

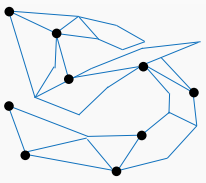


Data Application Lab

E-commerce Analytics

Outline

- E-Commerce Introduction
- Important Metrics & KPIs
- Digital Marketing Analytics Full Cycle
- Build Customer Profile
- Case Study 1: How to Increase Conversion Rate?
- Case Study 2: How to segment and rank customer for RFM/LTV analysis?
- RFM Segmentation

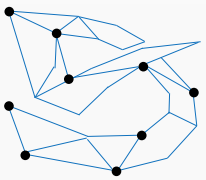


E-Commerce Industry Overview

What is
E-Commerce?



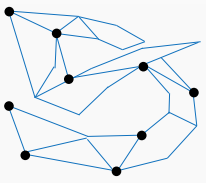
Business model enabling a firm or individual to conduct business over an electronic network, typically the internet.



Types of E-Commerce (C2C, B2C, B2B, C2B)

Consumer-to-Consumer (C2C)

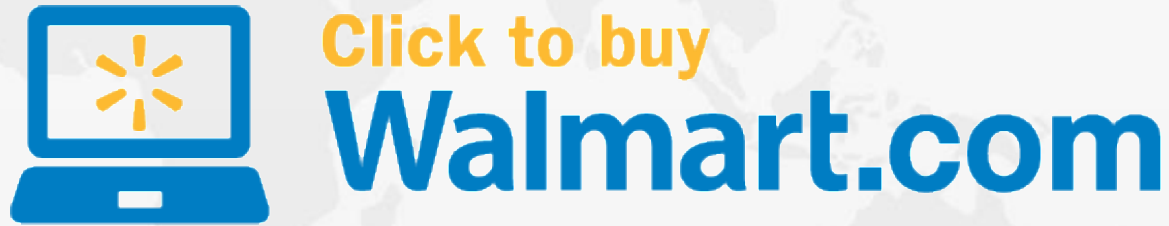




Types of E-Commerce (C2C, B2C, B2B, C2B)

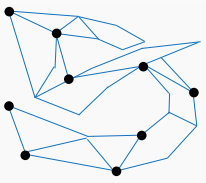
Business-to-Consumer (B2C)

amazon.com[®]



TARGET
.com

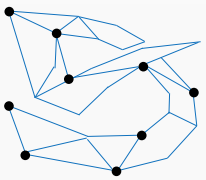

Alibaba.com[™]



Types of E-Commerce (C2C, B2C, B2B, C2B)

Business-to-Business (B2B)





Types of E-Commerce (C2C, B2C, B2B, C2B)

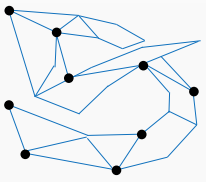
Consumer-to-Business (C2B)



Google AdSense



SurveyMonkey™



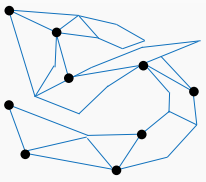
Product in E-Commerce

Physical

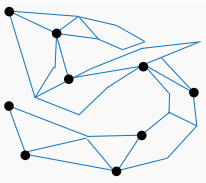
Digital

Service





Important Metrics & KPIs



Website Discovery

☐ Impressions

Each time when an ad is displayed to viewer, it is counted as an impression.

☐ CPM (Cost Per 1000 Impression) – $1000 * \text{Ad Spend} / \text{Impressions}$

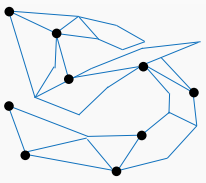
☐ View Frequency – The average number of times each visitor see your ad.

☐ Brand Name Search

A person who is searching for your brand is likely to convert as a customer.

- **Clicks:** Total counts from links to your e-store front or product page
- **CTR (Click Through Rate):** Clicks/Impressions
- **Position:** Ranking of your website's URLs on the search query pages.

Tools: Google AdWords; Google Search Console; Google Keyword Planner



Onsite Traffic

☐ Visitors: new or repeated

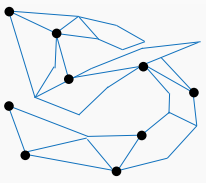
Visitors metric does not necessarily equal to individual user. It is usually identified by a unique cookie set by each visitor's browser. So if a shopper visits from mobile phone and desktop computer, each event/session will register as distinct visitors. If a visitor deletes his/her cookies and comes back to the site, the visitor will likely be counted as a new visitor.

☐ **Session:** Sessions typically end after 30 minutes of inactivity. All interactions by a visitor on your website within a given timeframe such as page views, events, social interactions, and ecommerce transactions will register as a single session.

☐ **Pages/Session:** the average number of pages viewed per session.

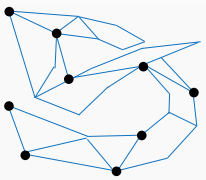
☐ **Bounce Rate:** the percentage of single page visits.

☐ **Average Session Duration:** total duration of all sessions (in seconds) / number of sessions. Usually used along with bounce rate to understand how engaging of store front or product page.



Traffic Sources

- ☐ **Direct Traffic:** all those people showing up to your Web site by typing in the URL of your Website or from a bookmark, a.k.a “default traffic” or “ambient traffic.”
- ☐ **Referring URLs:** other Web sites sending traffic to you. These could be as a result of your banner ads or campaigns. These could be all those blogs or affiliates who link to you.
- ☐ **Organic Search (SEO):** results are listings on search engine results pages that appear because of their relevance to the search terms, as opposed to their being advertisements.
- ☐ **Paid Search (PPC):** is the process of gaining website traffic by purchasing ads on search engines.
- ☐ **Other:** These include campaigns you have run, e-mail, direct marketing and so on.



Customer

☐ **Customers:** New / Active

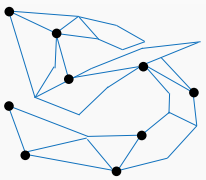
Different from Visitor as registered/logged in user.

☐ **Retention Rate:**

Customer retention rate is calculated by measuring the percentage number of customers that you have retained over a given period.

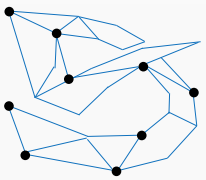
☐ **Net Promoter Score (NPS):**

An index ranging from -100 to 100 that measures the willingness of customers to recommend a company's products or services to others.



Conversion Stage

- ❑ **Conversion Rate:** the percentage of users who take a desired action. For e-commerce, often time conversion rate is the percentage of buying action over session visit or email campaign click through.
- ❑ **Time to Purchase:** how long it took for visitors to your site to change into actual customers.
- ❑ **AOV (Average Order Value):** the value of an average order within a period of time. Usually evaluated as $\text{Revenue over Number of Conversions (Orders)}$.
- ❑ **CPC (Cost per Conversion):** the amount you essentially pay to turn a visitor into a buyer.



Sales/Transaction (Essentials)

☐ **Gross:**

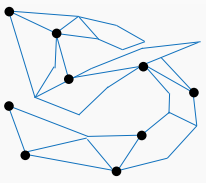
GsSales (FP/MD), GM%

☐ **Net**

NetSales, NetGM%

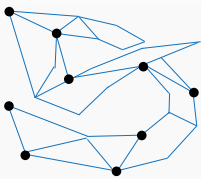
☐ **Rates**

RetRate, InvST

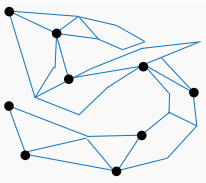


Marketing

- ❑ **CPA:** Cost per Acquisition
- ❑ **CPC:** Cost per Click
- ❑ **PLA (Product Listing Ads):** PLAs are the images people see when searching for a particular product in a search engine.
- ❑ **Est. Marketing Spend**
 - Paid Search & SEO (Search Engine Optimization)
 - Retargeting
 - Affiliate
 - Social Media
 - CSE
 - Email



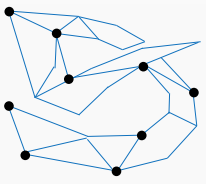
Digital Marketing Analytics Full Cycle



Data Analytics Full Cycle



Oversee every process in typical E-Commerce to look out for potential issues, problems and potential for optimization to boost business performance.



Data Analytics Full Cycle: General Steps

Step1: Setup solution for request

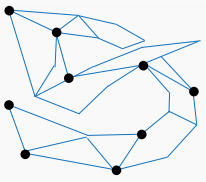
Step3: Analytical analysis: A/B testing, regression modeling, seasonality/trending, etc.

Reports

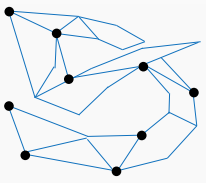
Step2: Data mining: collection/cleaning/massage

Step4: Summarize findings and insights: provide solution and/or recommendation





Build Customer Profile



Customer Profile

▪ Email Activity

Open/click count and rate click

Opt in/unsubscribe

▪ Order Activity

Product Type

Order Date

Order Value

▪ Demographic Information

Gender

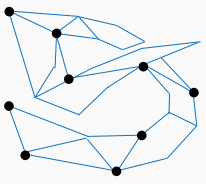
Age

Income

Occupation/niches

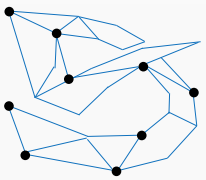
Region

Credit/profitable_index



Case Study 1

How to Increase Conversion Rate?



Increase Conversion Rate

Product attributes

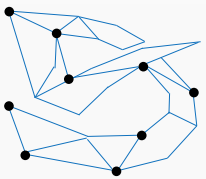
- Newness
- Size availability
- Product page view

Ads traffic

- Click through rate (CTR)
- Average ranking position

Inventory status

- Brand breadth: # of styles by brand
- Unit depth: # of sku units by brand



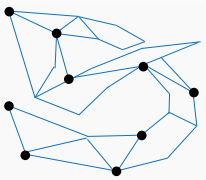
Increase Conversion Rate

- Pearson Correlation Analysis

Brand	CTR	Avg. Position	Prod. Breadth	Unit Depth	Newness_style	Newness_qty	SizeAvail_overall	SizeAvail_pageView
REV30	0.088	-0.063	0.149	0.147	-0.067	-0.042	0.075	0.102
FWD30	0.142	-0.197	0.076	0.083	0.021	0.012	-0.015	0.019

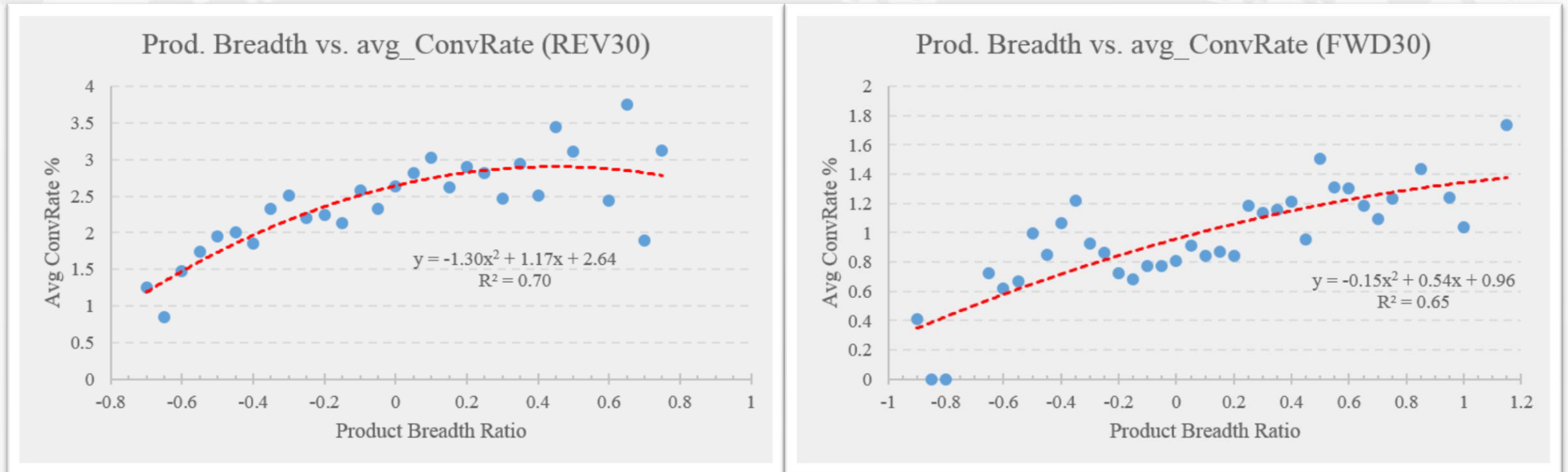
- Top contributing factors (ranked by linear regression model)

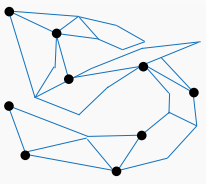
Brand	1st	2nd	3rd	4th
REV30	Avg. Position	SizeAvail_pageView	Prod. Breadth	CTR
FWD30	Avg. Position	CTR	Newness_style	Unit Depth



Increase Conversion Rate

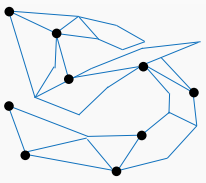
- Correlation Analysis for Product Breadth vs. Conversion Rate





Case Study 2

How to segment and rank customer for RFM/LTV analysis?



RFM Segmentation

- **Recency**

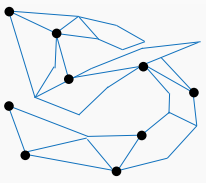
The amount of time since the customer's most recent transaction

- **Frequency**

The total number of transactions made by the customer (during a defined period)

- **Monetary**

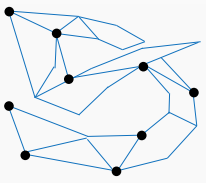
The total amount that the customer has spent across all transactions (during a defined period)



RFM Segmentation

Recency (days)	Frequency (count)	Monetary (\$)
R-Tier-1 (most recent)	F-Tier-1 (most frequent)	M-Tier-1 (highest spend)
R-Tier-2	F-Tier-2	M-Tier-2
R-Tier-3	F-Tier-3	M-Tier-3
R-Tier-4 (least recent)	F-Tier-4 (only one transaction)	M-Tier-4 (lowest spend)

Ex: <https://cran.r-project.org/web/packages/rfm/vignettes/rfm-customer-level-data.html>



RFM Segmentation for LTV Analysis

Example segments of interest:

- **High Value Customers** – Customers in segments R-Tier-1, F-Tier-1/2 and M-Tier-1 (1-1-1 and 1-2-1), meaning that they transacted recently, do so often and spend more than other customers.
- **High Spending New Customers** – Customers in segments 1-4-1 and 1-4-2, i.e. transacted just a few, but very recently and spent a lot.
- **Low Spending Infrequent Customers** – Customers in segments 4-4-4 and 4-4-3, i.e. not order for a long time, transacted only a few, and spent minimum.
- **Churned Premium Customers** – Customers in segments 4-1-1, 4-2-1, i.e. transacted frequently and spent a lot, but it's been a long time since they've transacted.



Q & A