

The Economics of E-commerce and Technology

Switching Costs and Lock-in

Switching costs

- ▶ **Switching costs are ubiquitous**
 - ▶ Between brands (e.g. credit card companies)
 - ▶ Between technologies (e.g. operating systems)
- ▶ **Example: Bell Atlantic and AT&T**
 - ▶ In mid-1980s Bell invest in \$3bn of AT&T switches
 - ▶ Proprietary technology, so needed AT&T for upgrades and fixes
 - ▶ Introducing '888' numbers cost Bell \$8m for software
 - ▶ Annual upgrades cost \$100m/year plus peripheral sales
- ▶ **Other examples**
 - ▶ Changing cell phone providers
 - ▶ Changing server software
 - ▶ Changing email address, internet service provider, phone company...

On switching costs

- ▶ **Switching costs are two-sided**
 - ▶ Customer switching costs: searching for new firm, learning new system, losing complementary investments etc.
 - ▶ Firm switching costs: setting up new account, hiring personnel
 - ▶ Total switching cost matters.
- ▶ **Switching costs can be endogenous**
 - ▶ Depend on compatibility decisions (e.g. number portability).
 - ▶ Can impose costs on departing customers (e.g. disruption)
 - ▶ Depends on users actions (e.g. queue in Netflix).
- ▶ **Lock-in also faced by suppliers**
 - ▶ Supplier lock-in: iPhone app maker and Apple.
 - ▶ Two-sided lock-in: coal mine and electricity plant

Why switching costs matter I

- ▶ **The Valuation Principle:**

- ▶ In homogenous good market, the discounted present value of a customer to firm = customers total switching costs.

- ▶ **Model**

- ▶ Competitive market has price $p^m=c$
- ▶ Firm A has N loyal customers with one-off switching cost k
- ▶ Time $t \in \{1, 2, \dots\}$ with discount rate δ .
- ▶ Customer willing to pay $p=c+k(1-\delta)$, otherwise will quit.
- ▶ This means profits equal $\pi=kN$.

- ▶ **Hence switching costs tell you how much firm is worth**

- ▶ Ignoring differentiation and costs differences.

Why switching costs matter II

- ▶ How much should you invest in installed customer base?
 - ▶ Promotions to acquire customers
 - ▶ Bribing customers to join you (e.g. credit cards)
- ▶ Idea: Verizon is trying to lure a new customer
 - ▶ Verizon makes profit \$20/user/month.
 - ▶ Retain $p=98\%$ of customers per month. Discount rate $\delta=0.99$
 - ▶ Lifetime Value (LTV) of customer is $20/(1-p\delta) = 671$ /user.
 - ▶ Switching cost for customer is \$300; cost to firm is \$50, so total customer acquisition cost (CAC) is \$350.
 - ▶ Can buy customer \$400 iPhone and make profit.
 - ▶ What about Sprint, where profit \$15 and $p=96\%$?

Lock-in cycle

- ▶ **Four stages of lock-in**

- ▶ Important to anticipate entire lock-in cycle from the start
- ▶ Holds true for both buyers and sellers.

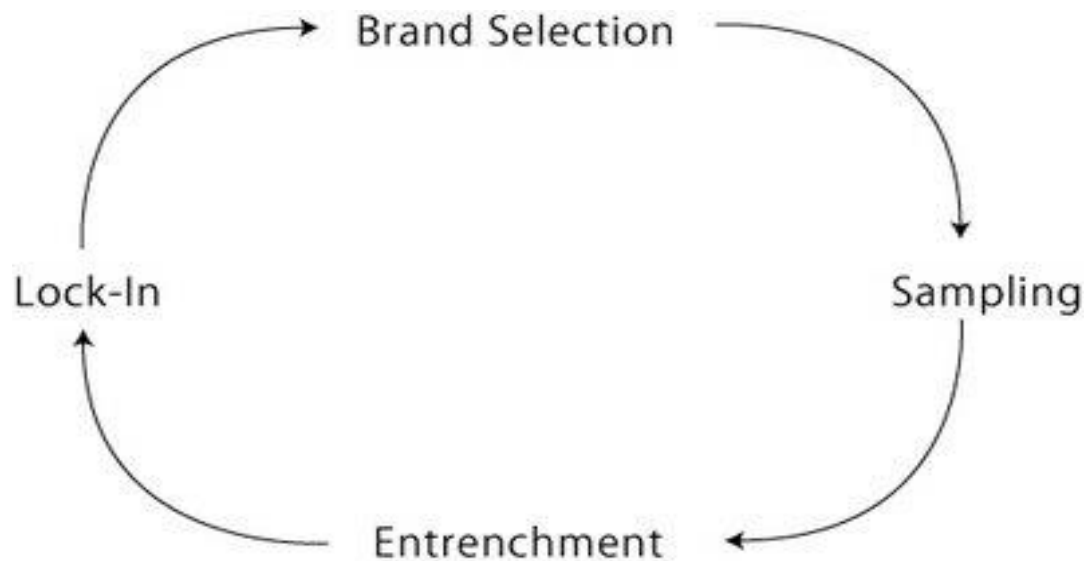


Figure : The Lock-In Cycle

Classifying Switching Costs

Classifying switching costs I

1. Contractual commitments

- ▶ Cell-phone 2-year contracts and family plans.
- ▶ Employments contracts
- ▶ Anticipate switching costs after contract terminates

2. Complimentary Investments

- ▶ Durable purchases (e.g. Xbox, printers),
- ▶ Brand specific training (e.g. learning software, fixing airplane),
- ▶ Complimentary purchases (e.g. iPad and Mac)
- ▶ SC determined by: durability of assets/training, ease of resale, scale of investments, ease of leasing.

Classifying switching costs II

3. Transactions costs

- ▶ Time and effort to make changes
- ▶ Changing bank account or web browser.

4. Search Costs

- ▶ Example: Yoga studios
- ▶ Consumer search costs: time and effort to find good deal, evaluating product, risk of new seller (experience good)
- ▶ Seller side: promotion, adverse selection

5. Loyalty Programs

- ▶ Examples: Frequent flyer miles, supermarket cards, iDine
- ▶ Loyalty benefits may increase (e.g. “gold” status)
- ▶ Cooperate with other firms (e.g. win miles with credit card)

What type of switching costs?

▶ Google chrome

- ▶ Change settings in computer (complimentary investment)
- ▶ Unknown quality of other engines (search costs)
- ▶ Learning how to search effectively (training)

▶ Facebook

- ▶ List of friends (complimentary investment)
- ▶ Learning the interface (training)

▶ Apple iPhone

- ▶ Durable equipment (software)
- ▶ Learning the interface (training)
- ▶ Mac sales (complementary investment)

Buyers Strategy

Bargain Before Being Locked In

- ▶ Look for introductory offers
 - ▶ Sign-up bonus, extended warranties, support in switching over
- ▶ Increase ex-ante bargaining power
 - ▶ “My current system is fine”
 - ▶ “I’ll make lots of follow-on purchases”
- ▶ Beware of being held-up after committing
 - ▶ Have price and quality carefully specified
 - ▶ Seek long-term protection: service guarantees, free upgrades, most favored customer treatment
 - ▶ Beware of non-contractible elements
- ▶ Be wary of vague commitments to being “fair” and “open”

A Little Bargaining Theory

- ▶ Zappos wants to do deal with Fedex
 - ▶ Value of relationship: $V(x_F)$, where Z invests x_F in relationship
- ▶ Zappos has outside option to do deal with UPS
 - ▶ Value of outside option: $W(x_U)$, where Z invests x_U in option
- ▶ Socially optimal investment, assuming $V > W$
 - ▶ Investment in A: $V'(x_F) = c'(x_F)$, where $c(\cdot)$ is cost of investment.
 - ▶ Investment in B: $W'(x_U) = 0$
- ▶ Negotiation: suppose firms A and B split gains 50:50
 - ▶ Profits: $\pi_Z = \frac{1}{2}[V(x_F) - W(x_U)] + W(x_U)$, $\pi_F = \frac{1}{2}[V(x_F) - W(x_U)]$
 - ▶ Under invest in A: $\frac{1}{2} V'(x_F) = c'(x_F)$.
 - ▶ Over invest in B: $\frac{1}{2} W'(x_U) = c'(x_U)$.

After Lock-in

- ▶ **Dual sourcing**
 - ▶ Use two companies to reduce hold-up (i.e. ex-post opportunism)
 - ▶ Toyota policy of two suppliers
 - ▶ AMD creation benefited both IBM and Intel.
- ▶ **Beware of creeping lock-in from complementary purchases**
 - ▶ Try to avoid completely committing
- ▶ **Acquire information to help ex-post bargaining**
 - ▶ Seller's suppliers.
 - ▶ Seller's cost information.
 - ▶ Details of production process.
- ▶ **Use bond to help ex-post bargaining**
 - ▶ E.g. “getting the factory knocked up” when outsourcing.

Seller Strategy

Investing in Installed Base I

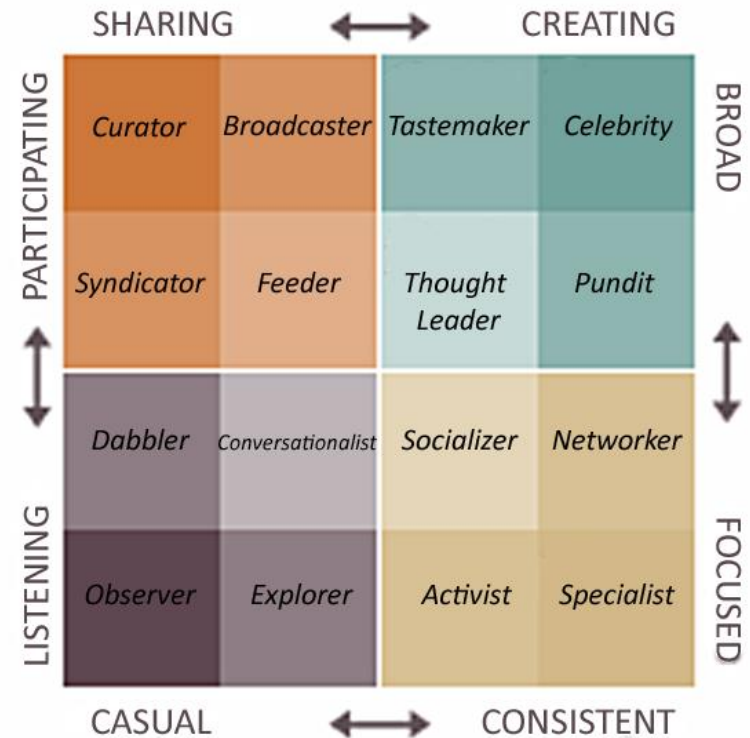
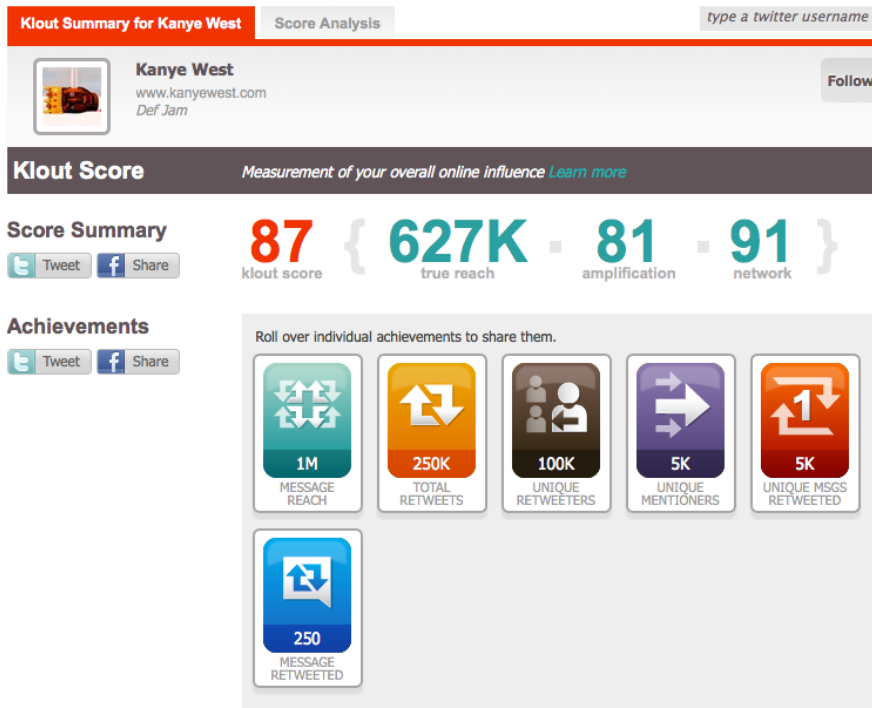
- ▶ May have to fight hard for “free” customers.
- ▶ Consider model from earlier
 - ▶ Competitive market with marginal cost c .
 - ▶ N free customers at time $t=0$. Switching costs k after join firm.
 - ▶ Discounted profits: if win customers $\pi_1 = kN$; if lose $\pi_1 = 0$.
- ▶ What is the equilibrium price in period 0?
 - ▶ Each firm will price $p_0 = c - \delta k$ and make profits $\pi_0 = 0$.
 - ▶ Called “rent dissipation postulate”.
 - ▶ Examples: fewer ads at starts of movie, student discounts for computers, low profits on bottom line cars.
- ▶ Profits ultimately determined by
 - ▶ Costs, differentiation and first-mover advantages.

Investing II: Sell to Influential Customers

- ▶ **Gladwell's classification of key customers:**
 - ▶ Connector – people who have lots of “weak ties”
 - ▶ Maven – people who accumulate knowledge
 - ▶ Salesmen – people who can persuade others
- ▶ **Selling to A may lead to sales from B**
 - ▶ Network effects (e.g. selling to division A within firm)
 - ▶ A has reputation for being informed (e.g. Walmart)
 - ▶ A may provide industry contacts (e.g. importer into the US)
- ▶ **Agency problems**
 - ▶ Professor, publisher and students
 - ▶ Businessman, airline and employer
 - ▶ Doctors, pharma firms and insurance company

Calculating Klout

- ▶ Virgin America used Klout to identify influential customers and gave them free flight on new routes.

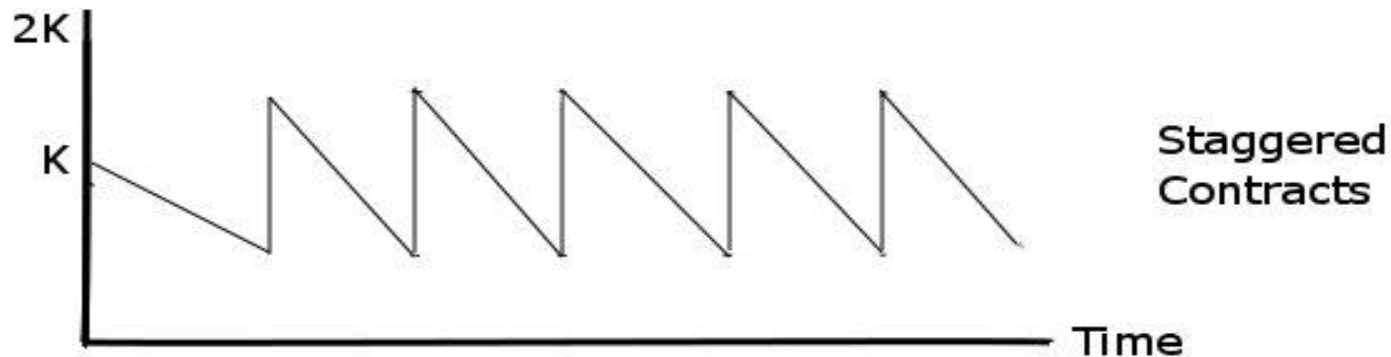
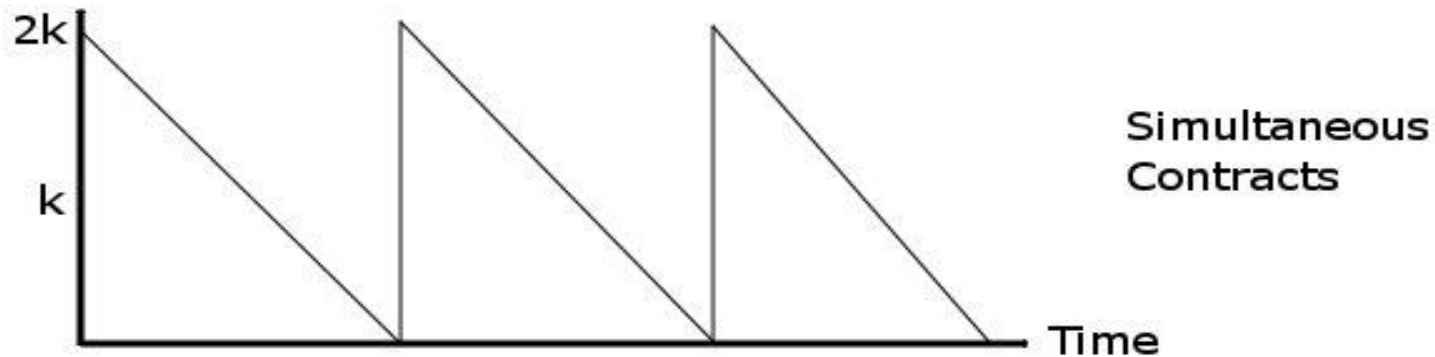


Encourage Entrenchment

- ▶ **Design products to entrench**
 - ▶ Open vs. closed system.
 - ▶ Mixed: basic version is free; advanced version is not.
- ▶ **Loyalty programs**
- ▶ **Stagger contracts/sales**
 - ▶ Minimal lock-in: when most contracts/equipment near end
 - ▶ Stagger contracts to strengthen weak link.
 - ▶ Example: Pitch product B when A halfway through life.
 - ▶ Example: Offer new phone contract after 20 months.
- ▶ **Forward sales**
 - ▶ Sell customer stock of black toner (but not color)

Minimal lock-in

- ▶ With single contract switching cost falls from 'k' to 0.
- ▶ With two contracts:



Leveraging Installed Base I: Pricing

- ▶ **Two firms (not competitive market, as before)**
 - ▶ Some consumers locked-in, others are free.
- ▶ **Lowering price...**
 - ▶ reduces profits from loyal customers.
 - ▶ increases profits from free agents.
 - ▶ increases installed base and increases future profits.
- ▶ **Expect switching costs to raise prices and profits**
 - ▶ Fattening effect: If A lowers price, then B's market share falls and B's prices falls, increasing competition.
 - ▶ Skeptical consumer effect: if A lowers price expect A's market share to rise and A's future prices to rise, reducing elasticity.

Leveraging Installed Base II: General

- ▶ **Have full range of products**
 - ▶ Means consumers can stay within brand (e.g. car range)
- ▶ **Sell complementary products**
 - ▶ Increases lock-in (e.g. MS Office) and is money-spinner (e.g. ink)
- ▶ **Early contract renewal**
 - ▶ Keep agent locked in (e.g. football contracts, phone contracts)
- ▶ **Sell access to installed base**
 - ▶ Adverts (e.g. Google) or endorsement (e.g. AAA)
- ▶ **Price discriminate between “free” and “loyal”**
 - ▶ Lower price to free (e.g. magazines). Version to reduce arbitrage.
 - ▶ Higher price to free (e.g. software upgrades)

Leveraging Installed Base III: Entry

- ▶ **Limit pricing**
 - ▶ Build up market share to avoid entry.
- ▶ **Creating switching costs**
 - ▶ Benefits incumbents but harms entrants.
- ▶ **Beware overestimating switching costs (and customer value)**
 - ▶ New entrants try to reduce SC
 - ▶ Example: MS Word mimicked WordPerfect controls.
 - ▶ Example: can honor other firms loyalty points.