The Evolution of Logistics Clusters

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1 Introduction

The logistics function encompasses activities such as transportation, warehousing, planning, and facilities location (Kasilingman 1998). The demand for logistics services arises from the need to move materials, parts, and products in space and in time—through a supply chain of intermediate facilities and players, to final consumers, as well as returns and responsible discarding. This process has to be accomplished in a time-efficient, high-quality (Groothedde et al. 2005; Stank and Goldsby 2000), and cost-effective manner (Xu and Hancock 2004), which is what logistics management is focused on. Logistics management is a fundamental supporting role for any industrial sector associated with physical products. An efficient logistics sector promotes high level of service and low-cost delivery and thus is a key to industrial competitiveness. Interestingly, logistics facilities and operations tend to cluster in the same geographical locations.

Sheffi (2012) defines logistics clusters as spatial agglomerations (that is, a collection of items in the same geography) of logistics operations and firms. These include logistics services providers such as transportation carriers, warehouse operators, and third-party logistics providers (3PLs). These providers are defined as firms providing multiple logistics services, usually integrated or bundled together by the provider for use by customers (CSCMP 2013), logistics divisions (and distribution centers) of manufacturers and retailers, and companies with logistics-intensive operations such as automobile manufacturers or bulk commodities distributors. Because efficiency in logistics can deliver competitive advantages and agglomeration can enable efficiency in logistics, logistics clusters have gained the attention of private enterprises and governments worldwide.

This unique, popular, and successful type of agglomeration is being developed all around the world through massive capital investments. For instance, in Zaragoza, Spain, the Government of Aragon invested €680 million to develop the Plataforma Logística de Zaragoza (PLAZA), which has become the core of the Zaragoza logistics cluster and the largest logistics park in Europe. Logistics parks are organizations with clearly defined ownership and geographic property boundaries. This is in contrast to a logistics cluster that is an amorphous agglomeration of companies and facilities with logistics-intensive operations that have fuzzy borders and no central management (Sheffi 2012). Similarly, the Panamanian government’s five-year plan includes an expected investment of more than $2 billion to position the country as the logistics hub for the Americas, based on logistics clusters at both ends of the expanded Panama Canal. In the United States, the
Dallas Logistics Hub was developed with an investment of more than $500 million, including $113 million from public sources (Hethcock 2010). As seen in Figure 16.1, new clusters are being developed, and existing logistics clusters are also expanding their scale and scope. Such is the case, for example, of the logistics clusters in Singapore, Rotterdam, Dubai, Los Angeles, New York, Miami, Memphis, Atlanta, Chicago, and others (Rivera et al. 2014).

2 Literature Review of Industrial Clusters

For almost a century, economists have studied industrial agglomeration in different contexts. Marshall (1890) identified three positive externalities associated with industrial clusters: knowledge sharing, the development of specialized labor pools, and the development of a suppliers’ base. Weber and Friedrich (1929) argued that agglomerated companies enjoy benefits from external economies of scale, specifically those provided by localization economies (Hoover 1937) that arise when firms from a particular sector co-locate.

2.1 Increased Productivity and Innovation

More recently, a branch of literature argues that, in addition, intra-cluster competition (see Section 4) fosters an increase in productivity and innovation, thus positioning co-located companies a step ahead of non-clustered firms and fostering new business creation within clusters (Porter 1998; Delgado et al. 2010). In addition, the close proximity allows for collaboration, which allows clustered companies to act as if they were formally bonded with each other but still keep their flexibility. This allows companies to enjoy some of the benefits of large companies (reach and resources), while avoiding large-company problems (slow decision-making and bureaucracy). An explanation of the clustering trend (Feser 2008; Ellison et al. 2010) states that clusters provide higher collective learning as well as tacit knowledge exchange. (Collective learning is the process of learning through a synergy that has been developed after interaction and communication (Granberg and Ohlsson 2005; King and Rowe 1999) while tacit knowledge exchange involves knowledge that cannot be verbalized or articulated and is closely related to intuition and personal experience (Nonaka et al. 2000).) Both of these types of knowledge exchange have been shown...
as keys to fostering innovation (Keeble and Wilkinson 2000; Maskell 2001; Leamer and Storper 2001). By and large, the benefits of industrial clusters grow as the clusters themselves become larger. The larger freight volumes in and out of a logistics cluster mean lower transportation costs (because carriers can use large conveyances at high utilization) and better transportation level of service (owing to higher service frequencies and more direct services). Not only do the interactions between companies grow and the opportunities to collaborate multiply, but companies in the cluster enjoy more sway with local government to get the regulations and public investment they need. The result is a positive reinforcing feedback loop. The more benefits there are, the more firms join the cluster. This causes the benefits to grow further, therefore attracting even more firms. Governments are typically supportive because, as industrial clusters grow, their activities lead to regional growth (Baptista 1998) and have a positive impact on firms’ competitiveness (Huo 2012).

2.2 Agglomeration Versus Dispersion

It should be noted, however, that another branch of the literature argues for the decreased relevance of industrial clustering. The argument rests on the power of modern information and communications technology which represent “the end of geography” (O’Brien 1992) and the “death of distance” (Cairncross 1997), possibly reducing the advantages of co-location. Another argument is that the agglomeration of firms causes an increase of land and labor prices as clusters grow, inducing a negative externality that encourages firms to leave clusters (Henderson and Shalizi 2001; Glasmeier and Kibler 1996; Teubal et al. 1991). These authors even argue that the clustering effect has been replaced by dispersion economies (Polenske 2003) that arise when firms relocate from clusters to dispersed areas.

The academic literature includes only a few articles specifically about logistics clusters, with little mention of their prevalence. Rivera et al. (2014) study this phenomenon in the US, finding qualitative and quantitative evidence that logistics companies and logistics operations of manufacturers, retailers, and distributors have clustered and that those clusters have been growing over time. Such growth of clusters is a strong indicator of the success of such clusters and that any economic dispersion forces are weaker than the agglomeration benefits. Van Den Heuvel et al. (2013) studied the concentration of logistics-related jobs in three provinces in the Netherlands and also chronicled a trend of increased clustering.

2.3 Logistics Clusters

Most of the literature related to logistics clusters is specific to ports or airports and does not address the logistics sector in general (i.e., the interrelationships of water, air, rail, and road systems in the context of manufacturing, warehouse, and distribution networks). Haezendonck (2001), Klink and De Langen (2001), and De Langen (2002; 2004) investigated maritime clusters, concluding that the concentration of maritime activities in clusters is likely to increase over time. The economics of hubs for maritime and airfreight are similar. Martin and Román (2003) document the agglomeration of airfreight carriers in hub airports, while Lindsay and Kasadra (2011) developed the concept of the “aerotropolis,” a full urban development that comes into being around an airport.

Finally, Wu et al. (2006) argue that China’s economic advantage goes beyond labor costs and can be explained, in significant measure, by the presence of “supply clusters.” These clusters provide all the logistics services needed for the management of global supply chains and have contributed significantly to improving China’s manufacturing competitiveness.
Development of Logistics Clusters

Logistics clusters typically develop around two types of locations. The first is a terminal location where shipments are moved between modes of transportation, such as around ports, airport, rail hub, and intermodal yards. The second is a central location with good surface accessibility. For example, the Rotterdam logistics cluster has developed due to the port and the large volume of trade that goes through it, while the Zaragoza Logistics Cluster is strategically located in the epicenter of the four largest cities in Spain with good road and rail access.

Many logistics clusters have a long history. For example, Singapore started as a free port and the logistics cluster grew around the port, while Chicago initially started as a trading hub for Western furs and grew to become the hub of commodity exchanges and a significant logistics cluster. Cluster-building strategies are popular with government because the belief is that the government just has to seed the process and let the “flywheel” do its magic, and the cluster will grow on its own. For example, the Zaragoza cluster started because the local government wanted to diversify the local economy, which was dependent on the automotive industry. The government bought the land and attracted Zara to the park, after which several local banks and many other logistics operations joined.

The role of governments in the development and nurturing of logistics clusters is more important than with other industrial clusters because these clusters require large tracts of land, and government-controlled regulation of trade, transportation, taxation of inventory, and other regulatory edicts affecting logistics operations. Governments are also responsible for infrastructure development as well as the provision of education and training for potential employees.

Logistics Clusters Benefits—Intra-Cluster Collaboration

In addition to the benefits accruing to any industrial cluster, logistics clusters offer four categories of advantages for the individual firms and the regional economies where they develop (Sheffi 2012; Rivera et al. 2016; Rivera et al. 2015b). The first is intra-cluster collaborations described in this section. The others are value-added services, innovation, and job growth, all described in subsequent sections.

The co-location of firms in a logistics cluster enables the development of natural cooperative linkages. Logistics companies (or, more generally, logistics operations) typically serve many different industries. However, the operations performed by the logistics function—e.g., receiving, handling, storing, packing, shipping, transporting, and tracking—are the same regardless of “what is in the box.” Thus, logistics companies serving different industries in the same locations are not really direct competitors. The results include both vertical collaborations (which are to be expected in any cluster) but also horizontal collaborations between logistics companies (Sheffi 2012; Rivera et al. 2015a). Similarities of goals and activities induce the formulation of joint strategies, solutions, or tactics. Moreover, the commonality of logistics assets (e.g., conveyances and warehouses) enable sharing of capacity; commonality of types of logistics labor (e.g., drivers, forklift operators, and pick-and-pack workers) enable sharing of labor; and commonality of logistics knowledge enables internal knowledge transfers. Importantly, geographical proximity means shared language, culture, and customs, which encourages informal ties between employees of different companies.

Transportation Capacity Sharing

The geographical proximity in logistics clusters enables time- and cost-efficient consolidation of loads from neighboring companies. Clustered firms can bundle loads going to a similar
destination and use a direct service (which does not require consolidation hubs) to deliver freight. Such consolidation-by-partnering is applicable to all transportation modes: air, land, and ocean freight. For example, Finnish and Russian companies routinely perform joint air cargo and warehousing activities within the Northwest Russian Transport Logistics Cluster (Pekkarinen 2005).

An example of airplane capacity sharing is described by Sheffi (2012) at the Zaragoza Logistics Cluster, between Zara, a clothes retailer, and Caladero, a fish distributor. Clothes from Spain fly to South Africa on a jointly leased 747, which flies back a load of fish to Zaragoza. Furthermore, since fish packed in ice are heavy, Zara uses the surplus volume capacity on the northbound leg to transport wool, which is a light, fluffy cargo. Zara and Caladero benefit from their spatial proximity because they are able to reduce the cost per unit of transporting their goods in a fast and effective conveyance.

4.2 Warehouse Capacity Sharing

Logistics clusters have vast expanses of warehouses and distribution facilities. Warehouse utilization, however, fluctuates due to variations in demand. Thus, a given firm may have under-utilized space at one time or may be in need of extra space at another time. To reduce costs, firms within a cluster can lend or borrow warehouse space from neighbors. For instance, the Vermont Teddy Bear Company, a handcrafted toy maker, faces peak demand just before Valentine’s Day. To cope with such orders, the company uses the space of neighboring facilities in the UPS logistics campus in Louisville, Kentucky.

Such co-locations enable smooth space exchanges without the need to train new workers, obtain new transportation contracts and or make other adjustments, which would be required if the distribution center or warehouse space exchange involved a different location. In general, companies are inclined to share their facilities and productive assets in order to achieve cost reductions and improved efficiency (Chapman et al. 2003).

4.3 Labor Sharing

Sharing employees between companies and facilities within the cluster is a common practice. The sharing is possible because of the similarity of required skills, the often non-competing nature of firms (e.g., a toy distributor and home goods distributor), frequent interactions between firms that engender trust, and the proximity of facilities. Human resource sharing is important for agglomerated businesses because it reduces recruitment and training costs, thereby increasing efficiency. Naturally, such an exchange is particularly easy when a single 3PL manages several facilities within a cluster.

For example, Exel, a logistics services provider, manages eight distribution centers (DCs) in the Alliance*Texas Logistics Park. Exel routinely shares workers between its managed DCs in order to ensure optimal performance for the different businesses it serves. The firm even created a special software tool to coordinate among DC managers who need workers and those who have extra ones in any given period. The software not only determines valid exchanges in terms of qualifications but also accounts for the work hours, charges to the correct customer, and completes the financial accounting involved.

4.4 Information Sharing

The increasing complexity of systems, services, and products has turned knowledge codification into a challenging task. Information management plays a key role in the profitability and growth
of logistics operations. Logistics clusters enable company managers to have casual encounters and chance conversations which are often the basis for developing trust, leading to knowledge-sharing and formal collaborations. Shared information may include supplier requirements, customer support needs, and benchmarking data; firms may also share information about their distribution methods and routes (Rivera et al. 2015a).

This type of information exchange was observed in Air Logistics Park Singapore (ALPS), where DHL and UPS share information about customers’ peculiar needs when the customer changes providers. For example, DHL had to transfer a Phillips Health Care contract for regional freight to UPS. Although DHL and UPS compete with one another, they both have incentives to ensure a smooth transfer of these contracts, something that entails sharing information about clients, routes, special requirements, and schedules. Both companies are conscious that the contracts may be transferred back to them in the next bidding process and thus they take advantage of the geographical proximity to easily coordinate such transitions (Sheffi 2012).

5 Logistics Clusters Benefits—Value-Added Services

Logistics companies typically perform many value-added activities while products spend time in their DCs. These include postponement and customization, tagging, kitting, labeling, managing returns and repairs, and preparing for retail display. Appold (1995) argues that offering value-added services increases the competitiveness of logistics establishments. Certainly, it increases the customer “stickiness” and the revenue derived from a given client. In general, it is argued that spatially concentrated firms are more likely to capture greater value in their production processes to create new products, materials, and value-adding services (Ettlie and Reza 1992). This is certainly the case for logistics clusters. As managers mention, “local value-added is the driving dimension behind a number of further operational decisions and dimensions. . . . It even determines the investments required for setting up co-located facilities” (Reichart and Holweg 2008).

Such value-added services are not only unique to logistics clusters, but they are more prevalent in such clusters as compared to dispersed locations due to the following four reasons: (i) the cross-fertilization of ideas, (ii) the ability to cooperate in the provision of value-added services, (iii) the availability of cost-effective and high-service transportation in a cluster (which helps deliver the processed goods to their destination), and (iv) the availability of specialized suppliers required for such services.

5.1 Postponement and Customization

Postponement is the practice of mass customization—shipping semi-finished goods to a distribution center and then making a late-stage adjustment or addition to the product after demand for the differentiated product is better known or orders are at hand. This allows companies to combine low-cost, long-lead time manufacturing processes (production in Asia with ocean-freight shipment) with high-service, short-lead product differentiation processes (e.g., colors, monograms, sizing, and custom assembly followed by local distribution) and just-in-time delivery. It also enables companies to respond to a sudden change in demand while reducing inventory carrying costs at the same time (Sheffi 2012).

For instance, Reebok sells replicas of National Football League (NFL) players’ jerseys. Reebok cannot predict fans’ demand for the apparel of particular teams and players because demand fluctuates week-to-week depending on player and team performance on the field. To satisfy demand during a surge in popularity while avoiding excess inventory, Reebok adopted a postponement
strategy. The company manufactures blank jerseys overseas and sends them to its Indianapolis distribution center where it can add team’s colors and players’ names based on a given team’s and player’s popularity. The location of Reebok’s distribution center within the 1,500-firm-strong Indianapolis logistics cluster allows for fast distribution. The Indianapolis logistics cluster attracts many transportation carriers—including FedEx, which has a regional hub there—leading to high level of service for outbound transportation, supporting the postponement strategy.

5.2 Retail Display Arrangement

Retail display arrangement involves organizing merchandise in specially constructed marketing displays that sit in the aisles of retail stores to increase visibility and sales, typically during promotions. It also involves the production of end-of-aisle and point-of-purchase displays, graphic design of promotional material, and so forth. Companies specializing in these types of activity can be found in most logistics clusters. For example, the Louisville area boasts twenty-five companies offering slatwall (panels made with horizontal grooves that are configured to accept a variety of merchandising accessories and are used in retail display fixtures).

In some cases, 3PL firms that operate several facilities in a cluster develop the local expertise to offer retail display production for their customers. For example, Exel in Alliance*Texas Logistics Park, builds, delivers, and installs retail displays.

5.3 Kitting

Kitting is the separation or joining of certain products or product parts to form a new, more saleable item. Firms use kitting to create product bundles (e.g., camera + lens or value-for-money multi-packs), provide product samples (e.g., a sample fabric softener with detergent), or to add promotional or seasonal accessories. For example, UPS Supply Chain Solutions, located in the logistics cluster in Louisville, handles Nikon’s logistics activities. UPS receives Nikon’s photographic equipment and creates kits with batteries, chargers, lenses and other equipment based on each retailer’s requirements or promotional plans.

Kitting is a postponement activity that relies on the efficient transportation services available outbound from a cluster location. Such service enables last-minute promotional adjustments by retailers without creating an undue cost burden on the supplier or the 3PL.

5.4 End-of-Runway Location

Operating in a logistics cluster reduces the round-trip journey for maintenance, diagnostic services, and repair, creating a unique service offering (Sheffi 2012). For example, Flextronics operates a repair depot for laptops made by several manufacturers. It selected Memphis for the repair depot in order to allow customers to send laptops in need of repair as late as 8pm in most US cities by FedEx. The company fixes 1,500 to 2,000 laptops every night, which are then flown back to the customers 36 hours later. Therefore, a laptop dropped at a FedEx retail facility by 8:00pm on Monday in Boston, will arrive at Memphis by midnight, be at the Flextronics facility by 1:00am Tuesday, where technicians will have about 22 hours to work on it. Before midnight Tuesday, it will get back to the Memphis facility and be in Boston on the owner’s desk at 8:30am Wednesday.

Such a turnaround is possible because of the FedEx hub, which is the center of the Memphis logistics hub. Similar opportunities are available to shippers located in and around Louisville, where the UPS world hub is located. When Christmas shopping includes shoes from Zappos.com,
customers can place orders by December 23rd, and as long as the order was placed before
4:00 pm Eastern time, it will arrive on December 24th anywhere in the United States. This works
because the Zappos fulfillment center is part of the Louisville logistics cluster developed around
the UPS Worldport.

6 Logistics Clusters Benefits—Innovation

As cited in the literature review section, a number of authors describe how industrial clusters
foster higher rates of innovation, knowledge creation, and knowledge transfer within the cluster.
The same is true of logistics clusters. However, logistics clusters offer two special innovation ben-
efits in the form of environmental innovations and inter-cluster transfers of innovation.

6.1 Environmental Innovation

In general, logistics clusters improve the efficiency of transportation activities owing to the use of
larger conveyances and higher utilization of these conveyances, both of which generally reduce
total freight transportation environmental emissions. However, while reducing environmental
impact globally, clusters can create local environmental nuisances for the communities around
them as a result of concentrated fumes leading to health effects. Through community pressure
and enabled by the concentration of resources, logistics clusters became a hotbed of environmen-
tal innovation (e.g., Port of Singapore biodiesel plant, or the Ports of LA/LB Clean Air Action
Plan) that may not have occurred if the emissions were more diffused in a world without logistics
clusters.

Innovation activities around the Port of Los Angeles—spurred by environmental lawsuits and
regulation—illustrate this phenomenon. Investments in new green technologies around the port
range from alternative fuel vehicles (as of 2012, the Port of Los Angeles had some 900 alternative
fuel vehicles in use) to speculative innovations such as algae-based biofuels. The port also insti-
tuted operational changes for the drayage trucks servicing the ports, resulting in 89% reductions
in truck emissions. Environmental innovations are then shared among the other co-located
companies. For example, VYCON Inc. has developed a new flywheel energy storage system for
regenerative braking and hybrid drivetrains on dockyard cranes that is being deployed to Los
Angeles’ mass transit system.

6.2 Intra-Organizational Inter-Cluster Innovation Transfer

Logistics clusters differ from other industrial clusters in a subtle, additional way: the way that
innovative ideas are disseminated. Whereas industrial clusters agglomerate industrial activities
in a concentrated region of production, logistics activities must be performed over distance and
between clusters. Moreover, logistics operators spend much of their time in several clusters. Many
global logistics firms (e.g., FedEx, UPS, Maersk) operate across the world and are able to trans-
mit innovation across logistics clusters by replicating practices developed in one cluster to other
clusters. Local firms can then benefit from such new knowledge. Even regional logistics firms
(e.g., a US railroad such as BNSF) operate across multiple clusters (e.g., the Ports of LA and Long
Beach; Alliance, Texas; Chicago, Illinois; and others).

In the EffizienzCluster LogistikRuhr in Germany, 160 companies and 12 scientific institu-
tions work together on innovation and research that centers on a wide range of environmental,
operational, transportation, and design issues. The innovations developed in EffizienzCluster
LogistikRuhr have far-reaching implications that transcend national boundaries. For instance, in
the education and training fields, the cluster has been working on the eQual 2.0 project (a vocational training plan that addresses the educational needs of logistics companies by applying a constructionist approach through a learner-centered program). Some further examples of innovative projects are smartNRW, which aims to develop an “Optimal Tag Type and Position Evaluator” to determine the best type of tag and its position on the outer package of consumer goods, and ResIH, which seeks to raise the efficiency in intra-logistics and maintenance in chemical parks.

The logistics cluster shares knowledge and best practices with top European logistics institutions that work within other logistics clusters such as the Zaragoza Logistics Center in Spain, the Dutch Institute for Advanced Logistics in the Netherlands, and the Verein Netzwerk Logistik in Austria. Moreover, many of the companies participating in EffizienzCluster LogistikRuhr—companies such as UPS, CHEP, and DB Schenker—have global footprints, thus innovations developed within the cluster become deployed around the world.

7 Logistics Clusters Benefits—Jobs

The regional economic benefits of logistics clusters arise from the clusters’ role as job creation engines. Sheffi (2012) identifies five traits of the logistics clusters jobs that contribute to this. First, most distribution activities must be performed locally to provide competitive service levels, which implies that they cannot be offshored. Second, logistics clusters foster economic activity beyond distribution and transportation, such as the value-added services described above, which increases regional job creation (and in many cases with higher salaries). Third, logistics clusters offer low transportation costs and high transportation service levels, which attracts other industries such as manufacturing. Fourth, logistics clusters offer jobs for unskilled or low-skill workers but also prize these workers’ operational experience, which creates opportunities for upward mobility. Finally, logistics clusters serve many different industries, and therefore, the regional employment is not dependent on the business cycle of a single industry.

Logistics clusters have massive amounts of impact on the economy. For instance, the development of Alliance*Texas Logistics Park has had a total economic impact of $36.4 billion for the region from 1990 through 2008. By 2008, the park accounted for the creation of 28,000 direct jobs (both white and blue collar), 1,700 construction jobs, and 63,388 indirect jobs (Sheffi 2010). Another example is Memphis Airport. Most of the 220,000 people who work at the airport work in logistics-related jobs. In fact, one in three jobs in the greater Memphis area is tied to logistics.

7.1 Blue- and White-Collar Jobs

Logistics clusters offer a spectrum of employment opportunities. Blue-collar workers perform most of the operational activities of the sector such as picking, packing, sorting, stocking, loading, and driving. However, those entry-level workers have the opportunity to be promoted to high-income, mid- or top-management positions because the industry favors managers who have frontline operational experience. In addition, the industry offers a multitude of white-collar jobs in information technology and systems engineering as well as customer service. Being located in a cluster enables workers to move between companies as their careers develop.

7.2 Sub-Cluster Development and Jobs

Logistics clusters can give rise to sub-clusters of other industries. For example, the logistics clusters in Louisville, Kentucky (UPS’s hub), and Memphis, Tennessee (FedEx’s hub), attracted a number medical devices firms who relocated there in order to improve their lead times for
time-critical medical supplies. This started a positive feedback loop that attracted more such firms, including specialized suppliers, and a new medical devices cluster developed.

Along the Panama Canal, sub-clusters of vessel and container repair, construction, and refurbishment have thrived within the logistics cluster. Rotterdam Car Center is another example of a cluster-in-cluster. Located in Britanniehaven, it benefits from having both the Rotterdam port and a logistics cluster nearby.

Most of the activities performed in such sub-clusters, as well as in the adjoining logistics cluster, are value-added activities that require higher-paid workers with specific skills such as pharmacists, marine engineers, or laptop repair technicians, generating well-paying jobs in the region. For instance, in Alliance*Texas Logistics Park, ATC’s cellphone repair operations employ many information technology technicians who have specialized skills and education.

7.3 Education and Training

In order to fulfill the specialized worker demand of the logistics industry, logistics clusters have developed training programs with local universities or colleges. For example, the Tarrant County College Corporate Training Center was created by the Alliance*Texas Logistics Park and the local Tarrant County College in order to provide trained workers for the park. This collective initiative guarantees a permanent supply of qualified logistics workers for the agglomerated firms while increasing the employees’ competence. Similar efforts take place in the logistics clusters across the world, including places like Louisville, Zaragoza, and Singapore.

7.4 Upward Mobility

In many cases, the logistics industry recruits people with low levels of education and gives them the opportunity to progress in the labor market. Clusters seem to enhance this phenomenon because of the concentration of firms. For example, workers in several firms in the Zaragoza cluster started “on the floor” and moved up to managerial positions either at the same firm or in another firm in the cluster (Rivera et al. 2016).

The classic example of upward mobility is UPS, which has a strong “promote-from-within” culture. The company trains entry-level workers and enables them to develop a career within the firm. An Accenture’s 2006 report states that 54% of UPS’s current full-time drivers were once part-time employees; 68% of its full-time management employees rose from non-management positions; and 78% of its vice presidents started in non-management positions (Thomas et al. 2006). In addition to these statistics, many other logistics firms are managed by former UPS employees.

Finally, large seasonal fluctuations in logistics volumes lead to the hiring of part-time or temporary personnel. The new workers gain experience in the industry, and firms can assess the performance of these workers who might then be offered permanent work, training, and opportunities for promotions. In this sense, temporary jobs in logistics are an entry point for permanent and well-paid jobs. This phenomenon is particularly strong in logistics clusters because the seasonality of such jobs means that workers in the area can count on such temporary jobs and schedule their other work and life arrangements accordingly. Furthermore, the experience that workers gain during temporary work at one company can open doors to other local companies.

8 The Future of Logistics Clusters

Logistics clusters have been growing owing to a positive feedback loop driving their success. However, there are some factors that may reinforce the growth effects, while others may provide a countervailing force.
8.1 Factors Leading to Logistics Clusters Growth

Any growth in globalization and international trade is likely to increase the importance of all logistics clusters. However, small logistics clusters suffer during recessions while large ones actually grow as a result. The reason is that their advantages—especially in terms of costs—lead shippers to route freight through the largest clusters, while smaller ones lose business.

Tariff and non-tariff barriers have been reduced after the creation of the World Trade Organization (WTO), with total trade increasing over the last ten years (WTO 2014). This has been the major force behind economic growth, because it links the most cost-effective sources from anywhere in the world with end markets everywhere in the world (Zakery 2011). However, it has increased the complexities of global supply chains and created more cost pressures owing to global competition, thus increasing the need for further efficiencies such as those offered by logistics clusters. At the end of 2015, however, certain political and economic factors converged to reduce the growth of trade below the global GDP growth—if such a trend takes hold, one expects again the largest clusters to keep attracting operations while smaller ones languish.

Logistics clusters, as the nodes of global supply networks where shipments are consolidated and de-consolidated, help businesses achieve economies of scale in production while maintaining their flexibility to handle temporal and spatial variations in demand. Thus, logistics clusters are pivotal in the global value chain to efficiently handle international trade volumes. At the same time, logistics clusters foster the growth of international trade by making it more efficient, creating a global economic self-reinforcing positive feedback loop. Such an effect may be observed in Dubai, where the development of logistics infrastructure and free zones like Port Rashi, Jebel Ali Port, and Dubai International Airport in the 1970s and 1980s led to a positive impact in the foreign trade that increased from US$39 billion in 2000 to US$362 billion in 2013 (Invest Bridge Capital 2015).

The economics of conveyances also favor the growth of logistics clusters. Both fuel-efficiency and labor-efficiency considerations favor larger conveyances over smaller ones. Yet larger conveyances implicitly increase the need for logistics clusters to perform consolidation, deconsolidation, and transshipment operations.

Large conveyances moving between logistics clusters also reduce the carbon footprint per ton moved. Thus, further environmental pressures may lead to growth of logistics clusters. In fact, the German government encourages the development of logistics clusters mainly for environmental reasons, pushing for more intermodal transportation, which is only economically feasible with large volumes of freight, requiring cluster-to-cluster moves.

Increasing customer demands for fast “same day” or “within the hour” deliveries will also likely favor the development of logistics clusters—in this case, places that are close to urban centers. This is due to the fact that such clusters can have enough outbound deliveries (e-commerce in particular) to justify a cost-effective transportation delivery service.

8.2 Factors Leading to Possible Decline of Logistics Clusters

Despite such possible drivers of logistics clusters’ formation and growth, other factors may point to possible declines in clustering. Protectionist and anti-trade regulation present risks for the logistics industry. Any restrictions on global trade will lead to decreased need for international logistics and therefore logistics clustering.

Low fuel prices decrease the need for efficient transportation and therefore the need for clustering. However, low fuel prices may also have a countervailing effect by encouraging global
trade and therefore the need for logistics clusters. A rise in local sourcing, possibly motivated by environmental concerns, would reduce freight volumes over long distances and with it the need for logistics clustering.

Logistics clusters may also contract and even disappear. The most frequent reason for such phenomena is that the local stakeholders are working in cross-purposes and do not cooperate. Such was the fate of the New Orleans oil processing and oil logistics cluster, which lost its pre-eminent position to Houston, which is now (by far) the largest oil logistics cluster in the US. In other cases, “when you build it, people simply don’t come.” An investment in a logistics cluster launched during 2008 in Winston-Salem, North Carolina, struggled. Computer maker Dell Inc. closed a manufacturing plant there in 2009, and other operations did not move in.

In some cases, logistics clusters simply run out of space. Such is the case in Barcelona, Spain, where the city now abuts the warehouses and distribution centers. In other cases, typically with maritime clusters, the high value of ocean-front condominiums and apartments pushes away any industrial activity.

9 Implications for Practitioners and Policy Makers

This chapter raises awareness of the benefits of logistics clusters for logistics companies and companies that depend on logistics, namely manufacturers, distributors, and retailers. Implications for company managers include considerations of site selection, globalization, and value-added activities. This paper also presents information on logistics clusters that may help improve regional and national public policy design and execution. Implications include support for cluster development, specifically in terms of zoning, connectivity and finance, regulations and taxes, and international trade.

9.1 Considerations of Site Selection

By choosing to locate in a logistics cluster, managers can benefit from high connectivity, reliable infrastructure, available human capital, and administrative efficiency. In many cases, such clusters also host educational institutions with specialized programs geared to the cluster’s needs, as well as research organizations and consulting firms specializing in logistics and supply chain management. Companies in a cluster also have the power to influence regulations owing to the influence of the cluster with local government.

Although optimal location software packages are frequently used to decide on facility location for warehouses, distribution centers, and fulfillment centers, these packages capture only some of the benefits of logistics cluster locations. These include low transportation costs and, possibly, high transportation level of service. What these software applications do not capture are dynamic effects. Thus, they do not capture the ability to exchange space, equipment, and employees when the business expands or contracts. They also cannot capture the potential for cooperation among cluster firms for increased efficiency and service levels. Finally, they cannot capture the ability of clusters to become better with time on many dimensions, owing to the positive reinforcing feedback loop that controls their growth.

9.2 Globalization

As long as international trade and globalization grow, the relevance of logistics activities and logistics clusters to companies who source from international suppliers or sell into international markets is likely to remain high. As other authors have stated, “globalization poses a challenge to
companies since it greatly influences the business environment and it has been identified as the main influencing factor in the logistics sector growth” (Kleindorfer and Visvikis 2007, p. 18).

9.3 Support for Cluster Development: Zoning, Connectivity, and Finance

Logistics clusters depend on certain conditions, conditions that are controlled by local and central governments. Foremost among these condition requirements is a large space, something that requires favorable zoning regulations. Logistics clusters also require high levels of physical accessibility (Van Den Heuvel et al. 2014) and connectedness—road, rail, air, and water transportation infrastructure—many of which are created, operated, and maintained through large-scale investment of public funds. Even in the case of private logistics infrastructure (e.g., private railroads or port facilities), freight often travels via public infrastructure such as road networks to manufacturers, warehouses, and retailers.

Many countries are developing their public infrastructure with an emphasis on improving their logistics competitiveness, as is the case of China, India, and the United Arab Emirates. Interestingly, the 2015 US transportation bill pays strong attention to logistics, including $10.8 billion for freight-specific projects. This is the first time the US Congress has funded a freight program in the transportation bill (Transportation for America 2015), including the creation of the Nationally Significant Freight and Highway Projects discretionary grant program, funded at $4.5 billion over five years, and the establishment of a new National Highway Freight Program (NHFP) with resources up to $6.2 billion over five years. The bill also creates a Port Performance statistics program, in order to collect data to help provide recommendations to improve port efficiency (American Association of State Highway and Transportation Officials 2015).

9.4 Regulations and Taxes

Regulations and taxes affect the economics of logistics and logistics clusters development. Regulations impact land uses for logistics and the costs of logistics due to permissible conveyance size, conveyance operations, freight movement restrictions, and other factors. Government-mediated land uses regulations and processes impact not only the ease of development of port, airport, and warehouse facilities but also affect rights-of-way by which goods can move via road and rail into and out of the cluster. Taxes (or tax incentives) impact site selection decisions by companies deciding where they might locate warehouses and value-added activities. Governments also help ensure the economic sustainability of logistics operations in a cluster through efficient administrative processes (e.g., conveyance registration, or customs processes for imported goods), and the stability of rules and incentives for soft infrastructure development like research centers and educational institutions.

9.5 International Trade

Governments have an important role to play in international trade because it is controlled by international and government-to-government agreements. For example, the recent explosive growth of logistics clusters in Mexico (the largest ones being in Reynosa, Juarez, Monterey, Tijuana, Guadalajara, and Mexico City) followed the establishment of about sixty bilateral trade agreements; most other countries, including the US, Canada, and China follow the same trend (WTO, 2015).
Governments are also responsible for the development of free trade zones and special economic zones where certain activities can enjoy preferential tax treatment. Finally, governments can help promote logistics cluster development through external relationships such as trade missions and harmonization of regulations.

Logistics clusters are especially relevant to policy makers in developing economies, in which the effectiveness of export-led growth policies are strongly dependent on the efficient operation of export logistics. Emerging BRIC countries (Brazil, Russia, India, and China) as well as CIVETS (Colombia, Indonesia, Vietnam, Egypt, Turkey, and South Africa) countries have become hotbed locations for new logistics clusters acting as important nodes of global trade.

Countries such as Panama, Singapore, Holland, Belgium, Dubai, and even Germany have made logistics a major pillar of their economies by creating key infrastructural waypoints in global supply chains. In turn, the development of logistics clusters “attracts workers, entrepreneurs, investment, companies, political interest and intellectual capital” (Sheffi 2012, p. 38), which fosters regional economic growth. Governments and societies then benefit from logistics clusters through their wide spectrum of employment opportunities, upward mobility, economic growth, and the lower dependency on the business cycles of particular industries.

10 Future Research Opportunities

Rising global trade has generated a higher demand for logistics services, favoring the spatial agglomeration of logistics activities. The increasing prevalence of logistics clusters contrasts with the paucity of literature in the field, which represents an opportunity for scholars. Our study summarizes selected benefits of agglomeration of logistics such as collaborative sharing of assets, value-added services, upward mobility, job creation, and environmental innovation. Future research may address the following issues:

- Assessing and measuring the relative importance of other potential benefits for companies in logistics clusters. For example, one such element argued in the literature on industrial districts is innovation (e.g., Albino et al. 2006). Another is capital formation—the higher rate of new business formation—which has been observed in many industrial clusters (Porter 1998).
- Obtaining an in-depth understanding of how location decisions evolve over time and are influenced by prior experience, current incentives, or changing regulations (e.g., hours-of-service regulations for truck drivers or changes in conveyance sizes).
- Settling the debate on the relative effects of agglomeration economics versus dispersion economics in logistics cluster development and logistics-related land use patterns. Data-driven analysis based on more than the US and Holland can help here.
- Analyzing intra- and inter-cluster relationships in order to describe the process of trade-network building, for instance horizontal collaboration practices emerge both inside clusters and between them (for more detail, see Rivera et al. 2015a).
- Examining the co-evolution of logistics agglomeration and urban agglomeration through sharing of (or contention for) infrastructure between freight and personal transportation.
- Extending research on logistics clusters by conducting analyses on clusters at a smaller unit of analysis that helps understand the clustering effect at a more granular level (see, for instance, Rivera et al. 2015b).
- Developing robust methodologies for sharing the costs and benefits of conveyance sharing arrangements; how costs and benefits can be shared if a jointly loaded conveyance off-loads in different places or if it performs multiple deliveries; how to deal with the
fact that one company’s costs may go up while others’ costs decrease to the benefits of the whole but not everyone’s.

- Collecting qualitative and quantitative data to measure the impact of logistics clusters on the operational efficiency of companies. Local, regional, and national economic data could help estimate the effects of logistics clusters on economic outcomes.

References and Bibliography


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