E-Commerce

Jack Lang

Anna.Soilleux@olswang.com

Richard Clayton

Aims

- Outline issues involved
- Lectures:
  - Historic and Economic Background (JL)
  - Business Models and Strategy (JL)
  - Web Design (JL)
  - Implementation (JL)
  - The Law and E-commerce (AS)
  - Making E-Commerce work (JL)
  - Finance and future opportunities (JL)
  - RIP, DCMA and other legal developments (RC)

Resources

- Jack Lang "High Tech Entrepreneurs Handbook"
  - FT.COM; ISBN: 0273656155

- Ross Anderson "Security Engineering"
  - John Wiley & Sons Inc; ISBN: 0471389226

- Hal Varian "Intermediate Microeconomics"
  - W.W. Norton; ISBN: 0393973700
- + Carl Shapiro "Information Rules" Harvard Business School Press; ISBN: 087584863X

- Tom Standage "The Victorian Internet"
  - Orion Paperbacks; ISBN: 0753807033

- John Kenneth Galbraith: A Short History of Financial Euphoria
  - Penguin Books; ISBN: 0140238565

Online Resources

- Andrew Odlyzko's papers on e-commerce and network growth: http://www.dtc.umn.edu/~odlyzko/

- Web Design:
  - http://www.wowwebdesigns.com
  - http://www.webpagesthatsuck.com

- Draft regulations
  - http://www.dti.gov.uk/cii/ecommerce/europeanpolicy/ecommerce_directive.shtml

What is E-commerce?

- A course thought up by the Teaching committee…
  - Academic research on protocols, economics
- Mail-order ('B2C')…amazon.com etc
- New business models…Lastminute.com, ebay.com
- Re-badging of Electronic Document Interchange ('EDI')
  - 'B2B': SWIFT.CREST,BOLERO,Just-in-Time
- Disintermediation: E*Trade.com
- CRM: Call-centres, credit-cards, cost-dumping, discrimination, customer aggravation, digital "haves and have nots"
- EU "Information Society Services"
- New opportunities for fraud
  - This list is not exclusive!

Bulla (Sumarian about 3500 BC)

- Business-to-business communications
  go back into antiquity
  - believed to have driven
    writing and mathemati
  - Trust system

Bearer certificates

- Token representing value
- May be anonymous
  - Cash vs Cheques
- Not easily forged
  - Trust
- Physical handling
  - Banks/ wallets
- Coupons
- Tradable
  - Bureau de change

Currency

- Exchange of value
- Store of value
- Measure of value

- Fiat money
  - $(G-T) = (S-I) - NX$
    - MMT
- Local currencies

- "Unforgable" bearer certificate
- Anonymous, Immediate

Electronic Money

- Centralised
  - e.g. Paypal, Oyster card, M-Pesa

- Decentralised
  - e.g. Bitcoin
    - Exchange of value ✓
    - Store of value X
    - Measure of value X

  - Hard (repudiatable) vs Soft (no recourse)

Fair Market

- Willing buyer and seller
  - "Fair price"
  - Not under compulsion
  - Price discovery
- Equality of information
  - "Reasonable knowledge of relevant facts"
- Anonymity
  - Pre transaction eg Stock market
  - Pseudo anonymity eg Ebay
    - Reputation
  - Post transaction

- Settlement

EDI ('B2B')

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

Remote transaction
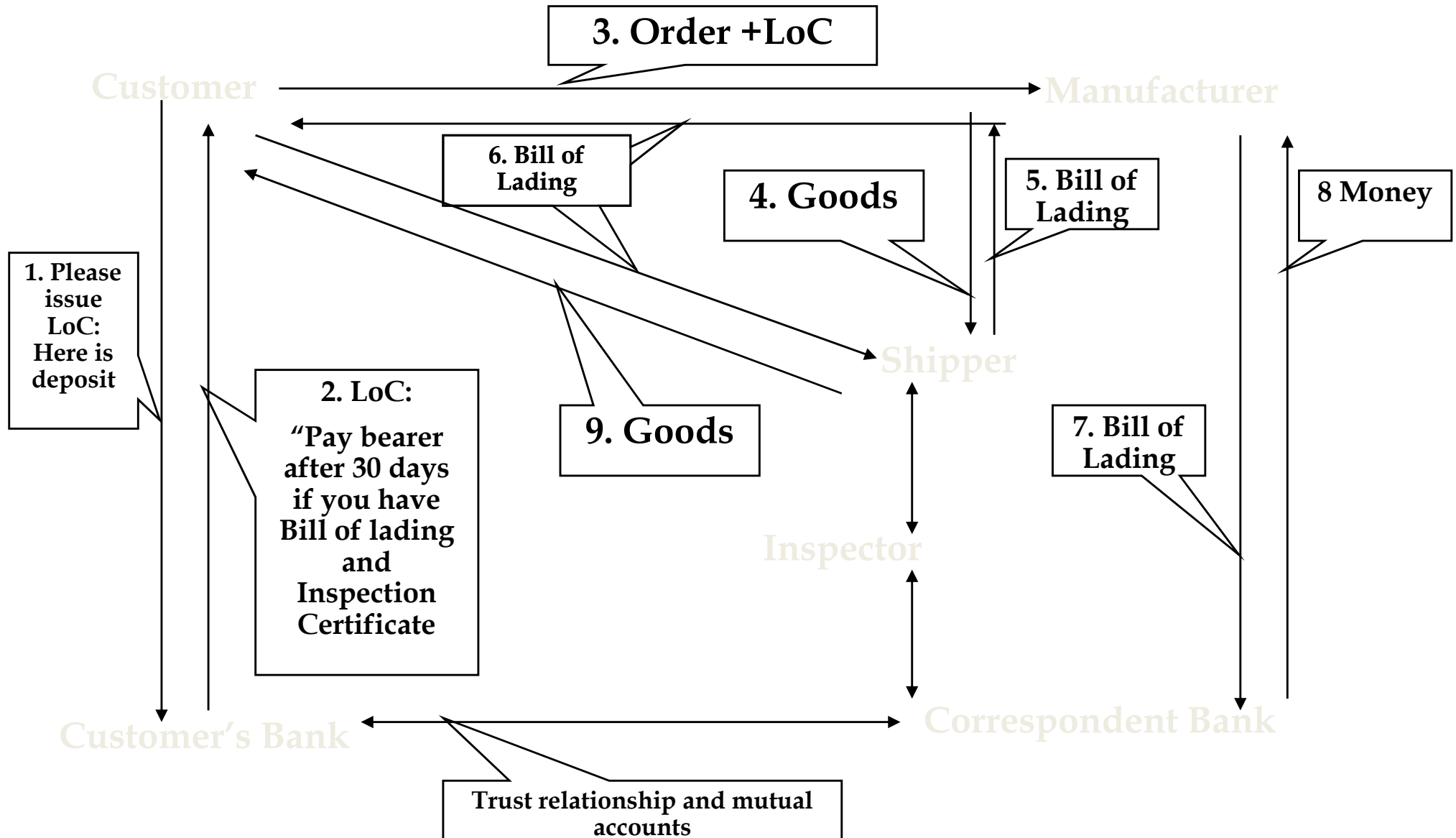
B2B (2)

- The invention of the telegraph led to the development of business use protocols
  - Huge boom in telegraph construction and applications (Standage)
  - 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 exisiting relationship, otherwise intermediaries needed
- Huge expansion in banking
  - Banks sent about 50% of telegraph traffic

B2B 3- Wiring Money

- Interbank message e.g
  - "To: Lomarco Bank, Geneva. Please pay SFR 10,000 from our account to Herr Thilo Schmidt on presentation of his passport. Our test key is 254"
  - The 254 is a primitive MAC computed on significant data such as money, currency code, date etc.
- SWIFT reimplement 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

B2B 4

- "Electronic Document Interchange" (EDI)
  - Proprietary systems built late 60's/early 70's
    - General Motors ordering car components (EDS)
    - Marks & Spencer's clothes ordering
- Big problem not security or DoS or lost systems but standards
  - 1980's 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

B2C Mail Order

- Book printers in C15th
  - Aldus Manutius of Venice 1498. His mail-order offerings included 15 texts that he had published.
- (UK version) William Lucus, Gardener, 1667
  - Army and Navy Stores supplied British Forces and others in India ~1871
- (US Version) Tiffany of Fifth Ave 1845
  - Montgomery Ward 1872
- Sears, Roebuck made it possible to settle the West(1886)
  - US Postal services subsidised shipping by having flat rates nationwide.
    - Still critical in some places!
- Need guarantee to provide customer confidence
  - Brand (e.g Sears, Amazon…)
    - Sears unique innovation: "Satisfaction guaranteed or your money back"
  - Industry (ABTA, MOPS)
 - Intermediary (VISA, Access Paypal etc)

Credit Cards

- Consumer credit goes back to 18th Century – "The Tallyman"
  - Some US stores offer "shopper's plate" from 1920's
- Diners Club offered first credit card
  - NY 1951: 27 Restaurants, 200 customers
- Barclaycard offered as incentive to high-value Barclays customers in late 60s; Access started as rival
- Classic "Network effect"
  - Need enough shops to attract customers and vice versa
- Took off in early 1980's 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
  - Competition starting e.g Paypal

Trusted Third Party

Buyer

Seller

Cash

Goods

Goods

Cash

TTP
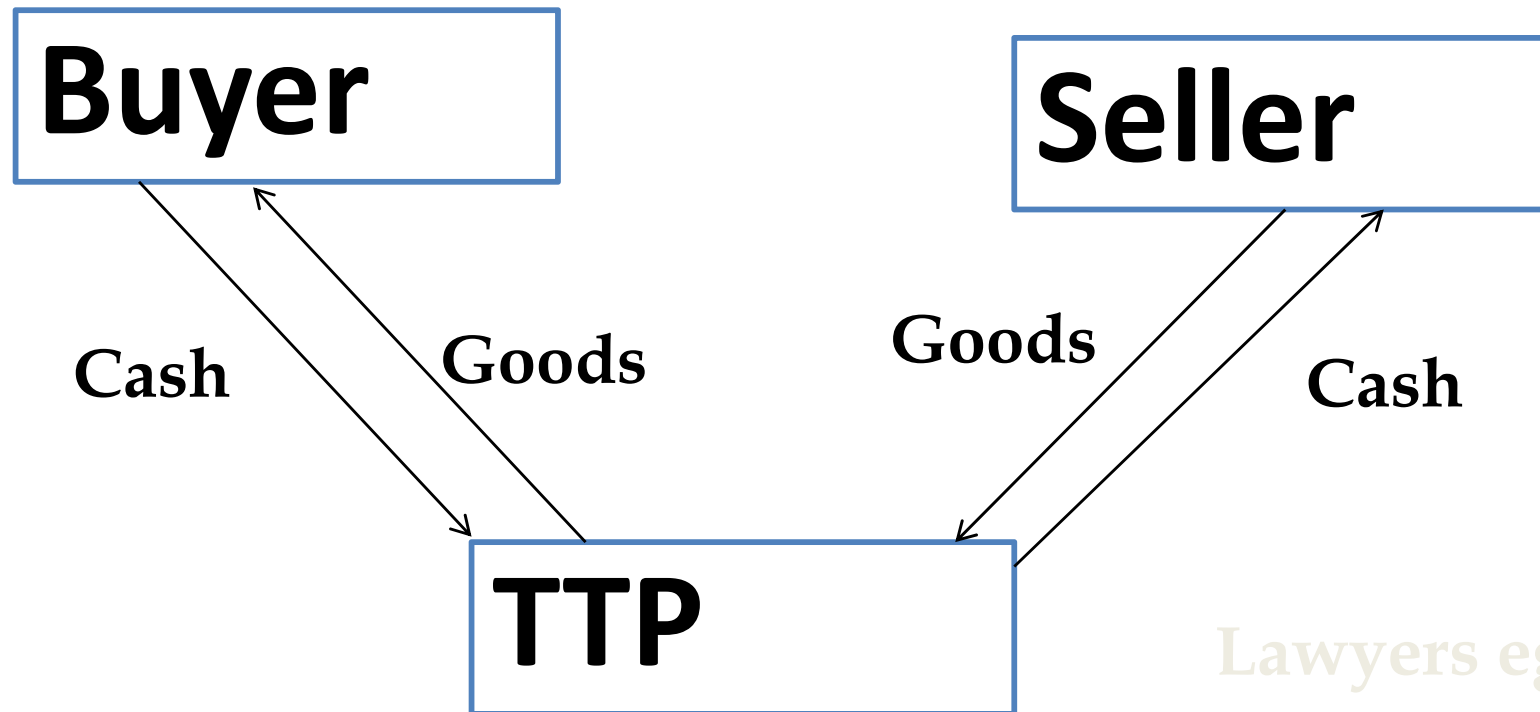
Lawyers eg property

Brokers eg shares

Credit cards B2C

Auction houses

Credit Cards 1
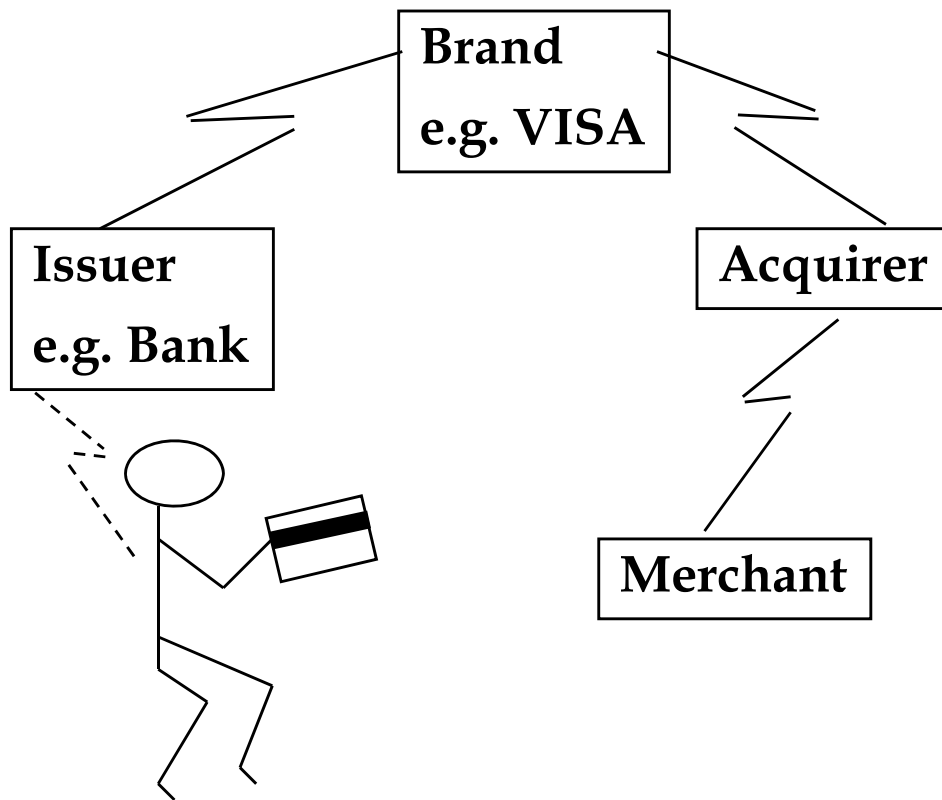
Credit Cards 2

- 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

Cards   4

- Overall cost of fraud
  - Spain 0.01%
  - UK 0.2%
  - USA 1.0%
- Motivation – who gets the reward?
  - Huge hype "Evil Hackers"
  - No case of fraud resulting from interception!
    - Getting sense from mail is hard
  - Real problem: hacked or crooked end systems
- Overall pattern – cyclical: Best defences not always

Cards 7

- 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 ways to pay

- Via phone wallets
  - e.g Pingit
- Electronic cash
  - Chaum
  - Bitcoins
  - Game currencies
- Issues
  - Anonymity, exchange rate, regulation etc

Hot Topics

- Hot topics:
  - 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?