A Development Officer’s Guide to Clusters

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Since the publication of Michael Porter's The Competitive Advantage of Nations, th1e urban competitiveness consulting industry has taken to the concept of the cluster as a key element in any municipal economic strategic plan with extraordinary enthusiasm and conviction. One international organization, The Competitiveness Institute, has even asserted that 'competitiveness is clusters'. M2unicipal leaders are inundated with proposals from economic development consultancies as to what they should do to implement this latest version of an “often-mindless groping for ‘best practice’”. A3ctually, research has shown us that this single-minded focus on cluster development is often misguided as cluster structures are effective - in some industries but not in others, in some urban settings but not in others, in conjunction with some municipal governance structures and policies but not with others, and so forth. In this presentation I would like to review: 1) the argument in favor of cluster development as an urban development approach, 2) the situations in which this is and is not effective, and 3) how municipal decision-makers might want to think about this strategic response to the need to enhance an urban economy’s competitiveness.

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1. The Concept of the Cluster

The concept of the cluster goes back a century before Porter wrote his book to Alfred Marshall, the English economist who wrote his Principles of Economics in 1890. M4arshall, in turn, saw the roots of what have come to be referred to as "industrial districts" in pre-industrial Europe where certain trades were concentrated in certain cities and the goods produced were transported for sale throughout Europe. In the early manifestation of industrial districts Marshall saw the key elements being physical conditions of the soil, patronage and the gathering in one place of workers with special skills. In nineteenth century industrial Europe the key elements were: a skilled labor force, sufficient activity to enable use of expensive machinery, flexibility in work relationships, proximity to low cost water transportation, and cheap land on the periphery of a city. In this situation an advance in technology by one worker was rapidly spread throughout the district to all other workers – we refer to this as the face-to-face transmission of tacit knowledge and it has emerged as one of the most important aspects of a true cluster.

Figure 12.1 gives us a representation of an industrial district that is in accordance with Marshall's ideas. The district is a clearly defined space, in which there are situated many small firms. Among them there is an intense interaction and sharing of knowledge. These firms, then, share a common skilled work force and other physical attributes that work to their advantage, it should also be noted that the interaction of these firms is not limited to the confines of the district itself; rather,

these firms have active interaction with the rest of the world, whether for sales, for import of new ideas, or of the import of factors of production, whether labor or capital or equipment.

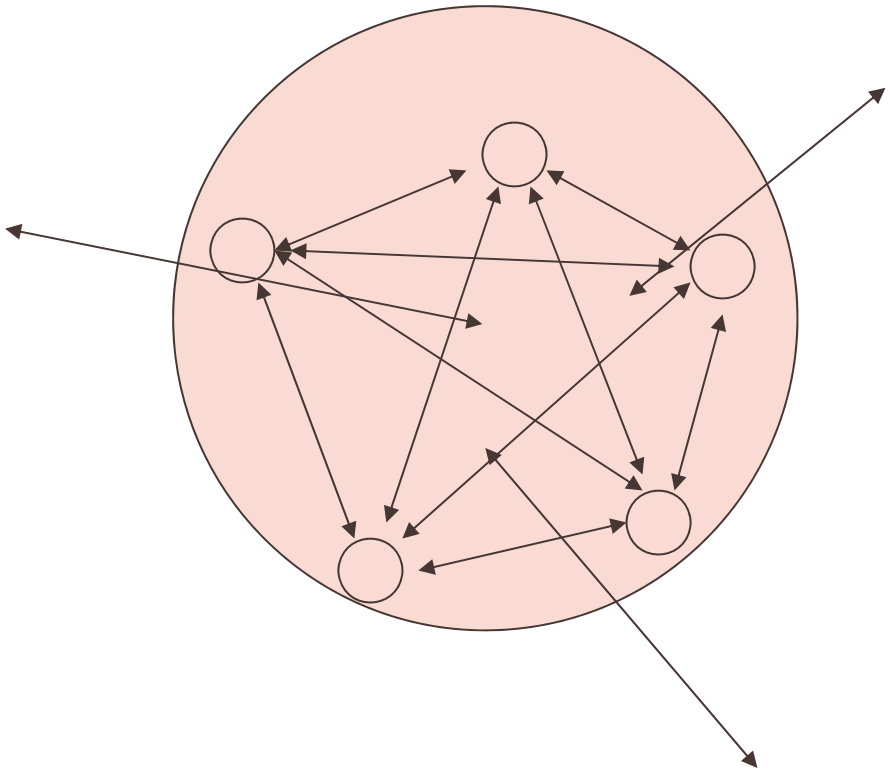

Figure 12.1 The Industrial District of Alfred Marshall

Not all clusters function in this manner; hence, they forego some of the advantages of a true Marshallian industrial district. In practice there are two other structures of the cluster that fail to live up to what is promised by the consultants who promote this structure. The first is the cluster that is isolated from contact with entities outside of its structure space. In Figure 12.2 I have depicted a cluster in which there is a perhaps intense interaction among the participants in the cluster but they speak to, and learn from, only themselves. The stimulation and enhanced

knowledge that comes from extra-cluster interaction is missing. There is little likelihood that this cluster will be innovative and dynamic over the long term. Members will be deprived of access to all of the innovation that occurs in the rest of the world.

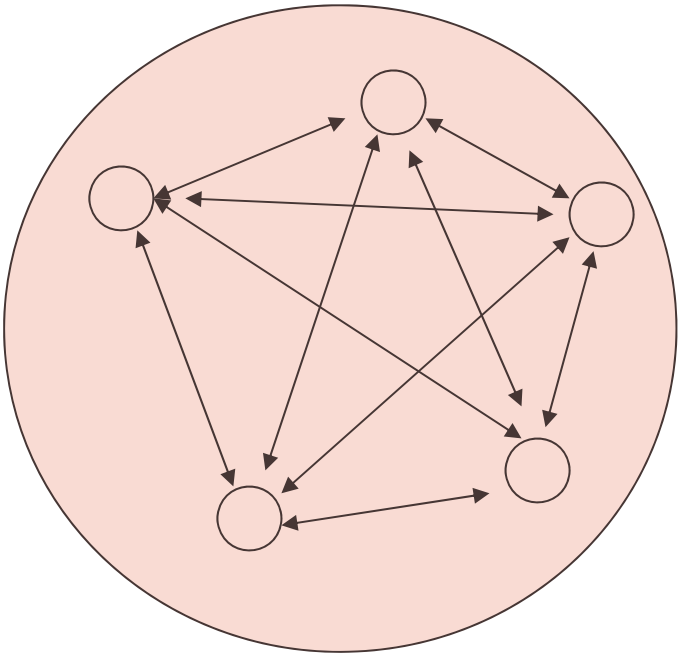

Figure 12.2 The Isolated Cluster

The second cluster structure that fails to deliver what is promised is that of the Cluster of the Multinational Corporation, as shown in Figure 12.3. Here the linkages to the rest of the world are central, but they are dominated by interaction with the

foreign parents of the constituent firms in the cluster. These flows are primarily of new ideas and products flowing upward to the parent from the subsidiary with, of course, some information and instructions flowing down to the subsidiary. This results in the participant in the "cluster" being little more than a client of the parent and deprives it of any horizontal interaction with other similar firms in this industry.

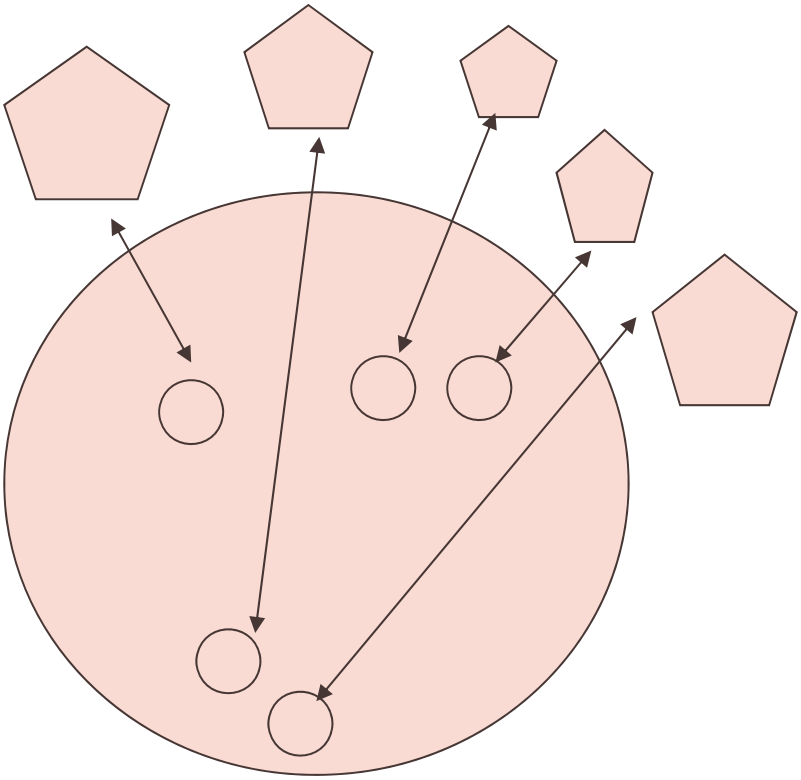

Figure 12.3 The Cluster of the Multi-national Firm

The two departures from the ideal industrial district/cluster give clear indication to city leaders and planners that uncritical promotion of a policy of promotion of clusters may not be successful. Before city leaders pursue a policy of cluster promotion there are two issues that they must examine. The first is the

identification of specific industries that are and are not congenial to cluster development. The second is whether clusters must arise naturally out of suitable assets and conditions or whether they can be put in place by policy and, then, is their growth a natural organic process or are there policies that can be implemented to stimulate successful growth? The remainder of this presentation will be an examination of these two issues with the objective of making is easier for city leaders and planners to consider most effectively the use of clusters in the economic development of their city or urban economy. But first we should consider two structures that are alternative to the cluster.

2. Structures other than the Cluster

The nature of clusters and their suitability for certain situations can be made clear if we examine two alternative structures – the agglomeration and the network. The agglomeration is simply the co-location of a large number of firms and people in one geographic location. This is inevitably a city, or an urban economy of which one or more cities are at the center. The benefit of this structure is that it generates a variety of economies of agglomeration. These economies are available to all firms located there so the agglomeration creates conditions that are attractive for firm location. Large agglomerations have better transportation infrastructure – global rather than national air connections, for example. These are public goods and are priced the same to the small start-up as to the large MNC. Furthermore, with the exception of some US sprawl-cities, such as Albuquerque, Phoenix and Las Vegas, the

fact of agglomeration also means increased density of population and employment. Ciccone showed that a doubling of employment density results in a five per cent increase in labor productivity. A5gglomeration economies are of particular benefit to firms in some industries and the existence of them can have an impact on the industrial structure of the urban economy as firms in those industries expand relative to others.

When firms are gathered together in a large city or urban economy, each has the possibility of capturing positive externalities from other firms. One of these might be zoning and regulatory benefits that one firm has the clout to obtain for itself, but has a collateral benefit for all firms. Another such benefit is access to non-traded inputs that are subject to increasing returns to scale.

Beyond these economies there is little additional benefit from an agglomeration, other than the existence of urban amenities, such as cultural institutions and universities, and the wider array of services that are available there than is the case in smaller cities. However, it must be noted that these can all be significant for retaining and attracting the work force of a knowledge-based economy.

The other structure is the network. Networks are private structures that are created for the exclusive us of those who establish them. Participation can be expanded by the founder(s), perhaps for a fee, if this is advantageous, and networks have, in fact, been described as 'clubs'.[1] O6ne of the principle features of networks,

and one that distinguishes them from clusters and agglomerations, is that geographic proximity is not a relevant factor. The network is typically connected through telecommunications and can encompass the entire globe. Through this network, however, some of the benefits of the cluster can be achieved, such as exchange of information about new products and new knowledge, about best practices and about commercial opportunities, as well as opportunities for coalition and joint-venture formation. This is of considerable benefit to smaller cities and to cities on the periphery, rather than in the center of 'the action', as it allows them to participate in the creation and dispersal of knowledge. Each entity will have to make the determination as to whether participation in a specific network, or club, is of benefit to it.

Clearly, participation in a network is the consequence of a process of evaluation of the net benefit to the individual firm and to other network members of that participation. Thus, members of a network participate only when, and for long as, membership is of identifiable benefit to that firm and the cost of being denied access is significant. That benefit is net of the costs of developing and maintaining the network. Being part of a cluster or an agglomeration may be a passive process, but membership in a network certainly is not. A network can be thought of as a private or closed cluster that is maintained through telecommunications, in which spatial proximity is not a factor.

3. Evaluation of Cluster Development

Two issues with regard to clusters have been identified earlier in this

presentation and in this section of the presentation I will examine each of them individually. This examination will be based on research that has been done on clusters and on an understanding of the nature of their interaction and development.

Which industries are most suitable for cluster development?

By its nature, a cluster is composed of firms that share a common labor or other in-put pool, geographic proximity, co-operative competition, and shared business-related local institutions. P7rominent among such industries are those for which the face-to-face transmission of knowledge is important. These industries include fashion and design, furniture, information-communications technology, advertising, publication, cinema, and video games. It has been shown that in these industrial clusters there is a higher degree of labor mobility than in other industries, and that this mobility is crucial for knowledge diffusion and creation.[1] H8arrison, Cooper and Mason show how important this mobility has been for the technology-based cluster in Ottawa; the experience here highlights the value of having future entrepreneurs work for several firms during which time they accumulate knowledge and contacts that are crucial when they take the step of creating their own start-up firm.[1] T9his confirms the importance of the geographic proximity aspect of a cluster for this sort of economic activity.

Confined geographic spaces, such as Manhattan in New York City, are favored since the creative workers can encounter each other in a serendipitous manner just by

walking between their residence, their place of work and a restaurant; in a city such as London where everything is very spread out and transportation is done by public transport such contact is relatively rare. I recently had the experience of examining economic activity in Copenhagen. Part of the development strategy was establishment of a design cluster. An abandoned industrial site was found and developed for the start-ups that would create the cluster. For a while little happened, until the planners discovered that in design clusters much of the beneficial contact and transfer of knowledge occurs at 2 o'clock in the morning in bars. The planners who went to sleep before mid-night never thought of this. So for many knowledge-based clusters an active nightclub life is essential. Hans Mommaas wrote this more formally: "much will depend on whether or not the places concerned will be able to deliver the critical mixture of spatial, professional and cultural qualities with which artists and other cultural producers and entrepreneurs want to associate themselves, both on a personal level, in terms of their lifestyle politics, and on a professional and business level".

I10s the growth of a cluster an organic process, or can it be introduced and stimulated by policy?

Most successful clusters grow organically, without very much influence of public policy. In the fashion cluster of Manhattan, Rantisi stresses the path dependence of development of the industry over a period of several decades. She also focuses on the importance of the "local or regional 'culture' of production" that

facilitates productive contacts among the economic actors. She shows how the industry evolved in response to changes in the economy, the place of women in society, competition from other places, costs, and tastes. Of great importance has been the ability of the industry avoid "becom(ing) 'locked in' to suboptimal technologies" or to business models and structures that are no longer competitive. This suggests the necessity of the openness of the fashion cluster to contacts throughout the world and to mutually beneficial extra-regional relationships. Many of the most important supportive elements developed without help from government: fashion periodicals, the Fashion Institute of Technology, New York's status as a center of culture, developments in communications and transportation technology, and the efforts of the International Ladies Garment Worker's Union.[1] T11his richness and multiplicity of independent actors who work toward a common end generates a very supportive cluster structure.

In Ottawa, the technology cluster had support from the National Research Council and other public sector entities in its initial phase, especially during the Second World War. But from the 1960s on it was largely the result of the efforts of Northern Telecom, Mitel and a variety of other private companies. Employees of these companies became the entrepreneurs and start-up founders who created a base of organizations that served to attract other skilled and entrepreneurial individuals. Harrison, Cooper and Mason emphasize: 1) that "the cluster would not have developed as it did in the 1990s without the core institutions pattern which was

initially established in the 1940s", and 2) "the role of magnet organizations, the related economic geography of talent and human capital and the pattern of entrepreneurial histories and geographies which underlie this process".

B12oth Rantisi, and Harrison, Cooper and Mason stress the development over decades of structures of relationships, economic and research institutions and an environment that is conducive to whatever the creative individuals in the cluster require. Santagata argues that; “(T)he infinite, random and unforeseeable events leading to the district’s critical mass is, in practice, irreproducible…The localized social and economic environment cannot be constructed ex ante”. T13his suggests that cluster development is, at least in many instances, a phenomenon that grows by a natural organic process of growth and maturation.

This is not to deny the crucial importance of intervention on the part of government in certain important phases of the cluster’s development. Cooke stresses the importance of state funding and promotion of research or science parks, such as the Research Triangle in North Carolina, the Swedish Development Agency for Innovation systems, actions of the Land of Bavaria, and the Öresund project in Sjaelland (Denmark) and Skåne (southern Sweden). Of equal importance has been the role of universities, public in the EU, and public and private in the US, and their research staff and facilities. A14ll of this combines to form a ‘regional innovation system’ in which both the public and the private sectors participate; but it must be

stressed that in this activity the most effective role of the state is that of supporting initiatives and developments that emanate from the firms, organizations and entrepreneurs that make up the cluster. The enthusiasm of public officials alone rarely leads to a viable and competitive knowledge-based cluster.

An example of cluster development that brings a lot of this together is the Öresund project. Here there is an umbrella organization Öresund University; not a university in the traditional sense as it has neither students, nor faculty, nor class-rooms. The University is a structure that encompasses 14 institutions of higher learning, among which are Lund and Copenhagen universities, the smaller universities of Roskild and Malmö, a music conservatory, a school of architecture, and the Copenhagen Business School. It is within this umbrella structure that several clusters have been developed, most notably Medicon Valley. This is a medical technology cluster that brings together large MNCs, start-ups and university research assets. After twenty years of operation there are additional clusters in bio-pharmaceutical, nano-technology, culture-film, food processing, and environmental economy. The 'triple helix' structure, combining government, universities and firms, is central to the Öresund project. What is most interesting about this structure is the fact that since all of these clusters exist within one structure, Öresund University, any one of them can seek out information about cluster managaement or dynamic development from the others that are more experienced. This is especially important for new clusters, that may have questions about finding venture capital, or what should be done after the cluster is established, or how can

relationships with similar clusters elsewhere be initiated. From this experience the importance of cooperative relationships with government, universities and other clusters is shown to be of great value. So while a cluster has difficulty doing it all by itself, it is clear that government should play only a supportive, rather than a directive, role in cluster development and growth.

4. Industrial Sectors and Cluster Models

Three models of clusters were identified at the beginning of this presentation. In this section I will suggest which industries or economic sectors are typically identified with each of the three.

Marshallian industrial districts

The industries that are closest to the original conceptualization of Marshall tend to be in areas in which creativity and tacit transmission of knowledge and information are important. Howells notes the "distinct distance-decay effect in 'knowledge' transfer" that is found in studies of knowledge spillovers. "Time, decay and loss are therefore crucial elements in knowledge transfer." S15o, for some forms of transfer of knowledge proximity is vital, even though for other forms networks in which contact may be infrequent or may be accomplished via telecommunications can be effective. The industries for which a Marshallian district is relevant have been enumerated above in the discussion of sectors that would be most suitable for cluster development - fashion, design, ICT, among others. The world of knowledge-based activity is predicated on access to the latest thinking on all aspects of the business, no matter

where the ideas originate.

Simmie stresses the importance of both local knowledge spillovers and international knowledge transfers. He goes on to note that 72 per cent of the customers of innovative firms were located outside of their region, that 40 per cent of small firms gained access to knowledge from contacts based abroad, and that face-to-face contact was the most important way to gain this knowledge.

M16arkusen and Schrock have studied the cultural or artistic clustering in 29 US metropolitan areas. They find a great diversity in the nature of clustering among individual categories of creative activity. Architects tend to be concentrated in large cities, but designers are to be found in many cities. Among cities that are the most attractive to cultural workers, each is attractive to varying degrees for authors, performing artists and visual artists. Artistic enclaves tend to be initiated by artists choosing to live in a congenial city and this then serves to attract arts-using firms. A congenial place entails municipal policies to provide living and working places, perhaps supported by public funds, arts education in the schools, and programs to bridge the gap between artists and the local business community. This allows for substantial arts and culture communities to be developed in many second-tier urban areas. P17roximity in a Marshallian cluster is of great importance to this sector of economic activity.

Vertically structured MNC-dominated clusters

The primary industries that conform to this structure are two-fold: 1) bio-pharmaceutical and life sciences, or bio-technology, an18d 2) low level assembly operations based on low labor cost. First, bio-tech is a voracious consumer of the products of research that lead to patentable products. The model of firms in this sector is less that of creating and relying upon their own research than it is of scouring the world for whatever they can develop. Philip Cooke identifies San Francisco, San Diego and Boston in the US, Cambridge and Oxford in the UK, and Cologne, Heidelberg and Munich in Germany as being the primary centers of research in this sector. In some health sectors San Diego is a primary center and in agro-food Saskatoon in Canada is the center. B19io-tech firms all establish their presence in these centers for the purpose of gaining access to patentable, or at least usable, research. The cluster of firms in close proximity is of less importance to the firm in this sector than is its insertion in global networks of research activity,

The relationship between the parent multinational corporation and its production centers is then that of a vertical transmission of research and orders down from the MNC to the subsidiary and a reverse flow of products to the MNC for distribution. This has two consequences for a cluster promoting city: 1) there may in fact be space for dozens of bio-tech "clusters" in, for example, the US or the EU, but 2) there will be little or no interaction among the subsidiaries in the "cluster" as they are totally integrated into the operation of their parent MNCs. Thus there is little or no

opportunity for beneficial impacts that lead to start-ups or an expansion of the capacity of the city to generate research, growth and employment. This structure is little more than an agglomeration of activity in one sector with each parent MNC involved in networks that encompass the world, but that does not bring much other than a few jobs to the host city. Kenney and Patton go so far as to "question whether biotechnology actually has 'clusters': rather the concentrations may be better referred to as concentrations, thereby not overemphasizing the inter-firm relational aspects."

S20econd, in countries such as China and others in South-east Asia and in Latin America hundreds of multinational corporations have established production and assembly facilities. These entities have as their attractiveness low cost labor, labor that performs simple repetitive tasks. Little or no skill is involved. In practice, as soon as lower labor cost iss discovered elsewhere the multinational firm closes the subsidiary and moves its production – there is nothing to keep it rooted in the original cluster area. Unless the host government is successful in introducing labor laws and practices that will force down wages it will be faced with increasing joblessness and, perhaps, unrest. If governments make the effort to foresee the consequences of this type of cluster and plan for skill enhancement and job creation in other sectors the negative consequences can be mitigated somewhat. But it is clear that this type of cluster activity will not provide jobs and exports for the nation in the longer run.

In either case, the Multinational Firm cluster will not serve the national economy as the basis for its continuing productive activity.

Isolated clusters

Clusters that are not linked to the world outside their economic space are condemned to stagnation and disappearance. Without the infusion of new ideas and ways of doing things the firms in the cluster become too in-bred, they lose their capacity to be innovative and go off on paths of development that remove them from the main areas of competition, markets and product relevance. Failure is a fate of many industrial enterprises that are not able to continue to be relevant in the face of technological and product advances. One thinks of small-scale firms of carriage makers who failed to adapt to the new automobile economy; and of products in, for example, the U.K. that were based on 19th century mechanical processes and were not able to adapt to the age of electronics. Isolation is a specific type of failure that could be avoided but for the hubris and self-satisfaction of a producer who has met with some success and thinks this can go on forever. The graveyard is filled with the remains of failed firms and it would take an industrial archeologist to sort out the isolated clusters from those who were trapped in a path-dependent course of activity that outlived its usefulness. Suffice to say it is virtually impossible for an isolated cluster to survive in a world of rapid technological and product change.

Trippl and Otto present the steel sector in the Saarland as a combination of both the vertically structured and the isolated clusters. Foreign investors had divergent interests and had little incentive to cooperate at the level of actual production, and "the close and strong relationships between the trade union, the regional government, and the steelworks" focused primarily on job maintenance, to the detriment of inflows

of new technologies and ways of producing steel. This is in contrast with the experience of Styria where “new-firm strategies and organizational innovations have been a key element” in the steel industry’s successful regeneration.” The industry in Styria had begun to decline and it was only after the “petrified ties” similar to those of the Saarland were broken that the sector could begin its transformation.

5. W21hat Can City Leaders/planners Learn from All of This?

Those who plan the economic development of urban economies often find the concept of the cluster to be of overwhelming interest. To some extent this is because of the value of cluster structures for economic activity, but to some extent it is a safe play since everyone else seems to be captured by its potential. In this presentation I have tried to suggest some of the situations in which clusters can be beneficial to urban economic development, and some others in which the benefits of clusters initiatives would be minimal or even counter productive. The challenge for urban leaders and planners is to sort out the wheat from the chaff, so to speak, and to adopt industrial structures that are most beneficial in the situations in which individual cities find themselves. What works for a center of ICT will probably be of little benefit for a center of logistics or of professional and financial services.

The first point to make is that the Marshallian industrial district model of a cluster works well because it combines the benefits of intense intra-cluster interaction with linkages to the world outside the cluster area. This maximizes the access firms in the cluster have to advances in technology and in ways of doing things that are developed

both by other firms in the cluster and by firms in the rest of the global economy. The first involves face-to-face transmission of tacit knowledge and the other captures more formal technological advances and research results. The two other forms of cluster structure, the multinational corporation and the isolated models, lack one or the other of these beneficial knowledge transfer mechanisms.

A second point is to note that each industry is better or more poorly suited to one or the other of the three cluster structures. Several of these industries have been examined above with regard to the three cluster structures that were identified. Bio-pharmaceutical and health sciences are quite different in their impact on the urban economy than are ICT, design and fashion. While there is a temptation to accept anything that comes along in terms of inward investment, local leaders should be clear in their minds exactly what can be expected in terms of beneficial impacts from any new industry location.

It must be noted, thirdly, that agglomerations can bring benefits, but that there are limitations with regard to what can be accomplished. This is a natural consequence primarily of the fact that a city is very large, although city leaders can work to make the economies of agglomeration work to the benefit of their city if the right accompanying policies are adopted.

The fourth and final observation to be made is that networks can be a powerful contributor to the effectiveness of an urban economy. Unlike agglomeration, networks do not just happen; rather, they are the result of extensive effort on the part of local firms and the support of local government. Networks can serve as a

mechanism to gain the maximum benefit of a Marshallian industrial district.

In addition to the points made in this presentation, I would want to stress the following observations regarding creative cities:

1) Evidence tells us that creative cities are open cities - open to the movement of people, of ideas and of ways of doing things, and not just to capital and multinational corporations. The creative individuals will be attracted to a city that has an exciting cultural and entertainment life, educational facilities, public security, and a clean environment.

2) While there is a temptation to develop state financing agencies for these new sectors and their start-up firms, the primary emphasis must be devoted to encouragement of venture capital and private equity sectors in the private economy as it is less risk averse than is the typical state agency, which usually has a political mandate to locate new activities ion rural or declining industrial districts – just the opposite of what a creative sector start-up needs.

3) The leaders of any city that seeks to enhance its place in the world economy will have to discern their city's distinctive role or function in the world economy – what does it ‘bring to the table’? They will also have to make an objective evaluation of their city's distinctive strengths and weaknesses. This can be through examination of research reports such as the Global Urban Competitive Report, a study of the competitiveness of 500 cities throughout the world that has done by Ni Pengfei, of the Chinese Academy of Social Science. These should be the basis for strategic planning to enhance any city's global position. Weaknesses in crucial areas should

be remedied and strengths in these areas should be given additional support.

The objective of this initiative should be to create the most effective strategic-economic planning process for the city's economy and to make it a valuable member of the global hierarchy of urban economies.

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