The Evolution of E-Commerce

History Repeats Itself (again)

Daniel V. Klein
dan@klein.com

In the beginning...

…the Earth was without form, and void; and darkness was on the face of the deep.

Where E-commerce began

• Telegraph (demonstrated in 1844) spread with the railroads in the mid 1800’s
  – Coast-to-coast by 1861
  – Ordering goods and services remotely
  – Wire transfer of funds (backed by physical transit later on by Express)
  – The promise of goods and of payment
• Transatlantic Cables – 1857-1866

Electronic Genesis

• Until very recently, only computer people had computers
• Started to change in the 1980’s
• Paradigm shift in 1995 – the World Wide Web

Checks & Credit Cards

• In the early 19th Century, there were cheques
• Credit cards only started to become widely accepted in the 1950’s
Evolution & Natural Selection

- Natural selection works in nature
- It also works in computers & business
  - Digital Equipment Corporation
  - Microsoft
  - Linux
- It also works in politics and e-commerce

Church and State

- Taxation is okay
  - You have to pay for armies
- Killing is okay
  - They are infidels
- Theft is okay
  - Spoils of war
- Lending money at interest is bad
  - A venial sin!

You’ll do it my way

- Big companies try to set rules
- Need special accounts with special banks,
  everyone uses my bank (or pay extra)
- Special hardware attached to your computer
- Place order online, call company with credit card information, exchange PIN numbers

Company Store, Company Scrip

- People work, are paid in company scrip
- Can use scrip to shop at company store
- Scrip has theoretical cash value
  - Cannot readily exchange for dollars
  - Company store engages in price gouging
  - Employees are slaves

Cybercash / Cyberwallet

- You buy cyberdollars with real dollars
- Clients buy services with cyberdollars
- Companies accept cyberdollars as payment
- Companies sell cyberdollars to get real dollars
- Transaction fees when you exchange
Private Banks

- In 17th – 19th centuries, banks were private
- Uninsured
  - If your bank was robbed, you lost your money
  - If your bank folded or absconded, you lost
- Largely unrelated
  - No ATMs, elaborately coded letters of credit

Cryptography

- Secure communication is the key
- Security is keeping a secret
  - Can you hear it?
  - Can you understand it?
  - Can you reproduce it?

Purchasing Agents

- You hire agent, give letter of credit
- Agent goes on road
  - Sees goodies
  - Sends samples
  - You send okay
  - Buys on credit, ships goodies
  - Credit cleared later

First Virtual

- Client signs up with credit card
  - By telephone
- When buying, submits form
  - Server sends email to FV
  - FV sends email to client
  - Client sends email to FV
  - FV sends email to server
  - (Can view product before paying!)

Industrial Revolution

- You make stuff, you want to sell it
- Unless you are big, you get robbed
  - Hire thugs
  - Cost of doing business
- Unless you are big, transactions are small
  - and local or highly specialized
- Wholesalers / retailers

E-Commerce Revolution

- If you want to sell, you need a merchant account
  - Have to be big, need credit history, nope - sell on trust, send me a check, get screwed
  - Don’t have to be big, just pay a lot, hard to interface to banks
- Wholesalers
  - Have merchant account, take 15%, take risks
  - Enable lower class to sell to world
Same Problems, Different People

- Large number of credit card wholesalers
  - Requires lots of work
  - Requires lots of security
- Mergers and acquisitions
- Survival of the fittest, fattest, fastest

What’s Next?

- Microtransactions
  - Pay as you go (or use)
  - Utility service analogy
  - Rent with utilities included
- Currently not cost effective
  - Credit card transactions too expensive
  - Tracking and reporting issues

So, nu?

- There is no difference between commerce and e-commerce
- Electronic transactions are just a different type of payment
- Protocols have to fit human needs and human models – not the other way around
- Your customers are not geniuses

Okay, what is for sale?

- Physical media
  - Books, parts, cars, music, antiques, junque, etc.
- Virtual media
  - Programs, memberships, searches, greeting cards, money, etc.
- Advertising
  - Anyone can be a publisher!

Physical

- Barnes & Noble, L.L.Bean, LandsEnd, Clinique, Camera World
- Books.com, buy.com, pets.com, groceries.com, wine.com, sparks.com
- Amazon.com, PayPal.com
**Virtual Media**

- **Sell once**
  - Buy a program (or picture, or license)
- **Sell repeatedly (monthly/annually)**
  - Buy a membership in a site
  - Mainly adult-site memberships, others exist
- **Sell sporadically (access/use)**
  - Buy information per search
  - Moving money (PayPal, IBill)

**Advertising**

- **Anyone can advertise!**
  - Selling ads is main motivation of free sites
  - Not all ads are banners!
- **Different payment schemes**
  - Per-impression
  - Per-click
  - Per-sale

**Paying for Ads**

- **Per-impression**
  - Fairest to advertiser (bandwidth costs), but advertiser must trust publisher
- **Per-click**
  - Fairest to both (both can track traffic, publisher can pull unsuccessful ads, but susceptible to abuse by both sides (click-bots and trimming by “uniques”))
- **Per-conversion**
  - Fairest to advertiser (pay only for results), but publisher must trust advertiser

**Two Distinct Marketplaces**

- **“Adult”**
  - 5–15% click-through rate
  - 0.1–1% conversion rate
  - Lots of traffic from little advertisers
- **“Mainstream”**
  - 0.25–1% click-through rate
  - 2–10% conversion rate
  - Most traffic through big advertisers

**Payment Schemes**

- **Per Impression**
  - Only way on big mainstream advertisers
- **Per Click**
  - Few adult sites use it any more – lots of abuse
  - Many mainstream sites use it
- **Per Conversion**
  - Mainstream and adult

**Simple Click-bot**

```perl
#!/usr/bin/perl
use HTTP::Request;
use LWP::UserAgent;

$sua = new LWP::UserAgent;
$sua->agent("Mozilla/4.76");
$req = new HTTP::Request(GET => "http://tracker.loser.com/count?id=1a47cb3");
while (1) {
  $sua->request($req);
  sleep int rand 16;
}
```
Per-Conversion Payment

- Different pay-out schemes (depending on business being advertised)
  - Per-referral fee
  - Per-signup fee
    - A fraction of sales
      - One-time
      - Recurring
    - A fraction of anticipated sales

Not the end…

- Information super-highwayman
  - New kinds of sales
  - New kinds of commerce
  - New kinds of theft
  - Different kinds of insurance
  - Adaptive restrictions
- Back to the Wild West!

It was the best of times, it was the worst of times.

- Instant gratification
  - Assessing customer feedback
  - Assessing ad effectiveness
- Loss of privacy
  - Voluntary loss
  - Involuntary loss
- Loss of anonymity
- Big Brother is already watching you!

Mainstream Sites - 1 day use

Mainstream Sites - 1 week use

Adult Sites - 1 day use
Adult Sites - 1 week use

Adult Sites - 1 month use

So... what’s next?

- Read science fiction!
  - Chester Gould (<1935) – wrist radio
  - Frederick Pohl (1965) – joymaker
  - Robert Heinlein (1959) – computer immersion
  - implanted computers, crypto, global networks, intelligent agents, nanobots...

The Evolution of E-Commerce

History Repeats Itself (again)

Daniel V. Klein
dan@klein.com