



FIRST WAVE PICK

The Business of Warehousing in North America - 2018

Market Size, Major 3PLs, Benchmarking Costs, Prices and Practices

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ABOUT ARMSTRONG & ASSOCIATES, INC.

Armstrong & Associates, Inc. (A&A) was established in 1980 to meet the needs of a newly deregulated domestic transportation market. Since then, through its leading third-party logistics (3PL) market research and history of helping companies outsource logistics functions, A&A has become an internationally recognized key information resource for 3PL market research and consulting.

A&A's mission is to have leading proprietary supply chain knowledge and market research not available anywhere else. As proof of its continued work in supporting its mission, A&A's 3PL market estimates are the most often cited in securities filings by publicly traded 3PLs, media articles and trade publications. In addition, A&A's email newsletter currently has over 46,000 subscribers globally.

A&A's research complements its consulting activities by providing a continually updated detailed database for analysis. Based upon its unsurpassed knowledge of the 3PL market and the operations of leading 3PLs, A&A has provided strategic planning consulting services to over 30 3PLs, supported 17 closed investment transactions, and provided advice to numerous companies looking to benchmark existing 3PL operations or outsource logistics functions.

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North American Warehousing Overview

Since 2004, Armstrong and Associates, Inc. (A&A) has published reports on Warehousing in North America. Our concentration has been on commercial warehousing particularly contract warehousing. Contract warehousing has grown rapidly over the last 40 years.

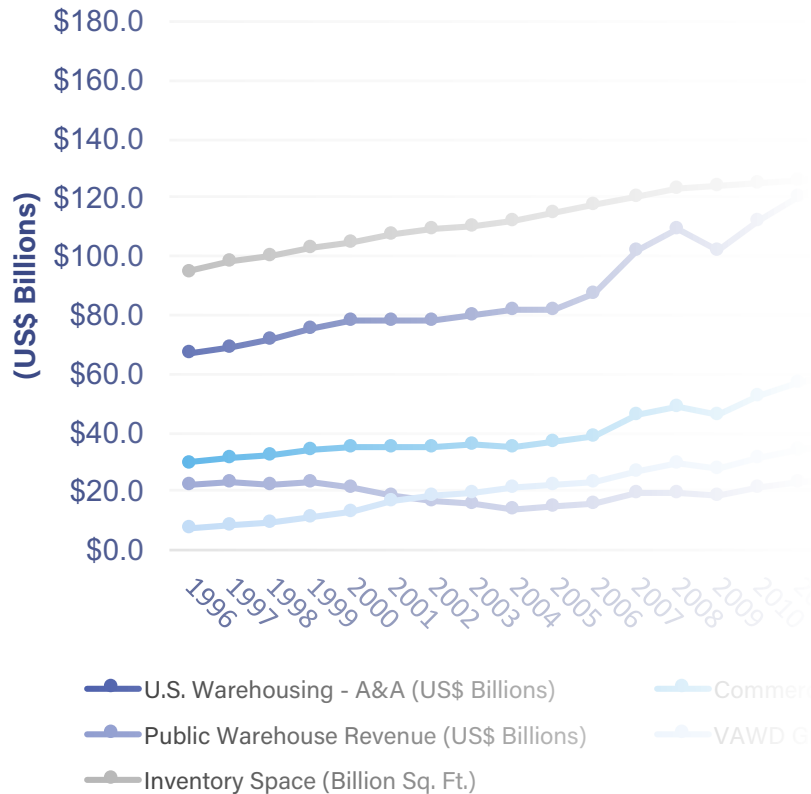
Figure 1 provides basics concerning the U.S. warehousing market. A&A's estimate of the U.S. Warehousing Market is \$148.7 billion through 2017.

The gray line reflects modern warehousing space. Len Sahling developed this estimate while at Prologis using the 31 largest U.S. markets. We have carried it forward.

The light blue line is Value-Added Warehousing & Distribution (VAWD). We estimate VAWD revenue each year as part of our financial report on third-party logistics.¹ VAWD reflects the contracted warehousing market in North America. This estimate is based on the financial results of third-party logistics providers (3PLs) comprising over half of the total VAWD market. Many of the companies are private and report the revenues to us annually. Others are publicly held, have public annual reports and are generally helpful with clarifications.

Public warehousing, which was the dominant form of warehousing in the U.S., now accounts for only 40% of the commercial warehousing market.

Figure 1. U.S. Warehousing Market - 1996-2020E



1 Third-Party Logistics Market Results and Trends for 2017 – June 2017

Table 1. U.S. Warehousing Market – Recent Values (US\$ Billions)

	2010	2011	2012	2013	2014	2015	2016	2017E	2018E	2019E	2020E
VAWD Gross Revenue	31.4	34.0	36.0	36.5	37.4	38.4	39.1	40.5	41.9	43.4	44.9
Commercial Warehousing Revenue	52.3	56.7	60.0	61.0	63.0	65.0	66.2	68.6	71.0	73.4	76.0
U.S. Warehousing – A&A	112.0	120.0	127.2	132.0	137.5	141.0	143.7	148.7	153.9	159.3	164.9
Inventory Space (Sq. Ft. Billions)	6.9	7.0	7.1	7.3	7.7	8.2	8.4	8.6	8.9	9.3	9.6

The figures in Table 1 are A&A estimates. The estimates reflect stronger growth in U.S. Warehousing than in Commercial Warehousing. This growth can be attributed in part to e-commerce expansions particularly by Amazon. Amazon is in the private warehousing sector as is much of e-commerce B2C (business-to-consumer) expansion. Amazon had \$17.6 billion in fulfillment costs in 2016 and 159.9 million square feet of space, including fulfillment, data centers, and other space.

Our Top 50 VAWD 3PLs have 3,827 facilities between them totaling 829 million square feet. We estimate that there are 9,000 U.S. commercial warehousing facilities of size with 1.9 billion square feet of space. The Top 50 have an average of 77 warehouses with an average size of 216,593 square feet. The VAWD market segment grew 1.9% in 2016.

DHL's warehouses follow uniform practices and are true VAWD facilities. The number of facilities for Ryder are inflated by many smaller multiclient operations associated with integrated transportation management operations.

UPS SCS reports 144 warehouses in North America. Of those, U.S. distribution is 32% of the total, U.S. post sales is 45%, U.S. mail innovations is 12%, and Canada – distribution & post sales is 12%. UPS has almost 17.3 million square feet of space in North America which makes it 14th on our list. The average U.S. distribution warehouse is 267,904 square feet, U.S. post sales warehouse is 18,507 square feet, U.S. mail innovations is 99,717 square feet, and Canada – distribution & post sales is 147,125 square feet. Healthcare accounts make up 27% of UPS SCS's total North America warehouse space. The average North America utilization is 90%.

For our Top 50 sample, the smallest company is Netherlands-based global supply chain manager Damco. Its 18 warehouses, covering 3.9 million square feet, are all located in the U.S.

Table 2. A&A's Top 50 North American VAWD 3PLs by Warehousing Space within North America

Rank	Third-Party Logistics Providers (3PLs)	Number of Warehouses	Total Sq. Ft. (Millions)	Avg. Sq. Ft. (000's)	Warehouse/ DC Capabilities					Value-Added Services Capabilities														WMS								
					Whse. Mgmt.	Frozen	Refrigerated	Temp. Control	Rail Siding	Call Centers	Cross Docking	Customization	Inventory Control/ Vendor Mgmt.	KanBan	Kitting	Labeling	Lot Control	Merge-in-Transit	Mfg. Support	Pick/Pack	Pool Dist.	Repair/Refurb.	Returnable Container Mgmt.		Reverse Logistics	Store Support/ Delivery	Sequencing/ Metering	Specialty Packaging	Sub Assembly			
1	DHL Supply Chain North America	673	119.0	176.8	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	RedPrairie, Manhattan, HK Systems, Insight, Proprietary
2	XPO Logistics	392	81.6	208.2	•			•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	Proprietary, Infor Provia, SIMS, Reflex 400, Infolog, RedPrairie, Cadre-Accuplus, SAP, Nulogy	
3	Ryder Supply Chain Solutions	246	43.7	177.6	•	•	•	•	•																						Servicegistics V3, Manhattan, RedPrairie, Accellos, Flux	

Infor/EXCEED 4000, Manhattan,

Answers to Big Questions

We asked survey respondents for their responses to changes and trends they have seen recently in value-added warehousing. The answers below reflect the consensus.

Table 6. Comments by VAWD 3PL Survey Respondents

What important changes have you seen in the last 2-3 years?	
1	<i>In some instances, shippers are leveraging 3PLs to expand and bring their networks closer to major populations, procuring additional warehouses. By establishing these nearby distribution centers, shippers are able to reduce shipping times as the demand for overnight and same day shipping increases. The increased demand for warehouses has also impacted the real estate market, causing tightened capacity and heightened need for real estate capabilities from logistics providers.</i>
2	<i>Decreased Capacity/Need for Innovative Solutions: This trend isn't a surprise, however, with decreasing capacity and highly competitive labor markets in the U.S. we have seen an increased need to drive efficiency within the four walls of the warehouse. Whether through Labor Management Systems or new mechanization/technology, innovative solutions for warehouses and the "warehouse of the future" will be crucial to maintain a competitive edge in a very competitive landscape.</i>
	<i>Sharing Economies/Infrastructure with Visibility: The idea of idle capacity used to be a way of life for many 3PLs and operators. Today, many companies are looking at how can they leverage that space effectively. Some providers like Flexe have been able to build models, but we are seeing more and more customers wanting to leverage multiple locations, providers or drop-ship locations, but needing visibility for all, which has caused us to enable our technology to have that visibility, but this will continue to be the new reality for many companies.</i>
3	<i>Shippers report on current studies, surveys that reliability and/or service is paramount, however, we see that price is usually the main driver of logistics and supply chain decisions. This "race to the bottom" is the main reason why there is a disconnect between what shippers expect of the 3PLs and the value that 3PLs believe they deliver. Ecom/omni-channel capability is a hot topic as the shipper and retail communities figure out how best to swiftly and economically provide for their customers/consumers.</i>
4	<i>The first trend involves multiple topics in and around food safety. From security to sanitary storage and transport, food safety is critical not only to our customers' brand reputation, but also our own. Hitting even closer to home, the impending implementation of the Food Safety Modernization Act holds executives personally liable (with fines and jail time!) for breaches. Like a lot of things in life, if we do everything in food safety right, no one notices - but if we fall short, everyone will.</i>
	<i>The final trend surrounds transportation. Some of these ideas are new, while others are seeing fresh wind behind them. Delivery requirements by shippers and their customer are changing, moving to tighter schedules to optimize their capital resources and inventory management. Complying with state and federal regulations on everything from hours of service to requirements for data recorders impacts not only the driver shortage but also many of the operation of systems in the distribution center. And, of course, there is sustainability, a topic that continues to ebb and flow over the years, often reflecting our nation's economic health.</i>
	<i>Companies wanting full logistic warehouse services and closing their warehouses.</i>
5	<i>New warehouse opening creating challenges in labor force.</i>
6	<i>Warehouse availability is tightening up further, driving higher levels of new construction.</i>
	<i>Technology enablers are reshaping the industry, but the path to profitability needs critical mass.</i>
	<i>Product lifecycles are shortening. Near-shoring supply chains to be more nimble.</i>

hope that the overall pricing is high enough to make up for absorbing startup costs; however, when combined with the potential for operational scope creep, this is a risky approach.

Transactional Pricing Guidelines

Pricing for contract warehousing services has become more tailored by location. The process is driven by customer demands and unique circumstances. Over time pricing schemes have become more varied, but according to our recent surveys the guidelines below are reasonable for basic warehousing and value-added services.

Table 7. Handling Charges

Table 8. Storage per Month

Modeling Storage Rates for Transactional Pricing

If you have situations which fall outside the market research data in the section above (as we often encounter in warehouse pricing benchmarking consulting engagements), below we describe a process for modeling pricing for storage using a heuristic bottom up approach.

Calculating Market Storage Rates per Pallet

The table below contains benchmark average square footages for a standard 48' x 40' pallet of goods stored in different configurations using a 25% common-area allowance and an average 85% warehouse utilization.

Table 9. Square Feet per Pallet

A&A Matrix			Pallets High							
Square Feet per Pallet			1 High	2 High	3 High	4 High	5 High	6 High	7 High	8 High
Rack	Turret, Swing 6' Aisle	1	43.60							
	Reach Lift	1*	52.94							
	Deep Reach Lift	2	40.27							
		3	36.05							
	9.5' Aisle	4	33.9							
5		32.1								
Bulk	Counterbalance	1	67.0							
		2	47.0							
	13' Aisle	3	37.0							
		4	32.0							
		5	28.0							
		6*	25.0							
		7	22.0							

*Typical Distribution Warehouse

The base monthly storage rates in this table are based on the current market. For more information, see the Current Warehouse and Valuation Report.

Contract Warehousing - Size, Commodities, Operating Margins

From the survey, there were five warehouses under 5,000 square feet and four between 5,001 and 6,000 square feet. We left these smaller warehouses in the data. The size distribution for all 536 warehouses is given in the figure below.

Figure 4. Contract Warehouses by Size

Table 17. Contract Warehouses by Size

The trend in new contract warehouses is for them to be larger in size. However, in our sample, 59% are smaller than 200,000 square feet. Overall, the mean is 252,110 and the median is 150,000 square feet. Eleven percent are “big boxes” at 600,000 square feet or greater.

Thirteen vertical industries/commodity classifications were used in analyzing the contract warehouses in our sample. Retail/Consumer Goods was the largest vertical accounting for 21% of all contract warehousing operations. Food/Beverage was second at 15%. High-tech/Computers was next at 14%. Refrigerated and Frozen warehouses comprised 9% of the total and of those, 10 handled frozen products. The average cooler cubic footage was 1.8 million. For frozen warehouse space, the average was 2.3 million cubic feet.

Figure 6. Contract Warehouses by Expected and Actual Operating Margins - 2016

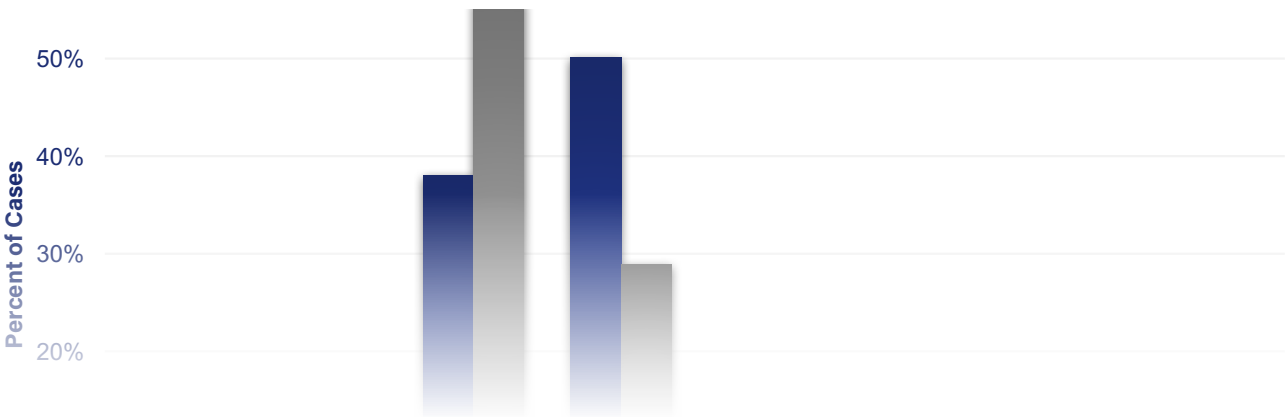


Table 19. Contract Warehouses by Expected and Actual Operating Margins - 2016

	Range	Mean	Median
Expected	5.70 – 41.00%	23.14%	19.00%

Table 20. Operating Margins - 2006

	Range	Mean	Median
Expected	0.0 – 42.6%	13.5%	14.8%
Actual	-49.6 – 56.1%	12.5%	11.5%

Figure 10. Contract Warehouses by Value-Added Services Provided**Table 25. Contract Warehouses by Value-Added Services Provided**

VAWD 3PL Customers

Our sample includes 396 customers of VAWD 3PLs. The ratio of warehouses to customers is 1.47. Customers have one to twenty-three locations. Only 14% of customers have arrangements involving multiple locations. The average (mean) customer utilizes 280,987 square feet. The median is 94,240. The largest allocation is for 4.5 million square feet.

Revenues per customer range from \$500 to \$52 million per year. The average (mean) is \$3.9 million and the median is \$1.6 million.

Table 34. Public Warehouses - Storage per Month

Table 35. Public Warehouses - Other Services

Current Warehouse Rental and Vacancy Rates

The most expensive warehousing markets with the lowest vacancy rates cluster along coastal areas. Los Angeles, San Francisco/Oakland, Long Island, South Florida from Miami to West Palm Beach, Houston and Northern New Jersey all have average rates exceeding \$8 per square foot per year. Average U.S. vacancy rates are declining, averaging 5.2%, which is the lowest in over a decade. The highest vacancy markets with inventory over 100 million square feet are Birmingham, AL at 10.8% vacancy and average revenue per square foot of \$3.71, and Phoenix at 8.3% vacancy and \$5.02 per square foot. In addition, net absorption (filling empty space) was high. The top 5 (in million square feet) were Los Angeles at 17.3, Atlanta at 16.7, Dallas/Ft. Worth at 15.9, Inland Empire at 14.1 and Eastern PA-Lehigh Valley at 12.9 million.

Big box leases driven by e-commerce and 3PLs in major markets are the driving force. Warehouse constructions for the U.S. at the end of 4Q17 was 230+ million square feet. Inland Empire, Dallas/Ft. Worth, Eastern PA-Lehigh Valley, Atlanta and Chicago are the top 5 for new construction. The following table provides a comparison of data from three major sources.

Table 36. Top 5 Markets by Vacancy Rate

Table 37. Vacancy Rate and Price Per Square Foot by Market

E-Commerce Fulfillment/Pick and Pack Value-Added Warehousing and Distribution

The percent of North American Top 50 warehousing 3PLs that offer pick and pack services is 98% which is also the percent in A&A's Who's Who in Logistics Online Guide to 3PLs. In our last report, 96.7% of the top North American warehousing 3PLs offered pick and pack services.

Figure 18. Percent of Top 50 North American VAWD 3PLs Offering Service

North America e-commerce growth from 2016 to 2020E is more than double for e-commerce logistics costs and 3PL e-commerce revenue.

Table 38. E-Commerce Logistics Costs, 3PL Revenue, and Growth (US\$ Billions)*

*Includes countries with \$500 million or more in 2020E e-commerce logistics costs; included countries represent 87% of global GDP and ~98% of 2016 global e-commerce sales.