A Mini-Cluster, a Hub for Knowledge Sharing and Business Networking

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Executive Summary

The paradigm for business competition is shifting. In the 21st century, global economic climate has been **changing from competition among companies to regions**. As a new paradigm appears, each region seeks distinctive strategy to survive i.e. new business management strategy aiming at expanding business opportunity **through inter-business networking**. **Mini-cluster is defined 'an integrated group** joined by stakeholder in the same or other kind of business, university, and research laboratory to extend their efforts for promoting innovative technology and co-marketing', The key strategy is **mini-cluster** for the groth of Changwon National Industrial Complex(CNIC). **Changwon Cluster Development Agency(CCDA)** supprots these mini clusters. About 40 experts are recently engaged in providing optimal support to mini-clusters

Introduction

World is betting on forming clusters. The paradigm for business competition is shifting, not inter-business but among regions. To foster regional competitiveness, Korean government is promoting a policy for more balanced national development, i.e. introduction of innovation cluster allows already established manufacturing complex to reshape industry intensive area secured competent R&D capacity with superb residential condition. In line with this mission, Changwon National Industrial Complex(CNIC) does not spare effort to form 'cutting-edge machinery industry in the world'.

Changwon's cluster policy is closely linked to the operation of mini-cluster. Mini-cluster is defined 'an integrated group joined by stakeholder in the same or other kind of business, university, and research laboratory to extend their efforts for promoting innovative technology and co-marketing',

To cope with the policy, 5 mini clusters were kicked off back in 2004 along with Changwon Cluster Development Agency(CCDA), play a significant role in propelling regional competitiveness and major locomotive for future growth.

This article will presents a goal of 5 mini clusters and introduce results that they have accomplished so far, and thus propose a future direction how mini clusters to be a growth engine in the process of vigor and sustainable development in local economy.

Mini-Clusters of Changwon National Industrial Complex(CNIC), Korea

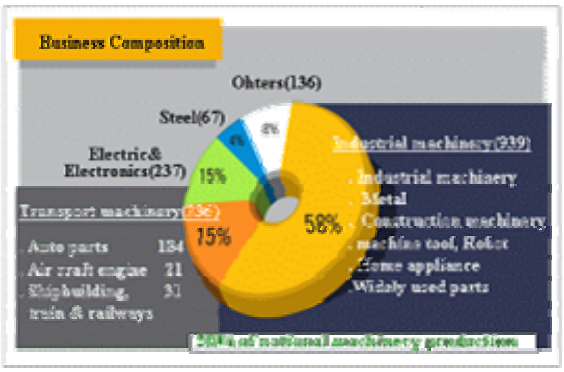
The policy of Changwon mini clusters is affiliated to the national industrial cluster project implemented by central government. This chapter will present how they follow the mechanism, what they achieved, and the role of local government and organizations in cooperation with each other.

1. Background

The key strategy of cluster project is 'to build an industry-university-institute network through their collaborative activity'. The joint work in technological development and marketing may create potential business opportunity among member companies.
Fueled by 38 full responsible staff members in 5 specific teams, support agency committee, and expertise board, CCDA extends its role in efficient operation.
CCDA pours all-round financial and personnel assistance in order to stabilize the mini clusters. Beside, all professional staff are dispatched to mini clusters to help them to make a rapid decision, The professional board gives them a better solution.
Meanwhile, Changwon city has been stepping up efforts in building infrastructure. Under the slogan 'Young City Changwon', and as Korea's first planned city, it strives to provide best condition for high level of human resources to reside i.e., occupying over 28% of transportation facility of total city territory, securing greenery area more two times larger than other cities, establishing foreign school, and constructing luxury residential area, etc. Beside, Changwon Exhibition and Convention Center(CECO) accommodates world class of conference rooms and exhibition hall, five star hotel, trade tower, and shopping complex to be constructed nearby, will surely be a landmark of the city Changwon.

2. Changwon, a home to korea's machinery industry

Proudly, Changwon has been developed as the cradle of S. Korea's machinery industry since early 1970s as it was designated specific industrial zone for fostering heavy and chemical industry. Strategically located within 1 hour of excess from Gimhae international airport, Busan and Masan Port, efficient transport network of expressways and railways, and well-organized logistic infrastructure, Changwon has been efficiently conducting Korea's high economic growth.
Arguably, nation's first planned city, modeled after Australia Canberra, Changwon is the capital city of Gyeongsangnam-do province, and center spot in terms of politics, administration, industry, culture and education as well. As of today, Changwon machinery intensive complex has partnered with 50 foreign invested companies such as VOLVO, GM, ALCOA, KRAFT, PRAXAIR, PHILIPS, FAG, DENSO, FANUC, DELPHI, global Korean enterprises such as LG Electronics, Doosan Heavy Industry, Doosan Infracore, Samsung Techwin, and more about 1600 companies. Within the city, collective R&D base including Changwon National University, Korea Institute of Machinery & Materials, and Korea Electrotechnology Research Institute , etc.



CNIC composes 58% of general machinery, 16% transport logistics, 12% electrical electronics, 5% steel, and 9% of others including parts and materials. As of 2004, CNIC contains 72,000 pers. of work force, total production accounts USD 28 billion, and export volume USD 10 billion, proudly taking ratio 20 % of machinery production nationwide.

Changwon, the Northeast Asia's largest machinery industrial region who has led Korean economy in the past era, kicked off second round of challenge to lead 21st century. A new policy called 'Innovative Cluster Project' launched to make changwon a world level of cluster like Korean version of the Silicon Valley in U.S., Kista Science City in Sweden, and Toyota City in Japan.

<Fig 1> Bird's eye view of governing city, Changwon & CNIC

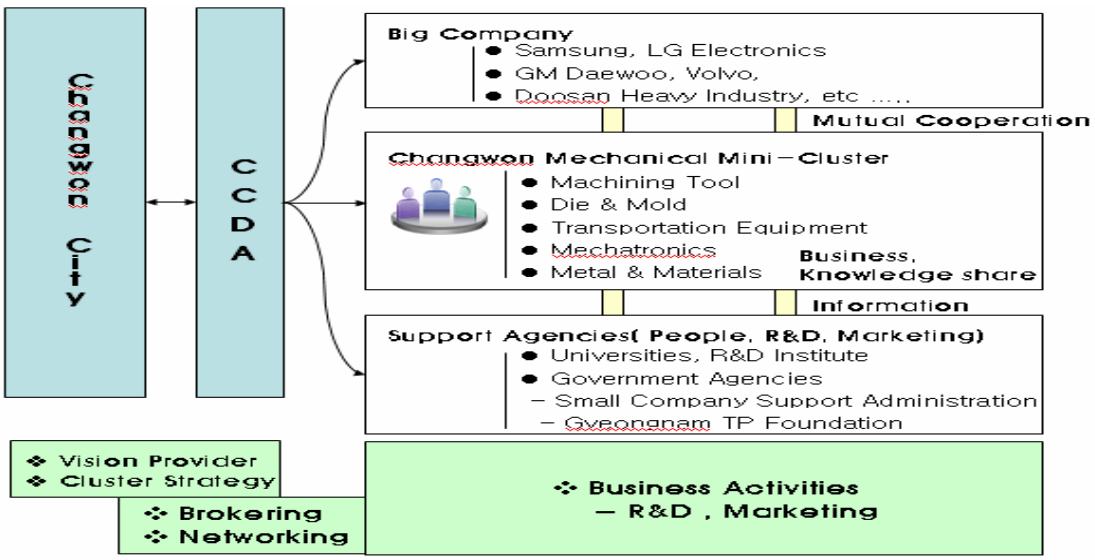
3. Operation strategy of mini cluster

To lift business competitiveness, mini cluster exerts mutual R&D technology dissemination, and co-marketing activities among same type of business. In this regard, CCDA and support agencies fuel the mini-clusters' activities indirect way.

CCDA falls into 5 distinctive mini clusters that are subject to the features of operating companies in CNIC : Machine tool, Transportational equipment, Die & mold, Mechatronics, and Metal materials. To braden inter business opportunity and know-how spillover , mini cluster aims to be a hub of industry-academia-laboratory-government cooperative network in exchange of information and knowledge stimulated within the region.

Regional entities add their contribution by taking their clear assignments. Local university and support agency, as a vision provider, engaged in operating guidance and providing manpower. The collaboration between big and small & middle firms is essential factor toward the success of cluster. SMEs taking 97% of total establishments, supply goods to big company and develop core technology.

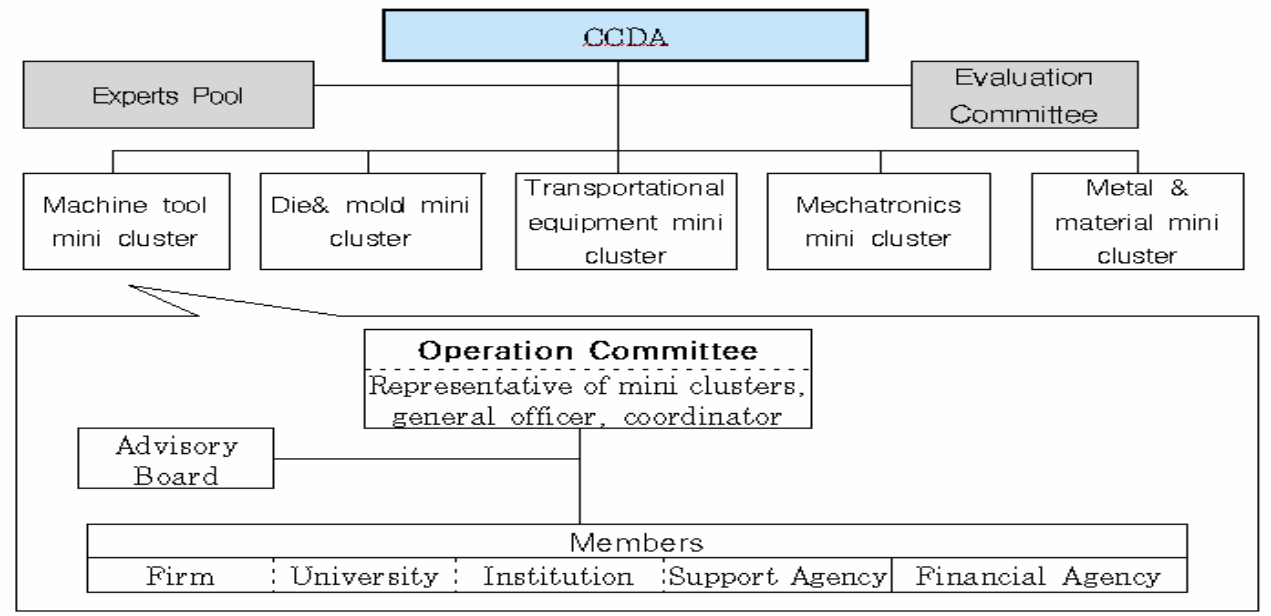
In summary, mini clusters involve in revealing problems and giving proper solution within clusters, meanwhile a vision provider including CCDA and local government add their assistance in setting operational direction of mini clusters, providing expertise pool, and upgrading learning condition in general, additionally big enterprises fulfill technical support and carry out commercialization of target product.



<Fig 2> Operation strategy of mini cluster

CCDA structure

To fulfill the mission, along with fully responsible staff composed 38 persons, systematic bodies cooperate along with expertise pool, assignment evaluation committee, operation committee, and advisory board.



<Fig 3> CCDA & mini cluster operating structure

4. Mini cluster operation

Taking consideration of features of machine industry of CNIC, mini clusters launched in April of 2004. One of distinctive point in CNIC, about 40 big firms and affiliated SME suppliers who manufacture parts and materials are highly dependent on the range from parts to finished product.
At the initial stage, 50 members in five areas launched In 2005, by now expanded 434 persons consist of 75% of corporate membership and the rest are university, laboratory, and public agency.

Classification	Company	R&D Center	University	Support Agency	Total
Machine Tool	55	3	13	6	77
Die & Mold	50	5	10	7	72
Transportational Equipment	55	9	9	3	76
Mechatronics	94	3	11	4	112
Metal & Material	67	13	14	3	97
Total	321	33	57	23	434

<Table 1> Mini Clusters Membership(2006)

Business cafe

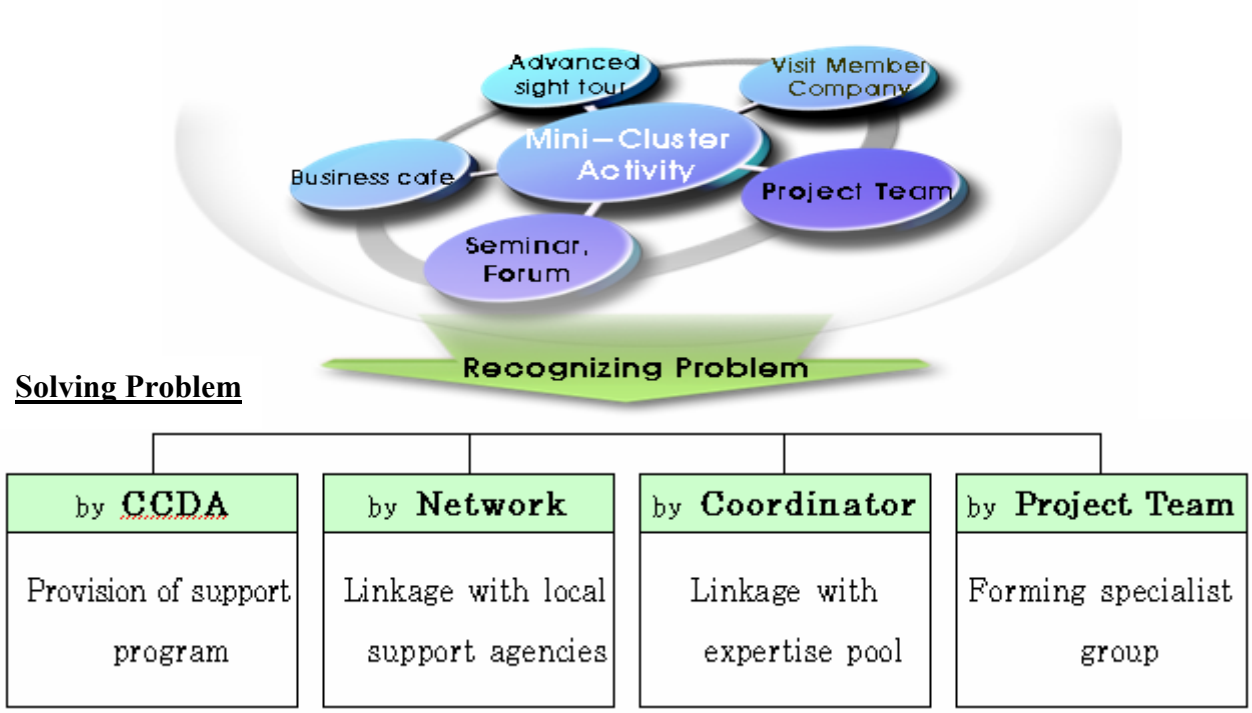
Recognized as a concentrated programs, there is a 'Giupsarangbang' which is sort of business cafe. Through this program, SMEs are able to quickly obtain numbers of soft knowledge about technological development, skill for shop problem solving, managemental consulting, marketing

strategy, corporate IR, etc. The cafe handled 80 cases so far, 20 cases among them were put on assignment list.
A variety of consultation and solution occurred inside the cafe.
According to the cases, expertise pool is ready to offer customized service fitting companies' own difficulties because they have different condition in size, business stage, and financial needs. If needed further study or assistance, the obstacle may be linked to assignment task and carried out by mini cluster.
Business cafe serves as a single window to hear problems unsolved in each company.

<Fig 4> Business Cafe(Inno Café, Consulting Room)

Major activity

Mini clusters' activities include : organization of seminar, workshop and bull session participated by specialists from firms, laboratory, and public agency. Second, putting a business goal and strategy taking consideration of the result drawn out from the prior events. Third, handling of project team given the task of solving problems.
22 project team were formed within 5 mini clusters aimed to explore difficulties and give a proper answer during the operation of member companies
Consequently, the revealed obstacle is registered to the assignment list to be granted partial financial aids, in this regard, CCDA engaged in screening acceptable partner among firm, university, and public agency, and offers brokering service in the most effective way to create preferable synergy effect in the field of technology development.

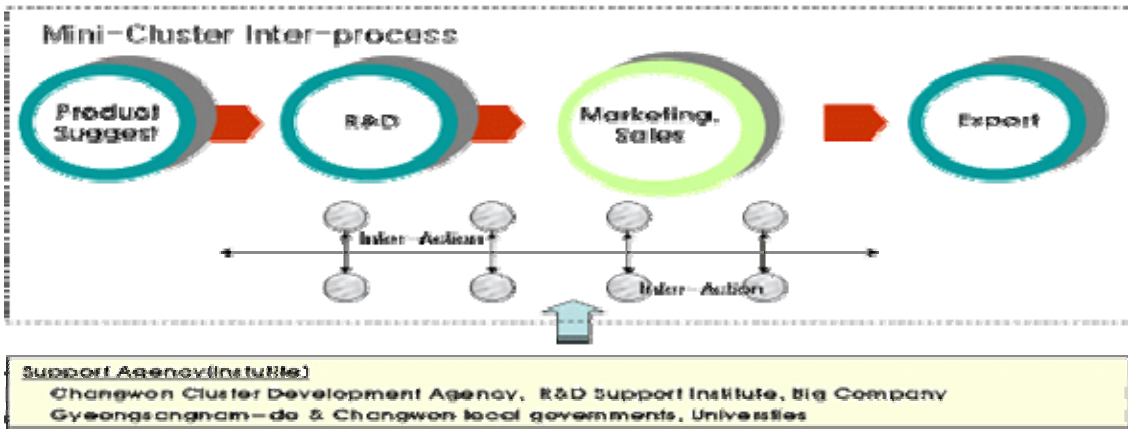


<Fig 5> Assignment solving process through mini cluster activity

Beyond giving the member company a solution for the obstacle, inter business cooperation can be another output. In other word, they expect diverse type of business appeared not driven by competition among companies but by a general pursuit of mutual benefits. Diversified network activities make it easy to grasp strong and weak point among member companies, and thus interactive joint technological development and parts sharing could be occurred. Eventually, a new paradigm of management has been emerged based on technology dissemination and logistic cost deduction.

As a regional innovation leader, mini cluster has envisioned new management strategy and business innovative system through providing specific seminars themed of future high tech and management strategy in line with efforts to keep offering fundamental base, which will surely lead corporate innovation.

Targeted a hub of industry- academia- laboratory- government cooperative network, mini clusters struggle for radical reshaping themselves. To heighten competitiveness, CCDA involves the process from revealing promising technology, and careful assignment evaluation, and to nurture mini cluster a self-reliant entity in the future. Consequently, they predict collaborative and open network to be created.



<Fig 6> Mini-Cluster R&D Process

5. Mini Cluster accomplishments

According to the mini clusters' activity report in 2005, 240 cases were successfully handled in the four different areas including R&D, marketing, and education, etc. It means that diversified business scheme were designed through mini clusters' program.

Field	Assignment Solving
General Management	Management consulting, industrial right, etc 78 cases
R&D	Joint technological development, technology transfer, etc. 120 cases
Education	10 programs, 76 firms participated
Marketing	Participation of domestic and overseas exhibition, marketing consulting, etc 37cases

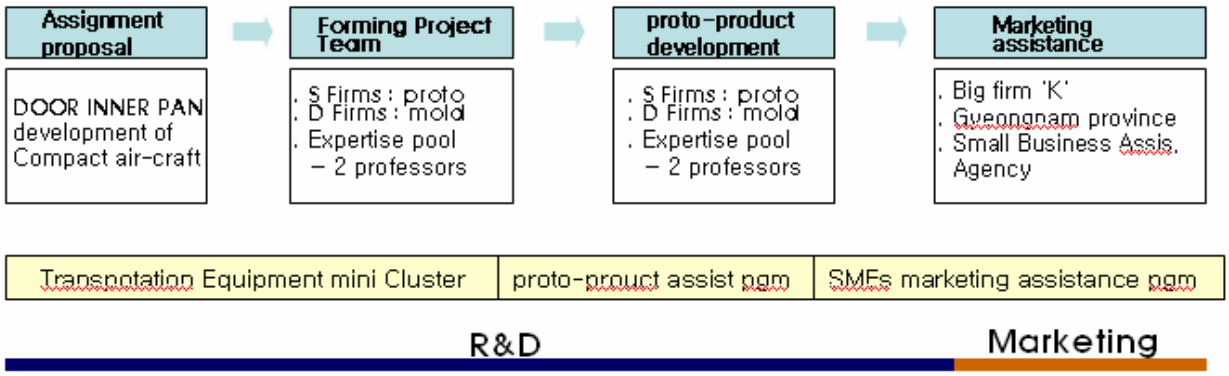
<Table 2> Solving difficulties within the member company

R&D and marketing sector

'S' firm, a member of transportational equipment mini cluster, conducted inter business project in order to develop a key part, MLG door pan to cover MLG(main landing gear)which is a taking off and landing equipment placed in the compact air craft(6~7 seats)

The chief coordinator suggested to make a project team joined by related firms and support agency. 'S' firm submitted a business plan for manufacturing proto-product to CCDA, then selected as assignment at the evaluation committee. S firm made a contract with CCDA and implemented the project under the condition S to be covered the project cost.

Meanwhile, Gyeongsangnam-do local government, Small Business Corporation and KAI which is a only company manufacturing complete air craft in Korea cooperated in designing 'Customized Support Program' and to involve in overseas sales of water gas. In result, they succeeded in making a contact of exporting 1,000 units in a year by 2015 with a total of USD 60 million (KRW 5.8 billion).



<Fig 7> The process of technology commercialization

Communication & commercialization of technical assignment

A member of machine tool mini cluster had a chance to participated Europe Machine Tool Exhibition to have a case study of advanced machinery industry in Europe. The member company recognized a necessity to develop a 30,000 rpm revolution body with ultra speedy principal axis. Upon the company's request, a project team launched team joint by complete product company, parts company, and professors in university. They invited a technician(TAKAYA) from Japan to hold a seminar for involvers to learn a global technology trend. Also they visited a company producing 10,000 rpm revolution body to examine the common use of technology. The team decided to link this project to the Regional Industry Development Program(Strategical Industry Promotion Agency), and submitted a

plan to Gyeongnam Strategical Industry Promotion Agency. Finally financial support KRW 630 million have been made to this project.

Marketing : Joint booth operation

In line with implementation of diverse joint-marketing programs for member companies operating same kind of business, 12 mechatronics mini cluster member companies participated the 3rd International Automation Industry Exhibition in March of 2006 and jointly operated a control unit marketing booth.
In addition, in June 2006, 5 member companies operated a cooperative marketing booth at the KOMAF CHINA 2006
By implementing a series of promotion event to advertise quality of products in domestic market, member companies accomplished fruitful results valued 7.7 billion won.

<Fig 8> Joint marketing at Int'l Auto. Industry Exhibition(left), Product explanation event (right)

Technology fair

Furthermore, Technology Fair was held to accelerate joint project and technology transfer among mini clusters attended by domestic technological institutes such as Korea Institutes Machinery & Materials(KIMM), and Korean Electrotechnology Research Institute(KERI) in 2005. Additionally, joint research movement underway with Daedeok Innopolis, one of representative research park nationwide. On the basis of stimulated national technology transfer experiences, they will concentrate on international level of technical cooperation with Japan and Germany, etc. in the future.

<Fig 9> Techno Fair(KIMM,KERI)

Mutual business inter-action among members

New business sector has been created by inter action among members. S firm supplies machine tool cam to D firm. S found that Y firm had a capacity of manufacturing the same kind of parts during

having discussion among member companies about the issue how to reduce cost price. By making a contract between S and Y, S saved 5 % of logistic cost, and Y added sales amount 300 million won in a year. This is a good model case of creating mutual benefit.

Utilizing local experts

In the expertise pool run by CCDA who assist difficulties given by members, 2 chief coordinators take an initial step to reveal obstacles that member companies have, 32 assisting staff members handle the issues handed over from chief coordinators. In addition, a specialist group(220 pers.) composed of local professors, researchers, and businessmen are responsible for screening technical assignments and giving solution.

Knowledge share : Education, seminar, etc

Mini cluster allows members to share the stimulated knowledge through seminar and educational program as well as to have a broaden opportunity in their business. For example, to encourage member company envision a new strategy in their business management, a variety of worthy lectures titled 'Future Machinery Technology Trend' and ' Blue Ocean Workshop' were arranged.
Add to this, to fulfill the goal of information dissemination and discussion about assignment, members had 160 times of meetings in 2005, envisage more chance to gather in 2006.

Knowledge management system : e-Cluster

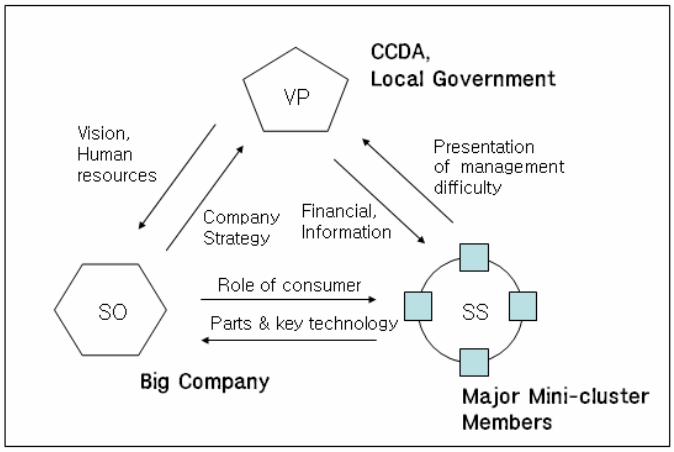
An industry-university-institution comprehensive knowledge management system, 'e-Cluster'(http://www.e-cluster.net) under service and provides a database and collective information of mini cluster supporters, enterprises, universities, research labs, and operating equipments, etc.

Item	No. of DB
No. of Company	126,000
No. of Product	43,000
Support Agency	1,200
No. of Experts Pool	13,000
R&D Equipment	12,000
Technology Page	17,000

<Fig 10> Knowledge Management System(http://www.e-cluster.net)

Conclusion

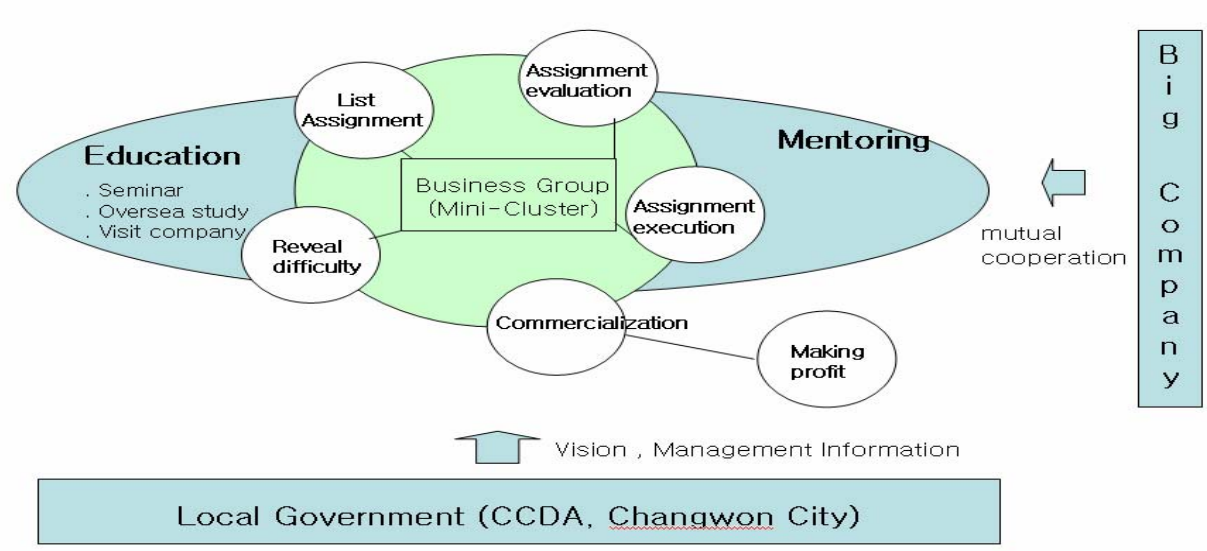
The success of Korea's cluster strategy on industrial complex extremely depends on mini cluster's achievement.
Envisioned 'Improving regional competitiveness through mini clusters', local innovative entities take shall their clear roles :
First, a vision provider (VP, CCDA and local government) will present a vision and direction, and exert to construct proper infrastructure. Second, big company as a system organizer(SS), helps SMEs to implement competitive merchandising & marketing strategy. Third, SMEs mini cluster members (SS) involved in R&D development.



Long-term mission of mini cluster to become a hub where mutual knowledge & information sharing is taking place then to be a center spot of business.

It is expected that a fruitful result of mini cluster will highly contribute to the regional economy. Within further three years, the production of Changwon to be increased from 2.8 to 4.6 billion USD, and 10 to 1.6 billion USD in export.

As required a new paradigm for knowledge-based infrastructure in 21 century, mini cluster which successfully combines major efficiency between big & SMEs, surely to be a growth engine to make Changwon a city of representing cutting-edge technology & information with a superb R&D capacity.



<Fig 11> Operation frame of mini cluster