

## Chapter 16: Achieving Customer Lock-In

### 16.1 Introduction

Product development, pricing and selling all become potentially more personalized thanks to the information revolution. Information technology in general makes the storage and processing of customer information immensely easier and cheaper. Online commerce makes the collection of this information faster, simpler and more foolproof. A significant consequence of this shift in the supply of information is an increased focus on the individual customer, rather than just the product or service. This focus is reflected in terms such as ‘one-to-one marketing’, customization, and ‘real time marketing’. A central strategy of a business becomes acquiring and retaining customers (and, of course, creating value for, and capturing it from them). In some respects this is just a modern incarnation, with much grander scale and scope and much greater speed, of pre-Industrial revolution craft methods of production and sale, where many goods would only be made to order, based on individual requests.

A pre-industrial economy of villages and small towns would support only individual craftspeople. Customers would be locked in to particular suppliers by transportation costs. Improvements in transportation and the growth of towns, partly fueled by those improvements, made competition possible, reducing customer lock-in. Every producer or seller’s dream is to counteract such effects, making it as unattractive as possible for customers to switch to a rival. The information economy supports this goal in several ways. Customer switching costs are the key in each case. These switching costs can arise from irreversible investments in physical equipment, software, and the knowledge required to perform tasks. The increased importance of the latter two categories means that switching costs are the norm in the information economy.

Irreversible investments often work in tandem with network effects to raise switching costs. We are familiar with supply-side economies of scale -- the bigger you are (relatively), the greater your cost advantage. Economies of scale therefore create a kind of positive feedback. In the information economy, demand-side economies of scale matter too -- the product’s value to a single user is greater the more people are using it. This is a form of externality. The most obvious demand-side economy of scale is caused by network externalities -- users interact in a network, which may be physical (communications, transportation) or virtual (communities of users). Network externalities raise individual switching costs (the loss of the value of the network if the customer switches), so a business innovator may have to engineer a collective switch. One crucial issue in e-commerce strategy is therefore how important are network effects in practice.

Traditional methods of achieving lock-in by raising switching costs are also important in online commerce. Switching costs also result from search costs and contractual commitments. Search costs may go down as customers move online, but differentiation from rivals and broad product lines can be used to counteract this effect. The effects of contractual commitments are relatively unchanged in moving commerce

online, though increased complexity may make legal enforcement more difficult. Perhaps one of the most important trends raising switching costs in e-commerce is the growth and increased sophistication of loyalty programs. Sellers have always informally tried to please loyal customers: they represent recurring revenue, and can be viewed as an asset of the business. Modern loyalty programs predate e-commerce, of course. The most well known example is airline frequent flyer programs. The increased capture of customer information that is possible through online commerce makes loyalty programs cheaper and more effective. At the same time, the reduction in search costs and other avenues for lock-in makes loyalty programs relatively much more attractive.

In the rest of this chapter, we first discuss types of switching costs and lock-in in general terms. Then we treat loyalty programs and network effects in turn. These are the two most important lock-in avenues that remain to be discussed, after having considered product differentiation and search costs in previous chapters. Finally, we provide an overview of the strategic issues in managing lock-in.

## **16.2 Customer Lock-In: An Overview**

At an abstract level, the customer switching costs that drive lock-in can always be viewed as the result of some irreversible investment. However, the nature and the process of the investment can vary so much that it is worth examining each method of lock-in individually. Carl Shapiro and Hal Varian, in *Information Rules*, have provided the most comprehensive non-technical treatment of this subject. They identify the following list of types of lock-in:

- Contractual commitments
- Durable purchases
- Product-specific training
- Information and databases
- Specialized suppliers
- Search costs
- Loyalty programs

We consider loyalty programs separately, because we view them as the most important aspect of e-commerce strategy for achieving customer lock-in. The rest of this section briefly reviews the other methods.

### **Contractual Commitments**

Contractual commitments for purchases of products or services are very common. They provide certainty for both the buyer and the seller, but they also create switching costs and lock-in. The switching costs in this case are damages for breach of contract. While contractual commitments have been ubiquitous in business-to-business commerce, consumers are also experiencing them more frequently, in the markets that work at the foundations of e-commerce, providing online access. One of the best known examples is the bundling of PC hardware with a contractual obligation for Internet service from a particular ISP for a particular period. This raises the consumer's cost of switching to another ISP after the hardware purchase, for the length of the contract. Wireless service contracts (which, more and more often now include Internet access as well as voice telephony) have similar features.

In the simplest case the customer lock-in lasts as long as the contract. Two separate effects may shorten or lengthen the lock-in. Typical service contracts will have explicit or implicit damages, but these, representing the actual switching costs, will go down over the duration of the contract: near its end, the switching cost may be quite low. At the same time, innovation in the equipment that is used to provide the service may increase the benefits of switching as the time remaining goes down. Hence a customer may no longer be locked in before the actual end of the contractual obligation. On the other hand, if the equipment is durable beyond the initial service contract length, does not suffer from obsolescence, and is incompatible with another service provider, lock-in may effectively extend beyond the contract's life. This can happen with wireless providers using incompatible technologies (e.g., TDMA and CDMA). It cannot happen directly with ISPs, where a single open standard for transferring data over the Internet ensures compatibility. However, ISPs may be able to build lock-in of other kinds during the life of the contract. Contractual commitments may be the thin edge of the lock-in wedge.

### **Durable Purchases**

Durable goods create an obvious kind of lock-in because second-hand markets are imperfect (partly because of lemons problems, as discussed in Chapter 7. Everyone knows that once you drive a new car off the lot, it is worth a few thousand dollars less than you paid for it. Switching, even right away, to another new car will cost you. Switching costs are therefore the net costs of replacing durable goods or equipment. They decline as the durable purchase ages and depreciates. Note that a service contract essentially tries to make nondurable services behave like a durable good, increasing lock-in, while a lease for a durable good tries to make a durable good nondurable from the buyer's perspective. In both cases uncertainty about the future value of the good, and how the buyer and seller want to deal with that uncertainty, matters for the preferred method of sale or lease. Here we are emphasizing that lock-in (or flexibility, as the reverse side of the coin) is also important.

The infrastructure of e-commerce is an important area where durable goods lock-in can occur. Servers, switches and routers are examples of infrastructure equipment that is necessary for firms engaging in e-commerce. Incompatibilities and the incorporation of proprietary features in the equipment enhance switching costs and the lock-in effect. The switching cost includes the costs of removal and of new installation, as well as the price difference between the used and new equipment, to the extent that that difference does not reflect real differences in benefits. The fact that equipment in such cases is not stand-alone, but part of a complex system, helps to broaden and extend the lock-in. Follow-on purchases of complementary equipment will achieve this effect. Buyers may be able to lease some kinds of equipment (for example, from 'server farms' such as Exodus) but switching farms would still involve the costs of moving the data in a fail-safe manner.

Hardware is not the only durable good. Of course hardware is inextricably linked with the system software that makes it work (a Windows operating system will not run directly on hardware designed for Unix, although it may be 'emulated'). Thus certain

kinds of software are integral complementary parts of the complex infrastructure of online commerce. In addition, software, even if portable across machines, is a durable good in its own right, and has associated switching costs arising purely from this durability. Note that lock-in gives software vendors an incentive to sell their software, rather than rent it out, as ASPs (see Application Box, Chapter 14) would like. This works against the incentive to rent as a way around the durable goods pricing problem discussed in Chapter 14. Which effect dominates will depend on a range of particular circumstances. To the extent that buyers want to avoid lock-in, the ASP model is attractive, if it can be proven to work smoothly. It is interesting to observe that the struggle to capture value through lock-in then shifts to a different part of the value chain. ASPs will strive to increase customer switching costs and lock-in through contractual commitments and customization, to whatever extent possible.

A third kind of durable purchase is subtle, but illustrates the essence of the information economy. Internet access through an ISP may be an easily substitutable service, but it comes with an email address that is not portable across ISPs. This creates a small, but perceptible switching cost for consumers. The costs of switching are small in absolute terms, but may be large relative to the costs of the individual consumer. This may be enough to keep an individual from switching from one dial-up provider to another, though probably not from dial-up to DSL. Telephone numbers and postal addresses share the same characteristic in the 'old' economy. There, centralized service provision meant that forwarding mechanisms were easy to develop and implement. The Internet's decentralized nature makes solving the problem a bit more difficult, but we would not expect this problem to be a lasting one, nor a long-term source of lock-in.

### **Product-Specific Training**

The costs of learning to use a product or service are switching costs to the extent that the training is product-specific. Product-specific training cost must be repeated if the switch is made, and will include not only the direct costs of learning a new system, but also the indirect costs in lost productivity while the switch is made. Ideally, sellers with more than one product that performs the same or similar functions would like these costs to be brand-specific rather than product-specific, so that a customer can switch products within a particular brand (say between different versions of an operating system) without bearing those costs.

The overall importance of this type of lock-in for e-commerce is hard to assess. On the one hand, the increased importance of complex information products and services makes this type of lock-in potentially ubiquitous. Furthermore, product-specific switching costs associated with learning tend to rise over time, as familiarity with the existing system increases, and as complementary products (especially from the same seller) are installed as well. These factors can make this type of lock-in both very common and very long-lasting. On the other hand, there are competitive forces at work to simplify and standardize the tasks that are performed by the user of software. While software can never be as easy to use as an automobile, a kitchen appliance or a stereo, there are rarely serious product-specific learning costs associated with these activities. Still, much of the force of this method of lock-in may come not from real difficulties in

switching, but a psychological comfort with doing and seeing things in a particular way. Using a particular web browser or financial information web site may be subject to lock-in even if the perceived switching costs (getting used to a new 'look and feel') are small, as long as they are large relative to any benefits of switching.

### **Information and Databases**

We have emphasized the collection, storage and processing of customer information by sellers. Buyers, consumers in particular, also perform the same activities, not necessarily to help them in future transactions, but simply for consumption purposes. Music and financial data would be examples of such information. For businesses and individuals, data must be stored in a particular physical form and format. Switching costs are then the costs of converting data to a new format. Again, these kinds of costs, and the potential for lock-in, tend to rise over time as the database or collection grows. Even if a large degree of automation is possible, there will be some unavoidable costs of conversion and transfer, including labor, risk of loss of data, and possible temporary loss of use. Sellers of information storage (hardware) and database (software) products can increase switching costs by reducing compatibility, though this may discourage buyers from their initial purchase of the product, an issue we take up in more detail in discussing lock-in management strategy.

### **Specialized Suppliers**

A specialized supplier is the flip side of a customized product or service. Specialized suppliers have been common in business-to-business dealings, and customization in e-commerce has extended their importance to business-to-consumer transactions as well. Switching costs in this case are the costs of finding and, in the case of B2B, perhaps funding a new supplier. These costs can rise over time if other potential suppliers do not maintain their capabilities. For businesses facing this potential lock-in, dual sourcing is an obvious and common strategy. In the B2C e-commerce world, the dominance of one product or service (for example, an operating system, web browser, or other software) can increase customer lock-in over time, as the smaller seller has a harder time investing in fixed costs of R&D and marketing. This possibility of dominance is discussed further in the section on network effects.

### **Search Costs**

We looked at customer search in the last chapter, where we emphasized its connection to advertising. We also discussed how buyer search costs create market power for the seller. There we emphasized price comparisons by shoppers. However, we can think of search costs more generally as well. Searching for a different seller than your current one (whose physical or online store you happen to be in, or have used before) can involve comparing all sorts of features, and can easily be costly online as well as offline. Transportation costs are avoided, but the buyer still has to bear the time costs of gathering and processing information. These are the switching costs. Web portals and online stores such as Yahoo! and Amazon.com rely on these search costs as one factor that will help keep consumers from switching away to other portals or online sellers.

### **16.3 Loyalty Programs**

While contracts, specialized suppliers, and training may all be significant in B2B transactions, loyalty programs are probably the most versatile and important tool for B2C e-commerce. Of course, informal loyalty programs do exist in the B2B world as well: every large, frequent business customer can expect better treatment over time. Here we focus on formal programs. The most prominent of these formal loyalty programs, initiated well before e-commerce existed, is airline frequent flyer programs. A more recent innovation has been grocery store 'rewards clubs'. The latter have been made possible by the general spread of information technology. Even airlines, which have used computerized reservation systems for decades, had difficulty managing their frequent flyer programs until their use of information technology became more widespread throughout their value chains.

### **Application Box Loyalty at Yahoo!**

Here are some extracts from Yahoo's web pages:

#### **What are Yahoo! Points?**

Yahoo! Points are part of a free program that lets you win prizes just for using Yahoo!. Once you enroll you can earn points throughout the Yahoo! network. Visit the Yahoo! Points page anytime to view your balance, find new ways to get points, or bid your points auction-style for cool prizes.

Enrolling in the points program: To enroll, visit Yahoo! Points or click "enroll" on any offer you see with a star while you're using Yahoo! Earning points: Check our Current Offers page as often as you like to view the latest ways to earn points. Winning prizes: Once you have accumulated some points, visit Yahoo! Points to view the selection of prizes.

#### **How do I earn Yahoo! Points?**

To begin earning points, just enroll in the points program and continue using Yahoo! as you already do. Look for Yahoo! Points' gold stars in Yahoo! Shopping, Yahoo! Travel, and throughout Yahoo! -- these stars are displayed wherever there's an opportunity to earn points. Plus, sign up for a Yahoo! First USA Visa card and earn points on all your purchases.

Getting More Points (up to 5,000 per day)

#### **Yahoo! Shopping Introductory Bonus:**

Get 2 points for every Dollar you spend at most merchants! (Note: Shopping points are held as "pending" for 14 days.)

#### **Yahoo! Delivers Introductory Bonus:**

Read a Yahoo! Delivers Message - 20 points (Note: you must read it using Yahoo! Mail)

#### **Yahoo! Travel**

Buy an Airline Ticket - 150 points (Note: Maximum of 4 tickets per transaction and 3 transactions every 2 days)

#### **Yahoo! Visa**

Get 1 Point for every dollar you spend on your Yahoo! Visa Card Already have a Visa Card? Link your Visa account to your Yahoo! account. Don't have the card? Sign up now!

The essence of loyalty programs is that they reward customers for loyalty demonstrated through accumulated purchases. These rewards are also tied to continued loyalty to the seller, and are not portable. The switching costs in this case are then the lost accumulated benefits from incumbent supplier. Switching may not immediately lose these benefits, but they may expire, or they may not be usable until a threshold is reached that will require a return to the original seller.

Loyalty programs are becoming more and more common, as information and the Internet allow them to be fine-tuned more and more -- information on consumers can be collected, processed and stored much more effectively. In addition, they have an attractive feature that other lock-in strategies may not share: the lock-in is achieved with the active participation of the customer, who signs up, and then enjoys the challenge of maximizing her loyalty points. Loyalty programs permit enormous flexibility. They can be adjusted over time, and they can be used in various kinds of cross-promotions. Earning frequent flyer miles by staying in particular hotels or by using a particular credit card are common examples. Other firms may therefore buy into a share of the loyalty program, without having to run an independent program, though that is an option that more hotels are choosing, for example.

The first Application Box (previous page) gives an example of a fairly traditional loyalty program, but with an Internet twist. The Web portal, Yahoo! rewards its users for spending time looking at the content (and therefore ads) that it provides. This is a way of paying for attention, but the currency is not money, but Yahoo! Points. These can only be spent on Yahoo!, keeping the customer linked to the portal, and can only be used in increments, requiring consistent use of the Yahoo! service. The shopping and travel categories are traditional arenas for loyalty programs, but Yahoo! is able to capture the requisite customer information for running the program much more effectively than any of its partners (the providers of products and services) might. One peculiarity of the Yahoo! program is that members may participate in online auctions for prizes, using their accumulated points. This makes them aware of Yahoo's auction service, for example, and adds a further dose of entertainment to the customer's experience with Yahoo!

The second Application Box describes the details of DigitalPlanet's loyalty program. DigitalPlanet is not quite a portal, but more of an online community, though it could be characterized as a focused or narrow portal, if one wants to use the term itself broadly. The interesting aspect of this program is that members of the program can earn points directly for reading the content on Digital Planet's site, and for responding with reviews, comments and opinions. The online loyalty program is thus tightly integrated with the Web's fundamental role as an information source, its interactive nature, and its ability to gather in new information conveniently and continually. These features explain why loyalty programs will be an essential and growing part of the future of e-commerce.

### **Application Box** **Loyalty at DigitalPlanet**

Here is another example of a Web-based loyalty program:

With Digital Planet's Loyalty Points Program, you earn points every time you participate in the Digital Planet community.

#### **How do I join the Loyalty Points Program?**

By registering with the Digital Planet website. When you become a member of

#### **16.4 Network Effects**

Since the essence of the Internet is that it is an information and communications network, understanding the economics of networks is crucial. In this context, since the connectivity of the physical network is not an issue, what matters in particular is the various virtual subnetworks formed by communities of users. For example, AOL subscribers and eBay customers form different, but overlapping virtual networks. Each is a well-defined subset of the network of all Internet users. The latter is an amorphous, ever-changing group, while eBay customers are a more focused group that interacts regularly.



The essential economic idea that distinguishes networks is that the value of the network to any individual member depends positively on the total number of members of the network. Thus membership in a network by one individual creates a positive externality for others who are already in the network. In general, individuals are heterogeneous, and this affects their value to a network. An absolute novice chess player who joins Yahoo!Chess may add much less than someone who is a decent experienced player. A verbose, opinionated, ignorant member of a chat group may be less valuable to the group than someone without those qualities. If one ignores or averages out these heterogeneities, then a useful rule of thumb (typically known as Metcalfe's Law) states that the value of a network is proportional to the square of the number of users. This rule is simply derived from the fact that with  $n$  members of the network, the number of possible interactions is  $n(n - 1)/2$ . Also, observe that the value of a network with  $n + 1$  members is  $n(n + 1)/2$ . The difference between these is exactly  $n$ , which is the marginal value for everyone (those already there as well as the new person) of another user joining the network.

There are two implications of the above calculations. First, and most obviously, a larger network is much more valuable than a small network (the value increases as the square of the size), what economists refer to as increasing returns to scale. In this case, the economies of scale are generated on the demand side rather than the cost side, which is the usual case of economies of scale. Second, the externality inherent in a network raises individual switching costs, since the cost of switching reflects the size of the network. Switching away from a large network to a small one can be costly simply because of the difference in size. Furthermore, switching costs go down if enough people switch together, because of this externality.

In the presence of network effects, if an innovator is going to make inroads into an incumbent's network, it may need to engineer a collective switch to bring down individual switching costs enough. The incumbent's network may be large not only because of the network effects, but also because of the usual economies of scale on the supply side. The simultaneous presence of demand-side and supply-side externalities creates a positive feedback effect that reinforces an incumbent's advantage. The larger is the incumbent's network, the greater is its value, and the lower is the average cost of providing it. In outline, this is the theory that is sometimes used to justify the prediction of dominance by single firms-- monopolies -- in e-commerce.

Are network externalities and scale economies in e-commerce strong enough to lead to market dominance by single firms? This question does not, we think, have a unique general answer. This is because there are several kinds of networks involved. First, there are the physical networks that are components of the Internet. Cisco, which provides hardware and software components of this infrastructure, is commonly cited as a firm that benefits from the nature of networks, and as one likely to dominate the market. The users here are firms creating subnetworks, and they will prefer to use a single supplier. It seems that the economic argument here is based on other reasons for lock-in (product-specific training, durable purchases and search costs), and really has nothing to do with the network aspect of Cisco's business. Many other firms have competing

products which can provide similar functionality. Cisco's size is in large part due to its aggressive and successful acquisition strategy, rather than network externalities or increasing returns.

A second kind of network is the virtual networks of consumers created in different ways by companies such as Amazon.com or AOL. The attempt is to create communities of users or customers, who will not want to leave the network because it means giving up access to the benefits of that network. In this respect, AOL is different from Amazon.com, because nonmembers cannot access AOL's specific content and services, while anyone can go to Amazon.com and buy whatever is on offer. In any case, all these consumer-oriented portals or "front ends" attempt to offer bundles services or physical products to communities of customers that serve as virtual networks. In each case, though, the attempt to create a network is just one component of the e-commerce firm's lock-in strategy: customization, product-specific learning, and loyalty programs all play a role. It seems that only the last of these may be strong enough to actually achieve lock-in, though AOL's subscription approach, where cancellation is reputedly very difficult, has also been successful. None of these, however, seems to fit the requisites for single-firm dominance. If any candidate is likely for this dominance, it is software for online digital music delivery. In this case, consumers have to choose between different playback hardware, and will build up libraries of music. The network effect matters here if people share music, but again it is merely reinforcing other kinds of lock-in factors. In this case, technological compatibility is key variable, and we will treat this below.

A third kind of network is one of buyers and sellers. eBay, with its online auctions, is the most famous example of this in the context of consumers, though Amazon.com and Yahoo! have imitated it. In B2B e-commerce, Ariba, Vento, CommerceOne and I2 are firms that are attempting to set-up electronic marketplaces for various industries. Bricks and mortar firms are also entering this arena. We have discussed this topic already in Chapters 7 and 12, in the context of market organization and intermediary roles. Here we examine the issues of network effects and lock-in. The key idea is that a larger network increases the chances of finding the best possible match between buyer and seller, i.e., one where the surplus generated by trade is the highest. Therefore, a potential seller may prefer to list the good being offered on the auction site with the most potential buyers. In a case of positive feedback, potential buyers will wish to go to the site with the most items being offered for sale. These considerations favor the largest site, that is the one with the most seller listings, and the most buyer traffic. In practice, for example, eBay has been able to use its first mover status to achieve this size advantage.

In order for the above argument to work in the manner described, it must be the case that simultaneous use of different buyer-seller networks is impossible, or at least too costly. This is another example of the importance of switching costs as the basis for lock-in. An auction site such as eBay will want to lock-in buyers and sellers not only through the advantages afforded by its size, but also through small costs for listing (making multiple listing less attractive), unique convenience features, and bundled services such as escrow. At the same time eBay would oppose any development that lowers switching

costs, or reduces the relative attractiveness of having a large network. In particular, eBay has vigorously tried to block automated search services that scan across several auction sites to provide potential buyers with availability and price information. At the same time, smaller auction sites may not have this incentive, since such searches may help them gain traffic and customers. It is not clear, therefore, that network effects lead to dominance by a single business.

In general terms, we can think of standards and compatibility as the central issues for determining how market structure will evolve in the presence of network effects. As we shall explain next, compatibility and open standards reduce switching costs and help entrants versus incumbents. Standards enhance compatibility and make the network larger, but the network is not then controlled by a single firm. The openness of standards on the Internet and the World Wide Web is an important difference from the case of desktop operating systems, where Microsoft, through aggressive (and possibly illegal) tactics, was able to establish its Windows family of operating systems as a *de facto* standard. The Windows operating system is a proprietary standard, owned by Microsoft. The software that governs communications on the Internet is a standard, but it is not proprietary, but freely available for anyone to use. This difference is why it is unlikely that firms engaged in e-commerce can achieve the same kind of dominance in other markets as that achieved by Microsoft in desktop operating systems.

This does not mean that the strategic battle is irrelevant. In fact, Microsoft's strategic goal is to push its operating systems (such as Windows CE) as the drivers of all devices capable of Internet communications, and to develop versions of open software, such as Java, that work best with its own operating systems. The goal is to extend the reach of its proprietary software, as well as to reduce compatibility with competitors' products. The latter goal, therefore, is supportive of the former one (see the Application Box for another example).

#### **Application Box Microsoft and the Internet**

Microsoft has often been accused of trying to transfer its desktop operating system dominance to the Internet. Integrating its Web browser with its operating system, the focus of its antitrust trial, is one example. It has also been accused of designing its new Windows 2000 operating system to work well only in an all-Microsoft network (using its server software), putting network software competitors such as Novell at a disadvantage, and of not adhering to Web standards defined by the World Wide Web Consortium. These kinds of issues are being investigated by antitrust regulators in Europe, though Microsoft says it has done nothing illegal. Illegal or not, Microsoft's incentives to make its proprietary software a *de facto* standard on the Internet are clear.

"A Tricky Element in the Antitrust Battle: Microsoft's Server Tactics", *The Wall Street Journal*, Wednesday, April 19, 2000, p. B1

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products compatible with its own installed base, but incompatible with rival products. Achieving compatibility may not only be more costly, however, but it may also involve some sacrifice in performance (slowing down the working of the software, or increasing

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the likelihood of malfunctions due to the greater complexity). Carl Shapiro and Hal Varian, in *Information Rules*, have neatly summarized the strategic tradeoffs facing innovating firms along the two dimensions of performance versus compatibility and openness versus control. The strategies describing different choices are shown in Table 16.1, adapted from their book.

**Table 16.1: Generic Network Strategies**

|                      | <b>Control</b>       | <b>Openness</b> |
|----------------------|----------------------|-----------------|
| <b>Compatibility</b> | Controlled migration | Open migration  |
| <b>Performance</b>   | Performance play     | Discontinuity   |

The migration referred to in the table is that of users to the new product. An installed base of customers, such as Microsoft has, favors a compatibility strategy and a controlled (proprietary) standard. Control gives the firm lock-in, which is good *ex post* but, *ex ante*, control may make it harder to get customers to switch to the firm, because it decreases the value to them of the switch. A strong incumbent is less concerned with this *ex ante* problem. On the other hand, reduced switching costs raise customer value, and this pushes in the direction of openness and cooperative standards for innovators who are not incumbents. With open and cooperative standards, the competitive battle is not for the market (via the standard), but in the market (given a common standard), as is typically the case in non-network markets. Product differentiation and branding, pricing discrimination, and artificial lock-in (e.g., via loyalty programs) are all key strategic elements, as we have discussed in the previous three chapters. As we emphasized there, the more sophisticated use of information by firms and consumers may be more important for e-commerce than the economics of technological standards and compatibility in networks.

### 16.5 Managing Lock-In

Achieving customer lock-in is important even if network effects are unimportant. As Shapiro and Varian have emphasized, the economics of switching costs are crucial in understanding how to go about this. First, we discuss how they analyze the problem of valuing an installed base. We proceed in steps. If a firm has some quality or cost advantage, or matches the preferences of its current customer better than do rivals, then we have the following equation:

$$\text{Profit from a current customer} = \text{total switching costs} + (\text{actual or perceived}) \\ \text{quality/cost advantage}$$

‘Profit’ in this equation means the present discounted value of economic profit, or return above opportunity cost. Recall (Chapter 2) that economic profits can be zero even if a firm is earning accounting profits. If the market is competitive enough, then there will be

imitation and free entry, so that cost or quality advantage are eroded completely. We can focus on this case, where the above equation is simplified:

**Profit from a current customer = total switching costs**

This equation most dramatically illustrates the power of switching costs. They can be a firm's only source economic profits, if competitive pressures in the usual dimensions (pricing, product choice) are strong enough. The total value of an installed base is then the sum of the switching costs of the current customers, unless there are network effects. Remember that in a network, the collective switching cost is not proportional to the number of members of the network who switch, but rises less rapidly because of the benefit from others switching along with you.

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**Concept Check:**

The formula for the present discounted value of an annual payoff of \$x forever, at a discount rate of 100r % is  $x/r$ . If a customer provides an additional profit of \$10 per year forever (to keep the algebra simple), and the discount rate is 5%, what is the value of this customer? If the market is competitive enough so that there is no cost or quality advantage, and the total switching cost is \$120, is the customer worth acquiring?

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It is important to note that the total switching cost includes costs borne by the customer and those borne by the supplier to whom the customer switches. The customer may have to bear the costs of changing email addresses when she changes ISPs for Internet access, while the new ISP has to bear the setup costs for a new account (and some prorated share of its total cost of marketing to potential customers). Ultimately, the latter must be recovered from the new customer, and hence they represent part of the value that can be extracted by the current provider. To summarize:

**Total switching cost = cost borne by customer + cost borne by new supplier**

In this equation, the costs are those directly borne by the customer and the new supplier. In practice, the new supplier can make transfer payments to reduce the customer's cost of switching. This does not reduce the total cost of switching, it merely shifts the burden to the new supplier. Assuming that the new supplier will recover the total switching costs over time, the customer cannot really expect to gain from the switch (recall that we are focusing on the case of no cost or quality advantages) if that is the end of the story. However, firms sometimes try to induce customers to switch back. A customer who anticipates this may expect to gain from switching.

This cannot be the end of the story, since we have to consider the incentives of the firm that induced the first switch. If it was willing to pay the entire switching cost because it anticipated recovering that cost over time from the new customer, then the possibility that the customer will switch back must be factored into its calculations. However, this means that new customers who do not switch back must somehow pay enough to cover the costs of those who do switch back. The only way they can be induced to do so is if their switching costs rise over time. This again highlights the importance of loyalty programs and similar strategies. Without these approaches, competition for customers in the presence of switching costs may not be stable.

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**Concept Check:**

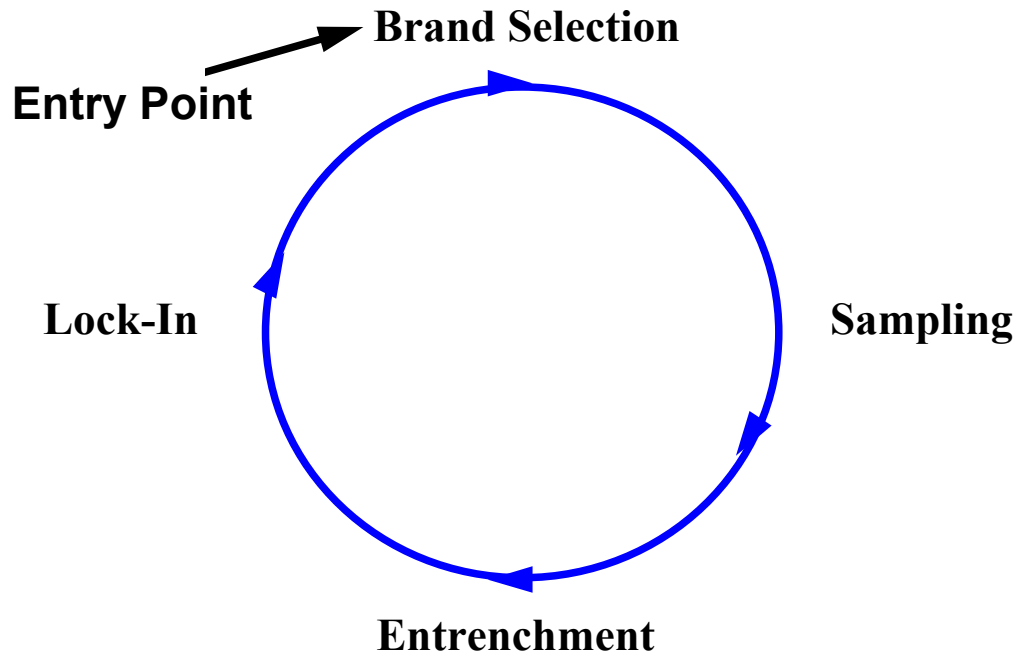
Suppose the cost of switching for a customer is the equivalent of \$50 in time and trouble, while the new supplier has to incur \$75 worth of marketing and account setup costs to make the switch. If the interest rate is 10 %, and the customer will generate \$15 extra profit per year forever, should the new supplier induce the customer to switch? How should it do so?

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One other practical aspect of inducing a customer to switch is worth noting. The new supplier can choose to compensate the customer for her direct switching costs in kind rather than with cash. For example, long-distance telephone companies can offer money for switching, but they can also offer instead a certain number of free minutes of calling. The latter may cost less to provide than their value to the customer. Again, we have to be careful to work out all the implications of this argument. If the phone company could have sold these minutes at the customer's willingness to pay, then it is forgoing revenue, and so it does not really gain with the shift from cash to an in-kind reward for switching. On the other hand, if the customer might use those minutes very slowly, or use them at off-peak times, when the cost to the phone company is even lower, there may be a real benefit. In general, these kinds of detailed considerations, informed by market research about typical customer behavior, may determine what is the optimal inducement to offer to promote switching.

The overall goal of a firm, therefore, must be to integrate strategy to promote switching into an overall strategy of managing lock-in. Shapiro and Varian describe the lock-in cycle, shown in Figure 16.1. Brand selection is an identifiable event, but the other phases of the cycle blend into each other. In fact, the seller trying to achieve lock-in would prefer that the customer is not aware of the process. Buyers therefore need to be forward-looking as much as sellers. They should bargain hard before they get locked in. A potential buyer can credibly threaten to not buy, she can try to convince the seller that she is a high-value customer or that she can influence purchase decisions of other customers. Potential customers can try to get protections for the future in any contract that produces lock-in, and in B2B transactions they can keep their options open through second-sourcing. In the information economy, information generated in a commercial relationship (service usage patterns, maintenance records, and so on) is often very valuable, and the buyer should retain rights of access to this information. In general, businesses must watch out for creeping lock-in as the result of decentralized decisions by different parts of the organization.

**Figure 16.1: The Lock-In Cycle**



Sellers have an incentive to promote lock-in of their customers, without getting locked in themselves (a potential problem in B2B transactions). They need to invest to build an installed base of customers, without spending more than a customer is potentially worth in future profits. Sellers need to aim for customer entrenchment, not sampling, and they need to lengthen the lock-in period, by strategies such as incorporating proprietary improvements, and designing products and promotions to get customers to invest in the seller's product. Where there are externalities due to network or reputational effects, sellers may also benefit from marketing aggressively to influential buyers. Finally, sellers can try to extract more value from their installed base ('leverage it' in popular business jargon) by selling complementary products and access to the installed base to other suppliers.

We can offer examples of some of these seller strategies in e-commerce. Amazon.com, AOL and E\*Trade are all good examples of firms that have invested heavily in building installed bases. Amazon.com has sold books at a loss to attract buyers to the Internet, AOL has probably offered free trial memberships to every household in the United States, and E\*Trade has pursued an aggressive marketing campaign, offering inducements such as frequent flyer miles and tax preparation software to those opening new accounts. Firms also offer inducements to existing customers if they get others to buy, sign up or deposit money. All of this is aggressive investment in building an installed base of customers.

These same companies and others illustrate strategies for achieving customer entrenchment. We have given the example of Yahoo's loyalty programs earlier in the chapter. Sellers of products can offer cumulative discounts, service providers like AOL

can offer more and more value-added informational services, so that a customer builds a history and comfort level with that provider. A financial services provider like E\*Trade may particularly benefit because of the value of the trading and investment history that is at the customer's fingertips. In general, customization of what is offered, based on the buyer's history, not only increases the value for the buyer, but it also increases the possibility of lock-in.

Amazon.com, AOL and E\*Trade illustrate aggressive attempts to leverage their installed bases. Amazon.com has steadily broadened its product offerings, and become a portal for a wide variety of sellers. AOL has increased its specialized content and added services like instant messaging (see Application Box). E\*Trade has purchased Telebank to offer banking services to its customers as well as its original set of financial services (stock trading and mutual fund investment). E-commerce is replete with examples of the principles outlined in this chapter.

### **Application Box**

#### **AOL: Installed Base Investment and Leveraging**

America Online is famous for building its installed base by aggressively courting new customers. Anecdotal evidence also suggests that it is difficult for subscribers to discontinue their AOL service. AOL has 22.2 million subscribers, several times its closest competitor's numbers. This installed base generates revenue from basic subscription fees, but an estimated 70% of AOL's profit comes from advertising and e-commerce businesses, which represent less than a third of revenue. At the same time, without the subscriber base, these profits would not be possible. This is a classic example of leveraging an installed base of customers. AOL has become a popular place for advertising by dot-com start-ups eager to build their own customer bases.

"AOL's profit Rose 7% in Third Period Due to Strong Ad, E-Commerce Growth", *The Wall Street Journal*, Wednesday, April 19, 2000, p. A3

## **16.6 Conclusion**

We can summarize the lessons of our analysis of switching costs and lock-in, in relation to our discussion in previous chapters, as follows:

- Understand the whole lock-in cycle and structure your deal explicitly over the cycle
- Understand your customers, their switching costs and their value to you
- Use product differentiation and cost leadership to earn supernormal profits, even as you compete for customers by reducing or paying their switching costs

One final related point is more general than the context of e-commerce, and that is the value of a brand name. Traditional businesses such as Coca Cola have illustrated the enormous potential value of a brand, and the importance of managing it. Very recently, Intel was able to take a product nobody experiences very directly, the PC microprocessor,



and create a powerful new brand (Pentium). In network markets, strong brands are especially valuable: they affect buyer expectations in a manner that can jump-start positive feedback. Preemption through deeds or words may help in building reputation, and Amazon.com and AOL are exemplars of this approach, in addition to its other strategic moves. What is perhaps most striking is that the speed of information dissemination over the Internet has accelerated also the building of these brands.

### Summary

- Irreversible investments create customer switching costs, and make lock-in possible.
- Irreversibility may be the result of technology, legal structures, or economic decisions.
- Technological and legal lock-in will generally diminish over time, but information-based lock-in increases over time.
- Loyalty programs are one of the most significant avenues for lock-in in e-commerce, because of the increased ability to manage customer information and to design customized programs. Loyalty programs also increase lock-in over time.
- Network effects are demand-side externalities: the value of a network to an individual depends on how many others are members.
- The open standards and compatibility of the Internet makes network effects alone unlikely to be the basis for lock-in, but they can reinforce the effects of lock-in strategies, as well as the effects of conventional (supply-side) economies of scale.
- Switching costs are a key component of the value of an installed base of customers.
- A successful strategy will include management of the lock-in cycle (selection, sampling, entrenchment, lock-in) and the customer installed base, as well as conventional strategies of cost leadership and product differentiation.

### Questions

1. In their book, *Information Rules*, Carl Shapiro and Hal Varian consider technological (hardware and software) standard setting strategies in great detail. Much of this struggle is under the surface of e-commerce, because consumers just see the pleasant user interfaces, not the programs and machines that allow them to run. Yet much of the discussion of dominance due to network effects focuses on consumer-oriented companies such as Amazon.com and eBay. What do you think of the potential for e-commerce dominant firms to emerge?
2. Continuing with the theme of dominance, what do you think has been the key to the huge success of companies such as Coca Cola and Walmart? What lessons do these companies provide for e-commerce upstarts?
3. In the numerical examples in this chapter, lock-in was assumed to be forever. How do your present value calculations change if the customer stays with the firm for only

a few years? How can a firm tell how long a customer will stay with them after switching? What can a firm do to prevent switching back?