APPLICABILITY OF ENGINEERING AND BUSINESS ADMINISTRATION APPROACHES FOR THE ACTIVATION OF LOCAL BUSINESS

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ABSTRACT: Stagnation of regional economies is caused by a decline in primary industry, which is vital for rural areas economies. Prime Minister Shinzo Abe's bid to participate in the Trans-Pacific Partnership (TPP) has the potential to reshape Japan's agricultural sector so that it can compete on an international level. This paper outlines an analytical framework aimed at solving the problems that local agricultural business face and the effectiveness of the analytical framework. The framework consists of two engineering approaches, called Conceptual Data Modeling (CDM) and Quality Function Deployment (QFD), and a business administration approach called Balanced Scorecard (BSC). The research is based on studies on industrial clusters, regional vitalizations and systems approaches. In CDM, the domain identity and mission of the target business is defined according to D.F. Abell's "Defining the Business" theory in which management is rendered visible as static and dynamic models. Furthermore, we examine whether formation of industrial clusters with agricultural businesses as their core is rendered visible using these approaches. BSC is an approach advocated by Kaplan and Norton and we examine that the skeleton of BSC strategy map can be extracted from CDM. QFD is a design approach proposed by Akao and Mizuno that aims at quality assurance from the design phase of a product. We apply QFD to a completely different field from the original field. This concept makes it possible to define a concrete strategy from reasonable and objective viewpoints by transposing the decision maker's subjectivity to numerical values. Our proposed framework makes suggestions for research into local business activation and may be applicable not only for agricultural business but for any type of business. We would like to repeat the hypothesis testing and promote this local business model.

KEYWORDS: local business activation model, Conceptual Data Modeling, Balanced Score Card

1. BACKGROUND

Because of the decline in corporate profits, a result of the economic downturn and financial deterioration of the national and local governments, there is a limit to the amount of investment in rural businesses and the availability of funds from urban areas. Therefore, a business model that can activate business in local regions endogenously is required.

Primarily stagnation of regional economies is caused by a decline of primary industry, which is vital for rural economies.

The insecurities over employment have led to young people's aversion to rural life. Low birth rate, longevity and depopulation in rural areas have risen, and a regional gap has emerged. According to data from the Ministry of Internal Affairs and

Communications, the number of agricultural workers in Japan was 6,973,000 people in 1980 and 2,601,000 people in 2011. Therefore, the number of agricultural workers in 2011 has decreased sharply by 37% since 1980. The meanwhile number of agricultural workers aged 60 and over has risen from 35% to 74%. Total agricultural income decreased from 10,262,500 million yen in 1980 to 79% at 8,121,400 million yen in 2010.

Prime Minister Shinzo Abe's bid to participate in the TPP has the potential to reshape the agriculture sector so that it can compete on an international level.

In the scientific study on regional activation, various researches have been performed. However, the great portion of researches emphasized practice itself, and a standard analytical framework has not yet been established. A study that can show the solutions to the problems of regional activation is therefore required.

2. CONSIDERATION OF PREVIOUS WORKS AND POSITIONING OF THIS RESEARCH

Previous studies on using analytical frameworks in conjunction with the activation of the agribusiness include K. Yamamoto (2008), O. Tomizawa (2011) and H. Kitamura et al. (2012).

In view of three phases (①Recognition and analysis of actual condition, ②Recognition and orientation of subject, ③ Embodiment and evaluation of strategy), the preceding studies can be considered as follows. K. Yamamoto (2008), O. Tomizawa (2011) put emphasis on "②Recognition and orientation of the subject" while H. Kitamura et al. (2012) is a collection of examples.

In this research, an agricultural business was set as a target to which we could apply our analytical framework for problem recognition stated in the previous.

We apply a technique of copying business structure of the target to models, and the business structure is rendered visible. This approach is based on the work of S. Nasu (2010). This is based on the concept of "creating a system which manages a subject by analyzing the phenomenon about the social system and modeling structure, while simultaneously obtaining the integrated insight about recognition of a social system."

Next, the analytical viewpoint of the BSC that R. Kaplan and D. Norton (2001) propose is applied to the copied models and a strategy map is derived from them. Use of the analytical viewpoint of QFD (Y. Akao, 1993) is included in "③Embodiment and evaluation of strategy".

In addition, use of "Defining the Business", presented by D.F. Abell to formulize the problem of the business definition theoretically, to develop a strategy and use of the static model for industrial cluster analysis are described.

The theoretical bases for this research are supported by research on regional vitalization and industrial cluster, and systems approaches.

3. COMPLETE ANALYTICAL FRAMEWORK FOR ACTIVATION OF THE AGRICULTURAL BUSINESS

The complete analytical framework is as follows.
①Recognition and analysis of actual condition
   Use of the analytical viewpoint of CDM.

①-1   Domain identity and mission

①-2   Static model

①-3   Dynamic model

②Recognition and orientation of subject

Use of the analytical viewpoint of BSC.

②-1   Strategy map

③Embodiment and evaluation of strategy

Use of the analytical viewpoint of QFD.

4. THE THEORETICAL BACKGROUND FOR ANALYTICAL FRAMEWORK

4.1 The viewpoint of modeling of an enterprise

According to M. Matsumoto (2009, 2010), enterprise modeling technology research began to be discussed during the International Society of Enterprise integration and business process reforms, along with the development of IT systems, from around 1992. There are three main enterprise modeling theories.

① "Enterprise morphology," that captures the form of the enterprise itself.

② "Enterprise model idea", in which the enterprise consists of some element models as the modules.

③ "Component model idea", in which the enterprise consists of value model, information model process model et al.

CDM is considered to be one of "the Component model idea" and the procedure is as follows.

① Domain identity and mission

Clarification of management strategy, the input, the output, and core competence etc. in an enterprise.

② Static model

Clarification of the "substances" as elements which constitute the real world and the relations between the "substances".

③ Dynamic model

Clarification of the relations between "substances" and "business activities".

④Cooperation model between organizations

Clarification of "substances" and "business activities" which an organization manages with responsibility,

⑤ Function model

Understanding of the chain of business functions.

⑥ Application Architecture

Derivation of an application system (a basic system, an information system etc.) suitable for an operating form.

⑦ Evaluation of the solution

Evaluation of the premise, the differences between solutions and former situations, measures against the new problem and loss, etc.

⑧ Phase plan

Planning a procedure to advance business reform.

In this methodology, we paid attention to, "domain identity and mission", which regard business as a value chain; the "static model", which clarifies main "substances" and its relations, and the "dynamic model", which catches the relations, of main "substances" and "business activities."

4.2 The "Defining the Business" Viewpoint of D.F. Abell

D.F. Abell was the first researcher to try and formulize the problem of the business definition theoretically. He formulized a business definition in the three-dimensional space of alternative technology, customer function, and customer segment.(Fig. 1)

The framework of "domain identity and mission" of CDM is shown in Fig. 2. CDM includes peculiar technology and internal resources as a core competence, customer function, and customer segment. Therefore, it can be said that CDM is

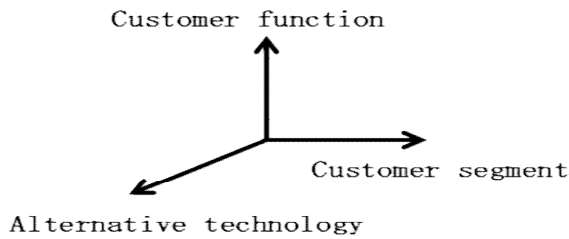based on D.F. Abell's "Defining the Business" model.
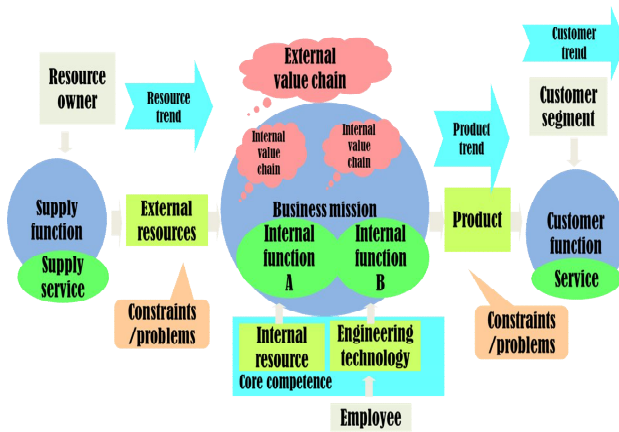

Fig.1 "Definition of Business" according to D.F. Abell

Fig. 2 Framework of "domain identity and mission"

4.3 The Viewpoint of Requirements Engineering

A. Ohnishi, T. Toshihiko and J. Shirogane (2000) say that it is necessary to consider two characteristics ("characteristic of operativity of demand acquisition", and "characteristic of target area"), in order to establish the differences between demand acquisition techniques of requirements engineering from a viewpoint of the application. They have presented a "requirements engineering technical map" (Fig. 3) based on their experiences.

■Characteristics of operativity of demand acquisition
 On which does the technique focus static structure or dynamic behavior?

■Characteristics of target area
 ・The target area is closed.

The known stable domain can be structured fundamentally and can be arranged in various models in formal theory. It is possible to understand mainly by paying attention to a target form and syntax.

・The target area is open.
 In order to search an unstable and strange domain, we have to examine the target meaning in detail.

We tried to arrange domain identity and mission, static model, dynamic model, strategy map, and quality function deployment to Fig. 3 according to our experiences. From a viewpoint of requirements engineering, we will extend our research from now on.
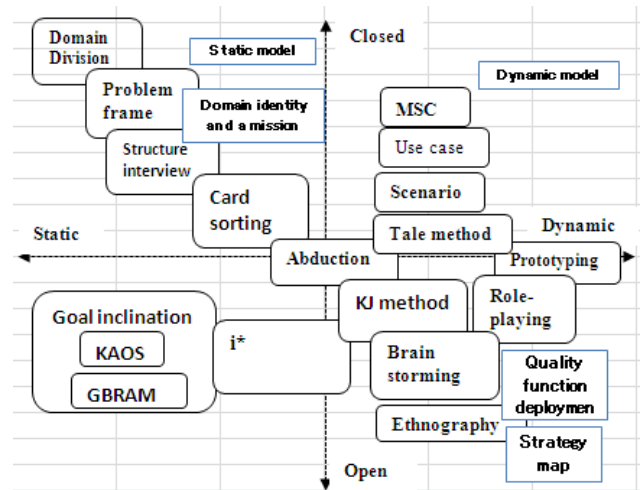
Fig.3 Requirements engineering technical map

5. THE OBJECT ENTERPRISE OF RESEARCH

We selected Mimoto Gardening in Kochi as a subject for our research. Mimoto Gardening owns about 3.5 ha of farmland in Haruno-cho, Kochi. The manager graduated from the agricultural department of a university in 1986, and found a job as a farmer. Cultivation of flower seedlings began when he was 30 in 1994. Yearly turnover is about 180 million yen (the 2010 fiscal year), and there are 35 employees (17 part-time employees are included). This

enterprise grows and sells flower seedlings (viola, clover), and has expanded also to overseas markets.

6. THE OUTLINE AND USE EXAMPLE OF EACH PHASE

6.1 Recognition and analysis of actual condition
In this phase, "domain identity and mission" and "static model " and "dynamic model " of CDM are used.

6.1.1 Use of "domain identity and mission"

6.1.1.1 The framework of "domain identity and mission"
This is shown in Fig.2. According to A. Teshima et al. (2011), by using "domain identity and mission", we can clarify the positioning of the enterprise in the inside of business environment and its relations with others and observe how the enterprise is performing.

6.1.1.2 Use Example and analysis
The "domain identity and mission" of Mimoto Gardening is shown in Fig. 4. Each element, -business mission, external resources, product, and core competencies including engineering technology and internal resources-can be clarified.

Furthermore, comparison and examination of agricultural businesses are enabled based on each element by observing the whole enterprise. (M. Igata et al.2013)

6.1.2 Use of "Static model"

6.1.2.1 The framework of "Static model"
A static model shows the " substances " that exist in the object world and the relation between " substances". The relation between "substances" is shown using "->" (-> means 1: n) in this paper.
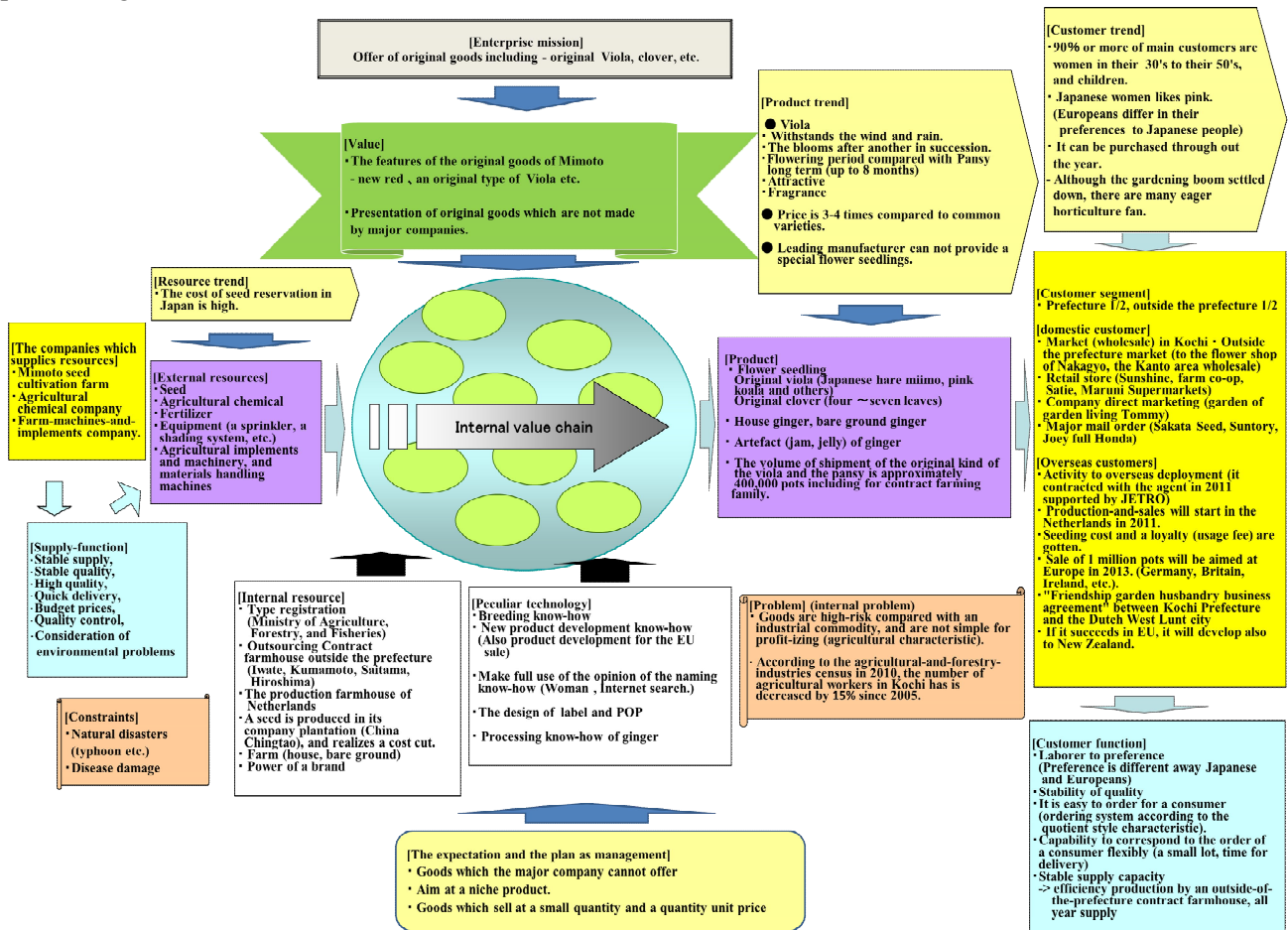
Fig.4 "Domain identity and mission "of Mimoto Gardening

6.1.2.2 Use Example and analysis

The "static model "of Mimoto Gardening is shown in Fig. 5.By using "static model", the substances, which are objects of management and exist in the object world of "domain identity and mission", can be extracted. A static business structure can be grasped to clarify the difference between agricultural businesses. (M. Igata et al.2013)
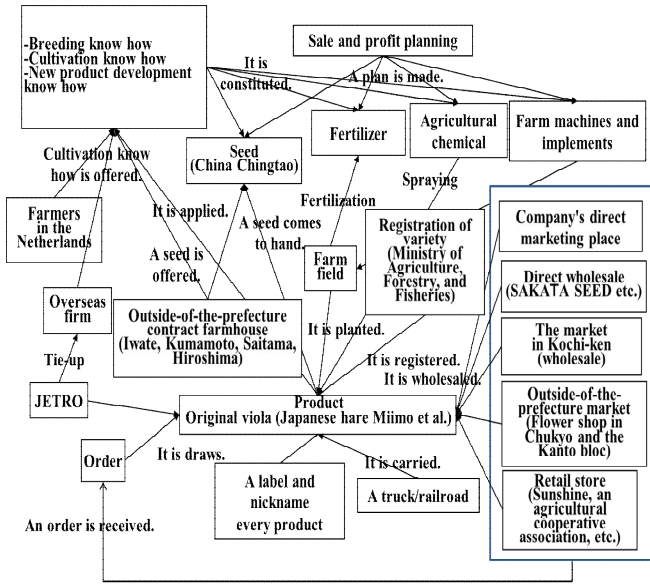
Fig.5 " Static model "of Mimoto Gardening

From the viewpoint of static model, the features of Mimoto Gardening are considered to be "breeding know-how, cultivation know-how and new product development know-how", "Registration of variety (Ministry of Agriculture, Forestry, and Fisheries) ", and "outside-of-the-prefecture contract farmhouse." The extraction of the features of an agricultural business can be performed by using a static model.

6.1.3 Use of "Dynamic model"

6.1.3.1 The framework of "Dynamic model"

A dynamic model describes the change rule of the substance influenced by "business activities" through the life cycle of the substance from generation to termination.
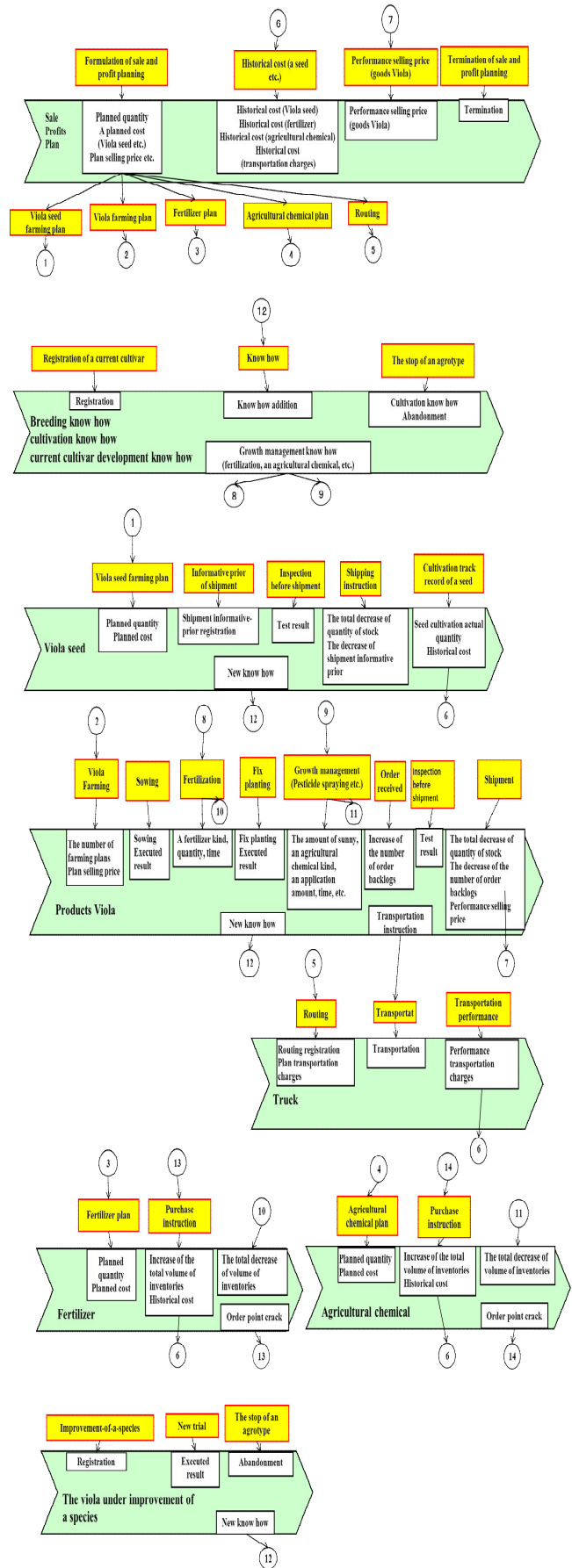
Fig.6 " Dynamic model "of Mimoto Gardening

"Business activity" which rewrites the data state of "substance" is described from the upper part of "substance." "Business activity" which sends data outside when the data state of "substance" has changed to a certain state is described in the direction of the lower part of "substance." The object world is described in the form that "substances" exchange information in dynamic model. According to S. Kaneda (2009), in CDM, "substances" which change data state and "business activities" with the function to change data state are the analytical targets. Therefore, the prospect for analysis for modeling is improved.

6.1.3.2 Use Example and analysis

The "dynamic model "of Mimoto Gardening is shown in Fig. 6. By use of "dynamic model", the behavior of "substance" that appeared in the "static model" can be drawn.

By use of the dynamic model, the features of agricultural business can be extracted from a dynamic viewpoint. Use of dynamic model is effective in analysis of agricultural business as with a static model.

6.2 Recognition and orientation of subject

6.2.1 The framework and the view of derivation of "strategy map"

According to R. Kaplan and D. Norton (2001), when BSC was developed, its purpose was to solve the achievement measurement problems of enterprise. Now, BSC is utilized for the examination and introduction of new strategy.

BSC can express and examine the strategy of enterprise from four viewpoints.

① The viewpoint of finance

② Customer's viewpoint

③ The viewpoint of internal business process

④ The viewpoint of study and growth

The method for derivating a strategy map from the outputs of CDM is shown in Fig. 7. The four viewpoints of BSC and a basic strategy are derived through the check of each element of "domain identity and mission", "static model" and "dynamic model".

T. Hujimoto (2012) has advocated applying the concept of "craftsmanship in a broad sense" to the agricultural business. In T. Hujimoto (2005), he claims that it is important to grasp the ability and competitive power of the manufacturing industry from the viewpoint of the four fields "organizational ability to making a thing," "hidden competitive power (performance in depths)" and" competitive power which appears outside (performance in surface)," and "earning capacity." The concept of making performance of four fields balance is quite close to the view of BSC.
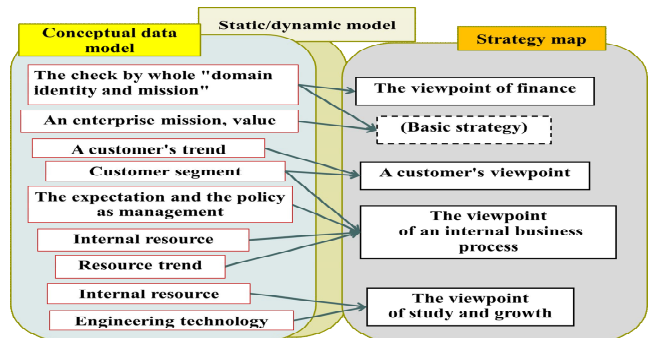

Fig.7 Method for derivating a strategy map from the outputs of CDM

6.2.2 Use of Example and analysis

"Strategy map "of Mimoto Gardening is shown in Fig.8. The measures grasped by CDM are extracted as strategic groups with causal chains. It is considered one of the factors which have led the business of Mimoto Gardening to success.

A strategic defects and aspects which should be improved, etc. become clear and it becomes an opportunity which materializes activity towards reform by drawing and analyzing "strategy map".
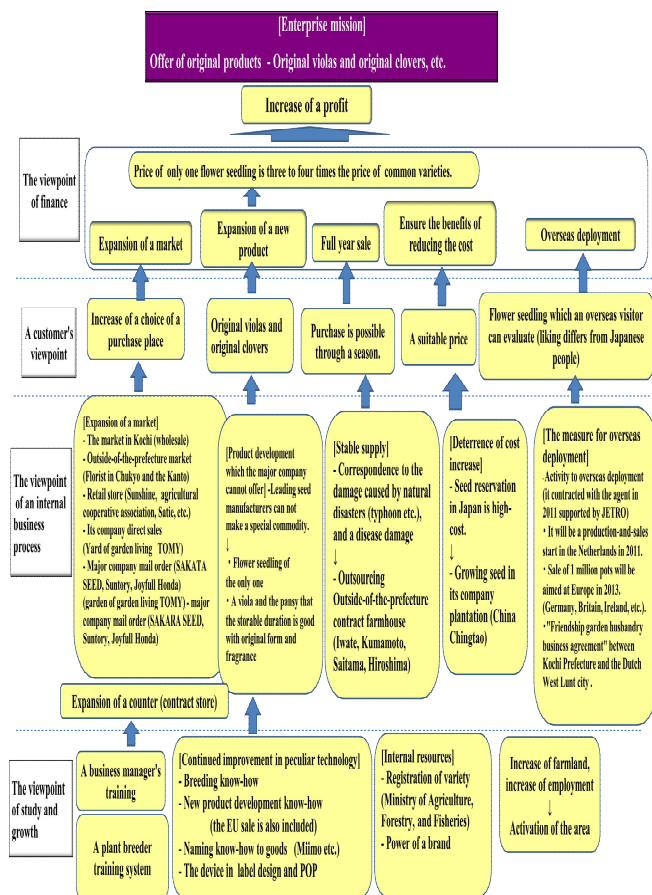
[Enterprise mission]
Offer of original products - Original violas and original clovers, etc.

Increase of a profit

The viewpoint of finance

Price of only one flower seedling is three to four times the price of common varieties.

Expansion of a market | Expansion of a new product | Full year sale | Ensure the benefits of reducing the cost | Overseas deployment

A customer's viewpoint

Increase of a choice of a purchase place | Original violas and original clovers | Purchase is possible through a season. | A suitable price | Flower seedling which an overseas visitor can evaluate (liking differs from Japanese people)

The viewpoint of an internal business process

[Expansion of a market]
- The market in Kochi (wholesale)
- Outside-of-the-prefecture market (Florist in Chukyo and the Kanto)
- Retail store (Sunshine, agricultural cooperative association, Satie, etc.)
- Its company direct sales (Yard of garden living TOMY)
- Major company mail order (SAKATA SEED, Suntory, Joyfull Honda) (garden of garden living TOMY) - major company mail order (SAKARA SEED, Suntory, Joyfull Honda)

[Product development which the major company cannot offer] -Leading seed manufacturers can not make a special commodity.
↓
- Flower seedling of the only one
- A viola and the pansy that the storable duration is good with original form and fragrance

[Stable supply]
- Correspondence to the damage caused by natural disasters (typhoon etc.), and a disease damage
↓
- Outsourcing Outside-of-the-prefecture contract farmhouse (Iwate, Kumamoto, Saitama, Hiroshima)

[Deterrence of cost increase]
- Seed reservation in Japan is high-cost.
↓
- Growing seed in its company plantation (China Chingtao)

[The measure for overseas deployment]
-Activity to overseas deployment (it contracted with the agent in 2011 supported by JETRO)
• It will be a production-and-sales start in the Netherlands in 2011.
• Sale of 1 million pots will be aimed at Europe in 2013. (Germany, Britain, Ireland, etc.)
• "Friendship garden husbandry business agreement" between Kochi Prefecture and the Dutch West Lunt city .

Expansion of a counter (contract store)

The viewpoint of study and growth

A business manager's training

A plant breeder training system

[Continued improvement in peculiar technology]
- Breeding know-how
- New product development know-how (the EU sale is also included)
- Naming know-how to goods (Miimo etc.)
- The device in label design and POP

[Internal resources]
- Registration of variety (Ministry of Agriculture, Forestry, and Fisheries)
- Power of a brand

Increase of farmland, increase of employment
↓
Activation of the area

Fig.8 "Strategy map " for Mimoto Gardening

6.3 Embodiment and evaluation of strategy

6.3.1 Quality Function Deployment (QFD)

QFD is a technique proposed by Y. Akao and S. Mizuno in 1978, and application has been tried in many companies. QFD is a general term for quality expansion and quality function deployment in a narrow sense.

According to Y. Akao (1993), QFD is a design approach for realizing a guarantee of quality from the design phase of a product. The "quality requirements deployment" which arranges the frank view of the market as linguistic information, the "quality characteristic spreadsheet" which developed the elements (quality characteristic) used as the measure which evaluates the quality of a product, and the "quality table" which consists of quality requirements deployment and a quality characteristic spreadsheet, etc. are created in QFD.

6.3.2 The use method of the analytical viewpoint of quality function deployment

In our analytical framework, the strategy item on a strategy map is equivalent to the "demand quality" of QFD. On strategy map, the important key performance indicator (KPI) is established as a concrete ruler for evaluating a strategic target. KPI is equivalent to "quality characteristic" which evaluates the quality of a product.

In our analytical framework, in accordance with the method of QFD, the strategy items on strategy map are further examined, and the importance of each strategy item is determined.

6.3.3 Correlations between Proposed Procedure and Procedure of Quality Function Deployment

The Correlations between our procedure and the procedure of QFD is shown in Fig. 9. A strategy item spread sheet corresponds to a quality requirement spread sheet, similarly, a key performance indicator spread sheet corresponds to a quality element spread sheet, "a strategy item * key performance indicator spread sheet " corresponds to "a required quality * quality element spread sheet" , and an embodiment strategic spread sheet corresponds to a job-function- spread sheet, respectively. The example of Mimoto Gardening is shown in Fig.10 and Fig.11. The importance of embodiment strategies is evaluated in Fig. 11.
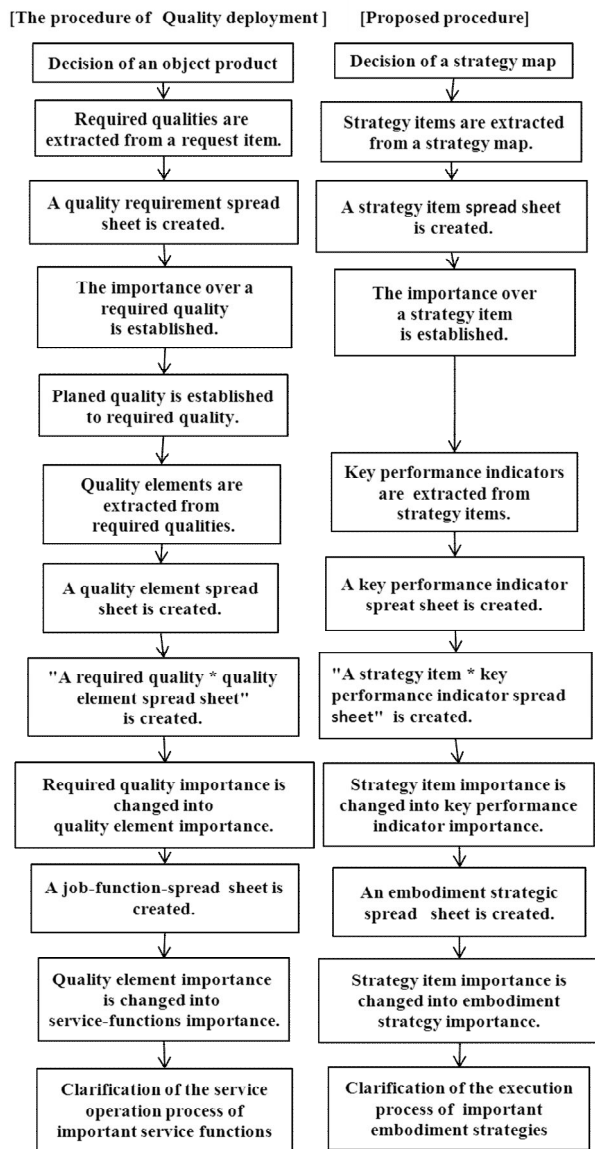
Fig.9 Correlations between Proposed Procedure
and Procedure of QFD

[The procedure of Quality deployment]
- Decision of an object product
- Required qualities are extracted from a request item.
- A quality requirement spread sheet is created.
- The importance over a required quality is established.
- Planed quality is established to required quality.
- Quality elements are extracted from required qualities.
- A quality element spread sheet is created.
- "A required quality * quality element spread sheet" is created.
- Required quality importance is changed into quality element importance.
- A job-function-spread sheet is created.
- Quality element importance is changed into service-functions importance.
- Clarification of the service operation process of important service functions

[Proposed procedure]
- Decision of a strategy map
- Strategy items are extracted from a strategy map.
- A strategy item spread sheet is created.
- The importance over a strategy item is established.
- Key performance indicators are extracted from strategy items.
- A key performance indicator spreat sheet is created.
- "A strategy item * key performance indicator spread sheet" is created.
- Strategy item importance is changed into key performance indicator importance.
- An embodiment strategic spread sheet is created.
- Strategy item importance is changed into embodiment strategy importance.
- Clarification of the execution process of important embodiment strategies

Fig.10 Strategy item and key performance indicater
spread sheet

The viewpoint of finance	Basic strategy	A customer's viewpoint	Market The number of expansions	Every year New product The number of development	Local distribution of a plantation	Cost The amount of reduction / deterrence	Overseas Expansion number
	Expansion of a market	Increase of a choice of a vendor	O 30.0	O 15.0	O 15.0	O 15.0	
	Expansion of a new product	Original violas and original clovers	O 10.0	O 20.0			
Increase of a profit	Full year sale	Purchase is possible through a season.	Δ 6.0		O 24.0		
	Ensure the benefits of reducing the cost	A suitable price	O 10.7			O 21.3	
	Overseas deployment	Flower seedling which an overseas visitor can evaluate.	O 8.0				O 16.0
			64.7	35.0	39.0	36.3	16.0
			33.9%	18.3%	20.4%	19.0%	8.4%

⊙:○:△ 4:2:1 Independent allocation-of-points method

Fig.11 Embodiment of strategy and its importance

1st order	2nd order	3rd order	Expansion of sales channels number 33.9	Developing a number of new products over the years 18.3	Dispersion of plantation 20.4	Reduction and deterrence amount of cost 19.0	Expand the number of overseas sales 8.4	Embodiment strategy Importance	Embodiment strategy Importance Ratio
The viewpoint of an internal business process	Expansion of a market	The market in Kochi-ken (wholesale)	O 68					68	3.8%
		Outside-of-the-prefecture market (Florist in Chukyo and the Kanto)	O 135					135	7.6%
		Retail store (Sunshine, an agricultural cooperative association, Satie, etc.)	Δ 34					34	1.9%
		Its company direct sales	Δ 34					34	1.9%
		- Major company mail order (SAKARA SEED, Suntory, Joyfull Honda)	O 135					135	7.6%
		Expansion of a counter (contract store)	Δ 34					34	1.9%
	Product development which the major company cannot offe	Flower seedling of the only one	O 68	O 73				141	7.9%
		• A viola and the pansy that the storable duration is good with original form and fragrance	O 68	O 73				141	7.9%
	Stable supply	Outside-of-the-prefecture contract farmhouse			O 82			82	4.6%
	Ensure the benefits of reducing the cost	Growing seed in its company plantation (China Chingtao)	Δ 34			O 76		110	6.2%
	Overseas deployment	Sale of 1 million pots will be aimed at Europe in 2013					O 34	34	1.9%
The viewpoint of study and growth	Continued improvement in peculiar technology	Breeding know how		O 73				73	4.1%
		New product development know-how	O 68	O 73		O 17		158	8.9%
		Naming know-how to goods	O 68					68	3.8%
		The device in label design and POP	O 68					68	3.8%
	Internal resources	Registration of variety (Ministry of Agriculture, Forestry, and Fisheries)	O 68	O 73		O 17		158	8.9%
		Power of a brand	O 68					68	3.8%
	Others	A business manager's training	O 135					135	7.6%
		A plant breeder training system	Δ 34	O 73				107	6.0%
		Total						1782	100.0%

7. FURTHER DEPLOYMENT OF OUR ANALYTICAL FRAMEWORK

7.1 Use to the strategic deployment of D.F.Abell's "Defining the Business"

D.F. Abell says that fundamentally there are three business definition patterns（specialization strategy, differentiation strategy, and non-differentiation strategy）. Specialization strategy is a strategy for specializing in the specific segment of a technology, a customer function, or a customer segment. Differentiation strategy is a strategy which secures

an enterprise widely and subdivides the inside of an enterprise. On the other hand, non-differentiation strategy is a strategy which secures large business space and does not subdivide the inside of an enterprise.

We would like to try developing the view of an above-mentioned strategy based on "the domain identity and mission" of our analytical framework. In M.Igata et al. (2013), the exercise which make students of Kochi University of Technology consider new businesses using D.F. Abell's "Defining the Business" approach is reported.

7.2 Use of the static model to industrial cluster analysis

According to Porter (1993), a cluster is a geographically proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities. The geographic scope of clusters ranges from a region, a state, or even a single city to span nearby or neighboring countries. The geographic scope of a cluster relates to the distance over which informational, transactional, incentive, and other efficiencies occur.

More than single industries, clusters encompass an array of linked industries and other entities important to competition. They include, for example, suppliers of specialized inputs such as components, machinery, and services as well as providers of specialized infrastructure. Clusters also often extend downstream to channels or customers and laterally to manufacturers of complementary products or companies related by skills, technologies, or common inputs. Many clusters include governmental and other institutions (e.g., universities, think tanks, vocational training providers, standards-setting agencies, trade associations) that provide specialized training, education, information, research, and technical support. Many clusters include trade associations and other collective bodies involving cluster members. Finally, foreign firms can be and are part of clusters, but only if they make permanent investments in a significant local presence.

A static model shows the "substances" which exist in the object world and the relations between "substances". Therefore, it seems that the analysis equivalent to Porter's cluster analysis is possible by using the static model of our analytical framework. Furthermore, the static model can be the input to the Porter's diamond frame analysis.

8. CONCLUSION AND FUTURE SUBJECTS

The following things are clear through this research.
①"Domain identity and mission" ,"static model" and "dynamic model" are effective in the grasp of agricultural business structure and their features.
② It is possible to make a strategy visible (derivation of a strategy map) by using the viewpoint of BSC to the outputs of CDM.
③QFD is a design approach aiming at the quality assurance from the design phase of a product and applied to a completely different field from the original field. This concept makes it possible to define a concrete strategy from reasonable and objective viewpoints by transposing the decision maker's subjectivity to numerical values.
④The examination results ("domain identity and mission," etc.) from our analytical framework include the know-how of each agricultural business, and can use it to examine other agricultural businesses efficiently.

In this research, there are two viewpoints on future subjects. One viewpoint is to make the proposed analytical framework more useful in

practice. Another viewpoint is to clarify theory on which the analytical framework is based.

From the former viewpoint, we would like to advance research on the two following points first of all.

①Since "domain identity and mission" includes D. F. Abell's "Defining the Business", we think that further strategic embodiment can be deepened by utilizing his theory at the step of "domain identity and mission".

②It is possible to use a static model for industry cluster analysis, and static model can be the input to the Porter's diamond frame analysis.

From the latter viewpoint, this paper described the rationale of the individual element of the analytical framework. We would like to clarify the rationale of the whole analytical framework based on the past researches and theories.

The proposed analytical framework suggestions for research into local business activation and may be applicable not only for agricultural business but for any type of business. We would like to repeat the hypothesis testing and promote this analytical framework and local business model.

REFERENCES

A. Ohnishi, T. Toshihiko and J. Shirogane, 2000.*Introduction to Requirements Engineering,* Kindai Kagakusya.

A. Teshima, T. Koike, H. Matsui, Y. Namba and A. Hideo, 2011. *Information technology connects the hearts of the people who work the design of conceptual data model,* Hakutou syobou.

Abell, D.F. 1980. *DEFINING THE BUSINESS:The starting point of strategic planning*, Pearson Education, Inc.

H. Kitamura, M. Ito, K. Kawasaki, T. Fujiwara, and T. Tansho, 2012. *Development of the teaching materials for personnel training of local innovation creation and Modeling of creation*, Local innovation creation study group.

K. Yamamoto, 2008, Development of agricultural version BSC (Balanced Score Card) which supports the advancement in the management of the colony farm type agricultural legal entity of Hiroshima Prefecture, *Hiroshima University of Economics Economic Research Journal* 31st volume No. 3.

M. Igata, S. Katsura, 2013.Visualization of Business Architecture of Agricultural Business and Derivation of Strategic Map based on it－For Establishment of Methodology for Invigorating Agricultural Business－, *Journal of Regional Development and Vitalization Studies*, Vol4:149-159.

M. Igata, S. Katsura and Y.Nakayama, 2013. Utilization of Conceptual Data Modeling Method in Education of School of Management, Kochi University of Technology －The trial which conceives business through a lecture and exercise－ , *ICPM2013*, Vietnam,2013.

M. Matsumoto, 2009. Enterprise model Fundamentals (Part 1), *IEICE Technical Report SWIM2009-25*.

M. Matsumoto, 2010. Enterprise model Fundamentals (Part 2), *IEICE Technical Report SWIM200-3*.

O. Tomizawa, 2011. Subject of regional vitalization by the deployment of 1.5the industry, *Regional vitalization system methodology Execution Report of management faculty of Kochi University of Technology*, pp. 167-174.

Porter, M. E. (translation: Hirotaka Takeuchi), 1993. *On Competition Theory II*, Diamond Corp.

Kaplan R. and Norton D., 2001.The *Strategy-Focused Organization*, Harvard Business School Pr.

S. Kaneda, 2009. Rebuilding of Conceptual Data Modeling (CDM) based on the pragmatism of CS Perth", *IPSJ SIG Technical Reportvol*.2009-IS-1 10 N0.2

S. Nasu, 2010. Social Management Systems Science, *Kochi University of Technology Research Bulletin*, 7 (1): 177-191.

T. Fujimoto, 2005. *Philosophy of craftsmanship in Japan*, Nikkei Publishing Inc.

T. Hujimoto, 2012.*Revival from craftsmanship*, Nikkei Publishing Inc.

The Ministry of Internal Affairs and Communications, 2013.Statistical data of agriculture-and-forestry fisheries, URL: http://www.stat.go.jp/data/nihon/07.htm

Y. Akao, 1993.*Introduction to quality deployment*, JUSE.