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Regional Revitalization Approach Using Strategic System Design

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Abstract

Regional development projects are often executed in a piecemeal manner based on intuitive sense without logical procedures. For this reason, know-how and experiences are not handed down for future reference. The objective of our research works is to identify the root causes and find solutions to overcome this problem by applying systems engineering approach called V model to regional development projects. Our observation and experiment at Bungotakada City, in particular, human resource development program, indicates that the V model has proven effectively applicable and provided various advantages to share clear ideas among stakeholders, to keep motivation for a slow-acting activities, and to accumulate best practice and experiences which are essential for sustainable regional development.

Introduction

In Japan, many local cities and towns that used to flourish until a few decades ago are suffering with continuing economic downturn together with depopulation and rapid aging. One of the reasons is inferred that Japan has the lowest urbanization ratio of approximately 66% among developed countries (Globis). This is caused by unusual concentration of population in the Tokyo metropolitan area, where urban residents are enjoying convenience life. In contrast, living in rural areas is getting more inconvenient in these few decades. Various measures and funding policies have been proposed and exercised, but most of them have eventually failed.

For the purpose of quantitative evaluation of regions' depression level, we have focused on the per capita income in a rural unit, i.e. cities and towns in rural areas. According to statistics by the Cabinet Office (Economic and Social Research Institute, 2007), the variation between per capita incomes of residents in 50 prefectures is expanding for the fifth consecutive year. For example, the per capita income of residents in Hokkaido was JPY 2.408 million in 2007, which was 3.4% lower than JPY 2.491 million in 2006 and the lowest in the recent 13 years.

Regional revitalization is essential for effective suppress of depression threatening the overall Japanese economy. With expectation to improve the quality of life in rural areas, a number of experimental policies have been taken by local governments with support of the central government. In fact, local governments have struggled with this issue by launching new ideas for revitalization and planned and implemented individual policies for each issue. However, these partial approaches never expanded to the entire region. One of the reasons is that each policy is often

implemented and affects only a part of stakeholders. Thus, this experimental policy implementation is terminated before expanding to the entire region. As a consequence, such a policy implementation never leads to the increase in the average per capita income of residents. Without prospect in sight for breaking out of the economic slump, it is difficult to stop population drain, and eventually the region loses precious human resources, who are essential for implementation of local revitalization.

This problem is caused by lack of cooperative organization structure. Vertical administrative structures of governments and business groups prevent from holding opportunities to exchange ideas and discuss effective collaboration.

Local Revitalization

Definition of Regional Revitalization
Prosperous regions enjoy vibrant communities; markets and streets are full of lively people, people gather for many cultural events and various activities. This dynamism is based on healthy and sustainable source of income. Therefore, local revitalization is defined by continuing increase in per capita income and consecutive increase in government's tax revenue as consequence. In other words, change in per capita income can be the measure of effectiveness of regional revitalization approaches and policies.

One of simple and efficient approaches to increase revenues is to raise income by manufacturing value-added products from local resources and selling these products outside the region. It is essential for sustainable local revitalization to establish the mechanism to earn outside and consume inside the region. This mechanism needs to work for the entire region and achieve an overall optimization. Partially beneficial mechanism can never attain sustainable economic growth in the region.

Requirement for Regional Revitalization
Based on the repeated interviews with people of various regions of Japan, it turns out that there are as many as 13 requirements to achieve a sustainable and optimized revitalization, as shown in Table 1. Not all the requirements in Table 1 are on the same level, and for this reason they are categorized in three major groups, which interact each other as shown in Figure 1.

Cooperation between government and stakeholders such as various people in business and education are essential for smooth and effective project promotion. A project team requires to be strategically built under clear and consistent visions and purposes by representing various stakeholders with mutually agreeable role sharing. This requires 1) understanding of government roles to develop opportunities for discussion and policy making among various stakeholders and providing appropriate and timely support for particular cases as needed, 2) Nomination of well-known coordinators with good reputation, and 3) Finding key persons to achieve the purpose and providing reliable supporting system for them.

In addition, a strategic and well prepared cooperation with mass media is essential since mass media plays an important role to encourage local residents' active participation by informing them of the projects and local government encouragement. It can also promote local attractions not only inside but also outside the region. More importantly, underlying this team building there should be close adherence to the region. The team needs to remind or instill residents' attachment and make them prepared to live in the region for a long time.

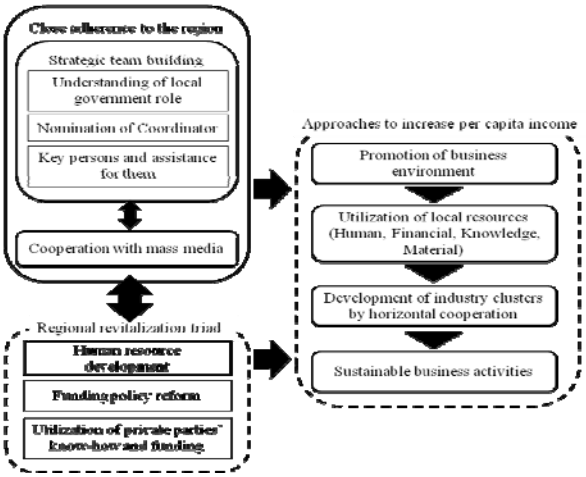

Figure 1. Realization Flow of Regional Revitalization

Cabinet Office of the Government of Japan established regional rejuvenation headquarters in 2003 under the triad for regional revitalization of 1) Development of human resource to lead regional revitalization projects and enhance human network, 2) Funding policy reform to allow more region's discretion, achievement-oriented funding and less sectionalism and 3) Utilization of private parties' know-how and funding such as low interest loan and tax benefit for private finance donors (Prime Minister of Japan and His Cabinet).

In order to increase per capita income, it is essential to create stable and sustainable revenue sources. These initiatives to utilize available human, finance, and information resources work well together with team building scheme to increase per capita income as depicted in the right side of Figure 1. A strategic team arranges business environment and lay ideas for branding of core items. Core items should be profitable and create employment and business in the region by utilizing local materials and resources. Business development leads to horizontal collaboration by building up industry clusters. This mechanism efficiently achieves establishment of sustainable business cycle and therefore, solid and sustainable economic growth in the entire region.

Table 1: Requirements for Regional Revitalization

No	Requirement	Details
1	Strategic team building	Cooperative relationship between public and private parties Information sharing Consistent directions and purposes
2	Understanding of local government role	development of opportunities for discussions and policy making Establishment of appropriate and timely support system
3	Nomination of coordinators	Key role players who are well-known and have good reputation to weld project teams
4	Key persons and assistance for them	People who will work in the region for more than 30 years in key facilities such as guilds and schools
5	Cooperation with mass media	Close dialogue with local people and delivery of local government's encouragement
6	Close adherence to the region	Prepared to live in the region
7	Human resource development	Human resources for future industry and business Human network development
8	Funding policy reform	Local discretion Achievement-oriented funding Less sectionalism
9	Support by private parties	Utilization of low interest loan and private investment and know-how

Table 1: Requirements for Regional Revitalization (Continued)

No	Requirement	Details
10	Promotion of business environment	Branding of core items utilizing local resources
11	Utilization of local resources	Human, Financial, Physical resources and Knowledge
12	Development of industry clusters by horizontal cooperation	Business aggregation of small enterprises Business clusters to promote value-added product development and innovation
13	Sustainable business activities	Expansion to the entire region Continue to increase per capita income in the region

Regional Revitalization Approaches Among those requirements our research and interviews indicate that measurable and effective elements of regional revitalization are 1) policy making and implementation and 2) Systemizing human resource development as illustrated in Figure 2.

Policies including the regional revitalization triad by Cabinet Office are essential for and efficiently support strategic team building. At the same time, revitalization approaches should not affect negatively on other areas within or outside the region. Policies can elaborate revitalization designs to achieve mutually beneficial and overall optimal solutions in addition to increase both income in each part of the region and the average per capita income in the entire region.

Human resource development is inevitable for sustainable economic growth. Systemizing human resource development methods decreases the risk to fail in handing down accumulated know-how and skills and fostering talented labour force in younger generation.

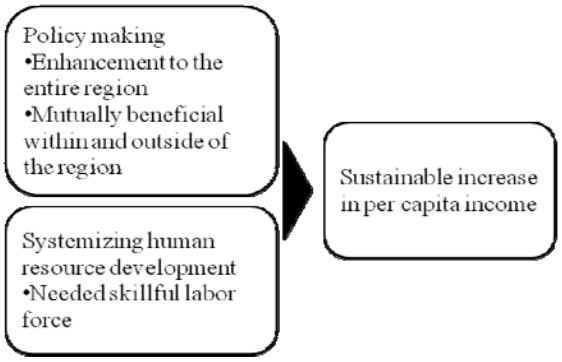

Figure 2. Regional Revitalization Mechanism

We explain details using an example of human resource development in Bungotakada City (hereinafter called Takada) in Chapter 4, Revitalziation of Takada. Application of V model, originally developed and effectively used in systems engineering field, enables effective and measurable implementation of this approach. Next chapter describes V model and its application.

Systems Engineering Approach

V model in System Development Figure 3 shows typical V model used in system development filed (Forsberg, 2005).

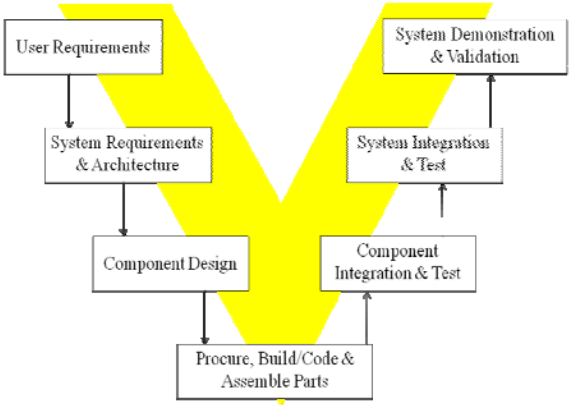

Figure 3. V model applied in System Development

After defining user requirements, corresponding system requirements are determined. All requirements are considered

in designing entire system architecture and the system is decomposed into subsystems. After designing each subsystem and completing all designs, engineers start to procure, build or code and assemble parts into subsystems. On each layer of integration, a subsystem or system is tested to ensure that all system requirements are met and these system requirements satisfy the user requirements. This careful and systematic approach efficiently achieves high user satisfaction.

Dual V model in System Development The same V model approach is also used in each layer to ensure the satisfaction of requirement, which is called entity V in Dual V model illustrated in Figure 4 (Forsberg, 2005).

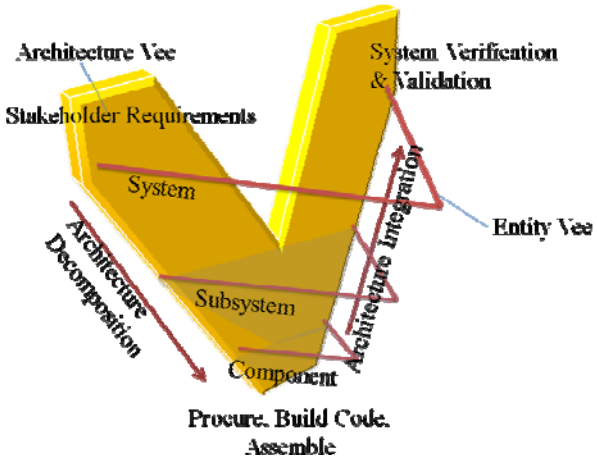

Figure 4. Dual V model applied in System Development

The V model is also applicable to social science systems, such as policy making and disaster control system (Forsberg, 2005). Figure 5 shows proposal development process by applying V model into social systems. Unlike visual mechanical systems, social science systems are often invisible but have real forms. Therefore V model is efficiently and effectively applicable to most form building process.

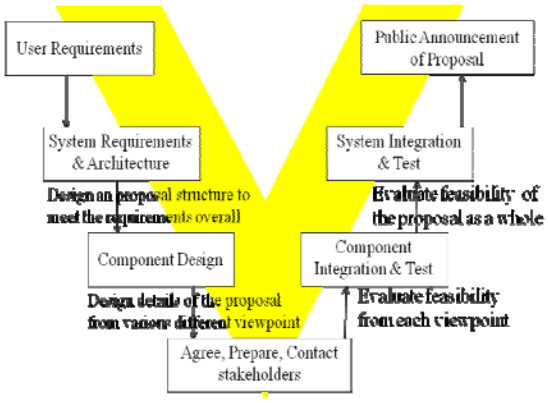

Figure 5. V model Applied in Social System Development

Example: Revitalization of Bungotakada City

Overview of Bungotakada City Takada is located in Kyushu, the third largest island in Japan, and away from major large cities as shown in Figure 6.

Figure 6. Location of Bungotakada City

Table 2 gives an overview of Takada.

Table 2: Overview of Bungotakada City

Items	Facts (2005 unless otherwise noted)
Area	206.6 km^2
Population	25,114 people (4.1% decrease since 2000)
Labor population	12,422 people (3.8% decrease since 2000)
Population aging rate	32.9% (8.7% above average of Oita)
Unemploy-ment rate	5.6% (1.9% worse than 2000)
Farming household	1.654 household (21% decrease since 2000)
Per capita income (2006)	JPY 2,079,000

Takada was flourished as a key shipping center in Bungo Channel for centuries as described in Table 3. However, as the dependence on the sea lane gradually diminished because of motorization and new mega stores eroded the market share of local shopping streets, Takada started to suffer from aging and depopulation. This continues as economy was slowing down since 1990's.

Just before two towns were merged into Takada City in 2005, local people started regional development projects under a theme to recreate flourished 1960's 'Town in Showa era' by focusing on reclamation of 1) buildings, 2) history, 3) commercial goods, and 4) friendly merchants in Showa era.

Takada applied for support from Cabinet Office and its plan was selected as a five year Regional Rejuvenation Plan in 2004. This plan mainly focuses on establishing sustainable systems to tackle service related issues such as 1) human resource development for tourism and commercial and restaurant businesses, 2) attraction of human resource for town development, and 3) consulting services on organization and training systems. The Cabinet Office provided low interest loan and supported promotion of employment creation project.

Table 3 History of Bungotakada City

1200 -	Flourish as a shipping center of Bungo Channel
1970 -	Start to suffer from depopulation and aging of society in accordance with motorization
1990 -	Decline in economic power by decelerated economy and mega stores' entry in suburbs
2001-	Start town development to reclamate vital 'Town in Showa era' with focuses on 1) buildings, 2) history, 3) goods, and 4) merchants
2004-2008	Regional rejuvenation plan was formulated focusing on 1) human resource development for tourism and commercial and restaurant business, 2) attraction of human recourse, and 3) consulting for organization and training systems.
2005	Two towns were merged into Bungotakada city

Revitalization Project In 2003 the town's chamber of commerce started a revitalization project to suppress aging and depopulation. The entire project process is well described using a dual V model illustrated in Figure 4. Figure 7 depicts the overall process of Takada's project. User requirements include preventing devastation of farmland and suppressing collapsing economy, regional communities, and depopulation. Their grand design/architecture was made under the vision to recreate the flourished 1960' 'Town in Showa era' and to stimulate business in cooperation with tourism. In Detailed design, this vision was broken into human resource

development for commercial and restaurant businesses and tourism, attraction of human resources for development of Town of Showa Era, and consulting on development of organization and training systems.

Each sub-project on a layer in the Architecture V has its designing process of decomposition and integration as depicted in the Entity V in Figure 4. Our example focuses on the Entity V model of human resource development project.

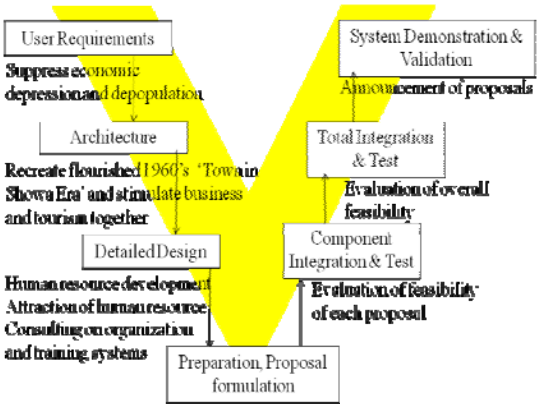

Figure 7. Architecture V of Revitalization Project (2004-2008) in Bungotakada City

Human Resource Development Figure 8 illustrates the Entity V model applied for the human resource development project to foster people that local businesses require. In order to accurately understand private parties' requirement, we conducted questionnaire survey and interviews for local businesses in addition to local economic analysis. Based on the findings, local universities sought for a new long-term human resource development program in collaboration with high schools and clear assignment of roles between universities and high schools as described on the Architecture layer. Additional care should be paid to motivate young people and keep their passion. In Detailed Design, local universities and high schools develop detailed education and training program to equip with companies' requirement. Universities also open classes for mature people to teach communication skills and other required skills to find a job.

In the integration stage on the right side of the V model in Figure 8, feasibility of each project is examined and checked before final proposal was made and announced.

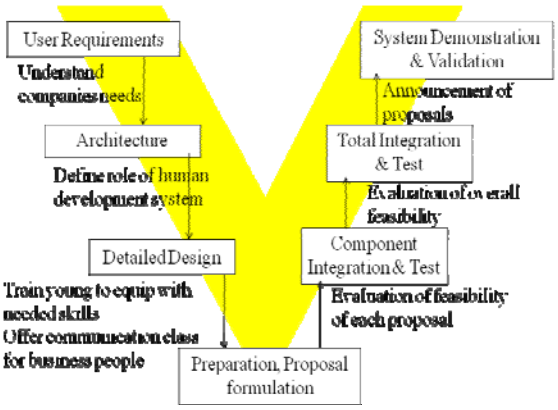

Figure 8. V model applied for human resource development

Evaluation

Results The eight year project design and implementation does not show a drastic improvement in per capita income or population as shown in Figure 9 and Figure 10. Per capita income decreased from JPY 2.138 million in 1999 to JPY 2.079 million in 2006 according the latest statistics in Oita Prefecture. One possible speculation will be slow-acting nature of human resource development. Considering that fact that the decrease in per capita income in Oita Prefecture was more drastic than that of Takada at the same period, it is too hasty to conclude that Takada's project was not successful as expected.

There are good results from the project. Another index of the revitalization projects shows that, the number of tourists increased from 27,000 a year in 2001 to nearly 370,000 a year in 2009, which greatly exceeded the target of 50,000 a year.

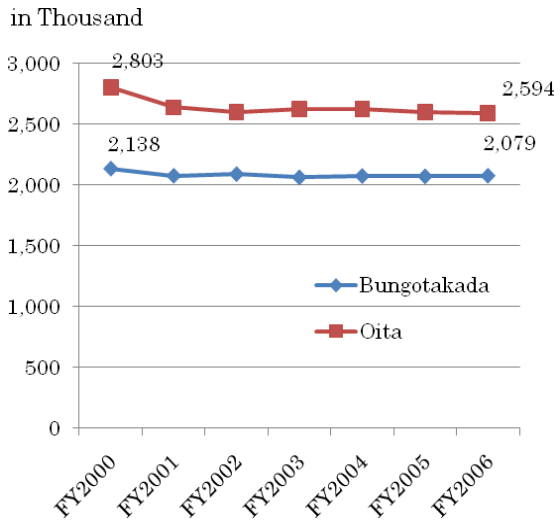

Figure 9. Change in Per Capita Income in Bungotakada City and Oita Prefecture

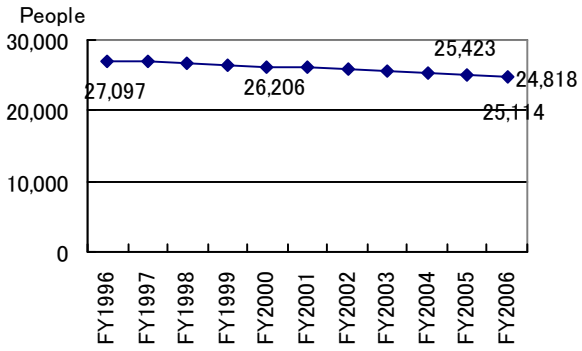

Figure 10. Change in Population in Bungotakada City

Evaluation and Remaining Issues

Although the quantitative progress has not seen yet, the human development project is evaluated is evaluated as being in the process of making a progress. The project members recreated a human network related to Showa era and residents have got motivated to continue improving the project to enjoy dynamism again, which can lead to a sustainable revitalization.

The town development project itself still needs to be revised and should promote optimization by enhancing activities through the entire region and fostering regional human resources. However, promotion of business and tourism together showed an immediate effect on increase in tourists, which continues motivating the entire region and positively impacted on various activities.

AS a next step, Takada started a new employment creation program which focuses on 1) expansion of job opportunities by improving of managers' management skills, 2) human resource development for Town of Showa era and farming business to utilize local products, and 3) employment assistance by providing opportunities for seminars and information exchange. This project enhances the range of assistance to utilization of agriculture products and job matching opportunities. The city aims residents' participation of 1) 50 companies in job opportunity enhancement projects, 2) 450 people in human resource development projects, and 3) 200 people in employment assistance projects during three year project period. Takada will continue to apply V model for project implementation.

Conclusions

The V model has been applied into a social system development, i.e., regional revitalization. It has turned out that the V model is useful to share common understanding among many stakeholders, including not only project members but also each resident and funding provider. This is also effective to trace activities and results, and thus keep motivation, especially when social systems are not visible.

There is a drawback that it takes time to evaluate the result because of the slow-acting nature of human mind control.

In short, the V model is an efficient and effective tool for regional development to ensure successful project accomplishment and consequently sustainable growth.

Acknowledgement

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References

Forsberg, Kevin, Hal Mooz, and Haward Cotterman. 2005. *Vidualizing Projedct Management*. *Third Edition.* John Wiley & Sons, Inc., pp108-116, 143-160, 341-351.

Bungotakada City. Employment Creation Plan in Bungotakada, 2009. http://www.city.bungotakada.oita.jp/content/000003338.pdf

Bungotakada City. Introduction of Bungotakada City.

Bungotakada City. Overview of Financial Situation in FY2008. http://www.city.bungotakada.oita.jp/content/000004671.pdf

Bungotakada Tourist Association. Showanomachi. http://www2.city.bungotakada.oita.jp/kankou/

Economic and Social Research Institute. Cabinet Office. Government of Japan. Economic Calculation by Prefecture 2007. http://www.esri.cao.go.jp/jp/sna/kenmin/h19/main.html

Globis. Top Seminar by Masahiro Sakane. http://www.globis.jp/1076-3.

Oita Prefecture. Economic Calculation by Municipality in Oita Prefecture for FY2006. http://www.pref.oita.jp/site/toukei/shichosonmin-h18.html

Prime Minister of Japan and His Cabinet. For Regional Revitalization- Regions play the lead http://www.kantei.go.jp/jp/singi/tiikisaisei/siryou/0609.pdf

Statistics Bureau, Director-General for Policy Planning & Statistical Research and Training Institute. National Population Census 2005. http://www.e-stat.go.jp/SG1/estat/List.do?bid=000001007609&cycode=0

Biography

Toshiaki Kimura. City Official of Otaru City, Hokaiddo, Japan and a second year Ph.D. candidate of the Graduate School of System Design and Management at Keio University. His specialty includes regional development focusing on collaboration between agriculture, manufacturing and business. Between 2006 and 2009, he worked for Cabinet Secretariat and Ministry of Agriculture, Forestry and Fisheries of Japan, where he was in charge of regional development planning and consulting, collaboration between regions and universities, and between various businesses.

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