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**Leveraging Scale Economies in Internet Access  
and the  
ISP Dead Zone**

**By**

**Daniel B. Littmann**

A Research Paper submitted in fulfillment of the requirements for 3 credits,  
GRADUATE INDEPENDENT RESEARCH PROJECT, Winter Term 1998,  
Professor David Butz, Faculty Supervisor.


## **Faculty Comments**

Dan has put in an extraordinary amount of work, far exceeding what would be expected for a 3 credit hour independent study. The document that follows reflects that hard work, as well as a well-conceived and well-executed plan of attack.

Dan provides a number of insights, some of which contradict conventional wisdom. These include:

- There are essentially three types of ISOs: small ISPs (with fewer than 20,000 subscribers), large limited-service ISPs, and large full-service ISPs.
- The median small ISP has average costs of \$22.78. Exhibit 4 shows, though, that average costs drop to \$16 - \$20 once an ISP reaches 3000 or more subscribers. Does this imply that small ISPs can expect rather vicious price-cutting in the next few years, as rivals attempt to achieve greater economies of scale? This would seem to be inevitable, particularly for those ISPs that provide generic internet connections. Dan counsels these ISPs to improve efficiency through cost-cutting and possibly to differentiate themselves by serving niche markets. This is wise advice.
- However, Dan counsels small ISPs against mimicking large full-service ISPs. There is a "dead zone" (20,000 - 100,000 subscribers) where few, if any, ISPs now operate. This is the most significant result of the study. There are indications that going beyond 20,000 subscribers requires huge investments in marketing and content, which can only be justified by subscriber bases of 100,000 or more. Unless a small ISP is prepared to make such a leap, Dan offers a more compelling strategy - concentrate on differentiating the product through ample bandwidth or a narrow content (e.g., targeted at legal or accounting firms). This advice runs counter to prescriptions from other experts. Given Dan's data, there is little doubt but that he is in the right. The only problem for small ISPs, though, is that there are limited prospects for growth if 20,000 represents an upper bound on an ISP's subscriber base.

The one area where I am not convinced by Dan's results involves the prospects for large, limited-service ISPs (page 13 - 14). Exhibit 9 suggests that while these ISPs have lower costs than small ISPs, the difference is quite small. Given the greater agility and focus of small ISPs, there would seem to be little advantage to being a large, limited-service ISP. Yet based upon the regression results in Exhibit 7, such large, bare-bones ISPs could achieve average costs of under \$10 per customer by building their subscriber bases to between 800,000 and 1.2 million. If content and marketing are so important to building large subscriber bases, how could such limited-service ISPs ever reach that size? There are two non-exclusive possibilities. First, several of these ISPs could merge. Second, individual ISPs could lease bandwidth to small ISPs, thereby achieving scale economies through loose marketing alliances. Dan is right that these ISPs can not exist in the long run their current form, but larger versions could.

  
Signature of Faculty Supervisor

**Assistant Professor of Business Economics**

# **Leveraging Scale Economies in Internet Access and the Long-Term Dead Zone**

## **Introduction**

Competition among Internet Service Providers (ISPs) has focused on the battle to acquire a large and growing customer base. Accordingly, national access providers and thousands of regional players have offered compelling deals such as flat rate Internet pricing and cutthroat monthly rates. However, recent changes in pricing indicate a shift away from such a strategy. America Online's (AOL) recent 10% price hike and the trend among local service providers toward metered pricing schemes may be symptoms of a changing competitive environment in which scale becomes less desirable.

The following study, based on data from a survey created and administered in fourth quarter 1997 and first quarter 1998, aims to determine the benefits of scale for ISPs. The survey sampled ISPs of varying size and service characteristics to explore their cost structure, service offerings, pricing policies, customer profiles, and monthly costs per customer. The findings reveal significant information regarding the economics of ISPs in varying market positions and the potential hazards of scale. Furthermore, the results have broad and meaningful applications for future strategic planning.

## **Methodology**

All data for the analysis were collected via a survey created and administered during the last quarter of 1997 and first quarter of 1998. Specifically, the survey obtained a snapshot of the ISP's business from a diverse sample, including the following responses:

- Number of customers (subscribers) delineated between standard dial-up access and dedicated link.
- Overview of services offered, including web hosting, e-commerce applications, video conferencing, telephony, high-speed access, etc.
- Estimate of total monthly costs
- Overview of cost structure (percentage of costs absorbed by hardware, labor, marketing, backbone access, admin & overhead, etc)

Most data received come from fourth quarter 1997, with a small portion of the sample from third quarter 1997 and first quarter 1998. Surveys were administered either over the phone or via regular mail or e-mail.

ISPs surveyed ranged in size from 150 to over a million subscribers. Moreover, the sample of ISPs varied in services offered from Internet connectivity only, to a full range of services including content, telecommunications services, e-commerce applications, and web hosting among others. Respondents from smaller ISPs tended to be owner / operators of the respective business. Respondents from large, national ISPs were mostly marketing or sales managers. In addition to mail and telephone surveys, average total cost data were obtained from financial statements for public companies.

**Exhibit 1: Survey Collection Methodology (110 surveys conducted)**

<b>Survey Method</b>	<b>Administered</b>	<b>Returned</b>	<b>Completed</b>
Mail (reg. & e-mail)	75	23	13
Phone	25	N/A	5
Financial Statement	10	N/A	10
Total	110		28

Exhibit 1 provides a summary of the number of surveys sent and responses received. A total of 58 companies responded to the survey. However, many of the surveys were returned incomplete, leaving 28 surveys usable for the data analysis.

Exhibit 2 provides a summary of the data collected. The data are presented in aggregate form and all company names have been kept confidential at the request of the participating ISPs.

**Exhibit 2: Summary of Data Collected**

	<b># of Cust.</b>	<b>Cost</b>	<b>Cost / Cust</b>	<b>Full-Service</b>	<b>National</b>
<b>Mean</b>	256,677	\$8,628,226	\$27.31	39.00%	46.00%
<b>Median</b>	15,150	\$382,500	\$23.75	N/A	N/A
<b>Standard Dev.</b>	472,079	\$17,212,254	\$9.95	N/A	N/A

**Overview of ISP Cost structure**

	<b>H/W</b>	<b>Labor</b>	<b>Admin</b>	<b>Mktg</b>	<b>Bkbone</b>	<b>Telco</b>
<b>Mean</b>	22.64%	19.14%	7.71%	13.54%	19.36%	15.75%
<b>Median</b>	20.00%	20.00%	5.00%	12.50%	15.00%	15.00%
<b>Standard Dev.</b>	11.93%	9.98%	4.43%	8.15%	15.51%	8.36%

ISPs surveyed can be further delineated between "large ISPs" and "small ISPs." Large ISPs have a customer base larger than 100,000 subscribers. Small ISPs have a customer base of fewer than 20,000 subscribers. Of particular interest was the lack of medium sized ISPs, between 20,000 and 100,000 customers.

## Overview of Costs and Technology

The business of providing flexible and reliable Internet connectivity is a complex endeavor, involving numerous hardware acquisitions and extensive technical expertise. Therefore, a top-level overview of ISP costs is warranted to help understand the economic findings and implications that follow. Some of the most significant costs incurred by ISPs are outlined below.

- *Hardware costs:* Networking and computing hardware normally account for between 20 and 25 percent of total ISP costs. Routers, modem pools, and servers among other hardware must be continuously added and upgraded to ensure the ISP has sufficient capacity to handle subscriber growth.
- *Labor Costs:* Labor costs typically account for approximately 15 to 20 percent of an ISP's total costs. Recently, labor costs have become a greater concern as ISPs struggle to meet increased customer service demands.
- *Backbone Access Fees:* Very few existing ISPs actually own their own backbone and, therefore, must lease bandwidth from a backbone provider in order to offer service. Charges paid to gain access to and bandwidth on the Internet are paid as fixed rate fees to backbone providers such as UUNet, MCI, or PSINet. Backbone fees normally account for about 15% of an ISP's total costs.
- *Telephone charges:* The most popular method of accessing the Internet is standard dial-up access using a modem. Moreover, the popularity of modem access is projected to continue, with 65% of consumers still using modems by the year 2001 (Infonetics, 1997). Since modems use telephone lines to receive and transmit information, ISPs must pay flat rate fees to their local exchange carriers (LEC) to gain access.
- *Marketing support:* There are currently over 4,500 national and regional Internet Service Providers operating in the United States alone (Infonetics, 1997). Marketing expenses are becoming increasingly essential to differentiate among the extensive pool of ISPs from which consumers can choose. Marketing costs vary greatly between ISPs.

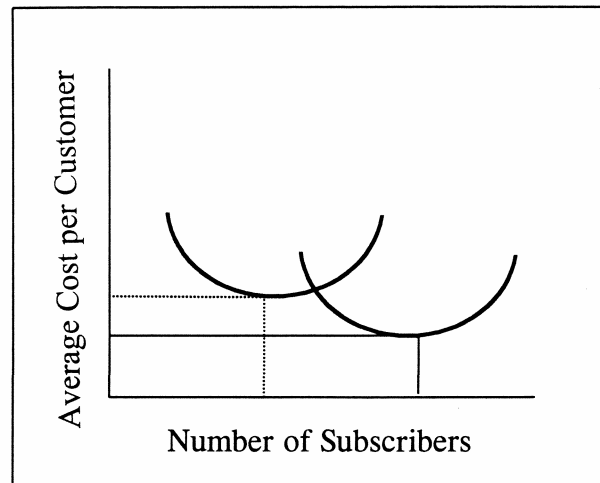
It is evident from the above description that a majority of ISP costs are "fixed costs," or costs that do not vary according to the number of subscribers. For example, once an ISP has invested in hardware sufficient to provide access for 1,000 subscribers, it incurs similar costs whether providing access for a single user or its capacity of 1,000. In the long run, an ISP may need to upgrade capacity, but for the short run, hardware costs remain more or less constant regardless of the number of subscribers. Similarly, flat rate

fees paid to local exchange carriers and backbone providers, plus the bulk of labor costs can be considered fixed costs in the short run.

A cost structure dominated by high fixed costs is normally characterized by economies of scale (EOS). Scale economies imply that a company's average costs per customer decline by adding more customers.

The average short-term cost curve depicted in Exhibit 3 portrays economies of scale by tracking average costs per customer (total costs / number of customer) given different quantities of customers. The initial downward slope implies that, as an ISP adds subscribers, fixed costs get distributed over a larger base of customers, thereby reducing *average* costs.

**Exhibit 3: Average Total Cost Curves**



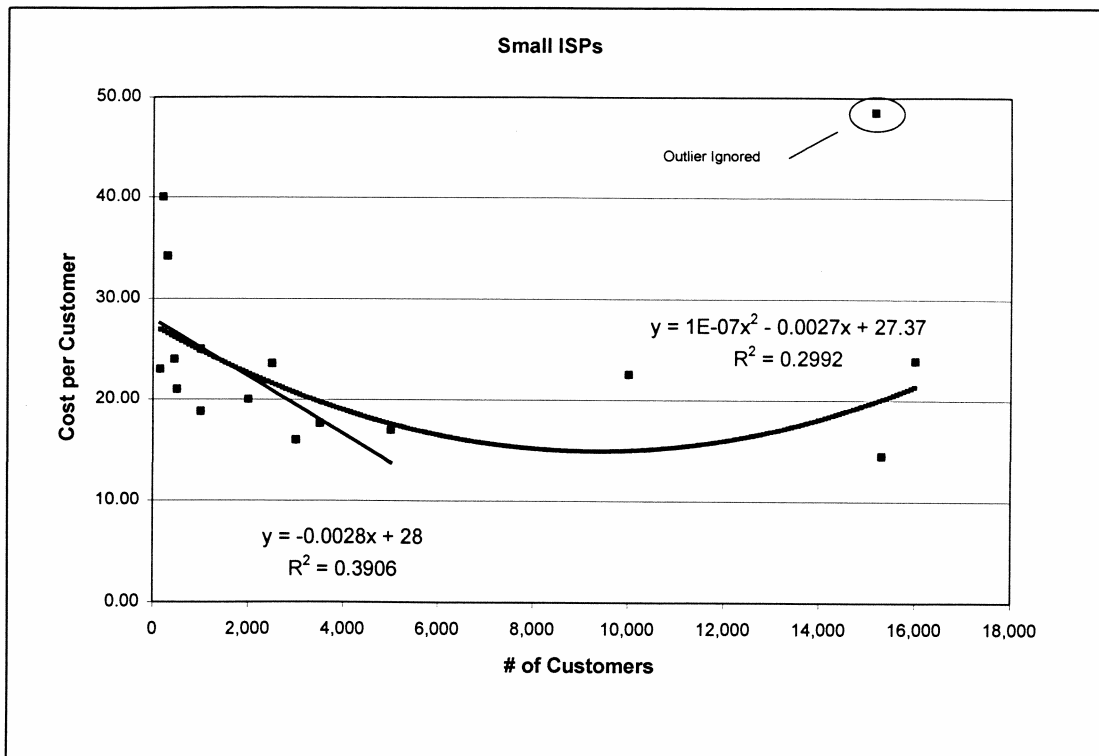
Costs continue to decline until they reach the lowest point of the cost curve or minimum efficient scale. If an ISP exceeds the minimum efficient scale, it should increase capacity, thereby shifting the cost curve and establishing a new, lower minimum efficient scale. Because of its preponderance of fixed costs, an Internet Service Provider should adhere to the average short-term cost curve and principles of economies of scale.

### **Findings**

Knowledge of company's average total costs per customer (obtained from the survey) allows further investigation into the viability of economies of scale for both large and small ISPs.

**Small ISPs:** The correlation between average cost per customer and number of customers suggests economies of scale are present within the sample of small ISPs. Exhibit 4 depicts a plot of the correlation between number of customers and costs per customer for the sample of small ISPs. As expected, the plot and fitted regression line slopes downward toward a minimum efficient scale.

**Exhibit 4: Small ISP Average Total Cost Curve**



**Large ISPs:** Large ISPs, however, failed to exhibit such scale economies both within their size category and in correlation with small ISPs. Instead, large ISPs had average costs per customer higher than their smaller counter parts. Mean cost per customer for large ISPs was \$31.28 with a median of \$32.34. Small ISPs, on average, had much lower costs per customer at \$24.33 with a median of \$22.78 (See exhibit 5).

**Exhibit 5: Average Total Cost Comparisons Between Large and Small ISPs**

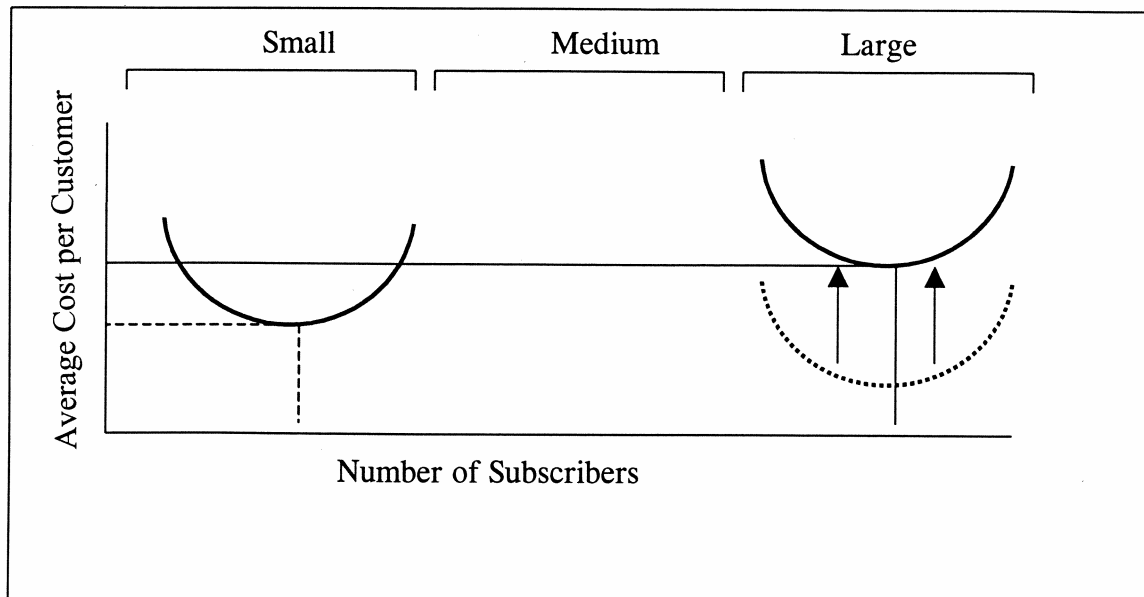
	Mean Cost Per Customer	Median Cost per Customer	Mean Marketing Expense (% of Revenue)
Large ISPs	\$31.28	\$32.34	19.33%
Small ISPs	\$24.33	\$22.78	9.19%
All ISPs	\$27.31	\$23.75	13.54%



Contrary to conventional wisdom, the average short-term costs of large ISPs are higher than those of their smaller counterparts. We can conclude that the size of the customer base alone fails to explain the variance in cost per customer.

Therefore, we must identify additional factors that boost the cost curve to a higher level than smaller service providers. The findings highlight two factors that have significant influence in raising average total costs: 1) additional marketing expenditures required to achieve greater than 100,000 subscribers and, 2) the costs of being a full-service ISP.

**Exhibit 6:** Higher costs per customer of large ISPs



**Marketing Costs:** Mean marketing expenditures as a percent of revenue for large ISPs were 19.33% versus 9.13% for small ISPs (see Exhibit 5). This implies that in order to attain the scale of a large ISP (greater than 100,000 subscribers), substantial marketing expenditure is required. Excessive marketing costs have become an area of concern at many large ISPs. As evidence, AOL recently reduced its costs of acquiring a new subscriber from \$375 to \$90 (Gunther, 1998).

**Full-Service Offerings:** Greater service offerings of large ISPs, however, appear to be the most significant factor boosting large ISP costs. Such services include content or online services, additional telecommunications services such as frame relay or conventional telephony, e-mail, video conferencing, electronic commerce applications and many others. Achieving a comprehensive list of additional services provided by ISPs is virtually impossible because the service menu continuously grows in tandem with technical innovation.

ISP services can impose both variable and fixed costs on service providers. For example, content is primarily a fixed cost. Once a database of content has been established, the number of customers who access the information has little impact on the ISP's costs. However, increased service offerings also imply the need for incremental customer service and support. Customer service costs would depend on the number of subscribers and frequency of use and, therefore, should be considered variable costs.

By further classifying each large ISP as either a full-service provider or limited-service provider and by highlighting major telecommunications providers, 80% of the variance between average cost per customer is explained in a regression model. Exhibit 7 shows the regression statistics. They support added services and marketing as influential variables in determining average costs per customer.

#### **Exhibit 7: Estimation Results**

##### **Regression Equation**

$$\text{Cost per customer} = \beta_0 + \beta_1(\# \text{ of Subs}) + \beta_2 (\# \text{ of Subs})^2 + \beta_3(\text{Full-Service}) + \beta_4(\text{Telecom})$$

##### **Dependent Variable**

$$Y = \frac{(\text{Total monthly cost}) * (1 - \text{Mktg}\%)}{(\# \text{ of Customers})}$$

##### **Independent Variables**

# of Subs:	number of subscribers to individual ISP
# of Subs squared:	number of customer squared to achieve polynomial form
Full-Service:	dummy variable (1 = full-service provider)
Telecom:	dummy variable (1 = established telecom provider)

**R-Square:** .805

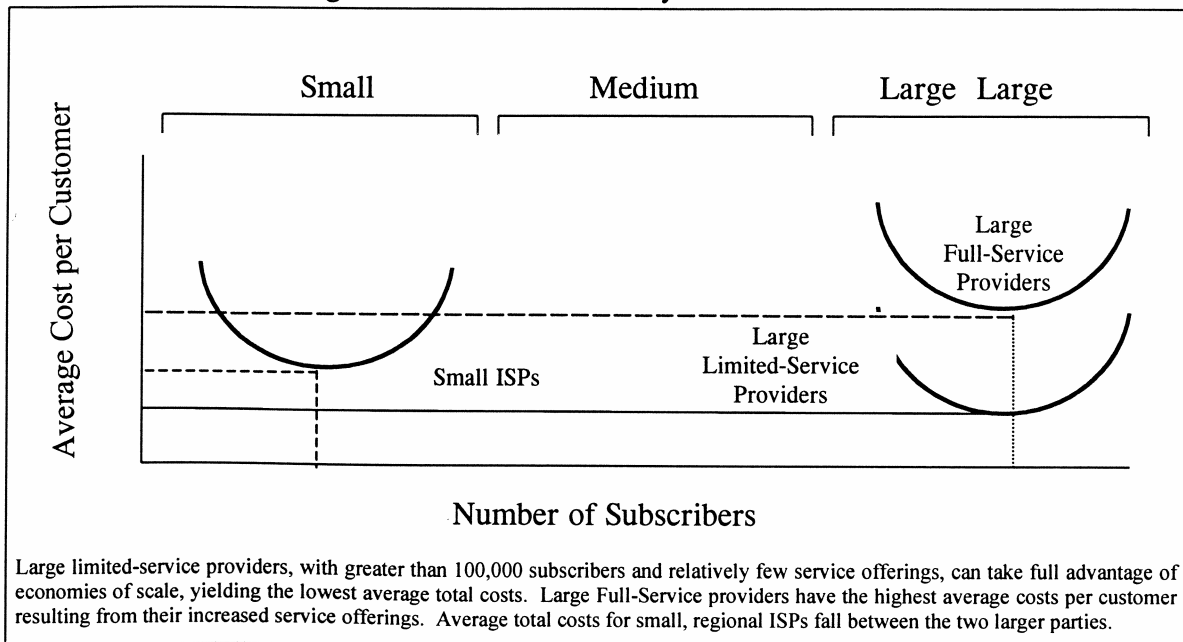
**Adj. R-Square:** .694

<b>Coefficients</b>		<b>P-Value</b>
$\beta_0$ : 25.2368	Intercept	0.00018
$\beta_1$ : -3.565E-05	# of Subscribers	0.01449
$\beta_2$ : 1.934E-11	# of Subs squared	0.01428
$\beta_3$ : 9.49938	Full-Service	0.01522
$\beta_4$ : 12.352	Telecom	0.03070

It therefore follows that ISPs can be further divided into three separate categories based on their respective size (number of customers) and service offerings. The three categories are described below:

- **Small ISPs:** ISPs with fewer than 20,000 subscribers. Small ISPs are typically private companies that provide local or regional access to both business and individual customers.
- **Large Full-Service Providers:** ISPs with more than 100,000 subscribers who provide additional services in conjunction with Internet access. Large full-service providers take advantage of economies of scale, but also incur additional fixed and variable costs associated with offering such services. Such expenses typically raise their average costs curves above the levels of the small ISPs.
- **Large Limited-Service Providers:** ISPs with more than 100,000 subscribers who primarily offer Internet connections. Limited-service providers take full advantage of economies of scale without incurring additional costs of providing additional services. Therefore, non-full service providers enjoy lower average total costs than both small ISPs and the large full- service providers.

**Exhibit 8:** Service Categorization Costs of ISPs by Size



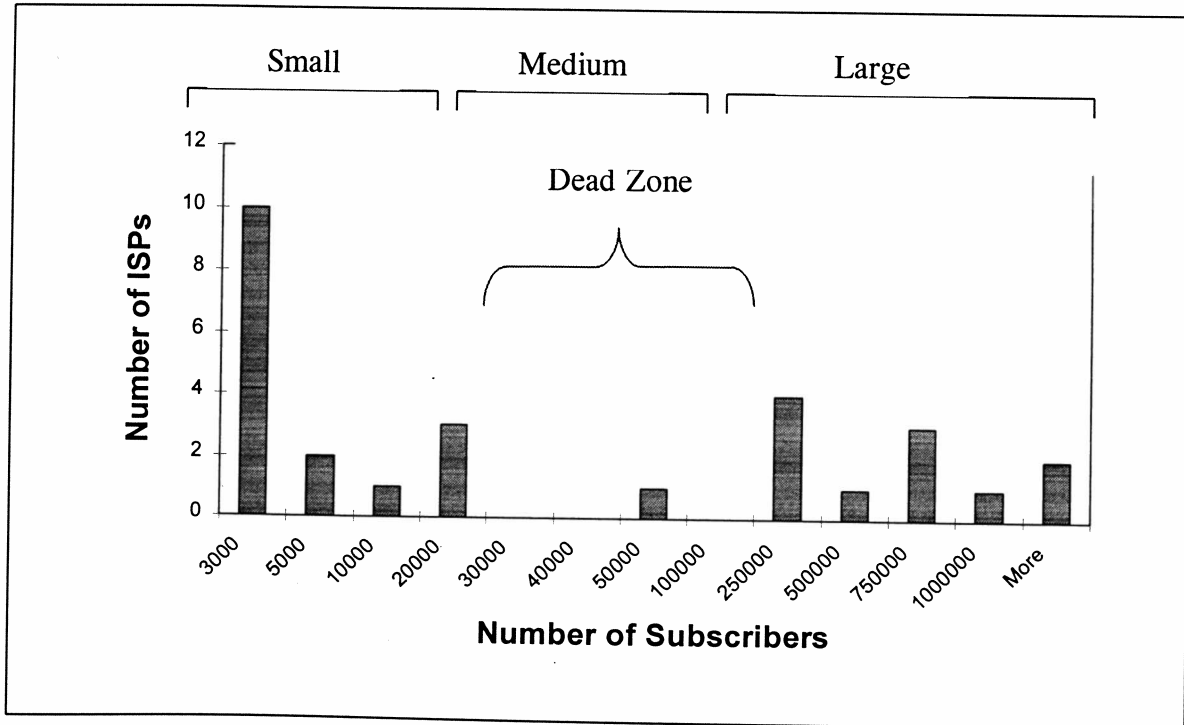
Additional proof of this categorization can be viewed when comparing mean values among the three groups in exhibit 9. As expected, large full-service providers have the greatest mean and median cost per customer and large limited-service providers have the lowest. The average cost per customer for small ISPs falls between the two large categories.

**Exhibit 9: Average Costs per Customer by Service Category**

	Mean Cost per Customer	Median Cost per Customer	Average Marketing Expense (% of Revenue)
Large Full-Service	\$35.63	\$38.09	18.00%
Large Limited-Service	\$22.57	\$21.34	21.00%
Small ISPs	\$24.33	\$22.78	9.19%
All ISPs	\$27.31	\$23.75	13.54%

**Long-term Dead Zone:** Noticeably absent from the data are ISPs of intermediate size. Only one ISP bridged the extensive gap between 20,000 and 100,000 subscribers. Moreover, this ISP was launched shortly before responding to the survey and acquired its customers in three months. It has the service, cost, and marketing characteristics of a large ISP and will most likely attain 100,000 customers in the next 12 months.

**Exhibit 10: Long-Term Dead Zone**

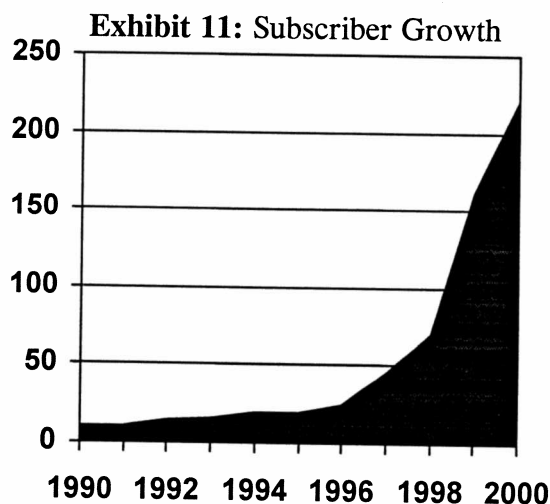


This vast gap in scale that exists between the large and small ISPs is an intriguing empirical finding that results from the significantly higher costs required to achieve large ISP status. For now, we classify the gap as a long-run dead zone for intermediate ISPs. The concept is referred to as “long-term” because the rapid growth in Internet subscribers and the relative immaturity of the industry serve to partially mask the dead zone. However, as the industry matures and new subscriber growth slows, the industry will grow less tolerant of companies that attempt to exist in this mid-range area.

### Strategic Implications

An accurate understanding of an ISP’s cost structure and market position in relation to competitors should play an important role in strategy formulation for all ISPs, regardless of size and service characteristics. Specifically, the findings outlined above provide insight into the future consolidation and long-term competitive landscape of the Internet access industry. Moreover, the findings furnish information regarding the optimal customer targets and service offerings for each category of ISP.

**Long-Run Competitive Landscape:** After almost a decade of exponential growth, the Internet has reached a milestone. Businesses and the more technically savvy home users account for a majority of current Internet subscribers (Jeffrey, 1998). However, to continue growing at desirable rates, large ISPs must now appeal to a different customer segment. ISPs will increasingly rely on users far less familiar with technology and modern communications. To acquire and serve this new segment, ISPs will need to establish increased customer service. Moreover, such customers will demand more intuitive processes of connecting to the Internet and performing basic functions such as sending e-mail, searching for usable content, and finding entertainment resources. For example, Dataquest identified content as the most compelling feature prompting new customers to subscribe to a major service provider (Dataquest, 1998). Serving this more demanding customer base will be more expensive for ISPs. However,



offering increased ISP services (becoming a full-service provider) will be a prerequisite to luring the less technically-savvy consumer and attaining large ISP status.

In this scenario, there is economic justification for only two categories of ISPs: one for local service providers operating as a low cost provider, and a second for large full-service providers, providing premium services at a premium price. It follows that large limited-service providers are a short-term phenomenon, unlikely to exist with their current service offerings in the future.

**Service Offerings:** Many analysts have endorsed the notion that small ISPs must differentiate themselves from their larger competitors by providing additional services. Indeed, it is tempting for smaller players to copy the service offerings of large ISPs to prevent falling behind. In a survey conducted by Bay Area consulting firm, Executive Strategies, 24% of small ISPs cited increased service offerings as a legitimate strategy to compete against larger ISPs, cable companies and established telecommunications companies (ISP News, 1998).

However, the above analysis of ISP average costs per customer should caution small ISPs against such a strategy. Small ISPs stand to benefit the most from lower costs per customer and should exercise extreme caution when incorporating service offerings that risk their cost advantage.

Instead, small ISPs must exercise discipline to keep their costs per customer well below those of the large full-service providers and provide the least expensive Internet connectivity. Small ISPs with low average total costs are already benefiting from America Online's price increase. Those Internet users willing to pay a premium for content, chat-rooms, and other on-line services will stay with AOL. Those who simply desire a fast Internet connection will turn to the low cost provider. Smaller, local ISPs are best poised for this market. However, they must resist the temptation to adopt more and more services that only serve to boost their average total cost curves beyond those of the large ISPs.

While additional services will attract additional customers for local ISPs, they will have an undesirable side effect. They will raise average total costs without allowing the ISPs to take advantage of the benefits of scale. The net result is average costs per customer that resemble the large players, but with far fewer customers, thus landing them squarely in the dead zone.

**Target Customers:** Instead of blindly offering additional web services, small ISPs are best suited to grow their business by pursuing groups of homogeneous customers. A homogeneous customer base allows a small ISP to offer focused services without the

negative side affect of boosting average total costs. For example, a regional ISP that markets its services to surrounding grocery store chains or law firms is far more apt to succeed than an ISP of similar size and a diverse subscriber base. Offering content relevant for similar customers or industries allows the ISP to incur far fewer fixed costs than if they were to offer content for a variety of industries and interest groups.

A homogeneous customer base does not limit itself to small business and/or home users. Many large companies and entire industries now view the Internet as the appropriate medium for their future communications needs. The automotive industry, for example, adopted TCP/IP in 1995 as its standard for data communications among its thousands of trading partners (Monk & Claffy 1996). Using the Internet for communication with suppliers, distributors, and even customers saves industries the hardware, wiring, and administration costs of establishing an Intranet or proprietary EDI network. However, large potential Internet consumers, such as the auto industry, see network delays and service reliability as a barrier, preventing them from fully utilizing public network access. Such potential consumers require guaranteed bandwidth and reliability for vital business operations.

Certifying a small number of highly competent Internet service providers to interconnect large industrial customers with their massive network of suppliers is a viable alternative to gain such reliability, service, and bandwidth guarantees. Small ISPs who resist the temptation to continually add services and instead, invest in high speed connections and maintain the capacity to guarantee bandwidth are best positioned to acquire such consumers.

The benefits to the service providers are extensive. Obtaining several large customers would dramatically reduce the marketing costs required to obtain new customers, giving them further cost advantages over large full-service providers. Moreover, planning for technology upgrades and expansion becomes much easier with a homogeneous set of corporate customers. Since large companies plan quarters or even years ahead of time, ISPs can align their own expansion with the plans of their largest customers. Such planning will allow small ISPs to get ahead of the capacity curve, while ensuring that expansion occurs in a planned and cost effective manner.

Finally, providing high speed, highly reliable, and no-frills Internet service to industry customers allows small ISPs to exist in the dead zone. Without such a focused and disciplined strategy, small ISP growth is severely limited to below 20,000 subscribers. Moreover, ISPs with a diverse customer base below 20,000, are highly vulnerable to consolidation or even dissolution. Reducing the variability of the subscriber base and offering carefully selected, services affords them the best survival opportunity.

## **Conclusion**

The Internet Service Provider industry is ripe for change over the next half decade. Technological advances combined with subscriber growth will ensure that only the most efficient and differentiated ISPs survive. For large ISPs, this implies providing a full range of services to a large subscriber base at flexible prices. For small ISPs, attempting to overcome the dead-zone obstacle, survival means differentiating base on customer segments.



## Bibliography

Dearborn, Rob; Howard, Greg; Howard, Michael; Napolitan, J'Amy; Whitcomb, Laura; and Wilson, Jeff. *The ISP Opportunity*, 1997. San Jose, Infonetics Research, Inc., San Jose, California, 1997.

Guther, Marc; Smith, Liz; and Woods, Wilton. "The Internet Is Mr. Case's Neighborhood." *Fortune*. Page 68, March 30, 1998.

Jeffrey, Don. "Buy Cycles," *Billboard Magazine*, Billboard Publication, March 7, 1998.

Mackie-Mason, Jeffrey K., and Varian, Hal R. "Pricing the Internet." In *Public Access to the Internet*, Edited by Kahin, Brian and Keller, James. The MIT Press, Cambridge, MA. 1995.

Monk, Tracie and Claffy, K.C. "A Survey of Internet Statistics / Metrics Activities."

Varian, Hal R. "Local Exchange Congestion and Internet Service Providers". Berkeley, University of California Press, 1997.

Venetis, Tom. It's Merger Mania for Internet Service Providers. Information Access Company. VOL. 24; No. 2; Page 11. Plesman Publications Ltd., Canada. 1998.

"Survey: Smaller ISPs Fighting to Remain Independent." *Internet News.Com*. March 30, 1998.

## Internet Service Provider Survey

All data collected will be held strictly confidential and will only be presented in aggregate form, without reference to individual firms.

Company Name: \_\_\_\_\_

1) Approximately how many customers (PC's) do you provide Internet access for? \_\_\_\_\_

2) What percentage of your customers fall under the following access categories?

Standard Dial-Up Access	_____ %
Dedicated Link	_____ %
Other, Please specify _____	_____ %

3) Please check the pricing system you currently employ.

- \_\_\_\_\_ Flat rate fee
- \_\_\_\_\_ Usage based (please circle either *time-based* or *data-based* usage)
- \_\_\_\_\_ Combination (for example, flat rate plus extra for e-mail)
- \_\_\_\_\_ Other (please specify) \_\_\_\_\_

4) Briefly describe why you chose your current pricing mechanism (i.e. simplicity, competition, lowest admin costs.)

\_\_\_\_\_  
\_\_\_\_\_

5) Do you provide any of the following additional services to your subscribers?

- \_\_\_\_\_ Web hosting
- \_\_\_\_\_ On-Line Services and Content
- \_\_\_\_\_ Value-added services
- \_\_\_\_\_ Other, Please Specify \_\_\_\_\_

6) Please estimate your approximate total monthly costs \_\_\_\_\_.

7) Please provide an estimate of the percentage of your total costs spent in the following categories.

- |               |   |
|---------------|---|
| • _____ %     | Hardware costs (routers, servers, modem pools, etc) |
| • _____ %     | Labor and Customer Service                          |
| • _____ %     | Admin and overhead                                  |
| • _____ %     | Marketing Support                                   |
| • _____ %     | Lease on Internet Lines (access to backbone)        |
| • _____ %     | Telephone costs (paid to LEC's or RBOCs)            |
| • _____ %     | Other (please Specify _____)                        |
| • <b>100%</b> | <b>Total</b>  |

8) What do you see as your primary competitive advantage (Check One)?

_____ Price	_____ Customer Support	_____ Reliability
_____ Value-added Services	_____ Content	_____ Other, specify _____

If you have any question or comments regarding this survey, please e-mail me at [littmann@umich.edu](mailto:littmann@umich.edu). Thank you!  
Please indicate if you wish to receive a copy of the finished report!

- \_\_\_\_\_ Please send me a copy of the report. Company name: \_\_\_\_\_
- \_\_\_\_\_ Do not send me a copy of the report