

# Future Scenarios for the Telecom Industry— A Ten-Year Forecast

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**F**orecasting the fate of an industry is dangerous conjecture. It is especially dangerous when one contemplates the telecommunications industry. The sheer size of this industry translates into a myriad of intangible opportunities, hazards, and pitfalls. The pace of technological change spurred by the communications revolution—and its resultant impact upon peripheral enterprises—is effectively transforming all aspects of human endeavor. Any serious attempt to forecast the transformation of this industry represents, by implication, an effort to outline the future structure and productivity of national, indeed international, economies.

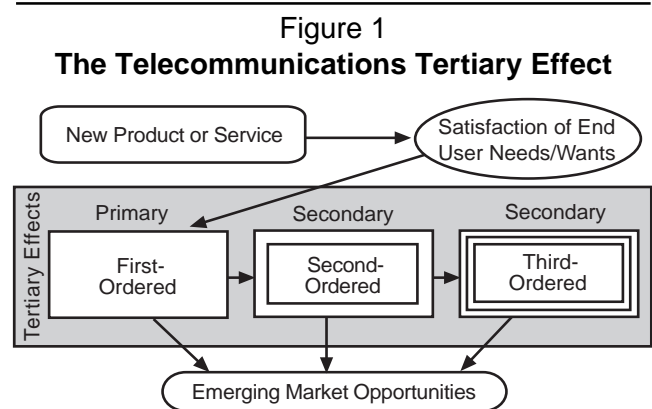
Despite this daunting task, we cannot plan unless we have a sense of where the telecommunications industry is headed. In defining a set of scenarios, the author does not presume that one scenario is intrinsically more probable than another, he merely contends that forces presently in place have impelled both the industry and economy to move along a path which isolates the following outcomes as most likely. In the end, the status of the industry in the year 2007 will,

most probably, be a function of the assimilated legal, regulatory, political, technological, and organizational dynamics presently installed. It is on this basis that we are permitted the opportunity to project the future.

## The Tertiary Effect

Economists refer to the “tertiary effect” in describing the commercial impact of emerging telecommunications technology. Tertiary consequences, and the opportunities they promote, are largely unanticipated by producers at the time a new product or service is introduced. The tertiary effect, given the driving economic influence of telecommunications, is shown in Figure 1.

The model identifies the unfolding market effects of telecommunications innovation. When a new product is introduced, serving its constituency, we immediately note a primary tertiary effect unintended at the time. For example, the development of network television effectively created first-order tertiary effects: New sales and maintenance professions, along with



Source: J. K. Shaw

support services required to sustain them, were immediately necessitated by the innovation. A second-order tertiary consequence (all consequences precipitated by the primary effect are categorized as secondary) was the impact felt by the motion picture industry: The audience for film was reduced by a factor of two-thirds in less than a decade.<sup>1</sup> The commercial success of television and its resultant tertiary impact on enterprises immediately outside its own domain represented an unintended, and thus unpredicted, consequence. A third-order effect prompted by the rapid expansion of television was the restructuring of the advertising industry, a phenomenon that reorganized corporate planning and promotion in all industries. By implication, we also infer fourth-order, fifth-order, and sixth-order tertiary consequences, and so forth.<sup>2</sup> Technological innovation influences every layer of organizational life, both public and private.

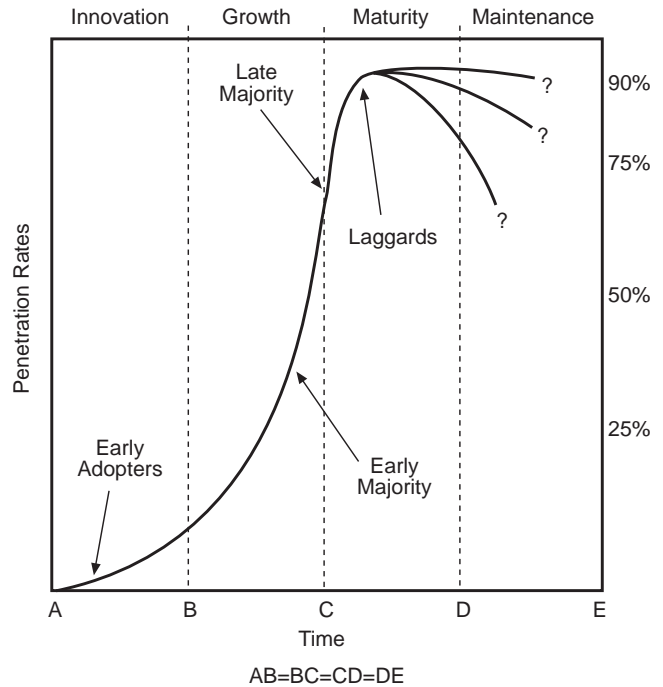
The importance of tertiary effect analysis, as applied to the telecommunications industry, lies in its identification of prospective market change. With the release of every successful communications product or service, we note the emergence of new market opportunities. Significantly, telecommunications has become the dominant engine of change in an economy marked by an expanding service sector. The generation, exchange, and evaluation of information will increasingly define success—individual and organizational. The evolution of telecommunications thus provides the framework for future economic change.

### The Demographics of Telecommunications

Increasingly, market planners in the communications industry are cultivating an incisive view of their prospective market base. The key determinant of future macroeconomic performance—and the critical variable underpinning the direction of telecommunications services—is the unfolding demographic character of the American consumer. There are several emerging demographic statistics that are essential to understanding the significance of the market paradigms discussed below.

A standard market research tool designed to estimate future demand for goods and services is the consumer S-curve. The S-curve, applied to prospective household and business behavior, identifies the stages of developing demand for new products. An extension of the logic implicit in Figure 2, the consumer S-curve holds that “early adopters,” responsible for initial household penetration rates of 10%, dictate the

Figure 2  
Consumer Adoption Rates



Source: J. K. Shaw

Note: During the late phase of the growth stage, competitors seek to develop alternatives to newly emerging technologies. At the beginning of the maturity phase, we note the commercial marketing of alternative technologies.

From the point of view of the firm, the maintenance phase becomes highly unpredictable, as the struggle to maintain market share precipitates great uncertainty (hence, the indicated question marks).

fate of new technologies. A critical demographic link in the success of newly-introduced products is the influence of early adopters. Early adopters are those who, by nature, are experimental, curious, and trend-setting. We note that the unfolding pattern of a consumer S-curve is the behavior of these early adopters; no other consumer will purchase new products in the absence of the influence of those whose lifestyle and income permit such experimentation. Using the consumer S-curve, substantiated by cyclical economic evidence, we infer the patterns shown in Figure 2 with regard to household and organizational adoption.

The data repeatedly indicate that Americans are prepared to pay for information that uniquely serves their needs, enhances their productivity, and allows

them to spend time on matters of “felt need.” These felt needs may be as simple as spending more time with family, or as concrete as improving professional efficiency. Forty years ago, marketers geared their strategy to the *segmentation* of consumers by virtue of generalized demographic analysis. In the 1970s and 1980s, the strategy shifted to *niche* marketing, in which those same demographics were measured against emerging consumer tastes via an expanded array of segments. Today, as we assess new product development in all markets, it has become clear that niche marketing has given way to *particle* marketing. The object of market research has become the satisfaction of consumer tastes on an individual basis. Each consumer thus represents a new market. These markets can change suddenly, dramatically, and unpredictably.<sup>3</sup>

The implications of these broad demographic movements, and their impacts on prospective marketing, are profound and crucial to the success of telecommunications firms in this age of deregulation. You will note differences in how the five basic paradigms outlined below respond to the changing character of American society, but every model factors into its imprint the great change implicit in these trends. By 2007, business success will be defined by those firms that can make the difficult and delicate transition to particle marketing.

A few final macroeconomic and demographic facts should be contemplated before we proceed to an evaluation of emerging scenarios for the industry 10 years hence. First, as the baby boom generation ages, produces children, endures an increased debt burden, and seeks relief from the time constraints of daily living, we are likely to see the most success for those telecommunications firms that are able to “bundle” their services.<sup>4</sup> In essence, firms that can merge telephony with television, Internet, and other services will secure a rising fraction of the market. Evidence is mounting that “boomers,” the single largest generation in American history, seek a simplified menu at competitive rates.

Second, a contentious but nevertheless credible, scenario for the American economy suggests a period of rising prosperity between 1997 and 2007. Consider, for example, the following facts:<sup>5</sup>

- (1) Every generation attains peak spending (income + savings + debt = spending), on average, between the ages of 47 and 49. The baby boomers, comprising nearly two-thirds of the labor force,

will produce repeating waves of spending within this age group through the year 2013.

- (2) While consumer debt will increase between now and 2007, resulting in rising demand for all goods and services, government debt should be abating during the same period. The result is that we may well be headed for a sustained period of stable prices with concurrent modest interest rates. We note the basic equation used to estimate annual national wealth:

$$C + I + G + Ex - Im = GDP$$

where C = consumers, I = business investment, G = government, Ex = exports, Im = imports. Gross domestic product is thus a function of consumer spending combined with business investment and capital spending. Government spending, when added to exports (and the overseas wealth they generate) but adjusted for imports (income and savings departing the country in the name of consumption), dictates national wealth. Viewed in their totality, the macroeconomic data suggest an expanding capacity for future savings and investment, particularly as boomers approach retirement.

- (3) The baby boom generation could well be the wealthiest generation in history for two reasons: It is the best educated generation in the nation's history, fueling its capacity to adapt to economic change at levels of rising income, and it is about to inherit the vast wealth accumulated by its parents.

These facts, however interpreted, suggest a more positive general economic environment than often outlined by economists. We must approach any serious discussion of economic modeling, however, with a set of assumptions. These assumptions must be consistent with the empirical evidence that directly bears on consumption for telecommunications services. Armed with these facts and assumptions, five discrete scenarios can be outlined for the telecommunications industry through the year 2007. These scenarios are:

*The Service Explosion Model*, in which the dream of deregulation, framed by the authors of the Telecommunications Reform Act (TRA), achieves a full flowering. It is a scenario in which rising demand for telecommunications products and services is met with

an ever-increasing number of providers able to deliver state-of-the-art services.

*Corporate Consolidation Model*, a scenario greatly feared by proponents of the TRA, in which initial deregulation inevitably promotes oligopolistic restructuring in a manner reminiscent of airline deregulation since 1978.

*Customer-Led Customization Model*, a scenario suggesting that, while the initial years of the TRA will lead to an array of products and services dictated by corporate research and development, it will be the consumer that eventually determines the emerging shape of innovations to come.

*Price Implosion Model*, a nightmare for telecommunications firms, in which prices collapse as a function of constant technological innovation and rapid substitution of veteran product lines. Under the terms of this vision, profits are so diminished that no firm has an incentive to maintain existing infrastructure. Also, new product development is stifled because of inadequate wireline maintenance.

*Short-Run Chaos (SRA)/Long-Run Stability (LRS) Model*, in which turmoil for the remainder of this decade inevitably invites economic stability during the first decade of the next century. This model presumes that public utilities will eventually assume infrastructure responsibilities formerly the domain of telephone monopolies.

If one assumes that the future of telecommunications during the coming decade will largely be a function of the Telecommunications Reform Act, reinforced by accelerating technological change, we can project these five alternative visions. It is essential to bear in mind that a hybrid of two or more of these models could emerge in response to dynamic competitive forces.

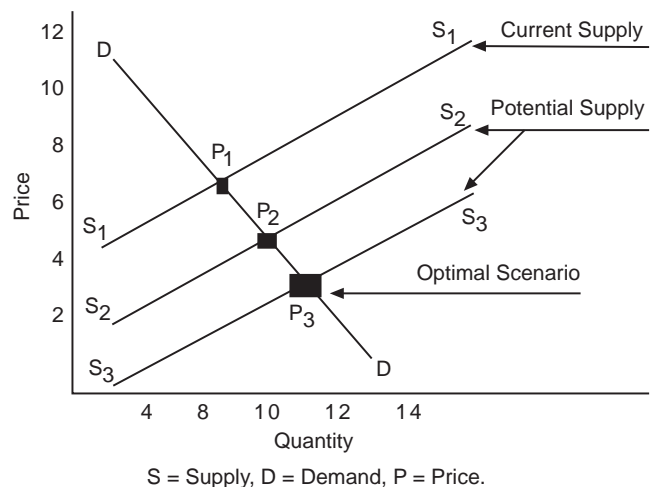
### The Service Explosion Model

The Telecommunications Reform Act was given impetus by the convergence of a variety of interest groups: telecommunications providers, consumer groups, consultants, and economists. In the years preceding 1992, these groups were divided as to economic self-interest and competitive philosophy. These divisions were eventually submerged as providers embraced the opportunity to enter *all* markets. Opportunity thus superseded security as the emerging industry paradigm.<sup>6</sup>

If the framers of the 1996 act are correct in their assumptions about present competitive forces—and the innovations likely to come from firms seeking to

enter diversified markets—we can conclude that, within the next several years, we will experience a rapid increase in the supply of telecommunications goods and services. This is an industry in which there is little point in dichotomizing product from service. Services cannot exist in the absence of infrastructure to support them, and product development will not be initiated in the absence of projected consumer demand for such services. With this reality in mind, TRA authors envisioned a simple scenario in which the forces of supply and demand would consistently reduce the price of emerging telecommunications goods and services (see Figure 3A).<sup>7</sup>

Figure 3A  
Service Explosion Model  
(What Legislators Foresaw)



S = Supply, D = Demand, P = Price.  
Price continues to fall as new supply is introduced to market. P<sub>3</sub> would constitute optimal pricing for new products.

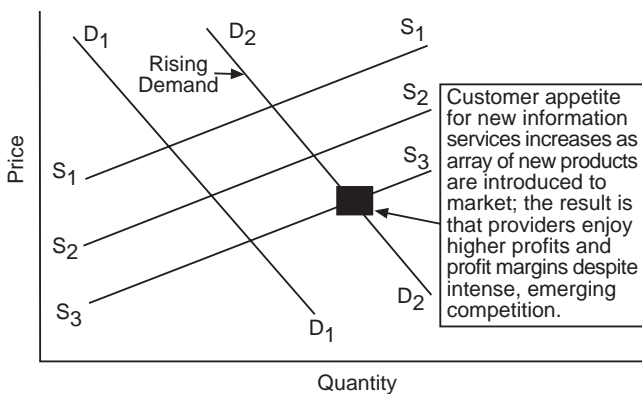
Source: J. K. Shaw

In a utopian scenario, supply would constantly expand relative to demand, precipitating gradual and, in some cases, profound reductions in price. A majority of legislators contended that constant innovation in the telecommunications industry would precipitate rapid substitution of veteran product lines in favor of new, cheaper substitutes. Indeed, these innovations would be spurred by entrants from peripheral industries. Some government officials and industry players concluded that, because the legislation permitted “entry” by any competitor, expansion of supply in the

short run might drive down prices by a factor of 50% or more.<sup>8</sup> Eventually, stability in market supply, demand, and price would be attained but, in the interim, consumers would benefit from expansive choice and diminishing cost.

The simplified account of the impending competitive battle in the industry was not shared by all proponents of the legislation. Some observers of this phenomenon perceive that the industry will develop in a manner fundamentally desirable for both consumers and providers. Viewed from their perspective, and applying the same reasoning, we might witness the scenario shown in Figure 3B.

**Figure 3B**  
**The Service Explosion (What Providers Saw)**



Source: J. K. Shaw

Both proponents and critics of the Telecommunications Reform Act recognize that the industry will experience dynamic shifts in the lines of supply and demand illustrated in the models above. However, those who envision that the market will efficiently decide winners and losers also assume that any organizational turmoil will be minimal within several years following passage of the legislation. Eventually, they contend, this model will define market equilibrium to the advantage of both providers and consumers. As we explore alternative modeling, we will note that this traditional conjecture about market competition constitutes the cutting-edge of interpretative dispute among forecasters. In short, will competition successfully manifest itself in the telecommunications industry as it traditionally has in other sectors of the economy? Or, are there economic characteristics

uniquely associated with “information businesses” that alter competitive behavior over the long run?

Implicit in Figures 3A and 3B is the notion that, although the demand function continues to shift to the right, the available supply of telecommunications products/services exceeds rising demand for years to come. Authors of this legislation, and the lobbyists who encouraged them, thus presume that providers will seek to optimize market share in the short run by maximizing supply. Reductions in pricing would ensure nominal market share at the beginning of this competitive wave. Thereafter, providers would be faced with the daunting task of expanding market share in the face of sophisticated players pursuing the same goal.<sup>9</sup> Significantly, it is generally estimated that the cost of recruiting a new customer approximates five times the cost of retaining one.<sup>10</sup>

### Corporate Consolidation

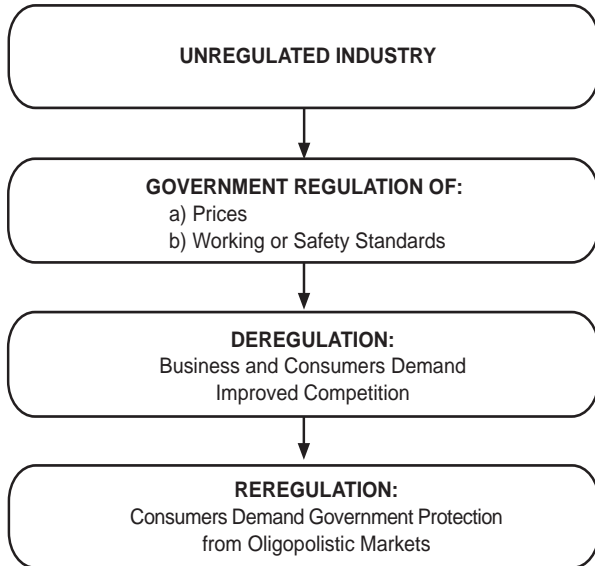
Some observers believe that “historical analogy” represents the most effective method of predicting the fate of the industry over the next decade. For these individuals, it is the *pattern* of historical evidence that provides the best guide to future business performance. Experimentation with deregulation in the aviation and trucking industries since 1978, they contend, therefore presents the best clue as to the fate of telecommunications.

One may distill the historic evolution of regulation and deregulation, adjusting for time relative to the industry examined, as shown in Figure 4.

Historically, perceived excesses in free markets precipitated government regulation in the name of protecting the consumer and preserving competition. Such perceptions gave way eventually to attempts at deregulating those same markets as regulation stifled innovation. In the early stages of deregulation, there is a proliferation of competitors that results in declining prices. However, as competitors seek to maximize market share (often through vertical and horizontal integration), oligopolies emerge, thus reinviting government involvement to redress problems of diminished competition. In the case of the airline industry, for example, the second and third stages of this process have taken 15 years to fully unfold. Now, Congress is besieged by complaints from consumers who believe that diminished competition has impaired quality and raised price.

Applying this historical parallel, the telecommunications industry might operate at optimal competitive

**Figure 4  
Regulatory Evolution**



Source: J. K. Shaw

levels through the year 2010 or so. Thereafter, an oligopolistic pricing structure would emerge from the interaction of a reduced number of players who simply absorbed their competitors. Such horizontal integration would consolidate perhaps 80% of telecommunications market share among three, four, or five providers.

In the absence of testing this hypothesis, one cannot be sure of the outcome. But, this conjecture is given some credence by similar experiments in deregulation attempted by the federal government since 1978. To argue that historical analogy is a reliable forecasting tool, however, one must consider the unique characteristics of the telecommunications industry.

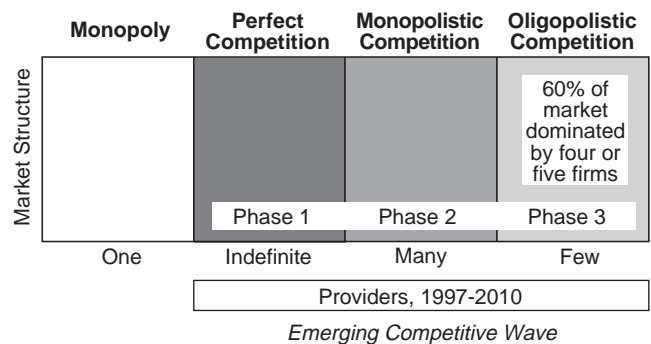
Several factors distinguish telecommunications from other industries. Certain fields within the industry presently operate on duopolistic, monopolistic, or effective oligopolistic bases. The cellular industry, for instance, consists of two providers per metropolitan area. While emerging competition is coming on-line in the form of SMR and PCS technologies, cellular incumbents nevertheless enjoy intrinsic competitive advantages. The same dilemma confronts long distance providers who seek to enter local loop

markets. These patterns are repeated at competitive variance depending on wireline or wireless services.

Additionally, unlike other industries in which products or services are comparatively tangible, the information generated via telecommunications is *intangible* and *portable*. Prospectively, every telecommunications service—voice, data, and image—presently offered through wireline can be replicated through wireless access. The result is that future commercial transactions are likely to be consummated at any location at any time: we thus make the transition to “anytime, anywhere information.” The significance of this development, relative to industry consolidation, lies in the necessity of every wireline provider to augment its product in the form of wireless service. Thus, a substantial fraction of capital investment otherwise exclusively devoted to wireline maintenance is then diverted to wireless infrastructure.

Consider the following model (see Figure 5) in light of the expressed fears of those who believe that deregulation, whatever its short-term benefits, will inevitably impel industry oligopolies. The telecommunications industry, dominated by AT&T through the mid-1980s, enters a period of intense competition during the first five years following passage of the 1996 Act. Beginning early in the 21st century, the industry experiences substantial competition through multiple provider access, but mergers and acquisitions gradually consolidate the market. By 2010, the industry essentially pivots on the market behavior of four or five providers, collectively controlling a minimum of 60% of market share. Approximately a decade will pass before Phase 3 is concretely evident.

**Figure 5  
Corporate Consolidation—13-Year Projection**



Source: J. K. Shaw

For purposes of the corporate consolidation model, Phase 1 acts merely as a theoretical construct. In practice, it is highly improbable that perfect competition will immediately precede monopolistic competition (many competitors dividing market share on the basis of branding). However, proponents of this model would contend that the greatest opportunities for entrepreneurs will reside within this stage of competitive development.

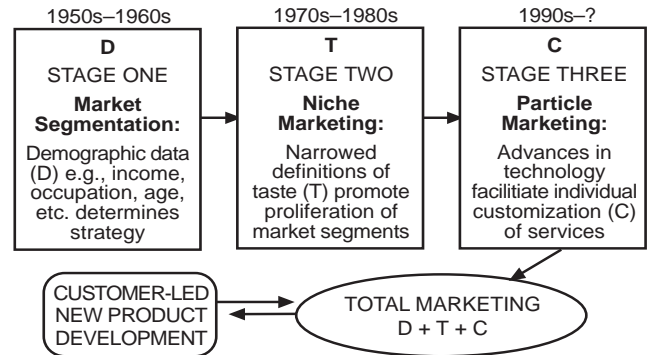
Given the need of incumbents to diversify services, particularly as wireless products approach maturation in the next century, there exists a natural propensity to purchase already-established firms.<sup>11</sup> Quite apart from the need to expand market share, industry consolidation is prompted by the desire of large enterprises to acquire the marketing expertise of young, successful firms. A knowledge of consumer behavior and forecasting will be at a premium for the long-distance giants as well as the Baby Bells.<sup>12</sup> The impetus toward horizontal and vertical integration is thus assured.

### Customer-Led Customization

An underlying assumption embedded in the models thusfar elaborated has been that providers will dictate the outline of future telecommunications products and services. This premise, underscored by the historic development of the industry, is challenged by an alternative forecast stressing the growing significance of particle marketing. Proponents of this view argue that business will now follow the lead of the consumer in designing and promoting services intended to meet the specific needs of the customer.<sup>13</sup> One notes the historic evolution in marketing as shown in Figure 6.

The importance of the recent transition to particle marketing lies in this simple fact: In prior eras, telecommunications providers originated new products and then sought to find or create a market for them. Under the umbrella of particle marketing, providers must first understand the unique needs of *individual* customers, then attempt to develop services which satisfy those multifaceted needs. Marketing therefore becomes highly complex and fluid. If this development truly manifests itself in the near future, then the industry will be completely reordered—mass marketing will give way to customized market research, and the success or failure of a firm will hinge on its ability to meet consumer needs on an ongoing basis. In other words, consumers—households and organizations—will dictate the terms of the service they

Figure 6  
Customer-Led Customization Model



Source: J. K. Shaw

receive. “Total marketing” therefore emerges as a model equipped to forecast changing consumer tastes.

If this model represents a valid paradigm for the telecommunications industry over the next decade, then we can infer that providers will attempt to maintain continual, positive, and personal relationships with their customers. As a result, organizational capital once directed to basic research will be diverted increasingly to applied research. A rising fraction of these funds will also be directed to marketing and strategic planning departments, where the firm’s primary objective involves gaining a keener understanding of the dynamics of consumer behavior. In short, the customer will tell the industry what to produce and when. If a firm fails to meet that standard, the model implies that we can expect to see a wave of new market entrants, thus generating competition over the long run.

### Price Implosion Model

As the Telecommunications Reform Act recedes into the fabric of the marketplace, one can detect a faint whisper of genuine concern not expressed at the time this legislation was enacted. That concern is the theoretical possibility of a price implosion: descending prices for telecommunications goods and services with a parallel decline in profit margins. In other words, the unique characteristics of this capital-intensive industry, increasingly governed by innovation in software applications, might lead to substitutions in technology so rapid that financial disincentives will divert providers from maintaining or improving existing infrastructure. Simply, if telecommunications

providers cannot be certain of recapturing the costs of new product development, why would they make them in the first place? And, if providers do not make these investments, will emerging competitors be thwarted in their efforts to provide new services?

To gauge the credibility of this scenario, uniquely pertinent to the telecommunications industry, consider the recent evolution of the Internet. The Internet, originally created to transmit information between computing networks, was not intended to be a commercial enterprise. In recent years, however, households and businesses are increasingly using this tool for commercial applications. Among those applications are recent innovations in software which permit voice traffic. The result is that telephony providers may be denied the profit incentive to maintain the infrastructure that others are exploiting—in effect, “free telephony” will eradicate the incentive to maintain current infrastructure. Five years ago, this prospect was unthinkable; now, it is attainable.

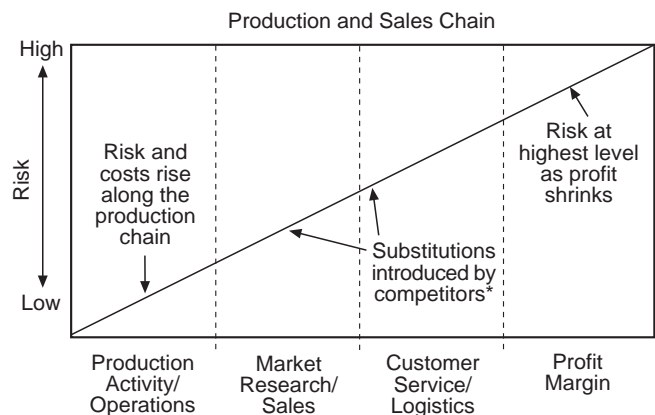
The same phenomenon holds for other telecommunications providers as well. In 1994, the FCC granted Interactive and Video Services (IVDS) licenses to investors via auctions. The IVDS industry, as well as the interactive television industry in general, has been stifled in its attempts to bring products to market because of perceived commercial threats implied by Internet development.<sup>14</sup> Private enterprise and the investment community are discouraged from generating new product lines in many of these fields because of the emergence of this new platform. Prices of new product lines might contract as innovators learn to substitute the ubiquitous Internet for prior applications. The economics of substitution create, in effect, “free” services for those previously proprietary in nature.

This scenario oversimplifies, of course, the pending development of the telecommunications industry. The fact is that providers in all industries continually seek to exploit the economics of substitution as new markets unfold; this is a traditional tactic of enhancing profit margins. TRA is engineering a “free market environment” at a time when major advances in telecommunications, particularly those sensitive to software applications, make it highly uncertain as to what new ventures are likely to be successful. The risk of excess supply, based on innovations which cannot be forecast, exists at any phase of the production/sales chain. If risk can no longer be calibrated, if prices might implode based on sudden overcapacity, have we put the industry at great long-

term risk? That is the message implicit in the model shown in Figure 7.

The model suggests that competitive threats surfacing from outside the industry, spurred by technological innovation, will influence the outline of future profit margins. Typically, a company will concern itself only with those innovations introduced by competitors from within the industry itself. In the case of telecommunications, however, new supply by traditional competitors is reinforced by additional services that are not susceptible to traditional forecasting. The result is that the firm which assumes the cost of new product development is sometimes denied the profits that would otherwise accrue. Prices fall or collapse, reducing profit margins proportionately.

**Figure 7**  
**Price Implosion Model**



Source: J. K. Shaw

\* Substitutions emerge from both within and outside the industry. The totality of alternative supplies generates overcapacity, resulting in declining prices late in the product development cycle.

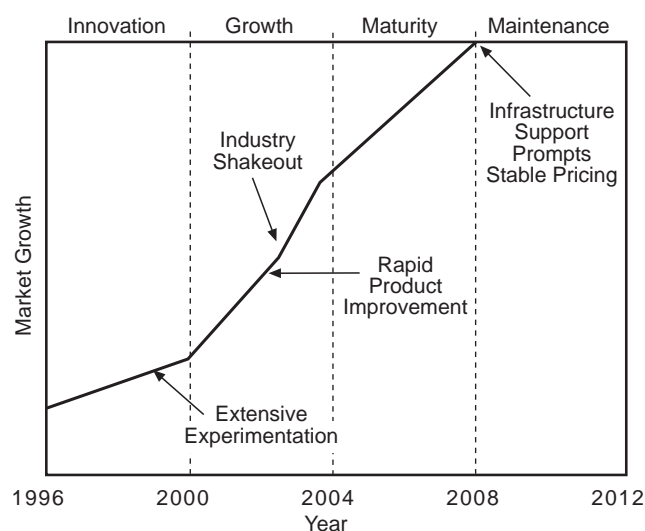
**Short-Run Chaos (SRC)/Long-Run Stability (LRS) Model**

Some observers contend that market confusion and chaos will inevitably follow implementation of the Telecommunications Reform Act. It is their contention, however, that it is just as inevitable that market stability will be restored after 10 to 15 years of experimentation. A highly capital-intensive industry whose progress was guided by government regulation, they believe, must educate itself in market dynamics never before experienced. The absence of competitive knowledge and experience means that industrial giants



must learn during a period of trial and error that can only be described as chaotic. Thereafter, acquired knowledge by current players and the assumption of risk by new entrants establish a framework of growing maturity and stability. One might express this evolution through the model shown in Figure 8.

**Figure 8**  
**SRC/LRS Model**



Source: J. K. Shaw

We note in Figure 8 the instability associated with short-term innovations in telecommunications. The proliferation of new entrants, accompanied by uncertainty and risk in infrastructure maintenance, translates into an industry shakeout before 2005. (Empirical evidence suggesting this timeframe is supplied by the experience of airline deregulation in the years immediately following 1978.) The model holds that long-term stability will manifest itself by the year 2008, however. It is during this period that risk diminishes as new infrastructure providers finally stabilize the economic environment. Put another way, the proliferation of service providers in the early years of deregulation is followed by the intervention of capital-intensive wireline maintenance companies. The logical candidate for wireline support during this period is the electric utility: These providers, already facing emerging deregulatory efforts by the states, will seek out new markets where their knowledge of state-of-the-art infrastructure can be readily exploited. The model

implies that, by 2008, a vacuum in infrastructure maintenance will invite electric utilities to enter the competition.

Once dismissed as pure fantasy, a scenario in which public utilities enter and stabilize the telecommunications industry is now embraced by many providers. By entering the field of infrastructure support, electric utilities effectively permit other telecommunications companies to pursue diversified strategies and newly-emerging markets, both domestic and international.<sup>15</sup>

### Evaluating the Models

With these five alternative visions in place, the challenge remains, of course, to identify the paradigm that most closely approximates the fate of the industry by 2007. Although elements of each model are based upon empirical evidence, the interpretative emphasis embedded in each imparts contentiousness. Instead of relying upon a single model to guide planning and strategy, one might consider testing the efficacy of each model as the early stage of competition unfolds. In other words, the outcome defined by each paradigm will be a function of the underlying assumptions postulated early in the framework of that model. We can thus evaluate the validity of each paradigm as each stages of competition unfold. Early on, it will be clear as to which model or models come closest to accurately gauging appropriate strategy.

It should also be noted that models serve three discrete functions:

- (1) To describe and categorize future economic development.
- (2) To prescribe appropriate strategy in response to those developments.
- (3) To project future outcomes based on continuing changes in the marketplace.

Viewed from this perspective, each model should be seen as a tool to measure the advance of competition and its impact on the telecommunications industry. We are left with a menu of potential outcomes for the industry, rather than a certitude about its direction. We must bear in mind that the experience of deregulation, as it now applies to telecommunications, will be unique. These remain uncharted waters. **NTQ**

<sup>1</sup> See Praveen Asthana, "Jumping the Technology S-Curve," *IEEE Spectrum* (June 1995):21.

<sup>2</sup> For a discussion of sequential ordering of tertiary consequences, refer to Edward Cornish, *The Study of the Future* (Bethesda, MD: World Future Society).

<sup>3</sup> The shift to particle marketing suggests an increased emphasis on a study of the psychological and social psychology influences on individual consumer marketing. The transitions from segmentation to niche to particle marketing imply dynamic customization of telecommunications services.

<sup>4</sup> Dent, *The Great Boom Ahead*.

<sup>5</sup> Harry S. Dent, *Job Shock* (New York: St. Martin's Press), pp. 53-57.

<sup>6</sup> Neil Gross, Peter Coy, and Otis Port, "The Technology Paradox," *Business Week* (March 6, 1995):13.

<sup>7</sup> Mary Thyfault, "Deregulation Has IS Support Wired," *Information Week* (September 9, 1996):596.

<sup>8</sup> Increasingly, telecommunications providers must regard themselves as having competitors whose interests lie outside the service domain itself, but whose resources inevitably lead to the creation of partnerships with other firms destined to enter their industry.

<sup>9</sup> See President William J. Clinton, *Technology for America's Economic Growth: A New Direction to Build Economic Strength* (Washington, DC: NTIA Publications, 1993), p. 6850.

<sup>10</sup> Joel Cawley, "The Era of Intelligent Communications," *Telecommunications* (April 1995):4.

<sup>11</sup> Edward Baig, "Ready, Set—Go On-Line," *Business Week* (July 12, 1994):26.

<sup>12</sup> Dent, *The Great Boom Ahead*.

<sup>13</sup> For additional information on emerging customization, refer to Dent's "Incremental/Radical Innovation" paradigm elaborated in *Job Shock*, pp. 241-243.

<sup>14</sup> See Sheila Galatowitsch, "Internet: Telephony's New Era," *Convergence* (September 1996):7, for a discussion of emerging issues surrounding development of Internet telephony as it prospectively will influence wireline local and long-distance competitiveness.

<sup>15</sup> Steven R. Rivkin, "If Competition Won't Build the NII, Utility Partnerships Will," *New Telecom Quarterly*, Vol. 4, No. 3 (August 1996):19-23.



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