

بِسْمِ اللّٰهِ الرَّحْمٰنِ الرَّحِيْمِ

Information Technology Fundamentals

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Web Systems: Introduction to E-Commerce

Module 5: Part 3

Module 5. Main Objectives

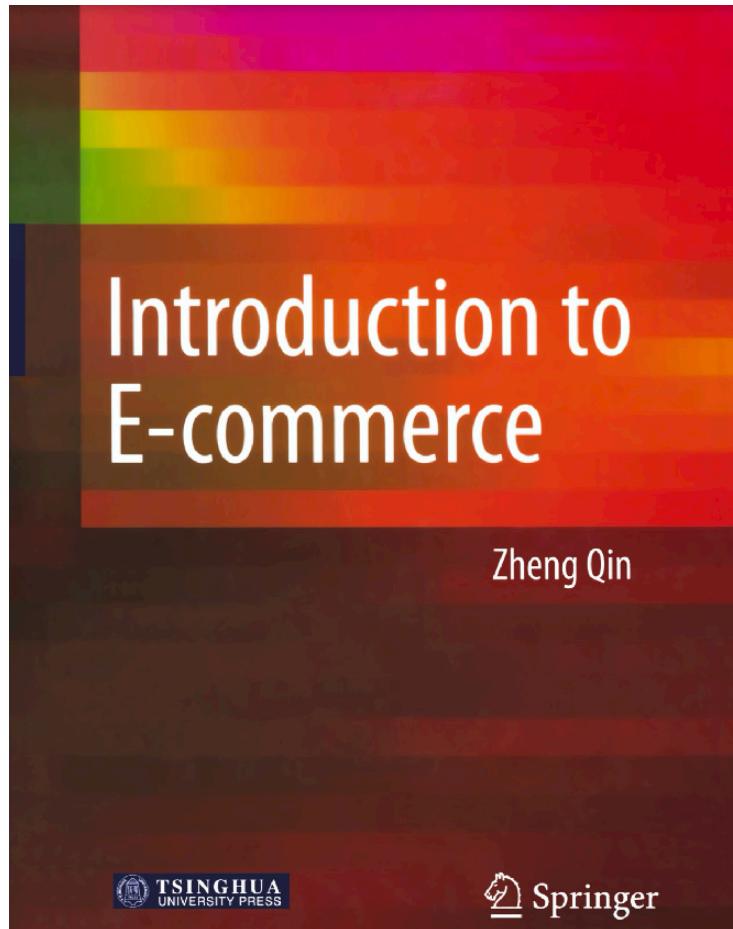
1. Review Web System Architecture
- 2. Explain E-Commerce Business Models**
3. Review Recommender Systems
4. Describe Blockchain Systems, Cryptocurrency, and Smart Contracts

An Introduction to E-Commerce

Main Reference

Zheng Qin. ***Introduction to E-commerce.***
Springer, 2009

Chapter I: Fundamentals
of E-Commerce



Contents

- E-Commerce: Definition/History/Main Players
- Advantage and Disadvantage
- Business Models
- EC Security
- Data Science+ E-Commerce

What is E-Commerce?

E-commerce, also known as electronic **commerce** or **internet commerce**, refers to the buying and selling of goods or services using the internet, and the transfer of money and data to execute these

What is E-Commerce?

E-commerce is the use of **electronic communications** and **digital information processing** technology in business transactions to create, transform, and redefine relationships for value creation between or among **organizations**, and between **organizations and individuals**



E-Concepts

E-commerce is in fact the combination of
information technology and **commerce applications**

Electronic Information Technology can be applied in many other fields:

- 1. Medical Treatment**
- 2. Education**
- 3. Hygiene**
- 4. Military**
- 5. Administration**

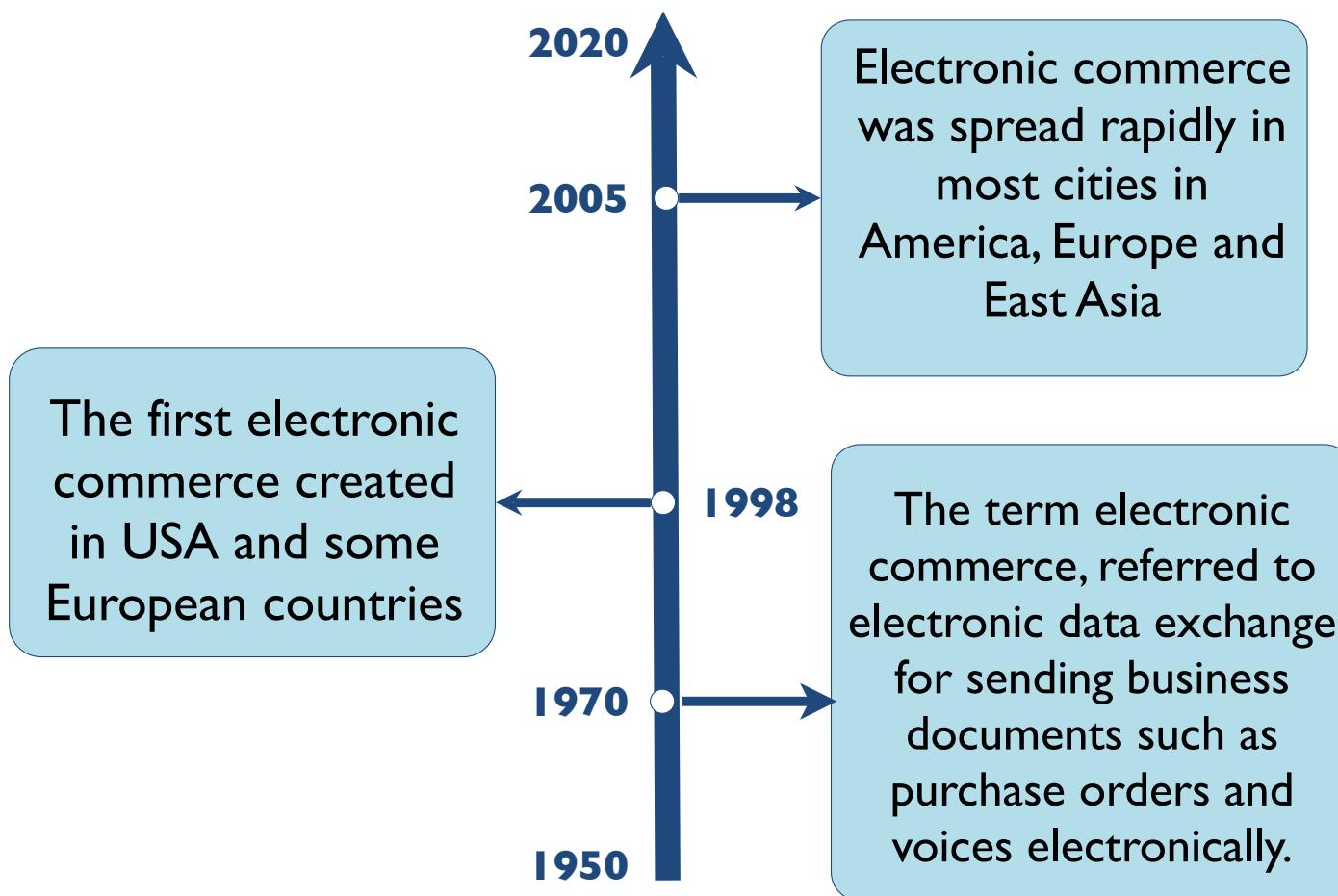
For instance, electronic education, electronic treatment, electronic administration, electronic command, online banks, virtual enterprises.

The Definitions of E-commerce

The following are definitions given by transnational corporations Intel, IBM and HP respectively.

- **ISO:** The general term for exchange of information among enterprise and between enterprise and customers
- **Intel:** E-commerce = electronic market + electronic trade + electronic service
- **IBM:** E-commerce = information technology + web + business
- **HP:** E-commerce is to accomplish commercial business by electronic means.

A Brief History



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GLOBAL E-COMMERCE SPEND BY CATEGORY

THE TOTAL ANNUAL AMOUNT SPENT ON CONSUMER E-COMMERCE CATEGORIES AROUND THE WORLD, IN U.S. DOLLARS

FASHION & BEAUTY



\$524.9
BILLION

ELECTRONICS & PHYSICAL MEDIA



\$392.6
BILLION

FOOD & PERSONAL CARE



\$209.5
BILLION

FURNITURE & APPLIANCES



\$272.5
BILLION

TOYS, DIY & HOBBIES



\$386.2
BILLION

TRAVEL (INCLUDING ACCOMMODATION)



\$750.7
BILLION

DIGITAL MUSIC



\$12.05
BILLION

VIDEO GAMES



\$70.56
BILLION

13

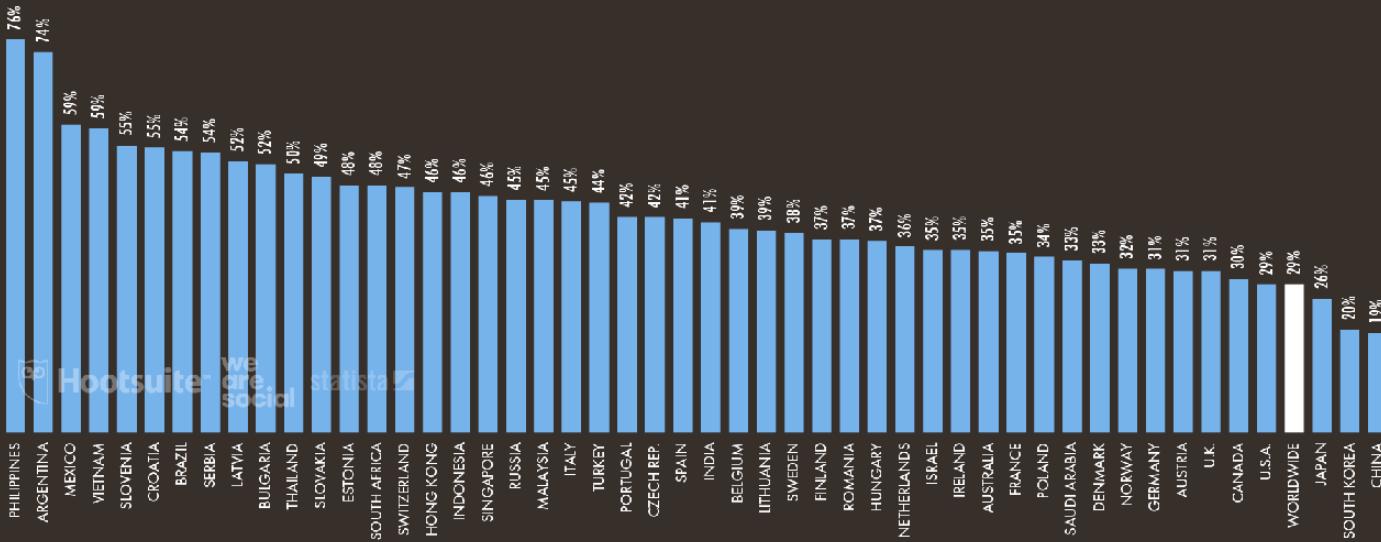
SOURCE: STATISTA DIGITAL MARKET OUTLOOK FOR E-COMMERCE, E-TRAVEL, AND DIGITAL MEDIA INDUSTRIES (ACCESSED JANUARY 2019). NOTES: FIGURES ARE BASED ON ESTIMATES OF FULL-YEAR CONSUMER SPEND FOR 2018, EXCLUDING B2B SPEND. FIGURES FOR DIGITAL MUSIC AND VIDEO GAMES INCLUDE STREAMING. ADVISORY: STATISTA HAVE REVISED THEIR FIGURES FOR 2017 SPEND SINCE LAST YEAR, SO THESE FIGURES WILL NOT BE COMPARABLE TO DATA WE REPORTED IN OUR DIGITAL 2018 REPORTS.

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TRAVEL'S SHARE OF TOTAL ONLINE CONSUMER SPEND

ONLINE SPEND ON TRAVEL-RELATED PURCHASES AS A SHARE OF CONSUMERS' TOTAL ONLINE SPEND BY COUNTRY



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SOURCE: STATISTA DIGITAL MARKET OUTLOOK FOR E-COMMERCE, E-TRAVEL, AND DIGITAL MEDIA INDUSTRIES (ACCESSED JAN 2019).

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GLOBAL E-COMMERCE GROWTH BY CATEGORY

ANNUAL CHANGE IN THE TOTAL AMOUNT SPENT ON CONSUMER E-COMMERCE CATEGORIES AROUND THE WORLD

FASHION & BEAUTY



+17%

ELECTRONICS & PHYSICAL MEDIA



+11 %

FOOD & PERSONAL CARE



+15%

FURNITURE & APPLIANCES



+15%

TOYS, DIY & HOBBIES



+15%

TRAVEL (INCLUDING ACCOMMODATION)



+11 %

DIGITAL MUSIC



+4.2%

VIDEO GAMES



+6.3%

197

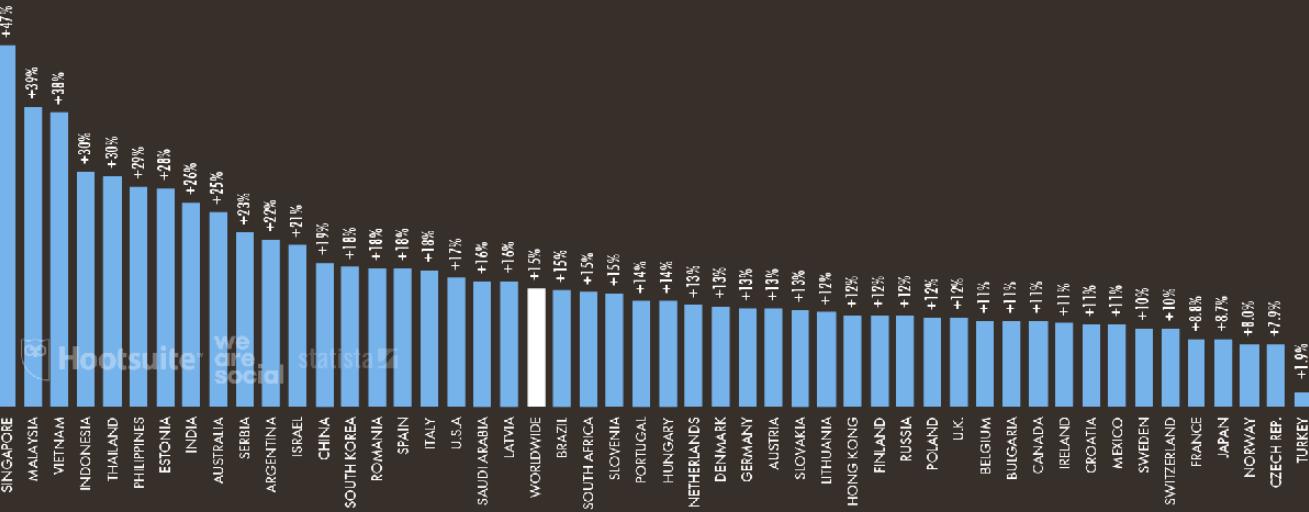
SOURCE: STATISTA DIGITAL MARKET OUTLOOK FOR E-COMMERCE, E-TRAVEL, AND DIGITAL MEDIA INDUSTRIES (ACCESSED JANUARY 2019). NOTES: FIGURES ARE BASED ON ESTIMATES OF FULL-YEAR CONSUMER SPEND FOR 2018, EXCLUDING B2B SPEND. FIGURES FOR DIGITAL MUSIC AND VIDEO GAMES INCLUDE STREAMING. ADVISORY: STATISTA HAVE REVISED THEIR FIGURES FOR 2017 SPEND SINCE LAST YEAR, SO THESE FIGURES WILL NOT BE COMPARABLE TO DATA WE REPORTED IN OUR DIGITAL 2018 REPORTS.

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ANNUAL GROWTH IN ONLINE GROCERY SPEND

YEAR-ON-YEAR CHANGE IN THE VALUE OF CONSUMERS' ONLINE GROCERY PURCHASES (2018 vs. 2017)

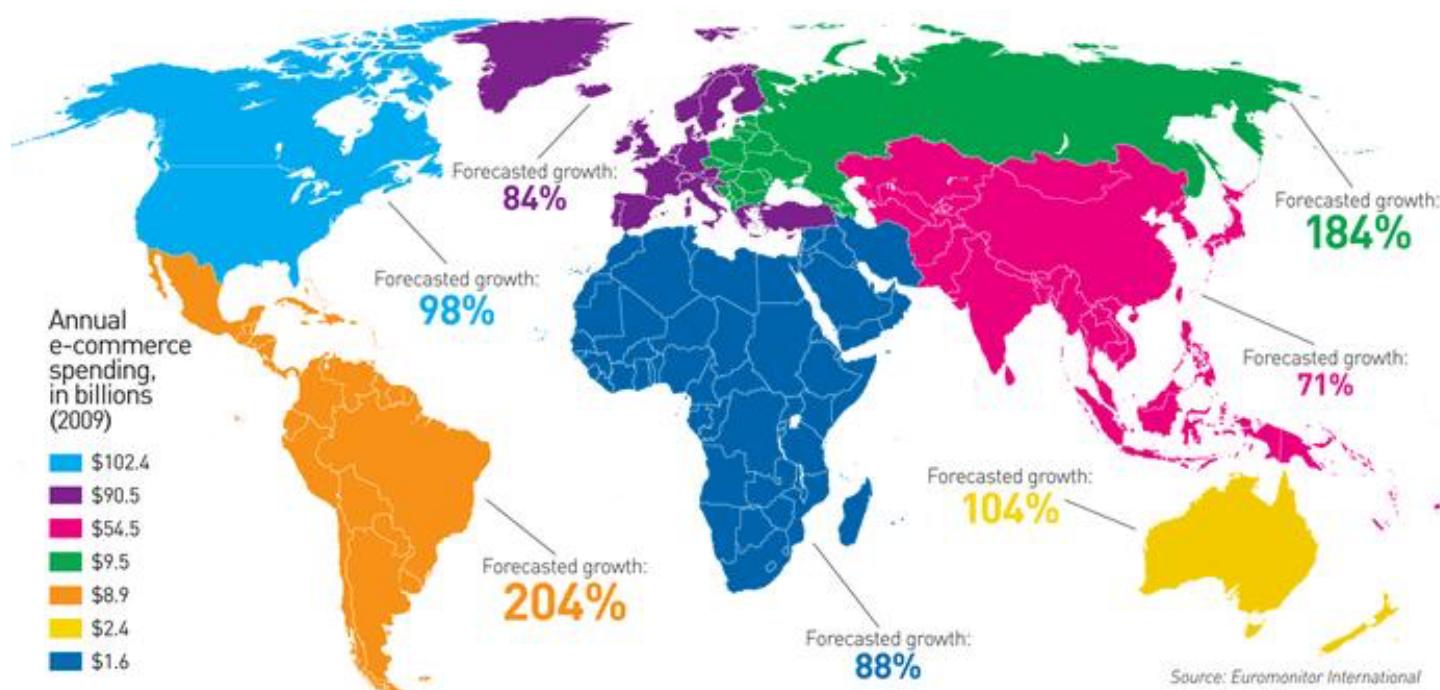


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SOURCE: STATISTA DIGITAL MARKET OUTLOOK FOR THE E-COMMERCE INDUSTRY (ACCESSED JAN 2019)

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World Annual E-commerce Spending



146 | INC. | DECEMBER 2010/JANUARY 2011

E-Commerce Examples

Two standalone e-commerce companies of meaningful enterprise value:

- Amazon
- eBay



Marc Andreessen is predicting the death of traditional retail as e-commerce “**eats the world**”.

A Few Words about Amazon



- Founded on June 5, 1994, by **Jeff Bezos**, who remains the CEO of the company
- The original name was Cadabra but was changed because it sounded too similar to the word “cadaver.”
- The company got its start in Bezos' garage, where it primarily sold books.
- In 2018, Amazon became the largest online sales company in the world, with \$524 billion in online sales.
- Amazon at 45% of the entire e-commerce industry with competitors eBay (6.8%) and Walmart (4%) struggling to keep up.

A Few Words about Amazon

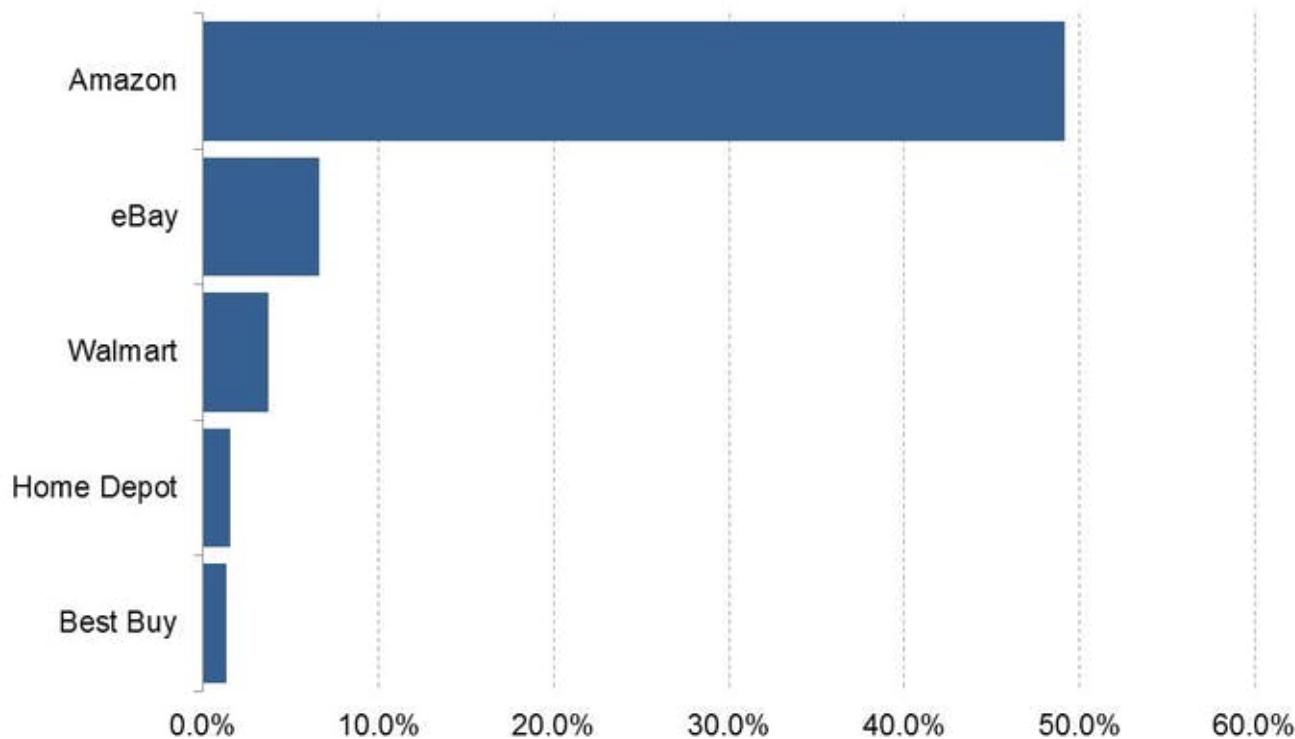
- **Prime service**, which not only allows customers to be delivered goods in one day, but also allows access to television shows and movies as a part of its **Amazon Prime Video service**. Bezos in 2018 announced that Amazon Prime surpassed **100 million subscribers** worldwide.
- Another unique service is **its Alexa voice assistant**, which allows users to order food, get weather information and make commands just with their voice.
- Amazon is worth roughly **\$956.6 billion**. Shares of Amazon are trading at \$1,942.91. Five years ago at this time, shares of Amazon were trading at \$333.55.



5 Quick Numbers in 2018

1. 807 million **books** sold, plus another 560 million **ebooks**
2. \$524 billion in **total e-commerce**. That puts it at 45 percent of the entire industry. eBay is second at 6.8 percent; Walmart is third at 4.0 percent.
3. 100 million **Prime** subscriptions, putting it behind only Netflix, which has 139 million subscribers.
4. \$80.4 billion in **cloud computing**, good for 32 percent of the industry. The **#2 is Microsoft, at 17 percent**.
5. \$70 billion in **online apparel sales**, putting it at 35 percent of the market. The #2 is Macy's, at 8.7 percent

Amazon Dominates America's Online Retail Market (Market Share in 2018)

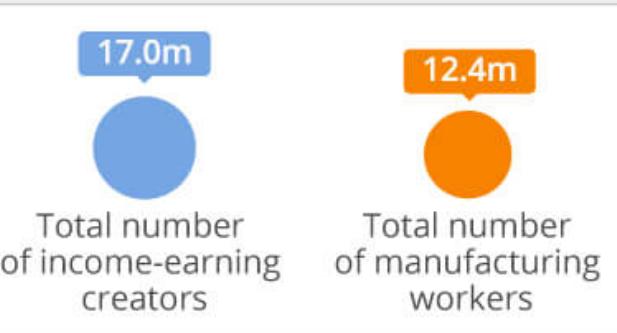
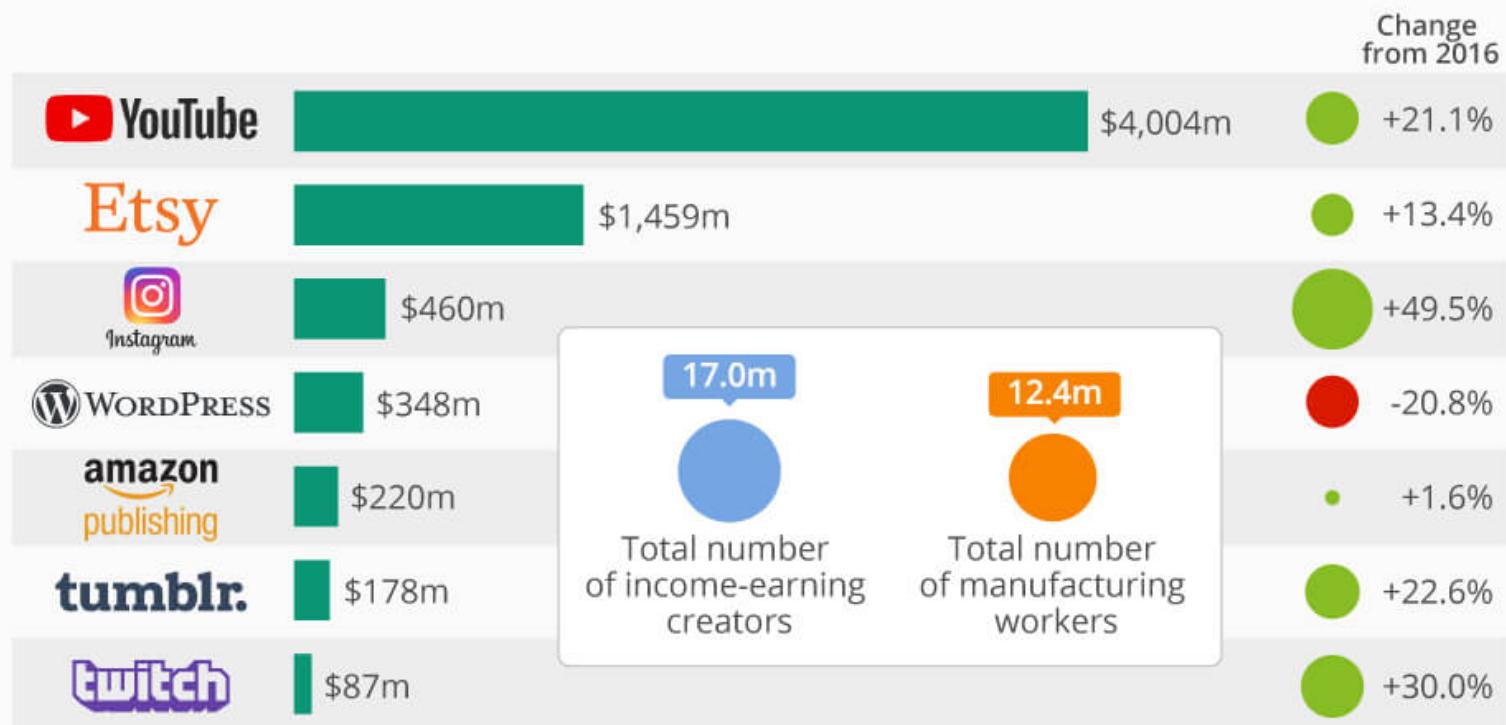


MARKET REALIST

Source: eMarketer

Where Online Content Creators Make Money

Estimated total earnings of U.S. internet creators on leading platforms*



* Most recent data from 2017. Internet creators include content, such as blog posts, books, commentaries, videos, video games, photographs, fine art, 3D printer designs, handmade objects, every type of music and more.



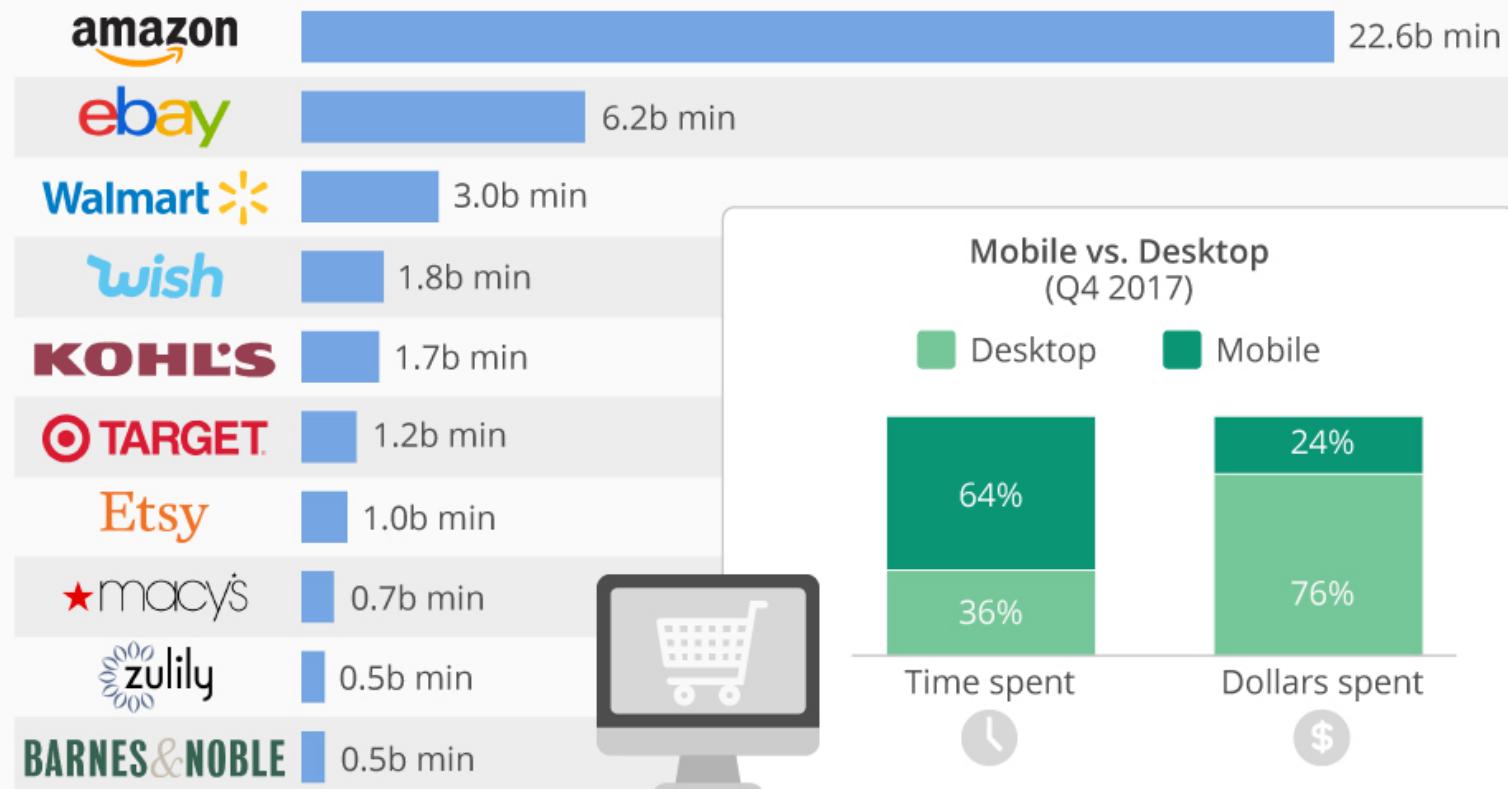
@StatistaCharts

Source: Re:Create Coalition

statista

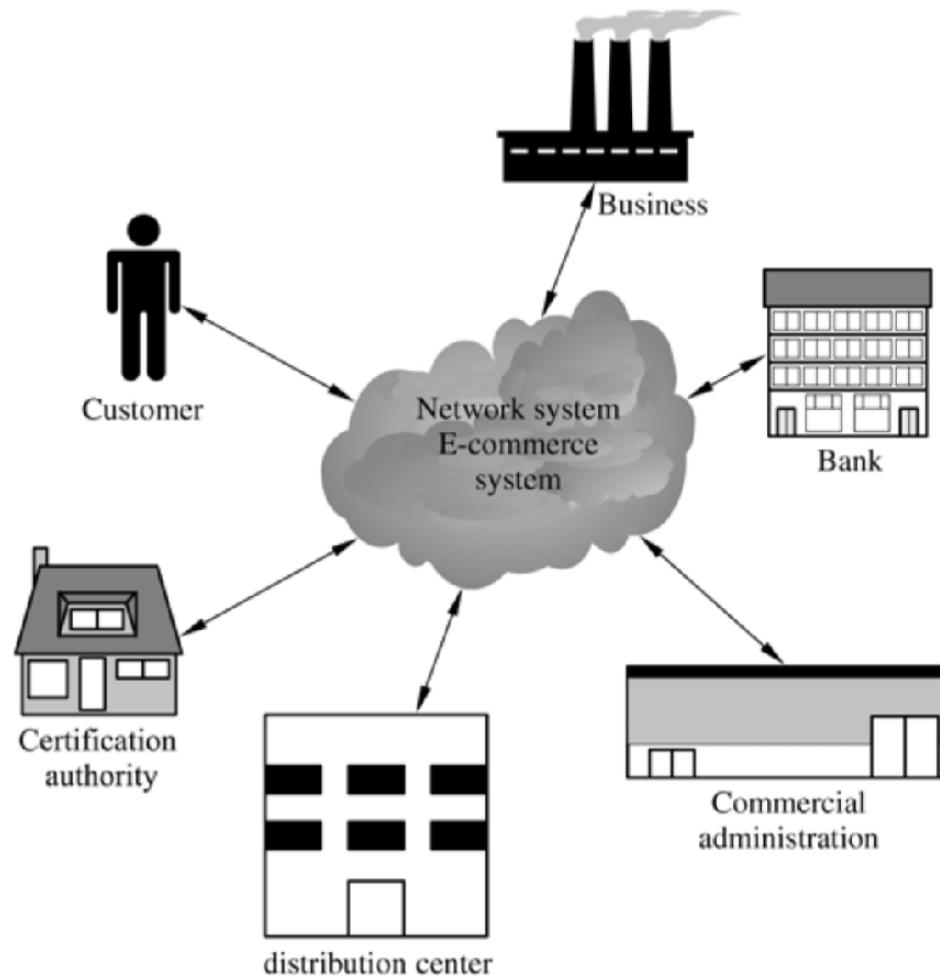
Amazon Dominates Online Shopping in the U.S.

Amount of time U.S. consumers spent on websites/apps of leading online retailers in Dec. 2017



@StatistaCharts Source: comScore

statista



Component of E-Commerce

Influence of Basic Science on E-Commerce

- **Mathematics**

- Probability Model
- Queuing Theory Model
- Nonlinear Dynamic
- Graph Theory
- Game Theory

- **Computer Science and Engineering**

- Networking and Communications
- Hardware and Software Technologies

 EC • Electronic Commerce

Since 1999, the ACM Special Interest Group on Electronic Commerce (SIGECOM) outlink has sponsored the leading scientific conference on advances in theory, systems, and applications for electronic commerce. The EC symposium features invited speakers, paper presentations, workshops, and tutorials covering all areas of electronic commerce. The natural focus of the conference is on computer science issues, but the conference is interdisciplinary in nature.

SIG Sponsors:



[SIGECOM](#)

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E-Commerce Advantages

- Buying 24/7
- Decrease Transaction Costs
- Conduct a Business Easily
- Comparison in Prices

E-Commerce Disadvantages

- Security
- Guarantee
- Social Relationships
- Impact
 - Marketing
 - Economics
 - Finance and Accounting
 - Production and operation management

Limitations

- **Lack of knowledge** and necessary information for use of electronic commerce and Internet network
- Protection of **consumer rights** in electronic commerce
- Lack of **legal infrastructures** in electronic commerce such documents that are not acceptable and electronic signature
- **Low security** of electronic funds transfer in some countries
- **Lower speed and limitations** on the use of Internet
- The security and confidentiality of **information exchanged**

Contents

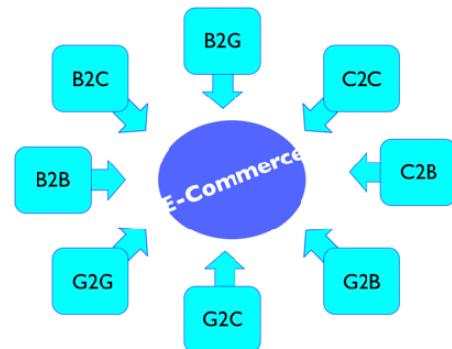
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A Taxonomy!

E-Commerce Business Models

Main Types of E-Commerce

1. Business to Business (B2B)
2. Business to Consumer (B2C)
3. Business to Government (B2G)
4. Governments to Governments (G2G)
5. Consumer to Consumer (C2C)
6. Consumer to Business (C2B)
7. Governments to Business (G2B)
8. Governments to Citizen (G2C)



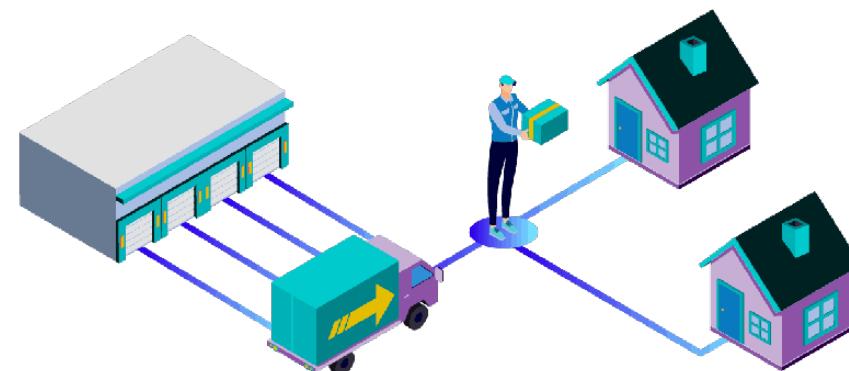
I. Business to Business (B2B)

A website following the B2B business model **sells its products to an intermediate buyer** who then sells the product to the final customer.



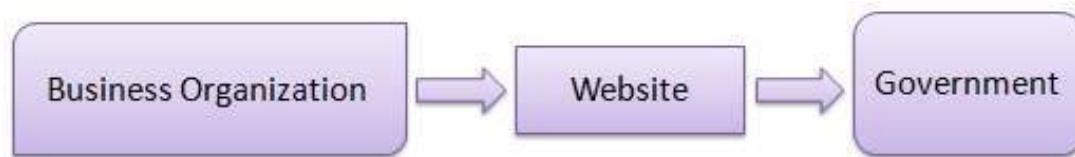
2. Business to Consumer (B2C)

The traditional retail model, where **a business sells to individuals**, but business is conducted online as opposed to in a physical store.



3. Business to Government (B2G)

B2G model is a variant of B2B model. Such websites are used **by governments to trade and exchange information** with various business organizations.



4. Governments to Governments (G2G)

The electronic sharing of data and/or information systems between government agencies, departments or organizations. The goal of **G2G** is to support **e-government** initiatives by improving communication, data access and data sharing.

5. Consumer to Consumer (C2C)

A website following the C2C business model helps **consumers to sell their assets** like residential property, cars, motorcycles, etc., or rent a room by publishing their information on the website.

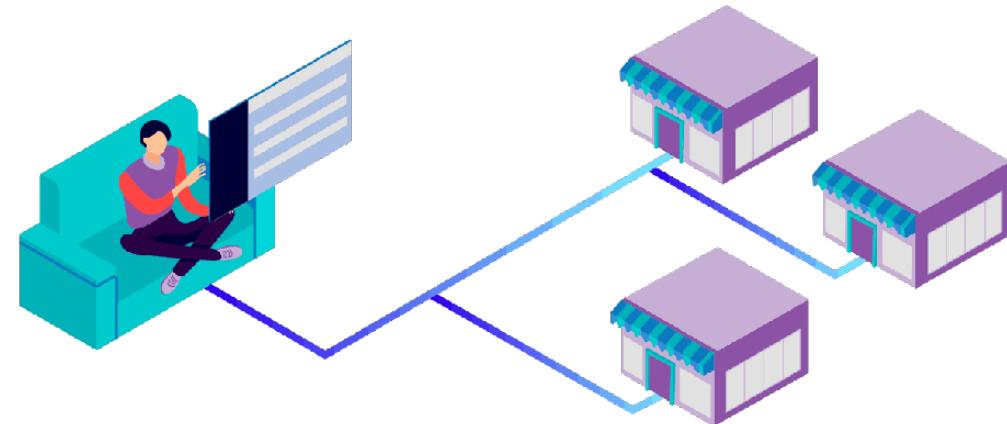


ebay



6. Consumer to Business (C2B)

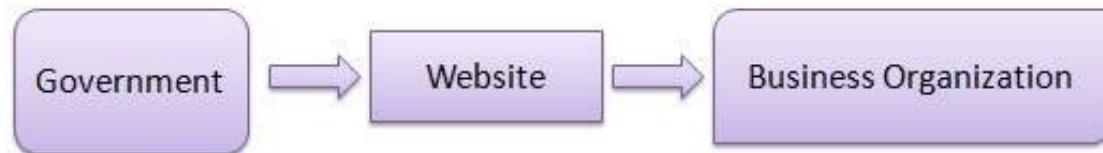
A consumer approaches a website **showing multiple business organizations** for a particular service.



priceline®

7. Government to Business (G2B)

Governments use B2G model websites to approach business organizations. Support **auctions**, **tenders**, and **application submission** functionalities.



8. Government to Citizen (G2C)

Governments use G2C model websites to approach citizen in general.

Support **auctions** of vehicles, machinery, or any other material.

Provides services like registration for **birth, marriage or death certificates**.



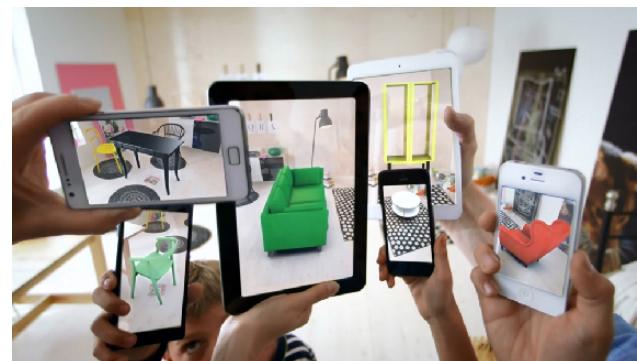
Mobile commerce (m-commerce)

The term of Mobile Commerce was invented in 1997 to aim “the buying and selling of products, information and services” **via wireless handheld devices** such as cellular phones, laptops and personal digital assistants.

Allows to users access to Internet and shopping in it without needing to find a place to plug in.

E-Commerce VS M-Commerce

Technology	E-Commerce	M-Commerce
Device	PC	Smart Phones, PDAs, Tablet Computers, Phablets
OS	Windows, Unix, Linux	Android, Windows, Symbian, Palm OS .etc.
Presentation Standard	HTML	HTML, WML, HDML, i-Mode
Bearer Network	TCP/IP & Fixed Wire Line Network	GSM, GPRS, TDMA, CDMA, Paging Network etc.
Browser	Google Chrome, Mozilla Firefox, IE ,Opera ,Safari, Bing etc	Opera Mini, UC browser, Android, IE, Bing etc



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It simply does not work without security!!

E-COMMERCE — SECURITY

E-Commerce Security

- **Security** is an essential part of any transaction that takes place over the internet
- Customers will lose his/her faith in e-business if its security is compromised.
- The **essential requirements** for safe e-payments/ transactions:
 1. Confidentiality
 2. Integrity
 3. Availability
 4. Authenticity
 5. Non-Repudiability
 6. Encryption
 7. Auditability

Measures to ensure Security

Major security measures are:

- Encryption
- Digital Signature
- Security Certificates

Security Protocols in Internet:

- Secure Socket Layer (SSL)
- Secure Hypertext Transfer Protocol (SHTTP)

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The future is here!

Data Science + E-commerce

A Few Questions on User Interactions

When you are shopping online, do you ever feel like,

- Why they have made this thing in certain way?
- Why is this stuff showing here?
- How does this thing know what am I looking for?



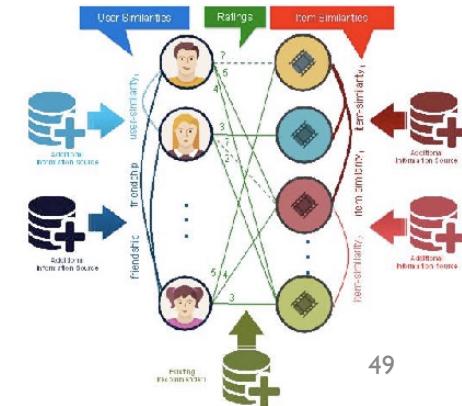
Data Science

Recommendation System

A recommendation system is a subclass of **information filtering system** that seeks to predict the “**rating**” or “**preference**” a user would give to an item. There are three main techniques as below:

- Collaborative filtering
- Content-Based Filtering
- Hybrid Recommendation Filtering

Wikipedia

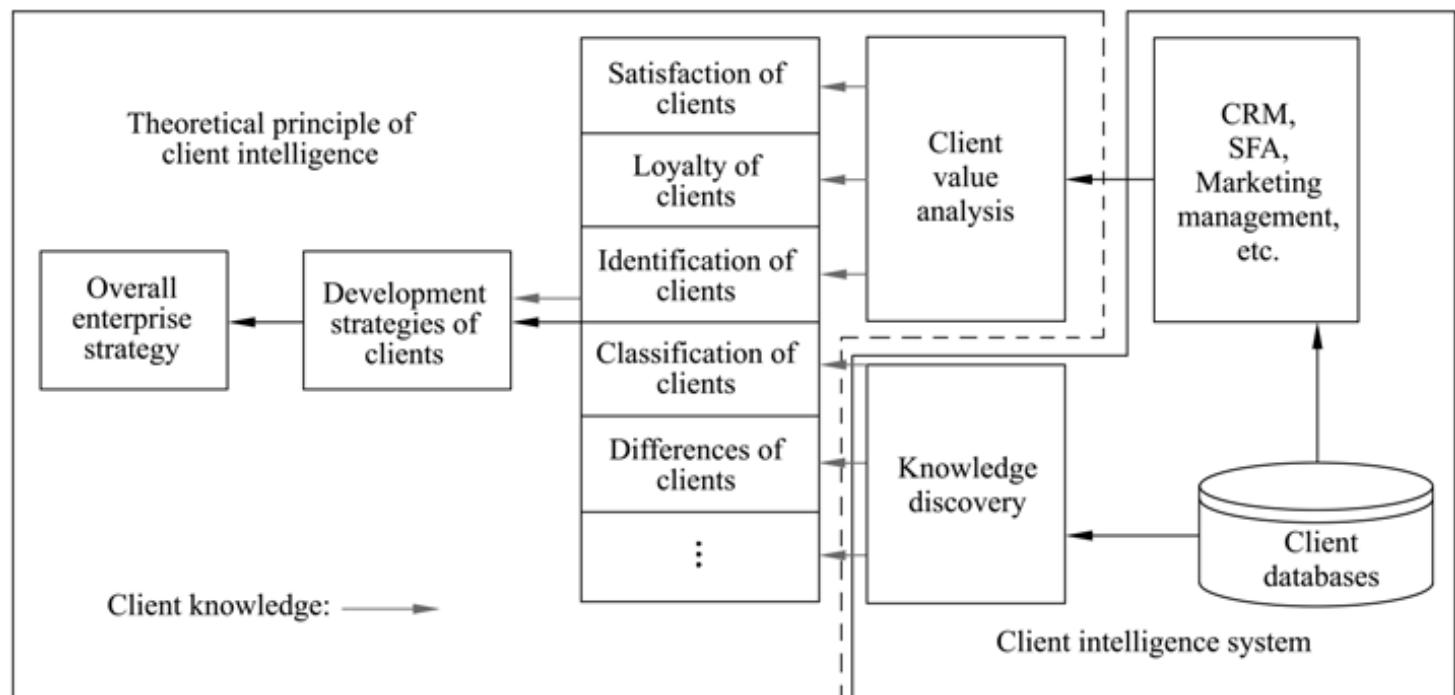


A Brief Introduction to Customer Relationship Management (CRM)

- An approach to managing a company's interaction with current and potential customers
- Uses **data analysis** about customers' history with a company to improve business relationships with customers, specifically focusing on **customer retention** and ultimately driving sales growth

Client Intelligence

- 1.Theoretical Foundation
- 2.Information System
- 3.Data Analysis
- 4.Knowledge Discovery
- 5.Strategic Level



Customer Lifetime Value Modeling

Customer lifetime value is a prediction of the net profit attributed to the entire future relationship with a customer.

(Average Order Value) x (Number of Repeat Orders) x (Average Customer lifespan)

Customer Retention Churn Model

Customer retention refers to the ability of a company or product to retain its customers over some specified period.

Fraud Detection

How can these companies detect the frauds?

- Data Science
- Machine Learning Techniques



Importance of Fraud Detection in eCommerce

The Fraud Detection System can help companies in various ways:

1. Increase customer retention
2. Increase company revenue
3. Decrease unidentified transactions
4. Help increasing company's brand value

Important Reviews- Improved Customer Service

These days companies especially online businesses, have ratings and reviews section on their websites for their products.

But, it is not easy to read each and every given review online manually.

