

It's Not All About Urban Infill

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It is no secret that the industrial sector has been the darling of the current commercial real estate cycle, especially over the last 5 years. Looking at NCREIF returns by property type, industrial is the only property type that saw stronger annualized returns in 2014 – 2018 than in 2011 – 2013. Moreover, relative to NCREIF's NPI index the industrial property type has outperformed the broader U.S. commercial real estate market by more than 400 basis points annually since 2014.

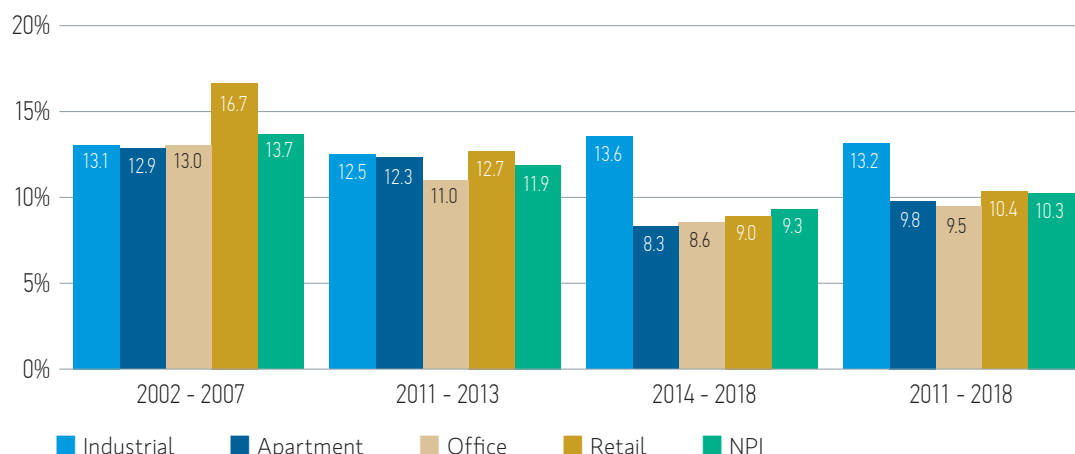
AUTHORS

REAL ASSETS RESEARCH
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DISPLAY 1

Pronounced Industrial Outperformance Since 2014

Annualized



Source: NCREIF, MSREI Strategy, data as of February 2019

This paper aims to explore the key trends driving the industrial market. We will analyze the current drivers of demand and rent growth as well as how emerging technologies, such as autonomous trucking, may affect the market.

Current Trends

Over the last 5 years (2014 – 2018), industrial net absorption in the U.S. has been remarkably strong, with an average of 260MM square feet of space absorbed annually during this period, a 40% increase over the annual average between 2003 and 2007. Moreover, the growth rate of total industrial occupancy has accelerated from 1.5% per annum over 2003 – 2007 to 1.8% per annum over the last 5 years. Analyzing the recent trends in industrial space demand, we believe that an emphasis on supply chain efficiency in recent years has driven tenants into large, exurban properties in the nation's major logistics hubs.

Big Box Demand

"Big Box" users, defined here as those larger than 200,000 square feet, have driven overall net absorption throughout this cycle. Since 2014, 67% of net absorption has been concentrated in properties larger than 200,000 square feet with these properties capturing 72% of net absorption in 2018. Propelling this trend is an increased emphasis among tenants on optimizing their national supply chains through fewer but larger and more centrally located warehouses.

The trend towards "Big Box" industrial has largely concentrated in key logistics markets, which we define as having relatively high stock of industrial space relative to local consumption. Generally, the key logistics markets possess large pools of labor. Additionally, the key logistics markets typically include the presence of major infrastructure (e.g. Riverside,

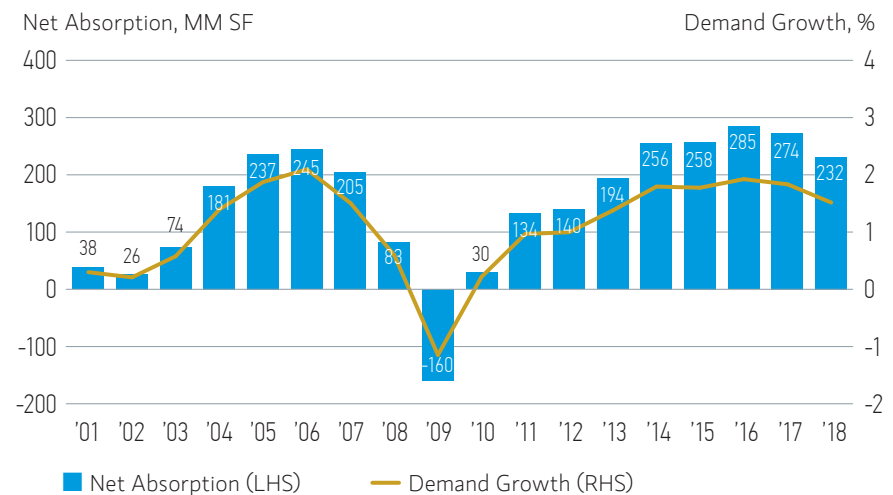
Chicago and Dallas) or a combination of low cost labor, cheap land and accessibility towards large consumption markets (e.g. Central Pennsylvania to New York and Stockton to San Francisco). Moreover, the

rise in e-commerce has supported growth in Midwestern metros like Columbus and Cincinnati, which can provide one-day air, and two-day ground delivery to a large swath of the country.

DISPLAY 2

Robust Demand Growth

Annual

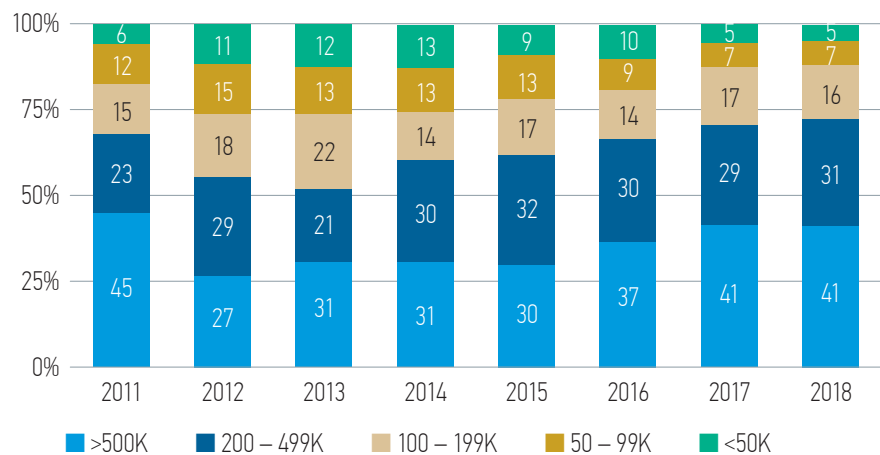


Source: CoStar, MSREI Strategy, data as of November 2018

DISPLAY 3

Net Absorption by Property Size

Share of Total Net Absorption



Source: CoStar, MSREI Strategy, data as of November 2018

Exurban

Despite the popular narrative surrounding “Urban Infill” industrial, tenants have increasingly preferred lower cost exurban submarkets as they seek to maximize profitability. Analyzing nearly 2,600 submarkets, we characterized each submarket by their population density,

assigning each submarket as Urban, Higher Density suburban, Lower Density suburban, or Exurban.¹ We found that 80% of logistics net absorption since 2007 has been in exurban submarkets, while exurban submarkets account for only 60% of stock. Over this period, higher density submarkets (including

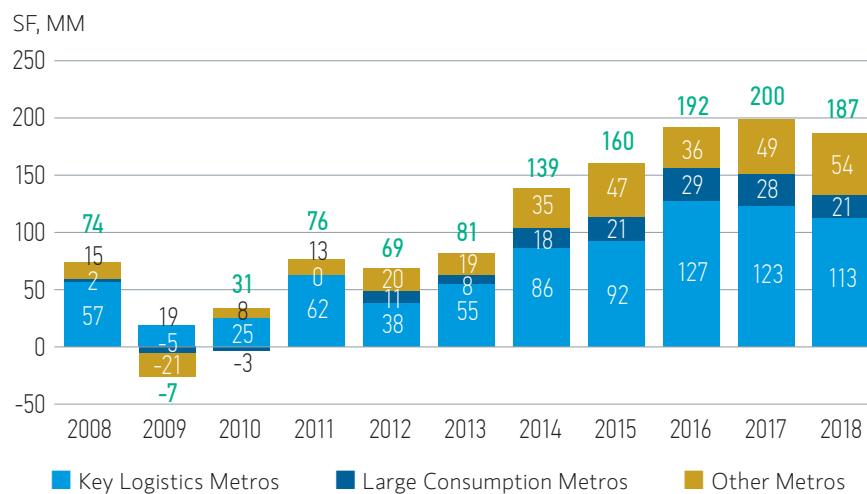
both urban and higher density suburbs) have captured 1% of net absorption.

We believe this trend towards growth in lower density submarkets is the result of tenants seeking to maximize their bottom line by lowering occupancy costs. Developers have taken notice, with nearly all development since 2014 occurring in lower density suburban and exurban submarkets. Meanwhile, urban submarkets have lost industrial stock as developers repurposed older warehouses into higher-value uses like residential and office. To validate further the exurban net absorption trends, we analyzed the location of over 300 million square feet of space leased to Amazon, Walmart, FedEx and UPS to glean occupancy trends, since these companies are some of the most sophisticated users of industrial space. Our findings show that Amazon and Walmart are highly active in leasing space in exurban big boxes. For example, 65% of Amazon’s warehouses are over 200,000 square feet (with 45% larger than 500,000 square feet), while 77% of Amazon’s total industrial footprint is located in the exurbs. Walmart favors the exurbs even more, with 90% of its footprint located in these submarkets. While the parcel carriers show more balance among the submarket types, they still are both slightly over-represented in exurban submarkets and slightly under-represented in urban submarkets.²

DISPLAY 4

Big Box Logistics Demand

Net Absorption in Properties >200K SF, By Metro Type

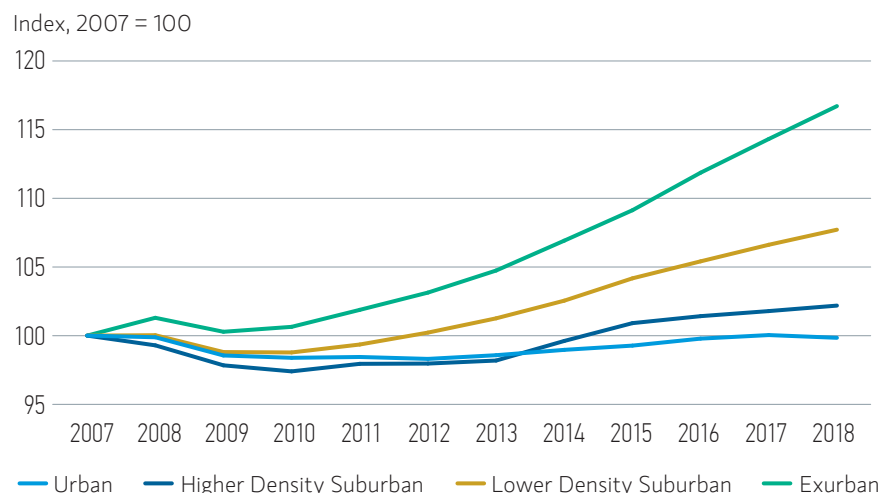


Source: CoStar, MSREI Strategy, data as of June 2018

DISPLAY 5

Cumulative Occupied Space Growth

Annual



Source: CoStar, MSREI Strategy, data as of November 2018

¹ Urban submarkets defined as those with a population density above 7,500 people per square mile; higher density suburban between 6,000 and 7,500 people per square mile; lower density suburban between 2,000 and 6,000 people per square mile and exurban as submarkets with a population density below 2,000 people per square mile.

² Analysis based on occupancies recorded by CoStar using MSREI Strategy’s submarket type definitions. The sample consists of 1,404 properties totaling 310 million square feet. Walmart includes Jet.com.

For urban and higher density suburban submarkets, a general lack of modern supply may have contributed to lower net absorption. In these higher density submarkets (which are predominately located in Southern California, Chicago and New York),³ product instead tends to be older and less efficient. For example, in the submarkets of Queens and Brooklyn, which collectively hold 175 million square feet of industrial space, just 1% of inventory meets a loose definition of “modern stock.”⁴ In contrast, 48% of the Exit 8A submarket and 38% of stock in the exurban Lehigh Valley meets this criterion of “modern stock.”⁵ While lack of land will likely continue to limit development in urban infill locations, rising rents may support renovating older warehouses to take advantage of tight market conditions in these locations.

Market Matters More than Submarket

Despite the supply constraints of higher density submarkets, our analysis does not find meaningfully higher rent growth in these submarkets (after accounting for market-wide factors), and even found instances where exurban submarkets outperformed infill submarkets within the same market. For example, in the New York metro Exit 8A (an exurban submarket approximately a hour drive from Midtown Manhattan) saw annualized rent growth of 7.7% over the last 5 years while Queens and Brooklyn (urban submarkets) posted rent gains of 7.1% per year over the same period.⁶ Our analysis, therefore, suggests that market

selection matters much more than infill vs. suburban location. Variations in rent growth are significantly greater across markets rather than within markets. Similarly, an analysis of submarket rent growth based on proximity to infrastructure (seaports, airports, and intermodal terminals) also shows that there is not significant variation.

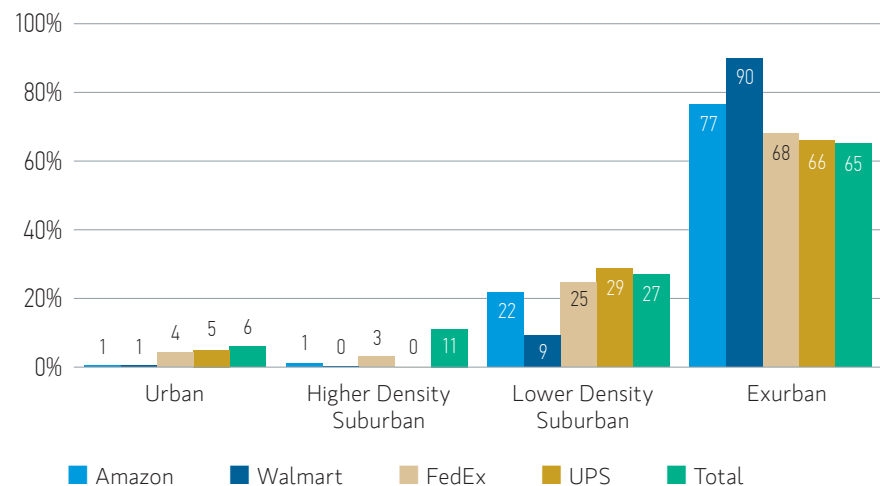
Emerging Trends

While we expect industrial net absorption to moderate as the U.S. economy downshifts, we think several emerging trends may influence the utilization and location of warehouses. These trends may also drive greater cost efficiencies (i.e. labor, transportation) which could offset higher rents as tenants look to

DISPLAY 6

Major Industrial Tenant Occupancy Patterns

Share of Total Industrial Footprint

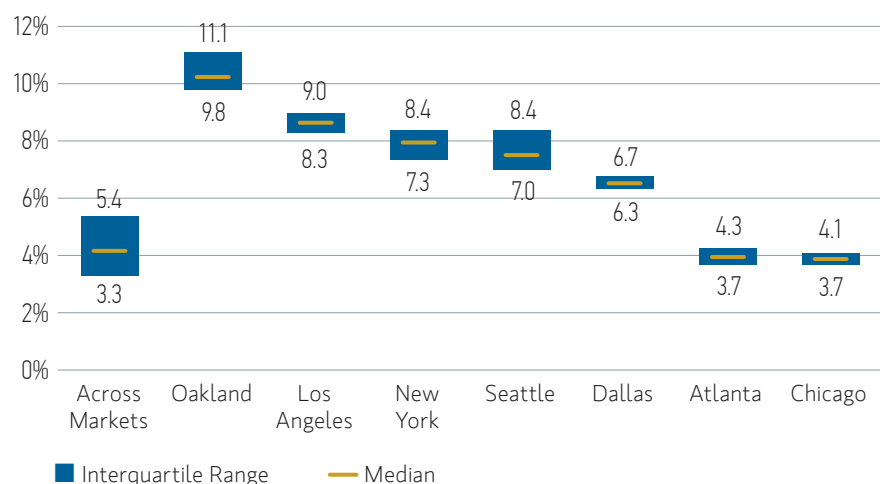


Source: CoStar, MSREI Strategy, data as of December 2018

DISPLAY 7

Rent Growth Variation Across and Within Markets

Annualized Rent Growth, 2014 – 2018



Source: CoStar, MSREI Strategy, data as of January 2019

³ The Los Angeles, New York and Chicago MSAs collectively account for 71% of all infill stock, with another 18% located in the San Francisco Bay Area, Boston and Miami.

⁴ Modern stock defined here as properties built since 2000 and larger than 200,000 square feet. A stricter definition of modern logistics stock could also include 36 foot clear heights, EFSR sprinklers, ample truck courts, and cross-docking, but these features tend to be more prevalent in newer industrial properties.

⁵ CoStar, data as of December 2018

⁶ CoStar, MSREI Strategy, data as of December 2018

optimize profitability with proximity to the consumer. While these technologies overlap, we see three distinct areas where technological innovations will likely affect the supply chain.

First, warehouse automation and big data analytics are changing supply chains and how companies utilize their warehouses. Big data in the supply chain allows companies to build better demand forecasts, lowering turnaround times, and optimizing delivery networks.⁷ These advances will continue to drive the shift towards larger, more centralized distribution networks and modern, efficient warehouses. Moreover, lower turnaround times may allow for leaner inventories, which ultimately could reduce the need for warehouse space relative to total sales. Predictive analytics and warehouse efficiency will be crucial for companies reducing shipping times, which may further enhance the use of the hub and spoke model.

Second, for the most sophisticated supply chains, the next frontier is increased automation of warehouse picking operations through robotics. For example, Amazon's warehouses (which employ 100,000 robots alongside 125,000 humans) are nearly 50% more efficient than the average retailer's.⁸ Improved warehouse efficiency (all other things being equal) reduces the need for logistics space, with Morgan Stanley Research estimating that Amazon's newer warehouses can handle the same freight capacity with 30% fewer square feet.⁹ Moreover, they estimate that only 14% of Amazon fulfillment centers are currently utilizing robotics. With

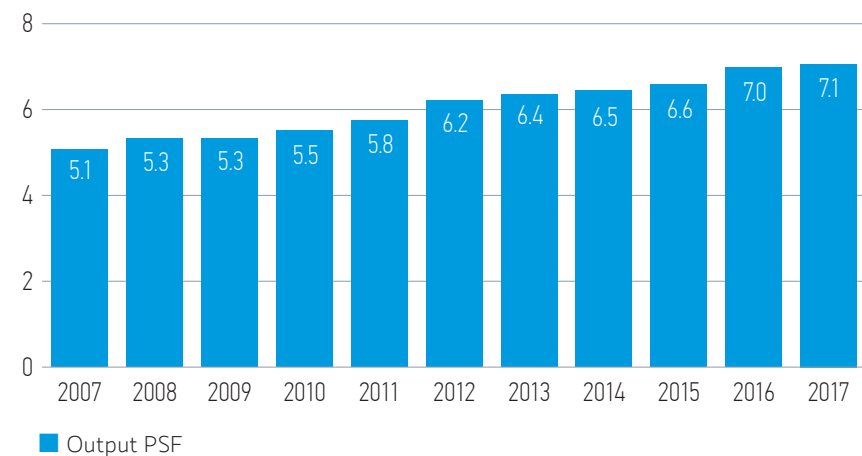
Amazon occupying an estimated 140 million square feet of logistics space, this increased utilization would reduce their occupancy needs by more than 35 million square feet. While we doubt Amazon would actually vacate this space, improved efficiencies may slow their take-up rate of new occupancy in the near to mid-term.

Higher levels of automation could also reduce the need for labor. Today, finding enough labor to staff a warehouse is a major challenge for companies, especially with historically tight labor market conditions. However, with more automation, smaller workforces may be capable of supporting larger warehouses.

DISPLAY 8

Warehouse Output

Warehouse Gross Value Added Per Square Foot

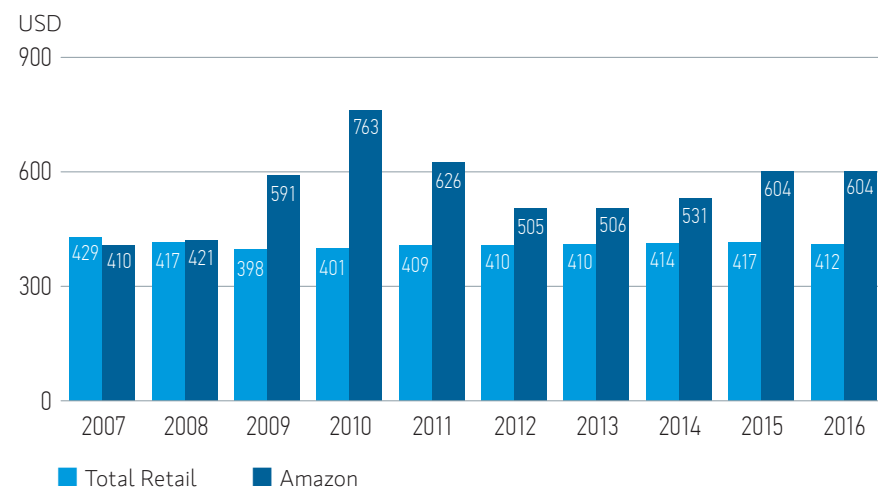


Source Bureau of Economic Analysis, CoStar, MSREI Strategy, data as of June 2018

DISPLAY 9

Amazon On the Forefront of Utilization

Annual Sales Per Warehouse Square Foot



Source Census Bureau, Moody's Analytics, Morgan Stanley Research, MWPVL International, Costar, Corporate filings, MSREI Strategy, data as of June 2018

⁷ McKinsey "Big data and the supply chain: The big-supply-chain analytics landscape (Part 1)" February 2016

⁸ The New York Times, "As Amazon Pushes Forward With Robots, Workers Find New Roles" September 10th 2017

⁹ Morgan Stanley Research "How Can AMZN Offset \$3Bn of Wage Increases?", October 15th 2018

Advances in robotics and analytics will also affect the supply chain through the development of autonomous trucking. McKinsey expects that the technology will emerge in four stages. They envision that the first and second stages will develop over the next several years and focus on “platooning”. At first drivers will remain in each truck, but wireless connections between vehicles will allow them to operate closer together and reduce fuel costs. The second stage of platooning, which they expect to occur over 2020 – 2025, will keep a driver in the lead truck with unmanned vehicles following closely behind. They estimate the use of platooning can reduce costs by approximately 11%. They call the third stage “constrained autonomy” and imagine that autonomous trucks will drive themselves on interstate highways at dedicated truck stops near urban centers where human drivers would take over. McKinsey expects this to develop over 2025 – 2027 and lower costs by an additional 9%. Finally, starting in 2027 they anticipate full autonomy will emerge with trucks driving autonomously along all highways. They expect full autonomy to lower cost another 25%.¹⁰

We anticipate several impacts from autonomous trucking. Proximity to highways, particularly interstate highways, may become a vital requirement for logistics tenants. Additionally, autonomous trucks may reduce the need for logistics tenants to locate near intermodal facilities as lower trucking costs may reduce intermodal freight demand. Warehouse operations may also move further away from higher cost infill locations as the cost of transportation falls. Finally, given autonomy will increase the distance a truck can travel in a given day (from 500 to 1,000 miles), centrally located markets may see increased demand.

¹⁰ McKinsey “Distraction of disruption? Autonomous trucks gain ground in US logistics” December 2018

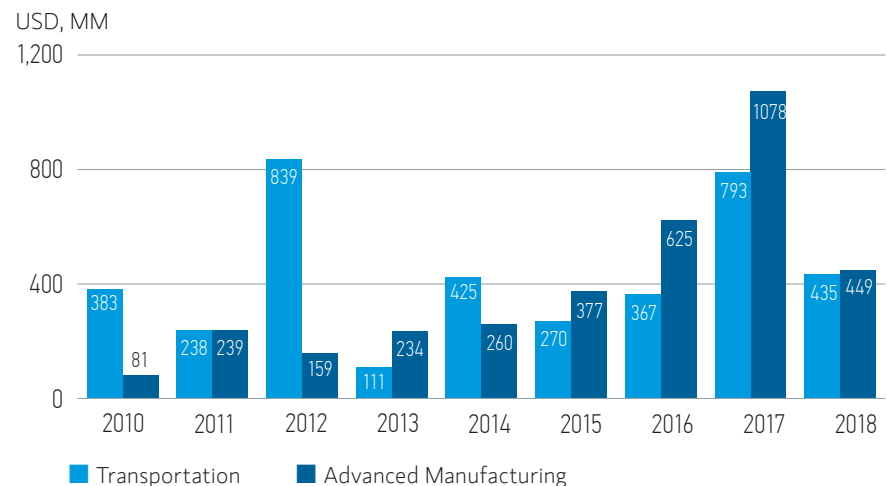
¹¹ Wired “Inside Adidas’ Robot-Powered, On-Demand Sneaker Factory” November 29th 2017

¹² Ibid.

Third, we expect that advanced manufacturing will influence the source of production and thus has the potential to shift supply chains with more manufacturing occurring in the United States. With speed to market becoming increasingly important and now seen by manufacturers as a key differentiator, we believe that advanced manufacturing techniques (i.e. 3D printing, industrial robotics, and virtual-reality assisted

manufacturing) will become a major force in the supply chain. This will likely increase warehouse demand in key manufacturing locations, particularly in the southeastern United States. One example is Adidas’ decision to open its “Speedfactory” in Atlanta.¹¹ “By placing factories closer to consumers, Adidas could ostensibly leapfrog over shipping delays and expenses”.¹²

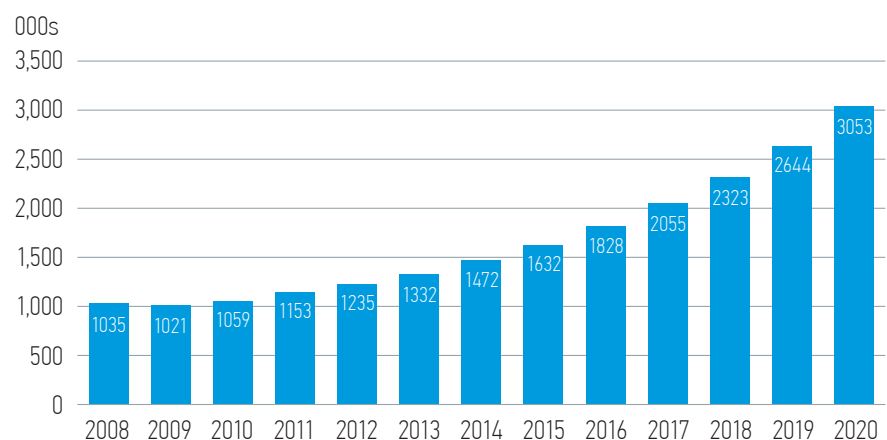
DISPLAY 10 Venture Capital Funding



Source: PWC MoneyTree, Pitchbook, National Venture Capital Association, as of June 2018

DISPLAY 11 Use of Industrial Robots Still Ramping Up

Industrial Robots



Source: International Federation of Robotics, as of June 2018

Conversely, advanced manufacturing may also reduce how much space tenants need. For example, 3-D printing may reduce the need for bulky manufacturing infrastructure and quicker lead times for products may reduce the need to carry larger inventories

Conclusion

Overall, we expect demand for industrial space to remain above historical levels, driven by continued growth in

e-commerce, manufacturing, and an expanding economy. We expect to see more divergence in market performance as tenants become more selective on location and believe exurban locations within the most attractive markets will optimize tenant profitability with a desire to be close to the consumer. The emergence of new technologies will lower the overall cost basis for warehouse users which could potentially enable logistics tenants to allocate the incremental savings to rent in higher

quality and better located warehouse facilities. Meanwhile, other secular trends such as shifts in consumption towards e-commerce, increases in local production, and just-in-time distribution should continue to boost industrial demand. The current and emerging trends in how industrial tenants seek to maximize the value of their real estate and drive space efficiencies likely favors the use of large exurban sites with good connectivity to large consumption markets.

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