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Network Markets & Strategies in Respect of Innovations

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Research Paper - Commerce

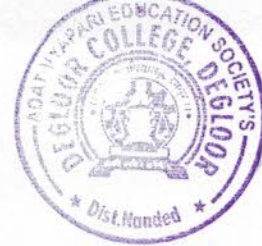
ABSTRACT

Network markets are everywhere in the 21st century, a prevalent reminder that we are in an information age brought about by the information revolution. Prior generations of firms had to learn how to compete in markets brought about by the industrial revolution. In this century, many more will have to learn how to compete in a network market. This research-paper attempts to summarize basic concepts relevant to competition in these markets. What do we mean by a "network market" and a "network effect," and how can firms compete through "innovation" in these markets? How does the type of innovation matter? How does the firm's position incumbent or challenger matter? What are the relevant issues? Although these concepts and issues are not new, much of our thinking about them is.

Keywords: Primary & Secondary Markets, Innovations, Tactics, Profit Motives.

Introduction:

The dominant characteristic of network markets is that the value of the product increases as the number of adopters increases. The marginal increase in value that these



adopters attain when one more person joins the network is called a network effect. In short, the size of the network (installed base) creates a benefit, which is independent of any product features, quality, or even the image of the product-and this changes the nature of competition (Farrell & Saloner, 1985, 1986; Katz & Shapiro, 1985, 1986, 1992).

A fax machine, for example, is useless if it is the only one in existence, regardless of any "exceptional" features. Its value increases as the number of fax machines with which it can communicate increases. Therefore, we say a compatible set of fax machines form a communications network in which network effects are direct. However, indirect network effects can also arise when different components-such as hardware and software-work together in a system, and the value of one increases as the installed base of the other increases. A video game console, for example, becomes more valuable the larger the installed base of games it can play. An audio playback device such as the iPod becomes more valuable as the library of music it can play grows larger (Clemens & Ohashi, 2005; Gallagher & Park, 2002).

Network markets are not new. FM and AM broadcasting systems exhibit network effects, as do electric transmission systems and even the relatively ancient Pony Express. However, network markets are arguably much more prevalent this century, given the central role of new communication and information processing technologies in our lives; many of us have had to choose among mobile phone operators, for example (Birke & Swann, 2005). When one also considers that the firm, as we know it, has only existed for a century or two, it becomes clear that we have a lot to learn about competition in these markets (Chandler, 1977).

This research-paper addresses this emerging area of knowledge and focuses on technological innovation as a strategy in these markets, particularly product and systems innovation. Whether innovation in a network market is likely to capture share and profits clearly depends on several factors. Prominent among these are (a) market structure-whether the market remains competitive or is dominated by a monopolist; (b) the position of the innovator-peer, challenger, or monopolist; and (c) the type of innovation-the extent of compatibility and improvement it provides relative to competitors'



products. Radical innovation provides large improvements and incremental innovation, small ones.

Network Markets?

Each scholar has his or her favourite source of knowledge regarding some phenomenon. This case is no different. There appear to be four major research streams that introduced ideas related to network markets, what they are, and how they differ from the traditional markets that scholars had previously focused on. These sources consist of (a) business histories such as the VHS and Beta wars documented by Rosenbloom and Cusumano (1987); (b) Arthur's (1989) analysis of increasing returns; (c) David's (1985) description of how expectations and compatibility issues lead to path dependence; and (d) the formal economic models developed by Farrell and Saloner (1985, 1986) and Katz and Shapiro (1985, 1986), which described network effects and how they affect competition and social welfare. This latter body of work is broadly referred to as network externalities theory.

Winner Takes All:

To date, most studies of network markets have focused on the dynamics of competition in emerging markets. Proponents of network externalities theory assert that incompatible technologies compete intensely in emerging markets, but when consumers expect the installed base of one technology to become larger than any other, they adopt that technology en masse, abandoning any other. That point where consumers expect a technology to win is called a tipping point because the market tips to adopt that technology to the exclusion of any other.

One of the most notable aspects of competition in these markets is that it becomes a do or die proposition. Competition is particularly intense because just one technology remains standing. If one firm has proprietary access to that technology, the end result is one monopoly and monopoly profits. The other competitors are vanquished and retain virtually no market share. Moreover, such a monopolistic position appears quite sustainable, since network effects deter others from competition. As a result, these monopolists have been considered invulnerable.



Thus, the term winner-takes-all characterizes this type of competition. The winning firm, that which owns the most popular technology, takes "all" the profits. Fringe competitors and new entrants bite the dust. Microsoft's monopoly share of the desktop (notebook) operating system market is a popular example of such a winner-take-all position.

Opportunities and Compatibility:

Key to this dynamic are the roles of expectations and compatibility. Expectations are self-fulfilling in network markets; they create a positive feedback loop. When consumers expect a product will attract the most consumers, they will buy that product, which causes the market to tip and that product to have the largest installed base. In competitions between systems that exhibit indirect network effects, consumer expectations about the availability, price, and quality of some components can be determinative when other components must be bought first. If consumers do not expect software components to be available, for example, they will not buy hardware components and, hence, the overall system. Expectations regarding these components determine which technological system wins the market.

As a result, firms have strong incentives to build expectations about their own products and tear down expectations about rival products. Some of the legitimate ways firms build expectations are through sources of competitive advantage such as established reputations, well-known brand names, and visible access to capital. Less legitimate tactics such as preemptive product announcements and predatory pricing have received the attention of antitrust agencies such as the Department of Justice in the United States and its counterpart in the European Union. Apparently, the promise of sustainable monopoly profits promotes hypercompetition that walks a fine line between business practices that are considered predatory and those that are not (Sheremata, 1998).

Firms without the previously mentioned sources of competitive advantage are more likely to pursue an open systems strategy in which technological specifications are made available to encourage compatible product development and larger networks. These firms are more likely to prefer to compete through compatible products. They compete within-rather than between-standards, those technological specifications that determine the extent to which products can work together. In contrast, firms that do have established



reputations, large sources of capital, and other advantages are more likely to compete through incompatible products-between standards (Besen& Farrell, 1994).

Compatibility has been broadly defined as the ability of a product to work well with another (Farrell, 1989). More specifically, communications networks are incompatible when a subscriber of one network cannot communicate with those on another network; "hardware/software" networks are incompatible when components of one system do not work with components of another system. EMI produces CDs, for example, that are "copy controlled" so they cannot be played on an iPod through iTunes. These CDs are components of audio systems that are incompatible with the iTunes system.

David (1985) explained the critical roles of expectations and compatibility in his history of the QWERTY design, which still dominates (as you can see from the top row of letters on your keyboard). He argued that this dominance is a historical accident because this sequence was chosen to prevent mechanical keys from jamming in a typewriter, which is no longer a problem. This design became locked in, meaning users became highly resistant to alternatives because it was the first to be widely adopted. Subsequent designs were incompatible and created switching costs for (a) typists who had learned the QWERTY design and (b) institutions that had trained them to type at record speeds. If these users and institutions switched to new designs, their prior learning and skill base would become worthless.

The QWERTY story and Rosenbloom and Cusumano's (1987) history of the home video wars (Beta vs. VHS) were among the first to capture the essence of compatibility issues in hardware/software network markets, where systems compete for market share. In the QWERTY case, the keyboard is the hardware; typist and training skills can be considered software. In the home video case, the recorder/ playback device (the VCR) was the hardware; the videotape was the software. The primary issue in these markets was whether software components designed to work in one system would work in another.

Typists trained to speed-type on QWERTY keyboards would find their skills devalued (and perhaps useless) if another design replaced QWERTY-even if it were technologically superior and allowed a new generation to type twice as fast. When VHS



won its standards war-when a majority of consumers expected VHS would become the most popular format, causing the market to tip to the

VHS standard-consumers abandoned their Beta tapes and VCRs in droves, so they could access the variety of VHS tapes that quickly flooded the market. Some became dual households for a while, but eventually folded. Hence, we come across a phenomenon that plays a big part in adoption decisions: the fear of being stranded. If consumers adopt the losing technology, their prior investments in learning, skills, hardware, and software libraries lose substantial value. They will not be able to access future improvements associated with the winning technology.

Co-ordination in Systems Competition:

A system consists of two or more components and an interface that allows them to work together. Hence, competition among systems brings up the issue of coordination (Katz & Shapiro, 1994). Consumers coordinate their choice of hardware based on their expectations of software availability (or other components). At the same time, firms must ensure sufficient "software" components are available for the "hardware" they produce. They can accomplish this by (a) owning all the relevant components, (b) establishing long-term contracts with other component owners, or (c) participating in formal standard setting bodies (such as the American National Standards Institute and the International Standards Organization).

Consider the generation of camcorder consumers who have been stranded with 8-mm videotapes of priceless family moments and (virtually) no devices with which to play them back. Markets have moved on to produce and adopt other camcorder formats, which (arguably) provide better performance (in some dimension) or are more cost-effective for the majority. Although many 8-mm consumers also bought new and incompatible generations of camcorders, we suspect they did not foresee that newer formats would eventually eliminate support for prior standards, leaving them without devices to play back birthday parties and weddings. But so it has been, since the dark ages of the 33-inch LP (long playing vinyl record) and even before that. When consumers adopt new and differing technologies so quickly that stranding is excessive and (overall) value is destroyed, we say these markets exhibit excess momentum (Farrell & Saloner,



1986). In an attempt to solve this problem, consumers may delay their choice of technology until they can be relatively sure they will not be stranded. In some cases-where technological change moves quickly and a variety of products are available based on competing standards-consumers can delay purchases indefinitely. As a result, these markets display excess inertia. They either fail completely because there is no foreseeable market large enough to sustain these products, or they fail because no single technology (firm) can attain a share that is large enough to generate profits.

Now consider Apple's iPod as a hardware component in a competition among portable audio playback systems. This hardware/software system has become a dominant standard for consumer playback of audio-on the go-and seeks to include more functionality by adding interfaces to a broader set of components. One of those components is Microsoft Outlook, which maintains contact data such as addresses and phone numbers. Apple provides instructions on how to import contacts from Outlook, and the result (when it works) is truly more functionality and ease of use. However, slight shifts in interfaces between components can create incompatibilities and what is, theoretically, a simple import can become a very complicated exercise.

Competition in Network Markets:

Economists have produced the lion's share of what we know about network markets. The pioneering work of Katz and Shapiro (1985, 1986) and Farrell and Saloner (1985, 1986) has been particularly productive. Overall, however, economic research has focused on market failures. Social (producer and consumer) welfare is reduced when networks are underutilized, meaning users do not join a network that would benefit them or they cause excessive stranding by joining networks too quickly. Economists see this as a coordination problem that can sometimes be avoided by integrating components within one firm or having large buyers sponsor networks. There are also pricing, contract, advertising, and reputation mechanisms that firms can use to integrate component owners and convince consumers that a network will grow.

Economists are also concerned about the longevity of monopolistic power derived from network effects, since it appears immune to competitive attacks (Microsoft's hold on desktop operating systems is a good example). They are usually concerned about the



threat (to social welfare) of monopolistic prices and hefty margins. However, economists disagree about the ultimate effects of monopolies. Schumpeter (1950) argued that monopoly profits were important sources of funds for large-scale innovations, while management scholars argue that monopoly profits increase wealth, employment, and (sometimes) technological innovation. What management scholars share with economists is an interest in (a) how challengers can compete against dominant incumbents and (b) innovation? Many economists have concluded that the sheer longevity of a monopoly protected by network effects can reduce the speed of innovation, while an important segment of the management community focuses on how firms can successfully compete through innovation. Despite this commonality, few in the management community have studied competition in network markets.

The remainder of this section summarizes what we know about strategic management in emerging network markets, after which we will return to the following issues: (a) How can a challenger compete against a dominant incumbent in a network market, and (b) how can firms compete through innovation in these markets? As we shall see, these issues require a more in-depth analysis of the type of innovation through which a challenger can compete as well as the market itself. Apparently, more comprehensive analyses of innovation types and market characteristics bring us, full circle, back to traditional competitive strategies such as product differentiation. T

Tactics in Emerging Markets:

Strategic management scholars are not interested in determinative theories of monopoly power. Because they focus on how firms can compete, scenarios where profits are locked up for generations hold less interest for them than those where competition can lead to market share and profits. As a result, most management studies to date have focused on how firms should compete in emerging network markets-those that have not yet tipped-before the winner takes all.

Both economists and management scholars have identified tactics that firms can use to attract consumers to networks in emerging markets. Among others, these include

- (a) Making credible and binding pricing commitments;
- (b) Opening the market to software suppliers to ensure users of an alternate "second



- source" supply
- (c) Renting rather than selling hardware so firms incur risk rather than consumers
 - (d) Integrating, or forming an alliance, to signal commitment to sell both hardware and software
 - (e) Penetration pricing, providing steep initial discounts
 - (f) Making sunk investments to show commitment to software supply while signaling expectations of heavy demand
 - (g) Holding important firm assets such as reputation hostage (Katz & Shapiro, 1994).
- All of these tactics can affect expectations and, therefore, influence the market to tip toward a firm's product.

Strategies in Emerging Markets:

Besen and Farrell (1994) are among the few who have tried to take a comprehensive look at competition in these markets from a strategic management perspective. Given a competition between two firms in an emerging network market, they focus on a basic strategic choice: Should a firm prefer to compete within or between standards? That is, should a firm make its products compatible with those of its rival, competing within a standard, or should it make them incompatible, competing between standards?

The key question for firms is whether competing for, or within, the market is more profitable. When firms are symmetrically positioned with respect to resources, reputation, and other sources of advantage, Besen and Farrell (1994) assert that a firm's return will depend on two variables: (a) the degree of skew in expected returns and (b) the sharpness of available tactics. The more skewed returns are, the harder firms will fight, and the sharper the available tactics, the more fighting will dissipate profits.

From these two variables, Besen and Farrell (1994) formulate three scenarios: (a) "Tweedledum and Tweedledee," in which both firms prefer to compete to set the standard and so have a standards battle; (b) "Battle of the Sexes," in which each prefers its own technology as the standard, but also prefers compatibility with its rival's standard to going it alone—compatibility is important and both prefer to compete within a standard; and (c) "Pesky Little Brother," in which one firm prefers to maintain its technology as a



proprietary standard, but the other wishes to join its rival's network. They provide more detail on the competitive dynamics that ensue and an entertaining account of each scenario.

Conclusion:

The field of strategic management is in its infancy, compared to others. It has only been a couple of decades since the field coalesced around concepts promoted by Porter (1980), Schendel and Hofer (1979), and Mintzberg (1977), among others. Porter's work is particularly relevant to our topic because he built upon economic theory to produce a framework for strategy formulation that has proven remarkably durable. Some have suggested that network markets challenge that framework. Porter (2001) himself, however, demonstrated that his models apply to Internet and information-related markets. His frameworks clearly provide valuable insights to any industry.


That said, traditional strategic frameworks simply do not address the unique facets of competition in network markets. They do not address the central idiosyncrasies of such competition, and so fail to capture the essence of competing in these markets. Like the "dark side" of the Star Wars series, the "demand side" of competition-the demand-side economies of scale that characterize network markets-are unfamiliar to many and present unique challenges. Let us return to what we do and do not know about these markets. We know some of the basic dynamics of competition in emerging markets, but far less about how to compete in markets that have already tipped.

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