

Regional Industrial Promotion through Open Source Software by Local Government in Japan

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Abstract. The software development method by open source software has a possibility to release the relationship, called “vender lock-in” typically in Japanese information industry. This paper examines this possibility referring a regional industry promotion project through the cooperation of the industrial-government-academic complex in typical local country city in Japan. And, moreover, in this project “Rub match”, which is typical in Japanese manufacture industry, is exactly expressed.

1 Introduction

In Japan, in spite of "Worldwide Economic Crisis", investment and economic growth in metropolitan areas is still lasting. However, the result of "trickle down" has not reached to local economy as well as small and medium-sized enterprises. Or the economic discrepancy is rather expanding. So, the industrial promotion policy and the market expansion that uses each original regional resource are necessary in each region. Government agencies, METI (Ministry of Economy, Trade and Industry) and SMEA (Small and Medium Enterprise Agency), founding "Regional Resource Use Program", have converted the focus of administration from metropolitan areas to regions. It contains sales promotion to the world, and aim to acquire foreign currency, having the side of assistance measures to consider "Market" strongly. In the “Small and Medium-sized Enterprise Regional Resource Use Promotion Method” enacted by SMEA, the regional resource is defined as regional industrial resources, limited to physical (visible) products or sightseeing.

On the other hand, Shimane Prefecture Matsue City – typical local country city in Japan, opposed the Japanese Government Policy and started a new local project which regards non physical (invisible) product as its own regional resource. In 2006, Matsue City started "Ruby City MATSUE Project", considering open source programming language “Ruby” as a regional resource of Matsue City. There are a number of regional development policies and plans that use ICT, especially in the region with a nationwide market by the Internet shopping and Web, in order to

reactivate regional communities. However, the promotion plan that makes a programming language – invisible and so to speak a "Statelessness" regional resource, doesn't exist anywhere but in Matsue in Japan.

As for the development of new software and the system by OSS, and the development of OSS itself, people gather and participate independently all over the world by using Internet, and source codes can be freely used and prompt correspondence become possible. Moreover, the places where people discuss and decide united standards and standardizations are open. This process, one hand, means "Statelessness", on the other hand, it can expand business chances of the addition of the function to OSS, and the construction of the system, etc. even if it is a local small and medium-sized enterprise. The software development method by such open source software can release the relationship, called "vender lock-in" which consist of through trust and consignment typically in Japanese information industry. And it will make chances that small and medium-sized information service enterprises in regions catch orders directly and expand their Markets.

2 Introducing of OSS and Regional Industry Promotion by Local Government

2.1 The Method of Division of Orders by using OSS in Nagasaki Prefecture

Actually, in the introducing of OSS at the local government level, additionally with introduction/management cost reduction of the IT system of the municipality, local industry promotion has been advanced in Japan. The typical case is the construction of "Electronic Prefectural Government System" in Nagasaki Prefecture. Nagasaki Prefecture, also typical local country like Shimane Prefecture, invited CIO from a private organization in 2001, and adopted open source system for the basic technology of the electronic Prefectural government system which consist of three functions (document management, application and tender). Then, the orders that had thrown out to a major IT vender in Tokyo divided to small systems. Why did it become possible? Because, (1) The staffs in the prefecture were to make specifications of the system, (2) When the external program development was consigned the division orders were to decrease its budget of one matter, (3) The technology was decided before system was constructed. These processes enabled local small and medium-sized information enterprises in Nagasaki to participate in this system development. By this method expenditure related to the computer system of the prefecture was greatly reduced with 694 million yen in fiscal year 2003 from 991 million yen in fiscal year 2002. Moreover, it becomes possible also for local

information enterprises to participate in the system development by the division order method. As a result, local information enterprises received 48/100 orders directly in 2002- 2003 fiscal year (15.1% in terms of monetary amounts), and 73/96 orders in 2004 fiscal year (32.7% in terms of monetary amounts).

Moreover, local information enterprises were encouraged to participate in the processes of making specifications and entry into the processes of project and specifications decision that had been major IT vendors' "Role", so that they could not only increase their orders but also improve their abilities of project management. Thus, there already was a success case of promotion of local information industries, by introducing OSS, and to expand Market in Japan. In the system construction of Local Government, it not only adopts OSS which local information service industries developed, as user = purchaser, but also, if products are open to the public on Internet as OSS, it can promote many chances that local information service industries can expand the market on a nationwide scale. "Cathedral type development method" or "Vendor lock-in" by major IT vendors can be released, so local information service industries can participate in the process of software development and receive orders of the system that has been divided in small sizes.

However, to make this process possible, as was shown in the case with Nagasaki Prefecture, staffs of the administration sector must participate in the upper processes of the software development, such as processes of "Requirement definition" or "Design". Why major IT vendors had secured orders of their own was that they had participated in these processes. Nagasaki Prefecture's case was, so to speak, an indirect development aid by the administration whose staffs in the prefecture was related to these processes of "Requirement definition" and "Design", so it enabled regional industrial promotion plan.

2.2 The Situation in Shimane Prefecture and Ruby City MATSUE Project

As mentioned above, in introducing OSS to Local Government, Local Government itself needs to participate in the upper processes of the software development. And, Nagasaki Prefecture exactly did it.

The situation was also the same in Shimane Prefecture. In the commercial report of Shimane Prefecture in 2005¹, "Order system development" is large with 42% overwhelmingly overall, next, "Business system operation management" accounts for 12%, on the other hand, "Package software development" is 3% slightly. Especially, the smaller enterprises became, the more this tendency became. Moreover, in orderers, "Information service industry" of the same trade was overwhelmingly many (37%), "Administration sector and affiliated association" (22%) and "Construction industry" (9%) continued to this. This is because of the multiple, and chain of the consignment and the trust among the same trade relation

¹ Shimane Prefecture Commerce and Industry Labor Division (2005)

typically in Japanese information industry. And, the ratio of the order from this type of business is high like small-scale firms, and it lowers in the large-scale firms. However, "Other service industry" (4%) and "Finance and insurance" (1%) was extremely little in Shimane Prefecture compared to nation wide scale. It is shown that the order was being eaten by major enterprises outside Prefecture. Orders of "Administration sector and affiliated association" and "Construction industry" had been decreasing on a nationwide scale. If they had depended on the orders in these fields indefinitely, the sales would have clearly declined fast.

Matsue City, capital city of Shimane Prefecture, 70% of information service industries in the prefecture, even in workers and sales gather, needed to change this trend. At first Matsue City began to learn from the case of Nagasaki Prefecture, but it was difficult to instruct city's administration staffs to be able to participate in the upper processes of the software development in a short term, like Nagasaki Prefecture. Then, Matsue City, having their own regional resource "Ruby", intended to make open source development style in the industrial promotion plan, the city adopted another method a little different from Nagasaki Prefecture. It is not the style that the administration adopts the development style of open source directly, but the style that promote regional industry through the cooperation of the industrial-government-academic (University) complex.

Ruby is the Object-oriented Script Language invented in 1993 by Mr. Yukihiro Matsumoto" called "Matz" in communities, and opened to the public. Matz lives in Matsue City and has been developing Ruby with many developers all over the world through the Internet. At first, Ruby had not been spread in business uses except some engineers. But, in 2005, David Heinemeier Hansson – a programmer in Denmark, released "Ruby on Rails", web application framework. Hence, Ruby came to attract attention and to be used also in enterprise areas. Then Matsue City started the project, which attempts to create a new regional brand for the city based around the Ruby programming language, as part of its efforts to regenerate the city and its environs.

The project aims, through the "Matsue Open Source Lab" facility, at creating a hub for all activities relating to Open Source Software and making Matsue a centre for OSS research, development and exchanges.

2.3 The Method through the Cooperation of the Industrial-Government-Academic Complex

But, only by this project, the abilities of the project management in local information service industries couldn't be improved. The development power of Ruby would have been only used for major IT vendors in Tokyo. To support and advance this project, the organization of open source, "Open Source Society Shimane" was also established in 2006, by companies, technicians, researchers, students, and users who specialize in open source software for them to be able to exchange knowledge and information, and to improve their technological development and project

management abilities through utilizing "Matsue Open Source Lab". Through such activities Matsue City will be able to become a national centre for open source software development, duly leading to new technological innovation, increased competitiveness in the field of OSS, and above all else the development of a modern workforce well versed in the intricacies of the IT world. Ultimately, it will make Matsue City a world-renowned Mecca for Ruby and OSS.

In order to materialize its mission promoting ICT industries through open source initiatives, Open Source Society Shimane conducts many varieties of activities in both policy and technology fields. One of the Society's main activities is to hold "Open Source Salon" in Matsue Open Source Lab. This "Salon" is a series of study meeting or seminar in more casual forms. The theme of the salon also varies; government officials explaining their policy initiatives, university professors presenting the recent OSS or IT-related research results, and the Ruby or OSS engineers are illustrating the cutting-edge OSS technologies, know-how and applications. As of February 2009, the salon was held 38 times in two years. The audience counts approximately 30 to 40, and then this salon becomes the "hub" for connecting people and information. With regard to business area, the Society conducts "Business Exchange Meeting" when receiving the visits from ICT-related enterprises outside of Shimane. This business meeting is exclusively for the members. Hence, the Society plays the hub role connecting people, information, technology, and businesses.

The society has just entered its 3rd business term in July, and this 3rd year a number of larger projects are being planned. In September 12-13, the "Open Source Conference 2008 Shimane" was held right next to the Lab. This Conference was the first attempt by the Society and Matsue to organize the OSS-related conference with expected audience of over 500. The Society's member structure is as follows: "enterprise", "individual", and "supporter". As of February 2009, there are 32 enterprise members, 11 individual members, and 28 supporter members. The community of this society may be "small" probably in the international standards, but based on the regional resources of "Ruby" as well as aspiration of the Mecca for Ruby and OSS, the society promotes above-mentioned unique activities connecting people and information, and bridging across the regions.

These are, so to speak, the Superficial Result, but most important purpose is industrial promotion by creating abilities of project management in local information service industries. In Nagasaki Prefecture, administration sector of the prefecture did it, on the other hand, in Matsue City "Open Source Society Shimane", the organization of industrial-government-academic complex in the region has been doing this role. By improving the abilities of project management, local information industries have been increasing the chances to participate in the upper processes of the software development. For example, "Medical and Nursery Care System of Matsue City" was constructed by "Techno Project" using Ruby in 2007, "Matsue SNS -Collaboration Effect of Regional SNS Connection (Morioka, Sayou, Matsue)" was opened by "Wacom IT" using by Ruby on Rails in Feb. 2008, and "Knowledge Management System of Matsue City" by "NaCl" also using RoR in 2008. These are

all local information service industries in Matsue City. Moreover, Shimane Prefecture developed “Shimane Prefecture CMS” using by RoR to construct its own Web Site, and opened the source of “Shimane Prefecture CMS” to the public in 2008. Then, other many local governments come to have interest in this CMS and prepare to adopt it for their Web site. “Shimane Prefecture CMS” is, of course, open source, but to construct and maintain Web sites, the roles of private businesses are needed, and the orders mostly come to local information service industries in Matsue City. So in 2008 they have increased their Markets 30% more compared to 2005. And attracting enterprises – 6 companies are now newly located in Matsue City with intention of collaborating with Ruby from Tokyo, Osaka, and Hiroshima.

One of the key success factors of the project of Matsue City is the development power jointly collaborated with the open source community of the nationwide. By touching upon the nationwide expertise of the open source, Matsue City and the project related people including us, recognizes crucial importance to cooperate with the open source of the whole country which connects further to the worldwide open source community. In addition, a personnel training and industrial promotion are advanced by the cooperation of the industrial-government-academic complex in the region. In Nagasaki Prefecture, the prefecture itself participated in the upper processes of the software development and divided their own orders to local information industries, on the other hand, in Matsue City, local information industries in the city gather and collaborate through "Open Source Society Shimane", the industrial-government-academic complex as a catalyst, and improve their abilities of project management to acquire orders and expand Markets. In both cases, adaptation of the development style of open source can make the possibilities to expand more Markets of outside of the regions. Why Matsue City chooses the latter is that, of course there is no time, it has the domination of programming language Ruby.

3 Contribution to Open source Community by Academic Side

3.1 Research on the Stabilization of Open Source Software

In Ruby City MATSUE Project, It is Shimane University that takes the initiatives in the academic side. The Roles of Shimane University are both contribution to open source community in research areas, and development of human resources of open source in the region. Shimane University began "Research on the stabilization of the open source software and on the business model's construction" in 2008. In this research, the examination of the technique of making documentation and the stabilization of programming language is being taken into practices.

Although open source software development is advancing in arenas other than corporations and institutions, the stabilization and upgrade of such software is not guaranteed. So, this project examines techniques for producing documentation for and guaranteeing the stability of open source software, focusing on the object-oriented script language Ruby. In addition, with the cooperation of industry, government, academia, and the software development community, empirical and theoretical research will be conducted on the value of business models for this field. For the former, the match for the standardization of Ruby is advanced in cooperation with Ruby Association, LLC (Limited Liability Company), which was established to promote and support Ruby activities in July 2007. For the later, we are now investigating in the theme of “Motivation and Productivity by ‘Rub match’ system in the Development of Open Source Software”. In this theme the standardization and modulation of the information service industry, and its relation to productivity, advanced by an international system of the division of labor, are being researched.

3.2 Modulation and “Rub match” in Open Source Development

In this study, we are going to analyze it by comparing the development style of the Embedded Software System, typical in Japan, and the development style of the Open Source Software, advancing worldwide.

In the field of the embedded system development which is related to manufacturing industries in Japan, to improve the productivity of the modulated organization such as subcontract and offshore, a process from which feature “Grinding match” or “Rub match” is applied from the manufacturing system, typically manufacturing system called “Toyotism” or “Toyota Style manufacturing system”. Systems rub the module of the assembly and Takashi Fujimoto, Professor of Tokyo University, clarify that as an “Integral Production Style”, comparing to “Modulation”². And in “Toyotism”, motivations of workers are gathered and improved to make high productivity in manufacturing industries, typically in automobile industries. We call this process “Kaizen”, which mean the improvement of production system voluntary.

On the other hand, the development style of the open source software, opening development technique that exceeds the frame of the enterprise and the organization, and the standardization advanced by the participation of a lot of enterprises and developers through international network. And it has been explained as a modulation included from production to the organization. In a theoretical analysis model of standardization, the modulation of the information service industry, and the relation of productivity is constructed. Chihiro Suematsu, Professor of Kyoto University, regard the modulation in the information service industry as a concept of the transaction cost by the reduction in the produce cost³.

² Fujimoto and others (2001)

³ Suematsu (2002) and (2004)

But, we recognize, in the development of open source software motivations of engineers are gathered and improved to make high productivity like “Toyotism”. To success an Open Source project, many elements are needed, leadership of developer, Support of enterprise, administration, University, and so on. So, we intend to prove it theoretically and empirically in this thesis by measuring motivation and productivity in the development of open source software in Japan. For this study, the development style through the cooperation of the industrial-government-academic complex is the most suitable research object. “Rub match” is exactly expressed in the process of the industrial-government-academic complex. And we hope, in turn, that the results of the research will contribute to local industries and regional economy.

4 Conclusion

The software development method by such open source software have a possibility to release the relationship, called “vender lock-in” which is consist of through trust and consignment typically in Japanese information industry. And it will make chances that small and medium-sized information service enterprises in regions catch orders directly and expand their Markets. However, a possibility is only a possibility. To move this possibility to reality, there will be some methods by Local Governments. Division of orders by using OSS in Nagasaki Prefecture is the one method. And, Ruby City MATSUE Project, the cooperation of the industrial-government-academic complex, is another. The later method is “Rub match”, which is typical in Japanese manufacture industry, is exactly expressed. It is paradox.

There is a worldwide community that supports development of open source. Moreover, in the region, the industrial-government-academic complex also supports a series of open source related activities. Open source Ruby led to further regional industrial promotion by implementing research projects and personnel training in Shimane University. In the process of these approaches for these three years, Ruby City MATSUE Project has been tying to the promotion of regional industries, by making "Statelessness" programming language as a local regional resource.

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