NORTHWESTERN INDIANA REGIONAL PLANNING COMMISSION nirpc

E-COMMERCE IN NORTHWEST INDIANA

Fall 2020

ABOUT NIRPC

The northwestern indiana regional planning commission serves lake, porter and laporte counties in northwest indiana as a council of local governments that provides a forum for northwest indiana elected officials to address regional issues relating to transportation, environment, and economic development. Nirpc also functions as the metropolitan planning organization (mpo) for northwest indiana, working with federal and state transportation departments and local transit operators to prioritize and fund regional transportation projects

PROJECT TEAM

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Northwestern Indiana Regional Planning Commission

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NORTHWESTERN INDIANA REGIONALPLANNING COMMISSION

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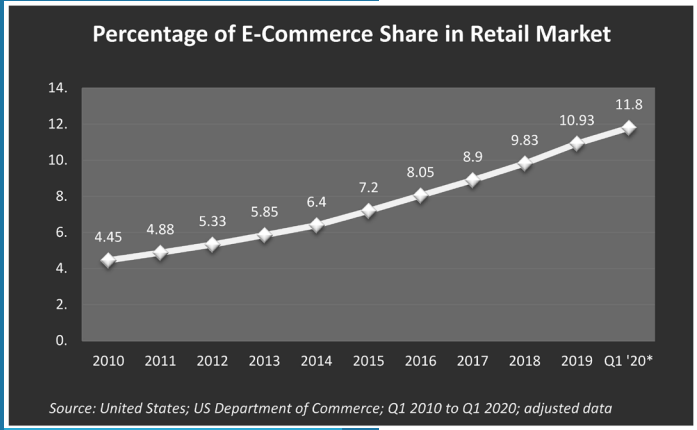
PROJECT OVERVIEW



IN 2009, THERE WAS A SINGLE DAILY INTERNET DELIVERY FOR EVERY 25 AMERICANS. TODAY, THERE'S ONE FOR EVERY EIGHT AMERICANS. AND THAT TRAFFIC WILL DOUBLE AGAIN BY 2023.

PROJECT OVERVIEW

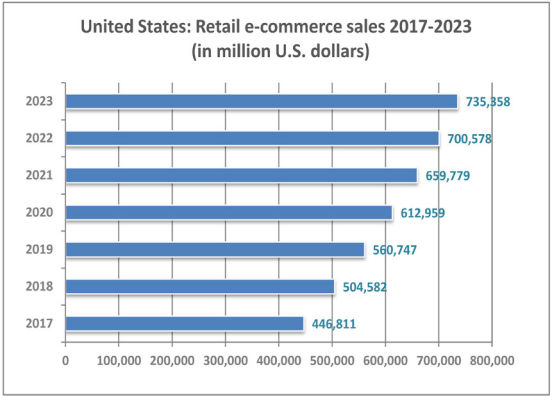
E-commerce is rapidly changing the face of retail in the world. Traditional big-box competitors are under pressure to reduce delivery lead times in order to increase speed to market, which directly impacts the transportation network. E-commerce is quickly changing cities and suburbs. Traditional malls have been devastated and large retail stores are going out of business. Urban freight delivery growth is expected to expand 40% by 2050 and that will increase congestion and negatively impact air quality. Cars and trucks are the largest source of greenhouse gas emissions especially trucks, which produce four times more nitrogen than cars and twenty two times more particles than petrol. E-commerce will also impact employment, where job training should be made available to accommodate advances in technology. The region's workforce will have to prepare for this shift and needs to comprehend the broad range of e-commerce impacts so as to benefit from its influence on our future.

PROJECT GOALS

Based on e-commerce current and future trends, and to accomplish *NWI 2050* regional goals and activities, NIRPC conducted this study to investigate the impacts of e-commerce on Northwest Indiana and offer recommendations to NWI municipalities on how best to anticipate e-commerce impacts, mitigate their effects on land use and transportation, and to harness the opportunities presented by e-commerce to ensure our communities leverage the benefits.

PLAN FOR E-COMMERCE LANDSCAPE

NWI 2050 represents a roadmap to fully realize the vision of a connected, renewed, united and vibrant 2050 through a set of strategies and action plans. One of the strategies of a connected region is to plan for e-commerce in Northwest Indiana. Since e-commerce has doubled in the last two years and tripled over the last decade, it is critical to harness the opportunities and investigate ways to prepare for this shift.



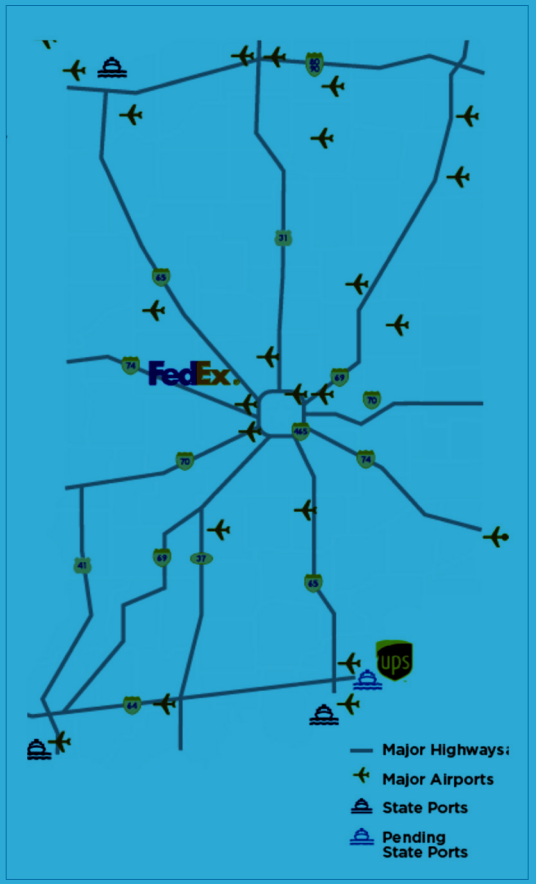
2050 PLAN E-COMMERCE STRATEGIES

REGIONAL

1. Forecast demand for future land development and the requirements of logistics use to accommodate e-commerce future needs.
2. Create a parcel-based map of current and potential e-commerce facilities locations along major NWI corridors to help identify economic centers and prioritize future transportation improvements.
3. Work with intermodal facilities and freight carriers to identify locations with high levels of freight movement to plan strategies to alleviate freight-related congestion.
4. Create plans and programs to address the impact of the growth of e-commerce in NWI on travel behavior, logistic systems and land use planning in partnership with regional and local agencies.
5. Work with the NWI Forum and local governments to meet local and regional needs by strategically investing in targeted transportation connectivity projects that support economic growth.

LOCAL

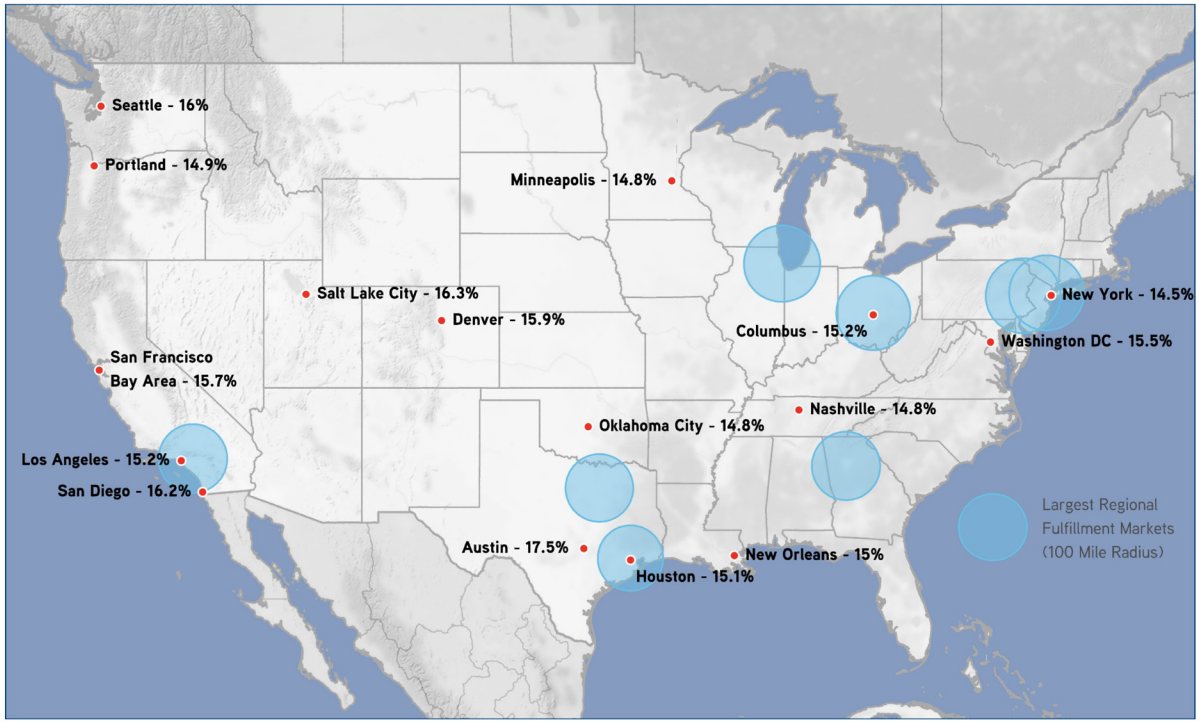
1. Coordinate in advance with private sector development of e-commerce facilities that will heavily utilize public infrastructure for transportation needs to improve overall efficiency.
2. Explore new tax structures to address expected issues with the decrease in property tax revenue because of the closure of brick and mortar retail. Since online shopping will continue to grow, local governments should find other ways to sustain local public services.
3. Develop and expand warehouses floor space and distribution centers to accommodate the growth of e-commerce.
4. Plan to repurpose big box retail and large surface parking to turn into distribution centers, logistics hubs, and supply chains.



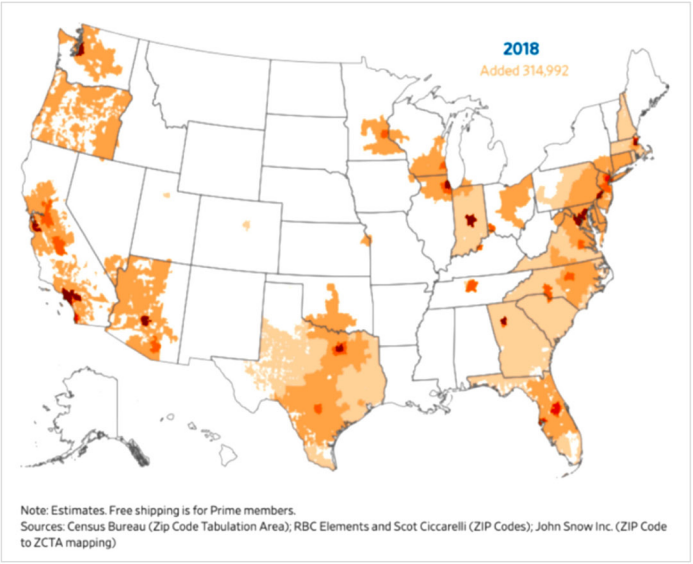
NWI Opportunities in E-Commerce

- NWI's transportation network employs many modes that accommodate travel needs. Currently, the region is home to 5,800 linear miles of roadways equaling over 13,000 total lane miles.
- Northwest Indiana is a great freight hub in the central United States. The region is served by no less than four U.S. interstates, three Class 1 freight railroads , and the Port of Indiana-Burns Harbor, which is a major transportation corridor with connections to the Atlantic via the St. Lawrence Seaway and the Gary-Chicago airport. The interstates and highways in the region are some of the most traveled in the country, providing vital connections within the region and throughout the Midwest, with ample opportunities for businesses and services.
- Indiana ranks ninth (9th) in best tax environment in the US based on the 2018 State Business Tax Index by Tax Foundation. This provides an incentive for innovative business and economic growth. The region has the opportunity to expand and diversify its workforce and economic sectors to meet the demands of emerging markets.
- NWI is close in proximity to the 2nd largest FedEx air hub worldwide, based in Indianapolis.
- UPS is expanding its express air network to Gary/ Chicago International Airport to help businesses in Northwest Indiana and the Chicago area successfully position themselves in the fast paced e-commerce market. In addition, UPS is leasing 14,000 square feet of office space in the Gary-Chicago airport's passenger terminal.
- NWI is located within the Chicago area fulfillment market that represents the third largest regional market in the U.S. Chicago provides accessibility to a world-class city with amenities and economic opportunity for residents and businesses. The proximity to major markets, along with a strong international economic center, offers vast potential for our region.
- NWI is located within the 250 miles of the top five industrial distribution markets in the United States. These are Cincinnati, Indianapolis, Kansas City, Memphis and St. Louis.

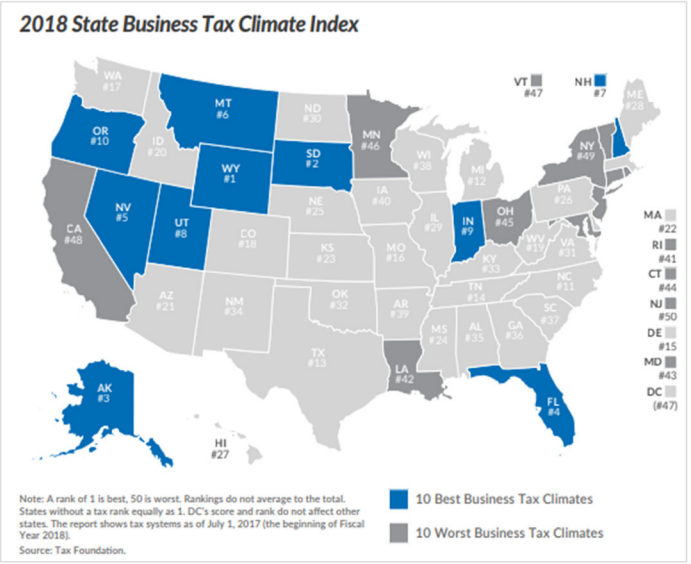
This map illustrates a 100-mile radius around each of the largest regional fulfillment markets in the U.S., as well as the locations of the cities with the highest percentages of millennials.
Source: Headlight Data, Colliers International



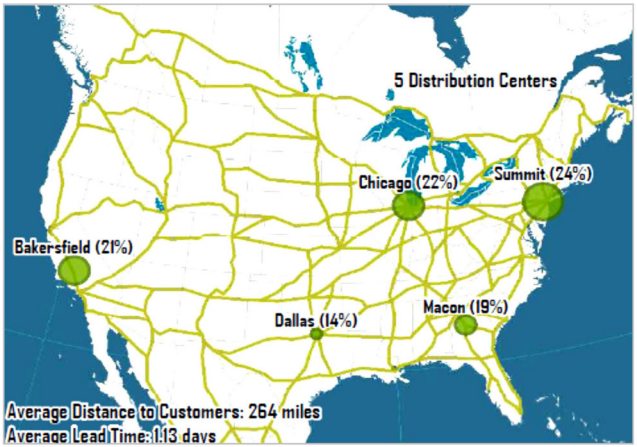
- Most urban warehousing is located one to 10 miles outside the urban center.

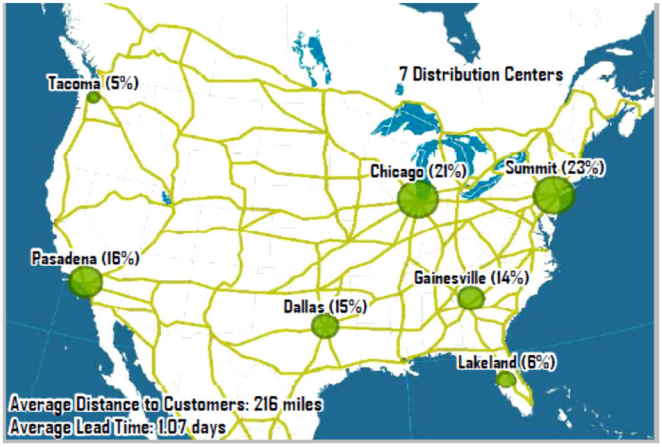


Note: Estimates. Free shipping is for Prime members.
Sources: Census Bureau (Zip Code Tabulation Area); RBC Elements and Scot Ciccarelli (ZIP Codes); John Snow Inc. (ZIP Code to ZCTA mapping)



Areas with access to free same-day and/ or one-day shipping, in square miles

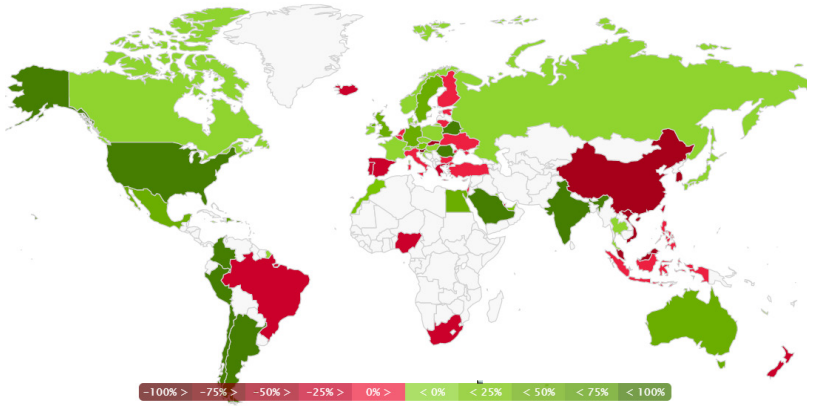




Optimal Location and Amount by Number of Freight Distribution Centers: Dr. Jean-Paul Rodrigue, Dept. of Global Studies & Geography, Hofstra University

PROJECT OUTCOMES

- E-commerce trends and impacts on land use, and transportation network and traffic.
- Local impact analysis on urban land use planning and freight movement.
- Potential locations for warehouses and distribution centers.
- Travel demand around existing and future e-commerce facilities.
- A set of recommendations for the Northwest Indiana municipalities on how best to anticipate e-commerce impacts, mitigate their effects, and benefit from the opportunities presented by e-commerce.



This map illustrates how pure play e-commerce and retailers (online activity) are performing worldwide in the second quarter of 2020. Source: https://insights.emarsys.com

THE NEED

The further expansion of e-commerce will impact urban logistics and change roadway system use and needs. It will also increase demand on facilities like warehousing, distribution centers, and last mile delivery. These facilities, located increasingly within urban areas, require interstate highway access to accommodate more frequent daily truck traffic. They also require larger workforces than traditional warehouses, even with increased automation. This leads to more trips by employees coming from areas with limited transit service options, and working multiple shifts. It increases the number of non-peak-period trips into residential areas impacting safety. These trips include traditional delivery services like FedEx, UPS, and USPS, as well as independent contractors who use personal vehicles to transport packages for companies like Uber.

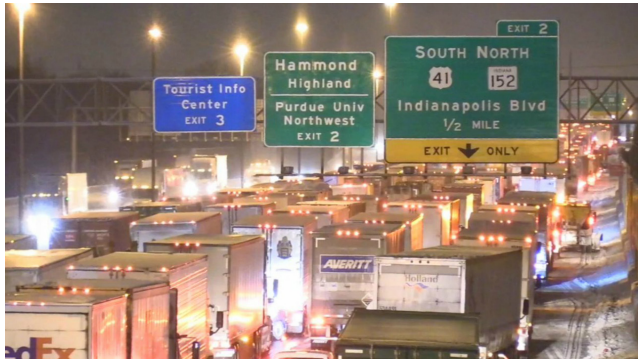
UNPREDICTED CHANGE IN E-COMMERCE

During the development of this e-commerce report, a sudden change in the e-commerce data occurred with the impact of COVID-19. COVID-19 expedited the closure of retail stores and the situation is rapidly impacting e-commerce. E-commerce experienced a boom in sales during the pandemic as online shopping became a preferred way to make purchases for many people. Recent surveys have revealed that a higher number of respondents will shop online than before the pandemic, meaning retail stores will continue to decline. According to Coresight research that is focusing on helping retail clients accelerate innovation and growth, there could be more than 15,000 store closures announced by retailers in 2020.

E-COMMERCE IMPACT ON TRANSPORTATION NETWORK

Growth of e-commerce will impact roadway network use and requirements. Urban freight delivery growth is largely expected to expand 40% by 2050. The INDOT Freight Plan estimated that freight volumes on major Northwest Indiana roads will climb from 13,000 to 44,000 trucks a day. This growth will increase traffic congestion and negatively impact air quality. Consequently, greenhouse gas emissions will increase To mitigate the related congestion issues, smart and tech-savvy strategies will be needed. Furthermore, the expansion of e-commerce will increase warehousing needs. These facilities, located increasingly within urban areas, require efficient interstate highway and major roads access to accommodate fast delivery. Even with increased automation, these facilities will require larger workforces than traditional warehouses would because of the growth of online shopping and same day delivery. That will lead to more trips by employees coming from areas with limited transit service or working multiple shifts.

Today's city streets and transportation networks simply were not designed to handle this additional flood of packages and freight trucks, especially with the added pressure of next-day or, in some cases, next-hour delivery.



THE IMPACTS OF E-COMMERCE ON RETAIL AND LAND USE

Retail stores may be diminished, but distribution centers continue to be fundamental for expanding logistics networks.

Living near a shopping location becomes less important when it is possible to order everything online and have it delivered to the home. Also, the potential for working remotely enabled by the Internet can allow for greater opportunities to live in remote locations.

In the future, as home shopping grows, malls and other shopping centers will likely need to be refurbished into logistics hubs, supply spaces, or removed altogether and the land redeveloped for other uses.

The current practice of decentralization and suburbanization impact the e-commerce distribution systems for business-to-consumer, and might gradually extend into more remote and less densely populated areas.

SHARE OF E-COMMERCE SALES OF TOTAL US RETAIL SALES 1ST QUARTER OF 2020 WAS:

12%

Sources: US Department of Commerce; US Census Bureau, Statista 2020, Additional Information: United States; US Department of Commerce; Q1 2020, adjusted data

LIVING NEAR A SHOPPING LOCATION BECOMES LESS IMPORTANT WHEN IT IS POSSIBLE TO ORDER EVERYTHING ONLINE AND HAVE IT DELIVERED TO THE HOME.

E-commerce warehouses will grow larger in urban locations and generate more daily truck traffic, which local communities and regional entities need to consider in their planning.

Express delivery services may result in challenges to mixed-use developments with limited freight zones and multiunit housing with limited storage for packages and fresh food deliveries

Some cities are better for e-commerce fulfillment than others due to their proximity to an e-retailer's customer base. Locating fulfillment facilities closer to the customer is needed in order to meet service commitment goals such as aggressive delivery schedules.

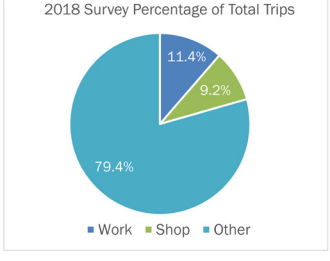
PART II

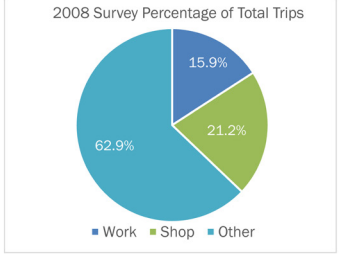
DATA ANALYSIS & IMPLICATIONS

BACKGROUND AND DATA ANALYSIS

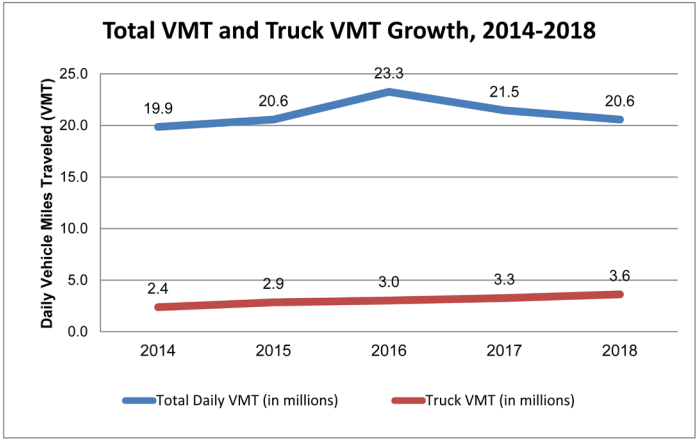
TRANSPORTATION

To better understand the effects of increasing e-commerce on congestion, it is important to first consider the big-picture transformation in traveling patterns that e-commerce causes: a shift away from consumers traveling to retail stores and shopping centers toward delivery vehicles bringing purchased goods to consumers' homes and workplaces. This means that in order to truly diagnose the net effects of increased e-commerce on congestion, one must account for both the decrease in shopping trips from residences and workplaces to retail centers and the increase in truck/van delivery trips to residences and workplaces. And it is more complicated than that—the decrease in shopping trips on the region's roads and highways due to less physical shopping could be replaced by an increase in trips with other purposes in an effect known as "induced demand"; likewise, the increase in truck/van trips is not solely attributable to e-commerce deliveries, but could also be due to increases in economic output in general. This is why it is critically important to examine data sources that have the ability to distinguish between types of trips and vehicles in order to best glimpse the true effect of e-commerce on congestion.





On the one hand, the rise of e-commerce has clearly led to a decrease in shopping trips. NIRPC conducts a household travel survey approximately every 10 years, and the most recently completed household travel survey conducted in Fall 2018 showed home-based shopping trips comprising 9.2% of all trips, down from 21.2% from the previous household travel survey completed in 2008, as shown on the previous page. This is a significant decrease in shopping trips in just a 10-year period, meaning that the trend of e-commerce contributed to a decrease in shopping trips. This decrease in shopping trips seems correlated with an increase in e-commerce shipments and deliveries, as seen in the trends of Total Vehicle Miles Traveled (VMT) and Truck VMT as shown below. Even though Total VMT increased only slightly between 2014 and 2018, even seeing a slight decline between 2016 and 2018, Truck VMT increased steadily over the same period.



LAND USE AND RETAIL

It is estimated that e-commerce could reduce the need for one-and-a-half billion square feet of retail space in the US, about 5% of the total and could increase warehouse space by 850 million square feet, to 14.8 billion square feet by 2023.

FACTS

A

In the last two years the transportation and warehousing industry employment increased in the sector of warehousing and storage as the demand for additional warehouses was significant.

B

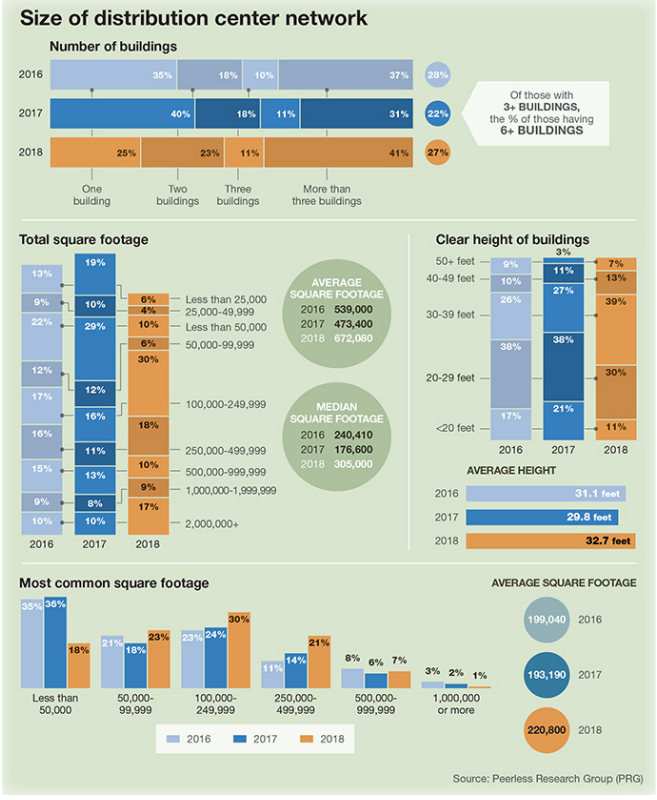
E-commerce has required the development of entirely new types of distribution facilities, such as e-fulfillment centers that are designed to service large volumes of heterogeneous orders to be shipped in parcels.

C

E-commerce and consumer-driven logistics consist of shipping to ports, then trucked to major warehouses, then spread to small distribution centers, and lastly fed to last mile warehouses that are close to customers that occasionally require same day deliveries.

D

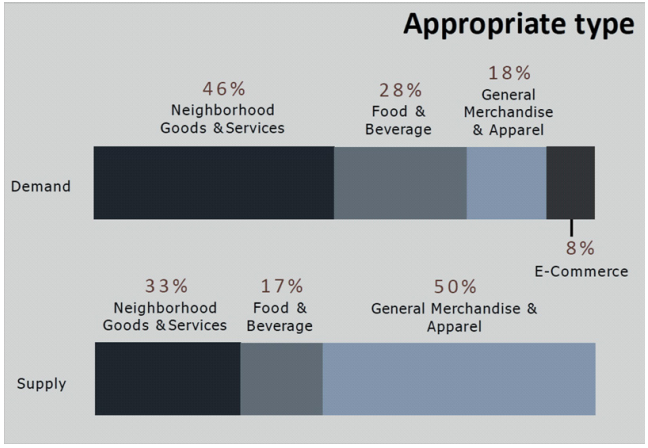
Locations near customers and accessibility of different modes of transport are keys for successful e-commerce in Northwest Indiana.



PRIORITIZATION CRITERIA

In order to understand land use changes and demand in Northwest Indiana for e-commerce, The NIRPC team collected and analyzed data. A prioritization methodology was developed by the NIRPC project team using criteria to define high priority areas for e-commerce. The results of the analysis are presented in the form of maps and tables using Geographic Information Systems (GIS). The maps are developed based on Northwest Indiana regional data.

Source: Resilient Retail in the Internet Age, Montgomery County Planning Department, Montgomery County, MD



MPO travel demand models and forecasts are performed based on traffic, population, employment, and land-use data. If e-commerce has direct implications on land use and traffic, land-use planning becomes even more critical to ensure that e-commerce-related facilities are suitable to other land uses in spatial relation to schools, residential areas, transportation hubs, and other uses. In order to best narrow locations to locate and accommodate e-commerce needs, the NIRPC team put together a number of criteria to assist in prioritizing these locations. In these criteria both negative and positive impacts are considered. These criteria are as follows:

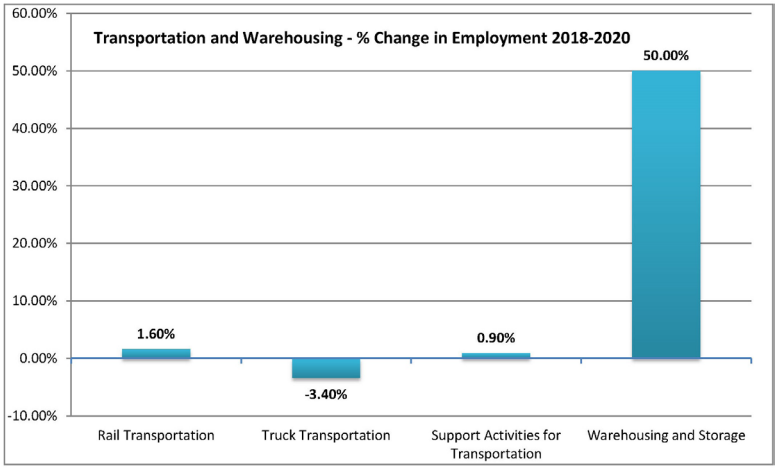
1. **Close proximity to major transportation nodes that are near ports (air and water), rail, and major roads and interstates.**
2. **Close to major suppliers, producers, and customers to reduce lead time and reduce transportation cost and keep pace with aggressive delivery schedules.**
3. **Minimal environmental impacts such as flood, wetland, conservation areas, noise (not to be in proximity to residential areas).**
4. **Location of omni stores*, regional centers, and cluster of industrial parks.**
5. **Areas with high population and employment density.**

**Omni store is a store with a multi-channel sales approach that provides the customer with an integrated customer experience. The customer can be shopping online or in a bricks and mortar store and the experience would be seamless.*

REGIONAL STATISTICS

Geography	Geography Code	Year	Industry	Industry	Base Year Emp.	Proj. Year Emp.	Percent Change
EGR 1, IN*	470109	2020	Rail Transportation	482000	3,479	3,536	1.60%
EGR 1, IN	470109	2020	Truck Transportation	484000	6,777	6,547	-3.40%
EGR 1, IN	470109	2020	Support Activities for Transportation	488000	1,132	1,142	0.90%
EGR 1, IN	470109	2020	Warehousing and Storage	493000	1,327	1,990	50.00%

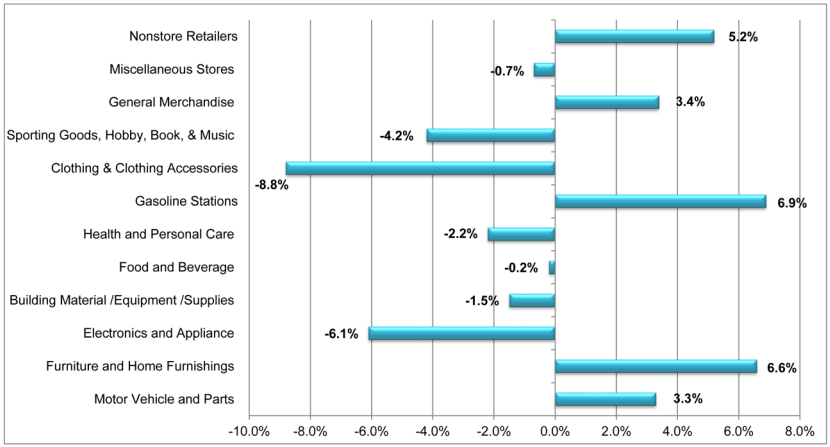
SOURCE: INDIANA DEPARTEMENT OF WORKFORCE DEVELOPMENT- RESEARCH AND ANALYSIS



*Indiana EGR1 Counties:
Lake, Porter, LaPorte, Newton, Jasper, Strake, and Pulaski

WORKFORCE

- Diversifying the workforce to meet the future logistics job demand.
- Job placement centers and economic developers should prepare for these changes by training workers for positions in information technology, logistics and other trending technical positions.



Indiana EGR 1: All Trades Percentage Projected Change 2018-2020

Source: Indiana Departement of Workforce Development- Research and Analysis

The "All Trades" chart on the left conveys the fact that some types of retail has already declined in the last two years, before the pandemic. The most impacted types of retail in region 1 in Indiana are electronics and appliance stores, which declined by 6.1%, and clothing and clothing accessories, which dropped by 8.8%. The data represents Indiana Region 1 in Northwest Indiana that includes Jasper, Lake, La Porte, Newton, Porter, Pulaski, and Starke counties.

Left: Port of Indiana-Burns Harbor / Credit: Ports of Indiana.
Right: East Chicago Steel Mill Canal/ Credit: One Region NWI

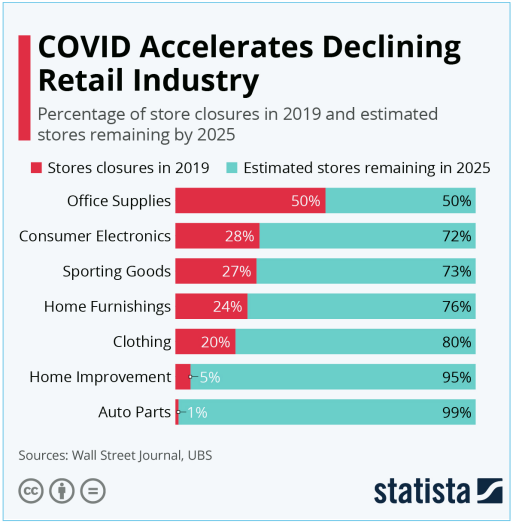
In order to analyze and map criteria, a two mile buffer was drawn around major roads in Northwest Indiana that represent viable accessibility for e-commerce access needs.

The Access map supports criterion number 1 and demonstrates the major transportation nodes, rails, and ports in Northwest Indiana. The transportation network contains and accommodates many modes of travel.

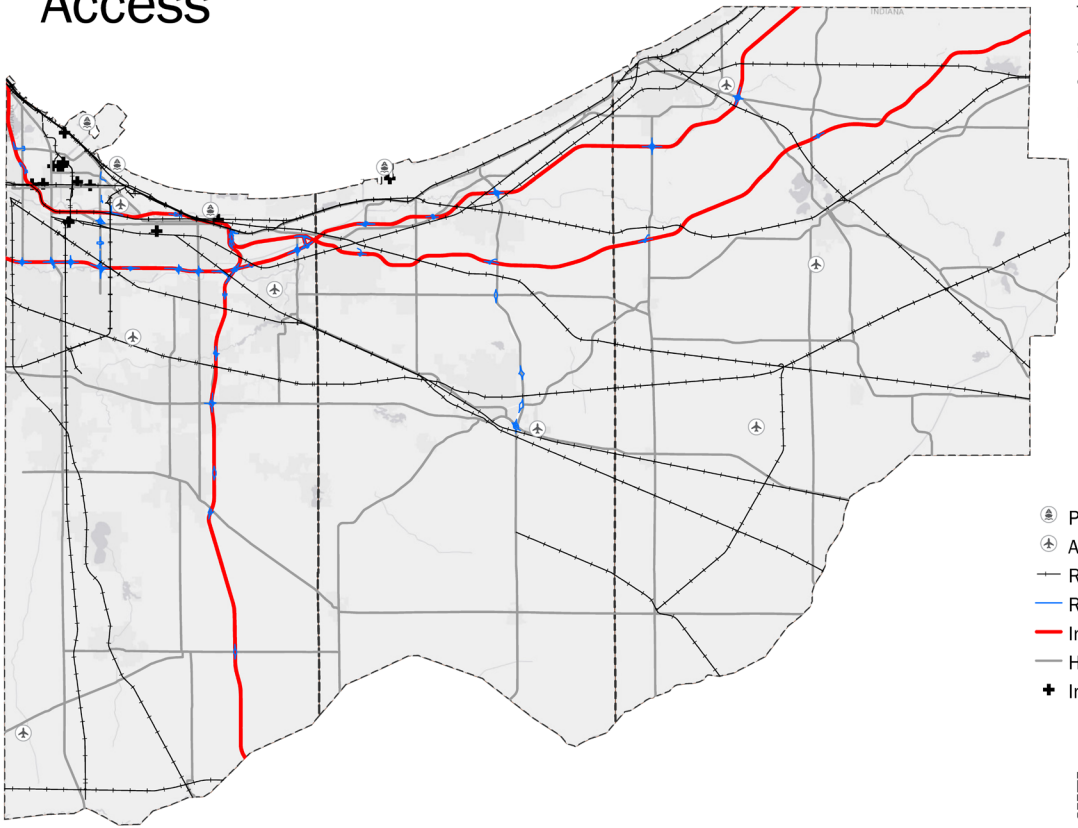
Currently, The region is served by no less than four U.S. interstates, three Class 1 freight railroads, and the Port of Indiana-Burns Harbor, which is a major transportation corridor with connections to the Atlantic via the St. Lawrence Seaway and the Gary-Chicago airport. The interstates and highways in the region are some of the most traveled in the country, providing vital connections within the region and throughout the Midwest with ample opportunities for businesses and services.

The main infrastructures of accessibility are found in the region. However, there are other factors such as congestion and safety, that could impact transportation efficiency.

Transportation and warehousing represent 17.6% of total industry in Northwest Indiana vs. 15.1% in Indianapolis.



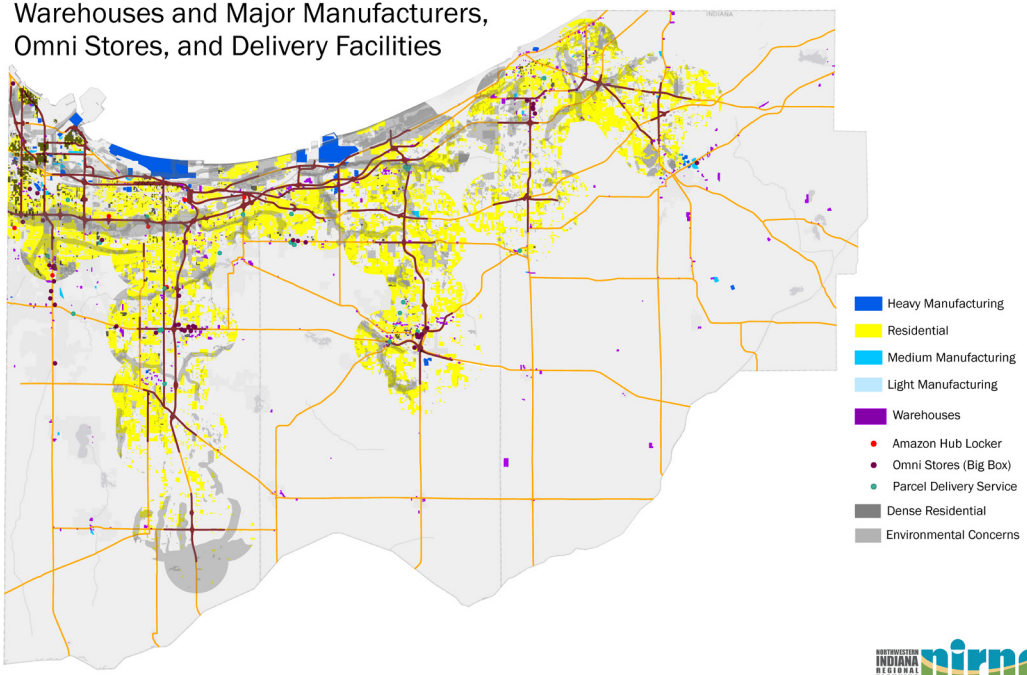
Access



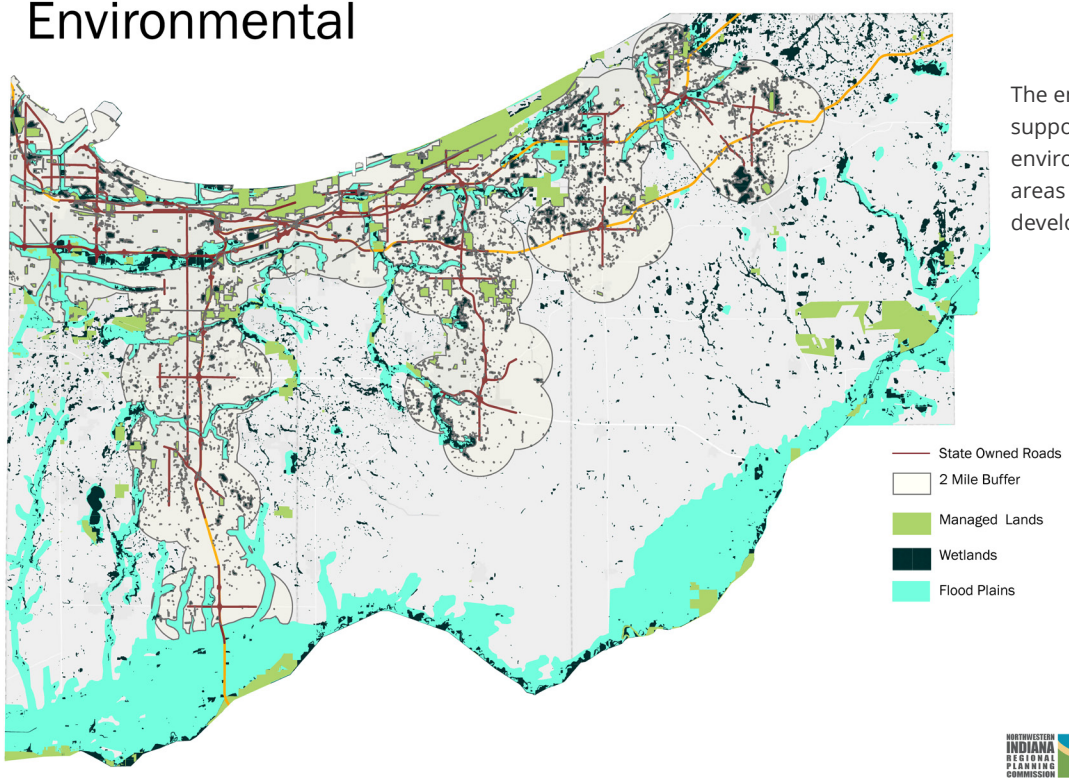
The Access map supports criterion 1 and demonstrates the major transportation nodes, rails, and ports in Northwest Indiana.

The warehouses and distribution centers map supports criteria 3 & 4 and shows that the majority of these facilities within the region are located in proximity to major manufacturing, regional centers, or major roads. Transportation and Warehousing in Northwest Indiana represent 17.6% of total industry versus 15.1% in Indianapolis.

Warehouses and Major Manufacturers, Omni Stores, and Delivery Facilities

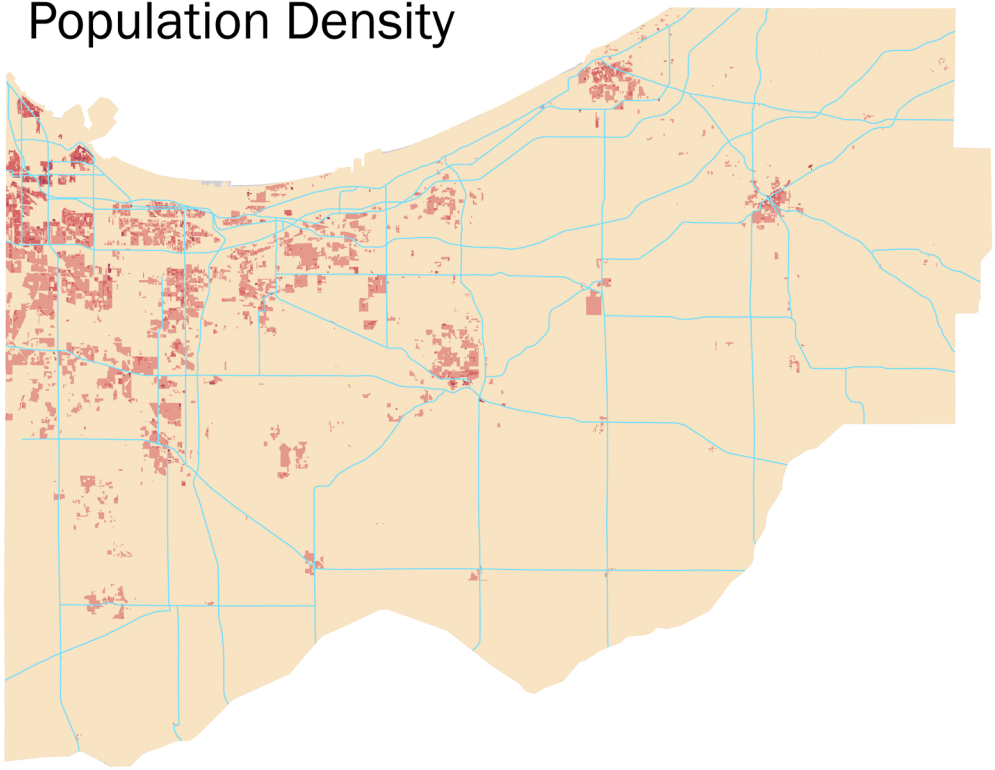


Environmental



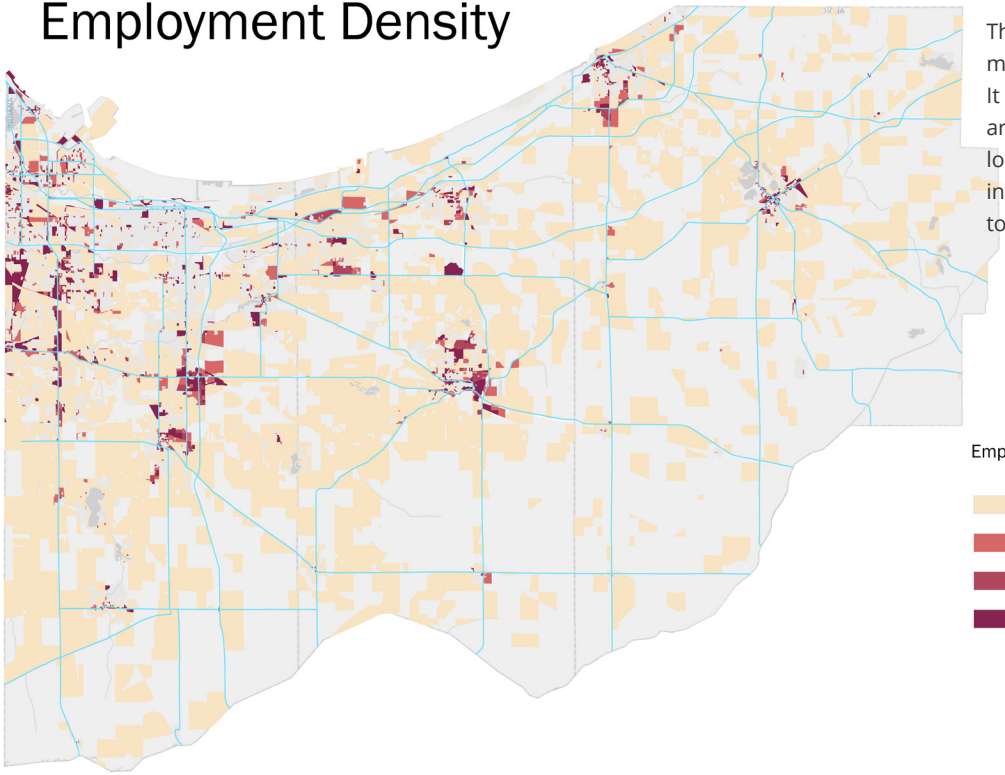
The environmental map supports criterion 3. It presents environmetally restricted areas that are not available for development.

Population Density



The population density map supports criterion 5. It shows the high density areas that are ideal locations for delivery hubs, in order to be located closer to their customers, reduce transportation costs, and keep pace with aggressive delivery schedules.

Employment Density



The employment density map supports criterion 5. It shows the high density areas that are ideal locations for delivery hubs, in order to be located closer to their customers.

E-COMMERCE POTENTIAL LOCATIONS

All five criteria are applied and evaluated using map analysis and demographic data within a 2-mile buffer of major roads and interstates. All desired locations that achieve good accessibility to major transportation and transportation hubs are considered. These potential locations include major centers and high-density population and employment areas. Environmental impacts within the two-mile buffer were counted and excluded from potential locations as shown on the map.

Transportation Modeling of E-Commerce Potential Locations

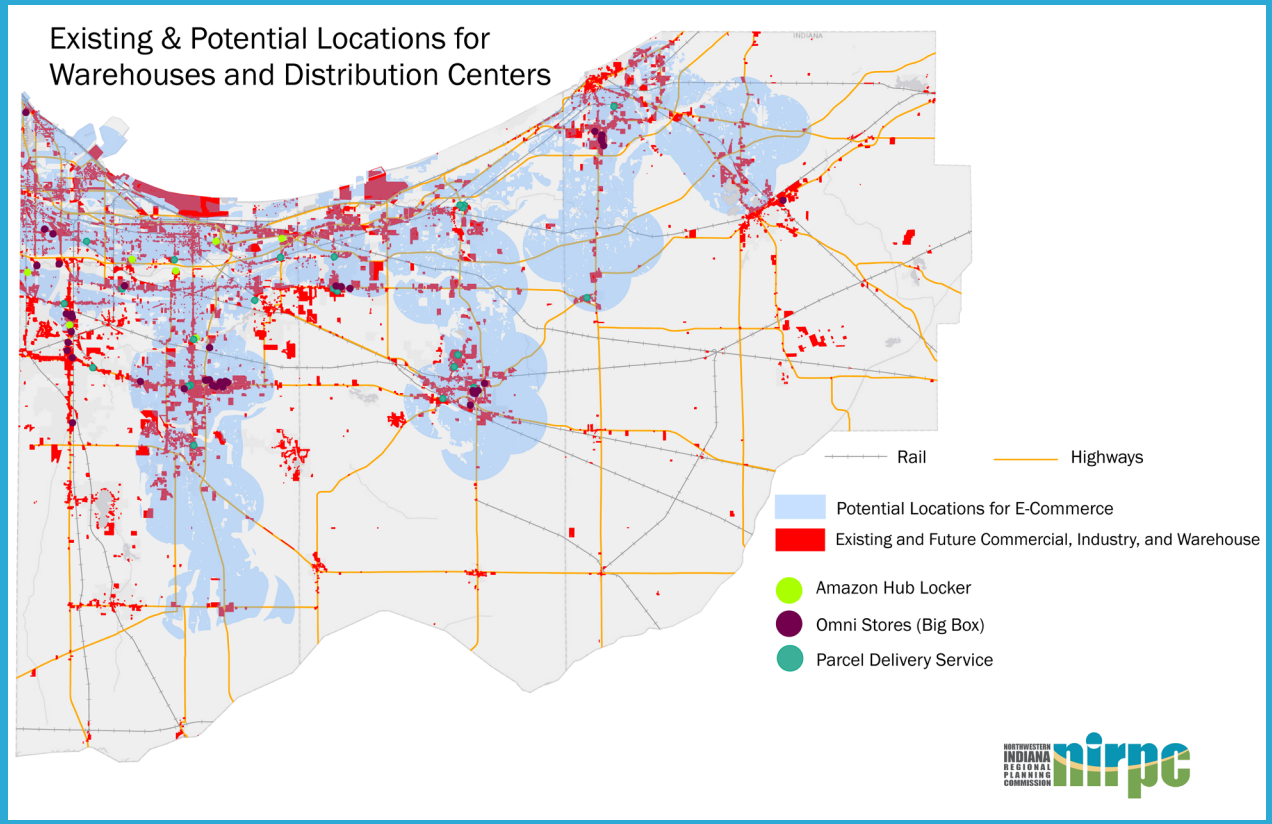
Based on a suitability analysis of e-commerce potential locations using Geographic Information Systems (GIS), NIRPC staff performed a travel demand modeling analysis for five potential sites of a major ecommerce distribution center and their potential effects on nearby surrounding locations. It collectively resulted in five potential ecommerce clusters. The locations of the five potential clusters used in the travel demand modeling analysis are as follows:

1. North Lake County, with a potential distribution center located near the I-80/94/Burr St Interchange,
2. South Lake County, with a potential distribution center located near the I-65/US 231 Interchange,
3. North Porter County, with a potential distribution center located near the I-94/US 20 Interchange,
4. Central Porter County, with a potential distribution center located near the SR 49/Vale Park Rd Interchange,
5. LaPorte County, with a potential distribution center located near the I-94/US 421 Interchange.

For each cluster, the travel demand modeling analysis assumed that the potential distribution center would employ 1,000 people at the site itself and an additional 250 people in other nearby areas within the cluster, along with an additional 3,340 residents spread across the Northwestern Indiana Region to support these new jobs. At a high level, the travel demand model analysis examined the congestion impacts networkwide along the metrics of total Vehicle Miles Traveled (VMT) and total Vehicle Hours Traveled (VHT) for each of the five clusters. The result of the high-level travel demand model analysis for the year 2025 is shown in the table below:

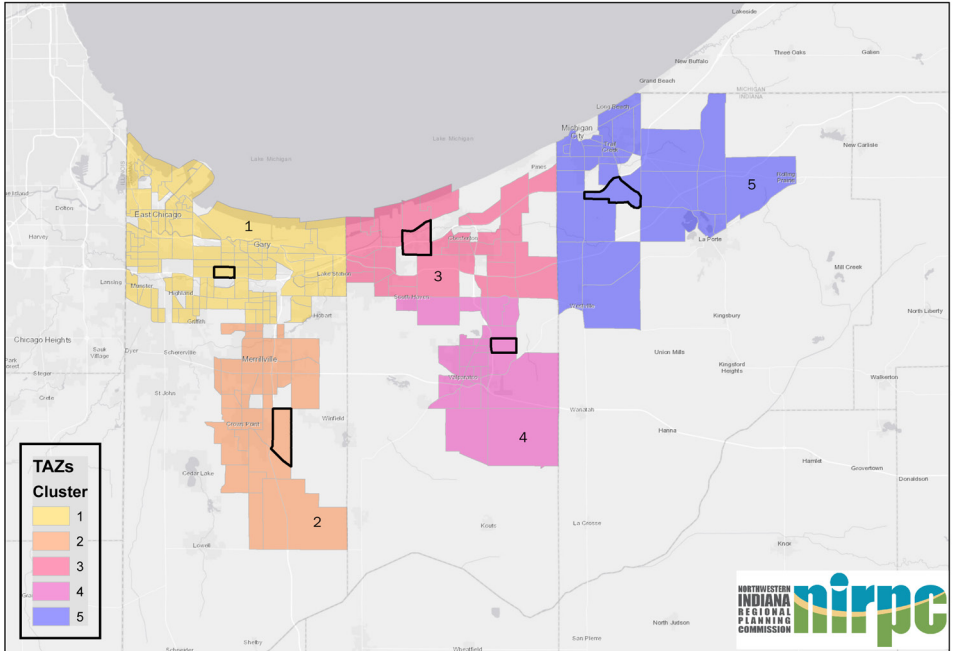
Cluster	Total Daily Vehicle Miles Traveled (VMT)	Total Daily Vehicle Hours Traveled (VHT)
Baseline Scenario – No Distribution Center	21,223,573	814,093
1. North Lake County	21,242,621	812,933
2. South Lake County	21,241,882	813,387
3. North Porter County	21,246,543	815,500
4. Central Porter County	21,214,589	810,336
5. LaPorte County	21,208,634	810,322

Travel Demand Modeling Analysis Congestion Impact Summary Across the Entire Northwestern Indiana Region for Five Potential Ecommerce Clusters for the Year 2025


Existing & Potential Locations for
Warehouses and Distribution Centers
Rail
Highways
Potential Locations for E-Commerce
Existing and Future Commercial, Industry, and Warehouse
Amazon Hub Locker
Omni Stores (Big Box)
Parcel Delivery Service
NORTHWESTERN INDIANA REGIONAL PLANNING COMMISSION
nirpc

The travel demand modeling table on the previous page shows that the LaPorte County cluster performs best in terms of total regional congestion impacts, with the lowest VMT and VHT. The Central Porter County cluster performs as the second best. Depending on whether one values VMT or VHT more, the North Lake County and South Lake County clusters perform as the third and fourth best. The North Porter County cluster performs worst in terms of total congestion impacts.

Potential Ecommerce Cluster Travel Analysis Zones (Best TAZ for Development Outlined in Black)



The map shows the Travel Analysis Zones outlined in black are simply the TAZs with the best proximity to the highway system and the surrounding TAZs within the cluster.

PART III

RECOMMENDATIONS / NEXT STEPS

NWI E-COMMERCE RECOMMENDATIONS

Transportation

- Include e-commerce, logistics demand, and freight transport in important strategy documents such as the comprehensive plans, and plan for the mobility effects of e-commerce.
- Map the delivery system, including alleyways, to improve the urban freight system.
- Improve transportation network connectivity to mitigate congestion on major arterials and interstates.
- Create loading zones on high traffic roads to make it easier for delivery drivers to find space and access buildings without impeding other road users.
- Increase and prioritize fuding to improve urban freight movement, and continue to raise the Region's profile as a thriving place to do business.
- Provide smart package delivery rooms in multiunit housing, university campuses, and office buildings to improve the delivery and pickup experience for couriers, staff, and residents, and reduce delivery trip times.
- Work with intermodal facilities and e-commerce carriers to identify locations with high levels of freight movement and to map out strategies for alleviating freight-related congestion.

SHIFT TOWARD AUTOMATED VEHICLE (AV)

The shift toward Automated Vehicle (AV) trucks help relieve congestion. AV trucks will be able to dramatically shorten following distances between other vehicles, increasing road capacity. Even before fully automated trucks are deployed, lower levels of automation, such as truck platooning, have already shown, in some real-world examples, the increased throughput of trucks. AV trucks can also improve safety by eliminating human error. As more and more trucks become electric, the harmful effects of congestion on air quality will be reduced. Even if initially the net effect of improved air quality for electric trucks is minor because of a predominately fossil fuel electric grid, the area subjected to those harmful emissions will be restricted to the areas around the power plants, not the areas where more people are (i.e. the Distribution Centers, commercial, and residential areas that receive e-commerce deliveries). Furthermore, as the grid becomes increasingly powered by renewable energy sources, there will be fewer overall harmful emissions.

Land Use and Retail

- Rezone, rethink adaptive reuse[1], and re-purpose larger vacant retail buildings into other uses.
- Transform vacant space into shared creative workspaces and community gathering places.
- Provide coworking space, opportunities for artists to exhibit and sell their work, revenue-sharing deals, and active programming open to the community.
- Redevelope blighted sites, which is especielly vital for inner-ring communities that have no land available to grow their tax base.
- Create niche storefronts that are perceived to be the most protected (in contrast to big-box stores) because they often carry products that are unique to a particular retailer, and thus the customer is likely to visit and even purchase something because they could not find a product otherwise.
- **Location:** Property owners and real estate investors need to focus on location, innovation, building efficiency, and flexibility by capitalizing on urban areas with high density of population and with high-growth areas. Demand for warehouse and distribution centers that exceed 250,000 square feet is growing in secondary major distribution and population hubs. Chicago as a tier-one market has become more congested and their supply infrequent. Northwest Indiana, being close to Chicago, has a tremendous chance to grow as a secondary major distribution hub.
- Add smaller sorting and delivery hubs, and locate them closer to their customers.
- **Buildings:** Build smart facilities and improve the efficiency of existing buildings to meet e-commerce demand. E-commerce companies need larger mezzanine areas on multiple levels – The height clearance range from 36' to 40'. New buildings can typically accommodate two or even three levels of mezzanine for picking, packaging, gift wrapping, returns, and other back-office tasks.
- **Parking:** large surface parking of vacant retail could be redesigned for other use. However**,** various e-commerce companies are requiring larger sites to accommodate employee parking because they hire intensive labor forces for picking and packing to fill online orders.

1 Adaptive reuse refers to the practice of taking existing buildings and repurposing them for a different use, while maintaining as much of the original structure as possible. Adaptive reuse differs from renovation in that the repurposed property serves a notably different function from the first. Because it utilizes existing structures, adaptive reuse can be up to 16% cheaper than new construction and take 18% less time to complete a project

LAST-MILE WAREHOUSES ARE LOCATED IN DENSELY POPULATED AREAS THAT COMMAND HIGHER REAL ESTATE PRICES. THEY HAVE RELATIVELY SMALL 50,000 TO 100,000 SQUARE FOOT FACILITIES.

Amazon hired 500 workers at Gary delivery station and established a few good entrepreneurs to help deliver packages throughout Northwest Indiana.

Source : Chicagocrusader.com, and nwitimes.com

Right:: Vacant Macy's store was reused for a health facility center at Exton Square Mall.

Source: https://www.hfmmagazine.com/articles/3228-repurposing-retail-space-for-health-care-use

RESIDENTIAL SAFETY IN SHIPPING COMPANIES

E-commerce eliminates the consumer's trip to a brick and mortar store, replacing that trip with delivery trucks or vans to residential areas. Increasing levels of traffic from unfamiliar drivers may bring forth a need to implement strategies that help maintain safety within neighborhoods. There are several different strategies that could be used to slow delivery vehicles, from signage to design considerations.

Strategies may include:

- Posting signage indicating delivery trucks to slow down within the residential neighborhood
- Posting low speed limits
- Road designs including bump-outs at crosswalks, and Chicane*
- Dense residential/ multifamily areas could establish a central drop off area
- Include a package room in an apartment complex that is comfortably accessible.

**A chicane is a serpentine curve in a road, added by design rather than dictated by geography. Chicanes add extra turns and are used on roads and streets to slow traffic for safety.*

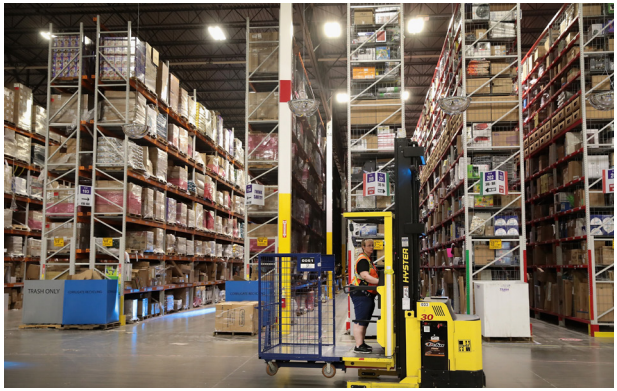
Chicane in a residential area.
source https://safety.fhwa.dot.gov/speedmgt/ePrimer_modules/module3.cfm

Example of an apartment building package room

Fix the Adverse Impact

E-commerce is rapidly changing the face of the retail world. Some physical shops and retailers struggle and some are forced to close. Similarly, empty spaces have increased in malls and shopping strips. Analysts estimate that 1 in 4 shopping malls will close their doors by 2022 while e-commerce will continue to grow. They are largely located in key locations with good accessibility to major roads and highways.

Many large chain retailers have been substantially reduced their footprint in recent years. Stores can also be designed to effectively satisfy the characteristics of e-commerce, acting partially as showrooms, or warehouses and pickup locations (known as omni stores). Following are some of the successful efforts and ideas for mallas and shopping centers that have been implemented to offset the negative impacts of e-commerce.



Workers pack and ship customer orders at the 750,000-square-foot Amazon fulfillment center in Romeoville, Illinois. Source: Curbed.com

A redevelopment plan of an ex-Sears site at the Asheville Mall, Asheville, NC. The site will be reshaped into a mixed-use facility that includes an open-air plaza with retail, a state-of-the-art cinema, and 6-story residential complex. Source: https://www.citizen-times.com

REPURPOSING VACANT RETAIL SPACE:

Architects and planners presented clever ideas for repurposing vacant retail space. Some turned them into a place where people meet, interact, shop, and enjoy entertainment. Others turned them into work and play places to have the balance of coworking in a retail center and being able to easily walk to restaurants and shops. It benefits both workers and business owners to have more foot traffic.

Some old malls never died. They have been refit for other uses. Malls have enough square footage for distribution centers and warehouses because they are often located along highways. Other malls turned into medical centers, community college campuses, or health clubs. Empty big box stores are also being redesigned for other uses such as courthouses, libraries, and even central parks or museums.

A rethinking of what retail means for shoppers has revisited the traditional town center that purposely includes mixed uses of retail, work, and entertainment with residential and accessible transit.

THE FUTURE OF RETAIL IS MORE LIKELY OMNI-CHANNEL IN NATURE AND AN OMNI-CHANNEL APPROACH TO RETAIL CAN BE APPLIED TO ANY FORM OF SHOPPING CENTER OR BIG BOX STORE, IN ANY SETTING.

On the right the before and after of an abandoned Wal-Mart in McAllen, Texas that has been converted into a new 123,000 square feet modern library.

Source:
https://www.archdaily.com/339970/mcallen-main-library-meyer-scherer-rockcastle

https://99percentinvisible.org/article/ghost-boxes-reusing-abandoned-big-box-superstores-across-america/

EXPERIENTIAL RETAIL

Retailers have been forced to reconsider their role in the marketplace and find new, creative ways of getting customers back in their stores with the increase of online shopping. This introduces the concept of 'retailtainment'. Retailtainment provides customers with unique and entertaining experiences that promote shopping on new levels. The aspiration for retail experiences is rising, with over 50% of millennial spending going to experience-related purchases.

Pop-up stores in a variety of forms are also driving demand for physical retail outlets. Short-term leases provide flexibility with opportunities to experiment and to exploit unique spaces. Many of these are tied to holidays and product launches

The ongoing trend of transforming retail-focused resources into more comprehensive activities that integrate residential and commercial uses will likely be the most influential retail trend in the next decade.

Based on recent trends, customers prefer to shop online because it is quick and offers fast delivery. If retailers would like to draw customers back, their stores should consistently be convenient and take less of a customer's time.

Above: *Nike's SoHo flagship store, has built-in event spaces. Its in-store basketball court, soccer trial space, and treadmills to buy and try their products while having fun.*
Source: *https://www.lightspeedhq.com/blog/the-rise-of-experiential-retail/*

Right: *Ikea U.K. brought 100 Facebook competition winners to spend the night to select and experience mattresses, sheets, and pillows, which created a new idea to interact directly with their customer.*
Source: *https://www.dailymail.co.uk/*

NEXT STEPS

Planning for e-commerce in Northwest Indiana is a new initiative at the regional and local levels. Further plans, capacity building, and funding should be established to optimize e-commerce opportunities within the region. NIRPC as the Metropolitan Planning Organization, established this project as part of the implementation of *NWI 2050* and will continue to work with other agencies in achieving the goals and strategies to improve and expand e-commerce within the region. The following are NIRPC's current goals to improve congestion and freight movement in Northwest Indiana that are considered fundamental criteria to locating e-commerce facilities:

- Reduce congestion by developing a regional railroad crossing improvement plan with a focus on major roads-rail grade separations.
- Improve regional transportation network connectivity to mitigate congestion on major arterials and interstates.
- Increase and prioritize funding to improve urban freight movement.
- Analyze freight data to identify truck freight bottlenecks.
- Work with intermodal facilities and freight carriers to identify locations with high levels of freight movement and plan strategies for alleviating freight-related congestion.

Integrating E-Commerce into NIRPC Transportation Plan & Funding

NIRPC, as the Metropolitan Planning Organization (MPO), is required to develop a long-range transportation plan as well as a Transportation Improvement Program (TIP) every four years. NIRPC included an e-commerce potential locations map as one of the criteria of selecting transportation projects to prioritize improvements within the identified areas. NIRPC assess the feasibility of designating a particular roadway segment to be established as a Critical Urban Freight corridor.

NIRPC Critical Urban and Rural Freight Corridors

The National Highway Freight Network (NHFN) is a roadway network that provides connectivity across the country allowing for quick and reliable movement of e-Commerce goods. The roads on the National Highway have access to federal funding that is specifically designed to improve efficiency in shipping of goods and transportation along the network.

Establishing Critical Urban and Rural Freight Corridors is a process that can provide critical connectivity to the National Highway Freight Network. These Critical Urban and Rural Freight Corridors play a role, with an increasing demand for e-commerce, in bringing freight facilities, intermodal facilities, or other locations that play a major part in the localized distribution of e-commerce goods. Designated Critical Urban and Rural Freight Corridors are also eligible for the federal funding available for roadways on the NHFN.

National Highway Freight Network funding can be used on these eligible activities

- Development phase activities, including planning, feasibility analysis, revenue forecasting, environmental review, preliminary engineering and design work, and other pre-construction activities.
- Construction, reconstruction, rehabilitation, acquisition of real property (including land relating to the project and improvements to land), construction contingencies, acquisition of equipment, and operational improvements directly relating to improving system performance.
- Intelligent transportation systems and other technology to improve the flow of freight, including intelligent freight transportation systems.
- Efforts to reduce the environmental impacts of freight movement.
- Environmental and community mitigation for freight movement.
- Railway-highway grade separation.
- Geometric improvements to interchanges and ramps.
- Truck-only lanes and climbing and runaway truck lanes.
- Adding or widening of shoulders.
- Truck parking facilities eligible for funding under section 1401 (Jason's Law) of MAP - 21.
- Real-time traffic, truck parking, roadway condition, and multimodal transportation information systems.
- Electronic screening and credentialing systems for vehicles, including weigh-in-motion truck inspection technologies.
- Traffic signal optimization, including synchronized and adaptive signals.
- Work zone management and information systems.
- Highway ramp metering.
- Electronic cargo and border security technologies that improve truck freight movement.
- Truck freight efficiencies inside the boundaries of intermodal facilities.
- Additional road capacity to address highway freight bottlenecks.
- Physical separation of passenger vehicles from commercial motor freight.
- Enhancement of the resiliency of critical highway infrastructure, including highway infrastructure that supports national energy security, to improve the flow of freight.
- A highway or bridge project, other than a project described above, to improve the flow of freight on the NHFN.
- Any other surface transportation project to improve the flow of freight into and out of an eligible intermodal freight facility. [23 U.S.C. 167(i)(5)(C)].
- Diesel retrofit or alternative fuel projects under the Congestion Mitigation and Air Quality Improvement program (CMAQ) for class 8 vehicles.
- Conducting analyses and data collection related to the NHFP, developing and updating freight performance targets to carry out section 167 of title 23, and reporting to the Administrator to comply with the freight performance target under section 150 of title 23. [23 U.S.C. 167(i)(6)].

Potential Agencies and Programs to Implement E-Commerce in NWI	
U.S. Department of Transportation, INDOT	NIRPC (PL) funds, TIP, Critical Urban and Rural Corridors
U.S. Department of Labor	Trade Adjustment Assistance Community College and Career Training Grant Program (provides community colleges and eligible institutions of higher education funds to offer educational programs and training that prepares participants for employment in high-wage, high-skill occupations.
Next Level Jobs- Indiana	State of Indiana: http://www.nextleveljobs.org/Job-Seeker/Available-Job-Training
Ivy Tech's Supply Chain Management Program	This program prepares students to enter the workforce with the skills demanded in industry. It addresses the movement and storage of raw materials, work-in-process inventory, analysis, and finished goods. Students can study and get familiar with the high technologies and information systems used to track goods and increase efficiencies.
Local Governments	Local municipal funds
U.S. Economic Development Administration	EDA's Economic Adjustment, Short-Term Planning, and Local Technical Assistance grants.
Indiana Economic Development Corporation (IEDC)	NIRPC EDD Program, Next Level Roads,
Indiana Office of Community and Rural Affairs (OCRA)	Community Development Block Grants (CDBG), and Next Level Connections Broadband Program.

Implementation of the E-Commerce Plan requires a number of actions and steps that may include:

- Develop sub-area plans that address transportation improvements and accessibility.
- Local governments should establish redevelopment / reuse plans that provide the best possible solution to repurpose vacant major retail within the Northwest Indiana region. NIRPC, regional agencies, and local governments should work together to identify funds for these plans and establish funding strategies.
- Establish a regional real estate market outlook for warehouses, fulfilment centers, and logistics.

CONCLUSION

Planners, legislators, and local governments need to keep up-to-date on the rapidly changing trends in retail growth in e-commerce and the use of express delivery services supplanting shopping trips with delivery trips. Expansion of express and one-hour delivery services of goods, grocery, and restaurant purchases could prompt more transactions from customers who prefer to pay for those services than make a shopping trip. Transportation planners should monitor commercial trips that use personal vehicles that may not be captured in current regional travel demand models. Planning agencies will need to adjust their models to ensure that needs are more accurately projected.

Local governments and regional agencies need to raise the profile of the region as a good place to do business. They should prepare to repurpose big box retail and large commercial areas. They should evaluate auto-dependence suburban shopping centers that have plenty of unused parking, and estimate how much less parking would be required if some customers choose delivery of their goods and no longer complete the last mile themselves. This oversupply of parking should be, from a zoning and land use perspective, utilized as an opportunity for redevelopment. The future of retail is more likely omni-channel in nature and an omni-channel approach to retail can be applied to any form of shopping center or big box store, in any setting.

While many challenges remain, as long as a demand to reduce delivery lead times remains, urban warehousing will continue to grow and shape urban landscapes throughout North America.

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