



Are Home Deliveries Increasing during the Pandemic?

Update 5

Sorin Garber 5/30/2021

In this fifth update of the series, I am adding a FAQ section of the kinds of questions that are often posed to me and others. I am hoping that readers can add their own take on my responses to FAQs as well as asking questions they would like me and others to consider.

Shopping Trends

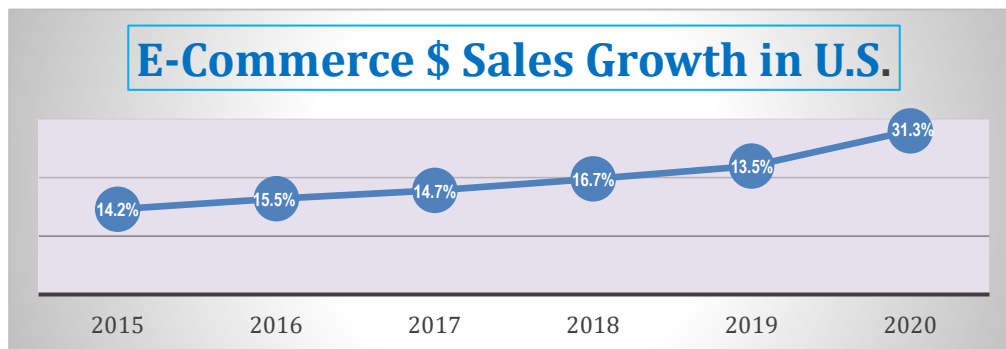
With one-third of all Americans having received at least one dose of the Covid-19 vaccine by the end of 1st quarter (i.e., March 31, 2021), it is not surprising that more people went shopping at brick-and-mortar stores than they did during the same period – i.e., pre-vaccine pandemic period - last year. What is a bit surprising is that while retail sales at stores did increase by 14% over that period (from \$1,203 B to \$1,366 B), *online shopping levels increased by a whopping 34%* (or from \$160 B to \$215 B). As shown in Table 1, online sales revenue grew at an annual rate of 14.3% to 31.4% between 2015 and 2020.

Table 1. U.S. Retail Sales in 1st Quarter from 2015 through 2021 (in \$millions)

	Jan-March 2015	Jan-March 2016	Jan-March 2017	Jan-March 2018	Jan-March 2019	Jan-March 2020	Jan-March 2021
In Stores	\$1,073,133	\$1,090,126	\$1,144,778	\$1,201,218	\$1,198,059	\$1,202,967	\$1,366,389
Online	\$ 80,451	\$ 93,046	\$ 106,383	\$ 126,985	\$ 140,346	\$ 160,414	\$215,035
Total	\$1,153,584	\$1,183,172	\$1,251,161	\$1,328,203	\$1,338,405	\$1,363,381	\$1,581,424
% Online	7.0%	7.9%	8.5%	9.6%	10.5%	11.8%	13.6%

Source: Quarterly Retail E-Commerce Sales, US Dept of Commerce,
<https://www2.census.gov/retail/releases/historical/ecom/21q1.pdf>

This 1st quarter 2021 trend continues the annual trends shown below and published in Update 4.



Retail sales revenue increased during the 1st quarter 2021 for several reasons including significantly increased employment levels, distribution of stimulus checks, low interest rates, and general economic recovery conditions. However, the increase in online sales is far greater than the rate of increase for overall retail sales, indicating that more consumers are preferring to make online purchases.

Commodities being Purchased.

As with the 4th quarter in 2020, fashion (i.e., clothing, and associated accessories) followed by electronics, toys/hobby/do-it-yourself materials, furniture and food and personal care items, continue to be the most popular items purchased online. Grocery revenue exceeded peak sales during the pre-vaccine pandemic periods even with increased shopping at stores and growing restaurant openings¹.



If vaccinations continue at their current pace, 70% of adults will have received at least one dose of Covid-19 vaccine by June 30, 2021. It will be instructive to see whether these online purchase trends continue as our shopping behaviors and needs are less restricted than they have been during the pandemic.

Even though we should not rely on these data to forecast too many trends², consumers will continue to increase their online purchasing, and that the supply chain and its facilities and logistics strategies will continue to support and influence consumer decisions.

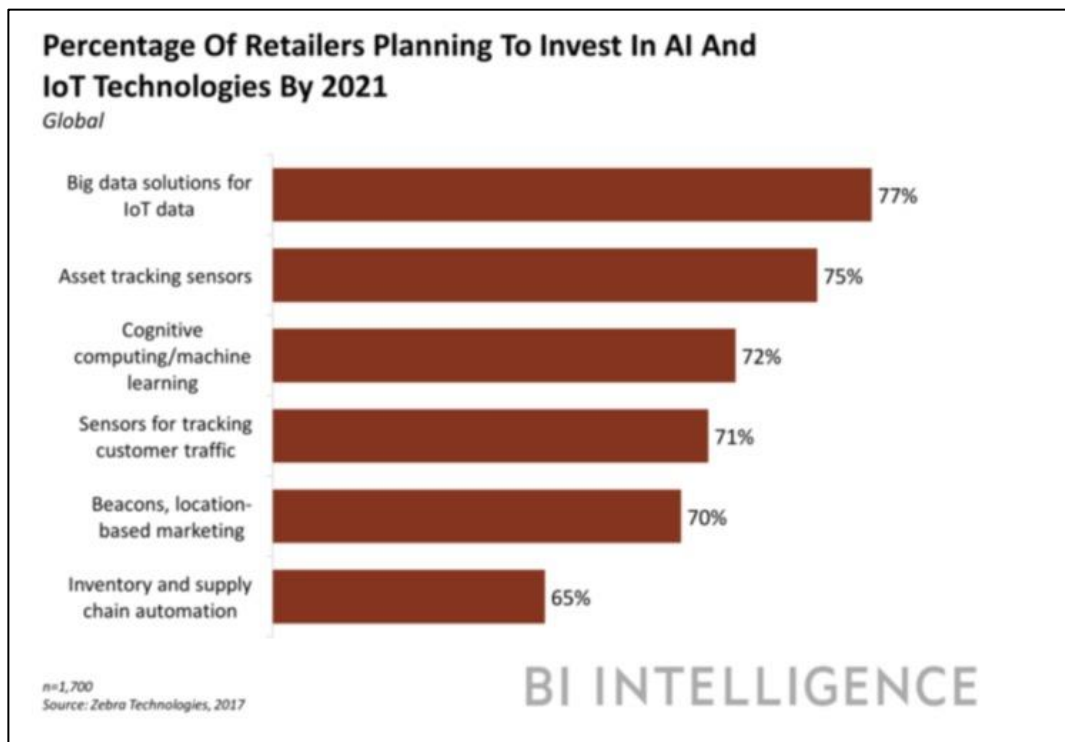
New Strategies being Employed to Attract More Customers

The online retail market is continually innovating; particularly the methods used to improve customer service and to personalize the shopping experience. For example:

Augmented Reality (AR), which allows shoppers to better visualize products has significantly enhanced the shopping experience. This is especially true in specific industries like fashion - where a customer can see how an item of clothing looks if

¹ U.S. online grocery sales for March 2021 up 43% vs. year ago, Blue Book Services, April 19, 2021, [U.S. online grocery sales for March 2021 up 43% vs. year ago – Produce Blue Book](#)

² That is, because they are, in many instances, short-lived phenomenon and because of the unprecedented economic times we are experiencing,



Courtesy: [Ecommerce AI: Using Business Intelligence to Drive Implementation \(bigcommerce.com\)](#)

they were wearing it; and home decor - where, one can place a photo of a piece of furniture for sale in a photo of the room they are considering placing it in.

According to Michael Prusich, Director of Business Development at 1Digital Agency, “35% of people say that they would be shopping online more if they could virtually try on a product before buying it, and 22% would be less likely to visit a brick-and-mortar store if augmented reality (AR) was available via their favorite ecommerce store.”³

- **Chatbots**, which help customers with questions about inventory, different versions of a commodity, and with payments, etc., are intended to act as in-store shopping associates. They are vital to helping a customer complete a purchase and can also be an important marketing tool. Several e-commerce analysts predict that chatbots will become more intuitive as they utilize previous buying behavior and other information gathered by e-commerce companies.
- **Automated Personalized Shopping Experiences**, which include artificial intelligence (AI) and data about customer purchases and online views, provide a wealth of information to a customer about items they might like based on the preferences they

³ Ecommerce Trends That Are Powering Online Retail Forward, BigCommerce, [Top 14 Ecommerce Trends in 2021 \(+ Industry Experts' Insight\) \(bigcommerce.com\)](#)

have shown. It is a means of customer service that cannot be provided efficiently in-store.

Potential Changes in E-Commerce Shipping

One of the major obstacles' retailers have overcome with e-commerce is the convenience offered to their customers through low and often free shipping, no hassle-free returns, and one- and two-day (or in the case of groceries, one to two hour) shipping schedules. These shipping advantages do, however, come with direct costs and we may soon be seeing some major changes in the delivery end of online shopping.

For example:

- **Shipping Rate Changes:** The three major U.S. carriers of e-commerce goods – USPO, UPS and FedEx – each announced price increases averaging 4.9% for 2021. Some third-party vendors like Shopify are maintaining 2020 price schedules for their customers, and Walmart+ service, like Amazon Prime, now offers free shipping on all online orders for its members. It would not be surprising if shipping costs continue to rise that leading retailers may rethink their free shipping policies.
- **Challenges in Meeting Demand:** The surge in e-commerce transactions and deliveries have sometimes resulted in a decline in on-time delivery performance which is a trend that may continue. Over the holiday season in 2020, 72% of packages were delivered on time in December 2020, down from 75% in 2019⁴. This despite retailers encouraging shoppers to order early if they wanted to receive gifts by Christmas. Some national carriers placed restrictions on parcels from large retailers as they tried to keep up, adding hundreds of thousands of seasonal workers hired to meet demand.

Clearly this past holiday season was complicated by the unprecedented increase in shipping vaccines and medical equipment to combat the Covid-19 pandemic, the high rate of employee absence due to Covid-19 at the major carriers, as well as the estimated 36% increase in package volume over the 2020 holiday season⁵. Still, with all the increased capacity to staffing, vehicles and logistics upgrades, carriers were unable to meet their on-time performance targets. Given that we will continue to experience increased e-commerce delivery traffic, one wonders whether the days of one and two-day delivery schedules will be a thing of the past.

- **Returns of E-commerce Packages:** Before online purchasing took hold, consumers who wanted to return items had to go directly to the store from which they purchased the goods and often had an unpleasant conversation with a store employee. If you purchased an item that was delivered through the mail, you had a

⁴ *Your late package will be delivered soon*, by Marc Bain, QUARTZ.COM, December 29, 2020, [Why so many UPS, USPS, and FedEx packages were late in Dec 2020 — Quartz \(qz.com\)](#)

⁵ Ibid. "ShipMatrix estimates just over 3 billion packages were shipped between Thanksgiving and Christmas this year in the US, or about 800 million more than last year."

very time-consuming experience finding the right individual to discuss your return and were liable for postage and processing fees.

With e-commerce, there is a higher expectation of returns because, for example, clothes ordered online may not fit, items could have been damaged during transit, perishables spoiled, and for hundreds of other reasonable reasons, not met a customer's satisfaction. In fact, the return rate on e-commerce purchases is generally around 30% of all purchases, or [typically at least double that of in-store purchases](#); and according to Narvar data, [ecommerce returns were up 70% in 2020](#). And for the most part, returns are free of charge and retailers provide shipping labels for customers and items can be picked up at your home or driven to a carrier's storefront.

But returns do have costs and some retailers have found – particularly for inexpensive items or overly large sized items - that it is cheaper to issue the customer a refund and allow them to keep the item. Another strategy being employed is to offer discounts between [5% and 10% to persuade customers to keep the item](#). Others instruct customers to return their items to their stores which provides an opportunity for that customer to buy something else.

- **More Last-Mile Strategies:** Rising last-mile delivery costs and environmental concerns are forcing retailers to explore new delivery and collection methods; primarily in the use of their physical assets and their corresponding logistics networks. Replacing diesel powered medium and heavy-duty trucks with smaller electric powered vans, passenger cars and cargo-bikes, as well as drones and bots, are part of their set of solutions. However, increasing attention is being placed on consolidating deliveries at small hubs, allowing customers to retrieve goods from these and other locations, or where goods can be transferred to bots for ultimate delivery to the consumer's home.

Japan has been experimenting with last-mile solutions more so than other countries, in large part because it is experiencing a severe labor shortage in its transportation industry. In 2021, delivery robots will be permitted to operate on roadways and sidewalks, along with newly designed on-street parking areas which accommodate truck to robot delivery transfers, installation of parcel lockers, and local and federal agencies will be examining optimization of logistics networks and curbside loading space management.

Delivery Bots make their first appearance in Oregon

One of the more hopeful strategies for last-mile delivery are bots or robotic delivery vehicles. While they appear to be driverless, they are controlled and monitored by remote dispatchers. They utilize GPS to map out the shortest routes, and on-board sensors to avoid collisions with pedestrians, bicycles, motor vehicles and fixed objects. There are a variety of different types of bot delivery vehicles including:



Starship Technologies

Starship Technologies delivery robot has quickly become the go-to choice for many food and delivery companies. These six-wheeled electric vehicles can carry 20 lbs. of cargo, travel at 4mph exclusively on sidewalks, and are used by [several US colleges](#) for delivery food to students across campus. They are also experimented with at grocery stores and takeout businesses.



Delivery Robot on OSU Campus

And they have arrived in Oregon - on the OSU campus in Corvallis. A fleet of 20 food delivery robots from Starship Technologies were deployed in October 2020 providing offerings from 12 on-campus restaurants. They drove around campus for a few weeks to learn the GPS map and surroundings. OSU initially tested its robots as an alternative to human food delivery drivers from companies like Uber Eats and DoorDash.

Nuro's R2 is the first autonomous-driving delivery vehicle to be granted regulatory approval for limited operation on roadways. It can travel at a top speed of 25mph and carry up to 250 lbs. of fresh food in chilled or heated compartments. It has been delivering Domino's pizza in Houston since 12/2020 along a heavily traveled arterial roadway (Houston Avenue). It is also being tested on roadways throughout Santa Clara County, CA.



Nuro R2

Amazon Scout is another six-wheeled electrically powered autonomous delivery robot that moves across sidewalks at a walking pace and brings packages to Amazon Prime customers near Amazon's headquarters in Seattle.

Customers place an order as normal, then are assigned a Scout instead of a delivery driver depending on availability. During testing, the vehicles are accompanied by an Amazon employee to keep an eye on them. Their use was expanded during the pandemic in Atlanta, GA and Franklin, TN.



Amazon Scout



Eliport

Eliport's four-wheeled electric vehicles are designed to drive at walking speed on sidewalks and in pedestrianized spaces, delivering goods to homes and offices. Founded in Barcelona in 2017, the robots load themselves with up to 88 lbs. of cargo at a warehouse/logistics hub and proceed to their destination along sidewalks at walking speed before automatically transferring their cargo into a secure pre-installed "trunk" container, from which the recipient can later retrieve their delivery.

The **Serve** robot, developed by Postmates, which is now owned by Uber, uses a top-mounted Lidar sensor to map its surroundings and navigate around pedestrians and common sidewalk obstacles like fire hydrants. An external touch screen display helps the Serve communicate with customers, and the robot has a carry capacity of 50 lbs. and can travel over 30 miles on a single charge.



Serve

While not technically a bot – though after testing that is currently underway it expects to launch a vehicle like those above - **Robomart** is not a self-driving delivery vehicle, but it is another unique solution to last-mile delivery of retail products. Calling itself the world’s first store-hailing platform, the self-driving vans open their sliding doors to reveal a selection of fresh fruit and vegetables for customers to pick what they want. Operating in West Hollywood, CA, is both the Pharmacy Robomart, which comes stocked with a full selection of medicines, toiletries, personal care items and household goods, and the Grocery Robomart which comes stocked with a full selection of fruits, vegetables, dairy, and breads.



Robomart

Portland Regional Trends

In Portland and Oregon as a whole, there is corresponding data about e-commerce growth related to associated employment and industrial/distribution space development. Unfortunately, neither the U.S. Department of Commerce or the Oregon Office of Economic Analysis keeps records of Oregon or Portland/Vancouver region retail sales and e-commerce sales revenues

Employment. The first four months of 2021 repeated the trends found in 2020, only more so. As shown in Table 2, total statewide and Portland region employment, as well as truck driver jobs, remained about the same in 2020 and 2021. In contrast, courier and messenger jobs and warehouse and storage worker jobs jumped by 7.5% and 10.2%, respectively, in just the first few months of 2021 (see Table 3).

As reported in earlier updates, the changes in e-commerce related employment are much more pronounced between 2019 and 2020 with 20% to 26% increases in those jobs statewide, and between 20% and 30% in the Portland region. After suffering a 2% loss in 2020 from 2019, truck driver jobs have begun to return to 2019 levels this year⁶.

Finally, retail jobs declined by 4.8% statewide and 6.0% in the Portland region between 2019 and 2020 – primarily due to the closure of stores – but have re-employed about 33% to 50% of their 2019 employee levels.

⁶ *Current Employment Estimates*, Oregon Employment Department, May 26, 2021, <https://www.qualityinfo.org/ed-ceest/?at=1&t1=410100000-0-0-0000000-2014-or>

Table 2. Changes in Selected Employment Categories State of Oregon and Portland Metropolitan Area, 2019, 2020 and 2021*

	Oregon-Statewide			Portland / Vancouver Region		
	2019	2020	2021*	2019	2020	2021*
Total Private Sector Employment	1,655,817	1,540,933	1,540,900	1,228,100	1,143,200	1,137,200
Truck Drivers	18,958	18,542	18,550	11,100	10,800	11,025
Couriers and Messengers	10,558	13,242	14,750	7,600	9,500	10,275
Warehouse & Storage Workers	13,717	18,767	20,575	9,000	12,900	14,075
Retail	210,083	200,517	204,675	118,100	111,400	113,700

Source: Oregon Employment Department
* - January through April 2021 data

Table 3. Percentage Changes in Selected Employment Categories State of Oregon and Portland Metropolitan Area, Between 2019 and 2021*

	Oregon-Statewide			Portland / Vancouver Region		
	Between 2019 -2020	Between 2019 -2021*	Between 2020 -2021*	Between 2019 -2020	Between 2019 -2021*	Between 2020 -2021*
Total Private Sector Employment	-7.5%	-7.5%	0.0%	-7.4%	-8.0%	-0.5%
Truck Drivers	-2.2%	-2.2%	0.0%	-2.8%	-0.7%	2.0%
Couriers and Messengers	20.3%	28.4%	10.2%	20.0%	26.0%	7.5%
Warehouse and Storage Workers	26.9%	33.3%	8.8%	30.2%	36.1%	8.3%
Retail	-4.8%	-2.6%	2.0%	-6.0%	-3.9%	2.0%

Source: Oregon Employment Department
* - January through April 2021 data

E-Commerce Related Land Development. As discussed in previous updates, the dramatic increase in e-commerce sales, employment and delivery has been supported by the rapid development of industrial and warehouse space nearer to and within the Portland region’s urbanized areas. As shown in Table 4, in the first quarter of 2021, the region had more than 3.5 million square feet of new industrial/warehouse space than in the first quarter of 2020⁷. Vacancy rates in warehouse space jumped from 4.1% to 4.9% in the past year, which may be associated with the global economic downturn, but there is another 2.9 million square feet of such space under construction. Lease rates for warehouse distribution rates remain unchanged in the past year, while rates for flex space declined by less than one percent.

⁷ Or 1.5% increase in total regional industrial/warehouse space – from 221, 577 sq ft to 225,092 sq ft. Q1 2021 Portland Metro Industrial Report, Colliers International, [2021Q1PortlandIndustrialReport.pdf](#)

Table 4. Changes in Warehouse, Distribution and Flex Space in the Portland Metropolitan Area in 2020 and 2021⁸

New Supply (in 1,000's of square feet)				
	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.
2020	178	1,686	437	315
2021	385			NA
Under construction(in 1,000's of square feet)				
	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.
2020	6,098	4,742	3,823	3,827
2021	2,947			
Vacancy Rate				
	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.
2020	4.2%	4.4%	4.4%	4.5%
2021	4.9%			

Source: Portland Metro Industrial Report, Colliers International

Frequently Asked Questions

- Is the increase in e-commerce delivery resulting in increased vehicle miles of travel (vmt) and emissions overall?
 - I don't know of any comprehensive or credible analyses of these impacts. Some researchers claim that e-commerce deliveries are consolidations of trips in place of individual household trips. Others believe that deliveries of individual goods would otherwise be combined by a household resulting in added vmt and corresponding emissions. There are a lot of opinions about this and while some might make sense for delivery of certain products, others will not for different products. In addition, for the vmt generated by carriers, one must consider the mileage between origins and destinations, the number of returns, and the logistical practices that always seek to increase the density of delivery trips. For the household making those trips there is always the potential to combine their trip purposes and thus reduce their total vmt and emissions levels.
- Are e-commerce deliveries creating traffic congestion or aggravating already problematic transportation problems?
 - In general, we do not know the answer, though localized studies could confirm whether they do. Anecdotally, and especially while people have been working from home, many residents do mention a large number of UPS and FedEx vans traveling their neighborhood streets throughout the day. Moreover, it's common to observe packages being stacked on sidewalks such as this photo I took on NW 23rd Street.

⁸ Current Employment Estimates, Oregon Employment Department, May 26, 2021, <https://www.qualityinfo.org/ed-ceest/?at=1&t1=4101000000~0~0~00000000~2014~or>



- Will brick-and-mortar stores soon be a thing of the past? If so, how will that affect our neighborhood activity centers?
 - It sure seems like they're part of a bygone era. One only needs to observe the number of vacant stores at shopping malls – many of which are being repurposed into different uses. This isn't the only time that pundits and others thought the sky was falling regarding downtown shopping. For example, when people moved in droves from cities to the suburbs in the 1950s through 1980s, and in Portland when we had the downtown parking lid in the 1980s and 1990s, and these days with the impact of protests and vandalism in the past year, many felt that downtown retail would be no more.

While many national retail chains and other mature retailers have been able to weather the storm through use of e-commerce, reorganizations, selling off assets, and promotions for their goods, we are witnessing a major change in the downtown storefront environment.

As shown in Table 1 above, sales revenue at brick-and mortar stores is higher than it's been in any year since 2015. E-commerce has been eating away at their sales, but the in-store experience is evolving, and many surveys on customer shopping habits indicate that they enjoy having both options. In other words, it is unclear whether the growth in online retail sales will continue at its current pace or whether customers will return to brick-and-mortar stores in droves.

- Can rail be used to deliver e-commerce packages?
 - The U.S. Post Office, FedEx, UPS, and other delivery companies already use rail for many deliveries of retail products, however, there is little to no-use of rail for one-day or two-day delivery. In general, rail is generally the most cost-effective option for delivery of large quantities of non-perishable, non-fragile commodities. Because many e-commerce packages are delivered directly to a customer's home, use of rail would require a trip by truck or car from its origin to a rail terminal and by truck or car from a rail terminal to their destination – which would be more costly than simply using a truck or a car for that delivery.

Can cargo-bikes replace trucks in delivering e-commerce packages?

- Yes and they already do for many types of delivery trips. Not only are private cargo-bike delivery companies in Portland including B-Line and Portland Pedal Power keeping busy, but UPS uses cargo-bikes throughout downtown Portland from a hub on the PSU campus. Cargo-bikes can accommodate as much as 275-350 lbs., and many use electric assist or all-electric power. They are clearly advantageous for deliveries to dense urban areas and smaller delivery destinations. They also can play a strategic role in handoffs between trucks/passenger cars as well as from close-in distribution hubs.
- How many medium trucks, light-duty trucks, passenger cars, bicycles, bots, drones, and pedestrians are delivering e-commerce packages?
 - No one knows. Much of the information about this is proprietary and public agencies don't distinguish the types of deliveries being made or whether a vehicle is performing services or making deliveries in their field surveys. Portland Metro will be using commodity flow data from the Freight Analysis Framework and INRIX, and origin-destination pairs by medium and heavy trucks to create a foundation for at least the contributions by trucks for this kind of analysis.

What does this all mean?

As I've mentioned in each of my updates, there are few consistent trends about how e-commerce customers and suppliers are reacting to the pandemic that we can rely on because there are so many unprecedented global events that dictate both product availability and customer confidence.

First and foremost is the contraction of the U.S. economy – which shrank 9.5% in the second quarter of 2020; the worst quarter decline ever – including the Great Depression when the economy shrank by 7.2% in one quarter⁹. Further, in the 2nd quarter of 2020, the U.S. GDP shrank at an annual rate of 32.9%¹⁰, and the unemployment rate fluctuated between 11.1% and 14.7%¹¹.

And then we find in the 1st quarter of 2021, we are in rebound mode with GDP increasing at an annual rate of 6.4%, and 4.3% in the 4th quarter of 2020 and the unemployment rate declined to 6.7%. Skeptics then might say: 'how much of this positive economic news is due to one-time stimulus payments to U.S. taxpayers?'

In other words, we need to exercise caution when reviewing data and anecdotes about the changes in the retail sector during the pandemic before reaching conclusions about what the future will bring. Retailers have always innovated to outperform their competitors, and

⁹ U.S. economy contracted at fastest quarterly rate on record from April to June as coronavirus walloped workers, businesses, Washington Post, Rachel Siegel and Andrew Van Dam, July 30, 2020, <https://www.washingtonpost.com/business/2020/07/30/gdp-q2-coronavirus/>

¹⁰ Gross Domestic Product, 1st Quarter 2021 (Advance Estimate) and Annual Update, U.S. Department of Commerce, April 29, 2021, [Gross Domestic Product, First Quarter 2021 \(Advance Estimate\) | U.S. Bureau of Economic Analysis \(BEA\)](https://www.bea.gov/news-rooms/2021/04/29/gdp-1st-quarter-2021)

¹¹ Unemployment Rates Seasonally Adjusted (USLAUS Tool), Quality Info. Org, <https://www.qualityinfo.org/ed>

suppliers and carriers have always responded to their changing demands. We can be confident, however, that there are many more changes to come in the e-commerce delivery industry and what we ask of it

This is the fifth installment of updates to the study - [E-Commerce and Emerging Logistics Technology](#) - I prepared for the City of Portland, which also describes strategies employed by shippers and carriers throughout the U.S. and around the world to meet the fast-growing volume of ecommerce deliveries, and recommendations for how cities can work with industry to help manage the delivery traffic.

I'm going to continue tracking data e-commerce sales, employment by type of delivery worker, vacancy rates for industrial/warehouse space, and sales by retail category, and publishing them on both my web site (www.sgapdx.com) and [LinkedIn site](#).



There is a wide range of data about ecommerce sales behaviors during the pandemic such as sales by age group, sales by commodity, sales by company, and more.

If you're interested in learning more about these and other trends, or asking questions, or commenting on my answers, please contact me at sorin.garber@sgapdx.com