Developing New Economy Industrial Corridors in LA County

Identifying Promising Locations for Bioscience Firms

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Introduction

As the second largest city in the United States, Los Angeles has maintained a diversified economy throughout its history and become the largest center of trade on the West Coast. The industries that have historically driven economic growth in this region include entertainment, logistics, aerospace, manufacturing, and tourism. Over the past two decades, the leadership of Los Angeles has focused on growing manufacturing industries to support the economic growth of the region.

This research takes the position that the nature of production has shifted and a new economy has emerged. Economic growth is no longer dependent on manufacturing and the production of commodities, but rather dependent on the exchange of knowledge to produce more complex goods and services. With declining transportation and trade costs, it is possible to divide production into finer and finer divisions of labor that can be separated geographically to form a global supply chain. Manufacturing, as a result, will continue to relocate to other countries and regions that can produce the same quality of goods at a lower cost, like China, Taiwan, and Korea. To ensure that Los Angeles remains a strong, diversified economy in the shifting system of global production, it is critical that the city adapts to the new economy and captures economic growth in knowledge industries.

The focus of this report is on the growth of bioscience and bioscience related industries in Los Angeles. With the advent of recombinant DNA technology in the 1970s and subsequent innovations in genetic manipulation, synthetic biology, and pharmaceuticals, bioscience shows exceptional promise as a new economy industry that can ensure lasting growth for the Los Angeles economy.

The Bioscience Industry

The bioscience industry encompasses firms that use biological materials to produce goods like pharmaceuticals and fertilizers. Bioscience can also refer to more general life science industries, including medical equipment and supplies for healthcare.

Bioscience is a promising industry for a number of reasons. First, the average annual wages for workers in the bioscience sector rose to $122,048 in 2015, nearly twice the average wage in California. In addition, bioscience occupations span a wide range of educational backgrounds, from the highly skilled jobs in genomics and pharmaceutical and drug discovery that require advanced degrees like an M.D. and Ph.D., to entry level positions like assay technician and clinical lab technician that require a high school degree (Los Angeles County Economic Development Corporation, 2017).

Growing a Bioscience Cluster

Nourishing the development of the bioscience industry in Los Angeles will require the coordination of city officials, firms, universities, venture capitalists, entrepreneurs, and other stakeholders to ensure that the industry has the resources necessary to thrive.

In a case study of the bioscience industry cluster in San Diego, five key elements to growing a bioscience cluster were identified (Walcott, 2002):

1. Outstanding research university with relevant specialty
2. Local entrepreneurship
3. Strong advocacy and leadership
4. Available risk financing
5. Appropriate real estate

Los Angeles County contains a number of these elements, shown in Figure 1. In addition, Los Angeles houses several bioscience incubators and large "anchor" firms.

Figure 1: Elements of a Bioscience Cluster.

Bioscience firms require specific real estate needs that can accommodate research and development activities, typically located in industrially zoned areas. Industrial vacancy rates in Los Angeles County are extremely low, estimated by Cushman and Wakefield to be just 1.8% in 2016. There is heavy competition for industrial spaces from other industries, notably logistics and warehousing.

Research Design and Methodology

Though there is not one clear strategy for creating real estate development that support new economy industries, the literature review revealed several key factors that are needed to support the formation of clusters.

First, **geographic proximity** of firms is critical to sustaining knowledge-based industries like bioscience. Geographic proximity raises greater awareness of activities in the region – if industrial activity is concentrated in a particular neighborhood or district, its presence is more apparent than if that same activity were not concentrated (Audretsch and Feldman 1996).

Anchor firms are also very important in supporting industry growth. Anchor firms, or large well-known "brand name" companies, create a pool of a human capital and skilled labor, build supplier networks, and in some cases support entrepreneurship, either through direct incubation of startups with funds and formal partnership, or by building up the talent pool and industry presence in the region. (Burton, Sorenson, and Beckman 2002).

Another critical factor of supporting new economy industries is **networking.** Networking supports the transfer of complex knowledge, as face-to-face interactions more successfully transmit knowledge. Networking also encourages industry growth because it can lead to partnerships between firms and the formation of new firms by connecting like-minded entrepreneurs (Whittington, Owen-Smith, and Powell 2009; Storper et. al. 2015).

Finally, **industrial land markets** can also dictate the presence and location of firms in a region. This is especially important for industries like bioscience and aerospace that require land uses beyond office space, including industrial areas for light manufacturing. Industrial land commands lower rents and, in growing cities, is often pushed to the periphery or converted to other "highest and best" uses. The availability of industrial land is an important determinant for where and how firms locate within a region (Dunse et. al. 2005).

The purpose of this research is to **identify other factors specific to the bioscience industry** that would influence firm location and could be incorporated into the selection of sites and amenities for future real estate developments. These specific factors could be combined with the more general known features necessary to develop spaces for new economy industries – geographic proximity, anchor tenants, networking, and accessible industrial land - to attract bioscience firms.

Results

Analysis of Factors Important to Bioscience Firm Location

A survey was conducted with existing bioscience firms (n=15) to identify key factors that determine bioscience locational activity. **Cheap rent** was identified to be of primary importance in bioscience firm location. Other factors survey respondents considered important included **proximity to universities, proximity to bioscience incubators, access to freeways,** and **desirable location**.

Multivariate Regression

Through the survey results and literature review, several factors that could explain bioscience firm locational decisions were selected for inclusion in a multivariate regression model. The regression will help explain which factors are actually significant determinants of how bioscience firms are locating in Los Angeles. Existing bioscience establishments as reported by the 2016 Los Angeles County Business Patterns dataset from the US Census were mapped and regressed against the following explanatory factors.

1. **Cheap rent.** Since many bioscience firms rely on lab space and research and development space, only industrial lease rates were considered.
2. **Proximity to universities.** Universities were defined as major research universities or bioscience specialized campuses, and excluded community colleges, liberal arts colleges, and other educational institutions.
3. **Proximity to bioscience incubators.** Several bioscience incubators exist throughout the county and were identified through the Los Angeles County Bioscience Implementation Plan.
4. **Access to anchor firms.** Similar to incubators, anchor firms were identified through the Los Angeles County Bioscience Implementation Plan.
5. **Access to freeways.** Since most ZIP codes in Los Angeles County contain areas that are within 0.5 miles of a freeway, access to freeway was defined as a ZIP code containing industrially zoned parcels within 0.5 miles of a freeway.

Employment and establishments in all sectors was also added to the model to increase goodness-of-fit and better calibrate the results to the factors specific to the bioscience industry rather than factors determining the pattern of establishments and employment overall.

Table 1 shows the model level statistics for each regression. All regression models were found to be significant.

Table 1. Multivariate Regression Model Summary for Bioscience Firm Location in Los Angeles County.

Dependent Variable	N	R	R^2	Adjusted R^2	Standard Error of Estimate	F
Establishments	2,068	0.733	0.538	0.526	5.898	46.364**
Employment (total)	50,460	0.654	0.301	0.301	351.088	18.622**
Firms with 1 to 20 Employees	1,545	0.730	0.532	0.521	4.675	45.367**
Firms with 20 to 100 Employees	225	0.624	0.389	0.374	1.488	25.385**
Firms with Over 100 Employees	78	0.514	0.264	0.246	0.800	14.294**

** Indicates statistical significance ($p < .05$)

Across all five dependent variables, industrial lease rates were proven to be a significant factor. Each beta is negative, indicating the higher the industrial lease rate, the lower likelihood that a bioscience firm will locate there. This finding is consistent with the survey responses.

Interestingly, for the dependent variable firms with 1 to 20 employees, location near a university was a significant factor in determining firm location, but not in the direction predicted by the survey. Survey respondents indicated that being located near a university is desirable and important in bioscience firm locational decisions, but the regression model indicates that this relationship is negative – the closer to a university, the less likely a bioscience firm is to locate there. This paradox could be due to the lack of available industrial space around universities in Los Angeles County.

Table 2. Multivariate Regression Model with Independent Variables for Bioscience Firm Location in Los Angeles County.

Dependent Variable	Industrial Lease Rate	Industrial Near Freeway (0.5 miles)	Anchor Tenant (1 mile)	University (1 mile)	Bioscience Incubator (1 mile)
Establishments	-2.639**	1.486	0.742	-0.834	5.345**
Employment (total)	-116.091**	53.492	184.291**	43.948	162.773
Firms with 1 to 20 Employees	-2.076**	5.169**	0.786	-3.237**	3.907**
Firms with 20 to 100 Employees	-0.636**	0.728**	0.175	-0.605	0.809
Firms with Over 100 Employees	-0.261**	0.198**	0.214	-0.002	0.383

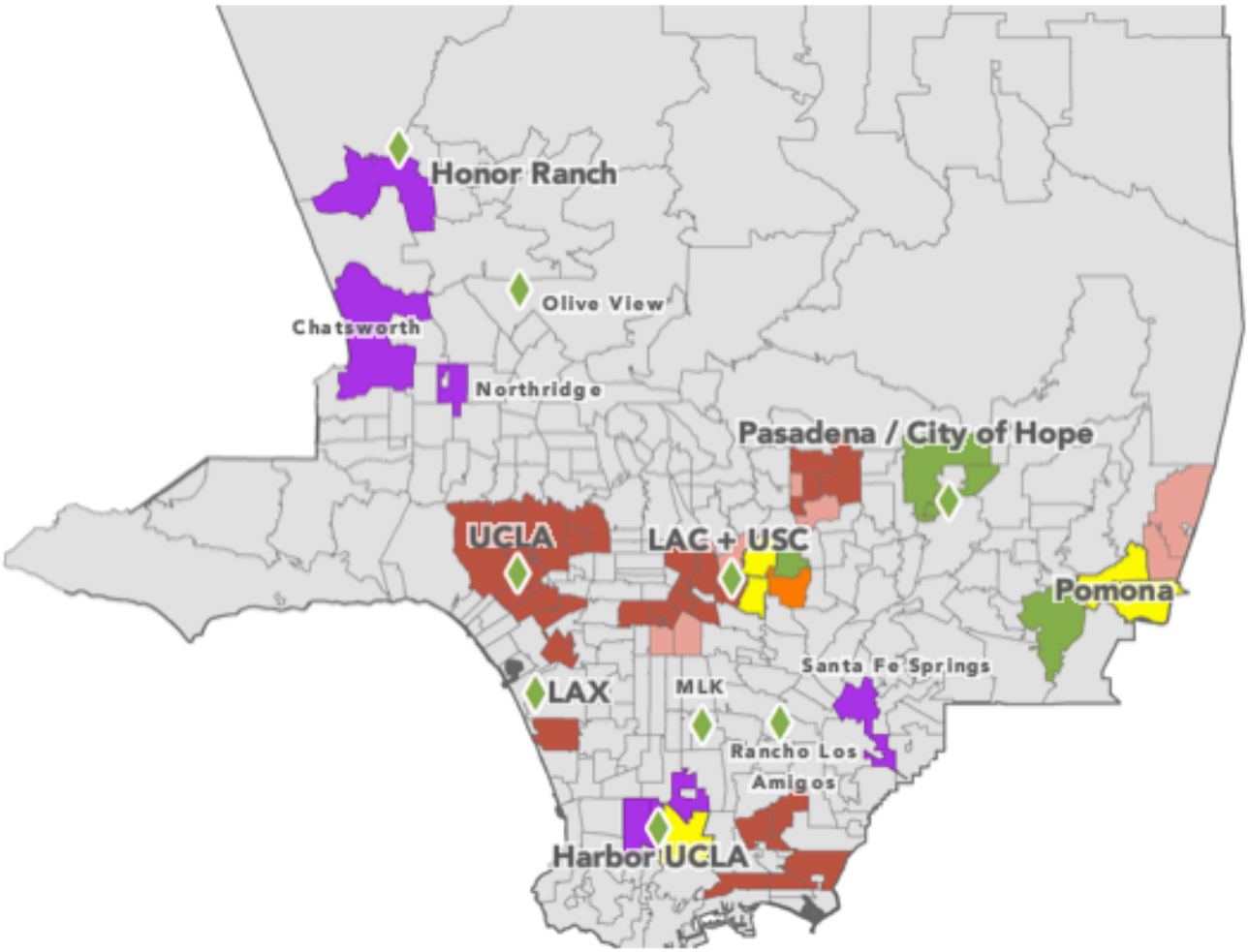
** Indicates statistical significance ($p < .05$)

From the multivariate regression, the following **significant factors** determining bioscience firm location were identified:

1. Inexpensive industrial leases
2. Industrial land within 0.5 miles of freeway
3. ZIP codes within 1 mile of bioscience incubator

Figure 2 provides a map of bioscience activity in Los Angeles County as well as the ZIP codes containing these significant factors. The purple ZIP codes indicate a high relative concentration of existing bioscience firms. To identify ZIP codes with a potential for supporting bioscience real estate development, ZIP codes containing the three significant factors were cross-referenced with ZIP codes that were considered desirable by survey respondents, either due to general location or proximity to a university. These ZIP codes are highlighted in orange and yellow, respectively. The green diamonds signify hubs that have been proposed by the Los Angeles County Board of Supervisors as potential sites for bioscience real estate development.

Figure 2: Potential locations for bioscience hubs by ZIP code.



LA County Proposed Bioscience Hub

ZIP Code Boundary

Emergent Bioscience Activity

Desirable ZIP Code

ZIP Code Within 1 Mile of University

Zip Code Containing All Significant Factors

Desirable Zip Code and Significant Factors

Zip Code Near University and Significant Factors

Recommendations

Identifying areas that are both desirable and consistent with the underlying economics and behavior of early stage bioscience firms is a critical first step in understanding where new development can be supported. Still, identifying feasible areas are only the first step; a broader economic development strategy must also be considered.

Real Estate Development Strategy

Concentrate bioscience activity in one central node. Resources should first be concentrated in most central node – LA County Hospital and USC Health Sciences Campus – for a number of reasons. First, it has multiple indications of feasibility to support bioscience – the presence of a university (USC Health Sciences) and hospital, political support from the LA County Board of Supervisors, available and relatively inexpensive industrial land, and a central location, which was listed as highly desirable. Enhancing connectivity between bioscience firms is critical to supporting a thriving cluster, and having an identifiable bioscience central "node" where a lot of bioscience activity is known to be taking place will help build awareness and connectivity to other hubs of activity, including Valencia, Pomona, and Torrance.

It is critical to provide a central node for the following reasons:

- **Bioscience firms are scattered.** Firms are located throughout the county and do not concentrate in the known employment centers: Downtown, Century City, and Santa Monica. This inhibits networking and knowledge sharing opportunities.

- **Desirable areas are unaffordable.** Desirable areas, particularly on the Westside, are inaccessible to many smaller bioscience firms due to lack of lab space and expensive leases.

Create developments that cater to the unique real estate needs of Los Angeles bioscience tenants. To truly enhance the growth of the bioscience industry in Los Angeles, real estate development needs to better cater to the needs of growing firms, especially those that have graduated beyond the incubation stage. Growing bioscience firms need to be located more centrally in order to capitalize on the benefits of knowledge spillover, access investors, and be able to recruit valuable employees. This is in sharp contrast to the forces moving industrial land to the periphery. By creating pre-fitted lab space and co-working amenities in central locations, the needs of growing bioscience firms can be more easily met.

Networking Strategy

Developers and building owners should provide networking as a building amenity. In the new economy, it is no longer sufficient to provide space for research and development activities or other tangible activities. The nature of production has shifted – production in the new economy is now the generation of knowledge, not just

the manufacturing of products. Manufacturing and producing goods is a second-order phenomenon; networking, collaboration, and knowledge spillover are today's divers innovation and economic growth. Industrial spaces built for bioscience should keep the goal of networking and collaboration as a top priority. Providing space to host events or investor presentations and coordinating these activities will be a highly desired amenity.

Bioscience investor base similar to the Tech Coast Angels should be created. Bioscience entrepreneurs have difficulty making connections with investors. Creating a well-known group of interested angel investors in LA and beyond would ameliorate this problem. A promising strategy is recruiting an investor group or bioscience focused venture capital fund to lease a bioscience lab space, coordinate networking and knowledge spillover activities, to ensure lasting success for their bioscience investments.

University-to-startup pipelines should be strengthened. Locations near universities are considered desirable. New developments for bioscience space can be supported by increased demand by university entrepreneurs. Since bioscience is a knowledge-based industry, it will remain closely tied to the universities. Therefore, it is important that the universities recognize the need for cooperation in industry building and commercialization efforts and provide flexibility for faculty pursuing startups in order to further foster the development of this industry.

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