

# **Regional Innovation System Built By Local Agencies: An Alternative Model of Regional Development**

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## **ABSTRACT**

During the 1960s through 80s, the national government of most Asian states exercised "growth pole" concept of regional development. This strategy calls for the rapid growth of national economy focusing on export-led mass production and taking advantage of cheap and low-skilled labour forces. It became clear that the state-backed economy underwent many difficulties in the current globalised and knowledge-based economy. The existing system faces growing criticism that it helps neither national economy to grow nor regional economy to prosper.

The restriction of growth-maximizing strategies of the central government is recognized. In response, local governments turned their attention more to the small-scale and endogenous development which emphasizes human capital, local technology and intimate territoriality. Governors and mayors are busy seeking locally-grown technology to support small firms rather than relying on large multi-national corporations.

Small-scale development can thrive with technological innovation and community participation. These schemes cannot be realized without the sufficient autonomy of the local government and entrepreneurship of citizens. This paper illustrates the Korean case tracing the changing regional development policy. It indicates how the national and local state changes their roles in the economic development and how local enterprise transforms the existing system of vertical relationship of production to more horizontal association responding to the system of flexible accumulation. This changing model of regional development will hopefully shed some light on other Asian countries to prepare for the emerging information age of the 21st century.

## Contents

- I. Introduction
- II. A Regional Development Model in the Knowledge-Based Economy
  - 1. Deficiencies of Regional Growth Pole Policy
  - 2. An Alternative Regional Growth Model in the Knowledge-based Economy
- III. Industrial Modernization of Kyeongnam after the 1960s
- IV. The Downward Spiral of the Kyeongnam Mechanical Engineering Industry
- V. Building the Innovation System by the Local Government
  - 1. Governance Structure
  - 2. The Innovation System
  - 3. Regional Clusters
- VI. Conclusion

## I. Introduction

The regional growth pole is a 40-year-old regional development policy adopted and put into forth in Korea. Now, it is in crisis. Despite the demonstrated rapid economic growth in the growth pole regions, their growing dependency on external forces of the global market has brought problems which became more explicit during the recent economic turmoil in Asia. In addition, over-concentration of population in a few of growth pole regions produced problems--lack of housing, deteriorating public amenities, environmental pollution and others.

As Korea gradually loses comparative industrial advantage against the newly industrializing countries, such as China and Southeast Asian nations, additional investment in the growth pole regions does not guarantee benefits automatically. Labour force in the growth pole regions are exposed to job insecurities. This is compounded by the increasing number of the companies automatising production system and moving firms to other regions. There is also the communication and transportation technology that are advancing fast, enabling firms to move goods and services faster and inexpensively (Drucker, 1994). If the employment in the services and public sector cannot absorb the disappearing jobs in the smoke-stack industry, growth pole regions in Korea are expected to experience growing unemployment in the near future.

It is well known that in the age of knowledge-based economy, innovation of new products and the level of factory automation largely determine the competitiveness of regional economy (Thurow, 1999). Investment in technology development tends to outpace the investment in road construction or industrial estate in improving regional

competitiveness. In U.S.A., for example, deindustrialization experienced during the 1980s and 90s yielded mass unemployment mainly in the manufacturing sector. This was, however, offset gradually by growing industrial productivity and increase of jobs in the new service sectors, particularly in the communication sector (Thurow, 1999).

Information technology loomed out to accelerate the pace of industries and services to cluster in a few of advantageous regions. In its wake, other parts of more traditional industrial areas were subject to depression. An example is the textile and garment industry in northern Italy and the information and movie industries that congregate in California, U.S.A.

It seems imperative that in order to maintain regional competitiveness in the knowledge-based economy, localities pursue continuous innovation of production system (Porter, 1998). A region cannot be competitive merely by existence of an industrial estate or a large firm or a multi-national corporation (MNCs). Without infusion of external investment and technology, the economy of a region cannot be viable in a long period (Ministry of Industry and Resources, 1998).

The purpose of this paper is to suggest an alternative model for regional development in the age of knowledge-driven economy. The main theme will focus on following issues: how to create business-friendly environment; how to facilitate clustering of industries in a competitive region to magnify agglomeration economies; and how to make firms to collaborate with each others to achieve higher synergistic effect. A case study of Kyeongnam province in Korea will provide a clue to guiding a locally-initiated development policy on the strength of innovative local firms, universities, research institutes, NGOs and governments.

## II. A Regional Development Model in the Knowledge-Based Economy

### 1. Deficiencies of Regional Growth Pole Policy

It is assumed that the growth pole theory is relevant to rapid industrialization and economic growth. For this reason, public agencies over the past have invested in a few of regions vested with comparative advantages. This was particularly the case of a region constrained with limited resources. It was assumed that the created wealth and employment in the growth pole would in turn permeate into other sectors and regions.

A rationale behind the regional growth pole policy came from the Keynesian theory of "the cumulative regional growth" (Chisholm, 1990). It maintains that once provided with external impulse for growth, a leading manufacturing company induced into a growth pole region is expected to create a successive chain of subcontracting firms supplying components and materials. Then there will be growing numbers of employment in the leading manufacturing sector. This then would lead into increase in in-migration and demand for local service sector economy.

The resultant growing population will lead into increase in the revenues of local government, enabling the local government to invest more in the infrastructure development. The growth effect in the leading region will then spread out to the surrounding regions through the forward and backward inter-regional linkage, before

attaining an equilibrium growth.

The Keynesian cumulative growth model has legitimised the state intervention in regional development, as it has purported to be an effective tool to mobilize external forces for regional growth at the early stage of industrialization.. Following a cumulative regional growth theory, the development of regional economies has been characterized as depending on three external forces: the demand for the products, the supply or migration of labour to the region, and the supply of migration of capital to the region (Chisholm, 1990)

For this reason, the national governments throughout the world have spent an enormous amount of public expenditure over the past in areas of roads, seaports and industrial estates to achieve the goal of growth pole-driven economic development.

There are mixed evaluations of the outcome of the growth pole policy. Despite the enormous amount of government expenditures spent in many countries, the cumulative regional growth in production and employment have barely been realized. Instead, the negative aspects magnified, including the increasing government role, the growing bureaucracy and the endeeptening local dependency on national subsidies for provision of public services. Moreover, the phenomenon was coinciding with the globalisation of economy, in which firms are forced to leave old industrial regions searching for cheaper labour force and a larger market. The ensuing bleak scene is characteristic of old industrial areas plagued with severe problems of unemployment.

Confronting these issues--arising from deficiencies of the national growth pole policy, an increasing number of local governments are awakened to the new possibility of endogenous development policy, emphasizing the use of traditional technology and human resources (Cooke and Morgan, 1998; Hassink, 1998). In response, planners are also busy searching for a new formula of regional development to come to this effect (Park, 1998). The formula are different from the neo-Marxist model for self-sufficient economy or the neo-classical model for equilibrium growth. The new model is unique in the sense that it advocates for social advancement upholding concurrently economic growth, income distribution, civic liberty and environmental sustainability. This is a more dynamic and evolutionary model. It is being sought after in many countries to stimulate continuous "challenge and response" to changing socio-economic environment (Braczyk, Cooke and Heidenreich, 1998; Chisholm, 1990; Cooke and Morgan, 1998; Park and Lee, 1997).

## **2. An Alternative Regional Growth Model in the Knowledge-based Economy**

An alternative regional growth model places emphasis on the development of technology and regional innovation, shying away from the traditional approach relying on physical infrastructure to attract firms from the outside. These new approach reflects the belief that a competitive advantage of region comes from the foci of a specific industry combined with the innovation ability of the region.. According to recent theory of regional development, local advantages have turned from comparative (relying on relatively cheaper costs of production) to competitive advantage (relying on more qualitative elements of productivity and technology). This new way of thinking about regional strength is founded on regional innovation system and agglomeration economies created by the clustering firms, research institutes and producer services (Steiner, 1999)

This gives birth to the policy to empower local economic agencies to be responsive to business needs and to improve firm's access to the global economy (Cooke and Morgan,

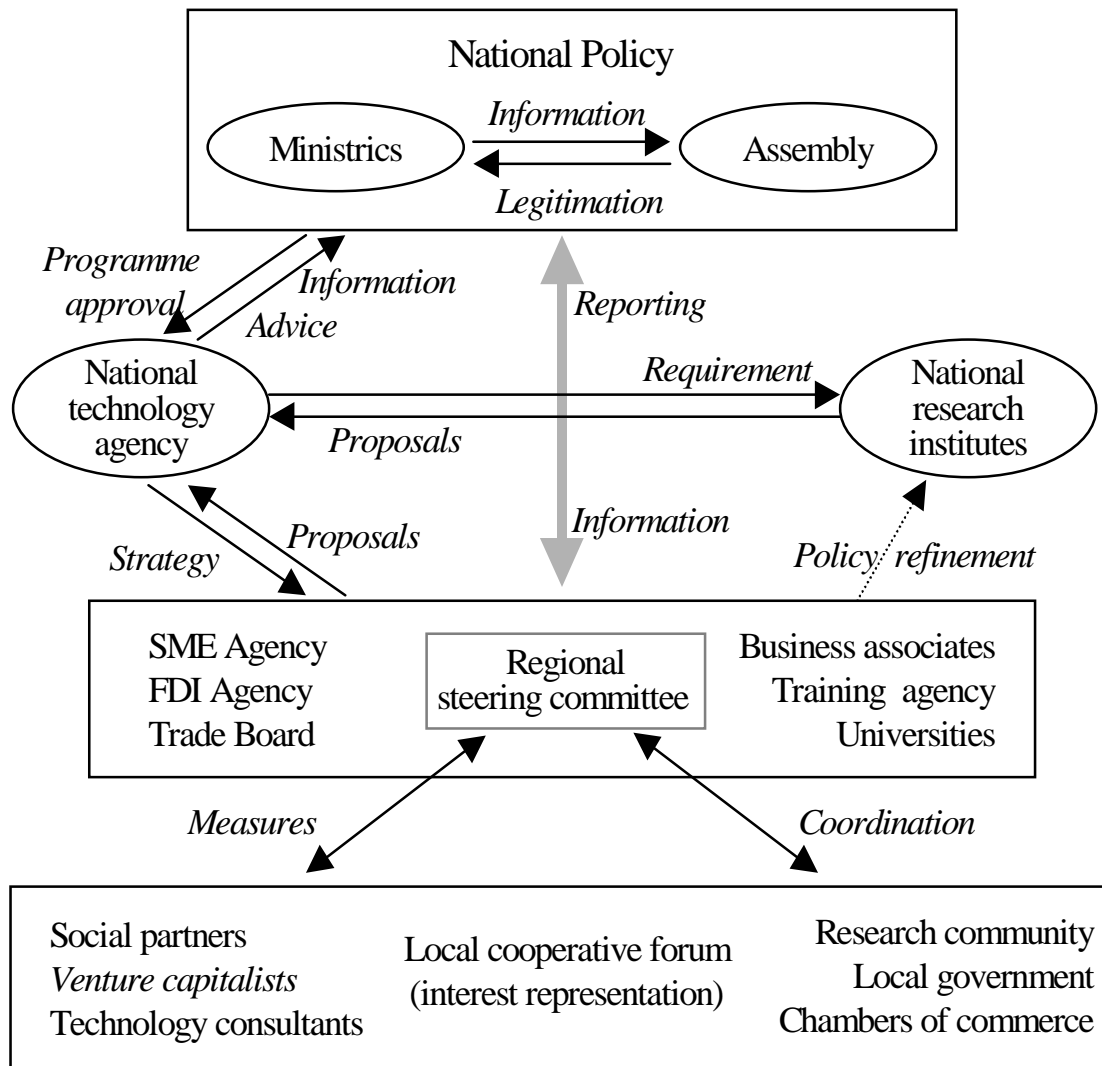
1998). It postulates specifically that regional economy is bound to grow when there is a new technology in place to improve the productivity of local industry and to make high value-added products.

From a geographic perspective, adequate scale of economies is important. It is essential to maximize the synergistic effect of "association and clustering" (Porter, 1998). According to Krugman(1998), regional competitiveness comes from high productivity created by geographical and functional clusters of interrelated industries and their production factors. Since capital, labour, technology and other production factors move freely in search for better business opportunities, companies operating in areas vested with higher productivity and innovation has a greater margin of competitiveness (Ministry of Industry and Resources, 1998).

Given reduced differences in land and labour costs among regions, it is important to have agglomeration of producer services in a specific location to attract high-tech firms. Physical clustering of firms is able to improve the economic environment for innovation and commercialisation. For example, Carrara in Italy maintains competitiveness in the area of stone industry for a long history, even though it does not have sufficient amount of stones any more. The accumulated technology and management are sufficient enough to compensate for the transportation costs of import and export of the stone (Ministry of Industry and Resources, 1998).

Regional innovation system requires coordination with various agencies, including local governments, chambers of commerce, venture capitalists and technology consultants, etc. (Cooke and Morgan, 1998). These organizations are involved at various points to support and stress the cooperation in the policy making and operation of regional innovation.

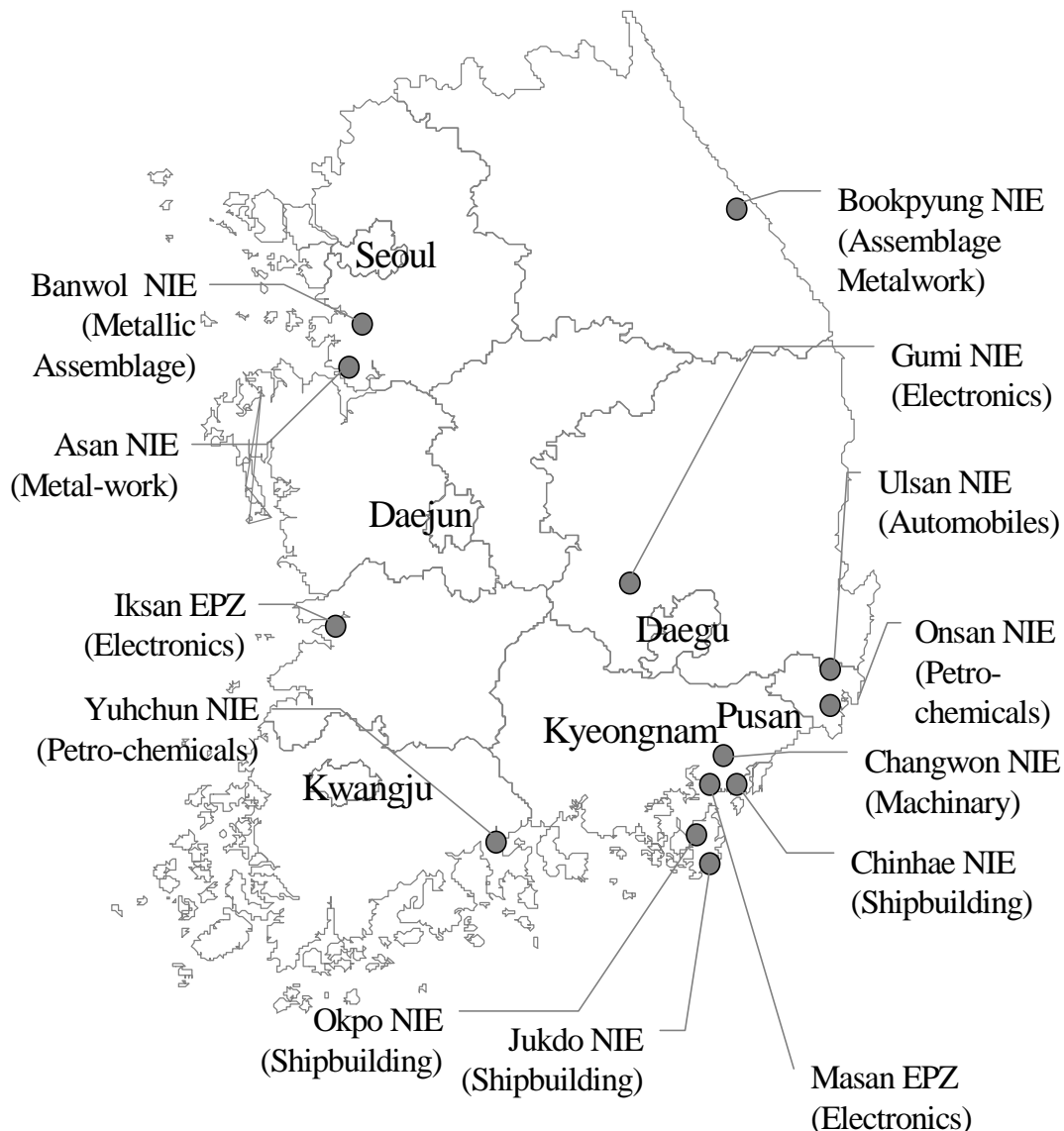
In this setting, the role of the local government pronounced. It is to initiate innovation program as well as to implement national industrial policy. The central government must support local innovation system through national technology transfer agency such as national science foundations and national research institutes in various locations (Braczyk, Cooke and Heidenreich, eds. 1998). Here, Space works as a facilitator and mediator of coordination



**Figure 1. A regional enterprise support system for innovation**  
 Source: Braczyk, Cooke and Heidenreich, eds. 1998

### III. Industrial Modernization of Kyeongnam after the 1960s

In Korea, the regional growth pole policy was adopted in the early 1960s. The National Physical Development Planning Law in 1963 and the Export Industry Estates Development Law in 1964 were the main instruments to support the policy. They encouraged the government to construct industrial estates for large export-led firms in a selected, favoured regions (Park, 1998).



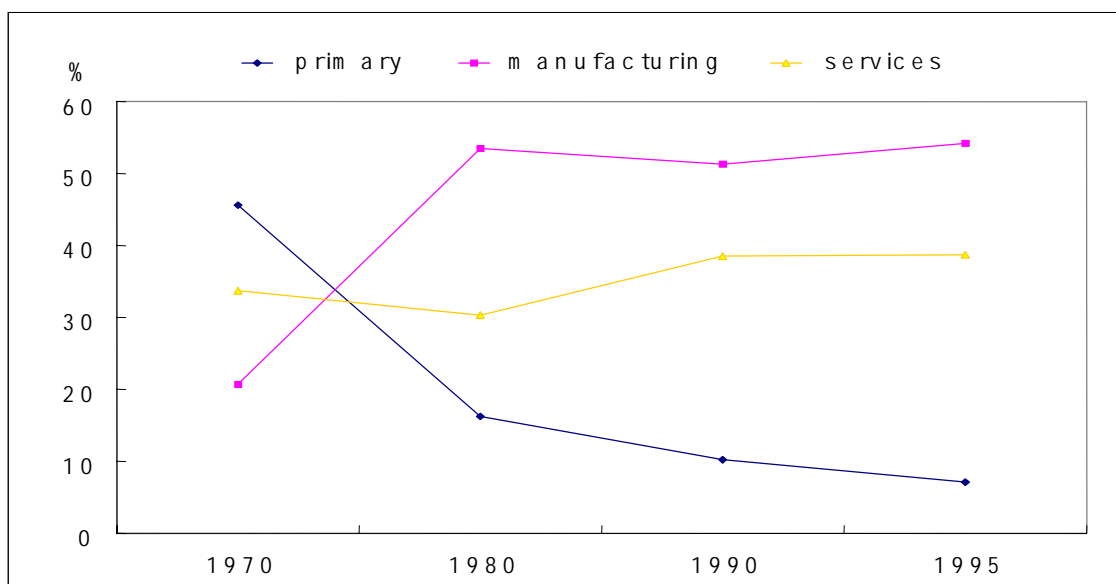
**Figure 2. National Industrial Estates(NIE) and Export Processing Zone(EPZ) Built in 1960s and 70s**

The early investments were concentrated in the south-eastern coastal region along Pusan, the national gateway open to the Pacific Ocean. Looming out in the early 1960s was the first national industrial estate that was built in Ulsan, then a small town of Kyeongnam province. It became the site for ship building and petro-chemical industry. Then came Changwon industrial estate specializing in mechanical engineering industry (Park, 1998). Successive investments were made according to national physical development plans adopted in the 1980s and 1990s. These national industrial estates were mostly concentrated in the southern and western coastal regions.

Kyeongnam is located in the centre of south coast industrial belt. It is a province of 11,300km<sup>2</sup> in area and 3.2million population. From the 1970s, the national government

encouraged industrialization of this province as the power house of Korea, capitalizing on its superb locational advantages. Ship building and transport equipment industry was first located in the island of Koje in the province. Then by 1974, a national industrial park, called Chnagwon Mechanical Engineering Industrial Complex, came into being. They produced machines, transport equipment, electric generators, electrical instrument, etc. for domestic and foreign market. Then, in 1990 the western Kyeongnam region of Sachun and Chinju began to be the site for an industrial complex for aerospace industry. Two of four large aerospace firms in the nation, Samsung and Daewoo, have already moved into the complex.

If we see key economic indicators of Kyeongnam, they have shifted over the last 30 years from agricultural to manufacturing sector. While in 1970 the primary sector of agriculture and fisheries occupied 45.6% of the regional production, it dropped to 7.1% in 1995. In the meantime, a manufacturing sector grew from 20.7% to 54.2% during the same period.



**Figure 3. Changes in GRDP of Kyeongnam by industrial sector**

Kyeongnam has also led the nation in mechanical engineering industry. Now, Kyeongnam accounts for 22.6% of the national production of mechanical engineering industry and 18.4% of the firms. In the aerospace industry, Kyeongnam accounts for almost 60% of firms and 69% of national production. Changwon national industrial complex alone accounts for 83.3% of CNC machine tool and robot industry of the nation.

The infrastructure has well developed in Kyeongnam to support the mechanical engineering industry. Over the past the government has built six national industrial complexes, with a total area of 69 square kilometres in Kyeongnam. They specialize in machines, automotive parts and ship building industries. In addition, two national research institutes of mechanical engineering have been located in Kyeongnam. They are Korea Institute of Machinery & Materials (KIMM) and Korea Electrotechnology Research Institute (KERI).



**Table 1. The portion of mechanical engineering industry of Kyeongnam in the nation, 1997**

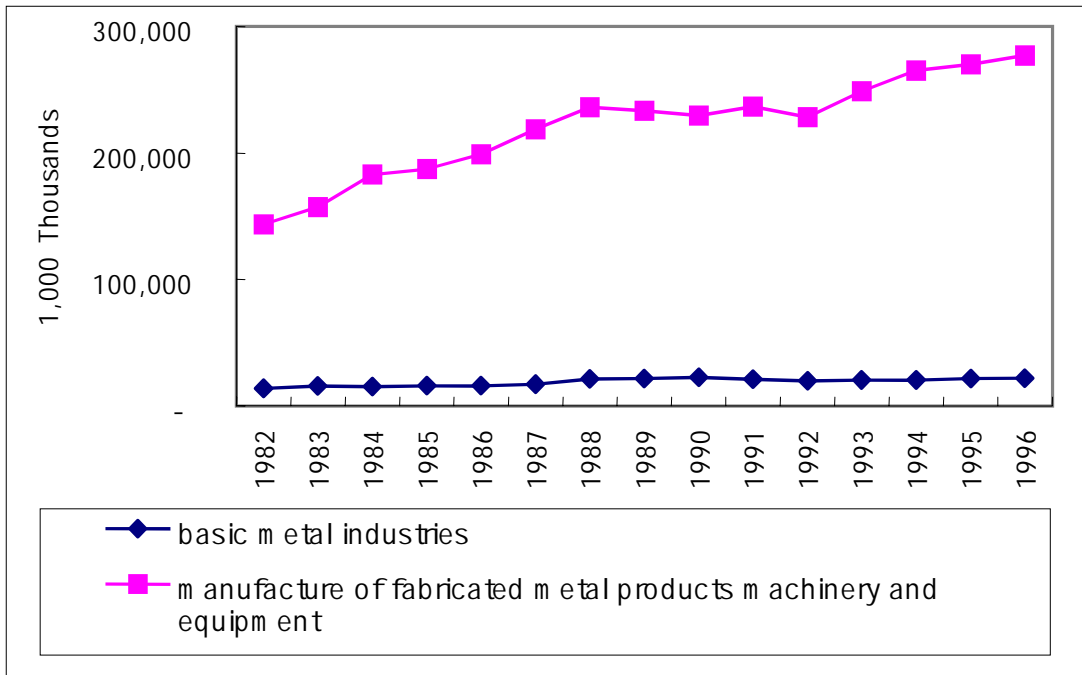
(unit : numbers, million won, persons)

Mechanical Engineering Industries	Number of Firms		Gross output		Number of workers	
	Kyeongnam	Proportion to the nation	Kyeongnam	Proportion to the nation	Kyeongnam	Proportion to the nation
Total	3,218	13.4	27,076,769	22.6	159,199	18.4
Assembly metal-products & Outfits	695	7.0	4,595,610	23.0	26,026	14.1
Machinery & outfits, n.e.c.	1,344	11.0	9,092,280	25.1	51,074	17.7
For medical, precision and optical	109	5.5	1,282,897	26.7	7,866	16.8
Electrical-machinery & converter n.e.c.	238	5.4	1,696,035	10.9	13,349	10.5
Motor cars & Trailors	454	14.7	3,067,894	6.9	20,919	9.3
Other transport Equipment	378	37.2	7,342,053	43.2	39,965	41.7

Source: National Statistical Office. 'Report on Mining and Manufacturing Survey(Regional)' 1998.

#### IV. The Downward Spiral of the Kyeongnam Mechanical Engineering Industry

Kyeongnam's economy has grown for the last 30 years on the strength of the coordinated ensemble of the national growth pole policy and the comparative advantage of the region. Nevertheless, as the region began to experience erosion of its comparative advantage in the globalised economy, its potential contribution to the national economy has been on the wane. Despite rapid growth in the early years of industrialization, mechanical engineering industry has slowed down in growth, both in production and employment in the recent years. For example, in 1994, it showed 26.4% of production growth against 18.8% in 1995, 12.1% in 1996 and 10.1% in 1997.



**Figure 4. Employment changes in metal and mechanical engineering industry in Kyeongnam**

A question rises as to why the economy of the province has not been faring well, if not keeping a high growth rate. In the following, we will discuss six factors responsible for the poor performance.

First, a major problem is the low competitiveness found among local SMEs (Small and Medium Sized Enterprises). Over the past, the government subsidy has been administered in grossly favoured terms to the large export-led firms strategically induced into the national industrial estates. This has resulted in a large number of local SMEs neglected in the national industrial policy. The weak economic strength of the SMEs has magnified in the current agile economic system. The closures, mergers and acquisitions of large firms during the IMF financial crisis in Korea has further aggravated the stance of many subcontracting SMEs.

About 67.8% of local SMEs in Kyeongnam are operating in the market by solely depending on the contracts from large firms. This makes them vulnerable to the economic dominance of large firms.

**Table 2. Market of local SMEs of mechanical engineering industry**

Sales	Total	Customer Orders	Government	Market Sales	Exports	etc
Proportion	100%	65.75%	9.84%	19.29%	13.39%	7.87

Source: Kyeong-Sang-Nam-Do. 1999.

Second, industrial estates operating in the growth pole region like Kyeongnam are vested mostly with manufacturing function, while the headquarters and sales office functions are relegated to the capital city. As a result, there are gaps among them in ability to adapt to the demand of the global market. Changing interests of consumers are poorly transmitted to local manufacturers. In reverse, many creative ideas are generated in the assembly line workers without being timely translated into application by the decision maker at the headquarters.

Third, Kyeongnam has a growing mismatch between the supply and demand of local labour force. People with traditional skills are less favoured in the new labour market. In reverse, SMEs have difficulty in finding quality workers. Many graduates of local universities move out to seek jobs outside. Misdirected university education is blamed for lack of skilled labourers. To local university graduates, it is their last choice to be employed in the local SMEs. R&D labs of SMEs have difficulties in finding professionals. Therefore, almost 43.3% of local SMEs have no R&D employees.

Fourth, R&D investment has been maintained at a low level by local governments. It depends mostly on national expenditures and large firms for R&D investments. The local government expenditures in the total national R&D spending remains 9.2% in Korea. In Germany the local share is much higher, 18.6%, of government spending executed in research and job training by universities and research institutes.

The R&D spending by local mechanical engineering firms is less than 3% of their total sales. In contrast it is 4.0% in Japan and 3.3% on the national average. When compared with Japan, according to a report, Korean capital goods industry is 22 years lagging behind in technology. Without increasing investments, it is indicated there will be further gap in near future.

Another survey shows that 64.2% of mechanical products in Kyeongnam are in the lines of full-grown life cycle. More seriously, most manufacturers delay introducing new products to the market due to lack of capital, man power and innovation facilities.

**Table 3. The proportion of R&D expenditures of the firms in total sales of mechanical engineering industry in Kyeongnam**

R&D Expenditures	Total	Less than 1%	1~ 3%	3~ 5%	5~ 7%	More than 7%
Proportion	100%	39.76	31.89	16.93	7.09	4.33

Source: Kyeong-Sang-Nam-Do. 1999.

Fifth, the majority of industrial complexes in Kyeongnam has production function not being supported by an adequate level of logistics, business incubation and financial services. In addition, firms in the complexes have increasing difficulties in finding space for physical expansion in face of escalating cost of land. Recently, firms are faced with sudden rise in rents in most industrial parks. They are being driven to relocation. The lack of producer services inhibits synergistic effects to materialize from firm's agglomeration in the industrial park.

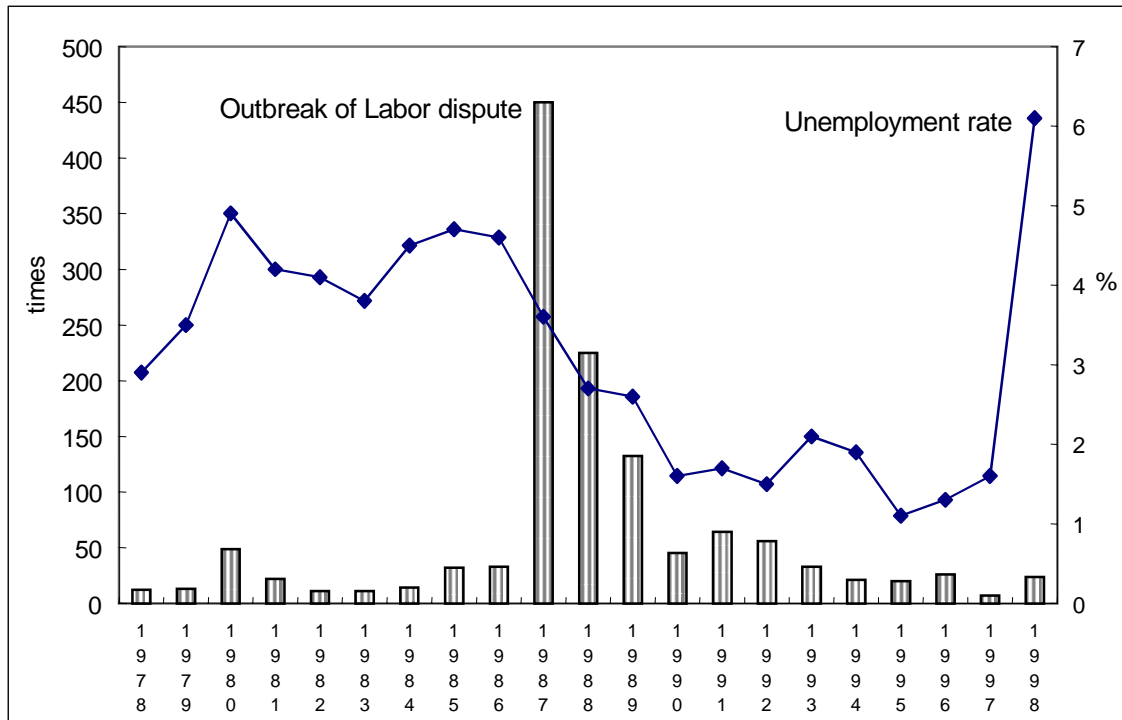
**Table 4. Producer Services by Region****(unit: workers, %)**

Region		Producer Services				
		Total	Financial Institutions	Insurance	Real Estate	Business Services
Nation		1,770,076 (100)	317,818 (100)	412,905 (100)	229,185 (100)	810,168 (100)
Capital Region	Seoul	706,402 (39.9)	113,182 (35.6)	131,372 (31.8)	89,153 (38.9)	372,695 (46.0)
	Inchun	69,479 (3.9)	14,220 (4.5)	14,767 (3.6)	11,337 (4.9)	29,155 (3.6)
	Kyeonggi	234,056 (13.2)	35,697 (11.2)	43,925 (10.6)	43,212 (18.9)	111,222 (13.7)
South Eastern Region	Pusan	150,231 (8.5)	21,602 (6.8)	52,785 (12.8)	17,669 (7.7)	58,175 (7.2)
	Taegu	88,753 (5.0)	15,228 (4.8)	22,850 (5.5)	12,982 (5.7)	37,693 (4.7)
	Kyeongnam	75,631 (4.3)	18,219 (5.7)	21,572 (5.2)	8,893 (3.9)	26,947 (3.3)
	Kyeongbuk	62,779 (3.5)	16,162 (5.1)	16,305 (3.9)	5,699 (2.5)	24,613 (3.0)

Source: Kyeong-Sang-Nam-Do. 1998.

Sixth, industrial relations pose as a serious problem. The rising labour movements in the late 1980s triggered by the military regime of Korea then under challenge in its legitimacy led into raising wage across the nation. The rise in labour cost has hard hit the mechanical engineering industry as a high value-added industry. Compared to most advanced nations where the proportion of value-added in total production of the mechanical engineering industry ranges from 35 to 54%, Kyeongnam has only 27% on the average during the past ten years. Particularly hard hit by the militant labour movement has been the heavy manufacturing industry. Recently, they are suffering from disrupted inflow of foreign direct investment due to labour disputes.

The figure 5 indicates the close interrelationship between labour disputes and unemployment. As the unemployment rate rises, there are more outbreaks of labour disputes.



**Figure 5. Labour disputes and unemployment**

The IMF financial crisis in 1998 has dragged industries in Kyeongnam into difficulties, the worst since 1987. More than 61.4% of local firms experienced decrease in sales. Operation rate of firms in national industrial parks in Changwon dropped to 75.2% from 81.3% a year ago. Operation rate in local industrial parks was more severe, dropping from 78% to 51.9% during the same period. The IMF bailout measures included big deals and workout against large firms. They dragged local economy into brinkmanship of recession. The unemployment rate rose to 6.1%, in contrast to 3.6% prior to the IMF crisis (see figure 5).

## V. Building an Innovative Production System in Kyeongnam by the Provincial Government

### 1. The Governance Structure

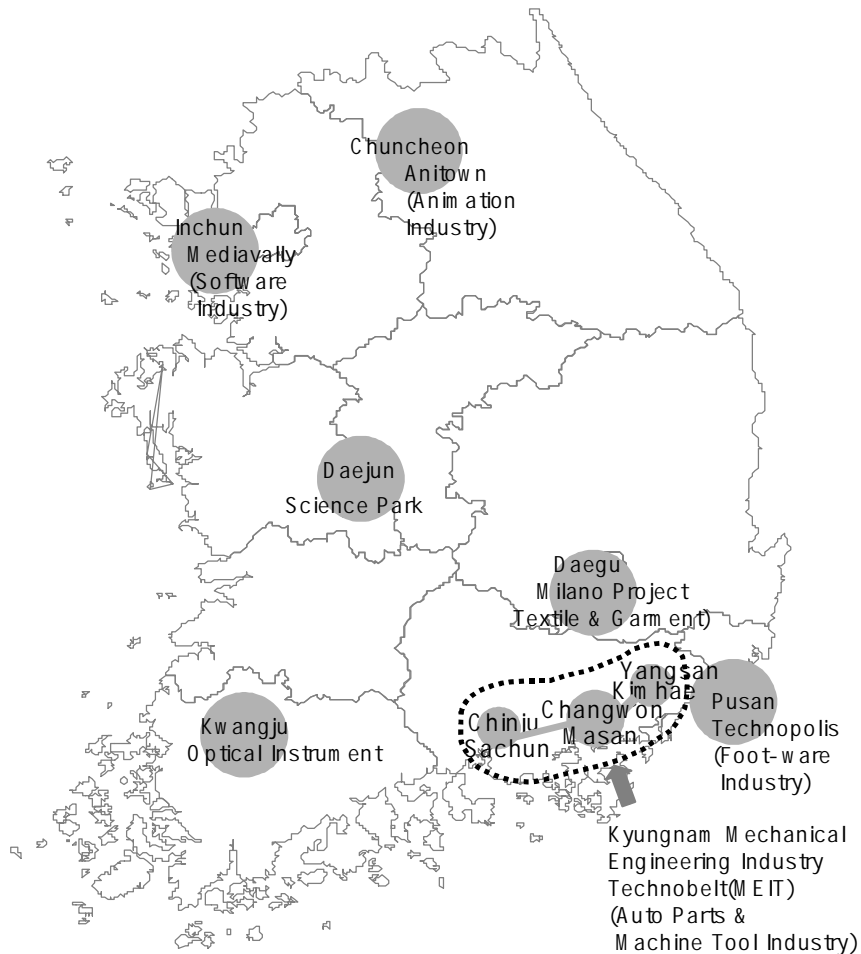
The regional production system in Kyeongnam is in need of reorganization. It is deemed imperative for sustainable growth and prosperity of the region. The reorganization by the provincial government consists of measures promoting industrial cluster on the one hand and developing advanced technology on the other. This dual strategy was proposed by the influential Regional Industrial Restructuring Steering Committee. It was disclosed in a report, entitled 'Knowledge-based Mechanical Engineering Industry Development Plan' issued in early 1999. The report was prepared by the Committee in collaboration with a task force appointed by the provincial government. The task force was entrusted with the task to search for "the ways out of the crisis."

The task force was led by the Kyeongnam Development Institute(KDI), the official research institute supported by the provincial government for policy development. It has

the framework to turn the traditional mechanical engineering industry into a knowledge-based advanced sector, using lean production and creative research system. The plan calls for a total fund of 400 million dollars committed to research and infrastructure.

The provincial government brought this plan to the attention of the president of the Republic of Korea when he visited the province in June 1999. The president has committed the national government to support the local innovative production plan. The provincial government moved on to organize a steering committee to further refine the restructuring plan of Keyongnam mechanical engineering industry. The committee consists of personnel on the existing task force and 50 more members from local universities, technical colleges, SMEs, chamber of commerce, central and local government agencies. The committee approved the 'Knowledge-based Mechanical Engineering Industry Development Plan' being submitted by the provincial government to the Ministry of Industry and Resources for funding.

At this time, two other cities of the nation have made similar plans on their own designed for industrial restructuring. They are asking for the national government support. The city of Taegu, the third largest city in Korea with 2.5million population, is one of them. She aspires to attain international competitiveness by restructuring textile and garment industry. The city of Pusan, the second largest city in Korea with 4.5 million population, follows the same strategy, capitalizing on footwear industry. The Kyeongnam province has opted for mechanical engineering industry to revitalize regional economy. To reciprocate these restructuring plans by local governments, the national government has pledged to support them with public funding.



**Figure 6. Locally-initiated development plans to cluster strategically chosen specialized industry in Korea**

## **2. The Innovation System**

### *(1) Research, Development and Technology Transfer*

The five-year plan advanced by Kyeongnam province to restructure its mechanical engineering industry was backed by the financial commitment by the central government. The national funds would be matched by local supplements. The plan contains bold proposals to advance technology in ten strategic fields in the mechanical engineering industry. It calls for 80 million dollars earmarked for R&D for large firms. The aim is to develop technologies to enable local firms to occupy 10% of world market share by 2010. Funding R&Ds of the SMEs is an important part of the plan. To take steps with the central government, the provincial government of Kyeongnam plans to increase R&D expenditures for science and technology to at least 4% of provincial budget By 2004, almost twice the existing 2.1%.

### *(2) Vocational and Professional Training*

The plan proposes to develop a dual education system for vocational education and

training for skilled employees. A chronic problem facing Gyeongnam is difficulty in maintaining a stable quality labour supply due to lack of good vocational education system. The existing Hanbaek Vocational School and Changwon Technical College were built in the early 1980s. They are falling short of meeting the educational demand, with obsolete facilities and outdated curricula.

The provincial government plans to restructure advanced degree programs and calls for establishment of more interdisciplinary programs, different from the existing ones, to meet the practical manpower needs of the local SMEs.

### *(3) Services for SMEs and Venture Firms*

In order to support venture firms, five business incubators are to be built in association with universities and research institutes. This project also provides assistance to local firms to participate in international exhibitions more frequently to promote marketing for local goods. The provincial plan also proposes international exhibitions of mechanical engineering industry to be held regularly.

### *(4) Supporting Infrastructure*

Using resources at universities and national research institutes in the province, this plan suggests to build three different kinds of technology innovation centres (TIC), each specializing in a specific industry. To be financed by the Ministry of Industry and Resources, they will perform functions such as R&D, training, and pilot production. The TIC proposed for eastern Gyeongnam region will specialize in mechatronics and automation equipment technology. The one in western Gyeongnam will specialize in transport equipment technology. The last one will be established on the premises of Korea Electro-technology Research Institute (KERI) to specialize in software, CAD/CAM and multimedia.

Another project is building an information network system to connect 600 local firms. It is to be built so that firms can have easy access to new technology and trade information. The hub of the information network system will be installed in the Korea Institute of Machinery and Materials (KIMM.) Following Cooke (1998)'s survey on local firms in Great Britain, over 40% of companies acquire technical knowledge from customer or supplier firms. Some 32% of firms use firms associations and higher education institutions to get new technical know-how. This means strengthened information network of the firms will help firms to pursue their own technological monitoring path.



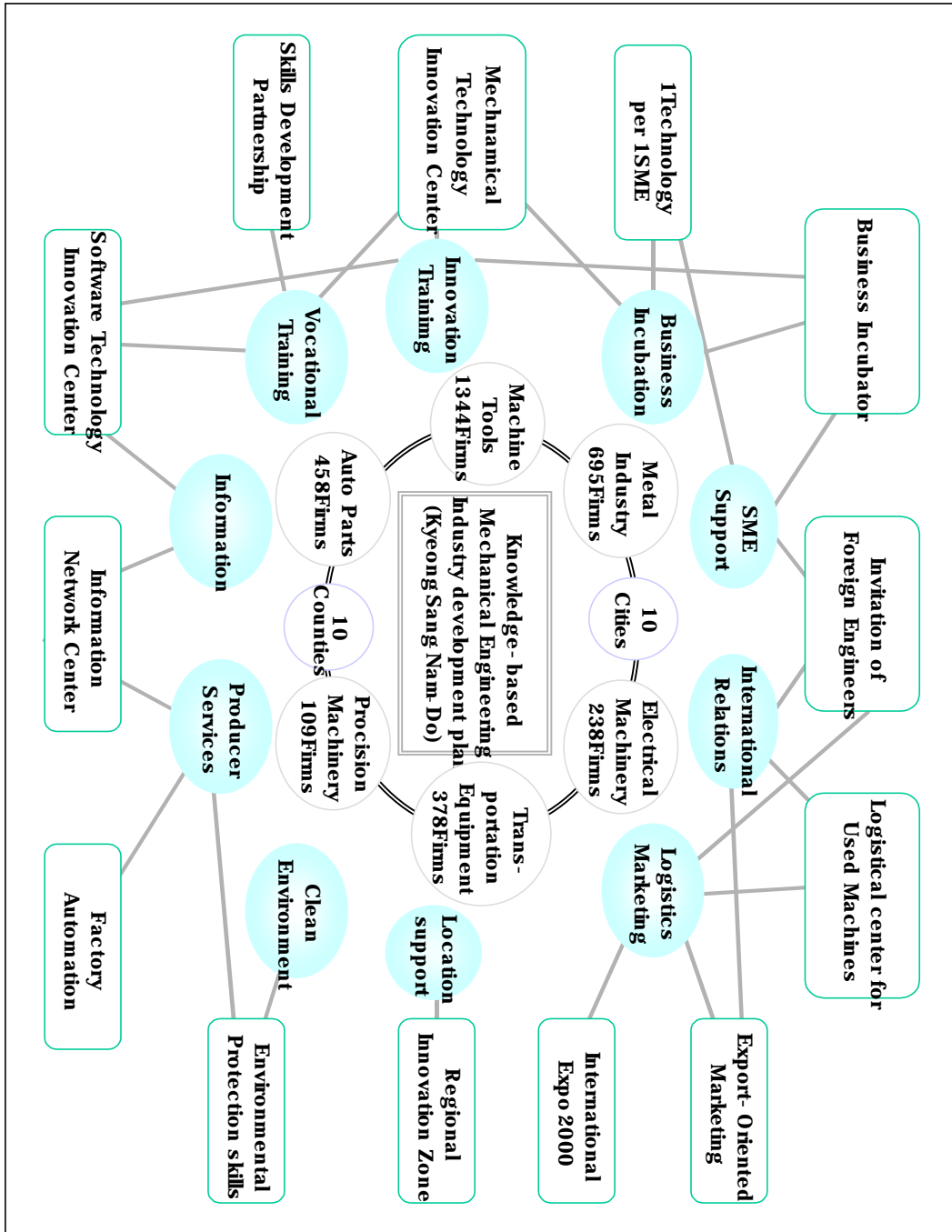


Figure 4. Regional Innovation System

### 3. Regional Clusters

In order for the province to be successful in its restructuring, it is imperative to maximize agglomeration economies of regional innovation system. In response, the plan calls for a geographical system of regional clusters of mechanical engineering firms, called Mechanical Engineering Industry Technobelt (MEIT) (see figure 6). It stretches from Kimhae/Yangsan in Eastern Gyeongsang which will specialize in auto parts and medical

equipment industry. Another one will be in Changwon/Masan, the most industrialized area in Kyeongnam. It will specialize in machine tools and transport equipment. The last cluster will be in Chinju/Sachun in the western Kyeongnam which will specialize in aerospace industry. These three clusters of mechanical engineering industry are interrelated functionally and geographically and easily accessible within one and half hour drive on the Southern Coast Highway 6. Each cluster has a research university, a technology innovation centre and industrial parks.

To encourage more technology-intensive firms to cluster in the area, the provincial government plans to designate the belt as what is called the innovation zone, like the enterprise zone in Great Britain. Each zone will make invited firms eligible for incentives such as tax deduction and rent subsidy to be allured into the region. The three clusters will be glued together in a network so that their innovation resources can be shared.

## VI. Conclusion

During the 1960s and 1970s, a dominant belief was that economic growth can be created and stimulated by the state. The 1980s witnessed emergence of different ideas--the supply-side policy to build business friendly environment. Since 1990 industrial policy has been shifting to a more networked and communicative procedure (Heinze, Hilbert, Nordhause-Janzen, Rehfeld, 1998). Following this trend, the regional development policy in Korea has changed from a growth pole approach to an endogenous development model. It is undisputable that for the last 40 years, the Korean government's growth pole policy has positively contributed to rapid industrialization of the nation. However, many problems have remained unsolved in the process, including uneven development of the nation and growing diseconomies of scale in large growth pole regions. It was revealed that as far as the success of the growth pole policy is concerned it had depended mostly on the external forces rather than on the internal potentials embedded in endogenous traditional technology and human resources.

This study indicates how once a growing region undergoes difficulties in restructuring its economy, particularly in adapting to the new business environment.

This study of Kyeongnam province indicates how industrial and institutional patterns have proved successful in the past and now hinder attempts to restructure its economy. Decreasing productivity and limits of technology innovation are in evident in the mechanical engineering industry in Kyeongnam. It has reached a state of low growth, rising unemployment and eroding tax base. The region faces a new challenge. It is a challenge of using its former strengths to find a new place in the changing world of competition. The creation of an innovative environment for industry is an answer. It can effectively be achieved only by reorganizing its traditional industrial structure. This is possible through changes in institutional framework using more endogenous potentials (Heidenreich & Krauss, 1998).

This paper presents an alternative development model to maximize competitive advantage to work in the global market. Our new model focuses on specialization of industries and geographical clustering of firms and services (Porter, 1998a). It proposes coordinated agencies of the region to instigate related industries galvanized toward a specific region to benefit from integrated packages of infrastructure, R&D functions and producer services. Clusters are beneficial to related industries and firms as they are conducive to face-to-face contacts, enabling sharing of information, diffusion of

innovation and lowering transaction costs of production. This paper will hopefully shed some light on how firms can move together to increase productivities.

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