functions as Metropolitan Planning Organization⁵. Due to its rapid increase

4. Very Good for Loma Linda, yet Good for Everybody?

Figure 10 summarizes what effects LLCCP itself as well as its relationship with the plans of higher rank are designed to bring into the city.

The fast and secure connectivity of LLCCP, along with the fact that it encompasses the whole city, would accelerate small/home businesses. This will also broaden the kinds of industry in which the city's businesses are engaged, and could intensify the economic activity. Sales tax revenue of the municipal government may increase and become stable accordingly.

LLCCP's complete coverage of the city, its position as a public infrastructure, and its technical standard maintained by the city's ordinance ensures high-standard of amenity of residents' lives. This would result into the higher residential property values in the city. According to the data by the trade association of fiber optics, a house with fiber optics is priced \$4,000 to 15,000 higher than an equivalent one without it [13]. This would eventually lead to the increased property tax revenue for the city.

Higher value of the residential property would attract people with high education and income to the city. This, although may not be politically correct, will be a positive phenomenon for the majority of current residents who do not desire the rapid change of the city's profile. It will also make a good market base for the high-end houses which the city is currently wanting. The increasing expenditure of the city caused by the growth would be covered by the above mentioned increased sales and property tax revenues.

LLCCP is not an isolated IT program in the city. It is coordinated closely both in the implementation process and in the contents with General Plan. It is an urban policy which is linked with transportation, housing, and environmental plan. This comprehensiveness of LLCCP could elevate the possibility of 'technology-advanced work/live community' that the city envisions.

Loma Linda's General Plan and LLCCP do not only go along with the growth control vision; i.e. high-density development, of the regional plan by SCAG. They also hold its own concept of work/live community. Mixed-use development will be carried out, which will create highly-dense environment that could accept the population growth. General Plan and LLCCP make a platform for this development, which will prevent the random private development under the pressure of the growth.

As discussed in the Section 2 of this chapter, Loma Linda is a self-sufficient small town with a university and a hospital as its economic/social cores and with highly-educated professionals as residents. Located in Southern California whose population is rapidly growing, the challenge for the city is to see the balance between encouraging growth and preserving the character.

As shown in the above, LLCCP could encourage small/home businesses, create work/live community, and increase the residential property values. Since these mean growth and preservation of the character, it is possible that LLCCP contributes much to the city in finding answers to the current challenge. As an urban policy for the smart growth of a city, LLCCP's prospect should be highly evaluated.

At the same time, the fact that LLCCP, for its comprehensiveness, could be successful in making work/live community suggests a new alternative for governmental telework

promotion. In stead of promoting telework itself in conventional ways, we could be able to increase teleworkers by developing both digital and physical environments which fit for telework. The prospect of the success will be higher, if we plan not only the immediate environment of home-offices or homes, but also larger environment of town and region, as in the case of Loma Linda.

This study, although with only one example in early stage of the development, showed the encouraging possibility of IT program both as an urban policy to address challenges of municipality, and as a governmental telework promotion.

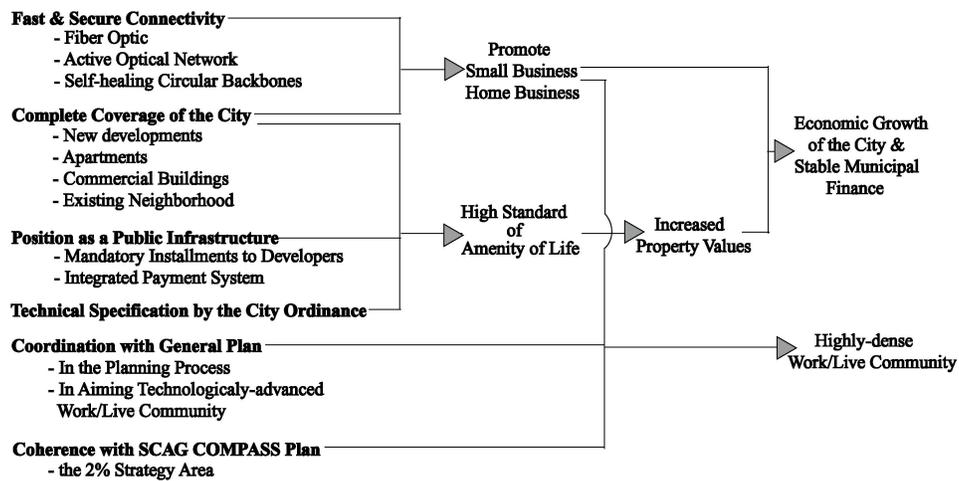


Figure 10. Possible Effects of LLCCP

Lastly, we, as urban scholars, would like to point out the issue of whether or not this possible success of municipal IT program as an urban policy will always contribute to the good of urban condition of the larger region. As mentioned in the introduction of this chapter, the decentralization of the cities as the possible result of IT and telework has been discussed much. If it happens or not, or whether it is good or otherwise is not the subject of this chapter. Yet we probably should not deny the possibility that a policy like LLCCP in suburban areas could cause the flow of the population out of the metropolises, which is not necessarily the result of natural overflow of the population. In other words, a good smart-growth policy in the municipal level of this kind can generate the urban decentralization or not-so-smart growth in the larger region. In addition, since the people who are likely to outflow in this way are with the limited socioeconomic profiles, a policy of this line could trigger the larger division between the metropolises and the others or the harsh competition between the cities.

This issue is not solely due to the IT infrastructure program as an urban policy, but more generally due to IT and telework. However, especially because a policy of this kind may successful and can be seen in more places, we should take this issue of larger region into the consideration.

Organizational Change

As the next step, we would like to pursue long-term observation and more detailed research to verify the degree of its contribution in Loma Linda case. We will also explore other cases of municipalities to test the possibility and limitation of generalization of such policies, which will help us to see their impact on our cities in the future.

Endnotes

1. The installation to the existing houses is not mandatory unless the remodeling is more than half of the structure. However, the city will install infrastructure up to the connection point on the streets and sign the service contract with the neighbourhood, based on their interest.
2. The next draft is not ready for the public at the time of this writing.
3. Metropolitan Planning Organization is a regional transportation planning body for metropolitan areas. Federal Highway Administration certifies its planning process.

Reference

- [1] Kawai, Yoko and Horita, Yumiko (2005), *Telework Promotion by Japanese and U.S. Governments: Difference of Time, Society and Culture*, presented at International Telework Workshop, Preston, U.K.
- [2] Mokhtarian, Patricia L. (2002), *Telecommuting and Travel – The Case for Complementarity*, Journal of Industrial Ecology, Volume 6, Issue 2, MIT Press
- [3] City of Loma Linda (2005), *City of Loma Linda Draft General Plan*
- [4] E-mail exchange (May 15, 2006) with a city official, Director of Community Development Department.
- [5] Agajanian & Associates (2001), *Fiscal Sustainability Report*, prepared for City of Loma Linda Quotations in this chapter are from its summary appeared in [3].
- [6] City of Loma Linda (2005), *Comprehensive Annual Financial Report For the Fiscal Year Ending June 20, 2005*
- [7] Phone interview (May 11, 2006) with city officials; Director of Information Systems and of Community Development Department
- [8] In-person interview (November, 2005) with a city official; Director of Information Systems
- [9] Levin, Melvin R. (1998), *Teleworking and Urban Development Patters: good bye cyberville, hello paradise*
- [10] Southern California Association of Governments (2004), *SCAG Growth Vision Interim Report*
- [11] Southern California Association of Governments (2006), *The 2% Strategy*
- [12] Southern California Association of Governments (2005), *Housing Element Compliance and Building Permit Issuance in the SCAG Region*
- [13] Data by Fiber To The Home. Quotation for this chapter is from Hettrick, James, *City of Loma Linda Connected Community Program*, Powerpoint Presentation