The Ama-zōning of America Continues:
It’s a matter of TIME
Rick, what exactly is Ama-zōning?
Amazon build-out in one year?
A system for the buying and selling of goods and services using the Internet as the main means of exchange.
Retail e-commerce sales in the United States from 2017 to 2023 (in million U.S. dollars)

<table>
<thead>
<tr>
<th>Year</th>
<th>Revenue in million U.S. dollars</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>446,811</td>
</tr>
<tr>
<td>2018</td>
<td>504,582</td>
</tr>
<tr>
<td>2019*</td>
<td>560,747</td>
</tr>
<tr>
<td>2020*</td>
<td>612,959</td>
</tr>
<tr>
<td>2021*</td>
<td>659,779</td>
</tr>
<tr>
<td>2022*</td>
<td>700,578</td>
</tr>
<tr>
<td>2023*</td>
<td>735,358</td>
</tr>
</tbody>
</table>

Sources
Statista DMO; Statista
© Statista 2019

Additional Information:
United States; Statista DMO; 2017 to 2018
Total retail sales in the United States from 2012 to 2022 (in trillion U.S. dollars)

<table>
<thead>
<tr>
<th>Year</th>
<th>Sales in Trillion U.S. Dollars</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012*</td>
<td>4.35</td>
</tr>
<tr>
<td>2013*</td>
<td>4.53</td>
</tr>
<tr>
<td>2014*</td>
<td>4.63</td>
</tr>
<tr>
<td>2015*</td>
<td>4.7</td>
</tr>
<tr>
<td>2016*</td>
<td>4.82</td>
</tr>
<tr>
<td>2017</td>
<td>5.07</td>
</tr>
<tr>
<td>2018</td>
<td>5.35</td>
</tr>
<tr>
<td>2019</td>
<td>5.53</td>
</tr>
<tr>
<td>2020</td>
<td>5.7</td>
</tr>
<tr>
<td>2021</td>
<td>5.86</td>
</tr>
<tr>
<td>2022</td>
<td>6.03</td>
</tr>
</tbody>
</table>

Sources: eMarketer; US Department of Commerce © Statista 2019

Additional Information: United States; US Department of Commerce; 2012 to 2019; excludes travel and event tickets
HOW THE BLOCKCHAIN WORKS

Transaction X: data of any length

Hash value #X: unique value of fixed length

Transaction A

Hash value #A

Transaction B

Hash value #B

Transaction C

Hash value #C

Transaction D

Hash value #D

Hash value #AB

MERKLE TREE

Hash value #CD

Combined hash value #ABCD

Hash of Block 49

Timestamp

Nonce

BLOCK 48

BLOCK 49

BLOCK 50

Reproduction of an original figure in “The Great Chain of Being Sure About Things” by the Economist
Blockchain: Product Validation
Blockchain: Consumer Payments
Elasticity of Demand
Manufacturing & Production & Jobs
Possible game outcomes
(it’s complex)
Deep Mind’s AI, AlphaGo played a 5-game series with one of the world’s best go players.

Shortly into game two, AlphaGo surprised the world with its “Move 37”
“AlphaGo’s moves were so surprising they overturned hundreds of years of received wisdom, and have since been examined extensively by players of all levels. In the course of winning, AlphaGo somehow taught the world completely new knowledge about perhaps the most studied and contemplated game in history.” – Deep Mind
We should start with a few assumptions.

1. We will always be under pressure to find better ways to be more productive.
2. Technology will continue to advance, and do so at an ever-quicking pace
3. These technologies will be applied to an expanding group of tasks to increase productivity and efficiency
The history of employment in America is one of change.
In 1850, 60% of the United States workforce was employed in agriculture.
Today that number is 3%
Today that number is 3% and productivity is 12x higher than in 1950
In 1960, 26% of the United States workforce was employed in manufacturing.
Today that number is 8.5%
Today that number is 8.5%.
And productivity has doubled since 1987.
Technical potential for automation of basic labor activities

- Predictable physical work (78%)
- Data processing (69%)
- Data collection (64%)
- Unpredictable physical work (25%)
- Stakeholder interactions (20%)
- Applying expertise (18%)
- Managing others (9%)
Percentage of jobs at risk for automation by state
Percentage of jobs at risk for automation by county
Transportation: “First Mile”
Fulfillment
Real Estate
Neighborhood Center
Community Center
Regional and Super-Regional Mall
Share of retail gross leasable area (GLA) in the United States as of 2017, by shopping center type

- Neighborhood: 31%
- Community: 25%
- Malls*: 15%
- Power Center: 13%
- Convenience: 12%
- Lifestyle: 2%
- Factory outlets: 1%
- Other**: 0%

*Note: Malls include community and regional malls.
<table>
<thead>
<tr>
<th>MARKET</th>
<th>2013</th>
<th>2018</th>
<th>$ Change</th>
<th>% Change</th>
<th>2013</th>
<th>2018</th>
<th>$ Change</th>
<th>% Change</th>
<th>2013</th>
<th>2018</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oakland</td>
<td>4.82</td>
<td>10.21</td>
<td>5.39</td>
<td>111.8%</td>
<td>20.73</td>
<td>23.09</td>
<td>2.36</td>
<td>11.4%</td>
<td>0.23</td>
<td>0.44</td>
<td>0.21</td>
</tr>
<tr>
<td>Seattle</td>
<td>4.87</td>
<td>9.12</td>
<td>4.25</td>
<td>87.3%</td>
<td>18.15</td>
<td>20.63</td>
<td>2.48</td>
<td>13.7%</td>
<td>0.27</td>
<td>0.44</td>
<td>0.17</td>
</tr>
<tr>
<td>San Francisco</td>
<td>6.52</td>
<td>12.00</td>
<td>5.48</td>
<td>84.0%</td>
<td>19.90</td>
<td>25.00</td>
<td>5.10</td>
<td>25.6%</td>
<td>0.33</td>
<td>0.48</td>
<td>0.15</td>
</tr>
<tr>
<td>Sacramento</td>
<td>4.44</td>
<td>6.86</td>
<td>2.42</td>
<td>54.5%</td>
<td>16.60</td>
<td>16.97</td>
<td>0.37</td>
<td>2.2%</td>
<td>0.27</td>
<td>0.40</td>
<td>0.14</td>
</tr>
<tr>
<td>Boston</td>
<td>5.53</td>
<td>8.41</td>
<td>2.88</td>
<td>52.1%</td>
<td>17.76</td>
<td>19.25</td>
<td>1.49</td>
<td>8.4%</td>
<td>0.31</td>
<td>0.44</td>
<td>0.13</td>
</tr>
<tr>
<td>Detroit</td>
<td>4.08</td>
<td>5.62</td>
<td>1.54</td>
<td>37.7%</td>
<td>12.67</td>
<td>13.04</td>
<td>0.37</td>
<td>2.9%</td>
<td>0.32</td>
<td>0.43</td>
<td>0.11</td>
</tr>
<tr>
<td>Omaha</td>
<td>4.08</td>
<td>5.62</td>
<td>1.54</td>
<td>37.7%</td>
<td>11.84</td>
<td>12.42</td>
<td>0.58</td>
<td>4.9%</td>
<td>0.34</td>
<td>0.45</td>
<td>0.11</td>
</tr>
<tr>
<td>Ft. Lauderdale</td>
<td>6.53</td>
<td>9.18</td>
<td>2.65</td>
<td>40.6%</td>
<td>18.37</td>
<td>20.26</td>
<td>1.89</td>
<td>10.3%</td>
<td>0.36</td>
<td>0.45</td>
<td>0.10</td>
</tr>
<tr>
<td>Los Angeles</td>
<td>6.47</td>
<td>9.62</td>
<td>3.15</td>
<td>48.7%</td>
<td>23.40</td>
<td>26.27</td>
<td>2.87</td>
<td>12.3%</td>
<td>0.28</td>
<td>0.37</td>
<td>0.09</td>
</tr>
<tr>
<td>Orange County</td>
<td>7.07</td>
<td>10.47</td>
<td>3.40</td>
<td>48.1%</td>
<td>22.52</td>
<td>25.94</td>
<td>3.42</td>
<td>15.2%</td>
<td>0.31</td>
<td>0.40</td>
<td>0.09</td>
</tr>
</tbody>
</table>
A multichannel approach to sales that seeks to provide customers with a seamless shopping experience, whether they’re shopping online from a desktop or mobile device, by telephone, or in a brick-and-mortar store.
Kohl’s

• Amazon partnership began 2017
• 1,180 stores
• Not located inside malls
• Can return and purchase Amazon goods

Aldi partnership – as many as 300 stores
• Most located in strip or power centers
Walmart

- 4,700+ stores
- 775 million square feet of operating space
- Acquired Jet.com in 2016 for $3.3 billion
- Online inventory grew from 10 million in 2016 to 67 million items in 2017
- Grocery pickup service at 1,200 stores and delivery from 800 stores
Whole Foods Market • Acquired 2017 • Cost of $13.7 Billion • 504 stores and distribution centers (including Whole Foods 365)

Source: Flickr (miamism)
STORAGE/ OFFICE

FLOOR SPACE
Goods & Freight
Our definition of **freight** for today’s discussion:
One traditional definition of freight:

Goods transported in bulk by truck, train, ship, or aircraft.
Our definition of freight for today’s discussion:

Goods transported in bulk* by truck, train, ship, or aircraft devices we might have only recently seen or haven’t even thought of yet, in ways we can only hope to predict.

* And we need to discuss what “bulk” means in today’s context as well.
Hub and Spoke Distribution Model
The “Last Mile”
Point of Origin Node
The “Last Mile”
Origin and Destination Nodes
The choice of brands featured in this video is purely coincidental.
Last Mile Delivery
CITY-SCALE DISTRIBUTION

Finding Opportunities for “instant” network
- Sears
- Macy’s

IMPACTS FOR NEIGHBORHOODS:
- Impede large site redevelopment
- Place freight uses in commercial corridor

Source: maps.cuyahogacounty.us
BUILDING/SITE USAGE:

- Flip the percentage of retail floor compared to storage

IMPACTS FOR NEIGHBORHOODS:

- Impede multi-story infill
- Create “truck”-dominated site – loading areas access

NEIGHBORHOOD-SCALE DISTRIBUTION
POTENTIAL DELIVERY IMPACTS

MAGNITUDE OF INCREASE:
- Could be much greater than anticipated

USC METTRANS Transportation Center:
- Ongoing study – sheds light on intensity
- A 300-unit apartment complex in NJ
- In 2016 there were ???? Parcels delivered
POTENTIAL DELIVERY IMPACTS

23,613 PARCELS!
- 65 deliveries/day
- 1.5 deliveries/apartment per week
- From Jan 2015 to Jan 2017, annual growth of 17%
- Most deliveries on weekdays

CLEAR IMPACTS
- If uncontrolled, huge increase in individual trips
- Distribution network changes?

Source: geekwire.com
Freight is no longer behind the scenes in daily life!
Last Yard: Curb to Home
No city is growing like Seattle

Jobs Up, Drive-Alone Rate Down 2010 to 2017

2010 2012 2014 2016 2017

202k 220k 228k 240k 262k

35.2% 34.2% 31.1% 29.7% 25.4%

commute seattle
We partner with the Urban Freight Lab (UFL) at the University of Washington (UW)

Private Partners:
- UPS
- USPS
- Nordstrom
- Ford Smart Mobility
- Kroger
- Expeditors International
- And more!

Public Partners:
- UW Supply Chain Transportation and Logistics Center
- Seattle DOT
Is the sidewalk wide enough?

Are key projects from the pedestrian, freight, transit, and bicycle modal plans being accommodated here?

Which essential functions does this street need?

*Essential functions:

- Mobility per modal plans
- Access for commerce
- Access for people
- Activation
- Greening
- Storage

City of Seattle

May 8, 2019
Seattle Department of Transportation
Loading Zone Inventory and Occupancy Study

- SDOT maintains an inventory of all ROW curb designations, including loading zones *best in nation*

- UW undertook an inventory of all alleys and loading bays in the downtown core
Curb Occupancy Study

Commercial and passenger vehicle drivers are using CVLZs and Passenger Load Zones (PLZs) fluidly in center city.

All vehicles parked in CVLZs: 52% were passenger vehicles; but half of these were only there 5 minutes.

All CVs parked along the curb: 26% of all CVs at the 5 locations parked in PLZs.

Nearly three quarters of all CVs parked for 30 minutes or less.
Commercial Vehicle Loading Zone Studies

- Most vehicles utilizing CVLZs are classified as “small vehicles”
- Most vehicles have parking duration between 0 to 5 minutes
- Most popular spaces in CVLZ are adjacent to driveways/No Parking zones
Current Projects:
TNC Loading Zone Pilot with UW

• Convert paid parking to loading zones and test with/without geofence
• Establish data collection methodology
• Study curb and surrounding traffic impacts
Current Projects: Queryable data > sensors?

Pay station location and parking rules

Sign text and location

City of Seattle
Current Projects: UW – SDOT Urban Freight Sensor Project

• Urban Freight Lab awarded DoE grant for $1.5M

• SDOT plans to install sensor technology in Commercial Vehicle Load Zones

• Goal is to reduce driver search for available load zones by broadcasting availability
Future considerations

• Measurement! Data Collection!
• How to propose digital strategies to manage and price all of the curb?
• Avoid “Smart Cities” traps
• How to anticipate/model the next trends in delivery and subsequent impacts to curb and ROW?
• Off-street pilots, zoning laws, understand entire process flow
• Manage the rest of the ROW- Congestion pricing?