



Digital Marketing

Welcome to the course!




Among every \$100 Hong Kongers spend on retailing,
how many dollars are spent online?



表3.1：按選定零售商類別劃分的零售業網上銷售價值

零售商類別		所有零售商類別			無店面零售			其他零售商		
		零售業網上銷售價值			零售業網上銷售價值			零售業網上銷售價值		
		百萬港元	佔零售業總銷貨價值的百分比	按年變動百分率(%)	百萬港元	佔零售業總銷貨價值的百分比	按年變動百分率(%)	百萬港元	佔零售業總銷貨價值的百分比	按年變動百分率(%)
年	月									
2024		31,661	8.4	-2.7	15,012	4.0	+10.9	16,649	4.4	-12.4
2024	6	2,347	7.9	+5.6	1,270	4.3	+17.6	1,077	3.6	-5.7
	7	2,280	7.8	+0.8	1,254	4.3	+12.8	1,026	3.5	-10.8
	8	2,342	8.0	-0.7	1,216	4.2	+4.5	1,126	3.9	-5.9
	9	3,068	10.4	-12.1	1,202	4.1	+3.1	1,867	6.3	-19.8
	10	4,049	12.3	+8.4	1,352	4.1	+15.8	2,697	8.2	+5.0
	11	2,932	9.3	-7.2	1,411	4.5	+0.9	1,521	4.8	-13.6
	12	2,345	7.1	-17.8	1,316	4.0	+6.7	1,029	3.1	-36.4
2025	1	2,415	6.8	+2.8	1,343	3.8	+4.6	1,072	3.0	+0.6
	2	2,302	7.8	-7.2	1,272	4.3	+13.1	1,030	3.5	-24.0
	3	2,425	8.1	-0.5	1,396	4.6	+25.7	1,029	3.4	-22.5
	4	2,330	8.1	-3.7	1,381	4.8	+19.1	948	3.3	-24.8
	5	2,576	8.2	-1.2	1,520	4.9	+16.1	1,056	3.4	-18.7
	6 p	2,545	8.5	+8.4	1,426	4.7	+12.3	1,119	3.7	+3.9

Source: <https://www.censtatd.gov.hk/tc/wbr.html?ecode=B10800032025MM06&scode=530>



Online sales account for just 8.5% of Hong Kong's total retail sales
(source: June 2025, Census and Statistics Department).

This is pretty low (mainland China: 26.8%; US: 19%).





What are the richest companies in the world?





What are the richest companies in the world in 2015?





What are the richest companies in the world in 2005?

































Largest Companies by Marketcap 1996-2024



**Largest
Companies
Marketcap**

Companies Market Cap - US\$

Rank of companies
by market cap
(August 22, 2025):

1	 NVIDIA NVDA	HK\$33.345 T	HK\$1,367	- 0.24%		 USA
2	 Microsoft MSFT	HK\$29.287 T	HK\$3,940	- 0.13%		 USA
3	 Apple AAPL	HK\$26.080 T	HK\$1,757	- 0.49%		 USA
4	 Alphabet (Google) GOOG	HK\$18.913 T	HK\$1,568	- 0.21%		 USA
5	 Amazon AMZN	HK\$18.496 T	HK\$1,734	- 0.83%		 USA
6	 Meta Platforms (Facebook) META	HK\$14.508 T	HK\$5,775	- 1.15%		 USA
7	 Saudi Aramco 2222.SR	HK\$11.940 T	HK\$49.37	- 0.71%		 S. Arabia
8	 Broadcom AVGO	HK\$10.643 T	HK\$2,263	- 0.54%		 USA
9	 TSMC TSM	HK\$9.213 T	HK\$1,776	- 0.56%		 Taiwan
10	 Berkshire Hathaway BRK-B	HK\$8.235 T	HK\$3,818	- 0.02%		 USA

What's this product?



It is a phone cradle!

But why do people purchase it?





Matthew Brennan @mbrennanchina · May 14, 2019

Chinese phone cradle for boosting your phone's daily step count. Some insurance companies in China allow people who consistently reach a certain daily step count to get discounted health insurance premiums.



Lê Nguyễn Hoàng (Science4All) @le_science4all · May 14, 2019

Replying to @mbrennanchina

Aka adversarial poisoning attack on data-driven algorithms...



9



97



Graeme Douglas ✓ @graemedouglas · May 14, 2019

Replying to @mbrennanchina and @BBHLabs

Not just China - Vitality does this in the U.K.



4



5



66




Uber collects data on your smartphone battery. But why?



Uber charges you higher prices when your battery is low,
because it knows you cannot afford to wait!





Dernière Heure conducted a test using two smartphones, one with 84% battery and the other with 12%, to request a ride from their office in Brussels to Tour & Taxis in the centre.

The result showed a significant price difference, with the phone at 12% battery being charged €17.56 and the phone at 84% battery being charged €16.6 for the same service.



How many couples meet their partners online?








Recent Breakthrough: Majority of Spouses Meet Online

The landmark 2024 Proceedings of the National Academy of Sciences study marks the first time a majority of spouses begin their stories online. According to this research, 60% of newly married couples said they met through online dating services. This shift from under 30% in the 2010s to a clear majority signals a profound change in the courtship landscape. Researchers attribute this surge to algorithmic matching improvements, widespread smartphone use, and the normalization of digital introductions among younger generations.


Inconsistency of Online Reviews

		Average rating			Number of reviews			Price		
		Amazon		Walmart	Amazon		Walmart	Amazon		Walmart
A		4.0	>	2.2	303	>	4	79.00	=	79.00
B		2.5	<	4.0	8	<	81	36.68	<	39.80
C		4.2	>	3.0	328	>	2	80.99	<	89.99

What makes the sentiment so different?



Data

- All the vacuum cleaners with at least one review from both Amazon and Best Buy at the time of data collection (January 6, 2015).
 - This results in a total of 177 vacuum cleaner models in our data set.
 - For each of these products, the authors collect the number of reviews, the order of each review, the date each review was posted, the rating of each review, the review texts, and the price of the product from both platforms.
- 

Initial Evidence: The First Review Matters

First Review		Average rating			Number of reviews			
Amazon	Best Buy	Amazon	Best Buy	Difference	Amazon	Best Buy	Difference	Sample size
(+)	(-)	3.974	2.835	1.138***	66.143	14.952	51.190**	21
(-)	(+)	3.046	4.264	-1.218***	41.147	18.970	22.176*	34
(+)	(+)	4.099	4.386	-0.286***	92.216	35.108	57.108***	111
(-)	(-)	3.151	2.857	0.293	55.182	17.545	37.636**	11
All samples		3.823	4.083	-0.260***	77.011	28.525	48.486***	177

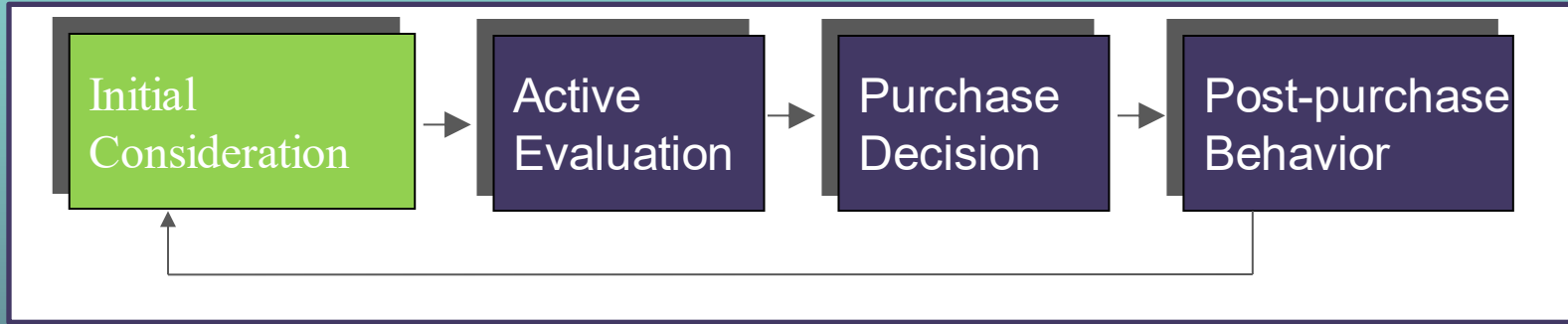


Discussion

How does Internet affect purchasing decisions?





Consumer buying decision




By consumer
By traditional media such as TV ads
How does digital media help?

Via Targeted Online/Mobile Ads




Word of the Day Translate Games Blog

 definitions 





Word of the Day
eudemonic
pertaining or conducive to happiness. [More...](#)


SIGN UP:

  
Previous Words

How do you pronounce *pronunciation*?
...
Why is this common word




 Your Word Wednesday


 Our Blog

Pick our Word of the Day!

What's your favorite word? Did Charles Dickens coin

Friday, December 18
Decem- means "ten" in Latin, so why is December our twelfth month? [Learn more here.](#)


Certified Pre-Owned by Mercedes-Benz

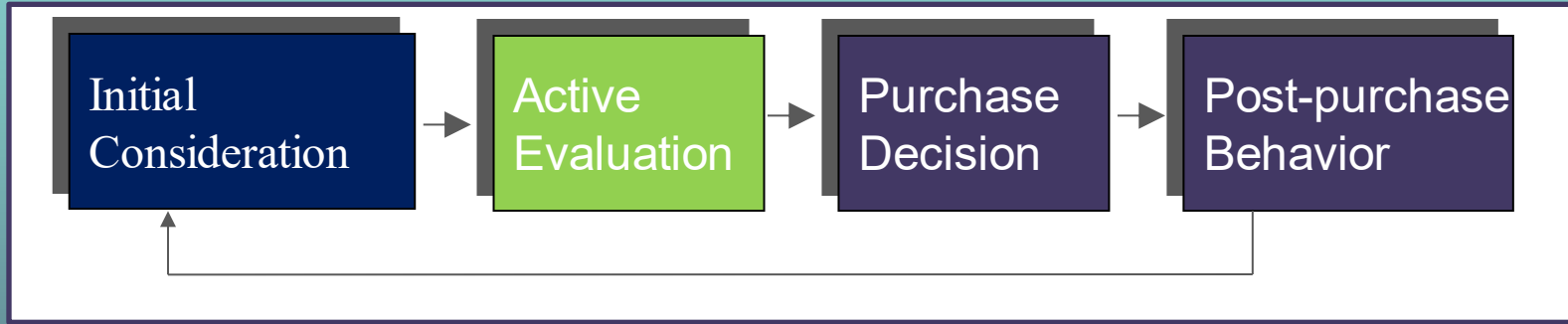

[Click here](#)

Dictionary.com Social

Via Influencers



Consumer buying decision



How is search done in the offline world?

Call/visit stores/friends

Problems?

Asymmetric information and high search cost

How does Internet/digital facilitate information search?

Low-Cost Search by Search Engines

OUR ADVICE
Buy now

Prices are unlikely to decrease within 7 days ⓘ

Track prices ☐ OFF

1162 of 1293 flights

Fee Assistant ⓘ

☐ Carry-on bag

☐ Checked bag

Stops

☒ Nonstop \$147

☒ 1 stop \$154

Cheapest
\$147 • 1h 35m

Best ⓘ
\$147 • 1h 40m

Quickest
\$162 • 1h 34m

Other Sort

Delta® Flights from Raleigh to New York

Enjoy Free In-Flight Entertainment on Delta Flights. Terms & Bag Fees Apply.

\$162 nonstop



delta.com | Sponsored

\$162
Delta

[View Deal](#)

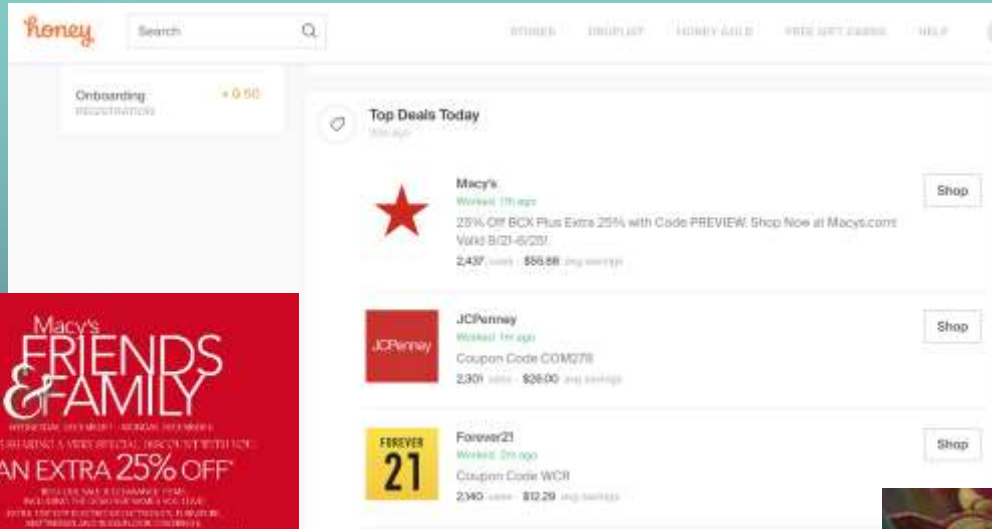
Cheapest

Rating: 9

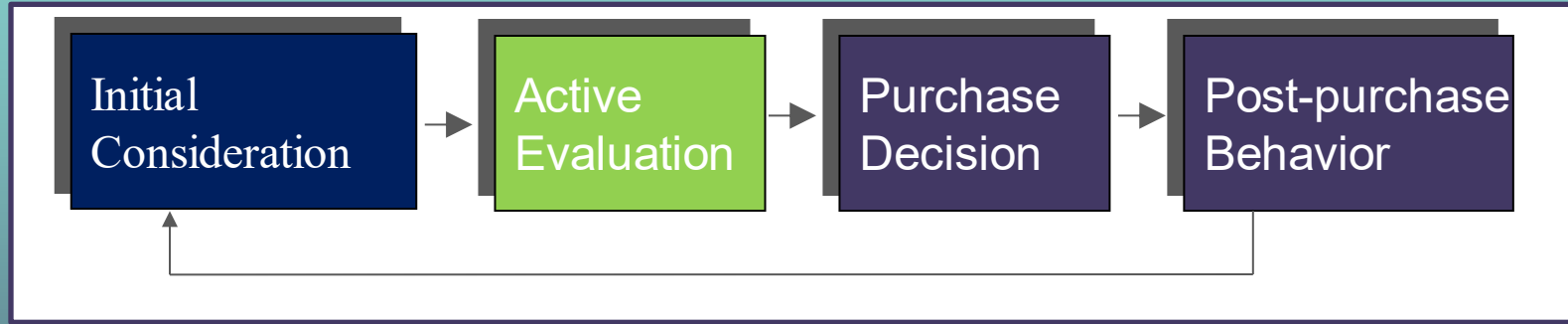
<input type="checkbox"/>		5:35 am — 7:10 am American Airlines	nonstop	1h 35m RDU - LGA	\$147 Hacker Fare Basic Economy
<input type="checkbox"/>		1:40 pm — 3:15 pm United Airlines	nonstop	1h 35m EWR - RDU	

[View Deal](#)

Coupons can be found more easily



Consumer buying decision



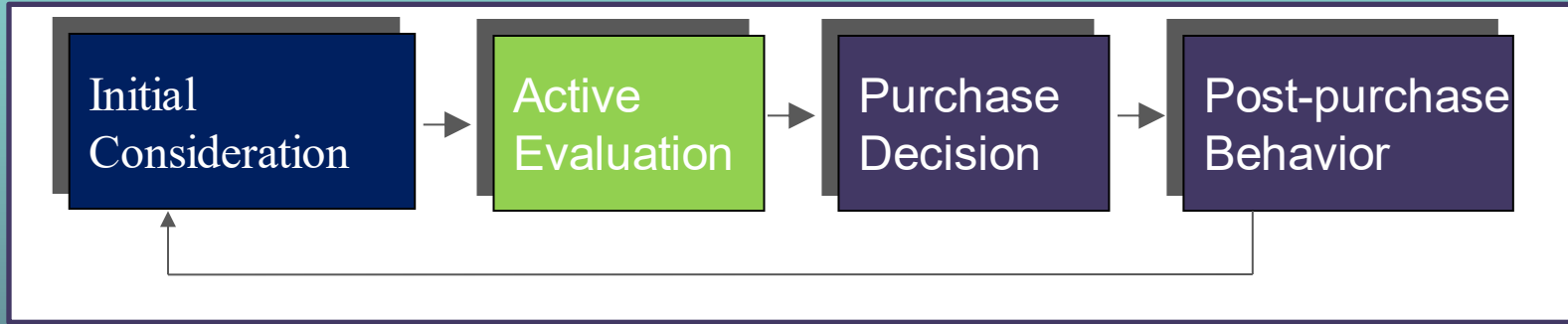
Implications of reduced search cost to firms?

- More price competition
- Less loyalty

How can manufacturers and retailers fight against price competition?

- Increase product differentiation, even just perceived
- Increase switching cost (e.g., loyalty program)

Consumer buying decision



Evaluate alternatives in consideration set

Is the product performing as claimed?

Are there any unobservable attributes?

Does this product match my preference?

How does Internet & digital media facilitate evaluation?

User Generated Content

Which Japanese restaurant will you visit?
Why?

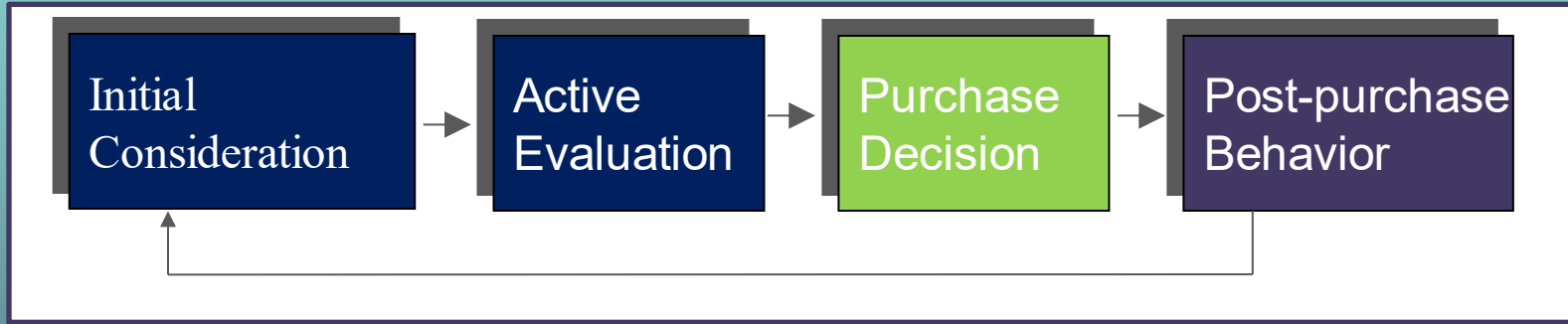
Rating vs. Volume

japanese restaurant Chapel Hill, NC

Filters: \$ \$5 \$\$\$ \$\$\$\$ Open Now All Filters

Rank	Restaurant Name	Rating	Reviews	Price	Cuisine	Address	Phone
1	MinGo	4.5	85 reviews	\$5	Korean, Japanese	116 Old Durham Rd Chapel Hill, NC 27517	(919) 933-1773
<p>I went to MinGo for lunch on Monday and was pleased with my experience there. The restaurant serves really authentic Korean and Japanese food, even serving the small cold appetizers that</p>							
2	Oishi	4.0	50 reviews	\$5	Sushi Bars, Japanese	1129 Weaver Dairy Rd Chapel Hill, NC 27514	(919) 932-7002
<p>Tasty, but service and price are a little off. I came out here for dinner recently. As a Japanese restaurant/luxury place, it's pricier than most of the other places in Chapel Hill. However</p>							
3	Akai Hana Japanese Restaurant	4.0	108 reviews	\$5	Japanese, Sushi Bars	206 W Main St Carrboro, NC 27510	(919) 942-6948
<p>Very cool place, much more fair for detail and quality than I am used to in a typical Japanese dinner restaurant. NOTE: I can't comment on the sushi because I've never tried that portion</p>							
4	Sushi Nikko	4.0	40 reviews	\$5	Japanese	104 NC 54 Carrboro, NC 27510	(919) 240-5046

Consumer buying decision



Purchase at an online store, offline store, or through a mobile app

Showrooming

The practice of examining products in a store and then buying it online for a lower price.

Top categories affected by showrooming?

- Electronics & Appliances
- Books & Music
- Clothing & Shoes
- Furniture & Home

60% in 2013 -> 35% now. Why?

- Increasing online presence for traditional retailers
- Offer price matching
- Digital friendly in-store environment (e.g. e-payment, digital coupons)
- Flexible return policy

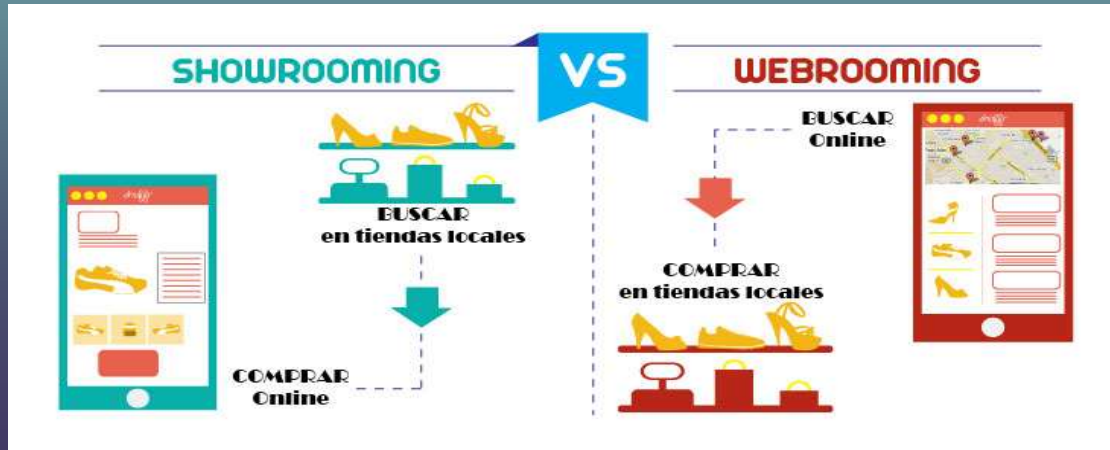


Rise of webrooming

Webrooming refers to the process of researching products online and then visiting a store to make a purchase

Webrooming more common than showrooming (46% vs. 35%)

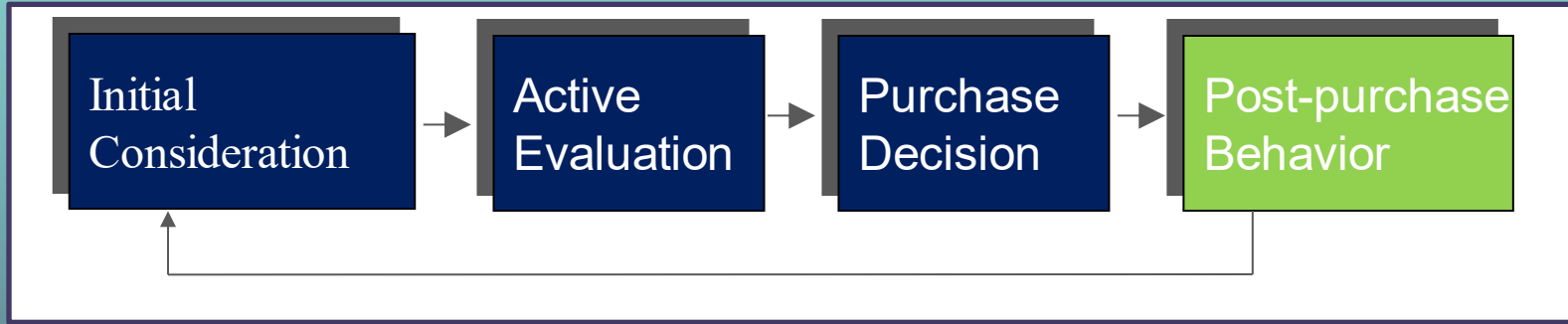
Millennials prefer webrooming



Mobile Grocery Shopping



Consumer buying decision



What does Internet & digital media add?

- WOM generation

- Positive ones can be used as promotional content

- Negative ones can be used as useful feedbacks

- Behavior-based recommendation

- Customer purchase history becomes a piece of "Big Data"



Key Takeaways

How has Internet/digital changed the way we shop?

Changes in search costs

- Results in larger product assortment and lower prices

- Implications to firms: focus on product differentiation, raising switch cost

Changes in availability and use of data

- Allows firms to deliver more targeted messages

- Allows users more easily to provide feedback (new data) to improve product/service

- Allows users to be affected by others' choices

Changes in role of geographic proximity

- Reduces the cost of communication with others

- Encourages the use of multiple channels in shopping process

- Offline context still matters in each stage of customer journey



What is digital marketing?

“Digital Marketing is the use of Internet connected devices and electronic media to engage a customer.”

- Search advertising
- Display advertising
- Social media marketing
- ...



What is this course about?

Overview of digital technology + Underlying Business/Marketing concepts

Aim is not mastery of all the topics, but to give an overview of most important topics

The list of topics covered in this course can be found in the syllabus.



Who should take this course?

Undergraduate students

Learn the basics of Digital Marketing

Learn the basics of data analytics

Already have a background in basic marketing /advertising

This is not a course about...

Introduction to Marketing

Web development or Web Design

Public Relation/ Journalism

e-Commerce

AI

Entrepreneurship class - build app/website, become a millionaire!

A specialized course intended for one specific aspect

Search Engine Marketing

Social Media

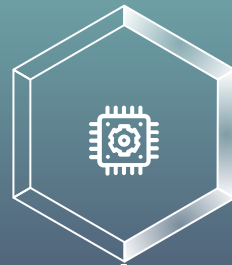
This course adopts methodologies from



**Computer
Science**



Statistics



Economics



Leveraging your competitive advantage

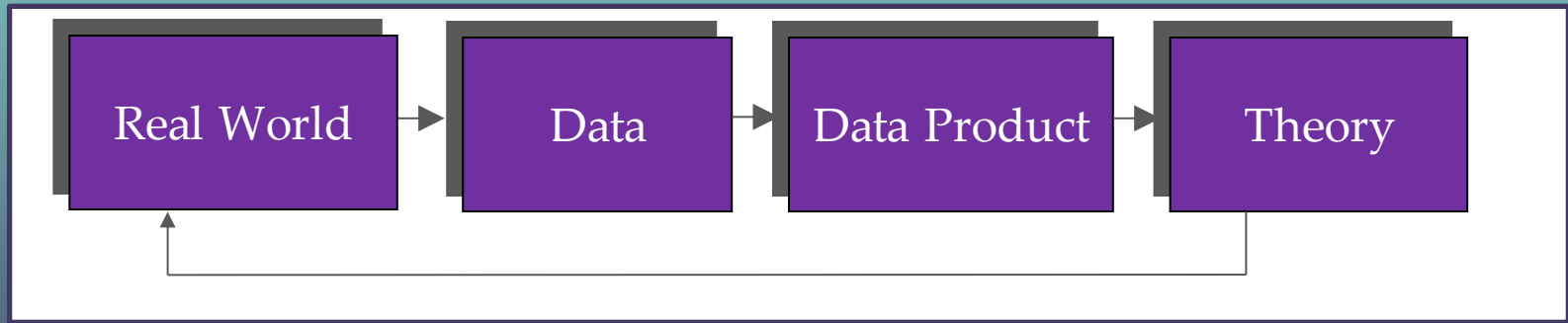
Compared to traditional marketers, you know the digital world and how to analyze data.

Compared to statisticians and computer scientists, you understand consumers better, and know how to apply results to business settings.

Compared to economists, you not only know the theory, but also know how to apply the theory to solve real-world marketing problems, and test the theory using real-world data.

The LOOP

If you hate data, don't take the course!





We emphasize on data, data, and data

“Talk is cheap, show me the data!”

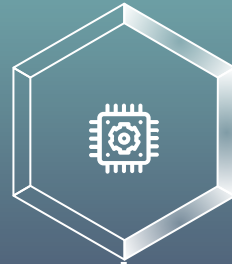
We solve problems for



Firms



Platforms



Individuals



The Instructor

Xi Li

Professor of Marketing

Professor of Information and Innovation Management

PhD in Management, University of Toronto.

M.Phil. in Operations Research, HKUST.

B.E. in Computer Science, Tsinghua University.

Director, Asia Case Research Centre

Associate Director, Institute of Digital Economy and Innovation

Research interests: Algorithms, big data and online marketplaces.

消费

+ 关注

价格的艺术：企业是如何使用数据“套路”消费者的？

李曦：互联网
的逻辑到底是什

专栏 消费

+ 关注

用算法拿捏消费者？“割韭菜”之前，请 三思

2025年6月4日

李曦：商家
引力，但盲

李曦 龍虎山下

FT中文网专栏作

內地電商強攻 港零售業3招自救

专栏 明德商论

+ 关注

自愿数据共享，真的可以保护消费者？

李曦：笔者的研究发现，基于自愿的数据分享更可能会推高产品的价格，进一步损害消费者的权益。

李曦为FT中文网撰稿





Do I really want to take the course?

I don't know. It depends. But let me offer you my advice.

Take the course if

- You are interested in data analysis, and you are considering to become to a data scientist in the future.

- You want to understand how the digital marketing industry operates and evolves over time.

Don't take the course if

- You hate data analysis or coding.

- You already know the materials to be covered in the class.

- You want to pick an easy course to fulfill your credit requirement.



Why should we study Digital Marketing?





Why go digital?

Consumers are online, more than ever before!

Firm productivity can be significantly improved by digital technology and data analytics

Better promotion effectiveness via SEO and online advertising
Better engagement between firms and customers via social media



The Average Screen Time

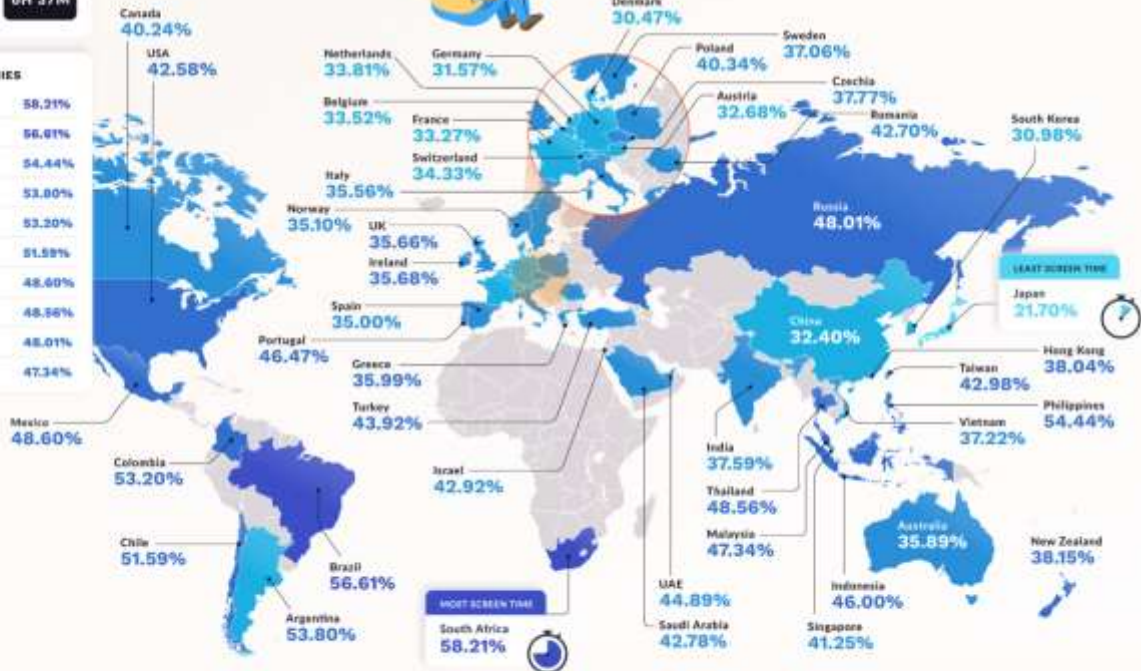
(% OF AWAKE HOURS) BY COUNTRY

WORLDWIDE
AVG
SCREEN TIME

6H 37M

TOP 10 COUNTRIES

- 1 South Africa 58.21%
- 2 Brazil 56.61%
- 3 Philippines 54.44%
- 4 Argentina 53.80%
- 5 Colombia 53.20%
- 6 Chile 51.59%
- 7 Mexico 48.60%
- 8 Thailand 48.56%
- 9 Russia 48.01%
- 10 Malaysia 47.34%



Are you a slave to your screen? According to our research, people spend an average of 6 hours and 37 minutes in front of screens. The question is, how does each country differ?

The country with the **highest average** screen time is **South Africa**, spending more than half the day on screens (58.21%). Surprisingly, even as one of the first countries to harness the power of technology and explore its benefits, according to News On Japan, **Japan** reportedly spends the **least** time scrolling (21.70%).

DAILY AVG SCREEN TIME (% OF AWAKE HOURS)



Methodology: We analyzed data from the Digital 2023 Global Overview Report by Statista and combined it with other publicly available data from Statista to calculate the % of awake hours each country spends on screens (18-64) specifically looking at screens for each category.



This image is licensed under the Creative Commons Attribution-ShareAlike 4.0 International License - [www.creativecommons.org/licenses/by-sa/4.0/](https://creativecommons.org/licenses/by-sa/4.0/)



How is digital marketing different?

More targeted and context relevant

More use of personal devices rather than mass media

Use of social aspect and viral marketing

More measurability





Additional Course Information



Textbook? No.



Website:

https://ximarketing.github.io/_pages/teaching

Password: MKTG





Course Overview

Data analytics with R.

You can use Excel or SPSS, but they are too simple and cannot handle complex data analysis projects.

R is a free software that is commonly used for statistical analysis.

It is not only useful for digital marketing, but also useful for other purposes such as machine learning and optimization.

The skills Data Scientists need today

(based on 300 job listings from tech companies in June 2019)





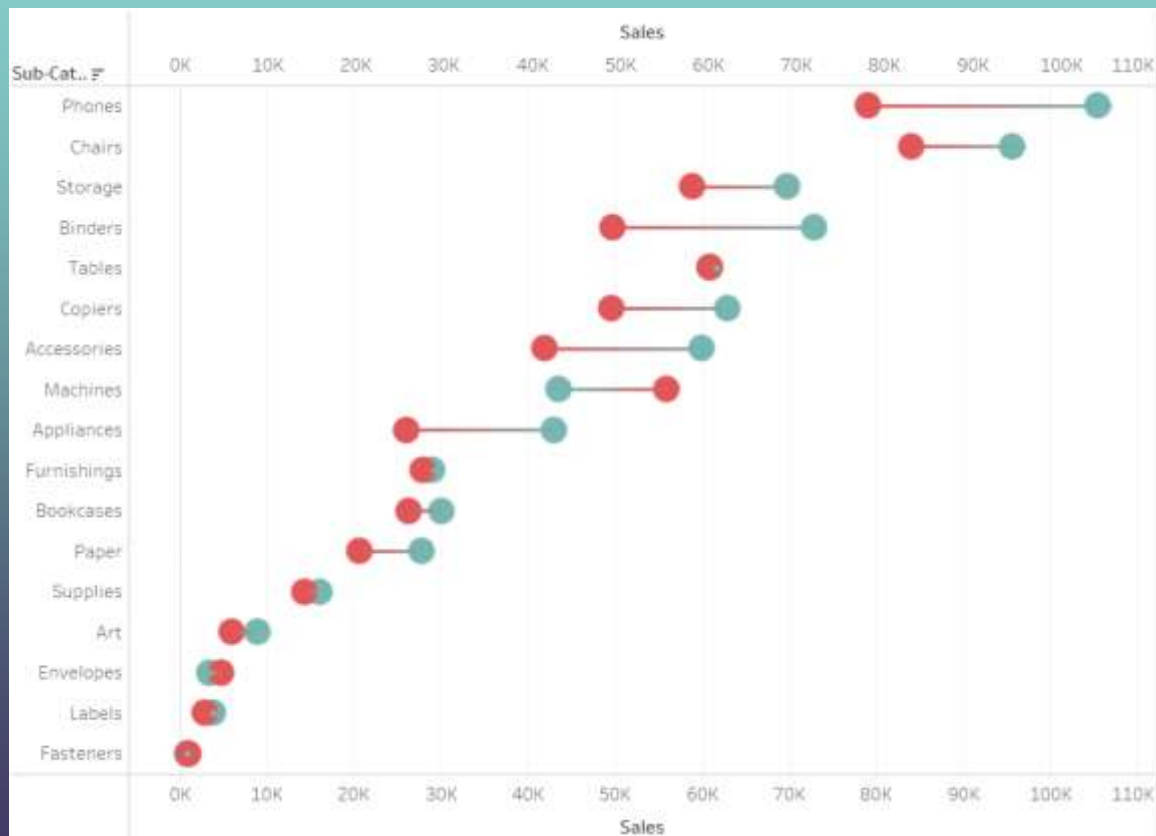
Course Overview

Data visualization with Tableau.

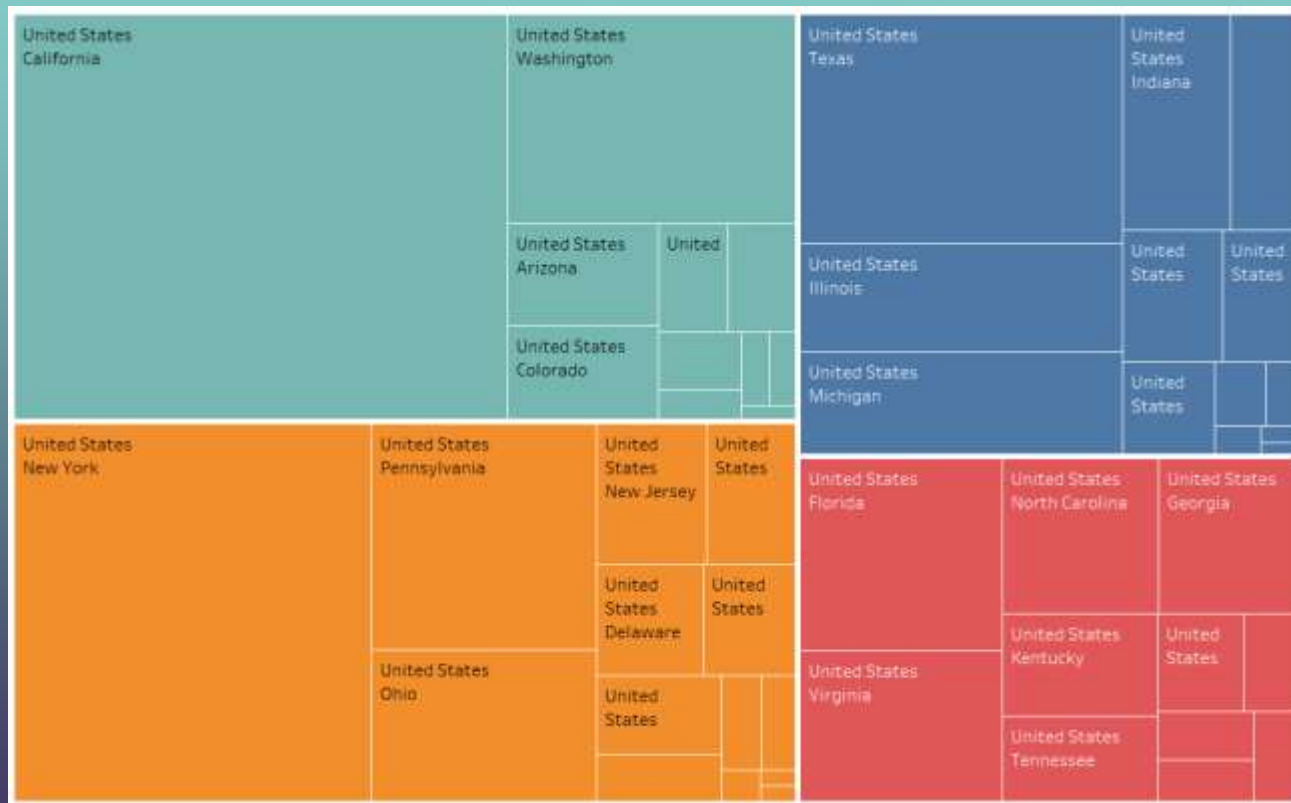
Data visualization gives us a clear idea of what the information means by giving it visual context through maps or graphs.

When you want to show your results to others, the best way to use figures --- *“A picture is worth a thousand words”*.

Tableau



Tableau





Course Overview

Web Scraping with R.

Data scraping allow you to scrawl information from websites, e.g., online marketplaces. For example, you can collect product information from HKTV Mall, weather information from Hong Kong observatory, and images from Instagram.

Warning: Do not expect that you can become an expert in data scraping within one class. This is simply an introduction, and you need more practice yourself.



Course Overview

For example, we will see how to gather information from HKU faculty webpage:





Course Overview

Search Engine Optimization.

We all know that Google is the most popular search engine (and even the website) over the world.

We are going to address the following questions: (1) How does Google (and other search engines) work? (2) How to improve your page rank on Google, so that consumers can more easily find your website through searching?



Course Overview

Paid Search.

While SEO allows you to improve your page rank for free, you can also spend money to get more attentions from consumers.

We are going to address the following questions: (1) What is online advertising? (2) How does Google sell its search results through auctions? (3) How to buy paid ads? (4) How to develop you keywords list?





Course Overview

Display Advertising and Content Creation.

- How to offer targeted ads based on user behavior?
- How are displayed ads bought and sold?
- How to design content?
- What is click fraud?



Course Overview

Social network and mobile marketing

We will discuss ways to take advantage of the social network to engage your users and amplify the influence of your brand.

We will introduce some measures of social networks and use R to process social network data.

We will also discuss some characteristics of mobile marketing.



Course Overview

Social media.

Setting guidelines and policies for your social media: make sure that you are using social media platforms in a correct way.

Ways to engage your users through social media.

AB testing for social media optimization.



Course Overview

Social media (Continued).

Social listening: listening to your consumers on social media. Social listening is useful for brand monitoring, watching the competition.

Influencer marketing – amplifying your brand on social media.



Grading

Your grades will be determined by the following components:

- Group-level data-analysis task: 10%

 - No presentations; reports needed

- Group-level company research project: 30%

 - Both in-class presentation and report required

- In class participation: 10%

- Final examination: 50% (open book open notes, MC questions only)



In-Class Participation

I don't count your attendance.

When you answer questions in class, you will get a bonus.

Each one can get at most one bonus in each class, unless no one else wants to answer. We implement this policy to give more students opportunities to participate in discussions.






Data Analysis

In this course, we are introducing a practice class on data analysis. This is one unique feature of our course.

You have already learned about R and Tableau. Perhaps you can also use many other tools such as SPSS, Excel, Python etc.

I will give you some real digital marketing data, and your goal is to study the data using the tools you know --- It's entirely up to you how you want to play with the data!






Data Analysis

You are going to work with your teammates on the data project. Then, each group will submit a report illustrating the findings from the data. **It will be graded, and it affects your final grade.**

We will start with the data analysis in the class, and you will finish all the analysis after the class.

The purpose of the data project is to help you understand the data analysis methodologies and gain a sense of real data that data scientists are analyzing everyday.





Company Research Project

Good news: Because we already have the data analysis task, you do not need to collect or analyze data in your research project.

What you need to do: **Choose a company and analyze the company's digital marketing strategy.**

You are free to choose your own company, but make sure that the company is active in digital marketing (at least it should have social media accounts and its own website).





What you should focus on

Company website: Any issues? What can the company do to improve its website?

Social media (e.g., Facebook, Instagram, Twitter): Is the company managing its social media accounts? Any issues? What would you suggest the company?

Online sentiment: How people are discussing the company or its brands in online review platforms (e.g., TripAdvisor, Amazon)? What's wrong?





TODO List

If you decide to take this course, here is what you should do after today's class (Important!):

Form groups with your classmates. Think about the project you are going to work on.

Individual task: Install R on your laptop. We will be using it in the next class.





Group Formation

Each group consists of at most 6 students (and at least 1).

You need to choose a name for your group, e.g., “Marketers”, “Fantastic”, “A Plus”...

Email the TA (Tianyun; tianyunl@hku.hk) your group information (group name, your own names and HKU ID) on or before **Sep 16**.

Let the TA know if you cannot find a group.





Let's Download and install R.

Your installation path must NOT contain any non-English characters. Otherwise, you will have troubles using it.

安裝路徑必須為純英文，否則運行可能出錯。





**Next, let's download R-Studio.
It is also free.**

Your installation path must NOT contain any non-English characters. Otherwise, you will have troubles using it.

安裝路徑必須為純英文，否則運行可能出錯。

