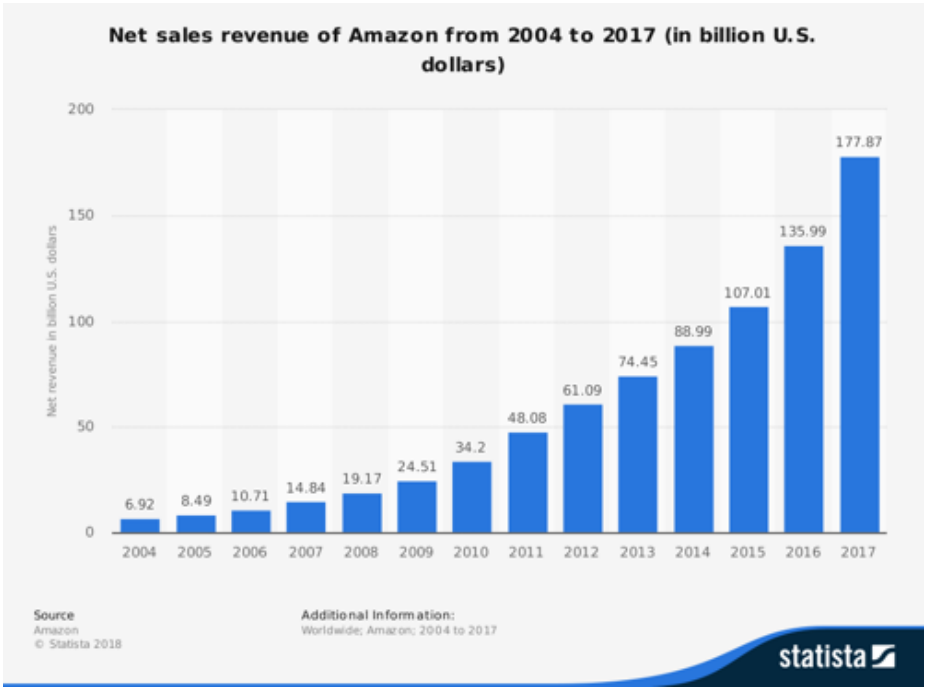
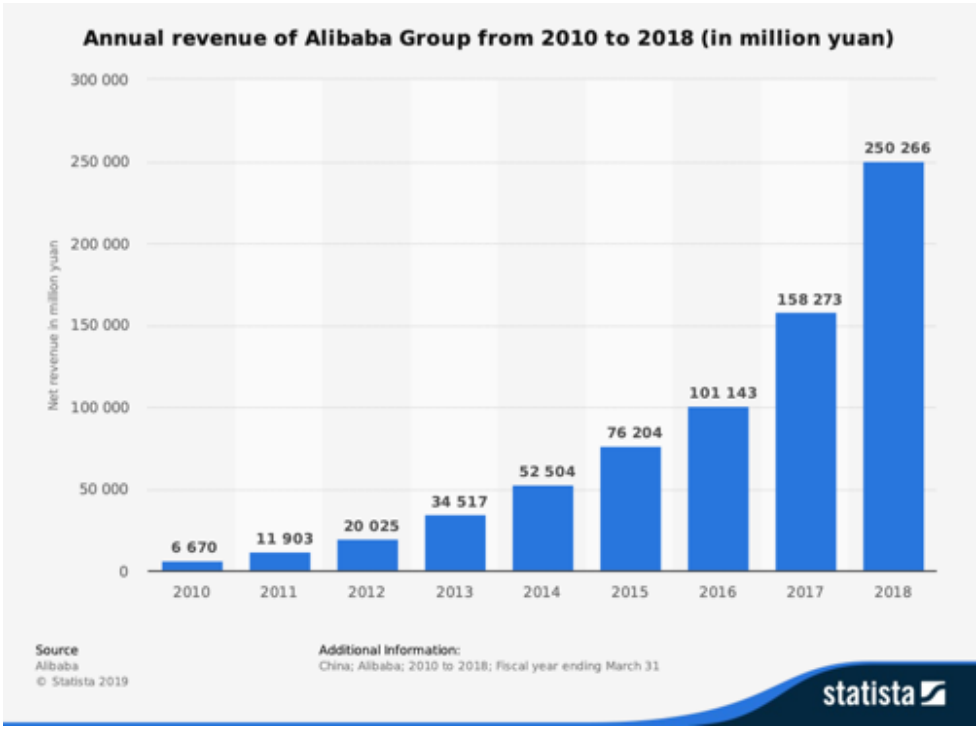
E-Commerce

Jack Lang and Stewart McTavish

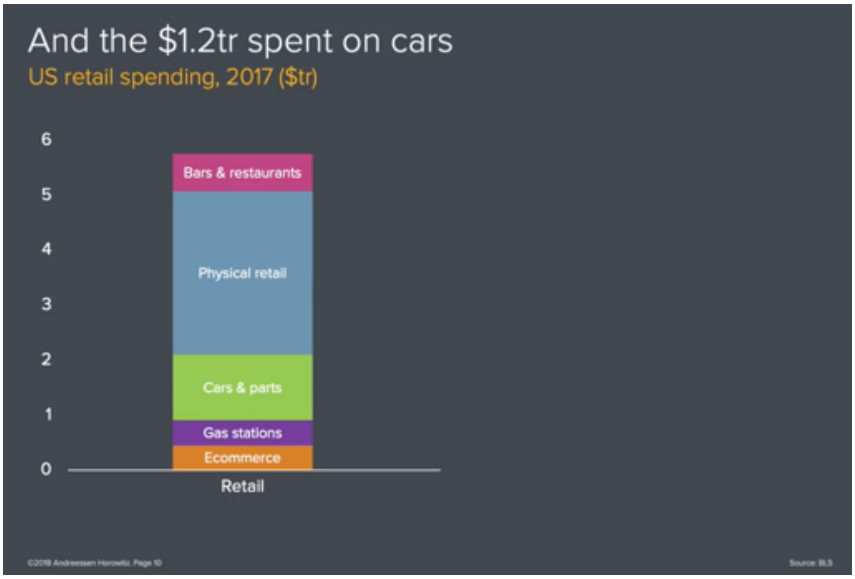
Guest lectures
Fiona Vickerstaff, CMS
Pete Stevens, Mythic Beasts
Richard Clayton, CL

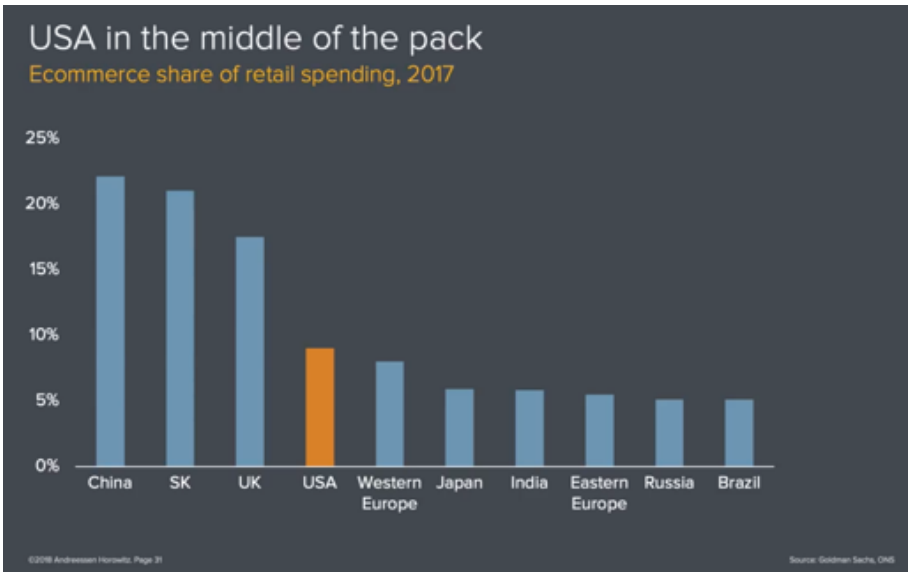
Commerce ?

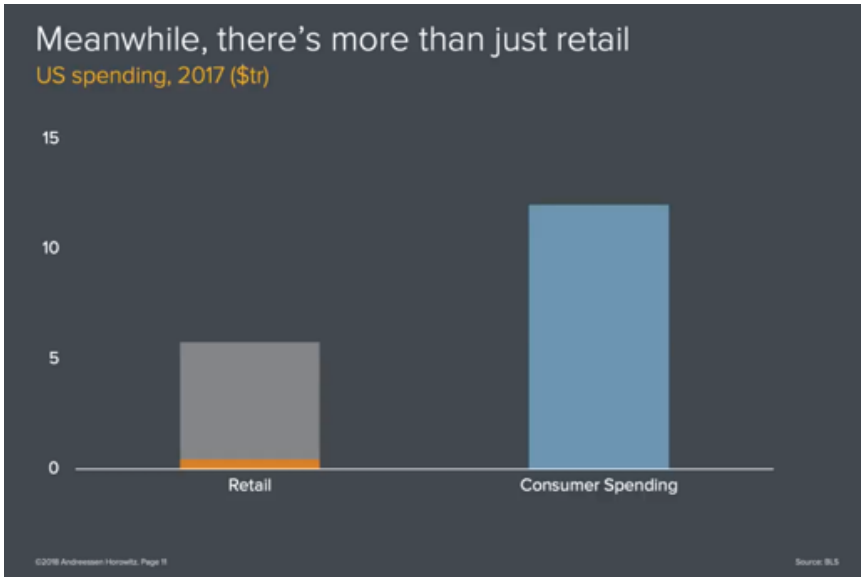

Net sales revenue of Amazon from 2004 to 2017 (in billion U.S. dollars)
Net revenue in billion U.S. dollars
200
150
100
50
0
6.92
8.49
10.71
14.84
19.17
24.51
34.2
48.08
61.09
74.45
88.99
107.01
135.99
177.87
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
Source
Amazon
© Statista 2018
Additional Information:
Worldwide; Amazon; 2004 to 2017
statista

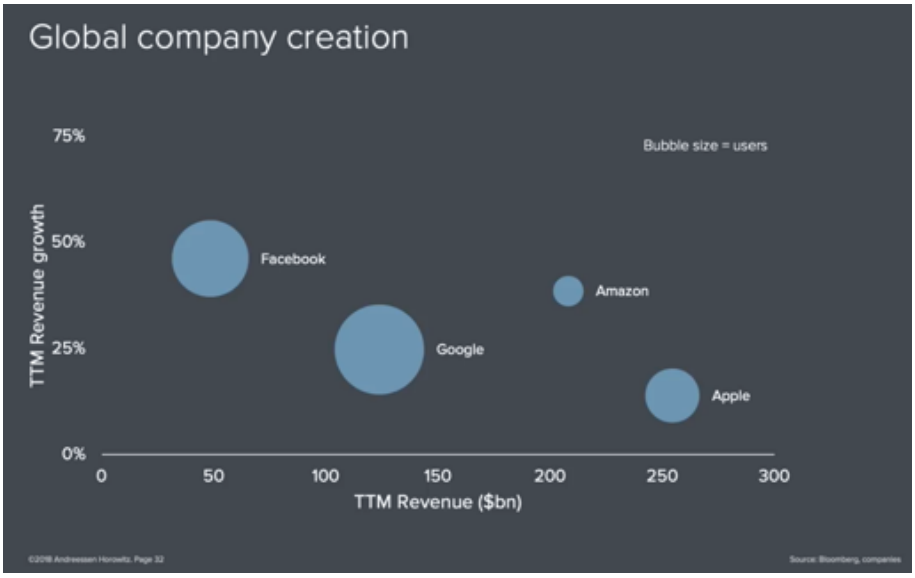

Annual revenue of Alibaba Group from 2010 to 2018 (in million yuan)
Net revenue in million yuan
300 000
250 000
200 000
150 000
100 000
50 000
0
6 670
11 903
20 025
34 517
52 504
76 204
101 143
158 273
250 266
2010
2011
2012
2013
2014
2015
2016
2017
2018
Source
Alibaba
© Statista 2019
Additional Information:
China; Alibaba; 2010 to 2018; Fiscal year ending March 31
statista

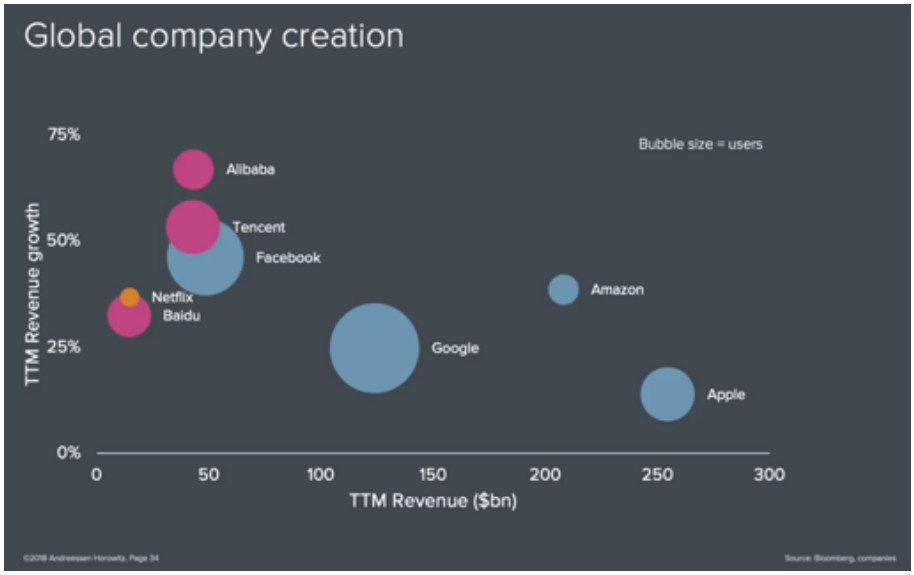

Ecommerce is big in dollar terms
Quarterly US ecommerce revenue ($bn)
150
100
50
0
Mar 99
Mar 02
Mar 05
Mar 08
Mar 11
Mar 14
Mar 17


And the $1.2tr spent on cars
US retail spending, 2017 ($tr)
6
5
4
3
2
1
0
Bars & restaurants
Physical retail
Cars & parts
Gas stations
Ecommerce
Retail


USA in the middle of the pack
Ecommerce share of retail spending, 2017
25%
20%
15%
10%
5%
0%
China
SK
UK
USA
Western Europe
Japan
India
Eastern Europe
Russia
Brazil


Meanwhile, there's more than just retail
US spending, 2017 ($tr)
15
10
5
0
Retail
Consumer Spending


Global company creation
75%
50%
25%
0%
TTM Revenue growth
Bubble size = users
Facebook
Amazon
Google
Apple
0
50
100
150
200
250
300
TTM Revenue ($bn)


Global company creation
75%
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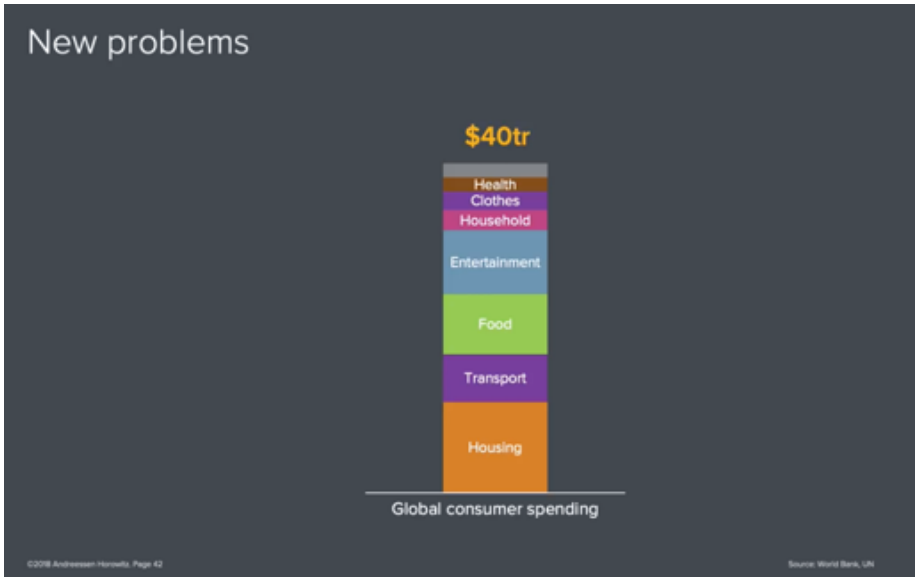
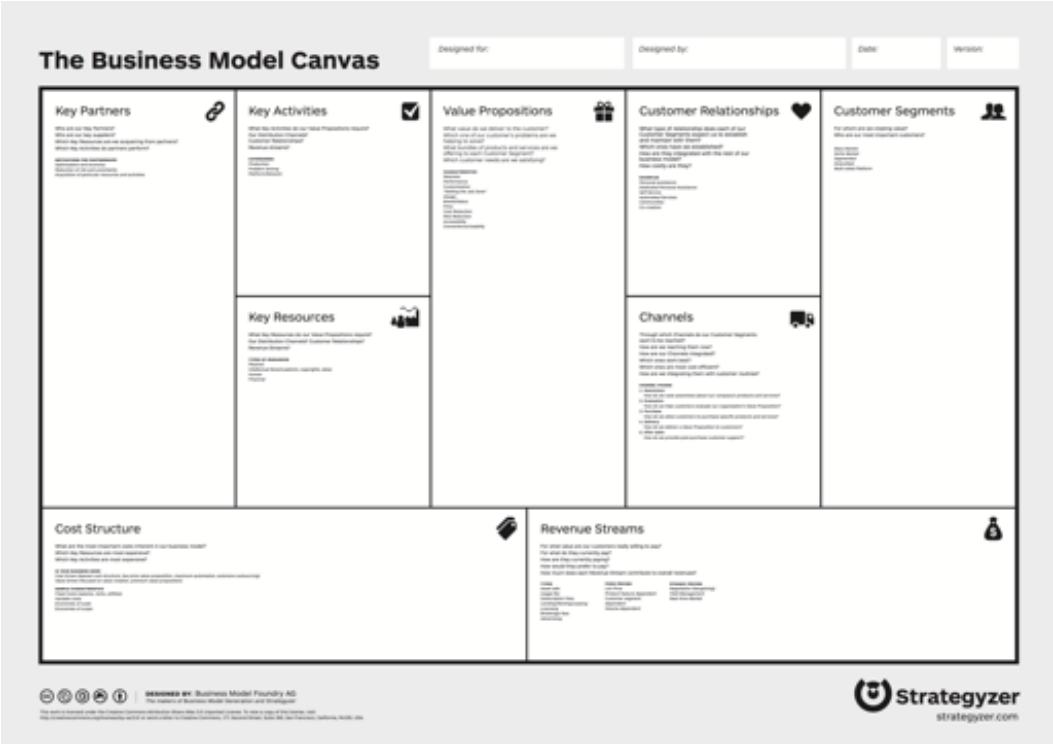
TTM Revenue growth
Bubble size = users
Alibaba
Tencent
Facebook
Netflix
Baidu
Amazon
Google
Apple
0
50
100
150
200
250
300
TTM Revenue ($bn)


New problems
$40tr
Health
Clothes
Household
Entertainment
Food
Transport
Housing
Global consumer spending
©2018 Andreessen Horowitz, Page 42
Source: World Bank, UN


The Business Model Canvas
Designed for:
Designed by:
Date:
Version:
Key Partners
Key Activities
Value Propositions
Customer Relationships
Customer Segments
Key Resources
Channels
Cost Structure
Revenue Streams
DESIGNED BY: Business Model Foundry AG
Strategyzer
strategyzer.com

What is E-commerce?

A course thought up by the Teaching committee…
- research on protocols, economics

B2B
- Replacement of paper with electronic documents
- Re-badged Electronic Document Interchange (EDI)
- Electronic Money

B2C Mail order - amazon.com
- New business models
- Disintermediation
- CRM

New opportunities for fraud
- The dark web

App economies

Social media

and many more potential topics

Aims

Lectures:

1. History and Economic Background
2. Business Models and Strategy
3. The Law and E-Commerce (FV)
4. Design and implementation
5. Running at Scale (PS)
6. Creating a business
7. RIP, DMCA and other legal developments (RC)
8. Making E-Commerce work

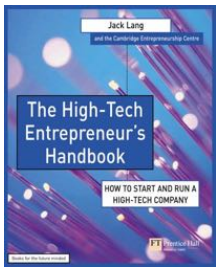
Examples classes

2nd March LT2 12:05-12:55, Q7P82012, Q7P82013, Q7P82014

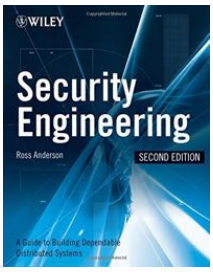
11th March LT2 12:05-12:55, Q5P82015, Q7P82016, Q7P82017

Lecture notes for guest lectures (3,5,7) will be provided on the day of the lecture

Resources

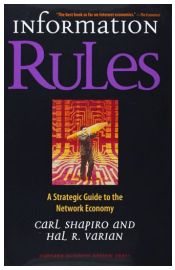


ISBN: 0273656155

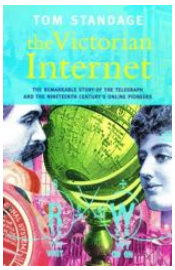


ISBN: 0470068523

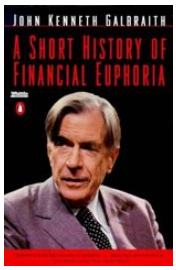
ISBN: 0393920771



ISBN: 087584863X

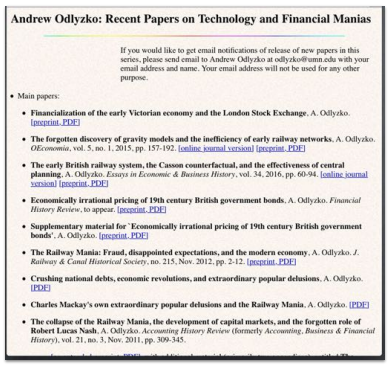


ISBN: 0753807033



ISBN: 0140238565

Online Resources

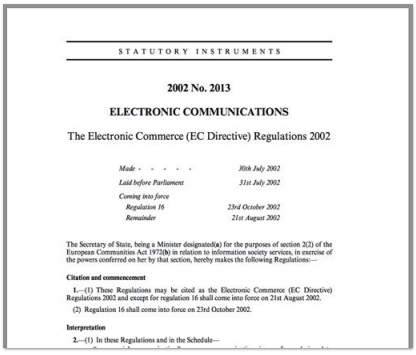


Andrew Odlyzko's papers on Technology and Financial Manias

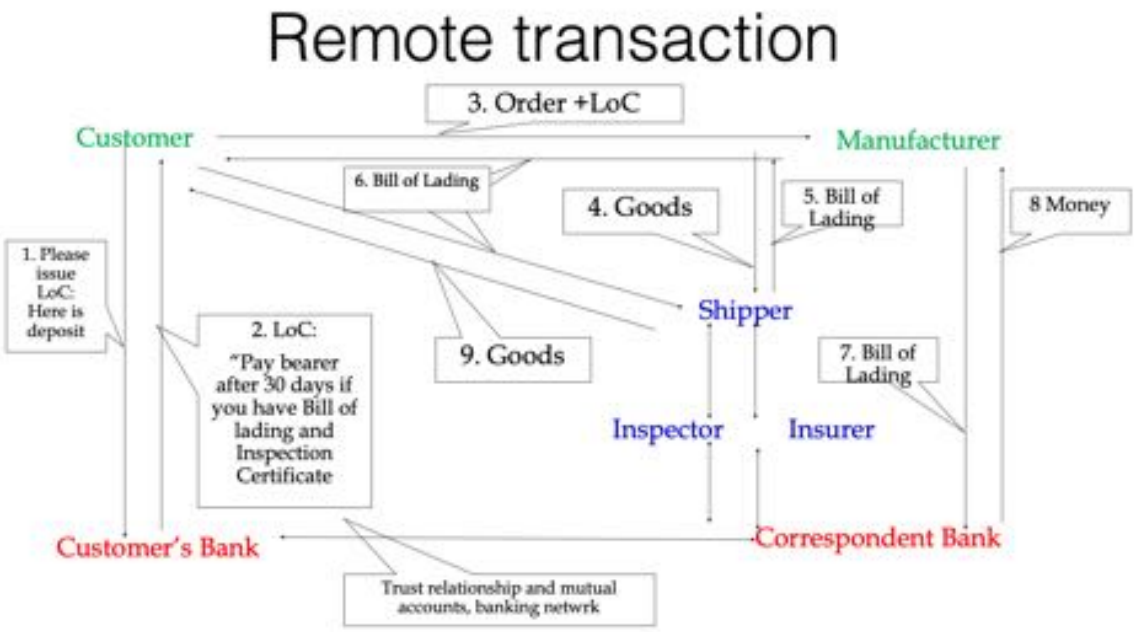
http://www.dtc.umn.edu/~odlyzko/doc/bubbles.html

http://www.onlinetechnologyworld.com/top-10-worst-websites-2017-avoid-embarrassment/

Or a web-search for other similar lists and pages



http://www.legislation.gov.uk/uksi/2002/2013/contents/made



Consider how a normal trade occurs. A customer (you) wants to purchase some goods for example a container full of computers from a remote manufacturer, for example in China. There is mutual distrust: you don't trust them to deliver, and they don't trust you to pay. How does this get resolved?

This is has been a common problem since humans started trading, and over centuries a common set of protocols have emerged for Business to Business trades, from which E-commerce systems have evolved. It goes like this:

1. You the customer go to your bank and request a Letter of Credit. This is like a bankers cheque, but one that can only be cashed if certain conditions are fulfilled. Here the conditions might include :
   - A Bill of Lading (showing that the goods have been shipped)
   - An inspection certificate (showing that they are what you expect, and not just rocks)
   - An insurance certificate
2. Your bank supplies the Letter of Credit, for which it requires deposit of the amount, plus a fee.

3. You send your order plus the LoC to the manufacturer.
4. The manufacturer manufactures the goods and delivers them to the shipper

5. The shipper provides a Bill of Landing. (or Air Way Bill etc) plus insurance certificate and inspection certificate
6 . The Bill of Lading is sent by fast means to the customer (eg electronically, or by fast horse)
7. The manufacturer presents the Letter of Credit and other supporting documentation (Bill of Lading, Inspection and Insurance certificates to their bank,
8. The bank pays the manufacturer, and claims the money via the banking network from the customer's bank
9 The shipper transports the goods

The above is a simplified view of a typical transaction. In practice there may be customs and taxes to pay, border inspections and controls, shipping fees, and the like, and many special cases, such as medicines and other time critical or regulated goods

Note that in this example the banking network is used as the trusted third party, giving guarantees to the customer that they will get the goods (or a refund) and to the manufacturer that they will get paid.

For B2B transactions the payment/credit provider, such as a credit card company, or Paypal often plays this role

Business-to-business communications go back into antiquity

Believed to have driven the invention of writing and mathematics

Trust system

Sumerian Bulla an " Unforgeable" warehouse receipt .Clay models representing sacks of grain pressed into a wet clay ball with the warehouse owner's thumbprint or design and then dried in the sun.

Could be used as money for a trade – a lot easier then carrying the actual goods

Superseded by stylus marks on a clay tablet

Thought to have contributed to the development of writing and of Mathematics (and accountancy, and taxes)

Coins

Early Coins

The first move away from the barter system may have been **the exchange of cowrie shells**, which eventually evolved into metal nuggets and pieces. Metal money exchanges started in the form of small knives and tools in China. In the 5th century BC, **Chinese hollow spade money** was commonly used. While not using "coins" per se, these were some of the first exchanges of valuable, standardized metal materials. This eventually evolved into the recognizable, rounded **Chinese coins**. In the west, the first official, minted currency was possibly the famous **Lydia coin**, which was created in modern Turkey and featured an image of a lion. It was made of gold. These were pounded out with a hammer and were create for King Croesus. In the greater **history of money**, this was a very important next step to opening up the Mediterranean to trade and an exchange of goods and ideas. In the next centuries, coins began to be exchanged and accepted **on a global scale**.

Types of Coins

While **paper money started to become the dominant currency** in China as early as the 13th century at the behest of Emperor Kublai Khan, coins were absolutely essential to several empires, which all had their own mints. In the Persian Empire, the coin of choice was the **daric**. In Greece, the ancient currency was the **drachma**, which is still used in its modern form today. In Rome, on the other hand, the currency was based around the silver **denarius**. During and after the fall of Rome, in the Byzantine Empire, the major coin was the **golden solidus**, which was also known as the nomisma. In China, the coin design stayed by and large the same, in the form of a circle with a square hole, which was called the **ban liang** coin. In the Renaissance, the florin was quite common, and the **pound** was used in England.

Gold Standard

The gold standard is a monetary system where a country's currency or paper money has a value directly linked to gold. With the gold standard, countries agreed to convert paper money into a fixed amount of gold. A country that uses the gold standard sets a fixed price for gold and buys and sells gold at that price. That fixed price is used to determine the value of the currency. For example, if the U.S. sets the price of gold at $500 an ounce, the value of the dollar would be 1/500th of an ounce of gold.

The gold standard is not currently used by any government. Britain stopped using the gold standard in 1931 and the U.S. followed suit in 1933 and abandoned the remnants of the system in 1971. The gold standard was completely replaced by fiat money, a term to describe currency that is used because of a government's order, or fiat, that the currency must be accepted as a means of payment. In the U.S., for instance the dollar is fiat money, and for Nigeria, it is the naira.

Bearer certificates

Token representing value

May be anonymous (cash vs cheque)

Not easily forged (trust)

Physical handling (banks / wallets)

May have Coupons attached
- tear off to claim interest

Tradeable

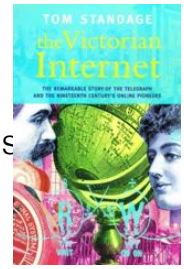
Traded Paper

Typical instruments include

- Warehouse receipts
- Bills of Lading - "The holder is entitled to 100 amphorae of oil from the cargo of the ship Augusta"
- Purchase orders and invoices
- Insurance certificates
- Certificates of debt
- Payment instructions - Bank-to-bank or bank-customer-bank (cheques), letters of credit
- Banknotes
- Bearer certificates - coupons
- Share Certificates

Negotiable / guaranteed - can be used for payment, security, etc.

The Victorian Internet



The invention of the telegraph led to the development of business use protocols

Hugh boom in telegraph construction and applications

Indirect effects included creation of national markets - price differences drove rapid shipment + arbitrage

Direct uses included purchase orders and queries. Easy where there is an existing relationship, otherwise intermediaries needed

Huge expansion in banking

Banks sent about 50% of telegraph traffic

Banks became trusted intermediaries

Others (insurers, inspection agents, shipping agents) largely harnessed via bank mechanisms

Wiring Money

Interbank message e.g.

"To: Lomarco Bank, Geneva. Please pay SFR 10,000 from out account to Herr Thilo Schmidt on presentation of his passport. Out test key is 254"

The 254 is a primitive MAC computed on significant data (money, date, currency, etc)

SWIFT reimplemented this using 'email' and proper MAC in mid 70's

First big 'open' EDI system

Swift II added PKI to manage MAC keys in early 1990's

Adapted to CREST (UK equity clearing)

Commercial transactions similar, but more complex conditions

e.g LoC needs Bill of Lading, insurance certificate and inspection certificate

Electronic Document Interchange (EDI)

Proprietary systems build late 60s / early 70s

General Motors ordering car components (EDS)

Marks and Spencer's clothes ordering

Big problem not security or DoS or lost systems but standards

1980s agreeing common message formats
UN, specific country / industry e.g. NHS

Being redone as XML
e.g. BOLERO (www.bolero.net)

Many players - slow progress

What is money?

Exchange of value for example making a purchase
Store of value for example savings
Measure of value for example pricing

Fiat money

Money issued by the Government, and can be used to pay taxes

- Governments can't go bust, as they can always print more: "Quantitive Easing"
- However devaluing the currencey may cause inflation, exchange rate drop and other bad effects
- "cash is trash"

IMF bailout, EU bailout (Greece)

"Unforgeable" bearer certificates

Anonymous, immediate

Trusted (mostly)

Magic of banking

Banks issue Money

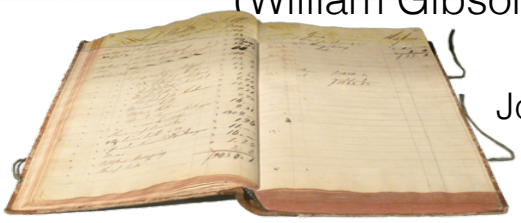
Not everyone will want to withdraw at the same time, so
Banks (if Trusted) need only fund difference between deposits and withdrawals
Reserve ratios vary over time, between countries and size of deposit taking institution, typical "Reserve Ratio" ~ 10%

If trust in the bank fails, everybody wants to withdraw their money at the same time…

Country	1968	1978	1988	1998
United Kingdom	20.5	15.9	5.0	3.1
Turkey	58.3	62.7	30.8	18.0
Germany	19.0	19.3	17.2	11.9
United States	12.3	10.1	8.5	10.3
India[34]	3	6	10	10-11

https://en.wikipedia.org/wiki/Reserve_requirement

"Cyber space – its where your bank keeps your money"
(William Gibson, Neuromancer 1984)



Journals and Ledger systems:

- Journal: List of transactions as they happen
  - A pays B £100
  - B pays C £ 50
- Ledger: View of Journal organised into Accounts
  - Double entry: Credit (+) Debit (-)
    - Debit A £100; Credit B £ 100
    - Debit A £50; Credit C £50
    - A bank maintains a journal (and hence ledger) for each account
      Trusted

B's Debit	Account Credit
	100
50	(50)
Totals	
50	50

<= Must balance

Electronic money tockens

- Token representing value
  - *Chaum, David (1983). "Blind signatures for untraceable payments" Advances in Cryptology Proceedings. **82** (3): 199–203.*
- Unforgeable Transaction record
  - eg (value, serial number, id) signed by the issuer's private key
- Problem: Bits can be easily copied.
  - How to avoid double spending?
  - Store all spent Tokens
    - Can retire blocks of used Transactions
  - Store all unspent Tokens
  - Store all transactions (~2500/block)
  - Central store (bank)
  - Distributed store
    - Block chain (>250Gb) but only updates broadcast
    - Everyone has a copy and can check
  - No good lightweight electronic equivalent of cash

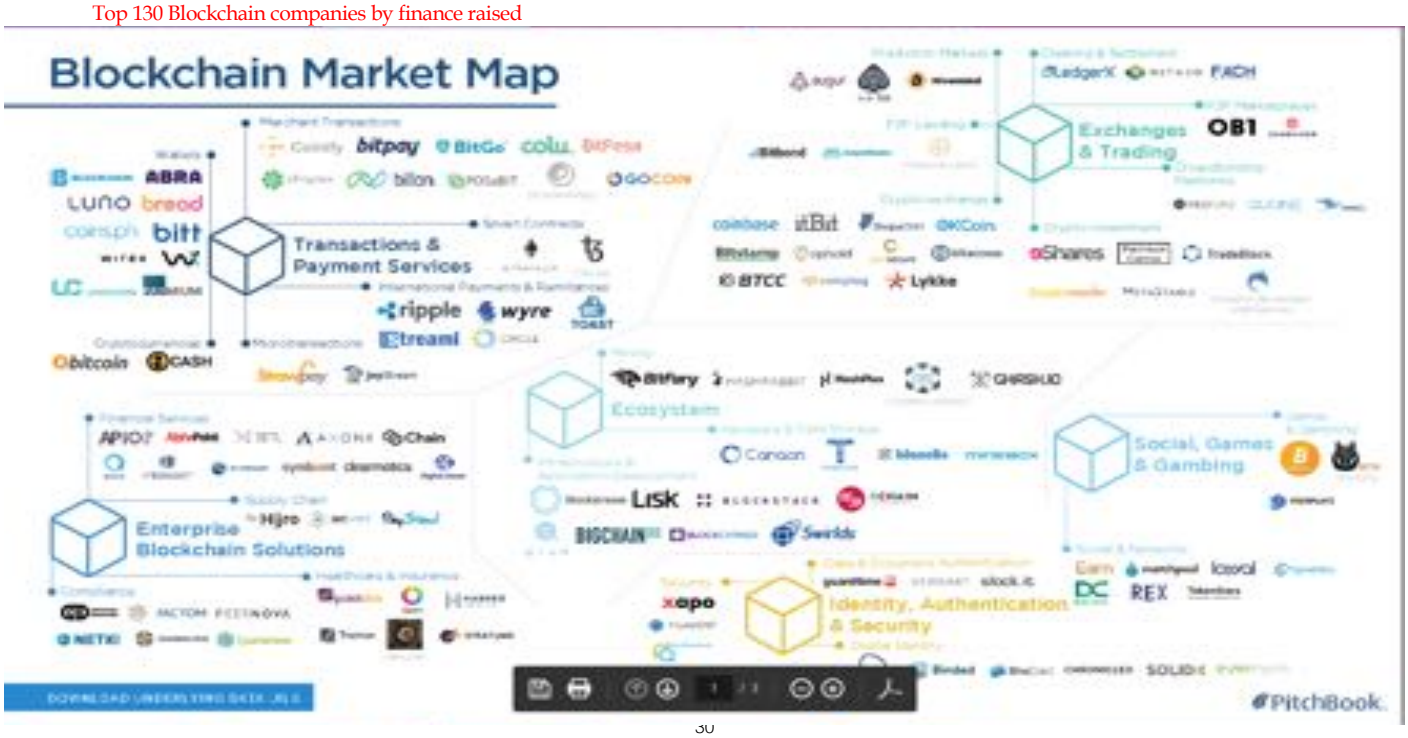
ID (user's public key)
Value
Date
Serial etc
Nonce

Crypto Currencies
"Distributed Ledger Technology"

- Over 1000 crypto currencies
  - Bitcoin
  - Ethereum
    - Includes smart contracts
    - Moving to proof of value
    - Many others

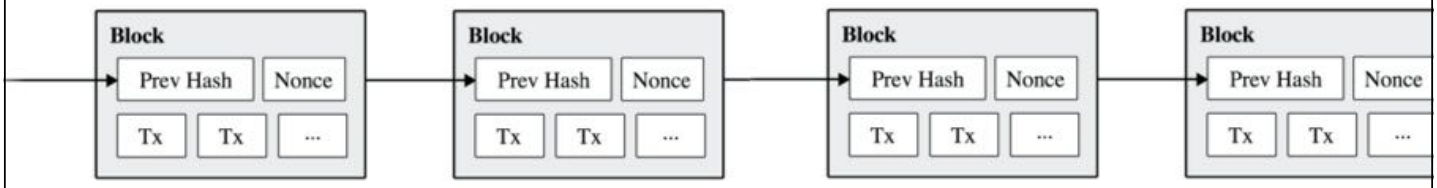
29

Top 130 Blockchain companies by finance raised



30

Block chain



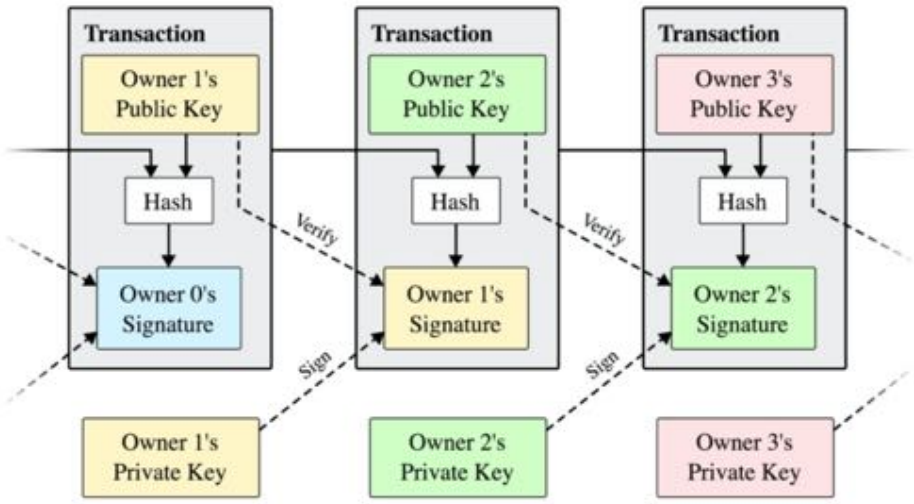
Chain of blocks of transactions

Currently 2500 per block

Currently reward of 12.5 coins per block

Rate limited by requiring a hard crypto problem solved

Bitcoin

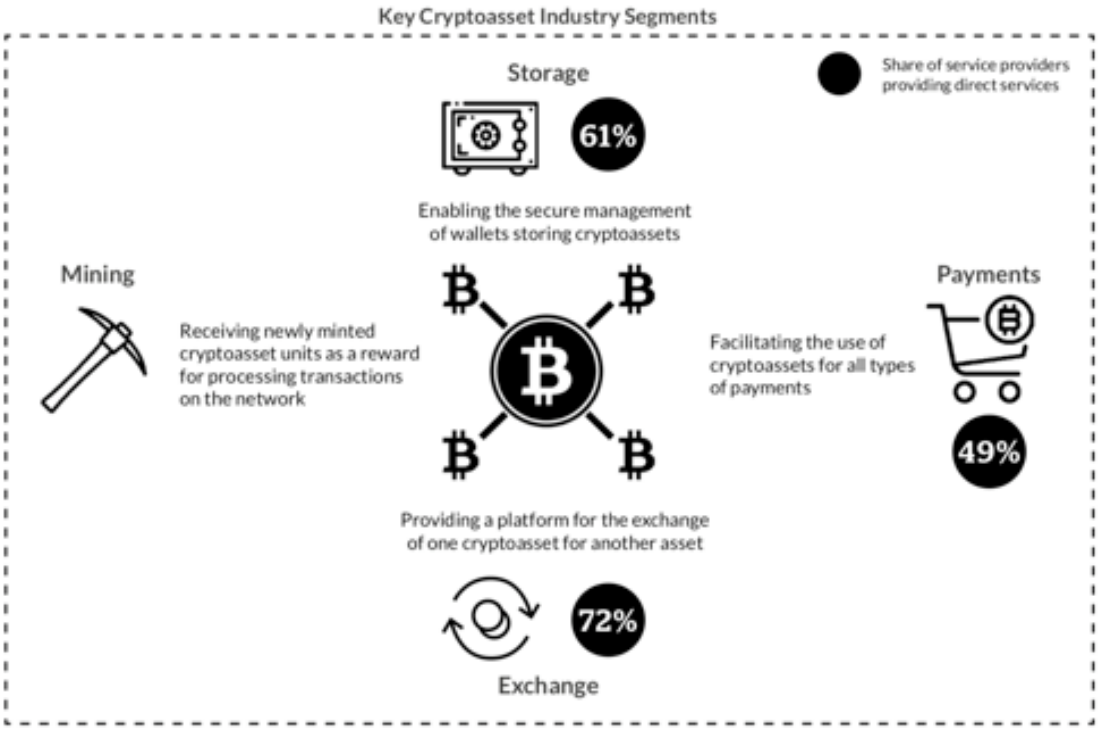


We define an electronic coin as a chain of digital signatures. Each owner transfers the coin to the next by digitally signing a hash of the previous transaction and the public key of the next owner and adding these to the end of the coin. A payee can verify the signatures to verify the chain of ownership.

http://nakamotoinstitute.org/bitcoin/#selection-57.4-57.311

Crypto market capitalisation

Downloaded 14 Feb 2019, https://coinmarketcap.com/charts/



https://www.jbs.cam.ac.uk/faculty-%20research/centres/alternative-finance/publications/2nd-global-cryptoasset-benchmarking-%20study/

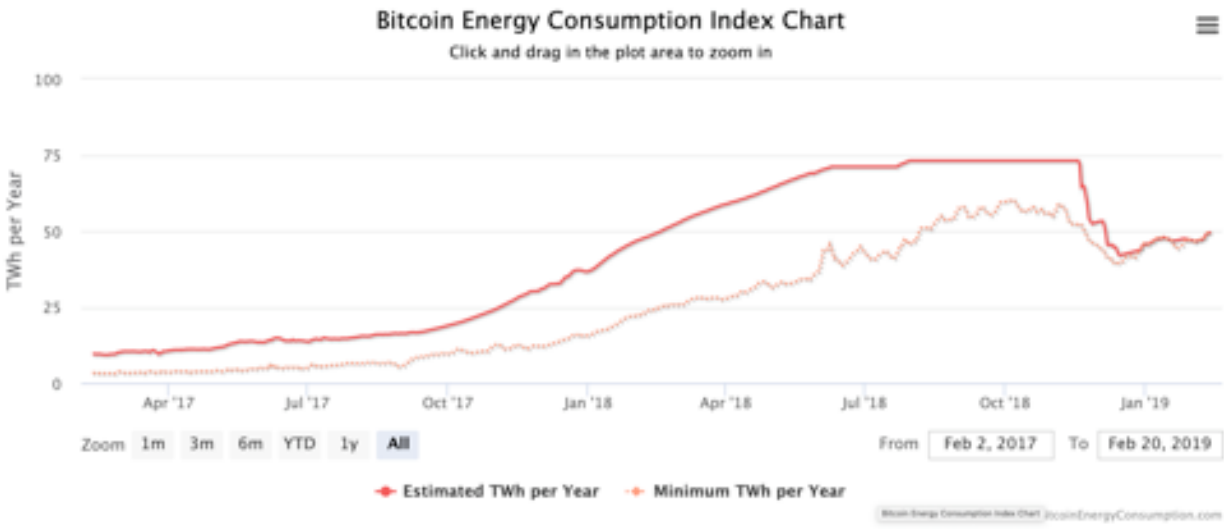
Mining

- Miners generate income by verifying transactions and adding blocks of transactions to the global block chain for a small fee
- Rate limited by needing to solve a hard cryptographic problem to generate a valid block
  - 6/hour
- This uses a lot of energy

35

36

Bitcoin Energy Consumption Index



Key Network Statistics

Description	Value
Bitcoin's current estimated annual electricity consumption* (TWh)	49.5
Bitcoin's current minimum annual electricity consumption** (TWh)	49.5
Annualized global mining revenues	$2,424,932,755
Annualized estimated global mining costs	$2,309,011,812
Current cost percentage	95.22%
Country closest to Bitcoin in terms of electricity consumption	Singapore
Estimated electricity used over the previous day (KWh)	135,604,584
Implied Watts per GH/s	0.115
Total Network Hashrate in PH/s (1,000,000 GH/s)	49,100
Electricity consumed per transaction (KWh)	411
Number of U.S. households that could be powered by Bitcoin	4,582,933
Number of U.S. households powered for 1 day by the electricity consumed for a single transaction	13.91
Bitcoin's electricity consumption as a percentage of the world's electricity consumption	0.22%
Annual carbon footprint (kt of CO2)	24,253
Carbon footprint per transaction (kg of CO2)	201.63

Rank	Country/Region	Electricity consumption (kW·h/yr)	Year of Data	Source	Population	As of	Average electrical energy per capita (kWh per person per year)	Average power per capita (watts per person)
—	World	21,776,088,770,300	2014	CIA	7,322,811,468	2016	2,674	309
1	China	6,310,000,000,000	2017	NEA[3]	1,403,500,365	2017	4,475	510
2	United States	3,911,000,000,000	2015 EST.	CIA	323,995,528	2016	12,071	1,377
3	India	1,408,624,400,000	2016 EST.	CSO[4]	1,266,883,598	2016	1,122	128
4	Russia	1,065,000,000,000	2014 EST.	CIA	142,355,415	2016	7,481	854
5	Japan	934,000,000,000	2014 EST.	CIA	126,702,133	2016	7,371	841
6	Germany	533,000,000,000	2014 EST.	CIA	80,722,792	2016	6,602	753
7	Canada	528,000,000,000	2014 EST.	CIA	35,362,905	2016	14,930	1,704
8	Brazil	518,000,000,000	2014 EST.	CIA	205,823,665	2016	2,516	287
9	Korea, South	495,000,000,000	2014 EST.	CIA	50,924,172	2016	9,720	1,109
10	France	431,000,000,000	2014 EST.	CIA	66,836,154	2016	6,448	736
11	United Kingdom	309,000,000,000	2014 EST.	CIA	64,430,428	2016	4,795	547
12	Italy	291,000,000,000	2014 EST.	CIA	62,007,540	2016	4,692	535
13	Saudi Arabia	272,000,000,000	2014 EST.	CIA	28,160,273	2016	9,658	1,102

47	Greece	53,000,000,000	2014 EST.	CIA	10,773,253	2016	4,919	561
48	Algeria	49,000,000,000	2014 EST.	CIA	40,263,711	2016	1,216	138
49	Romania	48,000,000,000	2014 EST.	CIA	21,599,736	2016	2,222	253
50	Uzbekistan	48,000,000,000	2014 EST.	CIA	29,473,614	2016	1,628	185
51	Singapore	47,180,000,000	2014 EST.	CIA	5,781,728	2016	8,160	931
52	Bitcoin	47,100,000,000	2018 EST	Digiconomist	0	2018	NULL	NULL
53	Portugal	46,000,000,000	2014 EST.	CIA	10,833,816	2016	4,245	484
54	Hong Kong	42,000,000,000	2014 EST.	CIA	7,167,403	2016	5,859	668
55	Iraq	42,000,000,000	2014 EST.	CIA	38,146,025	2016	1,101	125
56	New Zealand	40,000,000,000	2014 EST.	CIA	4,474,549	2016	8,939	1,020
57	Peru	39,000,000,000	2014 EST.	CIA	30,741,062	2016	1,268	144
58	Qatar	34,000,000,000	2014 EST.	CIA	2,258,283	2016	15,055	1,718
59	Belarus	33,000,000,000	2014 EST.	CIA	9,570,376	2016	3,448	393
60	Denmark	32,000,000,000	2014 EST.	CIA	5,593,785	2016	5,720	653
61	Bulgaria	31,000,000,000	2014 EST.	CIA	7,144,653	2016	4,338	495
62	Morocco	29,000,000,000	2014 EST.	CIA	33,655,786	2016	861	98
63	Slovakia	28,360,000,000	2014 EST.	CIA	5,445,802	2016	5,207	594
64	Serbia	26,910,000,000	2014 EST.	CIA	7,143,921	2016	3,766	430
65	Bahrain	25,000,000,000	2014 EST.	CIA	1,378,904	2016	18,130	2,069
66	Ireland	25,000,000,000	2014 EST.	CIA	4,952,473	2016	5,047	576

214	Kiribati	27,900,000	2014 EST.	CIA	106,925	2016	260	29
215	Nauru	23,250,000	2014 EST.	CIA	9,591	2016	2,424	276
216	Montserrat	21,390,000	2014 EST.	CIA	5,267	2016	4,061	463
217	Falkland Islands	13,950,000	2014 EST.	CIA	2,931	2016	4,759	543
218	Saint Helena, Ascension and Tristan da Cunha	9,300,000	2014 EST.	CIA	7,795	2016	1,193	136
219	Niue	3,720,000	2014 EST.	CIA	1,190	2016	3,126	356
219	Gaza Strip	202,000[contradictory]	2009	CIA	1,753,327	2016	0.1	0.01

Downloaded Feb 14 2019, https://en.wikipedia.org/wiki/List_of_countries_by_electricity_consumption

DLT pro and con

- Advantages
  - Public record
    - Pseudo anonymous
  - Mutually distrustful entities
  - Mechanisms for consensus

- Disadvantages
  - Not lightweight Blockchain size >250GB, Etherium>1TB,
  - Updates ¬300Gb/day

  - Slow for certainty –days to weeks

Bitcoin Redux

- Ross Anderson, Ilia Shumailov, Mansoor Ahmed and Alessandro Rietmann Cambridge University Computer Laboratory May 28, 2018 https://weis2018.econinfosec.org/wp-content/uploads/sites/5/2018/05/WEIS_2018_paper_38.pdf

- See also https://www.lightbluetouchpaper.org/2018/06/01/bitcoin-redux-crypto-crime-and-how-to-tackle-it/

BIS Annual report, June 17th 2018

"Cryptocurrencies promise to replace trusted institutions with distributed ledger technology. Yet, looking beyond the hype, it is hard to identify a specific economic problem which they currently solve. Transactions are slow and costly, prone to congestion, and cannot scale with demand. The decentralised consensus behind the technology is also fragile and consumes vast amounts of energy. Still, distributed ledger technology could have promise in other applications. Policy responses need to prevent abuses while allowing further experimentation."

Who do you trust?

- Distributed ledger technology does not remove risk but changes the trusted entity:
  - Exchange: changes real assets into electronic tokens
  - Wallet providers: stores tokens on behalf or users
  - Many examples of fraud
    - Mt Gox, 850,000 Bitcoins lost or stolen (about $500M) from wallets
    - One Coin (about $4 billion woldwide) (MLM scam?)

Must listen to

Https://www.bbc.co.uk/programmes/p07nkd84/episodes/player

Combination of Crypto currency, MLM (multi-level marketing) and Ponzi Fraud defrauded billions in the OneCoin scam

How can you own an asset?

- Self-hosting: keep your gold coins under the bed, or keep your private key on your laptop
  - If you lose your laptop you lose your money
- Gold merchant: you buy a gold bar for £30,000 and the merchant keeps it in their vault but with your name on it. If they go bust, it's still yours
- Bank: you deposit it and the bank records in its ledger that it now owes you £30,000. If the bank goes bust, you stand in line

Vienna, October 2018

The real bitcoin ecosystem in 2018

- The exchanges suggest they're gold merchants but analysis of the blockchain suggests they're banks
- Huge growth in 'off-chain' transactions over the past 2 years; payments fast and cheap
  - You might think you are buying electronic coins, but are just making a ledger entry in the Exchange's private ledger system
- Now most people in US, UK use Coinbase, most Chinese use Binance etc
- They are acting as e-money providers but without the licences required by EU law
- The E-Money Directive is not being enforced

Vienna, October 2018

How regulation is failing

- EU: new definition of hosted wallet (a service holding keys) is two years out of date
- Germany is similar; closed OneCoin as it was transferring funds by adjusting Euro balances, but ignores off-chain bitcoin transactions
- UK: Financial Conduct Authority won't see payment as significant: bitcoin a 'crypto asset'
- So it won't give the Payment Service Regulator authority over cryptocurrency payments

Vienna, October 2018

Liquidity and solvency

- Coinbase UK's company accounts show only about 1% of expected assets
- Most is in the virtual currency company, not the fiat e-money business (£23m vs £1m)
- Are even the former assets the company's own bitcoins, or customer deposits?
- So: what's to be done? Basel III?
- Yesterday: G4S announces cryptocurrency custodian service

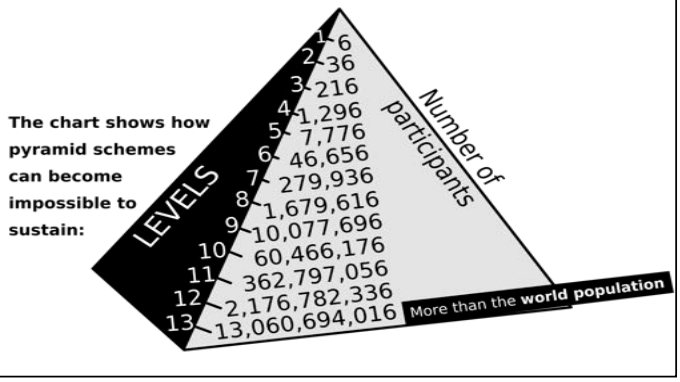
Vienna, October 2018

MLM (briefly)

- MLM – Multi-level Marketing
  - Sell something, such as cosmetics, via Agents and sub-agents Multi-level market (MLM) or network marketing is an American institution. Companies like Amway, Tupperware, Herbalife, Avon, Mary Kay and The Pampered Chef support huge networks of distributors and recruits
  - Agents purchase wholesale and earn a commission on sales they make
  - Agents recruit sub agents, and earn a proportion of their commission ("down line") and in turn pay some of their commission to their contact "up line"

Pyramid selling

- Example: each new recruit must recruit 6 others to break even
- Early adopters win by taking money from later recruits
- Chain letters are another example
- "Buy these crypto coins"



Ponzi scheme

- The scheme is named after Charles Ponzi, who became notorious for using the technique in the 1920s defrauding the Boston Fire Brigade
- Like Pyramid selling but the emphasis is on new recruits who pay to join in the expectation of later rewards. Inevitably run out of recruits
- Scheme uses money from later investors to pay early investors

Fictitious Example

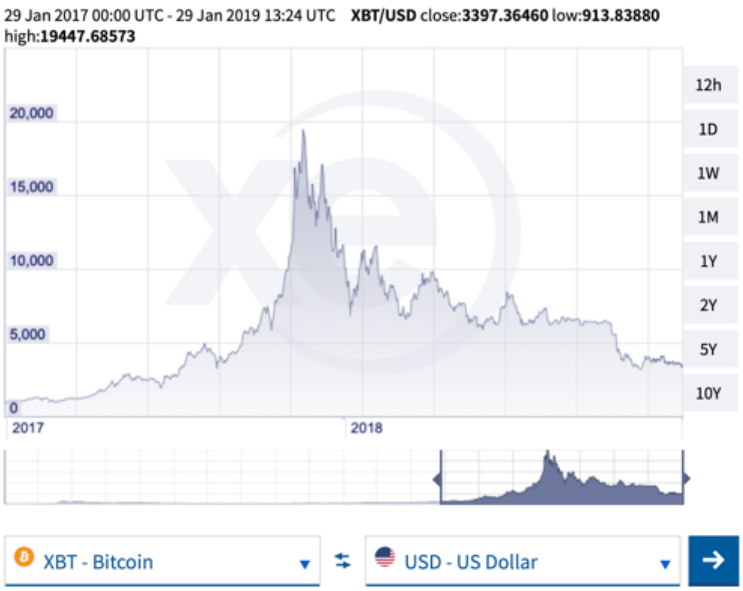
Health warning: do not try this at home

I have a great new company, JacknStewCoin

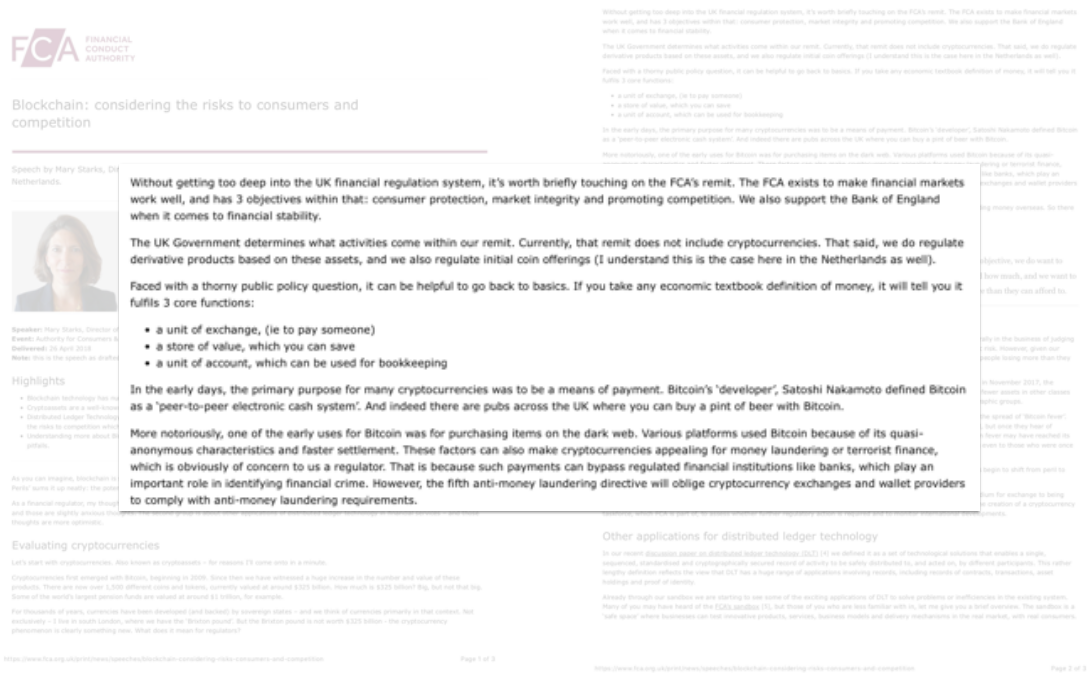
It is so good that for an investment of a mere £4000 I will pay you £400 interest per month after the first month providing you recruit two more investors on the same terms in that time, and I will pay you 10% of their investment as a management fee , and the same for any they recruit (your downline).

Month	Tier	no people	Recruits	Income tier 1	Income Tier 2	Income tier 3	Income tier 4		Profit/loss	per person
1	1	1	2	8000					67200	67200.00
2	2	3	4	16000	3200				6400	2133.33
3	3	7	8	32000	6400	7600			-12800	-1828.57
4	4	15	16	64000	12800	16400	6400		-51200	-3413.33

XBT to UsD



http://www.xe.com/currencycharts/?from=XBT&to=USD&view=1Y



Blockchain: considering the risks to consumers and competition

Without getting too deep into the UK financial regulation system, it's worth briefly touching on the FCA's remit. The FCA exists to make financial markets work well, and has 3 objectives within that: consumer protection, market integrity and promoting competition. We also support the Bank of England when it comes to financial stability.

The UK Government determines what activities come within our remit. Currently, that remit does not include cryptocurrencies. That said, we do regulate derivative products based on these assets, and we also regulate initial coin offerings (I understand this is the case here in the Netherlands as well).

Faced with a thorny public policy question, it can be helpful to go back to basics. If you take any economic textbook definition of money, it will tell you it fulfils 3 core functions:

- a unit of exchange, (ie to pay someone)
- a store of value, which you can save
- a unit of account, which can be used for bookkeeping

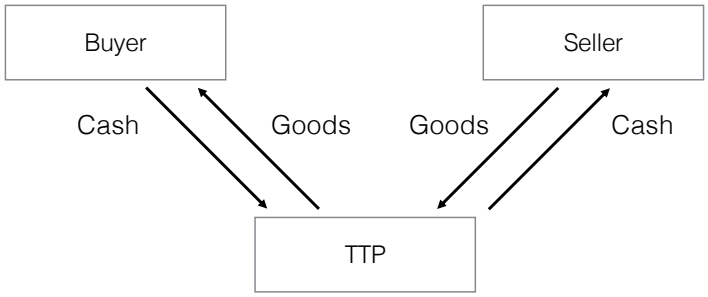
In the early days, the primary purpose for many cryptocurrencies was to be a means of payment. Bitcoin's 'developer', Satoshi Nakamoto defined Bitcoin as a 'peer-to-peer electronic cash system'. And indeed there are pubs across the UK where you can buy a pint of beer with Bitcoin.

More notoriously, one of the early uses for Bitcoin was for purchasing items on the dark web. Various platforms used Bitcoin because of its quasi-anonymous characteristics and faster settlement. These factors can also make cryptocurrencies appealing for money laundering or terrorist finance, which is obviously of concern to us a regulator. That is because such payments can bypass regulated financial institutions like banks, which play an important role in identifying financial crime. However, the fifth anti-money laundering directive will oblige cryptocurrency exchanges and wallet providers to comply with anti-money laundering requirements.

Other ways to pay

- Via phone wallets
  - e.g Pingit, M-Pesa
- Electronic cash
  - Credit and Debit cards
  - Bank transfers
  - Game currencies
  - Gift vouchers
- Many Issues

Trusted Third Party



Lawyers e.g. property
Brokers e.g. shares
Credit cards B2C
Auction houses

Credit Cards

Consumer credit goes back to C18th - “The Tallyman”
- Some US stores offer “shopper’s plate” from 1920s

Diners Club offered first credit card
- NY 1951: 27 Restaurants, 200 customers

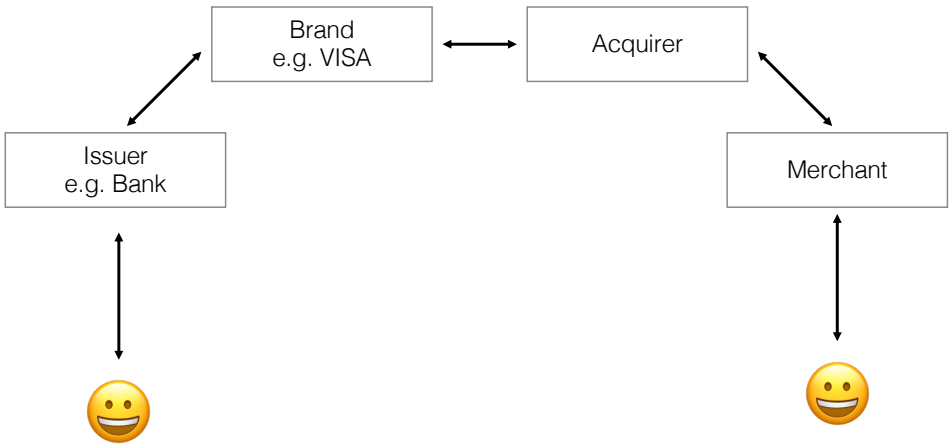
Barclaycard offered as incentive to high-value Barclay customers in late 60s; Access started as rival

Classic “Network effect”
- Need enough shops to attract customers and vice versa

Took off in early 1980s suddenly turning from loss leader to main profit centre.
- Some countries (e.g. Germany, Japan) only just taking off

Earnings from online trades starting to be significant
- PayPal, Apple Pay

Credit Cards - 2



Credit Cards - 3

Merchant is paid for goods by acquiring bank
less merchant discount (typically 2%-10%, often 4%-5%)

Transactions over floor limit checked with acquirer
hot card list or credit check with issuer

Brand takes a cut;
acquirer makes money from merchant discount;
issuer from selling revolving credit - expensive money, often over 20% APR

Credit Cards - 4

Overall cost of fraud varies

1 – Comparative Overview in 2013

	EU	France	Netherlands	UK	Canada	USA
Population (m)	508.1	65.7	16.8	64.1	35.1	313.9
Number of cards (m)	759.7	85.5	30.4	157.3	105.0	827.4
Card payments value (€bn)	2,204.4	438.4	100.3	653.6	417.2	3,438.4
ATM withdrawals value (€bn)	1,418.3	135.6	51.5	242.5	na	534.7
EMV Implementation	cards: 81.6%	complete	complete	complete	debit cards: 95%	—
Total of card fraud losses (€m)	1,330.0	405.8	41.9	530.3	361.5	4,148.5
Card fraud loss ratio	0.038%	0.071%	0.028%	0.059%	0.087%	0.104%
Sources:	ECB	ECB, OSCP	ECB, Betaal Vereniging	ECB, FFA UK	BIS, CDA, Interac	BIS, Federal Reserve

Notes: 1. Number of cards covers both debit and credit and e-purses. Card fraud losses cover both domestic and international transactions. 2. EU card fraud figures and all USA figures are from 2012. Canadian and USA card fraud ratios are calculated in order to comply with European figures. 3. France Statistics cover 68.4 million'CB' bank cards and Moneo e-purses and 17.1 million French "privates" cards issued by third parties. 4. Netherlands: Number of cards comprises 24.5 million debit cards and 5.9 million credit/delayed debit cards. 5. UK: Number of cards includes 0.19 million ATM only, 95.7 million debit cards and 57.6 million credit/delayed debit cards. 6. Canada: Number of cards includes 23.9 million debit cards and 81.1 million credit/delayed debit cards. 7. USA: Number of cards includes 290.8 million debit cards and 905.6 million credit/delayed debit cards.

Sources: European Central Bank (ECB), Bank of International Settlement (BIS), for other sources see above.

Motivation - who gets the reward?
huge hype of hacking the system
no case of fraud from interception
real problem is old fashioned card theft

7 – Card Fraud Losses by Method of Compromise – France vs UK vs Canada

	France		UK			Canada (credit cards only)		
	(€m)	%	(£m)	(€m)	%	(CADm)	(€m)	%
Card lost or stolen	81.7	34.2%	58.9	69.4	13.1%	25.2	18.4	5.4%
Card not received	0.9	0.4%	10.4	12.2	2.3%	5.0	3.6	1.1%
Card altered / counterfeit	0.5	0.2%	43.4	51.1	9.6%	111.5	81.5	24.0%
Theft of Card Details	154.0	64.5%	301.1	354.5	66.9%	299.4	218.8	64.4%
– of which e-commerce	125.0	52.4%	163.2	192.2	36.2%	na	na	na
Account takeover, others	1.5	0.6%	36.7	43.2	8.1%	24.0	17.6	5.2%
Total (€m)	238.6	100.0%	450.4	530.3	100.0%	465.1	339.9	100.0%

Notes: 1. Figures cover both domestic and international transactions on French and UK-issued cards respectively. 2. France Data covers both interbank ("CB") cards and private cards."Other" covers, particularly for three-party cards, fraud resulting from the fraudulent opening of accounts with a false identity. 3. UK "Others" covers third party application fraud. 4. Canada Data covers Canadian credit cards only. Additionally, card fraud losses on debit cards were CAD 29.5 million.

Sources: Observatoire de la sécurité des cartes de paiement, Financial Fraud Action UK, Canadian Bankers Association.

Overall pattern - cyclical : best defences not always high-tech

http://www.paymentscardsandmobile.com/wp-content/uploads/2015/03/PCM_Alaric_Fraud-Report_2015.pdf

Credit Cards - 5

Bigger problem: disputes
- Porn sites
- Paypal etc

Incompetence, fraudulent denial by customers, outright fraud by merchants

Control mechanisms poor and slow
- e.g. acquirer call centre can only check country, not cardholder address

Technology?
- SET failed
- Other formats, e.g stored value cards, cell-phones

Game money

Monetisation for F2P apps

Multiple currencies gives easier control

Hard/soft currencies
- "Buy this sword for £9.99 or 10,000 gems"

Multiple traceable game objects
- Wood, good, gems, credits, etc

Internal market

External market

http://www.pocketgamer.biz/the-iap-inspector/64609/how-does-dawn-of-titans-monetise/

Game money - 2

Fungible or purchase / winnable only?

+ prevention of “Mudflation”, 3rd party exchanges
- money laundering regulation, VAT, gambling etc

Economic Stability

Sources and sinks
Central banker(s)
Other financial products
Pseudo anonymous?

Business

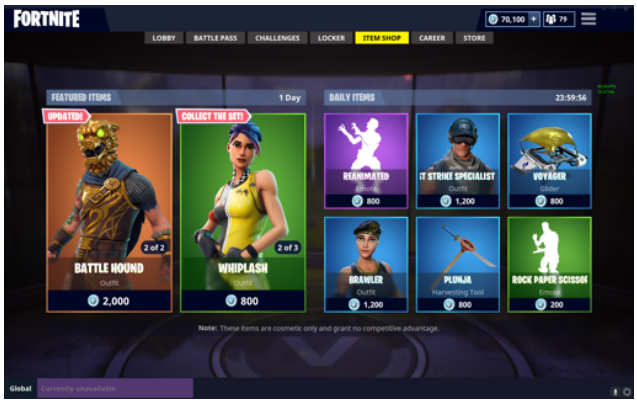
Second Life Closes Banks

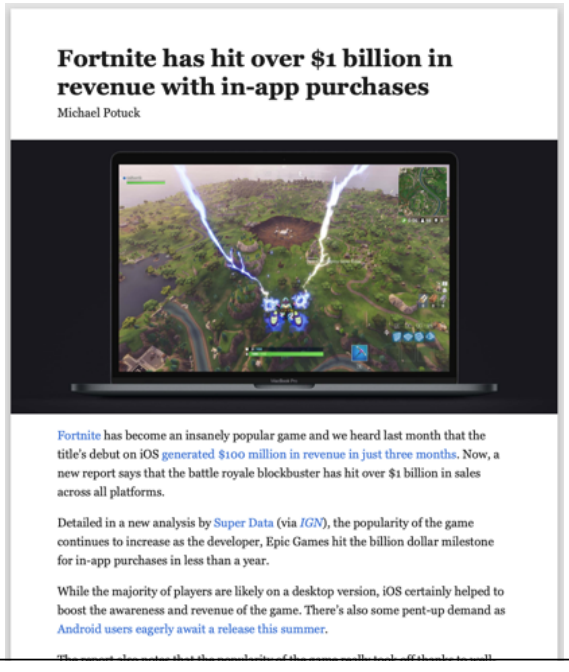
After months of financial scandals and fraud allegations, virtual banks got an eviction notice from Linden Lab.

by David Talbot January 10, 2008

https://www.technologyreview.com/s/409373/second-life-closes-banks/

Digital assets / customisation





Fortnite has hit over $1 billion in revenue with in-app purchases

Michael Potuck

Fortnite has become an insanely popular game and we heard last month that the title's debut on iOS generated $100 million in revenue in just three months. Now, a new report says that the battle royale blockbuster has hit over $1 billion in sales across all platforms.

Detailed in a new analysis by Super Data (via *IGN*), the popularity of the game continues to increase as the developer, Epic Games hit the billion dollar milestone for in-app purchases in less than a year.

While the majority of players are likely on a desktop version, iOS certainly helped to boost the awareness and revenue of the game. There's also some pent-up demand as Android users eagerly await a release this summer.

Fair Market

Group of willing buyers and sellers
- "Fair price"
- Not under compulsion
- Price discovery

Equality of information
- "Reasonable knowledge of relevant facts"

Anonymity
- Pre transaction e.g. Stock market
- Pseudo anonymity e.g. Ebay (reputation)
- Post transaction

Settlement mechanisms

Shared regulatory framework

Hot Topics

Anonymity
- Dark web

Who controls your identity?
- Government, Bank, or Apple / Google
- Identity cards, MS. Net

Lots of issues?
- liability
- control
- civil liberties
- protocol attacks
- etc

Privacy
- who owns your information?
- what is it worth?
- power and monopolies

E-Commerce - 2

Business Models and Strategy

Macro economics: Modern Monetary Theory

Government debt considered good

Domestic Government Balance + Domestic Private Balance + Foreign Balance = 0

$$(T-G) + (S - I) - NX = 0$$

Where
G is government spending
T is taxes
S is savings
I is investment
NX is net exports

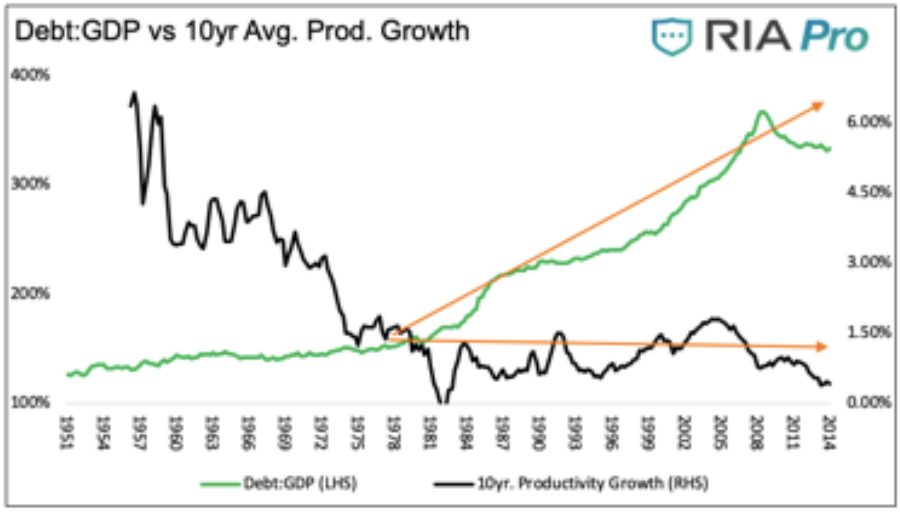
or

$$S-I = G-T + NX$$

=> Private Wealth ~ Government deficit or trade surplus

http://neweconomicperspectives.org/modern-monetary-theory-primer.html

Trouble Ahead: High US debt dos not increase USA productivity
Who will pay?



Data Courtesy: Bloomberg, St. Louis and San Francisco Federal Reserve

https://www.seeitmarket.com/u-s-productivity-why-key-understanding-todays-economy-18863/

Financial Instability Hypothesis

Hyman Minsky (1919-1996)

Accumulation of debt causes instability

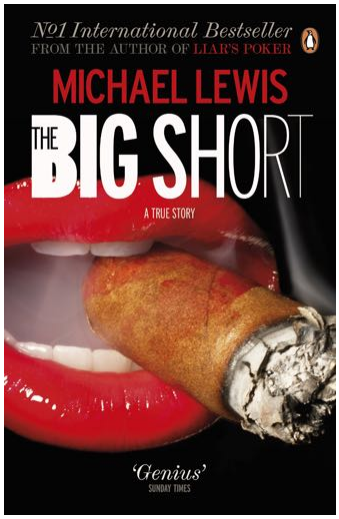
Three stages

Hedge borrower - can repay interest and capital
Speculative borrower - can only repay interest = hopes asset will go up
Ponzi borrower - hopes appreciation of asset will pay both interest and capital

Good times don't last

https://en.wikipedia.org/wiki/Hyman_Minsky

https://kpfa.org/wp-content/uploads/2016/06/HymanMinsky2.png



Network Externalities

The more people, the more valuable the network

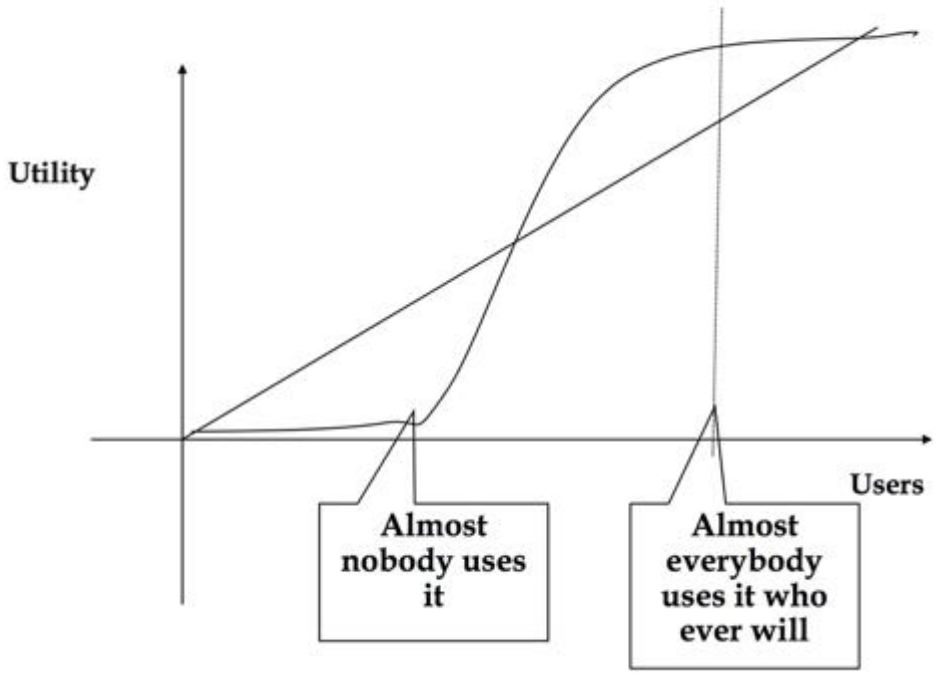
- Examples
  - Telephone late 19th century
  - Credit card 1980s
  - Fax 1985-8
  - Email 1995-9

Metcalfe's law

- The value of a network is proportional to the square of the number of users

Not completely accurate, as the value to each user is non-linear

Network Externalities



Networks

The increase in value of a network is an example of what economist call an "externality"

- an external factor other than price

Network means that my purchase benefits all other users as well as myself

Once a network passes a critical size it grows rapidly

- Success disaster

Network allows opportunity to extract value even when marginal costs are near zero

- price controls
- lock-in: value is switching costs

Combination of high fixed / low marginal costs, high switching costs and network externalities lead to a dominant firm model

- One sentence summary of information economics

Network Effects

Dominant firm markets -> huge amount to play for (crazy valuations)

Control of key de-facto standards

Hugh first-mover advantages
- Can be displaced by larger entity
- MS: “Embrace and Extent” - spreadsheets and wordprocessors

Need to create bandwagon effect with makers of complimentary products
- need to court developers rather than users (e.g. MS)

Price to value
- but still need to make a profit

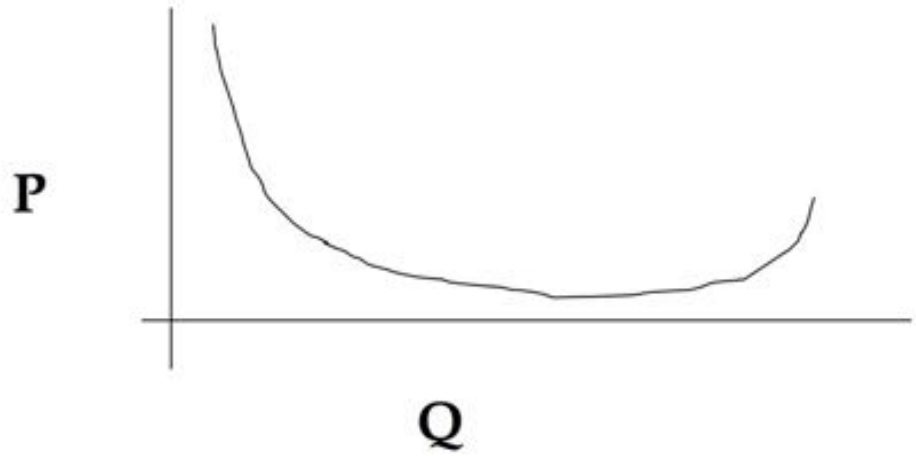
Liquidity

Liquidity is the ease with which an asset can be traded without creating a substantial change in price or value

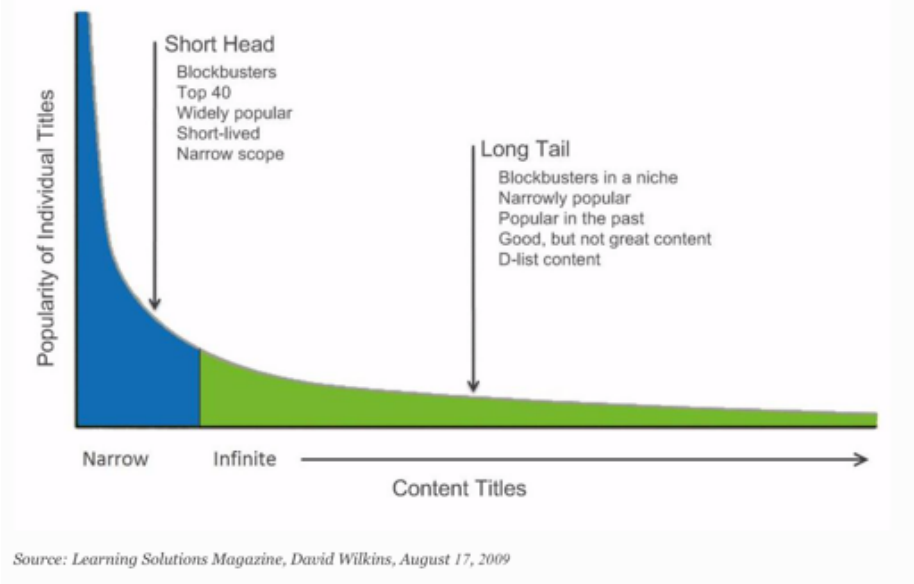
Liquidity is a Network Externality
- a single marketplace tends to dominate for any single class of goods
- reputation

Examples
- Ebay vs Yahoo Auctions
- Stock exchanges

Manufacturing Cost



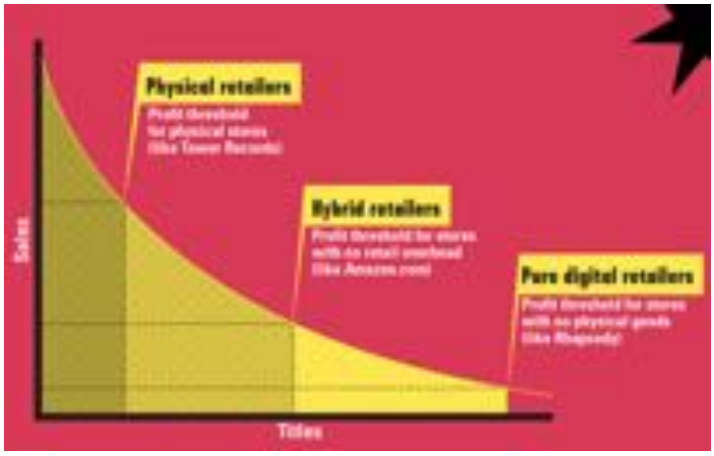
Long tail economics



Source: Learning Solutions Magazine, David Wilkins, August 17, 2009

https://www.forbes.com/sites/schifrin/2014/05/08/why-alibabas-long-tail-makes-amazons-look-like-a-bobcats/#22097ca97a20

Long tail economics



http://www.aurorawdc.com/ci/long_tail.gif

JINAL! SINAL! WANL!!

Regulations

The Consumer Contracts (Information, Cancellation and Additional Charges) Regulations 2013

Electronic Commerce (EC Directive) Regulations 2002

Privacy and Electronic Communications Regulations (EC Directive) 2003 update 2012/13

EU Consumer Rights Directive 2011

Consumer Rights Act 2015 - included “Digital content”

Consumer Contracts - 1

Your identity including sufficient detail for the consumer to be able to identify the business they are dealing with. **This means real name**

A description of the main characteristics of the goods or services you are offering

The price of the goods or services you are offering, including all taxes

Details of any delivery costs

Details of how payments can be made

If payment is required in advance, you must supply your full **geographic address**

Consumer Contracts - 2

The arrangements for delivery or performance of the service, for example when consumers can expect delivery of the goods or the service to start. The contract should be performed within 30 days unless the parties agree to a different period. **Note this affects pre-orders.**

Information about your consumers' right to cancel, where applicable.

If consumers have to use a premium-rate phone number, you must specify the cost of the call (including taxes) before any charges are incurred for the phone call.

For how long the price of the offer remains valid.

The minimum duration of the contract where good or services are to be provided permanently or recurrently and that you will pay the cost of your consumers returning any product that you supply as substitutes because the goods or services originally ordered are not available

Consumer Contracts - 3

After buying information that must be supplied in a durable form **(meaning paper or email)**

The information above

When and how to exercise their rights to cancel including
for goods - whether you require goods to be returned by the consumer and if so who will pay for their return

for services - the consequence of agreeing to a service starting before the end of the usual seven working day cancellation period

Details of any guarantees or after-sales services **(but see warranties)**

The geographic address of the business to which the consumer may direct any complaints. This excludes PO Box addresses

If a contract lasts more than a year or is open ended, the contractual conditions for terminating it.

ECR

Electronic Commerce (EC Directive) Regulations 2002

The full name of your business

The geographic address at which your business is established

Your contact details, including e-mail address

Details of any publicly accessible trade or similar register with which you are registered

If you service is subject of an authorisation scheme or if you are a member of a professional body, details of the relevant superviseory authority or body

Your VAT registration number

ECR 2

where you refer to prices, a clear and unambiguous indication of those prices and whether the price include taxes and delivery costs (but Consumer Contracts also require you to quote prices inclusive of all taxes if the sale is covered by those regulations).

Anti-spam provisions

commercial communications must be clearly identified as such,
provide your identify as the person making the communication,
clearly identify any promotional offer or promotional competition or game and ensure that the terms and conditions for participation are presented clearly

Requirements relating to the storing of the contract and for access to this by the consumer

Provision to enable the consumer to correct input errors prior to placing an order

Consumers should receive acknowledgement of the receipt of the order electronically without delay.

Warranties

EU law does not mandate a 2 year warranty

But does mandate a 2 year period for return of goods delivered faulty

Cancellations by consumer

- 14 working days after delivery of goods or required information
- 30 days plus seven working days if no information is delivered

VAT etc

UK customers

EU customers UNLESS they are registered for VAT and you have their VAT number

Special cases

Local sales taxes

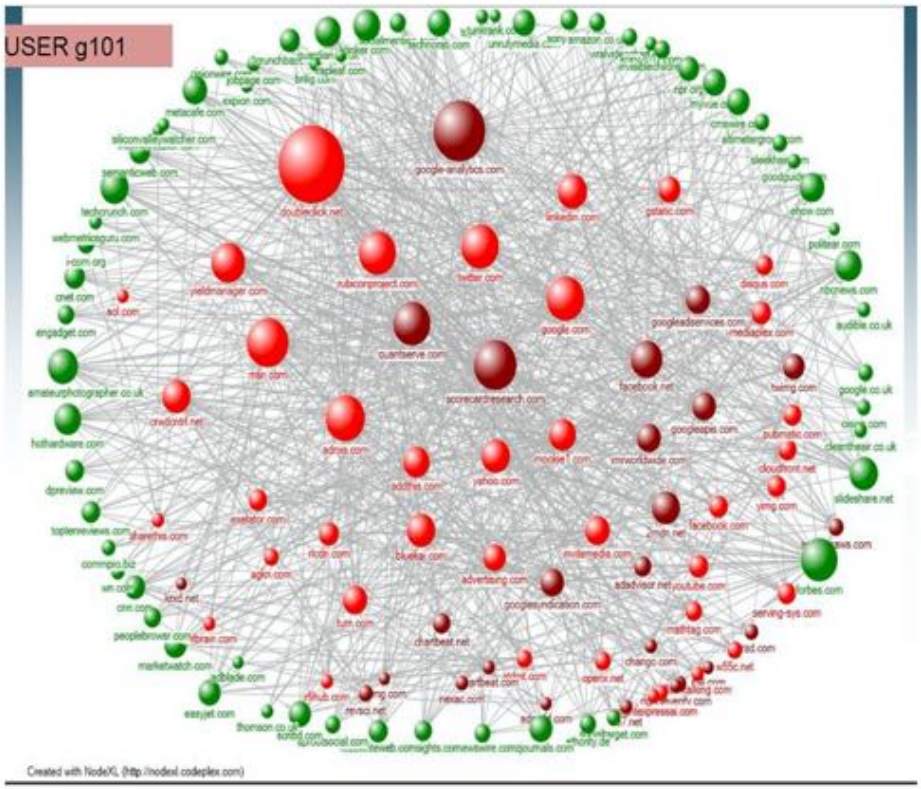
Revenue duty on import converse of above

Excise duties complex e.g. TV components

Cookies

Must declare use

Must obtain explicit assent for third party cookies each time



General Data Protection Regulation

Seven key principles - personal data shall be

(a) processed lawfully, fairly and in a transparent manner in relation to individuals ('lawfulness, fairness and transparency');

(b) collected for specified, explicit and legitimate purposes and not further processed in a manner that is incompatible with those purposes;
further processing for archiving purposes in the public interest, scientific or historical research purposes or statistical purposes shall not be considered to be incompatible with the initial purposes ('purpose limitation');

(c) adequate, relevant and limited to what is necessary in relation to the purposes for which they are processed ('data minimisation');

(d) accurate and, where necessary, kept up to date; every reasonable step must be taken to ensure that personal data that are inaccurate, having regard to the purposes for which they are processed, are erased or rectified without delay ('accuracy');

(e) kept in a form which permits identification of data subjects for no longer than is necessary for the purposes for which the personal data are processed; personal data may be stored for longer periods insofar as the personal data will be processed solely for archiving purposes in the public interest, scientific or historical research purposes or statistical purposes subject to implementation of the appropriate technical and organisational measures required by the GDPR in order to safeguard the rights and freedoms of individuals ('storage limitation');

(f) processed in a manner that ensures appropriate security of the personal data, including protection against unauthorised or unlawful processing and against accidental loss, destruction or damage, using appropriate technical or organisational measures ('integrity and confidentiality').

And the controller shall be responsible for, and be able to demonstrate compliance with the above ('accountability')."

https://gdpr-info.eu

General Data Protection Regulation

Six lawful purposes that data may be processed for

(a) If the data subject has given consent to the processing of his or her personal data;

(b) To fulfil contractual obligations with a data subject, or for tasks at the request of a data subject who is in the process of entering into a contract;

(c) To comply with a data controller's legal obligations;

(d) To protect the vital interests of a data subject or another individual;

(e) To perform a task in the public interest or in official authority;

(f) For the legitimate interests of a data controller or a third party, unless these interests are overridden by interests of the data subject or her or his rights according to the Charter of Fundamental Rights

https://gdpr-info.eu

General Data Protection Regulation

Four rights of the data subject

(a) Transparency and modailities: data controllers are required to information to the 'data subject in a concise, transparent, intelligible and easily accessible form, using clear and plain language, in particular for any information addressed specifically to a child.'

(b) Information and Access: data subjects have the right to access their personal data and information about how this personal data is professed. A data controller must provide, upon request, an overview of the categories of data that are being processed and well as the actual data. The data controller has to inform the data subject on details about the processing, such as the. Purpose, with whom the data is shared and how it acquired the data.

(c) Rectification and erasure: the data subject has the right to request erasure of personal data related to them on any one of a number of grounds within 30 days, including noncompliance with Article 6(1) (lawfulness) that includes a case if the legitimate interests of the controller are overridden by the interests or fundamental rights and freedoms of the data subject, which require protection of personal data.

(d) Right to object to automated decisions: The data subject has the right to object to their data being used for marketing, sales or non-service related purposes and for such use to stop unless there is an existing lawful purpose.

https://gdpr-info.eu

The European Union Directive on Copyright in the Digital Single Market

Article 11
Protection of press publications concerning digital uses

1. Member States shall provide publishers of press publications with the rights provided for in Article 2 and Article 3(2) of Directive 2001/29/EC for the digital use of their press publications.

2. The rights referred to in paragraph 1 shall leave intact and shall in no way affect any rights provided for in Union law to authors and other rightholders, in respect of the works and other subject-matter incorporated in a press publication. Such rights may not be invoked against those authors and other rightholders and, in particular, may not deprive them of their right to exploit their works and other subject-matter independently from the press publication in which they are incorporated.

3. Articles 5 to 8 of Directive 2001/29/EC and Directive 2012/28/EU shall apply mutatis mutandis in respect of the rights referred to in paragraph 1.

4. The rights referred to in paragraph 1 shall expire 20 years after the publication of the press publication. This term shall be calculated from the first day of January of the year following the date of publication.

https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52016PC0593

https://www.wired.co.uk/article/what-is-article-13-article-11-european-directive-on-copyright-explained-meme-ban

The European Union Directive on Copyright in the Digital Single Market

Article 13

Use of protected content by information society service providers storing and giving access to large amounts of works and other subject-matter uploaded by their users

1. Information society service providers that store and provide to the public access to large amounts of works or other subject-matter uploaded by their users shall, in cooperation with rightholders, take measures to ensure the functioning of agreements concluded with rightholders for the use of their works or other subject-matter or to prevent the availability on their services of works or other subject-matter identified by rightholders through the cooperation with the service providers. Those measures, such as the use of effective content recognition technologies, shall be appropriate and proportionate. The service providers shall provide rightholders with adequate information on the functioning and the deployment of the measures, as well as, when relevant, adequate reporting on the recognition and use of the works and other subject-matter.

2. Member States shall ensure that the service providers referred to in paragraph 1 put in place complaints and redress mechanisms that are available to users in case of disputes over the application of the measures referred to in paragraph 1.

3. Member States shall facilitate, where appropriate, the cooperation between the information society service providers and rightholders through stakeholder dialogues to define best practices, such as appropriate and proportionate content recognition technologies, taking into account, among others, the nature of the services, the availability of the technologies and their effectiveness in light of technological developments.

https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52016PC0593

https://www.wired.co.uk/article/what-is-article-13-article-11-european-directive-on-copyright-explained-meme-ban

When in doubt ask a lawyer

Capturing / Extracting Value

Business models (Where's the money?)

Landgrab: Maximise market share now; worry about profitability later

Merchant: Buy and sell goods and services
Special cases: PPV, Subscription, Freemium, Shareware, etc

Market: meeting place for others to buy and sell

Advertising hoarding

Lotteries and scams

Land grab

Maximise market share now; worry about profitability later

Since there are not yet profits, stock market values the company (for a while) on number of customers

Typical of new "Bubble" companies: cable TV, airlines, radio, Railways in 19th C, colonial exploration in 18th C

Now discredited: later never comes
At least, not until the next bubble

Merchant

- Sells goods or services for more than they cost
- Basic to most businesses
- Internet technologies add maybe 20% efficiency
  - Disintermediation
  - Lower cost market comms
  - Lower cost order taking
  - Lower cost distribution, especially for informational goods
  - 'Just in Time' gives lower cost for stock and inventory
  - Better modelling and control
    - Mexican cement plant example
- BUT still must be a sound business!! !
  - Established players may be asleep, but are not dead

PPV or Subscription?

- Pay per View (use)
  - e.g. phone rates
- Subscriptions
  - Actuarial calculations
  - All you can eat models
  - Administration issues - charging model never stays simple!
    - Matrix of services and products
    - Freebies, promotions, etc
- Copying issues
  - Provide service
  - Street Performer Protocol

Market

- Commission on other people's trades
  - No stock cost
  - Low barriers to entry
- Place for buyers and sellers to meet
  - eBay, B2B auctions, lastminute.com, bookfinder.com
- Liquidity, liquidity, liquidity
  - Network effects
- Settlement issue
  - Paypal, CrestCo, Bolero, Amazon pay, Apple pay, Google wallet
- Novel pricing models (e.g. auctioning demand / surge pricing)
  - Agent technology
- Death of the portal (and maybe rebirth)

Better ways to trade - Platforms

- Network effects
  - Single marketplace for each class of goods
  - Markets illiquid for large trades, inefficient for small trades
  - What is a 'fair market'?
- Clearance and settlement
  - Issues for very large and very small trades
  - Warranties provided by CC & banks
    - Dispute resolution
  - Bearer certificates?
  - Tax and jurisdiction?
  - Privacy vs money laundering

Fair Market

Group of willing buyers and sellers
- "Fair price"
- Not under compulsion
- Price discovery

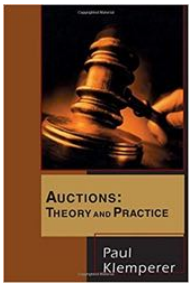
Equality of information
- "Reasonable knowledge of relevant facts"

Anonymity
- Pre transaction e.g. Stock market
- Pseudo anonymity e.g. Ebay (reputation)
- Post transaction

Settlement mechanisms

Shared regulatory framework

Auctions, a brief introduction



Price discovery
Settlement and Clearance

Auction types:
- Ascending bid aka Open, English
- Descending bid aka Dutch
- First price sealed bid
- Second price sealed bid aka Vickery Auction

Timing and certainty
Markemakers and liquidity

Advertising

- Typical rate £10 pct (thousand impressions)
  - More for personalisation and target adverts
  - Advertising industry, and advertisers are very conservative
  - Monitoring
- High traffic sites
  - ISP home pages
  - Need to drive traffic to the site
  - Need to refresh site often / build community to keep users returning
- Agency sales
  - Google, Facebook
- Market saturating
  - Rates dropping
  - Different formats
  - Flash inserts; streaming media
  - Email, digital TV, etc

Lotteries and Scams

- Lotteries: tax on the ignorant
  - Poor estimate of low probability events
- Premium rate telephone scams
  - TV quiz shows and auctions
  - Phone this number to win…
- Straight frauds
  - Ponzi schemes (Pyramid sells)
  - Credit card and other personal details
  - Telecom scams
  - Boiler room operations

Lightweight startups

Virtual office and presence

Licence don't manufacture

Cloud based resources (e.g. Amazon S3)

Low hanging fruit

Crowd source - Kickstarter
- Establish market
- Pre-sell product

Test assumptions not just predict miracles

E-Commerce - 3

Design and implementation

Web design

It's another form of publishing
- Your website is your shop window. People will judge your company on it
- Web publishing is no different from other types of publishing
- Spelling, grammar, point size, broken links, incorrect captions
- Social networking sites and CMSs make this available to all

Get the domain name right
- Inventive: business.com vs PlentyOfFish (dating site)

Design is important
- Good design is look and feel that enhances functionality
- Integrate good design with backend databases

Health warning!
- www.dokimos.org/ajff/
- www.zombo.com

Web design mistakes

Ego: Believing people care about you and your website
- Why are they looking at your site?
- What are they trying to do?
- Do you help them achieve THEIR goals?

Can't figure out what your website is about in less than four seconds
- www.genicap.com

Mystery Meat
- Navigation you have to roll over
- Zero intelligible
- www.zombo.com

Too much stuff
- www.arngren.net

Contrast, Contrast, Contrast, Constrast, Contrast, Constrast, Contrast

Horrid examples

http://www.dokimos.org/ajff/

warning flashing lights

http://Lingscars.com

http://www.patimex.com

more common mistakes

Huge images
Distracting colour schemes
Flash gifs, scrolling test
Autoplay music or video
Unclear navigation
Unreadable
Cluttered
Useless Title

Zero intelligible content
Refuses to work with IE
Only works with IE
Requires Flash
Assumes screen size
Assumes font size
Contains errors
Modes considered harmful

www.webpagesthatsuck.com

Navigation

Navigation is important
- Make the navigation clear
- Three clicks maximum to get anywhere
- Hard when Sainsbury's have >25,000 line items

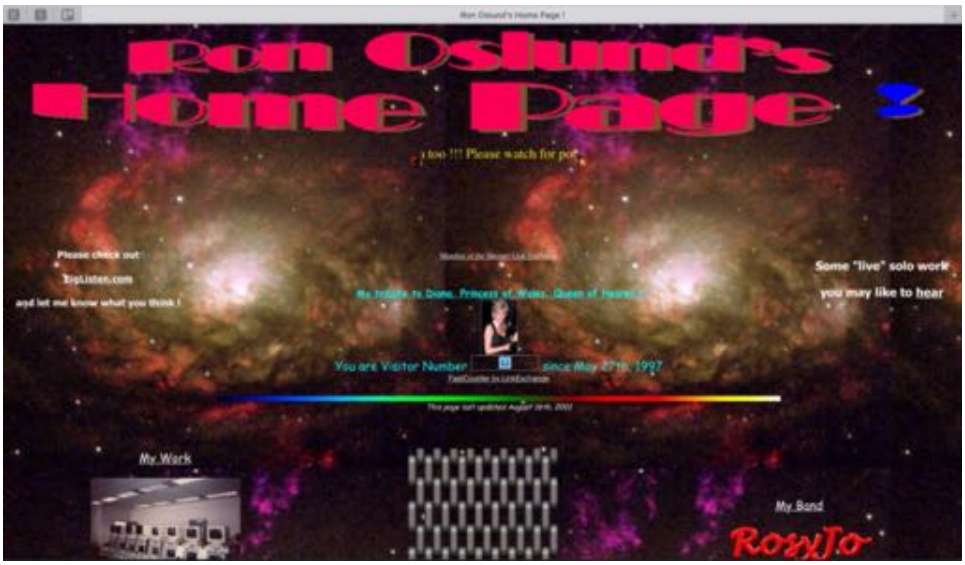
Consistent position / action
- Logo top left and takes you home

Search
- On site and landing page optimisation

Text

Consistent font
- One family
- Care on colour / size
- Fonts carry a subtle simplicity message
  - Serif or San Sarif?
  - **Loud** *Soft* **Strange** Respectable Old fashioned

Poor design examples



Poor design examples

Title confused with keywords

Mixes fonts

Navigational mess

Far too much material

Needs more then 1024x768

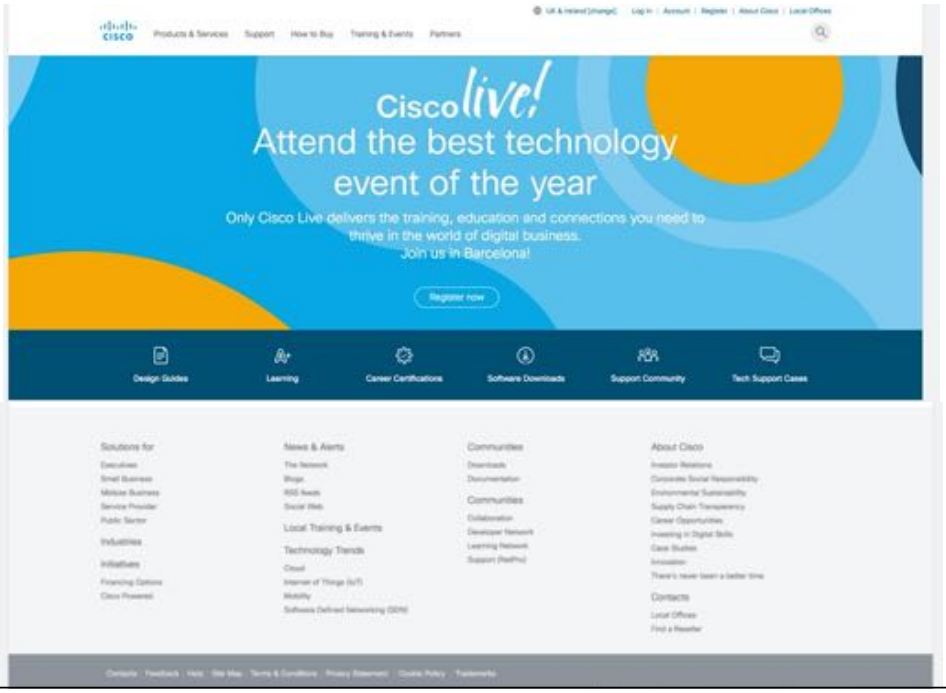
Good design example

consistent navigation

clear call to action

quick links

consistent navigation



Protected and encrypted pages

Most web sites are open to all

Protected pages for

- Subscribers, suppliers, customers, staff
- Protected by username / pw; IP address; domain name of browser; or combination thereof

Most traffic to and from websites is in the clear

- Potential eavesdropping possible
- Secure Socket Layer (SSL) encrypts data
- Widely used whenever privacy is important
  - Payment
  - Secure communication (spooks, terrorists, medical)

Static and Dynamic pages

HTML forms
- Fill in fields
- Press button to submit data
- Validate locally using javascript
- Remember use input when redrawing form

HTML with extra tags pre-processed
- Java Server Pages (JSP)
- Active Server Pages (ASP)
- PHP

Complete content management systems
- Signiant, Vignette, Joomla, Drupal, Wordpress, etc
- Content and style kept distinct - can adapt for target audience
- Dynamic pages added as extensions, many already in libraries
- Complex javascript frameworks (Jquery, MooTools, Prototype)

Improving the experience

Asynchronous Javascript and XML (AJAX)
- XMLRequest calls as data entered
  - No need to refresh entire web page
  - Immediate field verification
  - Google suggestions and Instant

Web apps that compete with local ones
- Sproutcore for iPhone apps
- HTML5 includes geolocation, local storage
- Google Web Toolkit
  - Java compiler produces Javascript
    - works with all browsers
    - that can be tested using standard Java IDE
  - www.gwtproject.org

Search Engine Optimisation

Links from other domains

Page titles - each page different

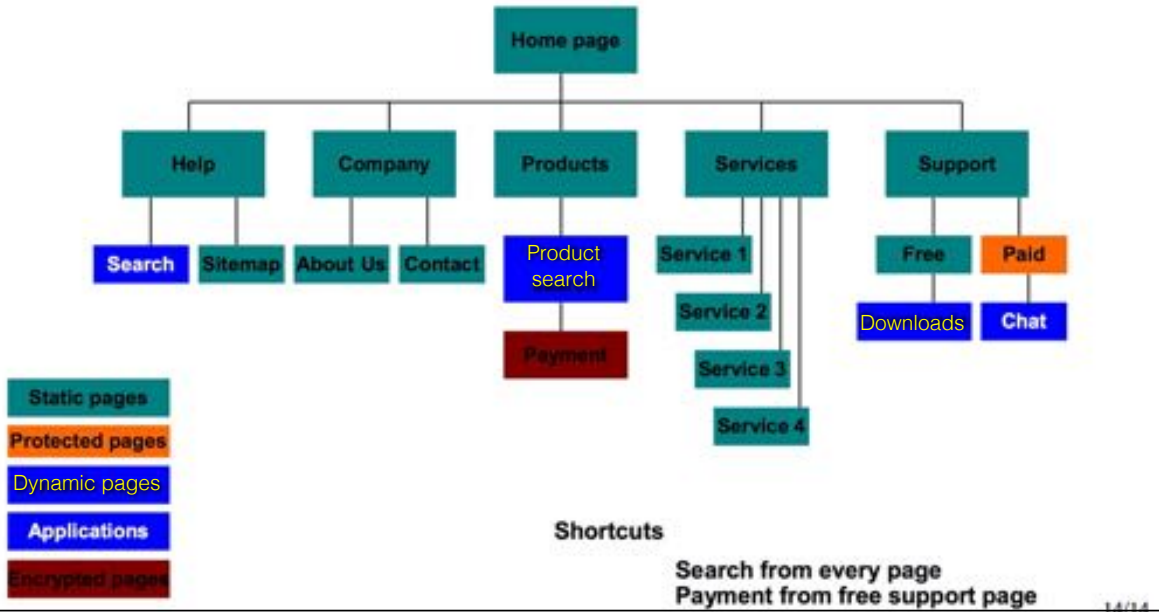
Meta tags

Anchor and alt text

Robots.txt

www.google.com/webmasters/

Page transition diagram



Online decisions

User logon required? When

Remember credit card details?

Same price for everyone?

Special offers (free delivery if over £100 spent)

Backend integration

Helpdesk support?

Online credit checking?

Order picking?

Online stock shown?

Delivery extra - options - reliability

Consumer Generated Content / Media

General model funded by adverts
- Layout generated by owners, content by users
  - Facebook, MySpace, YouTube, Twitter, Blogs
- Instant feedback to ideas and huge audience
  - Seen as important tool in elections
  - Modern version of 'on the stump' heckling
- Companies see need to participate
  - over 50% of shoppers who use social media follow / friend brands
  - but it can bite them back

Consumer review sites e.g. tripadvisor, lateroom
- Some ad income, other income from hotels listed
  - offers analytics, right of reply
- Unclear in some cases whether people had actually visited

Wikis
- Widely used as informal knowledge sharing tool

Outline Physical Design

Load balancer	Big IP
Web Server (static data)	Apache
Application Server (business logic)	J2EE
Database server (orders)	OPS
Legacy (stock control)	IBM

Sizing

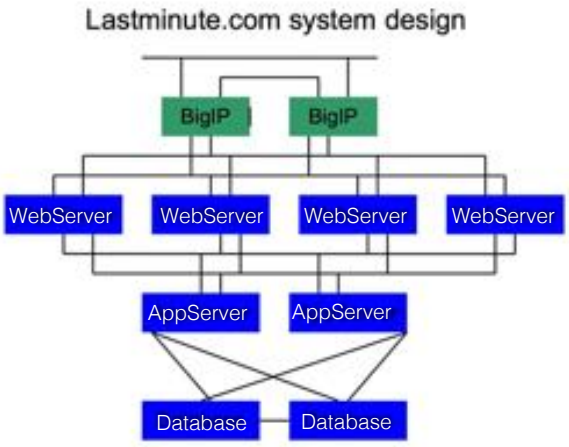
Scalability
- How many people?
- At the same time?

Number of products

Size of downloads
- Music 4M
- Software 200M
- Movie 2G

Reliability

Responsiveness



E-Commerce - 5

Creating a business

Merchant System

Requirements

- User logon required?
- Remember credit card details?
- Same price for everone?
- Special offers (free delivery if over $100 spent)
- Backend integration?
- Help desk support?
- Online credit checking?
- Order picking?
- Online stock shown?

Examples

- Microsoft Biztalk, OpenMarket, Intershop
- Stripe, Square, PayPal, Sage
- Amazon payment, Amazon fulfillment

Pricing

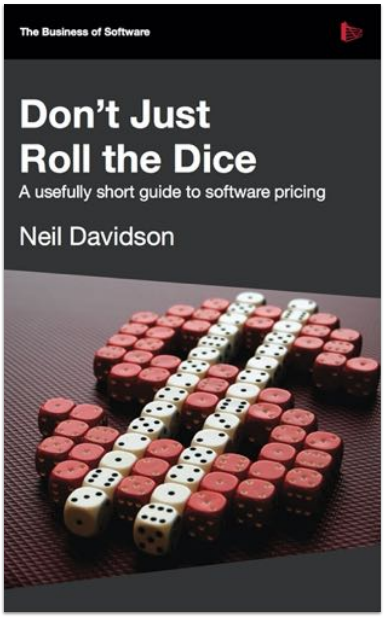
More complex than it seems
- confusion pricing

Service levels
- matrix

Special cases
- government, students, …

Special offers
- time limited

Service	Blue	Silver	Gold
Basic	✓		
Advanced		✓	✓
Fancy case			✓



http://download.red-gate.com/ebooks/DJRTD_eBook.pdf

Legacy Integration

Nightmare
- stock, picking, billing, customer care, marcom…

Legacy-based to realtime
- Sainsbury's mainframe is busy 6-10pm every day
- Attempt to run shopping system off this

Incompatible nomenclature

COBOL connecting to JAVA

Batch

Online credit card systems

Customer care issues

XML helps

Payment

Credit card horror stories
- has your card been compromised?

Not everyone has one
- Italians prefer post offices

Services such as WorldPay, PayPal

Fraud 40%
- but the merchant pays (at least in the UK)

Only deliver to card address
- Irrelevant: eTickets, Telegraph Crossword, downloads

Tax horror stories

Customer Relationship Management

CRM must be good

Empowering the Customer Service Representative

- "I'm sorry our terminals are down this morning"

Call centre hell

- Sainsbury's have 80 call centres
- Good Morning Dr King, please tell me your dog's name
- If you know my mother's maiden name then so does the whole world
- Continuity of customer experience
- Sly TV suggests turning box on and off to cure database fault

Personalisation

Make site more interesting, and hence sticky

User database

- Address / postcode -> socio economic indicator
- Gender
- Age
- **Register with Information Commissioner's Office**

Profile typical users

- Disposable income
- Disposable leisure time

Customer and User profiles

Pen portraits of typical user
- Hot buttons
- Influencers (media)
- Disposable budget / time

70 Profile 'bins'
- 2 Gender +LBGT
- 5-8 Social-economic class
  income / postcode
  - www.neighbourhood.statistics.gov.uk/dissemination/
  - www.acorn.caci.co.uk
- 7 ages
  - kids
  - teens
  - dinky
  - married with kids
  - empty nesters
  - retired
  - seniors

The National Statistics Socio-economic Classification (NS-SEC)

8 classes

1. High managerial and professional occupations
2. Lower managerial and professional occupations
3. Intermediate occupations
4. Small employers and own account workers
5. Lower supervisory and technical occupations
6. Semi-routine occupations
7. Routine occupations
8. Never worked and long-term unemployed

5 classes

1. Managerial and professional occupations
2. Intermediate occupations
3. Small employers and own account workers
4. Lower supervisory and technical occupations
5. Semi-routine and routine occupations

Never worked and long-term unemployed

3 classes

1. Managerial and professional occupations
2. Intermediate occupations
3. Routine and manual occupations

Never worked and long-term unemployed

Internationalisation

Not as simple as you may think
- e.g. German nouns, Yen

Fulfilment

Taxes

Legalisty e.g. Gambling, porn, alcohol, guns

Payment mechanisms
- Credit cards unusual in Italy, for example
- Different liability rules re bad debt

Free to use business models

For the Fun of it

Donation funded (wikipedia)

Land grab to gain early users

Funded by adverts
- That you can pay to turn off (spotify)
- That you can pay for the premium service (downloads)

Funded by selling information about users

Funded by sellers (eBay)

Part of the wider service (BBC, cars)

Free software, pay if you like it (guiltware)

Free software, pay for maintenance (Linux, AVG)

Paid for use Business Models

Try before you buy
- Poor quality short clips
- Free trial - but licence key cracks are common

Pay per use
- Software as a service
- Genealogy sites
- Betting

Licence / subscription
- Digital Rights Management (everlasting vs annual)

Per item
- Amazon, eBuyer

Value your business
- Cost per Acquisition (CPA) - how much to get a user
- Customer Lifetime Value (LTV) - how much they spent
- Average Revenue Per Customer (ARPU)

Freemium Model

Free taster
- Subset, or time limited or adverts
- ‘try before you buy’
  - Cf ACCTO

Premium content
- Payment or subscription
  - Register of users
- Unlock key
  - May be hacked

Street performer protocol
- patreon.com

Brand awareness

- Single most important piece of data
  - Hard to gain and easy to lose
- People buy from a known name
  - Sense of trust
    - Marks and Spence
  - Perceived value
    - Cheap reliable airline => cheap reliable mobile
  - Peer pressure
    - Nike, Rolex, Dolce and Gabanna, Ferrari
- Brand can exapand
  - Virgin
    - Active, Atlantic, Books, Bridges, Broadband, Cosmetics, Credit cards
    - Drinks, Galactic, Games, Holidays, Megastore, Mobile, Trains, Wine, and more
  - Apple
    - computers, iPods, iPhones

Advertising

- Google AdWords
  - Ads are matched to keywords purchased
- Buy your brand name
  - Coke
    - Careers
    - Corporate Responsibility
    - The Coca-Cola company
- Buy your supplier's brand name
  - Nike
    - JDSports
- Buy your competitor's brand name
  - Ford
    - Advert for Toyota dealer
- Buy your target
  - Nike (Boycott Nike)
  - Coke (KillerCoke)

Google AdWords

Select keywords and Ad Content
- Content Network and Search Network
- Each has a maximum Cost Per Click (CPC)

Actions when keyword(s) match search term
- Maximum CPC determines position (if at all)
- Actual CPC depends on auction results
- Daily budget stops runaway

Optimise via Click Through Rate (CTR)
- Less than 1% CTR may mean your keyword is removed

Make the ad match the keyword
- e.g. Ad says “Cheap electronics” searching “Digital Camera”

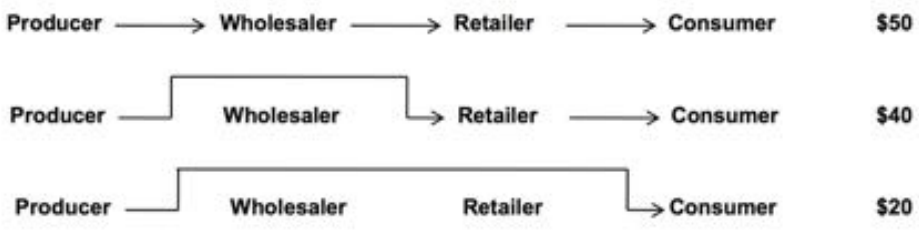
Users add value

Network externality
- The effect a user has on the value of a site to other users
- A site / service is more attractive if your mates us it
- MySpace / Facebook; Yahoo / Google / Bing
- Snapchat, slack, instagram

Produce content targeted at your users
- You produce it (Newspapers, slate)
- Let them produce it (Facebook, YouTube)

Chicken and egg problem
- How to get the site started?
  - Twitter used two large monitors at SXSW
  - Provide superset of competitor

Disintermediation



Supermarkets - dominant species

Consumer buys through local supermarket, even if chosen online. Producer must negotiate with supermarket to stock items who will only accept products via distribution chain.

Travel Agents - an endangered species

Airlines, holidays, hotels all sell direct. Customers can decide best time and prices.
Personal advice because they have been there - trip advisor, Lonely Plant far better
No commission paid to travel agent so far cheaper for consumer and larger margin for suppliers

Relationship with the customer is now sometimes with the producer

Analytics

Where do visitors from from and why

From another web site, via a search engine or direct
Google Analytics

Profile typical users when they visit a website

Time and path to make purchase decision
Read ad, click ad, browse site, choose item, checkout, pay
Purchase history
Amount of research done

Profile users through loyalty cards in the real world

Nectar know everything you have ever bought

Different landing sites for different campaigns

Successful business models

Google

- Acquiring DoubleClick gives it over 80% of web advertising
- Acquiring YouTube gives it millions more viewers
- Providing a simple way to advertise gets it plenty of customers
- Has Microsoft Office firmly in its sights
- Mobile and Android and voice and …

PlentyOfFish

- For a long time run by a single guy from his apartment paid over $5m per year by google from AdSence adverts
- Free dating site
- In the global top 40 websites
- Bought by Match.com for $575m in 2015

E-Commerce - 6

Making E-Commerce Work

Computer Scientists

Driving traffic

Special targets
- UK Online - Parents and kids
- WorldPOP - 12 to 16 year old females
  - actually paid by music industry

Adverts
- Click to win a car

Known URL
- www.microsoft.com

Freshness (even if just a date)
- Nothing sadder than ‘last altered June 1999”

Social networks
- Facebook, Twitter, etc

Search Engines

Easily the most important marketing item
- Complicated by highly personalised search results

Google
- Try “Computer Science” in google.co.uk
- Try “Computer Science” - in google.com
- Try “Computer Laboratory” - the lab comes top
  - poor nomenclature in the marketplace
- Try “Last minute holidays”

Algorithm
- Page ranking (peer review)
  - Which led to scams (checks IP now)
- Meta text, URL, page title, headings more important
- Massively parallel retrieval, rank and search

Google AdWord campaigns

Logs and Audit

Who bought what and when
- I bought this from you and it’s faulty
- Why have I been charged for this?

ISPs must keep records for RIP
- Regulation of Investigatory Powers

BCCi: The country’s most popular destination
- How do they know?

Ad costs
- Separate landing pages
- Per impression
- AdWords
- Effectiveness

Words mean what I want them to

Hit: Primitive object served by the server
- Or proxy request (not quite the same)
- Multiple object to the page
- Impression: Banner ad served - measured by counter

Page view: Pages or frames served

Click: deliberate action by the user
- Not refresh or script generated
- But timeout refreshes are interesting

Visit: multiple pages on site
- trajectory

Unique user / day

Exit popups

Answers depend on the questions

Audit
- Advertising returns and effectiveness
- Confirmation of transaction

Traffic analysis
- 80% of the site is wasted

Confirming user behaviour
- Still need focus groups to find out why

Trend analysis

Data mining

Lots of data
- 100 bytes / hit -> gigabytes / week
- Multiple sources: e.g. helpdesk, servers, proxy, telephone logs, radius logs, etc

Hits, clicks, page views ,visits, trajectories, etc

Answers depend on the the questions

Personalisation and localisation
- Models of the user
- Bins and profiles

Collaborative filtering
- X liked these so you'll like them too

Affinity marketing
- Special offers from our carefully selected partners

Real-world matching
- Sainsbury's data mountain

Communities

Chat

Bulletin boards

Social networking e.g. Facebook, etc

BBC

Amazon

Feedback and people feel good about it
- But beware false shoppers who are actually competitors

Typical behaviour

40% chat
- Maybe overstated because of frequent refreshes

10% mail, newsgroups, mail lists (75%)

5% help, admin, accounts, home page

3% search

2% favourite

Less than1% purchase (same as mail order)

Remainder fandom surfing
- 40% “specialist content”
- 30% shopping

Model (still) as ‘sad lonely geek’ BUT
Fastest growing demographic is women over 60
- Genealogy

Typical behaviour - 2

100,000 impressions

1% - 1000 clicks / new visitors
- about the same as mail shot
- CPC costs maybe $0.5 - $5

5% 50 register / trial
- depends how hard registration is

2% - 1 purchase

www.google.com/onlinechallenge

Typical funnel

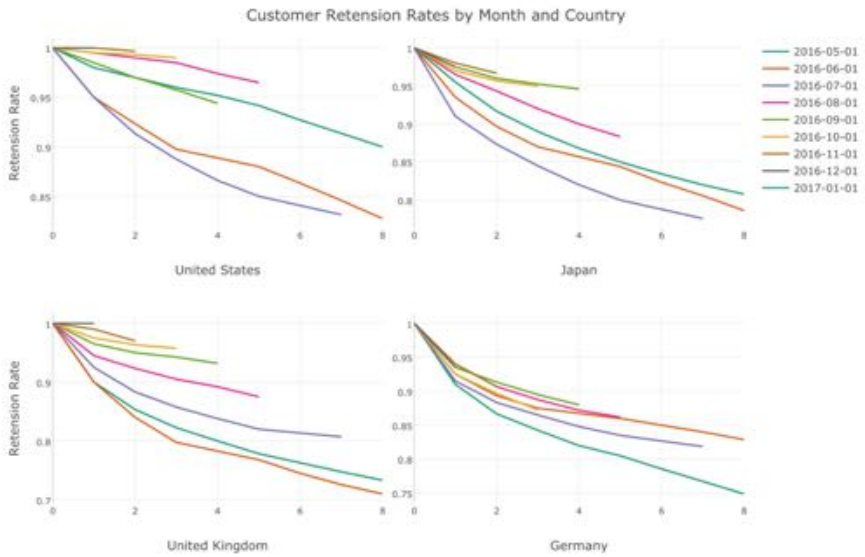
Stat	Actual	% funnel	% conversions	
unique visitors	84867			
new unique visitors	82170	96.82%	96.8%	% Unique Visitors = New
unique download page visitors	15141	17.84%	18.4%	% New Visitors = Download
new registrations	4318	5.09%	28.5%	% Download = Registered
new trial users	3192	3.76%	73.9%	% Registration = Trial
new paying user	95	0.11%	3.0%	% Trial = Paying user
cancelled subscriptions	17	0.02%	2.8%	% Total subscriptions

Sales funnel

Alphabet soup

CPC	Cost Per Click (what Google charges)
CPA	Cost Per Acquisition aka COCA
ARPU	Average Return per User (in period)
CLV	Customer Lifetime Value

User numbers vrs User retention



Apps

Proliferation of devices
- iPhone, iPad, Andriod, Fire
  - appinventor.mit.edu/explore/
- Facebook games, messaging games, etc

Controlled by vendor
- Limites revenue

Fashion (mostly)
- Top 10 list important

Social Media

Keep in touch

Human face

Consistent voice

Community

Feedback

Platforms

Messaging

Social Network

OS

Browser

Future

Mobile

TV

Clicks and mortar

Multiple devices

Adverts are annoying and don’t work - pop up hell

Content will no longer be free

Pay for E-mail

Conclusions

Invent your future

Go out there and build something

Sell it

Sell the company

Bonus material

Financing e commerce

Raising money

Valuation

Winners and losers

Futures

Lean startup

Book ‘the lean startup’ by Eric Reis

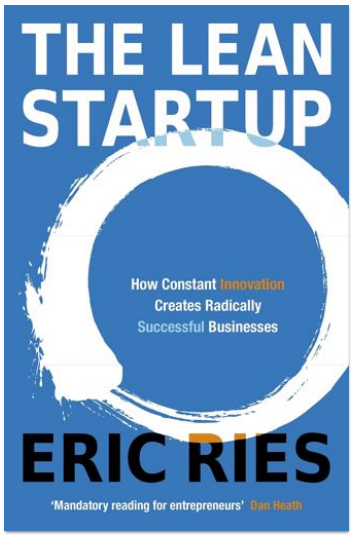
Minimum viable product
- feedback

Early and frequent customer contact
- build the case that there is a viable market
- low hanging fruit
- ‘the best is enemy of the good’

Analytics
- understand the value to the customer

Virtual company
- fail early and cheaply

Agile engineering



the web makes this possible easier, hackathons, crowdfunding

Sources of finance

Family and friends	£50k
Banks (need security)	£100k
Angels	£250k - £500k
Venture capital	£2m - £25m
IPO	£50m - 250m

Investor Criteria for a business

Market	Global sustainable under-served market need
Technical	Defensible technological advantage
People	Strong team
Financial	Believable plans, 60% IRR
Major Risks	Framework to understand and manage. What do you know? What do you know you don't know? How will you discover the things you don't know you don't know?

Writing the plan

1. Executive summary and funding requirement
2. Concept
3. The Market
   - 3.1 Global market size and need
   - 3.2 Sustainability
   - 3.3 Competition
   - 3.4 Marketing plans
4. The Team
   - 4.1 CEO
   - 4.2 CTO
   - 4.3 CFO
   - 4.4 VP Sales and marketing

Writing the plan - 2

5. The technology and IPR
6. Summary of Plans
   - 6.1 Development plans
     - 6.1.1 Methodology
     - 6.1.2 Milestones
   - 6.2 Marketing
   - 6.3 Sales and distribution
   - 6.4 Industry and quality standards
7. Financials

Writing the plan - 3

Appendices:

- Financial model
- Key staff
- Letters of support
- Correspondance re IPR
- Full development plan
- Full marketing and sales plan
- Examples and brochures

Valuation

Estimate of future yield - risk assessment

- Market
- Assets
- Ratio on current revenue
- Ration on current profitability
- Discounted Cash Flow (DCF)
- NPV of profitability
- Probability based methods

What goes wrong

Actual experience: not usually fraud

- angry customer phones up demanding to talk to someone korean at 3am

Bugs, blunders and incompetence

- free US flight for every hoover bought

Other places, other customs

- different laws; equities, porn, drugs, alcohol, fireworks, cigars
- product liability

Traditional business risks still apply

Still need traditional controls

- Double entry book-keeping
- Stock and accounting control
- Take up staff references
- Market analysis

Winners and losers

Winners

- Communication and communities
- Branded goods
- Bricks and clicks
- Specialty goods

Losers

- Content is NOT king or is it?
- Portals
- Get-rich-quick sites
- Smartcards, VOIP, interactive TV

Futurology

Integration of the Infosphere

Thesis / antithesis / synthesis

Better ways to trade

End of Moore's Law

Integration of the infosphere

.NET (www.microsoft.com/net)
- Moving functionality into the network (Saas)
- Disintermediating ISPs and Telcos
- SOAP & RPC

Google competes heavily
- discovery of intent

7 Big functions
- Identity
- Payment
- Diary
- Message delivery
- Address book
- Storage
- Search / DRM / content management / favourites / history

Integration of the infosphere

New services and devices

Smart consumer
- Dynamic bid for bandwidth
- Toasters bid for electricity

ipV6

Smart TV, white goods, cars, toaster, toliets
- “do you really want to have your third cup of coffee today?”

Home nets / LTE (4g)

P2P stuff - death of copyright

Privacy issues

Infrastructure capacity issues

Thesis / antithesis / synthesis

Thesis
- Unlimited communications and publications

Antithesis
- Entropy (99% of everything is crud - Theodore Sturgeon)

Synthesis
- No good solutions at present
  - search engines
  - personal agents
- University connectivity
  - Pandora's box?
  - Virtual reality?

Better ways to trade

Perfect information <> Perfect market
- Effective monopolises (amazon, eBay)
- Market and auction structure

New models
- kickstarter
- time and demand sensitive

Global
- Security
- New currencies / bearer certificates
- Cell phone banking, market prices in Africa

Death of Moore's Law

Geometry reduction nearing limits

- Leakage, quantum effects

Massive parallelism only works for somethings

Bandwidth demand growing faster

- Return to local data
- Text -> Pictures -> video -> HD -> UHD -> UHD VR
- Universal connectivity

Privacy pendulum

Conflict between local and central control

Phase	Main frame	Mini computer	Desktop	Laptop	Mobile
network	stand alone	stand alone	low speed network 10Mb/s	high speed network 100Mb/s	Wifi / 4g 100Mb/s
	central datastore	department	individual	Company database Private Network	Cloud Data centre