

## **Information Rules: A Strategic Guide to the Network Economy**

By Carl Shapiro & Hal R Varian  
Harvard Business School Press, 1999

### **Introduction**

The main thesis of this book is that while technology may change, economic laws do not. The authors, Carl Shapiro and Hal Varian point out that the information economy is driven by advances in information technology and infrastructure. What is new is, not the total amount of information available but our ability to manipulate information across industries. Technology is allowing people to do more with the same information, by improving access and reducing the cost of storing and transmitting information.

### **Information Rules**

The rules of competition in information markets need to be carefully understood. Information is costly to produce but cheap to reproduce. The fixed cost is high but the marginal cost is close to zero. In this kind of scenario, cost plus pricing does not make sense. What is needed is value based pricing.

Information products are also subject to network externalities. The value of information products depends on how many other users there are. As the installed base of users grows, the value of the product increases. More and more people feel it worthwhile to buy the product. Eventually, the product achieves critical mass and takes over the market.

To minimize dissonance and risk, consumers like to experience information to understand its value, before they would like to actually buy the product. How to give away information to let people know and experience what is on offer and charge them for it to recover the costs is a fundamental problem in the information economy.

To gain critical mass, technology alone is not enough. Consumer expectations have to be shaped. The product that is expected to become the standard will become the standard. So companies must do their best to convince customers that their products will ultimately become the standard. Timing is very important in information markets. Moving too early may involve making compromises in technology. Moving too late may mean customers could get locked into rival technologies.

### **Pricing**

Information is costly to produce but cheap to reproduce. Once the first copy of an information good has been produced, multiple copies can be produced effortlessly. For

all practical purposes, capacity can be increased indefinitely. Consequently, information markets are characterized by imperfect competition.

To succeed, companies must either become the price and cost leader or they must create a unique information resource and charge for it based on the value that it offers to consumers. Even if it is a monopoly, the price must be arrived at carefully to maximize profits.

The internet allows the price to be personalized, according to the customers' interests. Three kinds of differential pricing are possible:

- Personalized Pricing: Sell to each user at a different price
- Versioning: Offer a product line and let users choose the version of the product most appropriate for them.
- Group Pricing: Set different prices for different groups of customers.

### **Versioning Information**

Different versions of the same information can be offered to suit the needs of different customers. Customers differ widely according to how eager they are for various types of information. Some customers want real time information. Others are prepared to wait. This is the basis for the versioning tactic of delay. Another possibility is to provide high paying customers with more powerful search capabilities. Yet, another strategy is convenience, i.e. restricting the time or place at which an information service is used. Image resolution, speed of operation, flexibility of use, comprehensiveness, features and functions can also be used to version information.

The goal of versioning is to sell variations of the same product to different market segments at different prices. Versioning information is unique in that it just about costs the same or even less to produce and distribute a high quality version. In many cases, additional costs are involved in diluting the high quality version into a low quality one!

When both online and offline versions of the same information are offered, the key issue is whether they are complements or substitutes. If it is a substitute, the online version should be charged to minimize the impact of cannibalization. If it is a complement, the online version should be promoted aggressively to boost sales of the offline product. The online version can also be used to provide value in ways that the offline version would not be able to provide. For example, online information can be searched, sorted or filtered electronically.

The different constituencies can be identified for the information sold. If there is little likelihood of user confusion, different versions can be offered. On the other hand, mass market products must be offered in just one or two versions to leverage network externalities. Sometimes, users have trouble identifying which product is appropriate for

them. So high end and low end products can be offered to push customers towards the compromise choice which lies somewhere in the middle.

Bundling is a special form of versioning in which two or more distinct products are offered as a package at a single price. The price of a bundle is usually less than the sum of the component prices. So a bundle is effectively a way of offering one product to customers who would buy the other product at a smaller incremental price than the stand alone price. Bundling is also a useful marketing technique when customers would like to retain the option to use other components.

### **Rights Management**

Many of the tried and trusted laws of intellectual property hold good in the information world. The main difference is that reproduction and distribution costs have been significantly lowered by digital technology. Rights management has to take into account the trade off between control and customer value. The more liberal the terms under which customers can access the product, the more valuable it is to them. A product becomes more valuable if it can be shared, loaned, rented, or repeatedly accessed. But more liberal conditions also create more competition and the possibility of cannibalization, eg from rental/resale markets. In short, the more generous the terms under which intellectual property is offered, the more that can be charged (as customers perceive more value) and the less that can be sold.

### **Lock-in**

Buyers tend to incur costs when they switch from one information system to another. When these costs are very high, it is called lock-in. The supplier may also bear some costs when acquiring new customers. This together with the customer's switching cost gives the total switching cost. In general, profits are equal to the total switching costs plus the value of the other competitive advantages the supplier enjoys by virtue of having a superior product or lower costs than its rivals.

Lock-ins can be of various types:

- Contractual commitments – penalty clauses/liquidated damages
- Learning a new system
- Converting data into new format
- Search costs involved in identifying new suppliers
- Loyalty programs
- Follow on products and consumables that work with the originally purchased durable equipment.

Customers who fail to understand switching costs run the risk of being exploited by suppliers. Buyers can deal with lock-in by bargaining hard at the outset for various concessions. Indeed, the best time to bargain is before the deal is struck. If the buyer can convince the supplier that the current system is working fine and the switching costs are quite high, the chances of striking a good deal are high. The buyer can also try to make out a strong case for a very attractive package on account of the substantial follow-on purchases. The buyer can also hype up its ability to influence the purchasing decisions of other parties. A really smart buyer will try to extract major concessions early on by trying to project a picture of very high switching costs. Later, the buyer will attempt to make out a case that the switching costs are not high, to prevent the supplier from dictating terms.

Sellers can deal with lock-in by investing heavily to build an installed base of customers, encouraging customers to invest more and more in the system and maximizing the value of the installed base by selling complementary products to loyal customers. The goal must be to ensure that customers become more and more committed to the vendor's products, technology and services. Offering a large collection of attractive complementary products will result in a major competitive edge. Even if the supplier cannot sell complementary products to the installed base, it can allow others to access its customer database.

When there is a large base of locked-in customers, there will be a temptation to set higher prices. Since high prices will shut out new customers, the supplier must find a way of offering a selective discount to customers who are new to the market. Price discrimination in the form of selective discounts for new customers is one way of dealing with the problem. But while making these special offers, care must be taken not to alienate the installed customer base.

### **Networks and Positive Feedback**

Whereas the old economy was driven by economies of scale, the new one is driven by the economies of networks and positive feedback. The value of connecting to a network depends on the number of other people already connected to it. Other things being equal, it is better to be connected to a bigger network. Positive feedback makes the strong get stronger and the weak get weaker. In its most extreme form, a single firm or technology may completely dominate the market.

Building a network involves more than just building a product. Finding customers, building strategic alliances, and taking people along are critical success factors. In the early days of the network, the main challenge is to overcome the collective switching costs of all users. This can be done through two basic strategies: *evolution* and *revolution*. Evolution means incremental change by ensuring compatibility with existing products and facilitating customer adoption. Revolution means coming up with a significantly superior product.

Evolution focuses on reducing switching costs so that customers can try the new technology. Three strategies can facilitate this: good engineering and product design; systems approach and bridge technologies. However, it must be kept in mind that incumbents with intellectual property rights over an older generation of technology may create hurdles.

Revolution involves offering a distinctly superior product, with compelling performance and capable of attracting pioneering and influential users. Later, more people can be attracted by creating a strong perception in the market about the inevitable success of the product. The revolution strategy is inherently risky. It cannot work on a small scale and usually requires powerful allies. There is always the risk that the technology may not take off.

Another important decision is whether to keep the system proprietary or open. Proprietary control can generate great profits if the product or system takes off. But for the system to take off in the first place, openness is necessary to attract allies and customers. Broadly speaking, openness, helps expand the cake, while control helps increase the share of the cake. Openness is a more cautious strategy than control. Openness aims at opening up the market. There can be different shades of openness and control of course.

It all depends on how well the company is placed to ignite positive feedback on its own. Three factors are involved here: existing market position, technical capabilities and control of intellectual property. Openness is useful when no one firm is strong enough to direct or dictate technology standards. When multiple products must work together, making it important to facilitate coordination in product design, openness is again useful. Openness is usually preferred by upstarts to neutralize installed bases advantages or to help assemble allies. Incumbent market leaders are often less interested in openness.

### **Generic Strategies**

Four strategies are possible while launching information products.

*Performance play* involves a new technology with proprietary control. This strategy makes sense if the new technology offers substantial advantages over existing technology. Performance play is also attractive to outsiders with no installed base to worry about.

*Controlled migration* means offering a new technology compatible with the existing technology but retaining proprietary control.

*Open migration* means compatibility with existing products and openness. This strategy which involves low switching costs, often makes sense when the firm's competitive advantage is primarily based on manufacturing capabilities.

*Discontinuity* means new technology incompatible with existing technology but following open standards. Such a strategy favors suppliers who are efficient manufacturers or are well placed to provide value-added services or software enhancements.

### **Cooperation and Compatibility**

Identifying early on the allies and the enemies is important in network markets. Network economies and positive feedback make cooperation important. But after standards are established, cooperation may change to competition. These days, we hear the term "co-opetition" being increasingly used.

Standards reduce the technology risk faced by consumers. Truly open standards make consumers less concerned about lock-in. Standards shift the focus of competition from an early battle for dominance to a later battle for market share. Standards also move competition away from features, toward price, because many features are common across competing products. While reducing compatibility problems and expanding the market, a more extensive standard also reduces the scope for differentiation. Sometimes, vendors may find it better to live with some incompatibilities and a smaller total market in order to limit price undercutting and increase the scope for differentiation. Players can also try to differentiate by developing proprietary extensions, while still maintaining some degree of backward compatibility.

Standards tend to shift the focus of competition from systems to components. Specialists tend to thrive when there are clearly defined interface standards. Generalists and systems integrators tend to thrive in the absence of compatibility. For customers, standards reduce the risk of being locked in to a particular vendor but also result in less variety. Sellers of complements welcome standards so long as their products comply with the standard.

Product standards for new technologies can be a serious threat to incumbents. The standards if established, can cannibalize sales from the older technology. Incumbents can react in various ways. They can block backward compatibility, launch their own technology that is backward compatible, or allie with the new technology.

Most standard setting takes place through a formal standard setting process established by various standard bodies. There are hundreds of official standard-setting bodies through-out the world. While involved in setting up a formal standard, it is important to determine the goal at the outset. If the goal is to establish a standard in incorporating proprietary technology, formal standard setting does not make sense. When network

externalities occur at the national level, engaging with the global standard-setting organizations can be avoided. Often, the most sensible thing to do is to show up at standard setting meetings to make sure a consensus adverse to the company's interests does not form.

Alliances can play a crucial role in information markets by reducing time-to market and providing an edge in developing improvements. Two sides may realize they can make more money in peaceful coexistence than in a standards war. Building a coalition is very much a political process. The concerns and options of the potential partners must be understood carefully.

In assembling allies, it is important to offer inter connection or compatibility. But this should be done on terms that reflect the company's underlying strength and suitable restrictions so that the company will not end up losing its control over the network subsequently. Sometimes, alliances serve as a means of preventing war. The stronger the existing market position, technical capabilities and control over intellectual property rights, the less important the allies and the more easily they can be played off against each other. Unwieldy alliances consisting of companies with very different interests must be avoided.

There are three ways in which the negotiations between players backing rival standards may proceed. Both sides may decide to fight rather than join hands. This typically happens when customers are looking for variety, standardized products are likely to lead to low profit margins or when each side is confident about winning the war. In other cases, the two sides may prefer to push their standard given the choice but are predisposed to switch than fight. Both sides realize they are better off cutting a deal than entering into a fight. In the third scenario, one player is strong and the other weak. The strong player can dictate terms such as limiting access to its network or charging for interconnection or compatibility. The weak player has no choice but to oblige.

Truly open standards face two fundamental threats. Who will set the direction? Who will invest the resources to make improvements and thus keep the standard from stagnating? Open standards are prone to splintering, i.e. multiple incompatible versions of a standardized technology. So retaining limited control over the technology is important even when establishing a common standard. As long as commitment is demonstrated to openness, allies may be prepared to cede limited control and allow one company to guide the future evolution of the standard. This is probably what Cusumano and Gower call "Platform Leadership" in a book they published much later. Microsoft, Intel, Cisco, etc are all platform leaders.

### **Standards Wars**

Standards wars are unique to network markets with a powerful positive feedback. Not all standards wars are alike. The magnitude of switching costs or more generally, the

adoption costs for each rival technology makes the big difference. In some standards wars, the rival technologies may be incompatible with each other but may be compatible with the older established technology. In other wars, one technology may be backward compatible but the other may not be. Finally, neither technology may be backward compatible.

The ability to stage a standards war effectively depends on seven factors: control over an installed base of users, intellectual property rights, ability to innovate, first mover advantages, manufacturing abilities, strength in complements and brand name and reputation.

There are two broad tactics which can be used in a standards war: pre-emption and expectations management. Preemption means building an early lead so that positive feedback works for the company and against the rival. One way to pre-empt is to be first to market. Product development and design skills can be critical to gaining a first mover advantage. But early moves increase the risk of dilution in quality and a greater risk of bugs.

Customer expectations must also be managed carefully. One way to do this is by assembling allies and making grand claims about the product's current or future popularity. However, this option may not really be available to an industry new-comer. Vapourware, which involves announcing a product to freeze the rival's sales, has been used effectively by companies like Oracle and Microsoft.

Even after winning a standards war, companies must be careful. Technology keeps advancing. Moving early often involves making technical compromises. This gives others space and motivation to execute an incompatible revolution strategy. One way to grow even after installing a large customer base is to give substantial discounts to attract the remaining customers who are somewhat reluctant to pay for the product. Companies can also leverage the installed base and move into adjacent product spaces. But often a better strategy is to encourage healthy competition in complementary products. This stimulates demand for the core product. Geographic expansion is another possibility. The installed base in one region can become a source of competitive advantage in another region.

### **Information Policy**

Managers in the tech industry cannot afford to ignore the government's role. Tech industries are often subject to large increasing returns to scale, leading to concentration. The resulting monopolies will continue to attract the attention of the government. Anti trust challenges must be anticipated both from rivals and government. Understanding competition policy also helps the company to protect its interests when other companies are breaking the rule. While taking care not to violate competition laws, companies must not imagine ghosts where none exist. They have

considerable scope to engage in differential pricing. Versioning and differential pricing which are effective marketing tools in industries with large fixed costs and small marginal costs, are rarely subject to antitrust attack. Competition policy is intended to ensure a fair fight, not to punish winners or protect losers. If a company ends up dominating the market by offering lower prices and better products, there is nothing to fear from the antitrust laws. Companies should not be afraid of cooperating with other companies to set standards and develop new technologies, as long as the efforts are aimed at benefiting consumers. At the same time, the antitrust angle should never be ignored. It makes sense to audit business practices from time to time to ensure that anti trust laws are not violated and more importantly be better prepared to face anti trust challenges as and when they arise. Companies like Intel do this.

### **Conclusion**

The information economy offers exciting opportunities to companies. Taking note of how the information economy works and how players compete is important. While there are significant differences between the information economy and the old economy, fundamental principles remain the same. It is all about proving value to the customers at the right price.