

Study on Effective Financial Policies and its Administrative System of Investment and Loan Program for Promoting Urban Development Projects at the Local City

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1. Background

In recent years, it is coming close the requirement of local cities for self-supporting and sustainable development in the flow of the decentralization which progresses increasingly. However, there are some passive problems, such as reduction in tax revenues and curtailment of subsidy, and the tight financial situation. The key is to make the local financial plan effective and efficient, which is topic of this research.

2. Introduction of simulation model

In this research, Kusatsu city was chosen as the objective city and statistic data were collected for the period from 1980 to 2000 fiscal year. The research flow is shown in Fig. 1.

Effective financial policies, which were established aiming at the sustainable future city with good living environment, active economy and great charm, were measure by the improvement of the following seven items:

- Population: representation of the vitality of the city;
- Amount of employees: representation of the city employment power;

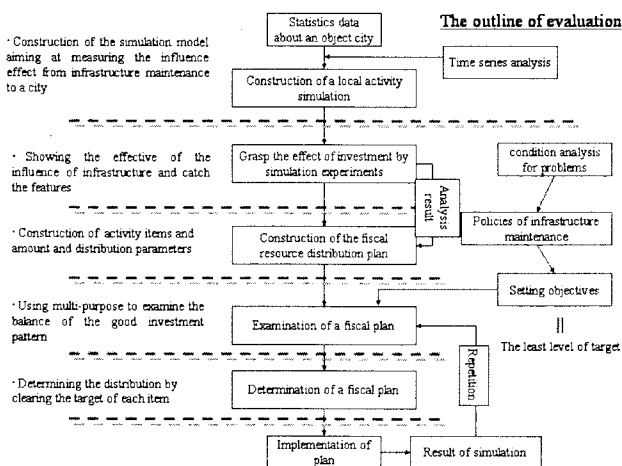


Fig. 1

Hybrid model

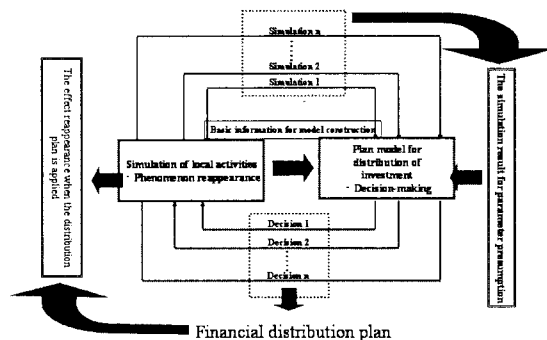


Fig. 2

- Average income: representation of the civic economical content;
- The production sum of 1st, 2nd, 3rd industry: representation of the activity of the industry;
- Tax: representation of the strength of the independence of city finance.

According to the data, by regression analysis, the simulation model of the urban social and industrial activity was constructed, which consisted a serial linear functions. The next step we applied simulation experiment, which caught the effect of investment, and constructed the plan of investment to urban development projects.

Because the influence effect by the difference in the contents of investment distribution became clear about five years later. And after ten years, the influence was enlarged, when we could easily classify the different patterns. We set three periods in the study, first from year 1 to 5, second from year 6 to 10, and third from year 11 to 20.

The output of the experiments were analyzed by statistic method and the selection based on the rate of contribution was concluded, which contained the several most related facts for each

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item, in details, the following four facts:

- ◆ Investment to living infrastructure;
- ◆ Investment to road infrastructure;
- ◆ Investment to cultural art and science infrastructure;
- ◆ Investment to welfare infrastructure.

3. Implementation of hybrid planning

After the four facts selected, objective function and constraint functions were built. It was a multi-purpose function and based on the financial policies, we decided the order of importance for the seven items: population, 2nd industry, 3rd industry, tax, employment, average income and 1st industry. The objective functions were minimization of the seven indexes standing for shortage to targets. The four facts took the roles of variables, describing different patterns of investment with different proportions.

The 2nd phase result application

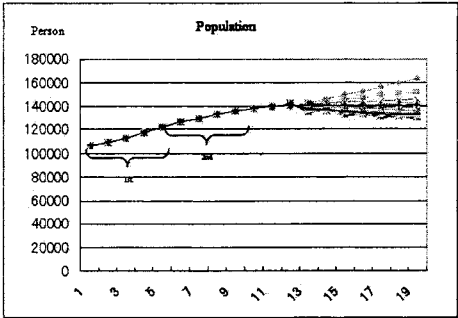


Fig. 3

The hybrid planning combined the simulation and the plan models, as shown in Fig. 2. In this research, it includes three phases correspondent the three periods mentioned above. For the first phase of simulation, we got parameter assumption and basic information for planning model, then we input the alternatives. Following the cycle, we stepped to simulation model again for reappearance of the effect of investment patterns from planning model. Second simulation produced output for updating the planning model to the second phase. The output of the decision-making stage then became the optimal pattern for the second phase, shown in Fig. 3. Cycle continued the third phase. We conclude the optimal proportion of distribution. The results were listed in Table. 1.

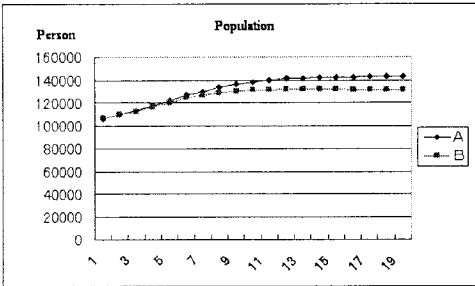
The Fig. 4. then described the result by the optimal distribution ratio. By the comparison with current distribution, we can easily find that the optimal proposal

form the hybrid planning is superior to the current pattern.

Table 1. Optimal distribution ratio

Investment field	Proportion of distribution (%)		
	1st	2nd	3rd
Living infrastructure	46.2479	43.3379	45.2354
Road infrastructure	28.9092	36.6621	28.6621
Cultural art and science	12.4221	10	16.1025
Welfare infrastructure	12.1208	10	10

Final result



A : Distribution plan model output The optimal distribution proposal
B : Comparison proposal (distribution performed now)

Fig. 4

4. Conclusion

In this research, local activity simulation model was developed aiming at measuring the influence effect from infrastructure. While the investment plan model by hybrid methodology considered the examination of acquisition-in-advance of the infrastructure improvement effect. So the proposal incorporated examination of acquisition-in-advance about the effect.

Positive examination which made Kusatsu-shi, Shiga the object city showed the validity of a system from a viewpoint of an effective and efficient investment.

For optimal principle, the research aimed to the current problems and development policies and decided the importance order of the multiple objectives, which were not all independent. This was from one viewpoint of optimization and could be not sufficient. In the further study, we could discuss the optimal proposal from other viewpoints.

We are planning to set independent objectives, by classifying and integrating objectives of the same categories. We would start search of optimal proposal from the category of the lowest level from target, and after satisfy it, we would keep it as least limitation and improve the next category, and so on, until all the items are satisfied. For further study, this idea will be discussed and applied for the search of the optimal proposal.