

## Metropolitanization of the Subcontracting Firms in Masan Free Export Zone, Korea\*

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### Introduction

In the previous study, one of the important findings was the existence of outprocessing activities via subcontracting with Masan Free Export Zone(MFEZ) firms. At the same time, the subcontracting had various impacts on the metropolitan community. The domestic linkages which emerged from subcontracting are becoming a part of metropolitanization processes with spatial changes of population and gradual spread of subcontractings toward Masan metropolitan area. This study analyzes the nature of metropolitanization in Masan metro area and its spatial implications of subcontracting since 1975.

One important impact of the FEZ on the local community was identified as the phenomenon of outprocessing which generated significant production links and employment outside the FEZ. These impact of the domestic linkages which were developed by FEZ firms did not examine in view of metropolitan growth and change.

While it is already clear that many extra jobs are created via subcontracting linkages, particularly with the neighboring rural areas and urban centers, it is not clear to what extent and in what other ways the subcontracting linkages have influenced the metropolitan area. The spread of outprocessing in both urban centers and rural areas since the late 1970's is one evidence of metropolitanization in general. The diffusion of the subcontractors toward the neighboring rural areas has many important implications for understanding the decentralization of industries and promoting rural industrialization. In addition, the outprocessing activities in rural areas might be a catalyst for the development of new bases of small-medium size industry as well as full employment of rural labour forces. The question on

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the spatial distribution of subcontracting firms over the metropolitan area gives an opportunity for understanding how a city expands with FEZ as a growth mechanism and how linkage as a system integrates urban and rural industrial systems.

In order to examine the above questions, the main data were collected from Masan FEZ administration office and for firm and worker survey, the questionnaire forms were developed. The actual data survey was done in two different time periods, first in early August and second in late October, 1988. The survey included a sample of 450 subcontracting firms which were registered in FEZ office as of May 31, 1988, the actual number of subcontracting firms registered in the FEZ office was 525 firms. For the survey, we selected around 150 firms out of 450 firms. The selection method used for the sample was the systematic stratified random method which considered the number of localities, urban and rural location, industrial sectors, and total number of firms in one location. To identify the nature of subcontracting, we tried to maintain the inclusion of over 40% of the firms from the host city, Masan. As other data, work-order information which was registered in the FEZ main office from January to the end of June, 1987 was collected and later sorted out by its items. In all 3,630 work-orders were registered. Generally the work-order was filled out by a FEZ firm whenever it contracted with a subcontractor based on each separate order no matter what the value and amount of work would be. The order form includes the name of the subcontractor, the work period and the kinds of work to be completed, total cost, and the proportion of total manufacturing that was attributed to subcontracting. All of this information provides the actual universe of transactions between the FEZ firms and subcontractors and gives the whole linkage pattern.

Other information concerning the subcontracting businesses was collected from the published or unpublished documents from the FEZ office. And main population data for Masan metropolitan area subtracted from the census returns in 1975, 1980, and 1985. For 1989 population data, the study used the annual nationwide population tabulation that was officially published by National Bureau of Statistics, Economic Planning Board.

## I. The Structure of Masan Metropolitan Area

It is little delicate to define properly the Masan metro area because there is no official boundary for major metropolitan area. Especially, in this southern part of the Korean peninsula the close location of major cities along coast line like Pusan special city, Ulsan,

Chinhae, and Changweon, Jinju and others is forming a gigantic extended metropolitan area as a whole. However, when we try to define immediate economic influential area or region as metropolitan area, it is possible to recognize its metropolitan area. Conventionally, Masan's economic region (Map 1) that the Chamber of Commercial and Industry controlled for a long time is one of alternative to define metropolitan area, but it is not identical with a geographical aspect of metropolitan influential area. One way of justification to draw its boundary might be reach through spatial distribution of subcontracting works and firms outside proper city boundary of Masan.

According to the Chamber region, population change of Masan metropolitan area since 1975 show in Table 1. Population data shows slight increase in total number in this region, but the proportion between urban and rural population completely reversed. In terms of spatial characteristics of regional organization, Masan metropolitan area is quite similar with British conurbation rather than American metropolitan structure in its growth and evolution. Even though all counties' population in this metropolitan area have decreased over the period, at the level of township (Myon) unit, there are some locational variations that could be one of best indication how metropolitan growth impacts on neighboring rural area.

The population changing patterns of Masan metropolitan area between 1980-1985, concede

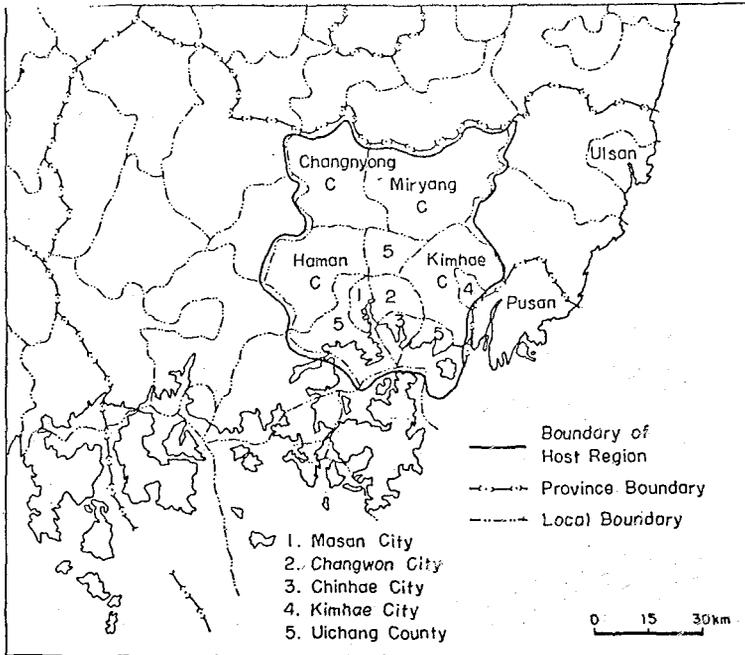
<Table 1> Population Changeq in Masan Metro Area (Unit : 1,000)

Name of Place	1970	1975	1980	1985	1988
Masan city	187	372	385	449	484
Chinhae city	90	104	112	121	123
Kimhae city*	—	—	—	78	91
Kimhae county*	192	203	166	95	97
Changweon city**	—	—	112	172	253
Changweon county**	164	96	—	—	—
Uichang county***	—	—	88	75	70
Haman county	107	99	80	71	68
Changnyong county	144	138	116	100	91
Miryang county	191	179	161	152	145
Total	1,075	1,191	1,221	1,251	1,422
Urban	277	476	610	687	951
Rural	799	715	612	564	471

\* Kimhae city separated from Kimhae county in 1981.

\*\* Changweon city separated from Masan city and Changweon county in 1980.

\*\*\* After Changweon city established, former Changweon county rename as Uichang county in 1980.



〈Map 1〉 Masan Economic Region

how an extended urban growth toward three west townships of Uichang county stretches out cross the city boundary. Such pattern was not usual in the previous period. This means impact of urban growth actually spreads to neighboring rural area surrounding the city. Consequently, in following period between 1985-1989, the intensification of continued overflow and increase in population in a broad area is supporting the idea of metropolitanization that takes place.

As a whole, there is no doubt that the population changing pattern in Masan metropolitan area has provided a typical evidence which has been occurred a form of metropolitanization. Also the spread of subcontracting firms in this region might play a major role for the progress of this process with intermingling to rural industrialization and rural stability.

## II. General Characteristics of Outprocessing, Subcontracting Firms and Domestic Linkages

### 1. Outprocessing and its Progress

The development of outprocessing in Masan FEZ was discussed in the previous reports

(Lee and others, 1987 and 1989). Outprocessing means that a part of the work before processing the final products is completed outside the FEZ under the supervision of the FEZ authority. The work permission form filed through the authority includes the kind of process, duration, amount of work, and other necessary items. Also any outprocessing firms outside the zone are required to register at the administration office every year by filing a registration form completed and signed by both the FEZ firm and the subcontracting firm.

No one knows about the precise situation of a FEZ firm which leads it to begin outprocessing. However, a couple of circumstances provide a clue which explains the origin of outprocessing. The first idea for outprocessing might come from a general practice of the Japanese subcontracting system in auto production, machinery, and textile industries. When Masan FEZ opened, over 90% of the firms belonged to Japanese invested branch firms. It was natural to introduce their unique production system into FEZ to minimize wages, raise efficiency, and maximize the limited space of the FEZ. Further expansion of the lots for production space was limited. This partly contributed to encouraging outprocessing for simple assembly work.

A second contributing factor to outprocessing is the temporary rush order which cannot be processed by FEZ firms in a given time period. In order to handle the rush orders, FEZ firms could easily contact outside firms which are available for temporary subcontracting. Along with these circumstances, the administrative authority began to revise the FEZ regulations over time in order to make them less restrictive. Earlier major regulations relaxed for outprocessing were the extension of work duration from a maximum of 3 months to 6 months, the widening of the manufacturing process from 30% of final products to up to 60%, and the release of the strict qualification of subcontracting firms. More recent revisions of regulations includes the permission to transmit the necessary equipment to the subcontractors and the fixed lists of the outprocessing firms. That means FEZ firms need not get permission for work orders for outprocessing firms listed through the authority.

## **2. Current Situation of Outprocessing**

The revisions of the regulations over time encouraged further outprocessing and accelerated the increase in the number of subcontracting firms. The number of subcontracting firms has increased from 94 firms in 1976 to 525 firms in 1988, while the number of FEZ firms involved in outprocessing remained relatively stable. The number of workers employed in outprocessing firms has increased 3.7 times in the same period. Thus, the FEZ firms

〈Table 2〉 The Basic Figures of Masan FEZ Firm and Subcontracting\*

Year	Total Export (\$ 000)	No. of Employ.	Total Payment (\$ 000)	Total Subct. Payment	FEZ Firm	FEZ Firm W. Subc.	No. of Subct. Firm	No. of Subct. Employ- ment
1976	303,000	29,953	35,646	4,076	94	42	94	4,518
1977	367,918	30,719	46,874	6,316	97	44	96	—
1978	484,788	30,960	47,591	7,179	95	46	99	—
1979	600,558	31,153	68,057	9,682	86	49	99	—
1980	628,100	28,532	55,788	12,439	85	55	108	4,620
1981	696,341	28,016	60,351	13,623	83	55	114	—
1982	601,342	26,016	59,575	16,923	80	—	117	—
1983	706,537	30,989	73,189	17,510	80	57	207	7,782
1984	878,319	33,858	83,298	24,042	77	59	252	8,521
1985	809,319	28,983	79,582	21,599	77	52	193	7,509
1986	1,033,379	34,883	95,784	29,230	76	55	291	9,766
1987	1,399,485	36,411	130,703	40,519	78	57	347	12,364
1988**	1,769,203	33,080	197,655	59,465	75	56	525	16,686

\* The data in this table were compiled from various sources provided by Masan FEZ Administration office.

\*\* As of the end of 1988.

currently keep a relationships with an average of 6~7 subcontracting firms, and the total payment to the subcontracting firms in 1988 reached almost 30% of the total labour payment to all FEZ labour forces(see Table 2).

According to recently released data, the number of subcontracting firms per FEZ firm in 1988 varies from only one up to 24 firms(Table 3). Thirteen firms among 57 FEZ firms linked with more than 10 subcontracting firms. Many subcontracting firms also have established business with more than one FEZ firm. In this data, the greatest number of firms linked with two subcontracting firms.

The number of subcontracting firms in Masan were 177 out of the 450 firms at the end of May 1988(Table 4). 201 firms are located in 18 cities including Seoul, Pusan, and Taegu. Another 72 subcontracting firms are located in the rural area near Masan city. Notably, those firms located in the rural area play a very important role in rural economic progress which might provide the basis for rural industrialization. The impact of the increase in subcontracting includes an increase in exports, creation of employment, and additional transfer of technology(MFEZ, 1987).

### 3. Subcontracting and Linkage

Generally, the meaning of subcontracting in the manufacturing sector has been well

〈Table 3〉 The Number of Subcontracting Firms per FEZ in March, 1988

No. of Subcontracting Firm per FEZ Firm (A)	No. of FEZ Firm (B)	Total No. of Subcont. Firm (A)*(B)
1	8	8
2	12	24
3	8	24
4	5	20
5	2	10
6	4	24
7	2	14
8	1	8
9	2	18
10	1	10
13	2	26
14	2	28
16	1	16
17	1	17
18	1	18
19	1	19
20	1	20
21	1	21
22	1	22
23	1	23
24	1	24
Total	58**	361***

\* Data compiled from the annual registration information of the subcontracting firms as of March 18, 1988.

\*\* A total of 58 out of 75 FEZ firms were active in subcontracting with outside firms.

\*\*\* The actual registration shows 385 subcontracting firms. Therefore, there are 24 missing firms which are not indicated on the list of FEZ firms.

defined since Japanese manufacturing has a long history of this type of business. There are many case studies related to Japanese subcontracting industries (Matsuhashi, 1982; Sheard, 1983; Tamura, 1985) and extensive international research (APO, 1979; Hill, 1985). According to Watanabe, subcontracting means the "the party offering the subcontract (parent firm, enterprise or company), requests another independent enterprise (subcontractor, or 'ancillary industry' in India) to undertake the whole or part of an order..." (Watanabe, 1970, p.54). The work of the subcontractor may include all different levels of production such as finished products, components, half-finished parts, and even repair services. Through the subcontracting system, the production system tends to become highly integrated through both horizontal and vertical linkages. Those relationships seem to be

〈Table 4〉 The distribution of Subcontracting Firms by Type of Manufacture and Location in 1988\*

Type of Manufacture	Masan City	Other Urban Area	Rural Area	Total
Electronics & Electricity	105	89	51	245
Metals	9	34	3	46
Non-Ferrous Metals	2	1	0	3
Machinery	4	5	0	5
Precision Mach.	32	33	11	76
Textile	6	13	2	21
Shoe	9	15	1	25
Others	10	11	4	25
Total(%)	177	201	72	450
(%)	(39.3)	(44.6)	(16.0)	(100)

\* Data based as of May, 1988.

subordinated hierarchically, but actually maintain each other in a mutually interdependent production system.

In many cases, the integration of the subcontractor is limited to certain parts of the operation like production lines, technical subordination, and wage levels. Therefore, once inter-firm linkages form as horizontal or vertical integration, for consistent maintenance of production, their relationship tends to be permanent (Sheard, 1983). Compared to the integration between the parent firm and the subcontracting firm in general, the subcontracting in Masan FEZ is quite distinguished from the ordinary concept of subcontracting in many aspects such as the conditions of work, the degree of integration, linkages, dependency on the parent firm, and the local impact on the economy.

Although the subcontracting conditions established between firms vary, essentially Masan FEZ subcontracting is initiated by FEZ firms. The outside potential firm is qualified by a FEZ firm. With the recommendation of the FEZ firm, the subcontracting firm must register to get permission for outprocessing at the FEZ administration office. The term of the permission for subcontracting is always limited to just one year. Therefore, a year later, to continue work, the subcontracting firm has to renew its term. Recently this procedure has been simplified and replaced by a paper report of the FEZ firm. However, whenever a FEZ firm sends out a work order, it is required to file a form with the FEZ office which includes details of total cost, kind of work, term to be finished, and amount of raw materials to be shifted out. In this sense, FEZ subcontracting differs from ordinary subcontracting.

The degree of integration between the FEZ firm and the subcontracting firm is very hard

to evaluate as a whole because the subcontracting relationships in terms of the FEZ firm assistance to the subcontracting firm in the provision of technical assistance, financial support and managerial support vary a great deal. However, one cannot deny the fact that the production system linked with subcontracting maintains conditional or temporarily integration. One way to give a general overview of the relationships is to analyze the dependency of the subcontracting firm on the FEZ firm.

The following table shows how the subcontracting firms, by employment size, rely on FEZ work orders in a year (Table 5). The data for the dependency ratio was filed by the subcontractors when they registered in the FEZ office based on the expected amount of annual work orders from the FEZ firm.

197 firms out of 347 subcontracting firms registered in 1987 indicated 100% of their work relied on the work order of the FEZ firms. According to this figure, it can be assumed that those firms are substantially subordinated or completely play the role of a branch firm for FEZ. Practically, those firms which depend on 100% work orders from the FEZ firms have already become integrated with the FEZ firms into the so called vertical production system. This sort of full interdependent relationship is probably a semi-permanent one as well as a new type of domestic linkage formed through outprocessing activities over the last decade.

In contrast, the majority of firms which had less than 26% of their work orders depending on the FEZ firms, a total of 90 firms out of 347, probably have flexible linkages based on the FEZ firm requests. The existence of these firms indicates the possibility of mutual independence in their firm operation and management. These firms maintain horizontal

<Table 5> The Dependency of the Subcontracting Firms by Employment Size\*

The Dependency Ratio(% : FEZ Sub. Work/Total Sub. Work)									
Firm size	0~9	10~19	20~29	30~39	40~49	50~69	70~99	100	Total
0~ 49	16	20	6	14	6	14	12	127	215#
50~199	17	11	3	0	0	7	3	64	105
200~299	3	4	3	0	0	2	0	3	15
300~499	2	0	0	0	0	0	2	3	7
over 500	4	0	1	0	0	0	0	0	5
Total	42	35	13	14	6	23	17	197	347

\* Data Source: The employment size and dependency ratio of the subcontracting firms is provided by the Masan FEZ office as of the end of 1987.

# indicates the number of subcontracting firms.

linkages in contrast to the vertical or hierarchical linkage of firms which depend totally on FEZ firms for their work orders.

Further interpretation of the subcontracting dependency and domestic linkage shown in Table 5 will be provided by a full analyses of the project sample survey in later chapters. Also, observations related to the local impact of the subcontracting activities on communities as well as some details of subcontracting relationships with the FEZ firms will be clarified through the sample survey.

In general, four different subcontracting types and relationships with parent firms such as full-capacity subcontracting, specialized subcontracting, marginal subcontracting, and cost-saving subcontracting have been recognized by Friedman and UNIDO (Friedman, 1977; UNIDO, 1974; Taylor and Thrift, 1982). This research confirms the existence of similar subcontracting relationships. In addition, this research found a locally generated layer of secondary subcontracting which a prime subcontracting firm arranges with other qualified local firms. This secondary subcontracting mobilizes a lower level of the labour market. It raises the possibility of invisible and informal subcontracting relationships which involve complex domestic linkages.

### III. Location of Subcontracting firms and Works

#### 1. The Nature of Work-order Information

This information provides the actual universe of subcontracting, how it worked out in detail. All of the work-order information accounts for 3,630 orders which 46 FEZ firms have actually contracted with 156 subcontractor firms throughout the nation during 6 months from January to June 1987 (Table 6). Without any sampling, the entire contract data during the period are used for this analysis. Each work-order form includes many kinds of information such as the name and address of the subcontractor, the kind of work, the total work days, the proportion of subcontracting work in relation to the final product, and the total contract cost. All these variables were selected for analysis. At first, all of the variables were sorted out by individual FEZ firm and subcontractors, region, and others, and then the cross tables were constructed to identify some possible relationships between the variables. During six months, the total payments to subcontractors account for around 40% of the total payments in 1987.

Even though 46 FEZ firms are actively involved in the subcontracting business, strikingly,

〈Table 6〉 Basic Figures of Work-order Information Between January and June, 1987\*

No. of FEZ Firm Invol. Subcont. (A)	No. of Subcont. (B)	Total Work Order (C)	Total Value of Contract (\$ 000) (D)
45	156	3,630	14,616

(continued)

(B)/(A)	(C)/(A)	(D)/(A) (\$ 000)	(D)/(C) (\$)	(C)/(B)	(D)/(B) (\$ 000)
3.4	80.6	324.8	4,024	23.4	94.9

\* All data were collected work-order forms prepared by FEZ firms whenever they contracted with subcontractors.

only 17 firms account for over 90% of the total number of contracts. Five firms, Tongkyong Co., West Co., T.C., Dongkwang, and Sammi Co. out of the 17 firms provided over 60% of the total contract work to outside firms. Furthermore, Tongkyong Electronic Co. alone furnished 25% of all contract work. All of these firms are leading electronic and electricity companies in Masan FEZ. However, the total payments to subcontractors is not quite equivalent to the total number of work-orders. The same 17 firms have paid only 80.4% of all contract payments and the above major four firms accounted for 42.6%, all percentages which are less than the percentages of work-orders (Table 7). According to these figures, the major work for subcontracting was provided by these upper 17 firms, which were regularly and actively involved in subcontracting over the period. The remaining FEZ firms participated based on temporary or occasional contracts which involved less than an average of 2.2 work-orders per month.

156 subcontracting firms gained an average of 23.5 contracts with FEZ firms. Each subcontracting firm earned an average of \$94,900 in the six month period. This average figure is probably not sufficient for the maintenance of full operation of any subcontracting firm. This suggests that many subcontracting firms are currently relying on only temporary or part time work from FEZ contracts. Actually 13 subcontracting firms, out of the total of 156, account for over 50% of all contracts, but their share of total payments accounted for only 18.2% of total contract payments (Table 7).

In addition, the average monthly share of the value among these firms is \$34,200 which is probably not a large size operation. The sorted data shows again 43 subcontracting firms have done over 80% of FEZ contract work and the remaining 81 firms have carried out less than 10 contracts per firm which definitely were not enough for firm maintenance.

〈Table 7〉 Major FEZ Firms and Subcontractors\*

FEZ Firm	No. of Contract	% Cum. (%)	Contract Value (\$ 000)	Cum. (%)
1. Tongkyong	924	25.5	1,037	
2. West	444	12.2	258	
3. T.C.	335	9.2	512	
4. Tongkwang	272	7.5	1,280	
5. Sammi	204	5.6(60.0)	3,148	(42.6)
Other 12 Firms	1,114	30.7(90.7)	5,491	(80.4)
The Rest of Firms	337	9.3	2,854	
Total	3,630	100.0	14,616	100.0

(continued)

Subcont. Firm	No. of Contract	% Cum. (%)	Contract Value (\$ 000)	Cum. (%)
1. Hajinsa	287	7.9	168	
2. Sangwoo	232	6.4	159	
3. Hyesong	186	5.1	415	
4. Songil	161	4.4	250	
5. Moonsong	142	3.9	244	
6. Tongkwang	140	3.9	190	
7. Namil	115	3.2	111	
8. Songwoo	108	3.0	37	
9. Sinhwa	105	2.9	151	
10. Daesong	100	2.8	135	
11. Dongil	98	2.7	711	
12. Gaya	97	2.7	157	
13. Pyongwoen	78	2.1(50.9)	108	(18.2)
Other top 30 firms		(80.2)		
Total	3,630	100.0	14,616	(100)

\* For data source see Table 6.

## 2. Spatial Pattern of Subcontracting Works

One of the major impacts of outprocessing activities, spatial diffusion of subcontracting work creates extra employment in both urban and rural areas which are affected by the indirect impact of the FEZ. The actual distribution of subcontracting firms provides direct evidence of the impact on local areas which can be analyzed in various ways. The number of contracts and the total value of contracts based on localities also provides a partial

answer to the question of local impact and metropolitization.

The work-order information for contracts does not provide data for total employment created via subcontracting, but employment can be estimated from the data on employment provided by subcontracting firms presented in Table 2.

The host city, Masan, is the largest center for subcontracting in both the number of work-orders and the total value of manufacturing, respectively 48.9% and 29.7% of all contracts (Table 8). Also 57 firms out of 156 subcontractors are located in the city. This probably happens because the host city of FEZ traditionally has many well developed small and medium industrial firms which are capable of further expansion. Furthermore, the accessibility to the FEZ is probably one of the factors for an ideal location for a subcontracting business. If the two neighboring cities, Changweon and Jinhae, are included, 80 firms are located in one integrated metro area.

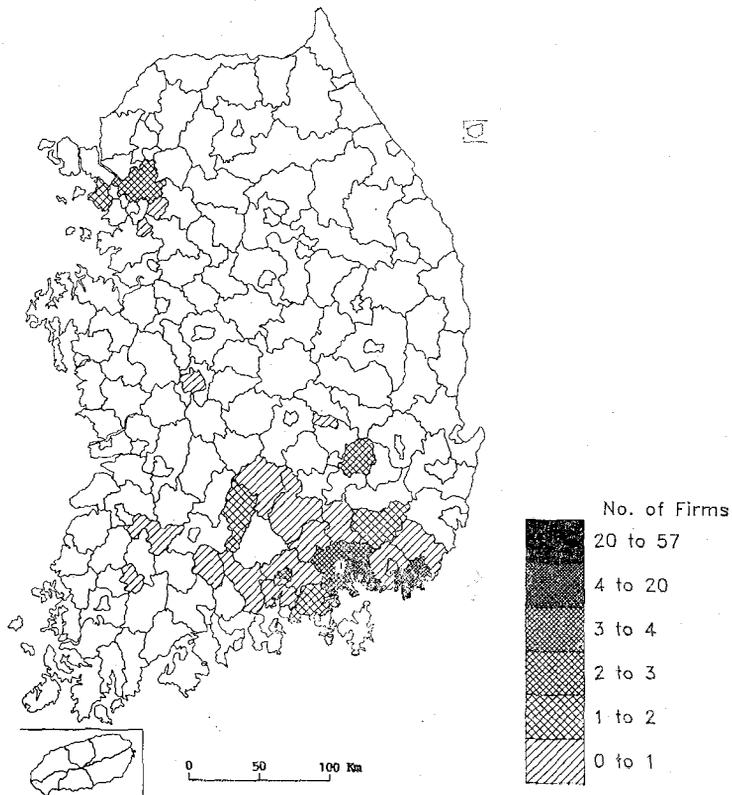
Major regional distribution of subcontracting firms outside Masan can be divided into two areas. One is within South Kyongsang Province and Pusan. Rural counties in the province essentially play the most important role for the subcontracting area. In terms of the total value of manufacturing, these rural areas have the highest share which accounts for 32.3% of the five subregions. In the province, except for five counties, 13 counties have more than one subcontracting firm which include all of the 42 firms. The distributional Maps (2, 3, 4) show the pattern for the number of firms, contract works, and the total value of processing. The map itself provides a self explanatory basis for what factor triggers off such distribution

<Table 8> Subcontracting Firms and Manufacturing Value by Location\*

Area	No. of Firm		No. of work-order		Total Manuf. Value(\$ 000)		
	No.	%	No.	%	Value	%	
Masan	57	36.5	1,776	48.9	4,347	29.7	
South Kyongsang Province	Rural	42	26.9	869	23.9	4,730	32.3
	Urban**	43	27.5	855	23.5	3,786	25.9
	Sub. Total	85	54.4	1,724	47.4	8,516	58.2
Other Areas	Rural	2	1.2	43	1.1	323	2.2
	Urban	12	7.6	87	2.3	1,430	9.7
	Sub. Total	14	8.9	130	33.4	1,757	11.9
Total	156	100.0	3,630	100.0	14,616	100.0	

\* For data source see Table 6.

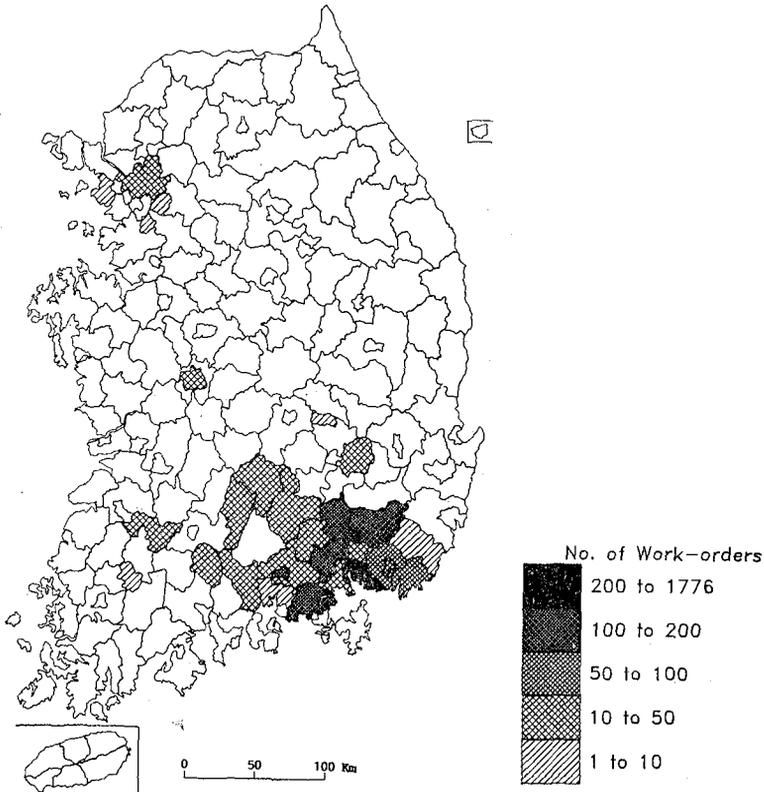
\*\* For easily understanding regional influence, the data of Pusan is included in it,



〈Map 2〉 Distribution of Subcontracting Firms, Jan-Jun 1987.

and what locational limitations exist. The urban areas in the province turn out to be the second most important area for subcontracting location. All five urban areas including Pusan, Changweon, Jinhae, Kimhae, and Jinju worked out to be 25.9% of the total contract value.

Practically, both urban and rural areas are forming major regions being influenced by the spread effect of the subcontracting impact generated from Masan FEZ. Ironically, the pattern of the spread effect of the FEZ is confined within the provincial boundary. Also the pattern of distribution integrates rural areas which still have available unskilled labor forces and urban areas which are a major part of the southeast industrial belt of Korea. The southeast industrial belt has promoted the development of the Korean economy since the early 1960's. These two facets of rural human resources and technologically based industrial urban areas are inter-complementary factors which make possible such diffusion of subcontracting work.

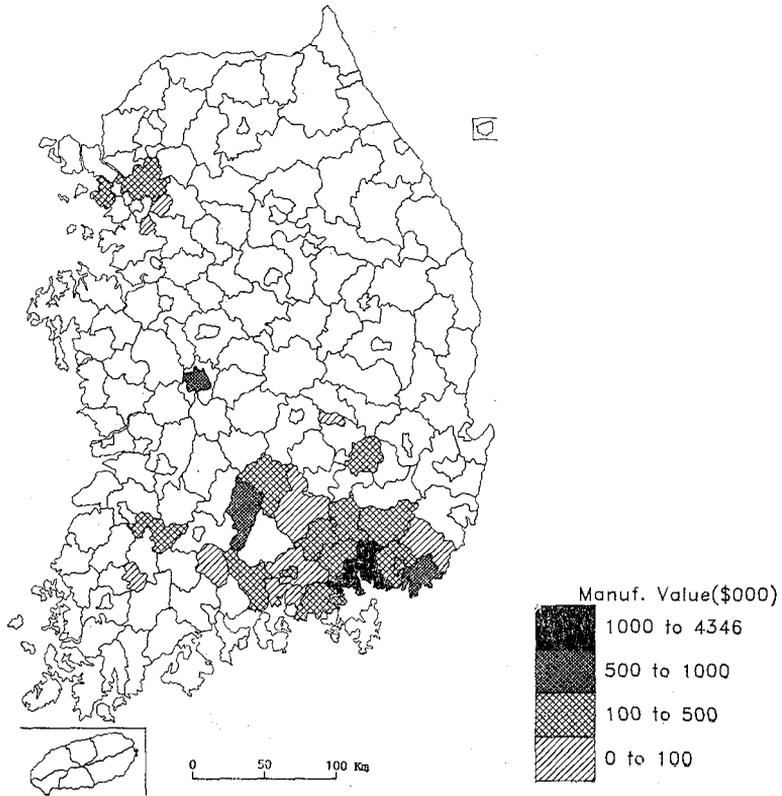


<Map 3> Distribution of Subcontracting Work, Jan-Jun 1987.

Outside the province, there are two rural counties in the west of the province which produced less than 3% of all subcontracting work. This pattern might be exceptional or unusual. The other seven urban areas including Seoul, Taegu, Suweon, Incheon, Seongnam, Taejon and Gumi had almost 10% of the total processing value. This proportion is higher than the proportion of firms and contracts. This means the remote urban areas are engaged in high value added processes based on high technology and sophisticated skills which are not available in neighboring industrial cities.

### 3. Spatial Distribution of Subcontracting Firms

The measurement of the spatial impact through diffusion of subcontracting work outside the FEZ boundary is a major subject of this research. Largely, the impact can be described through the evaluation of the total employment created from the contracts, the increase in the number of subcontracting firms, and the total amount of manufacturing costs for the



〈Map 4〉 Manufacturing Value of Subcontracting, Jan-Jun 1987.

host city, neighboring urban and rural areas, and other remote urban and rural areas.

During the last six years (Table 2), employment created by subcontracting work has rapidly increased from 26.6% annually in 1986~1987 to 34.9% between 1987~1989. In other words, annually at least 3,000 jobs have been added in the regional community. The total number of employees in all subcontracting firms rose from 19,006 in 1986 to 39,067 in 1988. The dependency ratio of employment on subcontracting work showed a slightly irregular pattern in the last three years, respectively 51.3% in 1986, 39.8% in 1987, and 42.7% in 1988 (Table 9). In this ratio, the host city, Masan, shows the highest dependency ratio (86.2%), next, the rural area (80.4%), and finally other urban areas (27.3%) the average marked a dependency ratio only 42.7%. This trend has not changed much over the period. However, a significant subcontracting employment is located in the rural area with a concentration in the neighboring counties of Masan within the province.

The precise number of rural employees involved in subcontracting work can be estimated

<Table 9> The Number of Subcontracting Firms and Employment by Location between 1986 and 1988

	1986			1987			1988		
	Firm	Emp.	Sub. E.	Firm	Emp.	Sub. E.	Firm	Emp.	Sub. E.
Masan Other	108	2,999	2,406	129	3,961	3,350	186	5,712	4,916
Urban Rural	128	12,141	4,471	160	23,087	5,736	263	28,340	7,735
Area	45	3,868	2,889	58	4,009	3,278	76	5,015	4,035
Total	291	19,006 (A)	9,766 (B)	347	31,057 (C)	12,364 (D)	525	39,067 (E)	16,686 (F)
(%)	B/A (51.3)			D/C (39.8)			F/E (42.7)		

Firm: Total Number of Subcontracting Firms.

Emp.: Total Number of Employees working in Subcontracting firms.

Sub. E.: Total Number of Employees working for only Subcontracting.

as 4,035 among all of the 16,686 employees who depend on subcontracting work. Masan has 4,916 employees involved in subcontracting work. The neighboring urban areas, Changweon, Jinhae, Jinju, and Pusan, share a similar number of subcontracting workers with the host city. Other urban and rural areas account for only one tenth of the total subcontracting employment.

As a whole, the rate of subcontracting employment has rapidly progressed in Masan and other urban areas. Especially the neighboring cities have begun to share in the role of domestic linkage, but it is still not clear what proportion of total employment is actually engaged in contract work.

Based on the creation of employment, the local impact in economic terms may be equally shared by Masan, the neighboring urban areas, and the neighboring rural areas. The remaining urban and rural areas share only around 10% of the total employment created by the subcontracts. The total employment of all subcontracting firms is an important factor for understanding the impact on the community economy in general. The number of subcontracting firms also provides insight into the impact. These firms generally have less than 100 workers per firm, for example, 65 workers in 1986, 89 in 1987, and 74 in 1988. Even though the number of firms has remarkably increased over the period, the basic size of employment per firm has been consistently the same. Most of them rely on a relatively small scale of operation (Table 10). For example, in 1988, 476 out of 525 registered subcontracting firms, 90.6%, recorded fewer than 100 workers. This small size firm might be feasible and flexible for subcontracting work.

The actual number of subcontracting firms engaged in production provides a very

〈Table 10〉 The Number of Subcontracting Firms and Their Size between 1983~1988

Firm Size	0~49	50~199	200~299	300~499	500>	Total
1983	117	71	10	6	3	207
1984	159	74	11	5	3	252
1985	122	54	9	5	3	193
1986	185	84	13	6	3	291
1987	215	105	15	7	5	347
1988	346	148	16	9	6	525
(%)	(65.9)	(28.2)	(3.1)	(1.7)	(1.1)	(100)

significant indication of the regional impact. The subcontracting work order information during six months in 1987 indicated only half of the registered firms are actively involved with contract work (Table 11). This regional data shows almost the same proportion of firms in rural areas in the province and in the combination of urban areas in the province and Pusan. All of the regional data indicated less than half of the registered firms worked

〈Table 11〉 The Number of Subcontracting Firms by Location

	Masan City	South Kyongsang Province		Pusan City	Outside Province		Total
		Urban	Rural		Urban	Rural	
1987, 1~6*	57	26	42	16	12	2	156
1987, 1~6**	107	51	42	47	40	7	294
1987	129	62	46	47	51	12	347
1988	186	108	60	69	86	16	525
(%)	(35.4)	(20.6)	(11.4)	(13.1)	(16.4)	(3.1)	(100)

\* indicates subcontracting firms involved in active operation during six months, 1987.

\*\* indicates total subcontracting firms registered in the FEZ office during the same period.

〈Table 12〉 The Dependency Ratio of Subcontracting Firms on FEZ Work by Location in 1988

	(% of Dependency)								Total
	0~9	10~19	20~29	30~39	40~49	50~69	70~99	100	
Masan	9	7	3	14	2	16	9	136	186
South Kyongsang									
Urban	0	5	1	3	2	7	4	86	108
Rural	2	1	0	4	2	8	3	40	60
Pusan	15	11	7	7	2	11	2	14	69
Other Prov.									
Urban	23	13	9	11	0	6	3	21	86
Rural	2	2	1	1	0	1	1	8	16
Total	51	39	21	40	8	49	22	295	525

on a contract job except for the rural area of the province. In the rural area, all 42 registered firms were fully in operation for contract work. Judging from this actual phenomenon, the most important impact of subcontracting work in both total number of firms and actual manufacturing value is in the neighboring rural areas in the province. The other factor, dependency rate(%), the proportion of the subcontracting firm's production completed for FEZ firms supports this significant impact on the rural area. In 1987, 40 out of 42 subcontracting firms in full-time operation leaned 100% on FEZ contract work. Also the 1988 data on the location of firms and dependency (Table 12) outlines the major structure of regional dependency. Thus, a high rate of operation throughout the year and a high dependency on the FEZ contract work turn out to be the two major factors used to evaluate the local impact of subcontracting work.

Additionally, we cannot ignore the fact that the role of the neighboring urban areas are significantly increasing in both the number of firms engaged in subcontracting and the dependency ratio. The spatial patterns of the number of subcontracting firms and the actual manufacturing values show how significantly the FEZ impact has been diffused without any further explanation. The maps themselves are explanatory for all impacts. If such diffusion and spread of the subcontracting work is possible as a continual process, this spatial mechanism might be used as a source for rural development strategy.

The main reason for this argument is that the spatial pattern did not emerge from any single factor such as cheap labor force availability hypothesized in classic labor theory. Because this region already had experienced large outmigration of the agricultural population, this newly emerging pattern is hardly due to any single factor but rather to several related factors. Further realistic rural development strategy might be formulated through the results of this research. What is important for understanding the significance of subcontracting work is the mechanism of spatial influence.

## Conclusion

Since outprocessing activity via subcontracting began in the middle 1970's, the role of subcontracting in creating employment and the number of subcontracting firms has continuously increased. In 1988, the total number of subcontracting employees fully relying on FEZ works reached almost one half of FEZ employment. Subcontracting employment which is directly or indirectly related to FEZ contracts accounts for 39,000 persons which is more

than the number of workers employed in FEZ itself.

The dependency ratio of subcontracting employment on FEZ work varies by locality: 85% in Masan, 80% in the rural area, and 27% in all other urban areas. An average 3.4 subcontracting firms per FEZ firm were active in contract work in 1987, but there were an average of 9.4 registered subcontracting firms per FEZ firm. This means that many registered subcontracting firms work only occasionally or temporarily on the FEZ firm requests. At the same time, over two thirds of subcontracting firms are small size firms with fewer than 50 employees.

However, the domestic linkage formed through the registered subcontracting firms contributes substantially to a broadening the industrial base for the surrounding rural area, and in urban areas it accelerates the creation of small size businesses. The impact in the rural area can be measured by the almost complete dependence of rural subcontracting firms on the FEZ contract work orders. Furthermore, with increase of the FEZ contract work, the linkage between the host city of Masan and the neighboring rural/urban areas tends to intensify. Ultimately, this intensification of interaction through subcontracting work forms a unique influential zone which may be spatially represented as the economic sphere of the FEZ. Also this process could be the same as the metropolitanization resulting from the spillover of urban growth to rural area.

The circular flow of the labor force between the FEZ firms and the subcontracting firms shapes the very close mutually interdependent relationship between them. This emerging relationship might be partially effect to metropolitanization of population.

The spatial impact of subcontracting firms increased in the neighboring rural area over the period. While the urban areas tend to process work requiring much more skilled or technically advanced labor, the rural area tends to be labor intensive. The labor force in the rural area consists of a wider range of age groups in females than in males. Sensitive, many workers in rural areas moved to the place of firms cross the neighboring country boundary. Thus, allocation of subcontracting work in rural areas substantially minimizes interprovincial migration including migration to urban areas, and further stabilizes population changes in general.

As a whole, the growth and rapid expansion of subcontracting work with FEZ firms multiplies its socioeconomic impact on the host city, Masan, neighboring urban and rural areas as well as the remote region. Especially, consistent growth and stable operation of rural subcontracting firms is a way in which subcontracting works might accelerate economic

development and reduce regional disparities. Even if there are many unanswered questions regarding linkage formation through subcontract work, it is clear that the growth of domestic linkages through outprocessing has played a major role in the successful development of Masan FEZ. Likely, very important for regional development and understanding metropolitanization is the wide spatial spread of subcontracting firms and the creation of new small size firms without any government support.

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〈국문요약〉

## 馬山 輸出自由地域 域外 가공업체의 巨大都市化

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수출자유지역내의 域內 업체와 유기적인 下請관계를 갖고 있는 역의 가공업체는 그 立地가 마산시지역내에 국한되지 않고 상호 連繫體系를 통해서 인접 도시와 농촌지역으로 확산되고있다. 본 연구는 역의가공업체들이 마산시로 부터 분산되는 거대도시화 과정에 대한 공간적인 특성과 주변 지역에 어떤 영향을 미치는가를 분석하였다. 역의업체에 대한 자료는 1988년 등록업체와 1987년 1월에서 6월까지 실제로 가공하청을 맡은 156개 업체와 3,630종의 하청작업의 지역별 고용, 생산량등을 분석하였다.

대체적으로 수출자유지역에서 역의가공은 1975년경에 시작되었으며 최근 등록된 525개 역의업체와 직간접으로 관련된 고용은 실제 자유지역내 고용을 초과 하는 39,000인에 달하고 있다. 평균 域내업체가 9.4개의 역의업체와 계약관계를 유지하고 있었으며, 그중 3.4개 업체가 가동하고 있었다. 그리고 역의업체들의 2/3가 고용인원이 50인 이하로 영세적인 것이 특색이었다. 역의가공에 의한 마산과 지역간의 연계는 강화되어 왔으며, 농촌지역의 역의 가공업체의 경우 수출지역에 대한 雇傭依存도가 높은 것으로 나타났다.

하청작업의 지역확산은 공간적으로 마산대도시권의 經濟的 影響圈을 확인할 수 있을 정도로 발전하였으며, 이것은 都市成長의 spillover의 형태로 나타나고 있다. 또한 수출자유지역과 역의가공업체 간에 확인된 고용의 상호 循環의존관계는 일반적인 거대도시화 현상의 한 형태와 유사한 것으로 평가된다. 역의가공업체의 농촌지역 급증은 집약적인 노동력의 잠재력과 높은 관계를 유지하고 있으며, 타도시지역으로의 확산과 연계는 기존산업체의 숙련 기술고용시장과 깊은 관계가 있는 것으로 나타났다. 비록 주변 지역에서 역의가공업체의 절대수와 고용이 증가 하였어도 해당지역의 전반적인 인구는 계속 감소하는 결과를 보였다. 그러나 마산 경제권 지역내의 인구는 계속 증가하였으며 인구가동에서 안정기에 접어든 것으로 평가되었다. 하청작업의 확산이 道外 大都市를 제외하고는 道境界내에 국한되어 분포하는 특색을 나타내었다.

결론적으로 역의가공업의 급속한 확산과 성장은 地域經濟發展에 직접적인 영향을 미쳤을 뿐만 아니라 地域間 隔差를 완화하는 역할을 하고 있다. 또한 수출자유지역의 이러한 域外 地域 連繫網의 발달은 자연적인 空間 分化過程에 따라 발전되었으며, 이 原理는 農村地域의 産業化 基礎를 마련할 수 있는 地域開發 戰略 메카니즘으로 활용할 수 있는 가능성이 높다.