

Sub-theme: 3.6. Regional innovation ecosystems: are they possible in small and remote regions?

Title: Development of Okinawa depends on Triple helix which center of OIST.

Subtitle: "We will be able to curate OIST as its partners."

Authors: Tsubasa Oshiro, Hiro Nakasone, Ayami Kuniyoshi, Eri Tada and Tatsuro Tamashiro

e087236@eve.u-ryukyu.ac.jp

We are senior students of University of the Ryukyus.

University of the Ryukyus

1 senbaru, Nishihara, Ginowan, Okinawa, Japan

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Abstract

Okinawa prefecture is trying to shift its main industries in the field of life science technology. They've been establishing Okinawa Institution of Science Technology (OIST), primarily for the development of Science Technology in the world and to promote economic independence and development of Okinawa. OIST has decided to accept doctoral course students from 2012.

We believe it's possible for OIST to bring out innovations not only technical ones literally, but also discovering new values and changing existing value and conscious in the world. The workshop discussed OIST's future, however, brought up many problems that to be solved for its success. In this article, we focus on one of the problems that OIST has. That is the way how we can connect industries and universities or institutions. Also how can the world's top institute, OIST contribute to the local development?

We found the way to solve this problem from the successful case studies, using the keyword, "curation". We've come to the conclusion that new values can be found by using the concept of "curation", and here're some ways to exercise them and what to be done.

1. Introduction about Okinawa and OIST

1.1 The exposition of Okinawa prefecture in itself

Okinawa prefecture is an island located at the most southern-west part of Japan which makes it have a sub-tropical climate compared to the other prefectures in Japan. Currently, Okinawa exists as being part of Japan, however that was not the case in the complex past which is deeply intriguing to understand. Okinawa was formally called The Ryukyu Kingdom which was a sovereign nation until the year 1872 when Japan annexed The Ryukyu Kingdom as part of Japan which is now known as The Ryukyu Disposition. After World War II ended in 1945, Okinawa was controlled and belonged to the U.S. government until 1972 when Okinawa returned as a prefecture of Japan. For that very reason, Okinawa has a mixed culture of Japanese and American culture integrated in one, therefore making Okinawa have it's own distinct background. There is no other prefecture in Japan that has the rare history and culture that Okinawa has resulted in, however in terms of economically being independent, Okinawa still faces many issues.

Tourism is the main industry accounting for 5,855,100 tourists in 2010. In the same year, 284,700 people were foreigners and the number of tourists in Okinawa continues to rise. Nevertheless, Okinawa is highly financially dependent on the other major industries which are tourism, U.S. military base, and public enterprises. Okinawa's economy is struggling because of the dependency on the structures of these industries; moreover the standard of annual income in Okinawa is only 70 percent of what the rest of Japan makes. In addition, the unemployment rate in Okinawa is the highest in all of Japan.

Under the present circumstances, the central government of Japan and Okinawa's regional government is making efforts to develop the health industry and bio industry to become the next major industry equal to the tourism industry. In order for these life-science fields to prosper as potential industrial developments, huge amounts of expenses will be required. That is why a research institution similar to a university such as the Okinawa's Institute of Science and Technology (OIST) was established and will be recruiting students from 2012 to realize its contribution in the new potential industries.

1.2 The policies that Okinawa prefecture has implemented (mainly science technology, industrial development, and the industrial cooperation and similarities thereof)

During the approximately 30 years when World War II ended and until Okinawa was returned to Japan, Okinawa was under the control of the U.S. military which was in complete isolation from Japan. Due to that factor, when Okinawa was finally returned to Japan in 1972, the gap between Japan's economy and Okinawa's economy was clearly evident. In order to narrow the disparities in each field such as the economy in Okinawa, while respecting the will of the people and for the purpose of developments, the central government of Japan and Okinawa prefecture worked closely to incorporate various policies.

For the purpose of Okinawa's promotion plan, policies were carried out. For example in 1972, a ten year objective was enforced to increase Okinawa's economy for potential growth. Furthermore, in the year 2000 [The plan & promotion of Okinawa's economy in the 21st century] was created for the support of industries to function with equipped facilities for new projects and creations systems to perform at their peak. Another aim was to observe and research the ecological areas that contained coral reefs, the study of deep seawater research was another promotion to further research and development. Other policies and objectives included furthering international exchange programs, development of human resources, and securing employment were taken into effect.

At the present state, the Okinawa's promotion plan is being conducted which started from 2002 until 2011, and is now the fourth time since it was established. The fourth promotion plan had a big difference than the previous promotion plan in terms of up until the third promotion plan, the aim was to [narrow the gap or differences between Japan and Okinawa] for example economically, however in the fourth promotion plan the objective was to [prepare and contribute to the development of Asia Pacific region's societies and economies].

The fourth promotion plan had three targets or points which it emphasized. (1) the construction of [Okinawa's Institute of Science and Technology] previously mentioned, (2) the promotion of international exchange/ cooperation, and (3) to obtain a foothold for international exchange and cooperation formation in Okinawa.

1.3 The summary of OIST

OIST was organized to contribute to the world's development in science and technology and to be the forerunners of the accumulation of top researchers in the asia pacific region for the objective of economic independence and growth for Okinawa.

OIST's concept basis are written below.

- Aim to be best in the world in terms of research and education standards.
- International: more than half of the professorate and the student body will be foreign students with courses, meetings, lectures all being conducted in English. The research environment will be internationally friendly.
- Global Networking: In or out of Research facilities will provide top class networking systems.
- Collaboration with industry: the inside and outside of OIST buildings in it's surroundings including companies, research facilities, and venture businesses will be invited for the building of intellectual and industry cluster. Industry-university cooperation will be closely monitored.

The OIST education consists of research fields in bio-systems being the central issue. Biology, physics, science, computing, nano-technology, etc. will merge creating the frontiers of interdisciplinary research. To create the basis for the future of OIST, core subjects will be categorized into four main fields including neurology, molecular biology, mathematics, and environment studies. 27 of these research units are already established.

As of September 1, 2010 the research faculty consists of over 170 professors (foreigner professors roughly 60) and office workers include approximately 90 members. Also, to create a new branch of studies including physics, mathematics, etc. recruitment processes are currently being carried out.

The set up of OIST is expected to contribute to not only the development of Okinawa's economy, but will also elevate the market's competitiveness, improve former industries and create new industries of innovation, and become the world's standard level of science and technology associated with intellectual property being centered in Okinawa.

1.4 Problems of OIST

OIST is a world-class research institute of life-science. Although many problems were pointed out at the "International Symposium and Workshop: Toward the Development of an R&D Cluster in Okinawa." in October, 2010. Table below shows the problems pointed in the conference.

Recommendation	
1: Educate&Train	<ul style="list-style-type: none"> ● Establish an international Math-Science High School in partnership with a university. ● Expand students' access to computers and the Internet ● Foster faculty outreach to high schools. ● Invest in broad-based English learning through education, incentives, and partnerships. ● Provide full scholarships to qualified students from low-income families to attend universities in Japan and abroad. ● Commit to building OIST int world-class university; improve infrastructure and programs at existing Okinawa universities; partner with other Asian academic institutions. ● Devise income tax measures that encourage philanthropic donations to

	universities and research institutes.
2:Recruit Globally	<ul style="list-style-type: none"> • Ease immigration restrictions to support efficient issuance of temporary or permanent residency for qualified workers. • Offer flexible employment arrangements to recruit the world's best researchers and educators. • Provide assistance to integrate foreign families into Okinawa life: job placement, international schools, promotion of culture and arts. • Once the measures are taken, promote Okinawa internationally through an institutional campaign.
3:Build Entrepreneurs	<ul style="list-style-type: none"> • Include entrepreneurship training and mentoring in the curriculum of Okinawa universities and schools. • Establish Entrepreneurship Training and Entrepreneur-in-Residence Programs at universities. • Build real and virtual networks of local and global entrepreneurs.
4:Promote Risktaking	<ul style="list-style-type: none"> • Undertake broad public awareness campaign to promote stories of local entrepreneurs and those who have found success overseas. • Create government seed venture fund for repeat entrepreneurs, particularly those who have previously tried and failed.
5:Commercial Zone	<ul style="list-style-type: none"> • Streamline regulatory environment for starting, operating, reporting, and closing new ventures. • Make all of Okinawa into a special economic zone to attract entrepreneurs, investors, and their companies. • Provide favorable tax treatment for emergent business: waive corporate taxes for the first 10 years of new company operations. • Provide significant tax-breaks for established businesses to re-locate operations to Okinawa.
6:Expand Private Investment Sector	<ul style="list-style-type: none"> • Institute non-punitive tax system based on global standards. • Allow for zero capital gains tax for investments held for 5 or more years. • Deregulate pension funds to allow their participation in venture funds. • Establish government-backed seed venture funds. • Provide incentives for Corporate Japan to locate R&D facilities in Okinawa. • Provide incentives to establish Angel, Venture, and Private Equity groups.
7:Build New Industrial Sectors	<ul style="list-style-type: none"> • Universities rent lab space to emergent businesses. • Establish privately-managed venture business incubators and structure them to maximize sustainability. • Allocate funds specifically for collaborative research projects between

	<p>academia and industry; ease regulations where necessary.</p> <ul style="list-style-type: none"> • Encourage local companies that can competitively provide services to the university. • Strengthen the role of the Okinawa TLO. • Universities to establish own IP development and business innovation units.
8:Expand Viewpoint Globally	<ul style="list-style-type: none"> • Aim for global markets for locally produced goods and services. • Establish binational foundations to stimulate, promote, and fund industrial R&D of mutual benefit. • Reduce the high cost of inter-Japan and inter-Asia air travel.
9:Develop S&T Strategic Plan	<ul style="list-style-type: none"> • Develop focused S&T strategic plan for Okinawa that guides investments by government and also serves as a benchmark.

table1) Recommendations Chart quoted from “the International Symposium and Workshop Event Report.”

These suggestions are written in the very long view. We hope these suggestions to be accomplished in the future, but we wonder if we should just wait until then.

In the panel discussion held in the end of this workshop, a panel stated, “We should not let OIST isolated”. We considered what we could do not to let OIST isolated and concluded that we need person and system that connected it to others. In the case of Triple Helix, coordinator plays a roll of connecting universities and industry. In the next chapter, we’d like to discuss model of coordinator so far and suggest new “connecting” model of him.

2. Interpretation

2.1 The definition of “Innovation”

Before our interpretation, We want to share you our definition of “innovation”. What is a political innovation for Okinawa? We think it in terms of politics, and refer to Innovation 25 and the Vision of the 21st century as national policies.

1. The definition of Schumpeter
2. Innovation 25 as national policy
3. Regional innovation in Okinawa
4. From these political standpoints,

Before we define innovation in this article, we’d like to ensure the definition of Innovation used all over the world, and the definition in Japan. After that, we’d like to state definition of innovation of Okinawa, regional innovation

In the beginning, we quote the words of Schumpeter who first defined the theory of innovation. The theory of innovation was defined by Schumpeter. According to his book “Theory of Economic Development”, he states that the concept of innovation includes:

- The introduction of a new good – that is one with which consumers are not yet familiar – or of a new quality of a good.
- The introduction of an improved or better method of production, which need by no means be founded upon a discovery scientifically new, and can also exist in a better way of handling a commodity commercially.
- The opening of a new market, which is a market into which the particular branch of manufacture of the country in question has not previously entered, whether or not this market has existed before.
- The conquest of a new source of supply of raw materials or half-manufactured goods, again irrespective of whether this source already exists or whether it has first to be created.
- The carrying out of the better organization of any industry, like the creation of a monopoly position (for example through trustification) or the breaking up of a monopoly position.

Next, we introduce the public concept of innovation in Japan. According to “White Paper on Science and Technology” in 2002, Ministry of Education, Culture, Sports, Science and Technology states below:

”Innovation brings benefit to not only companies but also whole social economy. By now, we have once translated ‘innovation’ into ‘technological innovation’ in annual economic reports. That is because many of innovations which changed our basis of life styles occurred of innovative technologies. Although, innovation originally means: producing economic achievement by changes of creation of a new good and service, and its process of production and distribution. It happens due to not only innovative technologies but also collaboration and improvement of existing technologies, improvement of production tools, and shakeup of management.”

Also, it states that an innovation fills these requirements:

- New or improved product introduced into the market, or introduction of a new or improved process into one’s company.
- Based on new technical development, collaboration of existing technologies, or result of using other knowledge gained by one’s company

In Japan, innovation is often translated into “technological innovation.” That’s because of idea that social revolution occurs from technological development. In this paper, we’d like to regard definition of innovation widely, referring to “Innovation 25 strategic conference” –the long-term strategic policy which was stated in the policy speech of Abe, in order to create an innovation which contributes to growth by 2025, and definition of innovation introduced above. In other words, we define innovation as not only technological development, product innovation, and process innovation but also social changes and following change of mind of people.

Considering that, we would like to discuss “what a big innovation in Okinawa is.” Referring to Okinawan regional features, we talk over from regional innovation to wide definition of innovation such as changes in social structure and changes of mind of people.

We think that the innovation brought by OIST creates a wide meaning of innovation such as changes of existing values and mind with new discovery of value in the field of life science. In addition, it makes the bottom-ups of living standard of Okinawan people brought in by changes of society and people’s mind all over Japan. This occurs from technological development with a huge innovation, and higher interest to education and employment promotion in Okinawa with a small innovation.

In the next paragraph, we would like to talk about our interpretation.

2.2 What is curaton, Why is curation.

It has been said that we need to cultivate coordinators who can connect enterprises, universities, and research organizations one another, in order to promote triple helix.

First of all, we'd like to discuss what coordinators are and what they can do. One of their rolls is to mediate between enterprises and research institutes/universities. Specifically,

- 1) Discovering technical seeds of research institutes and universities.
- 2) Collecting needs of enterprises, matching people needed for each other.
- 3) Counseling technical issues on developments and researches.
- 4) Handling competitive research funding applications.

By going between enterprises and research organizations, they can promote the interchange of capacity and information each other. That'll lead the high quality of research development and thus better the local economy. In order to make it happen, we need competent coordinators who can play these important rolls. Cultivating coordinators is a great agenda in Japan.

To reinforce this, the Ministry of Education, Culture, Sports, Science and Technology (MEXT) has started to locate triple helix coordinators to universities that actively tackle with triple helix as Triple helix strategic expansion project since 2008 which is called "Coordinate Program". Some cases have reported great results and achievements. Among them, we'd like to introduce three cases which we pay more attention on.

First one is "water-saving irrigation system using recycled resources." University of Tottori and local enterprises have made that system. Using recycled resources such as scrapped tires and glasses, they developed the anti-desertification water saving irrigation system. When SME (small and medium-sized enterprises) were on project of product development, they often paid too much attention on using and selling their products only in Japan. Even though SME have their own ideas of domestic sales and usages on product development, with this successful case, a coordinator could find a new method to sell, using their products' specialty.

Second one is the case of University of Aizu. They have introduced seeds of the university on the web and the number of technical inquiries increased. In this case, it started with coordinators who wanted to make a seeds collection that was easy to understand. They made some topics of simple introduction of researches that the university was working on. This made their communication with enterprises smoother than before and resulted to collaborate more.

The last one is the case of university of Yamanashi. They adopted a bank clerk as a coordinator. Since bank clerks are in the closer position to the enterprises, they wanted to research the seeds of the university from the viewpoint of enterprises, which brought a collaboration research between the university and the enterprises. The coordinator who is a bank clerk interviewed the university researchers and he introduced the research with the way a bank clerk talks. That helped enterprises to understand what the university is researching, and that brought many collaborations.

Some universities pointed out a narrow outlook as one of the reasons for failing. We found some common denominators in these cases of success and fail. Also, the key of success is not only what a coordinator can provide but also what people in general can do.

The key of success is curation. Curation is used especially in the field of arts, which means collecting information of art crafts in the world, collecting them and giving some coherent meaning to them, and holding them as an exhibition. Those who do such things are called "curator." In these days, people started using the word "curation" as a method of sorting better information on the internet.

The feature of curation is giving value-added contexts to informative contents. In curation, contents and context are mutual complement. Context is becoming no longer "sidebar."

* A square is quantity of “value”.

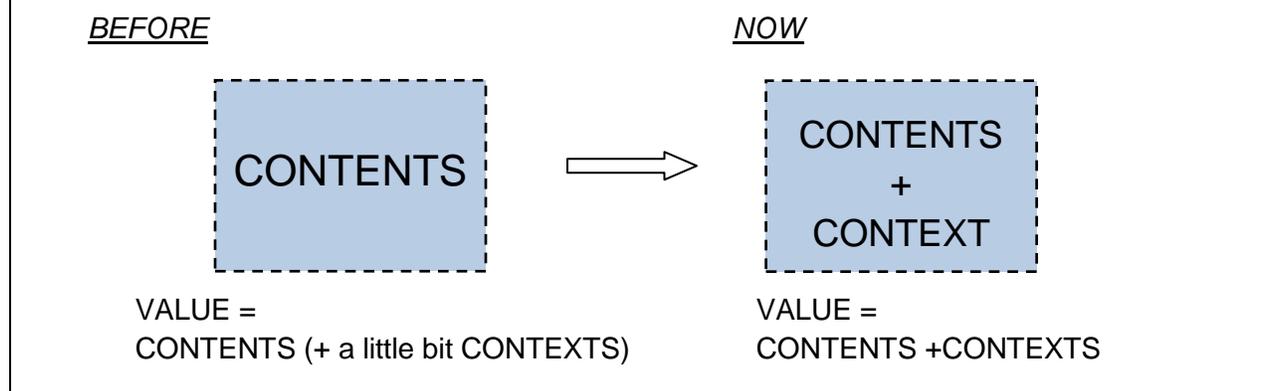


Chart 1) comparing value before and now

Contrarily, it is becoming more important to put context such as meaning, possibility, and the value for people to a piece of information.

We think this is applicable to researches in universities. Just disclosing information of seeds is not valuable any more. Disclosing and showing “how to use that seeds in society” is more valuable. It is easy to understand with the first example of University of Tottori. The coordinator put a new value to the technology (the contents), which led this case to a success.

In case of the second and the third, they got to collaborative research by making the contents of research look easier. This is an important fact of action of curation. Ability of judging where to make use of a piece of information—in that case, the result of the research, is one of important ability in action of curation.

The success of the second and the third cases were led by the coordinators that are competent in that ability. Abilities to know where to make use of information and how to show a context to make it stands out are also required. Does Japan encourage us to improve these abilities?

The establishment of OIST that is the greatest research institute of life science in the world will give Okinawa and Japan the best resource ever. In order not to throw away the merit of OIST, we want to put OIST as the center of innovation, get involved enterprises and government, and contribute to the development of Okinawa. To make it come true, we have two solutions. If we can actualize these two solutions, it will lead innovation in our definition, in other words, not just a technology innovation but a huge innovation that changes minds of Okinawan people.

The first solution is to keep in mind that coordinators don't connect research institutes and enterprises, but research institutes and society. In Japan, we tend to think how to put a seed into practical use, which causes exchange of information between a research institutes and an enterprises. But, can it really make innovation for society? We think disclosure of research contents to people without special knowledge for that field like us is necessary. Coordinators need knowledge of contents to find out seeds of researches and marketing skills to find out needs of enterprises. However, we think, they even more need curation—skill of rephrasing results of research to society and make it easier to understand. If we have a person who can put possibilities (context) to research results (contents), everyone can become a coordinator who put them together. Also, everyone can get the ability of curation. Because curation itself is putting a value for you, which means there is no a right answers but everything is right.

The second solution is to create a platform to share a lot of values for you. We'd like to suggest that we make a curation collection like the seeds collection on WEB base of University of Aizu. Sharing value from different angle will make it more possible to create a new idea. You cannot have it only for your own. Disclosing and prevailing value for you make value for others.

Providing research contents with others and creating a platform to share value for you, we can make a huge innovation that changes minds of whole world.

In Japan, WEB services using curation has appeared. Good examples of them are “Together” and “NAVER add-ups.”

Together is a service based on twitter. The same kind of service is provided in the U.S. named chirpstory. It allows you to bring tweets of someone in twitter together into one list and put permanent link. This service is new in the point that it is different from hash tags and add-ups from research in twitter because it gives you a new content that are brought together artificially.

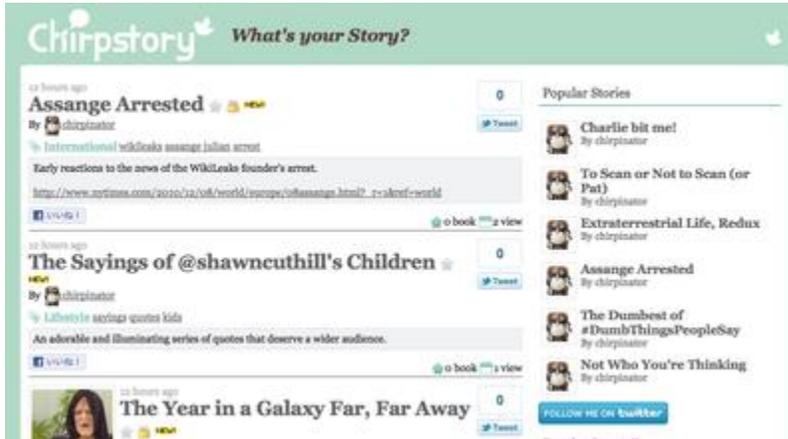


Image 1) top page of “Chirpstory”

Together lets an individual to organize information. Lots of individuals doing so, sophisticated information is formed. It is different from information provided by search engine like Google that uses complicated algorithms. Some people claim that this service lets searcher to find a new value of information.

Here is another example “NAVER add-ups.” It is a service that lets you to extract pieces of information such as tweets, websites, pictures, and movies from the Internet and put them together into a single web page. When the earthquake in Japan occurred in March, while a lot of “inaccurate” information has overflowed and confused people on the Internet, “NAVER add-ups” provided information edited by users.



Image 2) top page of “NAVER matome”

At the present day of Social Networking Service, curation services that organize information are gathering a great attention in Japan. We think that this can be applied to case of Triple Helix. If something that brings together results of academy appears, it will let us to share new values.

3. Conclusion

Establishing the world-class research institute OIST will give Okinawa and Japan great resource in triple helix. Whether we make useful or not depends on supports from people I us. Today, we talked about the concept of curation as a way to make innovation using resource of OIST. In order to achieve curation, we need a roll of telling results of researches to society in an easy-to-understand manner and to create a place to share things attached with new values. If these are accomplished, innovation of new form would occur. We could only mention about the future vision of OIST which is not even open yet, but we believe Okinawa has enough resources to make regional innovations. We hope this thesis contributes to the development of Okinawa.

References

Move! Japan taskforce (Ed), *Move! Japan*. Nikkei Business publication, 2003

Akio Nagahira and Koji Nishio, *Collaboration with industries , universities and government.* Chuokeisai, 2003

Koichi Sumikura and Toshiya Watanabe, *TechnologyLicensing Organization and Licensing Associates*. BKC (Tokyo), 2002.

Toshinao Sasaki, *the age of curation*. chikuma shinsho, 2011

Henry William Chesbrough, Wim Vanhaverbeke and Joel West, *Open Innovation: Researching a New Paradigm*. Oxford University Press, 2006

Ministry of Education, Culture, Sports, Science and Technology, *“White Paper on Science and Technology in 2002.”*

http://www.mext.go.jp/b_menu/hakusho/html/hpaa200201/hpaa200201_2_006.html

Okinawa Institute of Science Technology Promotion Corporation (2010), *“International Symposium and Workshop TOWARD THE DEVELOPMENT OF AN R&D CLUSTER IN OKINAWA October 6-7 2010”*

NAVER matome top page <http://matome.naver.jp/>

Chirpstory top page <http://chirpstory.com/>