Pricing and New Product Options with Telecommunications Competition

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Abstract

Emerging telecommunications competition includes convergence of industries and the removal of barriers to formerly protected markets. Successful entry and protecting existing lines of business mean selecting those markets that will be most profitable to serve. Success will require much more product and price differentiation and targeting to particular customers. This paper describes methods for addressing these needs and summarizes the findings from previous studies. First, firms with a strong brand identity can command a price premium. Second, quality is important in competitive success; indeed, concern for quality has been prominent in the development of rules for balanced competition and interconnection arrangements. Third, offering integrated packages of services (“one-stop shopping”) can be worth a substantial fraction of price. Finally, firms offering both wholesale and retail services will balance market share loss for the retail service against the possible expansion of the market from a new sales channel offered by firms with potentially high brand image.

1. Introduction

The evolution of competition, both in North America and elsewhere, is marked by the convergence of industries and the erosion of formerly protected markets. In the United States, the Telecommunications Act of 1996 can be viewed as a milestone along a long path from protected separate markets to open competition in all markets. The new freedom, indeed the necessity, to consider entry into new markets carries with it the burden of selecting which markets, services, and customers will be most profitable to serve—both in terms of protecting existing lines of business and successfully entering new lines. The possibilities are many: (1) how and to what extent will long-distance companies, cable television companies, and others enter local exchange markets; (2) will local exchange carriers be successful (both legally and commercially) in their attempts to offer long distance services; (3) will broadband offerings, such as video services be an important competitive issue; and (4) how will the separate markets ultimately converge?

Successful answers to these questions require a much different approach to product and service offerings than was necessary in the old monopoly environment, where homogeneous, ubiquitous services have been the rule. Competitive telecommunications markets will require much more differentiation of products and services and targeting of these services to particular types of customers. The questions that need to be answered are the following:

• Who will use the new product or service?
• How much of the new service will be used at different price levels?
• Do potential buyers have preferences for particular price structures, e.g., higher versus lower fixed and usage costs?
• Do service features other than price matter?

The offering of traditional products and services typically required answers to only the second of these four questions. In contrast, successful business decisions regarding new products, which will be made with increasing frequency in a more competitive and less regulated environment, will typically address each of the four questions. Timely answers to these questions are essential, not primarily because regulators (and intervenors) demand high quality, defensible forecasts, but because competitive success depends on good answers to these questions.

The rest of this paper is organized as follows. In the next section, methods for assessing the competitive prospects of new products are described. The questions and answers that have arisen from recent applications of
these approaches are then enumerated. The final section concludes the paper.

2. Measuring the demand for new products and services

The assessment of the prospect for new offerings (or restructured offerings to withstand competitive inroads into formerly protected markets) raises two fundamental questions: who are the target customers and how should successful products be designed.

2.1 Identifying customers

The transition from regulated monopolies to competitive markets introduces two fundamental differences in product offerings: targeting and timing. In the old monopoly days, products were often simple to understand and designed to be used by customers in general. Contrast this relatively cozy situation with what competitive responsiveness seems to require: evaluations of nebulous new products (e.g., new video services offered by telephone companies), targeted to a limited, but not completely understood, market segment, with results required yesterday. Not surprisingly, such evaluations often produce a hasty survey effort that is unlikely to produce much insight into who wants the new service and why, let alone yield reliable demand forecasts.

Well structured customer data go a long way towards filling vital information gaps. This information performs three vital functions for the new product analyst. First, knowing the demographic characteristics of customers and their usage of existing telecommunications services provides valuable information on the initial design, pricing, and targeting of the new product or service. For example, consider a new virtual private line service targeted to medium sized business customers. Properly structured data bases can show the size of the target market and its use of existing substitute products. Further, by using simple decision rules, (e.g., bill minimization), the success of the new product under alternative pricing plans can be tested.

Second, an off-the-shelf data base considerably shortens the time required for a special demand study for a new product. Constructing a one-of-a-kind data base for a special study can take weeks or months. In contrast, existing data bases are immediately available for drawing a sample for the target market, thus facilitating timely answers to product managers’ questions.

Third, information on the use of similar services by current customers and/or the use of the new services by customers of other companies who have already introduced the product can indicate how your customers will respond to the new service. The market response to price and other product features shown for analogous products and/or the same product in other companies can provide valuable insight into how your new product will perform.

2.2 Designing and measuring the market potential of new products

2.2.1 How to measure customer response to new alternatives.

In developing information on the impacts of potential competition, telecommunications firms face the problem of predicting how customers will respond to services that do not yet exist, to any great extent, in the market. Economists typically prefer to build models from information on how customers respond to real service alternatives. The need for information on competitive impacts before they occur may not permit this luxury.

When actual market data are unavailable, there are two potentially reliable sources of information for customer demand models. First, how customers choose among new alternatives may very well resemble how they select among existing products or services. Consider the decision of whether to offer services that require a combination of one-time fixed payments, ongoing monthly payments, and usage charges (e.g., high volume toll services offered under contracts). This decision involves, among other things, investing some resources up front in exchange for ongoing savings in telephone bills. In this regard, the decision is similar to the choices already made by businesses, e.g., the choice of PBX versus Centrex or the decision to install private lines. If telephone companies have data on customers who have made these choices and the features of the alternatives they faced, then it would be possible to develop a model that explained how the initial investment was viewed in light of the potential savings. In effect, the model would uncover the implicit discount rates (or payback periods) that businesses utilize when choosing among alternative services. To the extent that they would use the same decision criterion in choosing

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1 For example, PNR and Associates of Jenkintown, Pennsylvania maintain the Bill Harvesting and ReQuest data bases. The former data are a large customer sample of bills from telephone and other utilities and the latter data base includes detailed information on the use of telecommunications options, again from a large, national sample of customers.
among potential new services, the model could be used to measure demand for these services.

Three potential problems may arise here. First, data on actual choices may simply be unavailable. For example, we have found that telephone company information systems tend to focus on billing and cost accounting in such a way as to hide the demand patterns behind these numbers.

Second, there may not be enough price variability in the data to produce reliable parameter (or elasticity) estimates. A choice model explains how customers respond to alternatives with different prices and service features. Therefore, the data used to build the model must have differences in the prices that customers face. Cross company data bases substantially reduce this type of problem.

Third, the possibility of competing suppliers may introduce new criteria into the decision. Among the obvious possibilities is the very identity of the supplier. Customers may well favor certain suppliers (e.g., telephone companies), everything else being the same. In addition, the nonprice features of the competing services may well differ. The success of AT&T in the long distance market despite its (admittedly shrinking) price disadvantage is an example of how supplier-specific features may enter into the picture.

Because of these difficulties, NERA has employed an alternative approach. If customers have not faced choices like the ones they will have in the future, these choices are created for them. This means that the essential features that a customer would consider if faced with a choice are identified and alternative services that have different values for the essential features are designed. An example of this process is the alternative toll services shown in Figure 1. This figure shows two alternative toll service offering, defined by (1) price, (2) provider, (3) geographic coverage, (4) and several service (quality) features. In preferring one of these alternatives to another, a customer indicate how they would trade off a lower price, for example, for a more preferred provider, and/or a better package of calling capability.

The respondents’ evaluations of the alternative services characterized by these features allow us to consider several service design and pricing issues, e.g., which wireless products have the highest value to customers and/or is there advantage to packaging services such as local calling, long-distance, and video. Another interesting issue is whether charges should be based solely on usage or whether a flat monthly fee is more appealing to customers.
### Alternative 1

<table>
<thead>
<tr>
<th>COMPANY</th>
<th>GEOGRAPHIC COVERAGE</th>
<th>SERVICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>NYNEX</td>
<td>617 and 508 area codes only</td>
<td>Company handles all service and billing problems for calls made within the 617 and 508 area codes only</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BASE PRICE</th>
<th>VOLUME</th>
<th>BILLING</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 percent lower than your current rates</td>
<td>15 percent discount after 30 minutes of calls within the 617 and 50 area codes</td>
<td>Bill includes calls made within the 617 and 508 area codes only</td>
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</tbody>
</table>

### Alternative 2

<table>
<thead>
<tr>
<th>COMPANY</th>
<th>GEOGRAPHIC COVERAGE</th>
<th>SERVICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCI</td>
<td>Anywhere in the United States</td>
<td>Company handles all service and billing problems for calls made anywhere in the United States</td>
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<table>
<thead>
<tr>
<th>BASE PRICE</th>
<th>VOLUME</th>
<th>BILLING</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 percent lower than your current rates</td>
<td>10 percent discount after 60 minutes of calls anywhere in the United States</td>
<td>Bill includes calls made anywhere in the United States</td>
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**Figure 1: Alternative toll services**
2.2.2 A complete plan for developing a model of new service choice. A model of how customers choose among new alternatives is the result of a four step study: (1) survey design, (2) survey data collection, (3) model development, and (4) model applications. The key component of the survey design is creating the hypothetical new alternatives. We typically consult with industry experts and review product descriptions of existing services to determine which service features customers care about most in their decisions and how much services might differ on these features. Armed with this information, we then create a large set of service options. Our approach is essentially a random one, tempered by the objectives of having realistic alternatives and presenting real tradeoffs to the respondents. From this set of alternatives, we then randomly select small sets of alternatives—on the order of four or five alternatives per set.

In collecting the survey data, we ask respondents to rank the alternatives from best to worst and to indicate whether they would actually obtain each alternative if it were available. This core information is supplemented by survey responses on selected demographic characteristics.

The survey requires that the respondents have the hypothetical alternatives in front of them during their evaluations. To conduct the survey, we have used face-to-face interviews, a combination mail-telephone technique, or a complete mail-back procedure.

The customers’ rankings reveal the tradeoffs among the service features. A statistical customer choice model represents these tradeoffs as a set of weights, with a higher weight generally indicating that a feature is more important in the decision. These weights are much like the coefficients that result from standard regression analyses. The weights when combined with the values for their corresponding attributes produce a score for each alternative. The better the score, the higher the market share.

In particular, the choice model builds the value of an alternative product from its key attributes as follows:

\[
Value_i = \sum b_j A_{ij} - Price_j \tag{1}
\]

where \(A\) denotes nonprice attributes. The coefficients, \(b\), result from the choice responses in the survey.

The values obtained from Equation 1 are interpreted as the average values for customers in a given segment facing the same product. For example, the value might be the brand identity for a particular firm, expressed as a premium that the firm commands. A firm with a good reputation may be able to charge 5 percent more and still be on equal footing with a lower-value brand.

Another example is how different configurations of wireless telephony products affect demand. Several attributes may distinguish possible competing products (e.g., today’s cellular, a new version of personal communications service (PCS), and CT2 or Telepoint) from each other and from ordinary telephone service. These have included the following:

- Coverage: whether the service can be used nationally, in selected metropolitan areas only, or only at calling station locations (the cordless payphone);
- Mobility: whether the service can be used at fast speeds (in a car), at slow speeds (while walking), or only at stationary locations;
- Portability: the size and weight of the phone; and
- Price structure: purchase and installation, fixed monthly charge, usage charges.

In previous studies of such wireless products, we have compared the existing cellular product (high speed car phone), with a use of PCS spectrum distinguishable from current cellular service (smaller phones, less mobility, but with ubiquitous coverage throughout the U.S.) and CT2 (called Telepoint in the UK, essentially a low-priced one-way calling service tied to calling stations spaced throughout a metropolitan area).

Figure 2 shows how these three service concepts perform on the key product attributes that distinguish them. Notice that in choosing one product over another in the survey exercises, customers, in effect, assign dollar values to the individual attributes, and in turn the products themselves. In this example, both cellular and the PCS concept have high overall and net values, while Telepoint has relatively small, yet positive overall and net values. The importance of coverage and mobility for cellular and PCS is more than enough to overcome the price advantage of Telepoint.
The choice model also produces a distribution around this average, and from this distribution, market shares for the competing products are developed. For example, the commonly used logit model has an extreme value distribution around the average values in Equation 1.2

The corresponding market shares are given by the following equation:

$$\text{Share}_i = \frac{e^{B \text{Value}_i}}{\sum e^{B \text{Value}_j}} \quad (2)$$

In Equation 2, B, the coefficient that scales the value score shown in Equation 1, is the inverse of the standard deviation of the value distribution.

Figure 3 translates the net values in Figure 2 into market shares. In effect, a typical customer choice model produces both average product values (Figure 2) and a distribution around these values across the customers in a particular market segment. The average values and the distributions produce the market share estimates for the products in question.

Figure 4 illustrates how market share increases with value in the case of a binary choice. For example, if the choice in question were between cellular telephone and no wireless service, the figure shows that about 80 percent of the market segment have a positive net value, which would be the market share predicted from the Equation 2.

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2 The extreme value distribution has a cumulative distribution function

$$F(t) = e^{-e^{-t}}$$

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Figure 3: Market shares

Figure 4: Distribution of cellular net value
The final step in any modeling study is actually using the model to evaluate new services. For combinations of telephone company and competing services, the model first produces a score for each alternative for each customer in a representative sample. The alternatives are defined by specific values for each of the features used in the model. The scores, in turn, produce market shares for each alternative. The market shares and associated revenue estimates for the individual customers are then weighted and average to produce estimates of market shares and revenues for competing products.

The final question is how well do models based on hypothetical choices work. In general, this is a difficult question to answer. Not only does the customer demand model have to work, but also scenarios as to what competitors might offer have to be accurate. The evidence we have from previous studies in which the new services were actually offered as described in the study itself is quite favorable. For example, in the early 1980s, we developed a model for Southern New England Telephone that estimate a 22 percent ultimate market share for a new optional local measured service offering. When Southern New England Telephone had completed the monitoring of the new service, its market share had approached our forecasted value. Similarly, work on alternative wireless products produced results that were later corroborated in the market: (1) high initial charges are a significant hurdle—the market responded by offering heavy discounts on wireless phone units and (2) a low-end product with limited call receiving and mobility characteristics would not be attractive. Finally, models based on survey data have produced price responses (elasticities) that are close to those produced by more conventional approaches based on actual demand information.

3. Questions and answers from new product demand studies

Previous studies of telecommunications demand, as well as the entry strategies that are being used as markets converge have identified several major themes that will be important in determining the success or failure of particular offerings and/or competitors. These issues include: (1) the importance of brand identity; (2) the quality dimensions of product offerings; (3) the need to offer comprehensive packages ("one-stop shopping"); and (4) the significance of wholesale versus retail product offerings.

3.1 Brand identity

One of the most common questions that telephone company product managers have posed in considering competitive responses, regardless of the service in question, is whether particular providers have an advantage, everything else being equal. For example, in the U.S. many customers of local exchange companies still believe that they get their service from AT&T, which has a strong positive brand image. Similarly, there is concern that a firm with a high tech image, such as Microsoft, might start with a positive image if it chose to enter telecommunications markets. By the same token, some firms start with negative brand images. For example, in some studies we found that cable television providers were viewed unfavorably as providers of telecommunications services. In fact, the alliance of three major cable television providers with Sprint in the U.S. could be interpreted as a move on the part of the cable television providers to benefit from Sprint’s more favorable brand identity in telecommunications markets.

The importance of brand preference appears to cut across cultures. For example, in a recent study of Japanese consumers, I found that the incumbent provider, NTT, commanded a price advantage of up to 10 percent over the newer long distance providers.3

3.2 Quality attributes

The essence of product differentiation is varying the prices (and price structures) and the features of competitive offerings to appeal to different groups of customers. Our approach, which varies both price and quality dimensions, allows us to value these features and to determine how these values differ across customer groups. For example, in my study of Japanese consumers, I found that the speed of establishing service and whether or not extra digits were needed when dialing a long-distance call were important in establishing the value of long distance

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service and the market shares of firms of varying quality on these dimensions.

Similarly, our studies of wireless services identified the value of wireless versus fixed service (the capability of being untethered) and the value of being able to use a phone while moving at various speeds. Identifying and quantifying these quality dimensions can be crucial in ensuring the success of competitive offerings. For example, although there appear to be many different ways of using the new personal communications services (PCS) spectrum, “high end” uses that approximate current cellular services appear to have much greater appeal than “low end” uses, such as the unsuccessful Telepoint (CT2) service introduced in the U.K. several years ago.

3.3 “One-stop shopping”

Competition and the convergence of markets also raises the issue of whether there is a competitive advantage to being able to offer a package of services. In fact, one of the most contentious competitive issues that the new U.S. telecommunications act attempts to resolve is whether the prohibition against the incumbent local exchange carrier’s (LEC) offering interLATA toll places them at a distinct disadvantage when entrants into their intraLATA markets, such as AT&T and MCI, are able to bundle both intra- and interLATA calling. Similarly, when telephone companies start to compete with cable television companies, whether or not customers prefer to buy a package of telephony and video services will be important in establishing the competitive positions of the various players.

Previous studies have, in fact, shown that “one-stop shopping” can be an important competitive advantage. The trend in telecommunications markets is for providers to offer a range of services in an integrated fashion. Indeed, a recent article characterized current regulation as anachronistic in that it prevents customers from getting services on the basis that they want.

Amid all the rhetoric about telecommunications reform, you don’t hear much about bundling. But this poorly understood rule banning carrier from packaging equipment and tariffed services under a single price tag is getting increased scrutiny from critics, who call it an anachronism. They say that the bundling rule is a regulatory straightjacket that makes it unnecessarily difficult for users to get integrated network solutions.

While the reference to the bundling restriction quoted above is primarily large business customers, the general principle applies in all markets. By making it more difficult to obtain services, regulation can cause a real loss in consumer benefits.

Some indication of the magnitude of these losses is indicated by consumer research for other products. We are aware of studies in which the ability to obtain services from a single point of contact is one of the most important factors in how consumers choose their telecommunications services. For example, a recent Bell South study indicated that the ability to combine intra- and interLATA toll calls gave interexchange carriers (IXCs) an advantage that is worth a substantial proportion of price. This preference for one stop shopping even cuts across cultures. In my study of Japanese consumers, I estimated that the ability to obtain calling services from a single provider was worth about 14 percent of the average price.

3.4 Retail or wholesale?

The offering of new products and services carries with it the possibility (and perhaps even the requirement) that the service in question be offered on both a retail and wholesale basis. The need to address both sales channels arises both from legal requirements (e.g., both the new U.S. telecommunications act as well as regulatory rules seem to require extensive unbundling and resale) as well as from the possibility that wholesale offerings might function more as an additional sales channel than as a competitive threat to retail services. The modeling approach that defines alternatives in terms of brand identity as well as price and other quality dimensions is well suited to exploring this issue.

For example, technology can now provide new versions of call waiting, e.g., one that distinguishes between local and long-distance incoming calls. The

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6 Call waiting is the most successful of telephone companies' traditional custom calling services, with subscribership in the 30 to 40 percent range in the U.S.
questions LECs need to address in evaluating the market potential of such services include: (1) would this new service appeal to a new group of customers and/or divert sales from consumers of the traditional service and (2) would making the service available to long-distance companies on a wholesale basis work more as an effective sales channel or as a competing service to the LEC’s new and existing call waiting offerings. For example, the new “flavor” of call waiting might appeal mainly to customers who value the distinction between local and long-distance incoming calls, a group not completely served by the current offering. Similarly, the strong brand identity of firms likely to purchase the wholesale service (the IXC’s), while eroding the LEC’s share of the market, may have a greater potential to expand the market. Therefore, the extra profits (albeit at a reduced level) from wholesale purchases would more than offset the profits lost from reduced retail sales.

The basic issue of market expansion versus loss of market share will arise whenever the wholesale/retail distribution question needs to be asked. The answer to this question will vary on a case-by-case basis. For example, when subscribership to a particular service is high, e.g., basic residential access, the downside loss from market share loss will likely outweigh the upside potential from a larger market. There might even be different perspective within the same organization, with the wholesale product management seeing an expanding market and the retail product management seeing a market share loss. The basic point, however, is that successful response to competition will be aided by identifying new customers and new services that expand the market. Approaches that address specific market segments and allow product differentiation are very useful in addressing these questions.

4. Conclusions

Growing competition in markets that were formerly separated by technology and/or regulation, some of which were monopolies, and the convergence of these markets will require much greater attention to identifying and analyzing differentiated products and services. Data and techniques for identifying customer groups and targeting services that satisfy the demands of these groups will be important in protecting existing markets and assessing the profitability of entering new markets.

Several lessons can be learned from previous studies of new products. First, in facing new competition, product managers have rightly been concerned about brand identity. Firms with a strong positive image can command a premium for their advantage in the eyes of customers. Second, several quality features are likely to be important in competitive success. In fact, concern for quality (and the distinct disadvantage of the lack thereof) has been at the forefront of the development of rules for balanced competition and interconnection arrangements. Third, as markets converge, there appears to be a distinct advantage in being able to offer integrated packages of services. “One-stop shopping” can be worth a substantial fraction of the price of a product. Finally, the possibility (or requirement) that services be offered on both a wholesale and retail basis raises the trade-off between market share loss for the retail service against the possible expansion of the market from a new sales channel offered by firms with potentially high brand image. To the extent that there is some control over the pricing and terms of wholesale and retail offerings, addressing this trade-off will be essential in finding the right approach to offering wholesale and/or unbundled service offerings.