

Enhancing Valuation Analysis Through Customer-Based Corporate Valuation

Daniel McCarthy

CFA Institute

May 4th, 2022

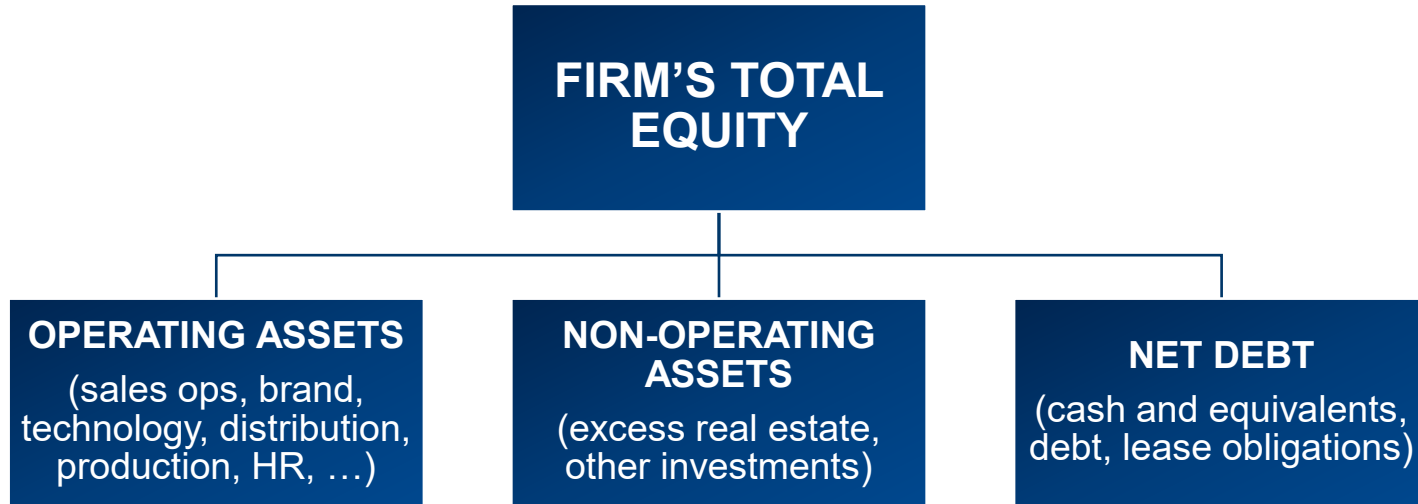
ZODIAC

Agenda

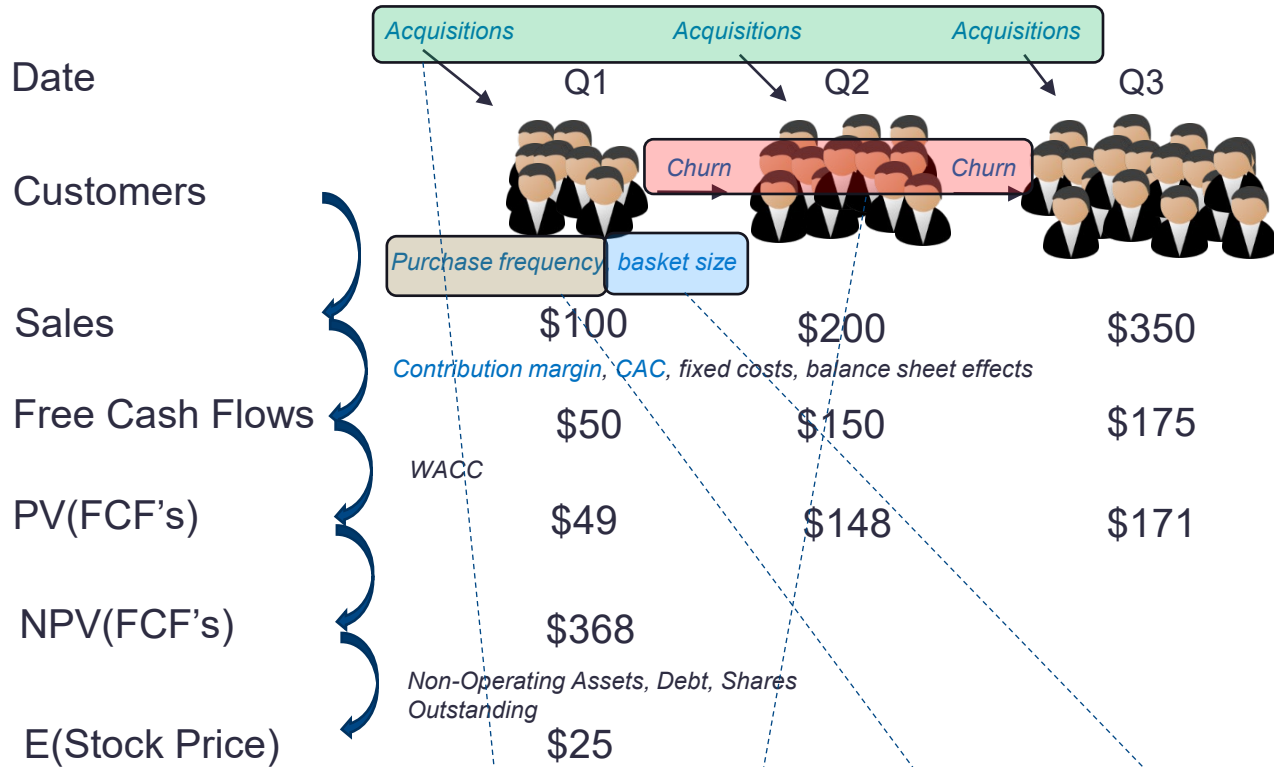
- Valuation framework
- The nuts and bolts of unit economics
- Bringing it to life: one real-world vignette
- Things to watch for
- Call to action



The sources of corporate valuation



Framework for customer-based corporate valuation



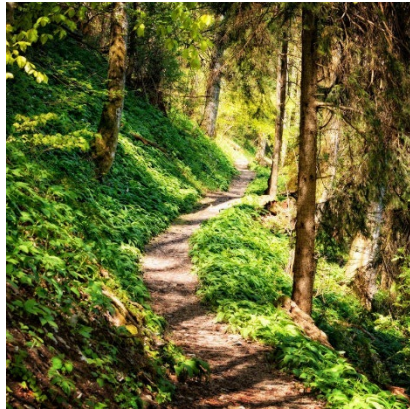
Specify generative models for **acquisition**, **retention**, **ordering**, and **spend**

CBCV → unit economic insights

CBCV framework gives us highly diagnostic unit economic insights “for free”:

PAV: determines upper bound on CAC

CLV: determines if you're **upside or not**



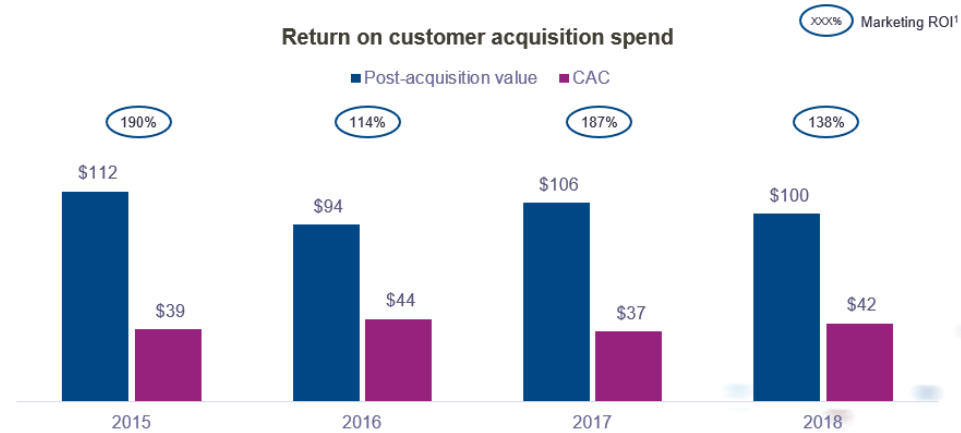
= Good current unit economics (CLV/CAC)

+ Sufficient customer acquisition

+ No significant degradation in unit economics

Recent diligence

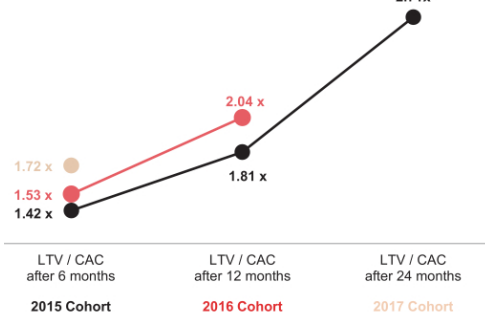
Return on customer acquisition spend



Though to be fair, ...

Farfetch:

Lifetime Value of a Consumer to Consumer Acquisition Cost Ratios

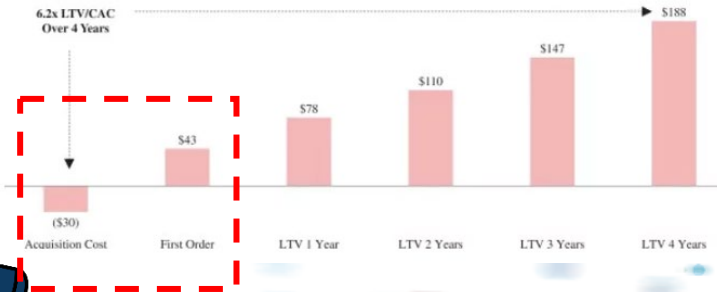


Other important related metrics

Other important terms:

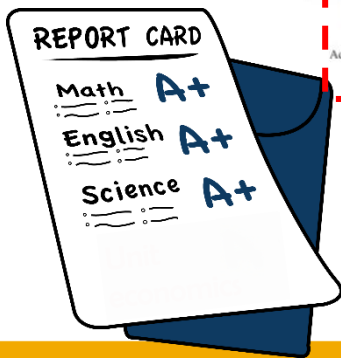
- **Finite-horizon CLV and PAV**
- **Payback period**
 - Time until cumulative contribution profit exceeds CAC
- **And more**

Revolve Clothing:



Critical to know these numbers

And calculate them **correctly**



Measuring CAC

Starting point: $CAC = \dots$

Sales and marketing

Customers acquired

In truth, more complicated:

- Marketing for repeat orders
- Cost allocation
- Lagged expenses
- Gross versus net CAC
- What is “acquisition”?

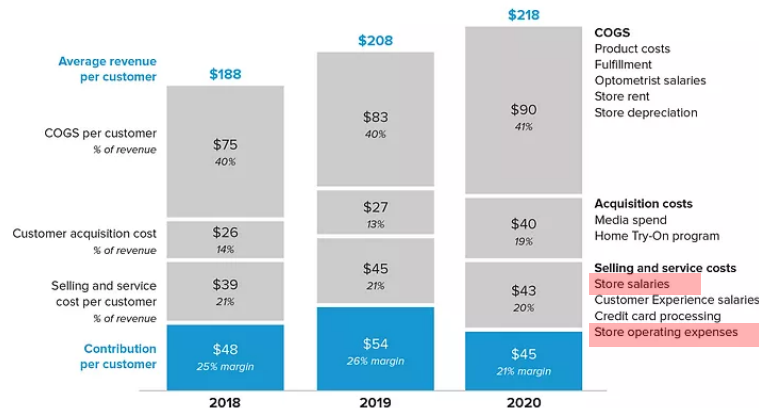
But
approximately right >> nothing



APPENDIX Illustrative Customer Acquisition Cost

(All units in millions, except per-customer figures)	2018
Total Advertising Spend	\$774.2
Partner Ad Spend	\$5.5
Direct Retail Ad Spend	\$768.7
Active Customers	15.15
Total Orders	28.08
% of Orders from Repeat Customers	65.8%
Implied New Customers	9.60
Implied Orders from Repeat Customers	18.49
AOV	\$239.2
Assumed Revenue from Repeat Customers	\$4,423
Assume 7% Direct Retail Ad Spend on Repeat Revenue	\$309.6
Implied Direct Retail Ad Spend for New Customers	\$459.1
Customer Acquisition Cost adjusted for Repeat Ad Spend	\$48
Annual Direct Retail Revenue per Customer	\$443
Annual Contribution per Customer	\$86.75
Contribution Margin	19.6%

WARBY PARKER

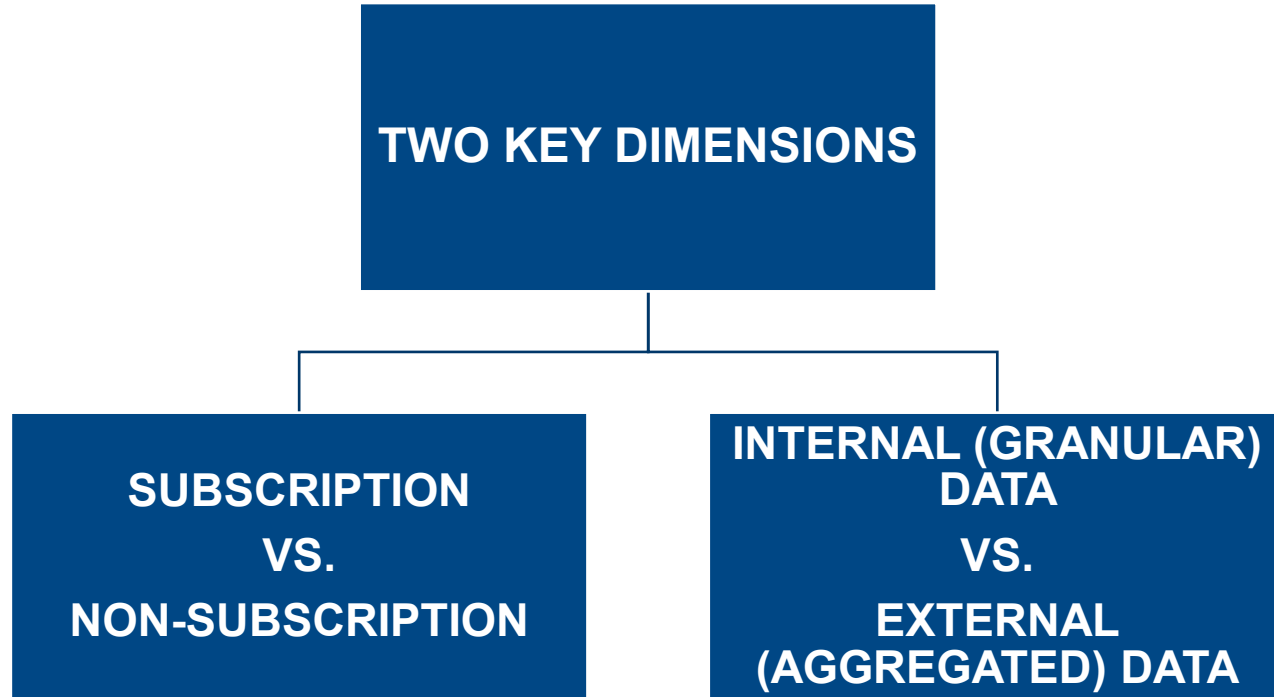


For a given cohort of new locations and product upsells that go live on the Toast platform in a given month, we calculate the CAC as the in-month hardware and professional services gross profit plus the sales and marketing expense incurred two months prior, which is based on the median time between when a location is signed and when it goes live on our platform.²⁰ To evaluate payback period, we compare our CAC to the estimated contribution profit from the same cohort of live locations and upsells, which is defined as (i) the subscription component of MRR for the cohort, less the estimated costs to service these fees, plus (ii) the average payments component of MRR in each new location's first three full months live on our platform, less the estimated support costs to service these fees.



Net Customer Acquisition Cost (profit) can be calculated as Adjusted Sales and Marketing Expense (which excludes depreciation and amortization expense and stock-based compensation expense) less Adjusted Connected Fitness Product Gross Profit (which excludes depreciation and amortization expense and stock-based compensation expense). Our Net Customer Acquisition Costs (profit) for fiscal 2017, fiscal 2018, and fiscal 2019, was \$14.2 million, \$(4.9) million, and \$1.6 million, respectively, or \$183, \$(33), and \$5 per Connected Fitness Subscriber added, respectively. We believe we will continue to drive rapid payback and efficiencies in Net Customer Acquisition Costs (profit) by further leveraging sales and marketing investments as a result of heightened brand awareness and growing word-of-mouth referrals. Changes in Connected Fitness Product margins or sales and marketing expenses may result in an inability to fully offset our customer acquisition costs.

Specifying the customer model



TWO KEY DIMENSIONS

SUBSCRIPTION
VS.

NON-SUBSCRIPTION

INTERNAL DATA
VS.

EXTERNAL DATA

Subscription vs non-subscription

- **Subscription:**
 - Observable churn
 - Telcos, insurance, club memberships, SaaS, etc.
 - Relatively steady payments over lifetime
 - Easy to model
 - But less common than non-subscription

BIRCHBOX ♦



mongoDB



Spotify



Subscription vs non-subscription

- **Non-subscription:**

- Latent attrition

- Retail, restaurants, gaming, travel, entertainment, healthcare/pharma, media usage, B2B distribution, ...

- Very “random” purchase timing over lifetime

- Much harder to model

- Can’t approximate it as contractual

- But suitable methods are now well-established



TWO KEY DIMENSIONS

SUBSCRIPTION
VS.

NON-SUBSCRIPTION

INTERNAL DATA
VS.

EXTERNAL DATA

MANAGEMENT SCIENCE
Vol. 33, No. 1, January 1987
Printed in U.S.A.

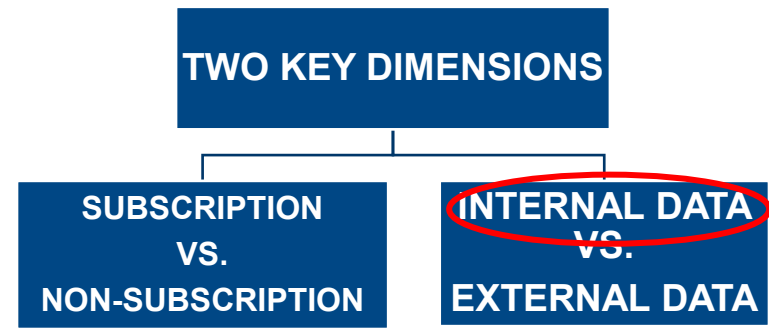
COUNTING YOUR CUSTOMERS: WHO ARE THEY AND WHAT WILL THEY DO NEXT?

DAVID C. SCHMITTLEIN, DONALD G. MORRISON AND RICHARD COLOMBO
The Wharton School, University of Pennsylvania, Philadelphia, Pennsylvania 19104
Graduate School of Business, Columbia University, New York, New York 10027
Department of Marketing, Tisch Hall, New York University, New York, New York 10002

This article is concerned with counting and identifying those customers who are still active. The issue is important in at least three settings: monitoring the size and growth rate of a firm's ongoing customer base, evaluating a new product's success based on the pattern of trial and repeat purchases, and targeting a subgroup of customers for advertising and promotions. We develop a model based on the number and timing of the customers' previous transactions. This approach allows computation of the probability that any particular customer is still active. Several numerical examples are used to illustrate applications of the model.
(MARKETING; CONSUMER BEHAVIOR; POISSON PROCESS; PROBABILITY MIXTURE MODELS; NEW PRODUCT INTRODUCTIONS; MARKET SEGMENTATION; BROKERAGE FIRMS)

Internal vs. External Data

- **Internal (granular)**
 - Customer-level transaction logs
 - Can be augmented by other sources
 - Marketing action
 - Customer satisfaction
 - Social media activity, ...



001.

LIFETIME VALUE ANALYTICS

ZODIAC

BACK TO LIBRARY

INSIGHTS

CLV

Retention

Transactions

ANALYTICS

A/B Testing

QUERY

New Query

Saved Query

Exports

Diagnostics

Accounts

Contact Us

Customer Lifetime Value Insights

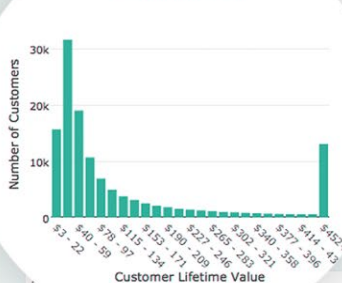
Financial Analysis: Sales Gross Profit

Value Metric: CLV RLV

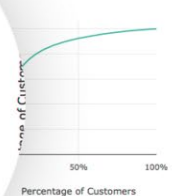
Customer Base

Total Customer Equity	Average CLV	Median CLV	Number of Customers
\$1,054	\$212.14	\$55.97	126,825

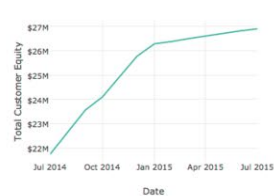
Breakdown of CLV



Cumulative Total Customer Equity



Total Customer Equity over Time



Zodiac tracks CLV insights including customer distribution by value and attribute over time and progress toward goal.

ZODIAC

002.

CUSTOMER SEGMENTATION BY VALUE.

ZODIAC

BACK TO LIBRARY

INSIGHTS

CLV

Retention

Transactions

ANALYTICS

A/B Testing

QUERY

Total Customer Equity by Acquisition Channel



Average CLV by Acquisition Channel



Nike's purchase of analytics firm Zodiac highlights focus on customer lifetime value

Nike has big digital plans as it goes direct to consumer, aims to innovate faster and build relationships. It is also beefing up its analytics team.



By [Larry Dignan](#) for [Between the Lines](#) | March 23, 2018 -- 14:31 GMT (07:31 PDT) | Topic: [Digital Transformation](#)

Nike has acquired Zodiac Inc., a consumer data analytics company, in a sign that its digital transformation plans revolve around customer lifetime value.

The athletic shoe and apparel maker, which is in a dogfight with Adidas and Under Armour, has a strategy called Consumer Direct Offense that aims to develop products faster with personalization at scale. Nike also has to focus on selling direct and owning the customer relationship since retail is a messy industry.

In 2016, Zodiac raised \$3 million in seed funding to launch predictive analytics tools based on forecasting individual customer lifetime value. The models were developed by Wharton School Professor Peter Fader and a team of data scientists at the University of Pennsylvania.

Zodiac's mission is to understand the value of an individual customer to boost revenue and retention with the right marketing, recommendations and offers.

In November, Nike outlined plans to juice its growth in the years ahead by scaling new product platforms quickly and then going direct to consumer via its retail outlets, mobile apps and e-commerce partners.

Mark Parker, speaking on Nike's third quarter earnings conference call, outlined the company's progress across key areas:

- 2X Innovation, which revolves around developing new platforms (types of shoes and technologies).
- 2X Speed, which revolves around investing in digital to serve consumer demand faster. There's also a heavy dose of investment in robotics and automation.
- 2X Direct, which leads with digital channels as well as Nike's own retail outlets.

Analytics will be critical to multiple efforts. Parker added that Zodiac and its "proprietary tools will help us deepen relationships with consumers all over the world with a primary focus on our NikePlus members."

Predictive Customer And Corporate Valuation

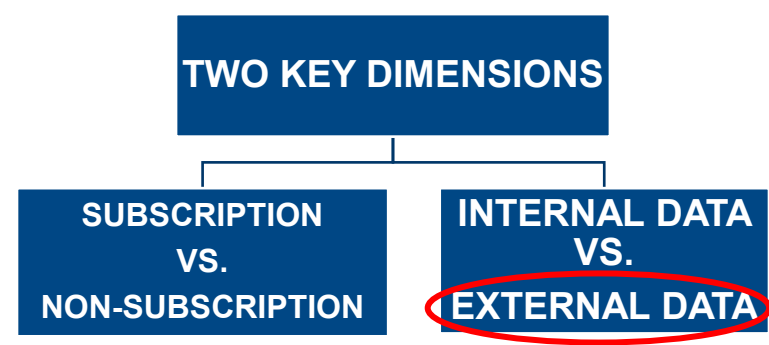
See what customers will do tomorrow, so you can make better decisions today

[GET THE DEMO](#)[▶ FOR INVESTORS](#)[▶ FOR BUSINESSES](#)

Internal vs. External Data

- **External (aggregated)**

- “Rolled up” summaries
- Periodically disclosed
 - First-party disclosures (10-K’s, 10-Q’s, investor presentations, etc.)
 - Third-party disclosures



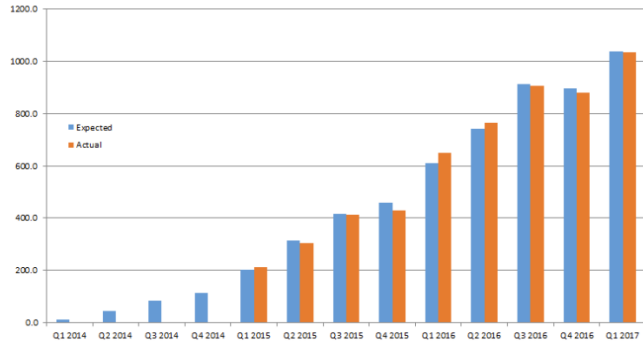
Case study 1: Blue Apron

- In the run-up to their IPO:
 - Leader in a booming industry
 - 53% market share
 - Revenue growth of 100% y/y

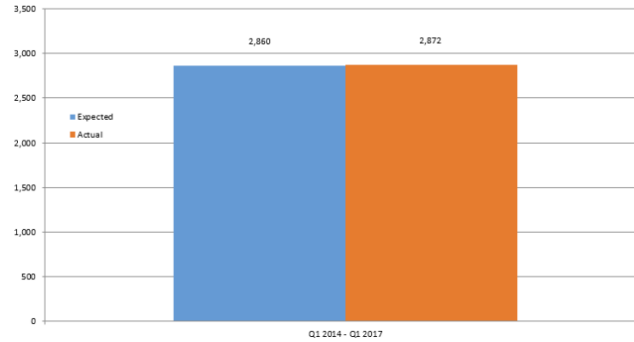


Validating our CBCV model

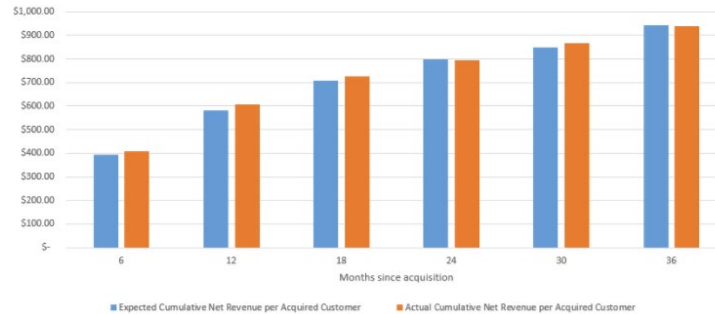
Active Customers Over Time (k)



Cumulative Customers Acquired (k)



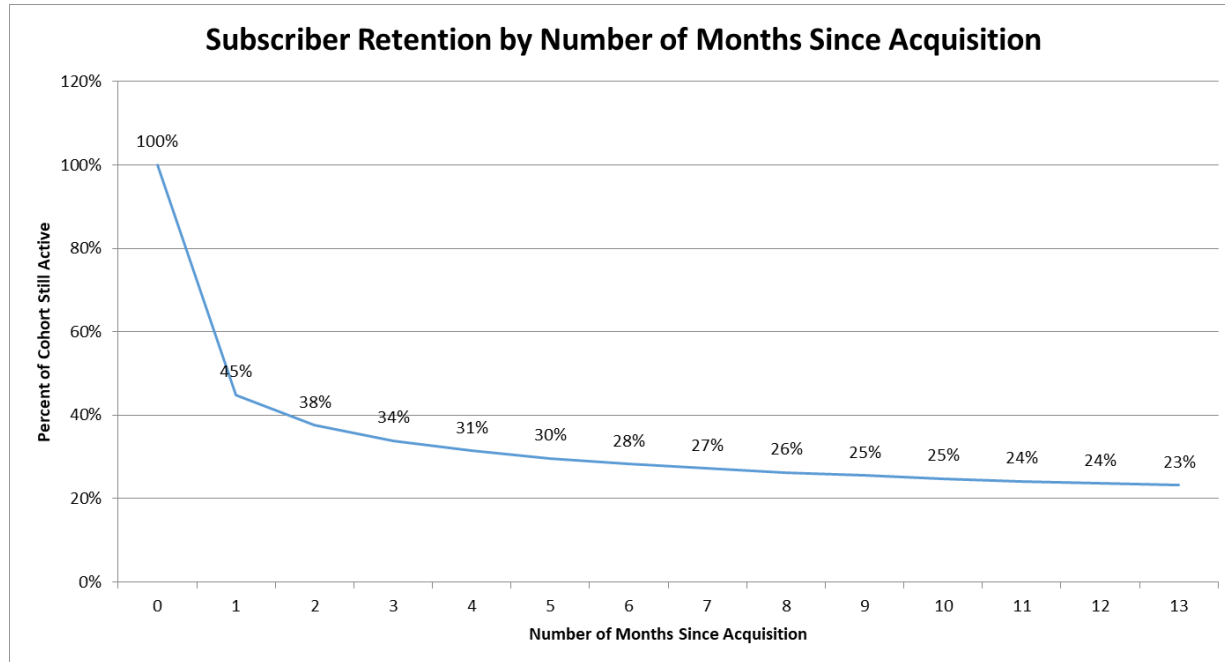
Cumulative Net Revenue per Acquired Customer by Months Since Acquisition



... (many more)

CBCV results: retention

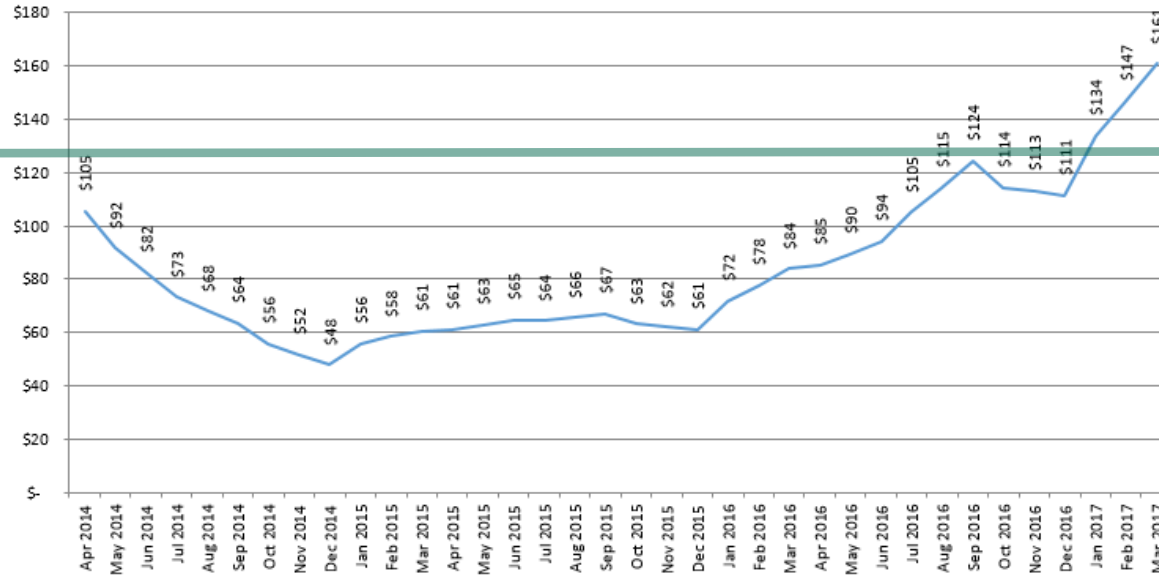
Challenging customer retention (70% churn within 6 months):



CBCV results: customer acquisition cost

Rising CAC relative to LTV:

Estimated Marketing Spend Per Customer Acquisition



Average post-acquisition customer value: \$133

Popular media reaction



TECH Stir Fry on Sale? Blue Apron Draw Customers

Another problem is that Blue Apron is losing customers. The company does not disclose its customer retention rates in its securities filings about market performance. But Daniel McCarthy, a professor who has analyzed Blue Apron's customer retention, says that the rate of customers stop using the service is "The retention at Blue Apron is significantly lower than much out of the norm," Mr. McCarthy says. The drop rate would be 30% to 40% higher than what you would see how they're going to grow their



Credit: Blue Apron

A Detailed Look at Blue Apron's Challenging Unit Economics

Published on June 27, 2017 [Edit article](#) | [View stats](#)



Daniel McCarthy
Assistant Professor of Marketing at Emory University - Goizueta Business School

12 articles

Good companies can acquire many customers cheaply, retain existing customers for extended periods of time, and generate a lot of revenue while those customers are alive. Putting it simply, the litmus test of any company's financial success is the ability to acquire

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Finance

Thursday, June 29



...es public today. The company priced at the bottom of the price range last night, bringing its valuation to \$1.9 billion. For more details below, but I want to point to [this analysis](#) on the customer churn rate. Finding how quickly customers stop out of a subscription was the first stat I looked for when the company filed its IPO. I was disappointed when I realized the company didn't disclose it. I like to see an important stat to share with potential

... professor and entrepreneur, has [crunched some](#) data using the retention curve technique he developed to arrive at a prediction that Blue Apron customers churn within six months. Another stat that Blue Apron did disclose: It pays an average of \$58 million to acquire a customer. So: Blue Apron ended the first quarter with 1.1 million subscribers. That means, to merely stay flat, Blue Apron must pay \$58 million every six months to acquire *customers that leave*. To grow, it's gotta spend even



Additional resources on Blue Apron

HBR article

Subscription Businesses Are Booming. Here's How to Value Them

by Daniel McCarthy and Peter Fader

DECEMBER 19, 2017

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HBS case study

HBR STORE > CASE STUDIES > SALES & MARKETING

Blue Apron: Turning Around the Struggling Meal Kit Market Leader

CASE STUDY by Daniel M. McCarthy and Eric M. Schwartz

\$8.95

FORMAT

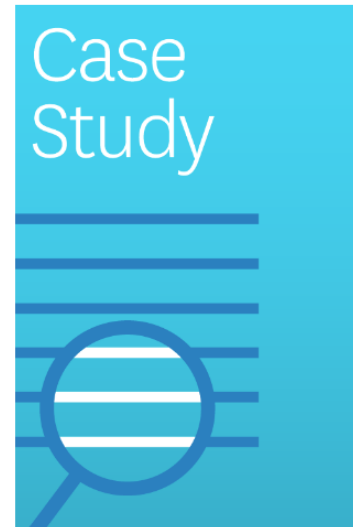
PDF Hardcopy Black & White

Add copyright permissions. [Quantity discounts.](#)

LANGUAGE

English

ADD TO CART



Stock price reaction

IPO price target: \$15-17

IPO price: \$10 (down about 40%)

Current price (2/21): \$0.40 (down 96%)

Market Summary > Blue Apron Holdings Inc

6.02 USD

+ Follow

-134.08 (-95.70%) ↓ all time

Closed: Feb 18, 7:10 PM EST • Disclaimer

After hours 5.95 -0.070 (1.16%)

1D | 5D | 1M | 6M | YTD | 1Y | 5Y | Max



Things to watch for

- (-) Misleading definitions
- (-) Cherry-picked disclosures

Forbes

Surprising Learnings From Warby Parker And AllBirds IPO Filings



Jason Goldberg Contributor
Retail

Follow

I am a shopper marketer focused on the digital disruption of commerce

Warby Parker reported a blended customer acquisition cost of \$27 for 2019 (the last non-pandemic year), which is quite reasonable for a business that generates \$72 in contribution profit per order. Daniel McCarthy, a Marketing Professor at the Goizueta Business School of Emory University, and a guru in customer value calculations, identified a significant wrinkle: Warby Parker uses a “novel” definition of customer acquisition costs, because they apply their costs against all active customers, and not just newly acquired ones. This means the costs to acquire new customers (traditionally the definition of CAC), is probably significantly higher.

allbirds

Profitable within initial month of purchase

100%

of all cohorts have contribution profits in excess of CAC within the initial month of purchase¹

Things to watch for

- (+) Alternative data
 - Highly granular
 - Helps with selective disclosure
 - Note though: (1) US, (2) credit card only, (3) subsample of population



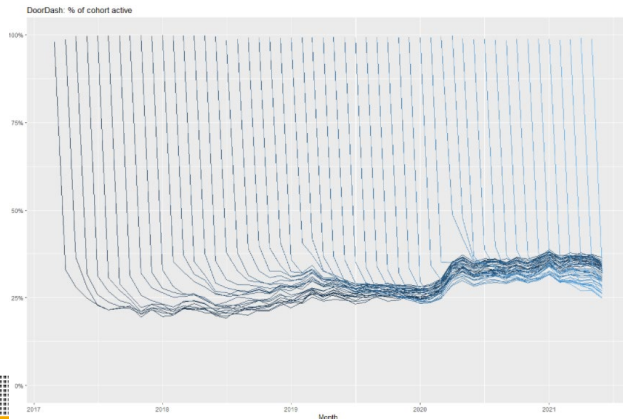
DoorDash, Instacart, and Shipt: A Tale of 3 "COVID Bumps"

Published on August 17, 2021 | [Edit article](#) | [View stats](#)



Daniel McCarthy
Assistant Professor of Marketing at Emory University - Goizueta Business School

22 articles



Scalable Data Fusion with Selection Correction: An Application to Customer Base Analysis

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Abstract. Increasingly, applied researchers study problems for which multiple sources of data are available. These sources may come with varying degrees of aggregation, and some of them may not be representative of the population of interest. Using multiple data sources could lead to richer insights. However, existing data fusion approaches do not correct for selection bias in data sources that may not be representative and either do not scale to large populations or are statistically inefficient. We propose an aggregate-disaggregate data fusion method that corrects for selection bias and is both computationally scalable and statistically efficient. We apply the method to estimate a model of customer acquisition and churn at subscription-based firms. We bring the model to life using a large credit card panel and public data from Spotify, the music streaming service. This application and supporting simulations show that incorporating the granular data through our data fusion method enhances identification and offers richer insights than extant approaches. We find, for example, that previously churned customers remain with Spotify longer than newly adopted subscribers do, implying a more sanguine view of Spotify's future retention profile than previous approaches that do not use multiple data sources.

Things to watch for

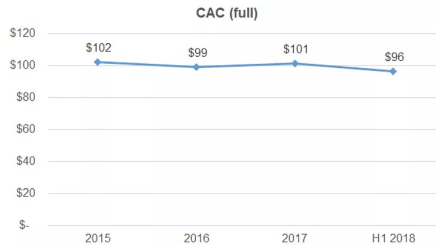
- (+) Network effects
- (+/-) TAM / acquisition

Theta Equity Partners Services Research Team Careers Contact

Farfetch IPO: Strong Unit Economics Support Its Projected Valuation

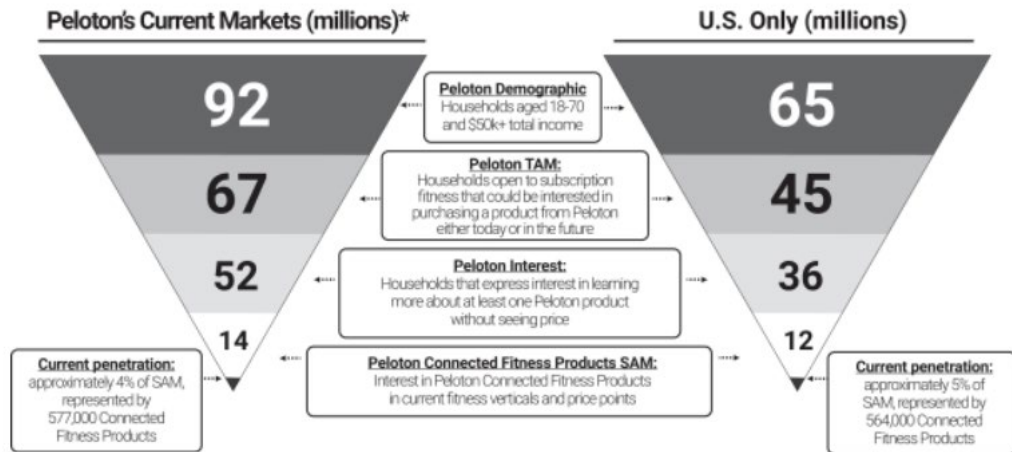
Results: CAC has been stable, if not slightly declining over time

Assuming that all demand generation expense is allocated to new customers, Farfetch's CAC has been very steady over the past few years, hovering at about \$100 per customer. If anything, its CAC has been in decline over the past few years. Note that Farfetch internally uses only demand generation expense attributable to new customer acquisition to calculate CAC, but unfortunately, they do not disclose these numbers.



Great economics mean less if TAM (or more accurately, SAM) is small at that level of economics

SAM drivers: current pricing, current products, marketing, ...



Call to action!

- Metrics/data to collect:
 - CAC, repeat activity, cohorted data, churn rate, active customers, AOV, payback, net revenue retention, contribution margin, ...
- Where to look:
 - SEC filings, investor presentations, alternative data sources
- Data directly **disclosed** → data **inferred**
 - Companies disclose good data, hide bad data...
 - ... but you can often triangulate back into the hidden data
- Get unit economics (e.g., CLV/CAC and drivers), judge TAM/acquisition, then assess how drivers and economics will change



Summary and conclusions

- Bringing insights and methods from marketing into finance can improve forecasting accuracy and create important new investment KPI's
- Scores of companies disclose meaningful amounts of data
 - Many more we can obtain data for through alternative data sources
 - Through careful triangulation, even more measures are obtainable
- Disclosure (whether and how) is voluntary – be careful!

Additional Resources:

- Connect/follow me on LinkedIn and Twitter (@d_mccar)
- Seminal CBCV papers: <http://bit.ly/2N8P3sq> and <http://bit.ly/2LUmLFG>
- CBCV paper incorporating credit card panel data: <http://bit.ly/2UlwfXO>
- HBR article: <http://bit.ly/2sBjbYM>
- Theta: <http://www.thetaclv.com>

Thank you!