

Changes in the Multinational Corporate Networks and International Quaternary Places

Kee-Bom Nahm*

This paper investigates spatio-temporal changes in the international system of linkages among multinational corporate domestic decision-making centers and their overseas subsidiary centers for the period 1974-1991. During this period advances in information technologies and an ever increasing interdependent world economy have permitted the globalization of resource transfers, production techniques, service provision and financial transactions. Based on a network theory of internationalization, the study identifies the dispersion of multinational control centers and the diversification of their linkage patterns. These tendencies are led by small and medium sized quaternary places as well as the rapid growth of service industries. Corporate headquarters cease to be tied together to big corporate and governmental centers but will disperse over time at global, national and regional level. Using information statistics, this paper confirms the dispersion patterns of capital flows and diversification of multinational control linkages. With an increasing trend toward a multicentric world system and the associated decline of the global hegemony of a small number of largest cities, multinational control linkages should continue to disperse.

Key Words: quaternary places, multinationals, networks, dispersion

1. INTRODUCTION

In a world of increasing global competition, large North American, European and Japanese multinational corporations (MNCs) compete for market share and profits everywhere. Over the past couple of decades, MNCs have grown rapidly to become central organizers of economic activities and influential in shaping the international division of labor. Recently, foreign direct investment (FDI) flows have increased dramatically. For instance, during the second half of the 1980s, global foreign direct investment grew four times faster than domestic output, twice as fast as domestic investment, two-and-a-half times as fast as exports and one-and-a-half times as fast as royalties and license fees (UNCTD, 1992). MNCs stimulate economic growth by contributing to the investment cycle

that produces technological progress and encourages human resource development as well as promotes environmental quality (UNCTD, 1991).

The rapid growth of MNCs and the subsequent globalization of the international economy facilitate restructuring of cities and regions. As Castells notes (1989, p. 346), the operations required for the processing of worldwide capital flows, concentrate in the control centers of important global cities. These centers are closely linked together through capital flows, resource and technology transfers, and strategic decision exchanges. The spatial manifestation of this globalization process can be examined by studying the changing importance of domestic corporate headquarters centers and foreign subsidiary cities. Firms engaging in overseas operations create direct links between the operations of domestic corporate centers and host subsidiary centers. These headquarters offices are handlers, processors and transmitters of information to and from other parts of the

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corporation and also among similarly high-level organizations outside. On the other hand, host subsidiary centers act as the intermediary between the corporate headquarters and foreign affiliates (Dicken, 1992). At a global scale, a relatively small number of cities house a large proportion of both multinational corporate headquarters and overseas subsidiary offices. Such global cities are the geographical control points of the world economy (Nahm, 1995b).

This paper investigates, in general, the spatio-temporal changes in the international quaternary place system. In particular, it examines the dispersion trends of multinational decision-making centers and their corporate linkages for the period 1974-1991. It is apparent that these centers are in close contact with one another but geographically dispersed, and that they are affected by rapid changes in technologies that has permitted the globalization of resource transfers, production techniques, service provisions and financial transactions.

2. CONCEPTUAL FRAMEWORK

1) FDI AND INTERNATIONAL QUATERNARY PLACES

The global pattern of FDI in the 1970s and early 1980s could be characterized as bi-polar; dominated by American and European interests. The growth of FDI during the middle and late 1980s was due to the rapidly increasing cross-border provision of goods and services as MNCs sought to rationalize their presence in a concentrated core group of large and wealthy industrial nations. This period witnessed the deregulation of finance, communications and transportation services, as well as the rationalization of international markets (Enderwick, 1989; OBrien, 1992). By the late 1980s the global pattern of investment could be characterized as tri-polar, with the EU, North America and Japan forming the Triad (Ohmae, 1987; Nahm and Semple, 1995a). Today, the Triad accounts for four fifths of total outward investment flows (UNCTD, 1994). Within the Triad, more and more corporations operating from a more dispersed set of international

headquarters centers invest their resources into overseas operations. For instance, the source of multinational corporate control for Canadian subsidiaries remains overwhelmingly within the Triad (Semple, 1987). At the same time, within these nations the origins of ownership and control are rapidly diversifying by corporation, city and sector.

This growth of FDI and the concentration of corporate resources result in the formation of global nodal points possessing worldwide command and control, information, communication, and financial networks. Emerging global cities hosting headquarters of multinational firms coupled with large financial institutions and their social and physical infrastructure, are the most important business transaction areas of the global economy. In the tightly interwoven corporate world, national borders have little meaning. A global web of multinational corporate control linkages connect the spatial units of corporate command and control centers (Nahm and Semple, 1995b).

Corporate headquarters send, receive, and process information to and from all parts of their internal and external environment (Dicken, 1992). The major components of the internal organization consist of departments, subsidiaries, and internal agents. The external environment consists of corporate competitors, government regulators, financial markets and the external providers of business services. These quaternary places in the past have evolved as a system of interlinked command and control centers. Connections, for the most part, were internal and hierarchical, with only moderate contacts externally. Today, in a globalizing world, although internal contacts are still important, external contacts are the focus. Not only for the largest domestic places, but also for those centers considered secondary or even tertiary in the internal hierarchy, external contacts are vital. These external contacts, moreover, appear to be flatter in terms of the hierarchy of centers (Powell, 1990). That is, instead of information going up and down the external system, it appears to be directed across the system at all levels. Also, important domestic quaternary places find most of their activities directed

outward to the international community; while residual activities tend towards a formerly dominated domestic urban system. In other words, many domestic quaternary places find their external activities and influences more important than their internal contacts.

Growing interest in the command, control, and decision-making structure of particular global cities, as well as the general system of centers, focuses on corporate headquarters. Located in major centers, they have international subsidiary headquarters dispersed throughout the international system. (Friedmann, 1986; Meyer, 1991; Shachar, 1994). It is the quaternary activities that bring about the accumulated concentrations of producer and financial services, social infrastructures, informational linkages, and their associated communication hubs (Moss, 1987; King, 1990). In theory, a grand international network of hubs and spokes can be devised to represent the quaternary place system.

2) IMPACTS OF THE DEVELOPMENT OF INFORMATION TECHNOLOGY

The growth of a city and the availability of information are highly correlated. Cities survive and flourish as centers of communications and hubs of information exchange. Cities, the focal points of information, are centers of power. This power reflects the accessibility and range and quality of contacts that cities have with their external environment (Castells, 1993; Gertler, 1989). In fact, large business organizations are both the major suppliers and users of this information infrastructure. From an economic perspective, the growth of a quaternary place is directly related to the ability of the center to manipulate and coordinate global information transactions.

The location of multinational headquarters is related closely to the availability of informational infrastructure such as telecommunication services, computer and leased networks, and satellites. The rapid development of information technology enhances the ability of executives at the headquarters of international corporations to

control their external business environment spatially (Gillespie and Williams, 1988; Hepworth, 1989; Langdale, 1989). It also gives executives the flexibility to decentralize and relocate production, distribution, and service activities away from quaternary centers. Today, a decentralized system of differentiated and pluralistic quaternary places characterizes the global economy (Knight, 1989). This means that the global economy expands and international business transactions become more diffused.

Information technology influences the location of corporate control centers in two ways. First, it permits control centers to disperse by taking advantage of the universal accessibility of the information technology and standardized common infrastructure. Second, it permits quaternary centers to concentrate within a system containing a small number of large informational hubs and spokes. Conventionally, the view that information technology is a distance-shrinking and friction reducing spatial mechanism is popular (Falk and Abler, 1980; Abler, 1991; Janelle, 1991). This technology creates a space-time convergence by bringing places closer together. Telecommunications, for instance, substitute face-to-face contacts among executives and information technology facilitates the increased flexibility and concentration of headquarters-based activities. Decision-makers are able to disperse corporate control functions internationally and in turn be provided with effective logistic support through global information networks. Consequently, corporate control centers are able to decentralize away from downtown area and disperse away from large metropolitan areas, taking advantages of reduced taxes, cost of land, congestion, and increased amenities.

Information technology, however, exhibits high fixed costs and low marginal costs. Important global communication systems such as teleports, leased networks, fibre-optic systems, and computer networks, offer significant economies of scale for large users but are too expensive for infrequent and small users. Telecommunications facilities, for instance, favor high volume and point-to-point communications from one hub to another. Large

metropolitan areas with their major markets are cost effective over remote places to attract telecommunications (Gillespie, 1991). Furthermore, industrialized countries possessing large corporations and sufficient users for information technology have advantages over developing countries. Concentration of information infrastructure has a cumulative effect. Information infrastructure favors the existing information processing complexes in major industrialized nations and it also enhances the attractiveness of large business headquarters functions. As information technology grows and linkages among major cities increase, the importance of those cities as multinational corporate control offices rise. At a national scale, the trend towards the concentration of multinational corporate control centers in the advanced industrialized countries reinforces the same locational pattern of informational networks. At the same time, with information services becoming increasingly ubiquitous, second-order centers in the global economy will attract headquarters functions. This results in concentrated dispersion; concentration of control centers in the industrialized regions and dispersal of centers within them (Nahm, 1995a).

3) THE NETWORK MODEL OF INTERNATIONALIZATION

Theories dealing with MNCs are taken from the literature of regional science, economic geography and business. They assist in the explanation of locational strategy, hierarchical structure, size, ownership, and marketing practices. They also provide a basis for predicting changes in firm behaviour. The international product cycle theory, proposed by Vernon (1966; 1992), focuses on the decisions of the firm to trade and invest based on both cost and revenue conditions. Internalization theory focuses on the economies of vertical integration (Buckley and Casson, 1985; Rugman, 1987). Large firms possessing monopolistic advantages tend to internalize market transactions within the firms. As Williamson (1975) points out, hierarchies replace markets. Dunning's eclectic model (Dunning, 1988) integrates these

monopolistic and internalization advantages as well as location factors.

These existing explanatory frameworks on FDI have been unsuccessful in relating the internationalization *process* to the concept of an industrial *network*, or the system of relationships among firms (Johanson and Mattsson, 1988). The network is the spatial organization of businesses that need to maintain a close relationship with local markets while taking advantage of global developments (Leo and Philippe, 1991). Håkansson (1989) identifies three important components of all networks; *actors*, *resources*, and *activities* (Fig. 1). *Actors* are companies that coordinate and perform complementary and competitive industrial activities. They control resources directly through an internal hierarchy and indirectly, through external ties to the network. *Resources*, such as physical assets, financial capital, technology, human assets, are necessary conditions for all industrial activities. Finally, *activities* are the processes of production and exchange which internally transform inputs to outputs; externally, they provide services and transactions among other linked organizations in the network. Transaction activities link transformation activities, forming chains of activities and creating relationships with other actors. The network is by no means stable over time. It evolves as firms compete with one another. There exists a struggle to gain control over resources. Firms need investments to thrive and to acquire control in the network. Investments which require considerable financial capital are often associated with other disinvestments. This dichotomy changes the internal network structure and the external links of individual firms. In general, the evolution of a firm within the network, as a process to gain more power and resource control, results in internal hierarchicalization of the firm along with the associated externalization of linkages.¹⁾

The process of internationalization is an interplay between increasing commitments of resources and developing a knowledge base about foreign operations and markets (Fosgren and Johanson, 1992). Internationalization of a firm means that a firm establishes and develops positions; these positions relate to counterparts

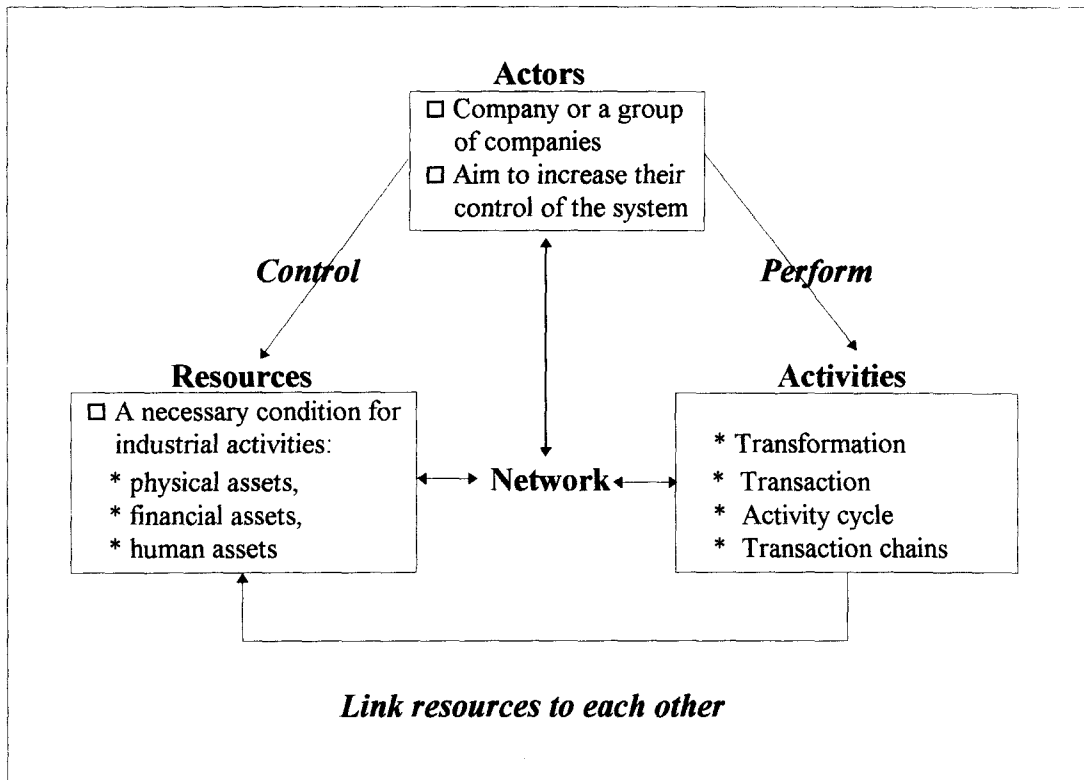


Figure 1. Three factors of industrial network
 Source: Modified from Håkansson (1989, p.17)

in the foreign networks which change over time. The foreign investment behavior of a firm follows, to a large extent, its long-lasting relationships with suppliers, customers, and competitors. These relationships give the business a certain control over its environment and, at the same time, make it subject to some reciprocal control. In short, the network model of internationalization stresses the importance of relative position in industrial networks (Fosgren, 1989).

Such network model of internationalization aims at explaining the pattern and mode of establishing international operations (Johanson and Vahlne, 1990, p. 16). Executives at headquarters determine the location of foreign subsidiaries and decide the pattern of international operations. Herein lie the spatial implications of the network model. It postulates that firms first invest by invading physically and culturally close markets; then, as experience grows, they enter more distant markets. As the

functional separation between conception and execution of economic processes continues, corporate power and decision-making systems concentrate in the major nodes of world-wide information, communication, trade, and financial networks. Conversely, operating activities disperse by taking advantage of expanding corporate networks and advances in information technologies (Gillespie, 1991; Conti, 1993). Foreign subsidiary centers, initially concentrated, will disperse over time. As network evolves globally, new candidates based at various spatial locations enter into the network with increased experimental knowledge and reduced uncertainty. Multinational control centers will be diversified and dispersed over time at a regional, national, and global level (Semple, 1985; Semple and Rice, 1994; Nahm, 1995c).

3. RESEARCH DESIGN

1) PREMISES

The dispersion of economic activity over time is a global phenomenon. Endless pursuit for profit, growth, and technological advances lead firms to move from old national and international core regions towards rather new and remote centers. Multinational firms, possessing wide information networks, are creating more complicated and dispersed decision-making linkages at a global scale.

Three premises concerning these dispersion tendencies examine the global pattern of spatial control links among multinational domestic headquarters and foreign subsidiary centers.²⁾ First, domestic quaternary places and foreign subsidiary centers become more dispersed, as small centers grow enough to compete with larger ones and information technologies shrink distance over time (Brunn and Leinbach, 1991; Wheeler and Mitchelson, 1989). With the deregulation on international business, finance, and communication, and the diminishing barriers for international trade and investments, an increasing number of small and medium sized centers host multinational headquarters activities. Foreign subsidiaries are relatively easy to move from place to another to cope with the changing environment and to comply with the strategic decisions of the parent firms. Consequently, the degree of dispersion of the subsidiary centers is higher than that of headquarters centers. Second, Small and medium-sized quaternary centers tend to lead the growth and dispersion. These centers globalize to compete effectively with the larger centers for the headquarters location. Information technology permits corporations to decentralize and contributes to the germination of small and medium-sized control centers. Third, service sector quaternary centers tend to develop rapidly and thus tend to disperse more than other sectors. Their control linkages also tend to be more diversified. Service industries rarely require large amount of fixed capital and are unusually not bound to existing material and

product linkages as are manufacturing and resource industries. They are the major recipients of the advantages of the development of information technology (Hepworth, 1989; Daniels, 1993). These conditions allow the rapid increase of service companies and dispersal of control centers into less congested and amenity-rich small or medium-sized quaternary places. Concomitantly, their control linkages become more diversified and sophisticated than other sectors.

2) DATA

This study investigates the premises for the top 600 manufacturing, top 100 resource, and top 100 service multinational firms based on revenues. These businesses are ranked according to the location of their domestic headquarters and foreign subsidiaries for the period 1974-1991.³⁾ The data set consists of the location of multinational headquarters and subsidiary cities as well as the associated revenues in millions of US dollars. The data are gathered from a number of sources. The primary source of headquarters location and corporate size data is the *Directory of Multinationals* (Stopford, Dunning and Haberich, 1980; Stafford and Purkis, 1989; Stopford, 1992) and Business Week's *The Global 1000*. These data are supplemented by *Forbes Foreign 500*, *Dun and Bradstreets Principal International Business* and *Moody's International Manual*. Data sources for the size and location of subsidiaries vary by host countries.⁴⁾

3) METHODOLOGY

Three measures indicate the importance of corporate headquarters and subsidiary centers as well as their linkage patterns. 1) The first one deals with the relative size of corporate headquarters/subsidiary centers expressed as the percentage of total multinational headquarters/subsidiary revenues. 2) The second one indicates the pattern of headquarters-subsubsidiary linkages expressed as actual revenue flows of subsidiary centers from corresponding headquarters centers. This measure shows the

degree of globalization for each headquarters center. 3) The last measure is an information statistic that measures the dispersion of corporate centers. Information statistics have several advantages over other statistical techniques. They measure changes in the state of a system consisting of a number of component parts, (Thomas, 1981; Johnston and Semple, 1983). They depict changes between two system states such as changes in concentration and dispersion. Furthermore, information statistics produce an unbiased estimate of the statistically most likely form of the probability distribution on the basis of limited information (Pooler, 1983).

Discrete information theoretic models employ proportional data as opposed to absolute data for each observation n and each time period t . That is, the study uses an information statistic to determine the degree of concentration or dispersion of corporate power by transforming the absolute revenue statistics for each corporation for each time period into a proportion y_{it} such that:

$$\sum_{i=1}^N \sum_{t=1}^T y_{it} = 1.0 \quad (1)$$

where $0 \leq y_{it} \leq 1 (i=1, \dots, N; t=1, \dots, T)$.

Using equation (2) to calculate total system dispersion, $H(y)$ for all centers over all time periods,

$$H(y) = \sum_{t=1}^T \left[\sum_{i=1}^N y_{it} \log_2 \frac{1}{y_{it}} \right] \quad (2)$$

where $H(y)$ takes on a maximum value of $\log_2 NT$, indicating complete dispersion and a minimum value of zero, indicating complete concentration. The dispersion measure in equation (2) can be decomposed into between and within regional components. Partition multinational control centers into R regions S_1, S_2, \dots, S_r , assigning each center to one region. Denoting N_r for the number of centers in S_r ($r = 1, 2, \dots, R$) such that: $\sum_{r=1}^R N_r = N$. Expand equation (2) to:

$$H(y) = \sum_{t=1}^T \sum_{r=1}^R Y_{rt} \log_2 \frac{1}{Y_{rt}} + \sum_{t=1}^T \sum_{r=1}^R Y_{rt} \left[\sum_{i \in S_r} \left(\frac{y_{it}}{Y_{rt}} \right) \log_2 \left(\frac{Y_{rt}}{y_{it}} \right) \right] \quad (3)$$

where $Y_{rt} = \sum_{i \in S_r} y_{it}$, such that: $\sum_{t=1}^T \sum_{r=1}^R Y_{rt} = 1.0$

This regional model can be partitioned into a subregional model. Subdivide regions into K subregions, $S_{r1}, S_{r2}, \dots, S_{rk}$, such that K subregions are contained in region r . Equation (4) represents the expanded multicomponent information theoretic model employed in the study:

$$H(y) = \sum_{t=1}^T \sum_{r=1}^R Y_{rt} \log_2 \frac{1}{Y_{rt}} + \sum_{t=1}^T \sum_{r=1}^R Y_{rt} \left[\sum_{k=1}^K Y_{krt} \log_2 \frac{1}{Y_{krt}} \right] + \sum_{t=1}^T \sum_{r=1}^R Y_{rt} \left[\sum_{k=1}^K Y_{krt} \left[\sum_{l \in S_{krt}} \frac{y_{lrt}}{Y_{krt}} \log_2 \frac{Y_{krt}}{y_{lrt}} \right] \right] \quad (4)$$

where $y_{lrt} = \frac{y_{lrt}}{Y_{rt}}$ such that: $Y_{krt} = \sum_{t=1}^T \sum_{l \in S_{krt}} \frac{y_{lrt}}{Y_{rt}}$

and $\sum_{t=1}^T \sum_{r=1}^R \sum_{k=1}^K Y_{krt} = 1.0$

The first expression in the RHS measures the between region dispersion, the second term measures the between subregion dispersion, and the third measures the within subregion dispersion over all time periods. This case study divides the world into four Regions (North America, South America, Europe, Asia-Australia-Africa) and each Subregion corresponds to each country.

4. THE ANALYSIS

1) THE CHANGING CITY STANDINGS

Figure 2 graphs the rank changes for the top 25 manufacturing headquarters and subsidiary centers between 1974 and 1991. The most notable change is the rise of Tokyo as the first

ranked headquarters center at the expense of New York, the second ranked city in 1991. Most of the American headquarters cities experience a decline. In the top 10 largest headquarters centers, the decline of New York, London, Detroit, Chicago, and Stamford is matched by the rise of Tokyo, Paris, Osaka, and Essen. New entries and exits for the top 25 list also depict the decline of American headquarters centers and verify the rise of Japanese and European quaternary places in the global rankings. The pattern of subsidiary centers reveals quite a contrast to that of headquarters centers. New York replaces London as number one position in

1991. This first ranked city is up from thirteenth in 1974. Among the other rising centers, American cities dominate the system. Los Angeles, Stamford, Chicago, and Philadelphia are good examples. On the other hand, European and Canadian cities that served mainly as subsidiary centers for American manufacturing MNCs decline, and even disappear, from the top 25. Hamburg declined from fourth to fifteenth, and Montreal from fifth to twenty-first. Compared to the pattern for headquarters centers, the range of rank change for subsidiary centers is greater and the frequency of new entries and exits exceeds those for headquarters

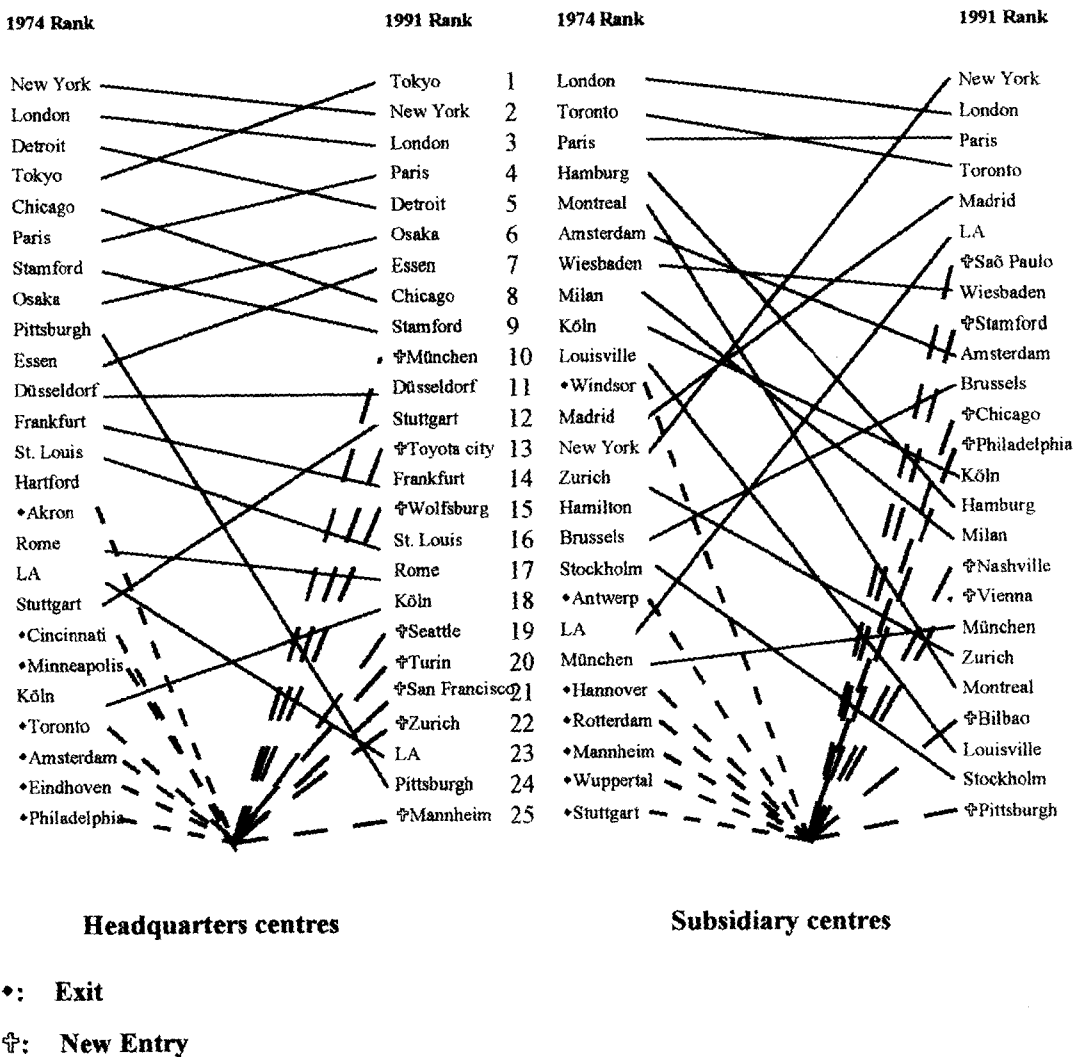


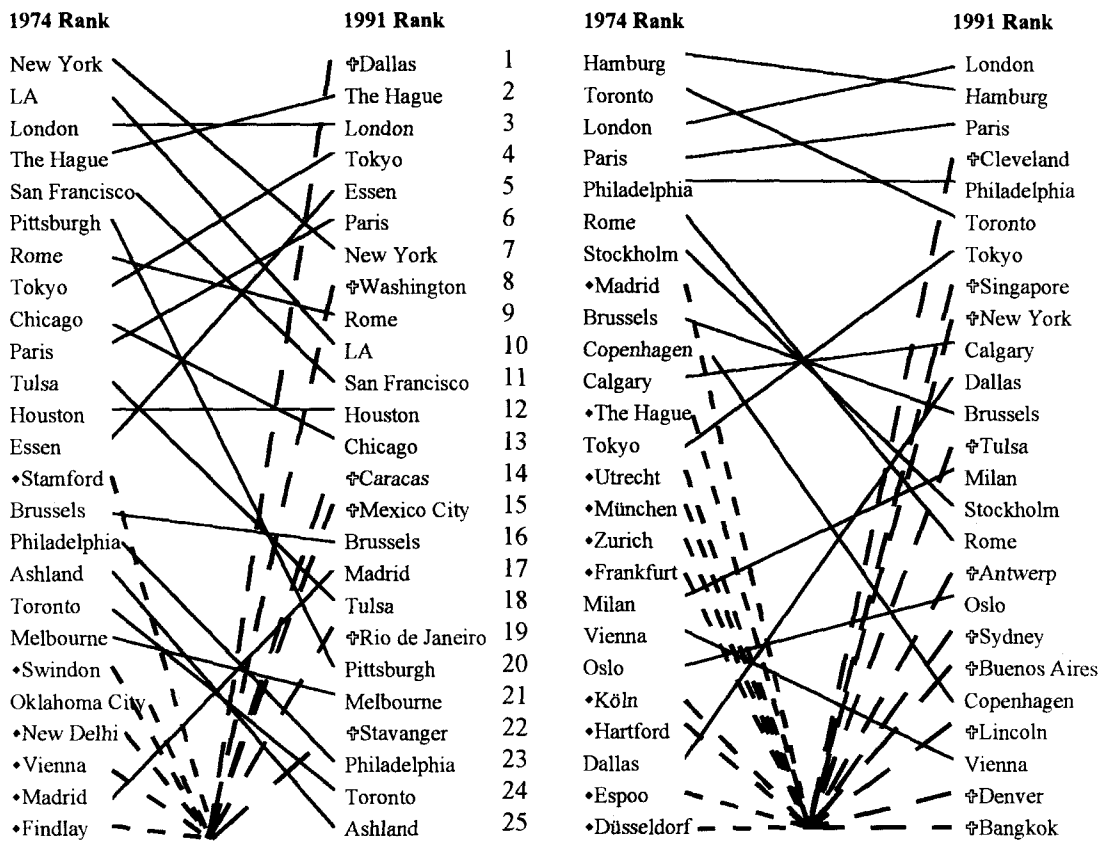
Figure 2. Changes in the rank for the top 25 manufacturing headquarters and subsidiary centres

centers.

Figure 3 depicts changes for the top 25 resource headquarters and subsidiary centers. Most of the declining headquarters centers are American cities, while rising centers are located in Europe and South America. The decline of the dominant city, New York, is due to the relocation of giant firms like Exxon and Mobil to Dallas and Washington, respectively. Resource nationalism, caused by the two oil shocks in the seventies, contributes to the rapid rise of Third World headquarters cities like Caracas, Mexico City, and Rio de Janeiro. For subsidiary centers, higher ranking cities are quite stable over the

years. Note also that in the lower ranking centers, American subsidiary cities replace European ones. This indicates a rapid penetration of the American market by European and Third World companies. Like the manufacturing sector, changes in the subsidiary centers are greater than in headquarters centers and the dominance of the Triad nations persists. These patterns of headquarters and subsidiary centers reveal the dominance of the Triad.

In the higher ranking service control centers, the changes of headquarters and subsidiary centers have been relatively small (fig. 4). Tokyo and New York remain first and second ranked



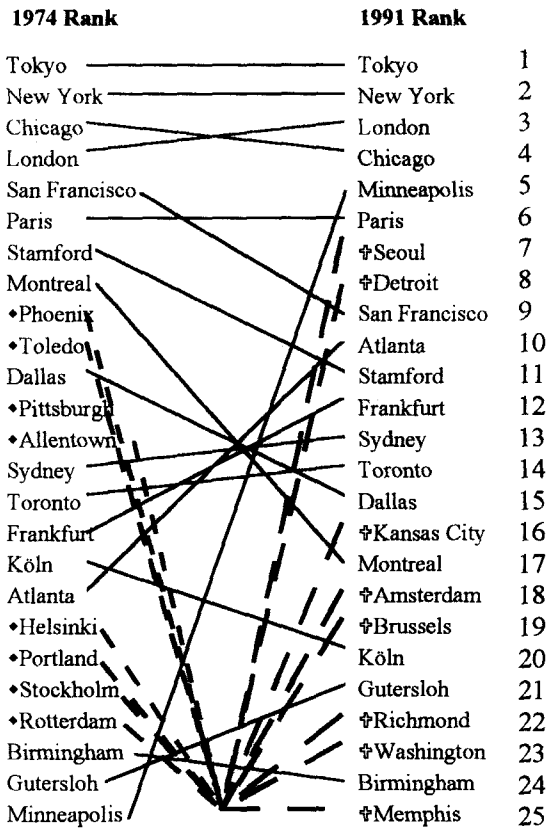
Headquarters centres

Subsidiary centres

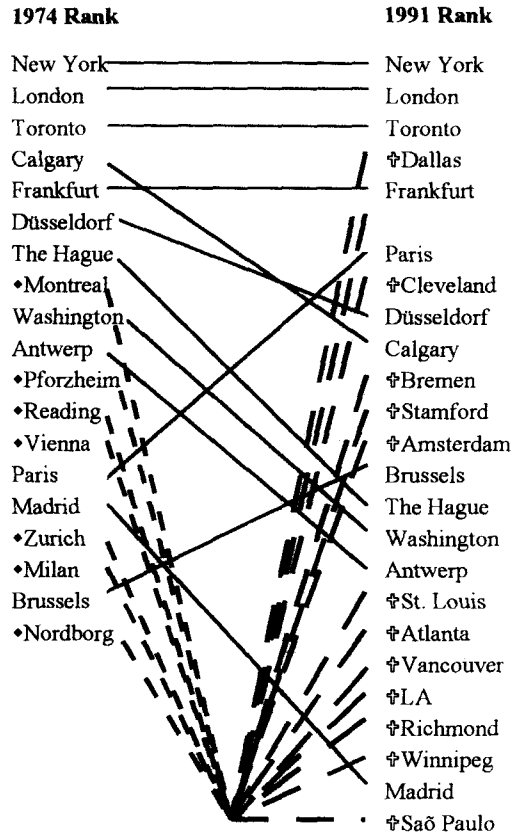
◆: Exit

⊕: New Entry

Figure 3. Changes in the rank for the top 25 resource headquarters and subsidiary centres



Headquarters centres



Subsidiary centres

◆: Exit

✦: New Entry

Figure 4. Changes in the rank for the top 25 service headquarters and subsidiary centres

headquarters centers. New York, London, and Toronto stay at their same ranks in subsidiary centers during the study period. Like the patterns of other sectors, the decline of American headquarters centers is balanced by the rise of European counterparts. The decrease of European subsidiary centers is accompanied by the increase of American counterparts. Over the years, the dominance of the Triad continues, both for headquarters and subsidiary centers. Seoul, with a rank of seven in the 1991 list represents one exception to the rule. This is due to the rapid growth of a number of Korean trading companies like Samsung, Hyundai, and

Daewoo.

2) GROWTH OF SMALL QUATERNARY CENTERS

Today, small and medium sized corporate centers are playing a leading role in attracting multinational headquarters. Figure 5 compares the top 10 fastest growing headquarters centers with the top 10 largest centers in 1991. The cities listed in the top 10 growing centers are small in size and remote from existing centers. Memphis ranks first, followed by Caracas, Omaha, Seoul, and Kyoto. The implications of the trend are

two-fold. First, small fast growing centers are the leading forces in accelerating the dispersion and diversification trend of corporate control centers. Second, the dispersion occurs outside the Triad as well. These centers develop through intense contacts with the centers of the Triad. It is significant that none of the top 10 largest centers is included in the top 10 fastest growing centers. Note that Dallas, a large center, ranks twelfth in growth rate. The biggest centers like Tokyo, New York, and London rank 38th, 125th, and 95th, respectively, in growth. This implies that the largest headquarters centers may have receded and that lower centers lead future development. Keeping in mind, however, that the absolute size of the fast growing centers is very small and it will take a long time for these new centers to replace today's leaders. Second, the current information infrastructure favors existing large centers. This fact makes it unlikely that fast growing small centers will outrank any existing large centers in the near future.

Figure 6 demonstrates that relatively large subsidiary centers lead the pace of growth. Chicago ranks first, followed by Stamford, Cleveland and Dallas. There seems to be a time lag between the growth of headquarters and subsidiary centers. In the headquarters centers, small and remote centers lead in the growth of the system, while large centers continue to attract subsidiaries. This trend is due to the familiarity and ease of access that foreigners enjoy with places like New York and London. In sum, international quaternary power continues to

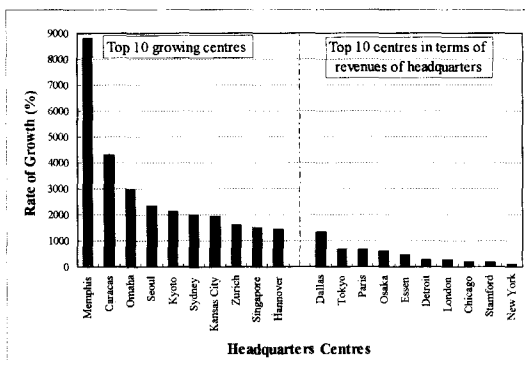


Figure 5. Top 10 fast-growing multinational headquarters centres

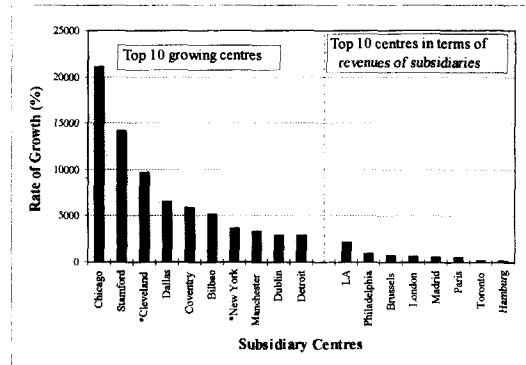
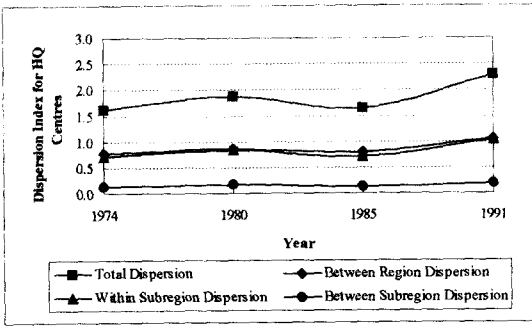


Figure 6 Top 10 fast-growing multinational subsidiary centres

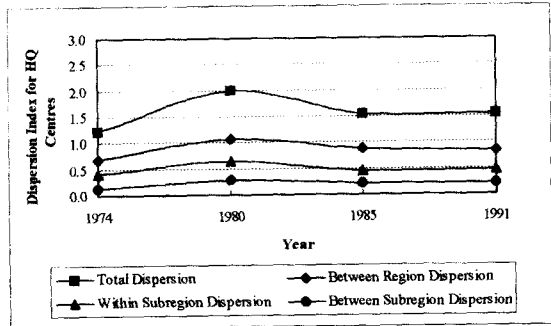
concentrate in countries of the Triad, while at the same time, it continues to disperse to newer and smaller corporate centers within these countries.

3) DISPERSION OF MULTINATIONAL CENTERS AND GROWTH OF THE SERVICE SECTOR

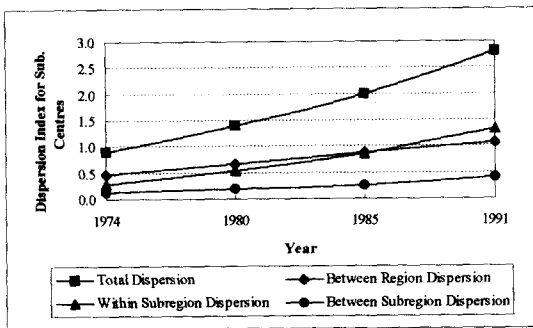
Changes in corporate control centers or changes in the power relationship among international quaternary places provide the basis for the concentration and dispersion tendencies. The study identifies the 130 largest manufacturing headquarters centers and 200 largest subsidiary centers in years 1974, 1980, 1985, and 1991. Figure 7 graphs the components of total dispersion for the manufacturing control centers. Total headquarters dispersion has increased gradually from 1.6226 in 1974 to 2.2795 in 1991 with slight variation in 1985. The major contributor to the total dispersion among subdivisional dispersion is the between region dispersion. This implies that dispersion at the regional level is greater than the urban center dispersion within subregional level. It also verifies that world manufacturing headquarters centers have shifted from North America to Europe and Japan & East Asian region. The North American proportion of the between region dispersion decreased from 45 per cent in 1974 to 34 per cent in 1991, while European and Japan & East Asian region shares account for 36 and 27 per cent by 1991, an increase from 32 and 13 per cent, respectively, in 1974. The between



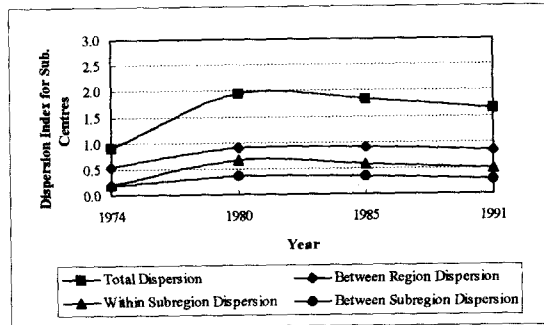
A: Manufacturing headquarters centres



A: Resource headquarters centres



B: Manufacturing subsidiary centres



B: Resource subsidiary centres

Figure 7. Dispersion index for the manufacturing control centres

Figure 8. Dispersion index for the resource control centres

subregional dispersion is the smallest of any information statistic component because centers in each region dominate corporate activity.

Dispersion indices for subsidiary centers also indicate a steady dispersion of economic power during the period. In comparison with the value of headquarters centers in 1991(2.2795), total dispersion of subsidiary centers is 2.8066, suggesting that subsidiary centers are more dispersed than headquarters centers. Note that in subsidiary centers, while subdivisational dispersions also increase over time, major contributor to the total dispersion changes from between region dispersion in 1974 to within subregion dispersion in 1991. This implies that dispersion at the regional level is greater than others in 1974 and the urban center dispersion within subregional level is greater in 1991. In sum, the gradual increase in total dispersion and the higher value of within region dispersion than between region dispersion indicate that

manufacturing control centers disperse over time, mainly within the Triad.

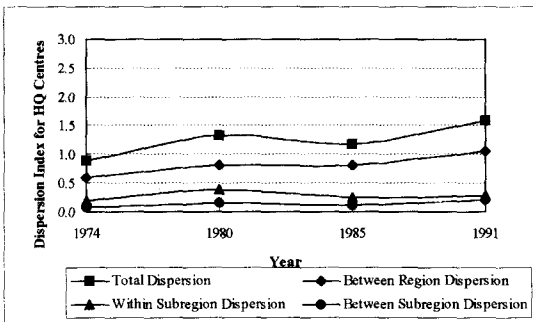
Figure 8 shows the changes in dispersion components for the top 50 resource headquarters centers and top 75 subsidiary centers. For both sets of control centers, dispersion has increased between 1974 and 1980 and then decreased slightly. Among the components of the total dispersion, between region dispersion is the greatest, implying that the dispersion of the resource quaternary centers at major regional level is a leading force and the urban center dispersions is less apparent. This pattern suggests several important implications. Firstly, the peak period of dispersion coincides with the high period of resource nationalism after the oil shock. During this period most nations tried to secure energy sources at the expense of the Seven Sisters by nationalizing resource

companies. By the 1990s the multinationals regained control. This trend accounts for the dispersion of control centers in 1980 and concentration thereafter. Secondly, the hegemony of American quaternary system diminishes, while growth continues in Europe and Japan. Thirdly, the overall level of dispersion in resource sector is less than that of manufacturing sector. A small number of very large resource companies dominate the sector and their subsidiary centers are relatively concentrated in comparison with the more dispersed manufacturing control centers.

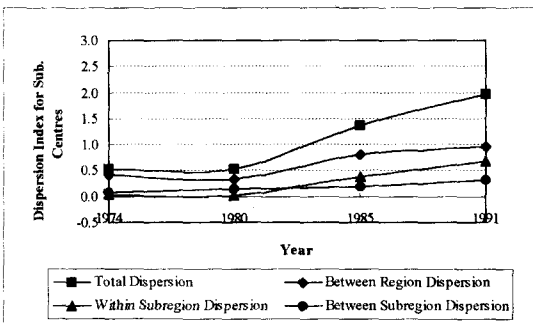
Figure 9 depicts the changes for the top 50 headquarters centers and top 70 subsidiary centers. Dispersion has gradually increased between 1974 and 1991. The dispersion is the smallest in the headquarters centers, implying that a few large headquarters centers dominate and their foreign subsidiaries are dispersed all

over the world. The between region dispersion is the major contributor to the total dispersion, indicating that greater regional dispersion of corporate centers leads the dispersion trend. Furthermore, the magnitude of the dispersion statistics tends to monotonically increase from 1974 to 1991 and thus the dispersion for all the levels has progressively been increasing since 1974. These trends indicate that multinational control centers are driven by centrifugal forces and are dispersed mainly at the regional level. Overall, international quaternary places become more dispersed and the level of dispersion is highest in the service sector. The fast growth of service MNCs in various parts of the world contributes to this dispersion trend of service decision-making centers.

4) SERVICE SECTOR LINKAGE DEVELOPMENT



A: Service headquarters centres



B: Service subsidiary centres

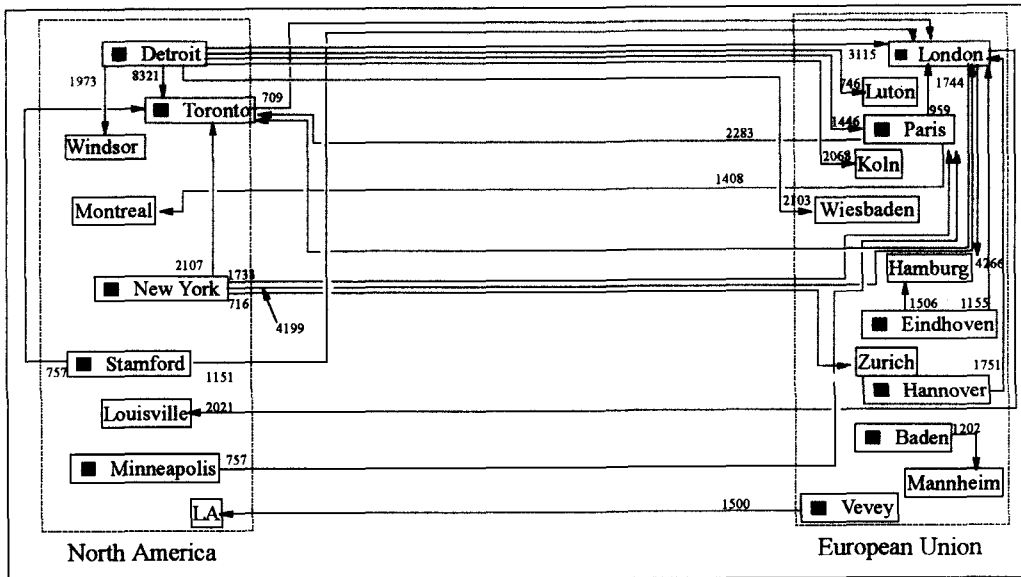
Figure 9. Dispersion index for the service control centres

Figure 10 depicts the manufacturing headquarters-subsidiary linkage patterns. During the years from 1974 to 1991, the multinational control flows have dispersed. The dominance of New York and Detroit as nodes for flow dispersion is apparent in 1974. Their control flows are mostly directed forward European subsidiary centers, namely London, Paris, Hamburg, and Wiesbaden. Overall, the level of intracontinental controls is higher than intercontinental linkages of 1974. This dominance lessens by 1991 with increasing counter flows from European headquarters centers and unidirectional flows from Japanese cities mostly directed to North American subsidiary centers. Among them, Tokyo and London stand out as significant headquarters centers.

By 1991, several important changes contribute to the dispersion of international corporate control linkages. Firstly, within regional control diminishes along with the rapid growth of interregional control. Most of the control flows stemming from Japanese and European centers are directed to the American market, while most of the North American flows go to the European market. The global reach of largest business organizations become more sophisticated and

A. 1974

(US\$ Mil.)



B. 1991

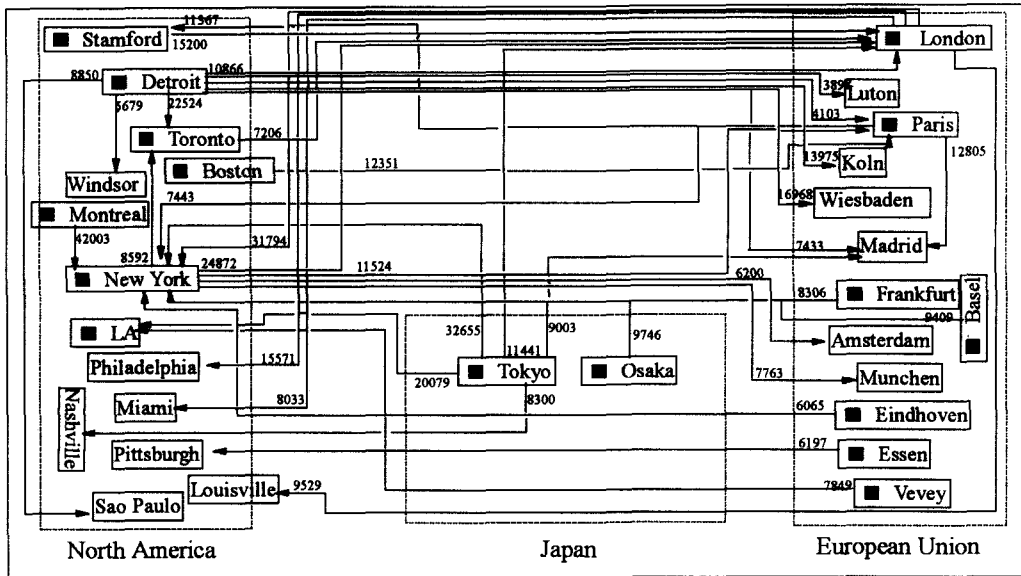


Figure 10. Major headquarters-subsidiary linkages in the manufacturing sector

*The numbers below arrows indicate that multinational headquarters in the origin city control specific amount (in millions \$) in the subsidiaries located in the destination city.

target distant markets. Secondly, economic hegemony of American cities decrease along with the dispersion of economic power into the

major quaternary centers of the world. Thirdly, European and Japanese firms have different regional biases for the location of American

subsidiaries. Excluding New York, Japanese firms locate in the Western and Southern centers like Los Angeles and Nashville, while European firms locate in cities of the Northeast, like Stamford, Pittsburgh, and Philadelphia.

The diversification of resource sector control linkages is greater than manufacturing sector. Figure 11 graphs this pattern. During the two decades, the predominance of the largest headquarters center, New York, has diminished

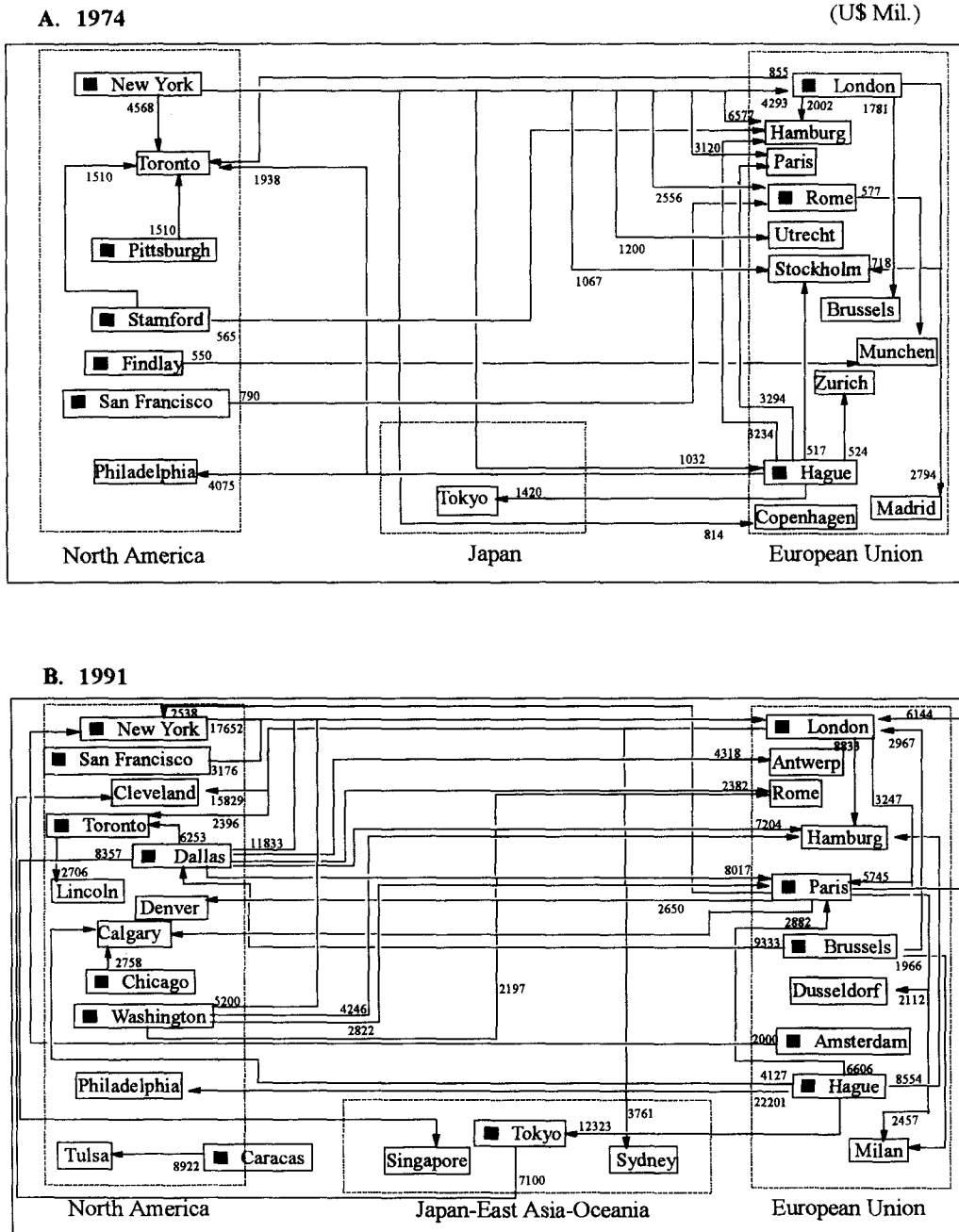


Figure 11. Major headquarters-subsidary linkages in the resource sector

substantially. Also the dominance of American centers as flow originators has decreased as European and Japanese headquarters centers enter the system. In comparison with the manufacturing sector, most flows are exchanged

by North American and European control centers.

Figure 12 graphs the major control linkages in the service sector. In 1974, major flows occur within regional boundaries. In the North

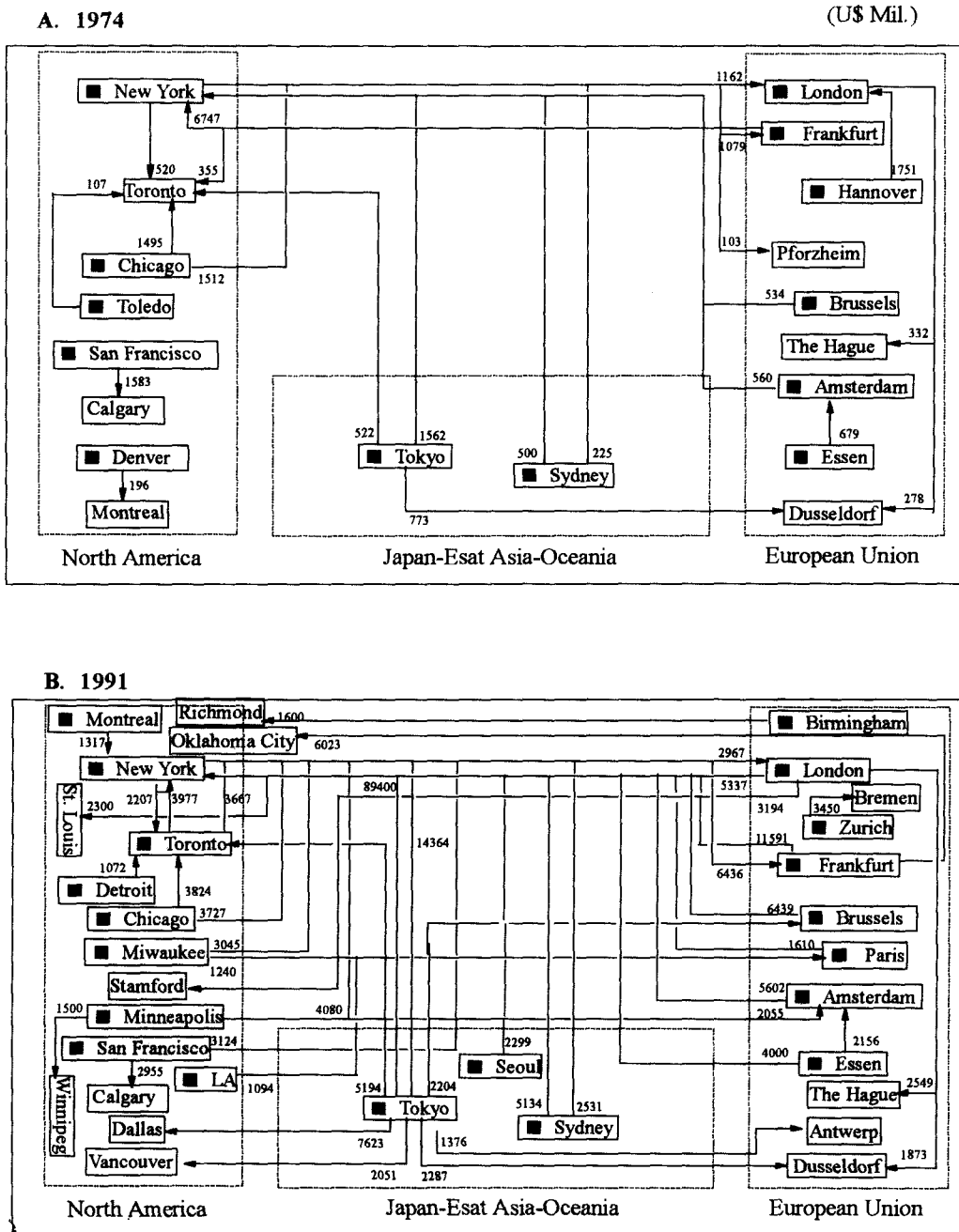


Figure 12. Major headquarters-subsidiary linkages in the service sector

America, New York-Toronto and San Francisco-Calgary control linkages are dominant and Hannover-London and Essen-Amsterdam linkages are important in Europe. Interregional flows are small in number and are dominated by New York and Tokyo. By 1991, multinational control linkages are complicated and diversified in several ways. First, interregional control flows overshadow the previous intraregional flows. Second, the number of linkages coming from one headquarters center increases substantially. Third, flow originators are also flows destinations, in other words, multinational headquarters cities also house foreign subsidiary head offices.

Overall, Multinational control linkage patterns reveal a dispersed international quaternary place system with a diversified global set of control linkages for all sectors, especially the service sector. The diminishing dominance of the largest quaternary centers implies that the spatial dispersion of economic power is diffusing to smaller centers. In part, the rapid rise of Japanese service MNCs, which were rare in 1974, fosters this diversification trend.

5. SUMMARY AND CONCLUSIONS

This study investigates the spatio-temporal changes in the linkages among the domestic and foreign headquarters centers that are home to the largest international corporations. These centers house high order producer services like telecommunications, information-processing control functions in first class office space. They are the nodal points in the space of flows, such as capital flows, information flows, and decisions and power transfers, that constitute global networks of exchange. The network model in internationalization, which aims at explaining the pattern and mode of establishing international operations, provides the spatial implications of corporate behaviour. The model predicts that firms will invest by invading neighboring markets and later, as experience grows, invest more distant markets. This process gains speed by the rapid development of telecommunications and other distance-shrinking technologies. Corporate headquarters cease to be

tied together to big corporate and governmental centers but will disperse over time at global, national and regional level.

The case study identifies a dichotomous trend of concentration and dispersion, by analyzing the top 600 manufacturing, top 100 resource, and top 100 service MNCs. Global corporate power concentrates in the Triad region. At the same time, international corporate control centers disperse and linkages among them diversify. Throughout these processes, small and medium sized centers lead the trends. The entire system of the international quaternary places depicts the trend towards more balanced system status. With an increasing trend toward a multicentric world system and the associated decline of the global hegemony of a small number of largest cities, multinational control linkages should continue to disperse.

Future research will incorporate a larger set of international corporations. The ranking of the biggest corporations in the world has changed little during the study period and is unlikely to change for some time in the future. By increasing the size of data to include the top 2000 or top 3000 MNCs, the changing characteristics of quaternary places, especially of the small and medium headquarters centers, can be represented clearly. Second, the economic subsectoral differences in quaternary location should be addressed. There exists a contrasting variance in the degree of globalization among economic sectors. The utility sector, for instance, is prone to develop within national or regional boundaries, while the high-tech sector industries tend to be more globalized than other industries. For the concentration and dispersion trend, there will be some lead and lag sectors. This economic subsectoral decomposition can add more detailed explanation concerning the locational tendency of quaternary activity in this globalization era. Lastly, as the future trading blocs may emerge, especially in the East Asian region, more up-to-date and detailed studies will become necessary to understand the nature of the concentrations and dispersions of corporate control centers. The consolidation of the major trading blocs and the newly emerging blocs add complexity to the international quaternary place system and to its

associated interlocking global networks.

NOTES

- 1) The success stories of Benetton and Northern Telecom clearly illustrate the importance of centralized control and dispersed linkages in business network (see Jarillo and Stevenson, 1991; Rugman and D'cruz, 1994)
- 2) See McConnell (1982) and Taylor and Thrift (1982) for spatial models of internationalization of firms, which didnot consider control linkage and sectoral differences. This study examines the system of international control centers and changes in multinational subsidiary linkages over time.
- 3) This study does not examine financial corporate centers, which are becoming important agents in the changing world economy. This topic will be investigated in a future paper with a comparison of financial and non-financial hierarchical systems and associated linkage structure.
- 4) Subsidiary data sources are listed below:
Subsidiaries in the US: *Forbes*, The 100 Largest Foreign Investments in the US; *Forbes 500*; Dun and Bradstreet, *Million Dollar Directory*.
Subsidiaries in Canada: *Canadian Business*, Corporate 500, Toronto.
Subsidiaries in UK and Commonwealth Countries: *The Times*, *The Times 1000*, London.
Subsidiaries in Japan: *Diamonds Japan Business Directory*, Diamond Pub., Tokyo. *Japan Company Handbook*, Toyo Keizai Inc., Tokyo.
Subsidiaries in Europe: ELC International, *15000 Largest Companies in Europe*, ELC, London.
Subsidiaries in Asia: ELC International, *7500 Largest Companies in Asia*, ELC, London.
Subsidiaries in the developing countries: *South 500*; *Latin America 300*; *Asia 300*, South Pub., London.

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多國籍企業의 네트워크와 4次産業活動 空間의 變化

南 基 範*

세계경제는 정보·통신 기술의 발달, 기업의 재조직화, 그리고 해외투자의 신장 등에 의해 매우 급속하게 변화하고 있다. 오늘날 세계화된 경제체제속에서 가속되는 상호의존과 금융자유화는 다국적 기업을 빠르게 팽창하게하고 세계 경제의 형성에 가장 중요한 결정인자로 작용하게 하고 있다. 기업의 중심업무기능, 즉 명령, 통제, 조정, 전략적 의사결정등은 계속 그 범위와 양이 증가하고 있으며 대규모 4차 산업공간에 집중되고 있다. 반면에 기업체계의 조직적 유연성은 분권화된 내외적 기업 네트워크 형성을 통해 점차로 증대되고 있다. 본 연구는 네트워크국제화이론에 바탕을 두고 4차산업활동의 대표적인 사례인 다

국적기업의 본사-해외지사의 입지와 연계의 변화를 각 경제부문별로 고찰해 보았다. 연구 기간동안 4차산업활동의 공간은 점차로 분산되고 있으며 그 연계도 수직적이고 하향적인 계층적 형태에서 어느정도 수평적인 네트워크형태로 변화하고 있다. 이러한 분산과 다양화는 중·소규모의 도시(4차산업활동의 공간)와 서비스산업을 중심으로 활발하게 진행되고 있다. 앞으로 세계체제도 다원화되고 대도시의 영향력이 포화점에 이르면 다국적기업의 입지와 네트워크도 더욱 분산되리라 예상된다.

주요어: 4차산업활동공간, 다국적기업, 네트워크, 분산

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