1. Introduction

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For several years, the editors of this book have been studying technological transfer, multinational corporations (MNCs), deregulation and globalization processes (see, for example, Kagami and Tsuji 2000) and information technology (IT) (Giovannetti et al. 2003). In our studies, questions naturally arose as to why MNCs choose some locations for their plants and offices as opposed to others. Also, why do IT-related firms agglomerate in certain places even though the Internet supersedes distance? Examples of the former phenomenon are industrial agglomerations in certain Eastern European countries, coastal areas of China and some border cities of Mexico, while examples of the latter are Silicon Valley in California, Bit Valley in Tokyo and Bangalore in India.

Increasingly, we came to the realization that the answers to these questions are absolutely essential to understanding, predicting and explaining economic growth in developing countries. Industrial ‘clusters’, as they are called by leading theorists, are often the drivers of regional and even national economic growth. As perhaps the most remarkable example, consider the IT cluster in Bangalore. Without the IT industry explosion concentrated mainly in this city, India’s economy would be growing at a slower pace, and would almost certainly not be commanding the international attention that it now does. Smaller nations are even more dependent on the economic output of one or two key regions.

Thus, we decided to undertake a project of considerable magnitude – the observation and analysis of industrial agglomeration, taking into account recent changes in the global economy. Our effort, if successful, will provide invaluable information to key individuals in developing countries. With a comprehensive understanding of the clustering process in a contemporary context, business leaders and entrepreneurs will be able to take maximum advantage of existing or emerging clusters; policy makers and business leaders will be able to deliberately promote the development of clusters in their nations and regions; and researchers will have a head start toward a deeper understanding of the various processes at work.

This book represents the necessary first step in that process – namely, gathering and describing relevant examples of industrial agglomeration. Although the development of a general theory is our ultimate aim, we believe that this goal is beyond the scope of a single book, especially since our understanding of agglomeration is as yet incomplete. What we seek to do here is present and explore in-depth anecdotal evidence. In future works, we shall attempt to generalize; however, this book should not be viewed simply as an installment in a series. By examining the well-researched examples provided in this book, readers should be able to learn by example, and make their own generalizations. In this volume, comparison is key.

Several aspects of this book's scope and methodology set it apart from previous studies of industrial clusters. To accomplish our goals, we decided to draw examples from all over the world – specifically, from the key regions of Asia, Europe and North America – and to cover a wide array of industries, from traditional heavy industry to more modern software-based industries. Although studies of agglomeration and clustering are numerous, this book is one of the first large-scale surveys to cover many examples and many regions. It is also one of the first surveys to focus on developing nations, including studies from China, Mexico and Vietnam. We also decided to direct much of our attention toward IT, and its effect on old industries as well as its creation of new ones. Again, this book's IT focus separates it from most earlier clustering studies.

The basic question is: why do firms gather, or agglomerate, in a certain region? Intuitively, MNCs will tend to construct their factories near large markets such as Europe, East Asia (including Japan), and the USA in order to save transportation costs. In addition, chosen locations can usually provide skilled and quality labor (information spillovers) at relatively low cost as well as copious funds supplied through various financial institutions and capital markets. In the case of software clusters, the existence of a pool of computer-literate laborers is essential. However, this reasoning does not fully answer the question of why a special location was chosen among many possible candidates.

These questions are fundamentally related to main themes of economic geography, or spatial economics, such as why certain cities grow as opposed to others, or why certain cities decline. There are some factors which ignite regional growth, and the process seems to be self-reinforcing or self-organizing once it starts. However, when other factors begin to take effect, a cluster will shrink or decay. This cycle of concentration and dissolution (or dispersion) is thus the product of 'centripetal' forces working against 'centrifugal' ones. A standard textbook expresses this as follows: 'The spatial structure of an economy is the result of a tug-of-war between external economies and diseconomies, between the linkages and

information spillovers that foster concentration, and between congestion and other diseconomies that discourage it' (Fujita et al. 1999, p. 349). The same authors also summarized that the centripetal forces are the Marshallian trinity of external economies: linkages, thick markets and knowledge spillovers (research and development: R&D), as well as other pure external economies, while the centrifugal forces opposing agglomeration include immobile factors, land rent/commuting, and congestion and other pure diseconomies.

One key aspect of our survey was to be its longitudinal nature. By mixing in studies of old, established clusters with examples of newer, up-and-coming ones, we hoped to paint a more complete picture of a cluster's life cycle. Old clusters can often experience a surprising rebirth after a long period of decline, sometimes spurred by new technology such as IT. This, we hope, will provide readers with a glimpse into the future, as well as allowing researchers to single out the centripetal and centrifugal forces involved in clustering.

Another important concept regarding clustering is increasing returns, which are different from the classical models of perfect competition and constant returns. Krugman (1995) wrote: 'Increasing returns in production activities are needed if we want to explain economic agglomerations without appealing to the attributes of physical geography. In particular, the trade-off between increasing returns in production and transportation costs is central to the understanding of the geography of economic activities' (cited by Fujita and Thisse 2002, p. 7). If scale merits work, we must use different sets of analytical instruments, such as imperfect competition and monopolistic competition frameworks, combined with dynamic aspects.

In this volume, the terms 'agglomeration' and 'cluster' are used interchangeably. The latter term, however, additionally implies the presence in a particular area of knowledge spillovers among firms or persons in the area. 'Clustering', in the formal sense, is therefore a new concept that focuses on the external effects of information flows. Recently, these information flows have become increasingly important to industrial agglomerations. For example, countries such as China, India and Thailand were once widely considered to be relatively simple production bases for MNCs attempting to exploit cheap natural and human resources. In some agglomerations in those countries, however, R&D facilities or institutions have been established by MNCs or R&D, and innovation processes have developed endogenously (Kuchiki and Tsuji 2005). These agglomerations have thus been elevated to a 'higher' stage, at which time they may be properly referred to as 'clusters'. However, because this book's primary goal is to answer the fundamental question 'Why do firms agglomerate?', the word 'agglomerate' is placed in the title in lieu of 'cluster'.

Industrial clusters include small-, medium- and large-scale firms. Interactions among these, in terms of economic activities, are quite frequent and close. Famous examples of industrial cluster, in Porter's (1990) terminology, are printing equipment in Germany and robotics in Japan. The term 'industrial districts', in contrast, is used in the original Marshallian sense, particularly for Italian cases where small-scale firms mainly gather to form an industrial town with a particular socio-cultural flavor. More precisely, industrial districts are characterized as (a) local systems of active integration between a community of people and a community of industrial firms, and (b) a flexible specialization characterized by the widespread presence of small-sized firms.

Until recently, industrial clusters could be explained successfully by the various existing theories mentioned above. The contemporary world economy, however, has undergone a new evolution, with transformations such as globalization, emerging of developing countries, demand shifts and rapid technological changes such as the Internet revolution. Industrial clusters in advanced countries have therefore had to adjust to these new shocks and survive under new conditions (see for example, Small- and Medium-Scale Enterprise Agency 1994, 1996 and 1997). Industrial clusters in developing countries, as we mentioned, may serve as an engine of growth for the nation as a whole. The role of recent software industry clusters in certain developing countries, for example, has become important to these nations' national economies, in terms of employment, income and exports. These developments require new insights in the analysis of industrial clusters, since existing theories cannot explain all the forces at work. This volume thus intends to examine examples that will eventually allow us to identify, understand and model these new forces.

To accomplish our research goals, we formed three research teams, in Japan, Italy and the USA. These teams comprised respected researchers who had done outstanding work studying industrial clusters and the IT industry in their respective regions. After signing on to our project, the teams were charged with the task of examining recent IT clusters including software industries, as well as traditional industries such as iron/steel and automotive industries.

The Japanese team studied the Toyota Motor Corporation; an iron and steel city; urban-rural relationships in the Internet era; industrial estates in Vietnam; Korean regional growth with IT-related industries; bridging of activities between industrial clusters (the Region-to-Region Initiatives Program by Japan External Trade Organization); and China's regional industrial disparity.

Italy was chosen due to the active role of its small and medium-sized enterprises and its unique but vivid industrial districts. The Italian team analysed

peculiar patterns of Italian specialization and comparative advantage; involvement of some traditional firms in industrial districts in globalization (subcontracting production processes in the global value chain); the recent evolution of the famous ‘Third Italy’, i.e., the Emilia-Romagna region; and clustering forces at work in the Internet industry in spite of the weakening of traditional centripetal forces due to globalization and IT.

The US team explored the US and Mexican software industries. The well-known software clusters such as Silicon Valley and Route 128 are now being challenged by offshore programming platforms like those in India and Ireland. Four possible future scenarios for this industry were provided, taking into account the advantages of US production and proximity. The research indicated that the most likely scenario would be ‘nearshore’ operations in the same time zones as the US – such as Central American and Caribbean countries – which have gradually developed worker skills and IT-related infrastructure. In particular, the Mexican software industry has grown to be a threat to the US traditional software clusters.

Overall, we found that, although industrial clusters can be divided into several distinct types, the essential features common to clusters are present in all the types. These common features include the presence of the all-important knowledge spillover effect, which creates positive externalities for firms; the ‘collective efficiency’ of collaboration between firms; the presence of increasing returns to scale; the value of face-to-face contacts among skilled workers and the exchange of ‘tacit knowledge’; the advantage of stable demand and the destabilizing effect of demand shifts; the ‘centrifugal forces’ of transportation and communication costs; and the importance of government policy for small and medium-sized enterprises in clusters.

This last feature – the importance of government policy – is especially important, as we have discovered that some countries’ rapid development has been due in large part to the intentional planning of ‘industrial parks’ and other special zones designed to attract foreign direct investment. This finding is particularly important for government officials seeking to harness the power of clustering to jump-start their nations’ economies.

We sincerely hope that readers, using this volume, will be better equipped to understand contemporary patterns of spatial economics under globalization and the rapid progress of the Internet revolution.

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