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Adoption Barriers of Broadband

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ABSTRACT

Internet has been detached as communication means in many different ways. All this development would not be possible if data transmission technology through internet had not have been developed enough to allow adequate speed for many applications.

However, in small business market one can still find significant part of dial-up internet users that have not adopted broadband.

This work has the objective of identifying the reasons that lead to this resistance (the so called adoption barriers).

Based on a literature regarding quality service and technology acceptance models, this study was composed by two parts: i) qualitative research with a broadband provider, ii) qualitative research with dial-up internet users.

Among many interesting results, one can state that the only barriers generated on the supplier's side concern the pricing and the price structure, i.e., both are reflected in what the client regards as *cost*. The qualitative research with users of dial-up Internet access clearly identified a perceived value barrier, which can be seen as being comprised of the expected results and viability.

Keywords:

Broadband, Quality service, Technology acceptance models

INTRODUCTION

More than 95% of Brazilian companies with a staff of 10 or more have Internet access (INTERNET MANAGEMENT COMMITTEE IN BRAZIL, 2005). However, most of this audience still works with low speed dialed access.

In the Brazilian market as a whole, broadband Internet services have been posting strong growth year after year, reaching 3.8 million accesses at the end of 2005. As compared to more technologically developed countries, however, the dissemination of this service is still low. Countries such as the Netherlands or South Korea, for instance, have reached the level of some 270 accesses per 1,000 inhabitants, or 13 times more than Brazil's 20 accesses.

Part of this strong broadband advance in Brazil and the world can be ascribed to a need for faster connections, spurred by the popularization of applications that involve a high volume of traffic, generally sound or image, such as downloading files of music, voice over IP (VoIP), digital photos, videos, etc. Furthermore, even in low traffic volume applications, there is demand for convenient access due to rising dependence on the Internet (mainly for professional use), whether for communication tools (for example: e-mail, instant messenger), online services (for example: net banking, consulting credit protection services), replacing hard copies of information by site visits (for example: phone directory, public notices of bids, civil service exams) or other services.

Despite this revolution and the Internet's great growth, the academic research we consulted regarding studies about the Internet frequently address themes such as its uses and effects, technologies, e-commerce or online services. The themes are varied. In common, they share a view of the Internet as a "means" (the demand side) to generating business opportunities in several fields of activity or simply as entertainment. The proposed study, on the other hand, looks at the Internet as an "end" (the supply side) and aims at exploring this market from the standpoint of the offer of broadband access solutions for small companies. The scientific studies consulted on broadband Internet have begun to focus more closely on the supply of the service, though always based on

structural aspects (for example: new technologies or regulations) rather than on the individual aspects of users or suppliers.

Considering the highlighted characteristics of the Internet market and analyzing the existing research on the theme, one sees that:

i. The "Internet market" theme has high potential for generating academic research;

ii. Demand (e-commerce, supply chain applications, corporate process changes, influence upon the personal life of users and online services) has been fairly well explored;

iii. The supply side continues to offer only an ill-developed volume of academic production, centered mainly on medium-term and long-term issues, such as regulations and the broad dissemination of the service, without any concerns about individual factors that may or may not lead to adopting the use of the Internet.

Within this context, the overall objective of this study is to:

Identify and evaluate the main barriers to the adoption of broadband Internet among small companies.

THEORETICAL FOUNDATION

Service quality

Where the theoretical foundations of service quality are concerned, we will adopt as our frame of reference a line of research of great academic influence on the theme (headed by A. Parasuraman, V. Zeithaml and L. Berry), which was initiated with an exploratory

study published in 1985. This generated two main offshoots: the gaps model of service quality and the SERVQUAL tool.

The exploratory study of Parasuraman *et al.* (1985)

In this article, the authors rank themselves among the pioneers of research into service quality and therefore highlight two initial difficulties: the scarceness of research on the theme and the difficulty of defining "service quality" (both by consumers and providers of service). Given these difficulties, four objectives were defined for the subject: (i) to review the small number of studies that investigate service quality; (ii) to report the insights obtained through an intensive exploratory investigation about quality in connection with four types of service; (iii) to develop a service quality model; and (iv) to offer proposals capable of encouraging future research on quality.

In their review of the literature (the first objective of PARASURAMAN *et al.*, 1985), the authors initially highlight three characteristics that distinguish the evaluation of services from the evaluation of goods: intangibility, heterogeneity (variations: "from producer to producer, from client to client and from day to day") and the inseparability of production from consumption (which automatically increases the direct influence of the client in the delivery of the end product). Three conclusions that are highly relevant for this study emerged from the studies (main references: Grönroos (1982); Lehtinen U., Lehtinen J. (1982); Lewis, Booms (1983); Sasser, Olsen, Wyckoff (1978)) that the authors evaluated

1. Service quality is harder to evaluate than the quality of goods, due to the lack of research attributes (criteria for comparisons that can be identified prior to purchase), leading to comparisons based solely on the tangible aspects of service (for example: appearance of physical facilities). In the absence of tangible

aspects (and in addition to them), "some authors have suggested that *price* becomes a pivotal quality indicator" (PARASURAMAN *et al.*, 1985, p. 42).

2. The perception of service quality results from comparing the consumer's expectations with the service's actual performance: "Delivering quality services means consistently fulfilling client expectations" (LEWIS; BOOMS, 1983 in PARASURAMAN *et al.*, 1985, p. 42).

3. Evaluation of quality does not only apply to the result of the service, but also involves evaluating the process of delivery of the said service. Grönroos (1982) typifies two types of service quality: technical (related to the result) and functional (related to the process).

In the exploratory study (the second objective of PARASURAMAN *et al.*, 1985), the authors conducted a set of personal interviews with executives in charge of companies from four service-rendering sectors (retail banks, credit cards, security brokers and technical service & maintenance), besides holding focus groups with the clients of these companies. Among the executives, despite the particularities of each one of the services, the authors highlight one main and common conclusion: "A set of key discrepancies or gaps exists between the perception of executives about service quality and the tasks associated with the delivery of service to consumers" (PARASURAMAN *et al.*, 1985, p. 44). Among the clients, the gap that stood out the most was the difference between the expectations of service and actual delivery (as forecast by the second conclusion of the review of the literature).

Based on the interviews and exploratory focus groups, the authors structured, in sum, two models for evaluating service quality (the third objective of PARASURAMAN *et al.*, 1985): a suggestion of 10 service quality determinants that later gave rise to SERVQUAL and a service quality model based on five gaps.

Finally, because this was a theoretical and exploratory study, the authors encourage five lines of future research (the fourth objective of PARASURAMAN *et al.*, 1985): (i) the development of a standard tool for measuring the perception of service quality; (ii) the development of methods for measuring quality gaps accurately; (iii) the examination of the nature of the association between perceived quality and its determinants; (iv) the evaluation of the usefulness of segmenting consumers according to their expectations; and (v) the identification and prioritization of the factors that influence the creation of expectations about consumers.

The 'SERVQUAL' tool

Leveraged by the qualitative findings of the exploratory study of PARASURAMAN *et al.* (1985), and to fulfill the first line of research encouraged by the authors themselves at the end of the article (development of a standard tool for measuring the perception of service quality), the same authors published, in 1988, a new study with the development of a service and retail quality measuring tool called *SERVQUAL* (PARASURAMAN *et al.,* 1988).

This tool is aligned with the *quality gaps* model and its objective is to measure *the quality perceived by the client* through the difference between the *service expected by the consumer* and the *service perceived by the consumer* across five dimensions (Table 1).

Table 1 – SERVQUAL Dimensions

Dimension	Definition
Tangibles	▪ Physical facilities, equipment and appearance of the personnel
Reliability	▪ Ability to perform the promised service reliably and precisely
Responsiveness	▪ Willingness to help clients and provide prompt service
Assurance	▪ Staff knowledge and courtesy and their ability to inspire trust
Empathy	▪ Careful and individualized attention provided by the firm to its clients

SOURCE: adapted from PARASURAMAN *et al.* (1988, p. 23)

SERVQUAL has no direct application to this specific study and therefore it will not be discussed extensively here. However, its dimensions will be used qualitatively. To this end, one must consider dividing the rendering of this service into two parts: (i) the actual access to the Internet, which does not involve any interaction between the client and the supplier, as it concerns only a technical functionality; and (ii) the required support processes of installation, customer service, collections and technical service, which generally involve some form of client-supplier interaction.

Given that the concept of the dimensions defined by the tool (and mainly the details of the variables of which each dimension is comprised) is centered on the client-supplier interface, the applicability of the tool to this study is limited to the second part of the service. Regarding the first part, only the "reliability" dimension (i.e., delivering what was sold) makes sense, with adaptations of the details of the variables. Thus, SERVQUAL was used as a reference for the development of the guidelines for qualitative interviews.

The service quality gaps

Besides SERVQUAL, the other major outcome of the exploratory study of Parasuraman *et al.* (1985) was the development of the service quality gaps model, which defined five gaps that can cause the perceived quality of the services rendered to be sacrificed

Of these gaps, gap 5 consists of the difference between perceived service and expected service, which the authors ascribe to the consumer and that can be evaluated using SERVQUAL. The other four concern supplier shortcomings and were detailed and defined by Zeithaml *et al.* (1988, pp. 35-36) as:

Gap 1: Difference between "*consumer expectations*" and "*management perception of consumer expectations*"

Gap 2: Difference between "*management perception of consumer expectations*" and "*service quality specifications*"

Gap 3: Difference between "*service quality specifications*" and "*service actually performed*"

Gap 4: Difference between "*service actually performed*" and "*what is communicated to consumers about the service*"

Still according to Zeithaml *et al.* (1988), the authors identify theoretical constructs and specific variables that control or enhance these four gaps.

Acceptance of technology, adoption of innovation and related theories

"Computer systems cannot improve organizational performance if they are not used. Unfortunately, resistance to systems for the 'end user' among executives and professionals is a generalized problem. In order to better forecast, explain and enhance user acceptance, we must understand better why people accept or reject computers." (DAVIS *et al.,* 1989, p. 982)

With these words, Davis *et al.* (1989) opened their text to justify the development of the Technology Acceptance Model (TAM). To better understand them, however, it is important to recall that back in 1989, the use of PCs and information systems by the "end user" (rather than only by IT technicians) was still very recent. Nowadays, the context is obviously quite different. But the foundations proposed in TAM continue to be valid, even for application to a broader idea of "technology". Merely for the sake of illustration, it is worth noting that the model validation of DAVIS *et al.* (1989) was based on acceptance of a word processing software program.

In the subsequent decade (the 90s), other models and theories that tried to identify the factors that lead to the adoption or not of technology were also published, until Venkatesh *et al.* (2003) formulated the Unified Theory of Acceptance and Use of Technology (UTAUT), based on the consolidation of concepts drawn from eight such models and theories. In this study, UTAUT will be adapted to evaluate the acceptance and use of broadband Internet.

Below, we present the foundations of their theory, complemented in an introductory way by the models and theories that originated it and, finally, applications of these theories in the evaluation of broadband Internet.

UTAUT: The Unified Theory of Acceptance and Use of Technology

Venkatesh *et al.* (2003) proposed the consolidation of eight models and theories to generate the "*Unified Theory of Acceptance and Use of Technology*" (UTAUT), based on constructs that combine the essence of the models and theories of which it is comprised.

In this theory, the authors determine four constructs as direct determinants of the *behavior intent* and *usage behavior*: (i) *performance expectations*, (ii) *effort expectations*, (iii) *social influence* and (iv) *facilitating circumstances*. The definition and origin of each one of these determinants is shown in Table 2.

The *behavior intent* construct, found in the theory as the mediator of *usage behavior¸* comes from the Rationalized Action Theory. This construct defines to what extent the individual is motivated to adopt the behavior in question (based on performance expectations, effort expectation and social influence), regardless of the conditions that render this behavior viable (which, according to this theory, are limited by the *facilitating circumstances*).

Table 2 – Main UTAUT factors

Construct	Definition
1. Performance expectations	"Degree to which an individual believes that using the system will help him to obtain work result gains"
2. Effort expectations	"Degree to which using the system is easy"
3. Social influence	"Degree to which an individual perceives that other important people believe that he should use the new system"
4. Facilitating circumstances	"Degree to which an individual believes that there is an organizational and technical infrastructure to provide support for using the system"

SOURCE: Venkatesh *et al.* (2003, pp. 447, 450, 451 and 453)

In the eight models and theories of which UTAUT is comprised, the authors identified three other indirect determinants of behavior intent (attitude to the use of technology, self-efficacy and anxiety) that were not included in the final theory because they became irrelevant in the presence of the other four direct determinants.

Finally, the authors defined certain *mediators* of the direct determinants, including personal aspects (gender and age) and aspects related with the usage situation (experience and voluntariness of use).

A more objective interpretation of UTAUT and the interrelation between each one of the adopted constructs can be obtained from the hypotheses defined in the original article (Table 3).

Table 3 –UTAUT Hypotheses

H	Definition of the hypothesis
H_1	▪ "The influence of performance expectations upon behavior intent is moderated by gender and age, so that the effect will be stronger among men and particularly among young men."
H_2	▪ "The influence of effort expectations upon behavior intent is moderated by gender, age and experience, so that the effect will be stronger among women, particularly young women and who are at a stage of little experience."
H_3	▪ "The influence of social influence upon behavior intent is moderated by gender, age, voluntariness and experience, so that the effect will be stronger among women, particularly older women, within situations of mandatory use and who are at a stage of little experience."
H_4	▪ "The facilitating circumstances HAVE NO significant influence on behavior intent."
H_{5a}	▪ "Self-efficacy regarding computers HAS NO significant influence on behavior intent."
H_{5b}	▪ "Anxiety regarding computers HAS NO significant influence on behavior intent."
H_{5c}	▪ "Attitude to the use of technology HAS NO significant influence on behavior intent."
H_6	▪ "Behavior intent has a significant and positive influence on usage behavior."

SOURCE: Venkatesh *et al.* (2003, pp. 450 and 453 to 456)

It is important to highlight that the nomenclature used by the authors tries to represent the content of each construct better, regardless of prior definitions found in the literature.

EVOLUTION OF THE BROADBAND MARKET IN BRAZIL

The Internet market is characterized by being, among other factors, a market that is still growing fast, so that we do not know exactly how it will behave as a "mature" market. According to the Teleco and IDG Now sites, the growth of the Brazilian broadband access market reached an average of roughly 90%/yr between 2001 and 2005 (Graph 1).
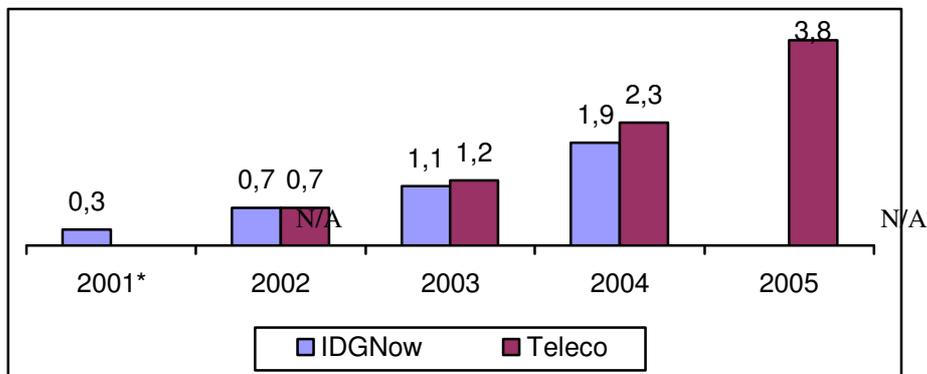

Graph 1 – Evolution per year of the number of broadband accesses in Brazil (in millions)
SOURCE: reports published in the IDG Now and Teleco sites

Another fairly striking characteristic of this market is the entry barrier for new competitors, given the difficulty in gaining access to the "last mile", i.e., a data transmission channel that actually reaches the end client and that can consist of metal cabling, optic fiber, radio or even satellite. Given this barrier, it is common for this market to be dominated by the large local wireline phone companies, which take advantage of the broad reach of their networks to offer DSL services (Digital Subscriber Line, i.e., technology for accessing the Internet via broadband using wireline phone lines, such as Speedy (Telefônica), Velox (Telemar) or BRTurbo (Brasil Telecom)). This technology has some variations. ADSL - Asymmetric Digital Subscriber Line is the most common standard in Brazil and is called thus because the downloading and

uploading speeds are different. This situation is also found in Brazil in the market dominated by Telefônica (in the state of São Paulo), Brasil Telecom (in the southern, mid-western and part of the northern regions) and Telemar (in the balance of the southeastern region, as well as in the northeast and part of the northern region). Graph 2 shows the evolution of these three suppliers, together with Net, the main cable broadband supplier.
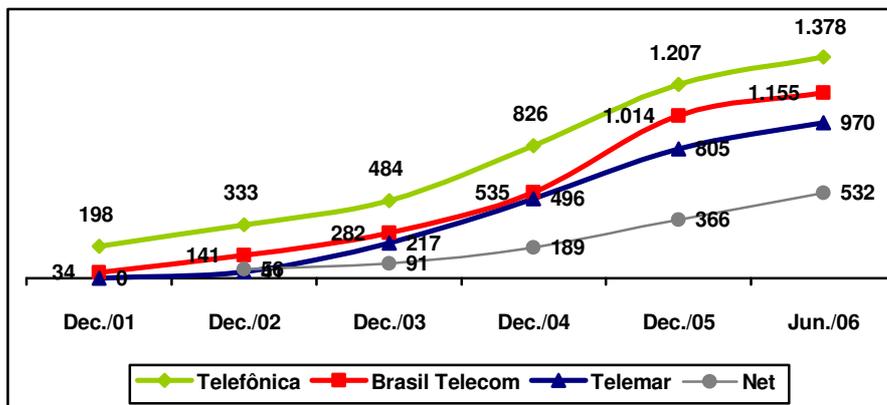
Graph 2 – Annual evolution of the number of accesses (x 1,000) among the main suppliers
SOURCE: Reports released by the companies themselves

Telefônica, which pioneered this technology in Brazil in 1999, has been growing at a relatively steady pace. Brasil Telecom, despite being a late entrant, grew strongly in 2005 and, in proportion to the number of lines it has in service, is the leader of the three concessionaires. As for Telemar, it chose to initiate its Internet services by focusing on other products: RDSI – Integrated Digital Services Network, a technology for voice traffic that uses a conventional line, video-conferencing and Internet access. The Internet access is dialed, but offers faster speeds than conventional dial-up access, though lower than provided by DSL access. It currently has the lowest DSL complex of the three operators (Graph 3). Net is a cable TV operator and has no data comparable to those of the other companies mentioned above.
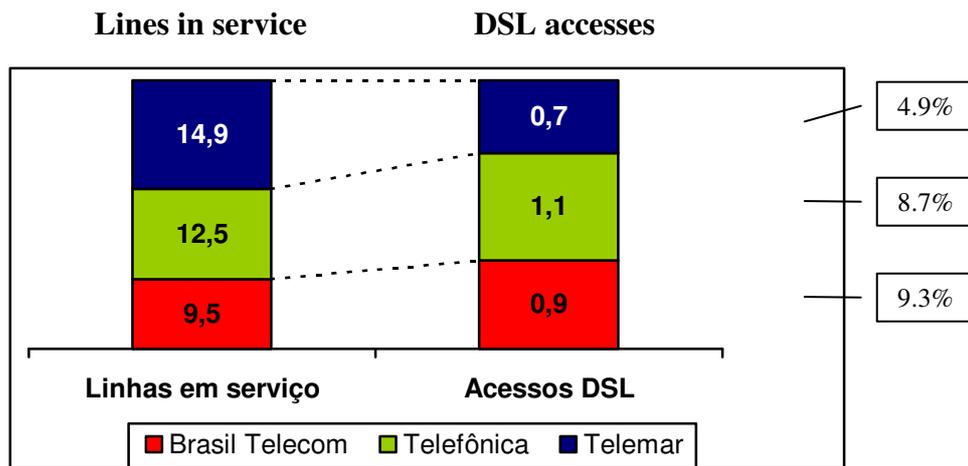
Graph 3 – Comparison between DSL accesses and the no. of lines in service (in millions)
SOURCE: Reports issued by the operators (Sep./2005)

Such quick market evolution is one of the factors that highlight the relevance of the theme of this study. Moreover, another factor complementing the interest in the study carried out is that, despite this growth, Brazil remains far from having an outstanding position in world terms. Though it ranks among the countries with the greatest absolute number of accesses, penetration among the population is very low.

However, two difficulties currently stand in the way of a precise comparison between countries:

- The reliability of the figures in reports that make such a comparison is questionable: data on Brazil, for instance, differ from those found in other domestic sources (indicating this may also be true of the data for other countries); and

- This market's very fast growth caused the data that is divulged (regardless of their reliability) to become obsolete very quickly.

Graph 4 compares the number of access per 1,000 inhabitants between countries, based on two sources: the Computer Industry Almanac (released in November 2005) and Internet World Stats (released in 4Q2004, based largely on Nielsen/NetRatings data, taking into account only DSL). Computer Industry Almanac defines itself as "a market

research company for the PC, Internet and related industries. The company was established in 1986 (…)". In its site (http://www.c-i-a.com), it reinforces its credibility with testimonials from sector experts such as the Symantec CEO and the ACM Computing reviewer. Internet World Stats defines itself as "an international site that characterizes, with data updated up to 2005, the use of the Internet, population statistics and market data for 233 countries and regions of the world" (http://www.internetworldstats.com).
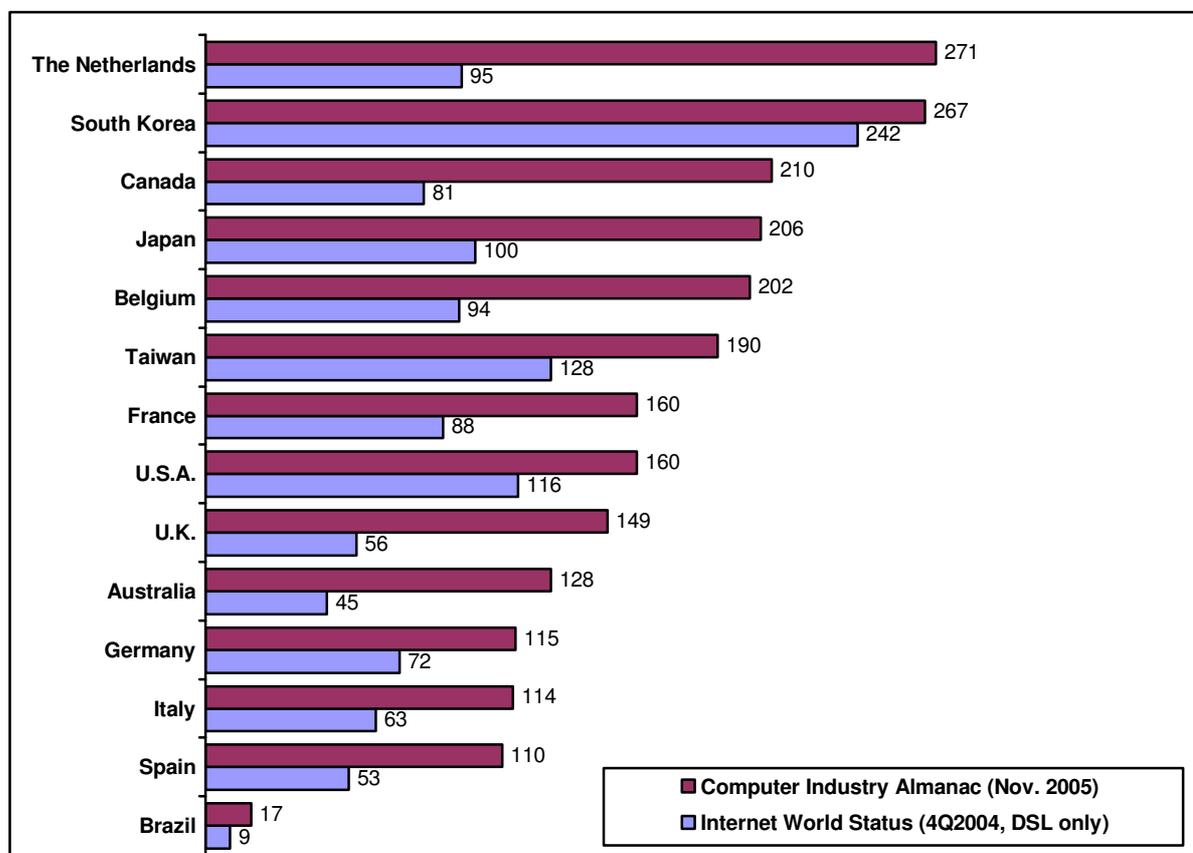
Graph 4 – Comparison of the number of broadband accesses per 1,000 inhabitants
SOURCE: Computer Industry Almanac (Nov./05); Internet World Stats (4Q2004, only DSL)

Despite the discrepancies between the two sources, Graph 4 clearly shows the gap between Brazil and the top ranking countries.

In sum, both the fast growth of the last few years and the potential that still exists for broadband market growth in Brazil (based on the comparison with other countries) awaken interest in acquiring a deeper understanding of the barriers to the usage of this

service, which is what motivated this study. In particular for the small companies market, an analysis of the available offerings anticipates one of the barriers on the supplier side.

Lack of broadband products specifically designed for small companies

Of the previously presented volume of accesses in Brazil, the share ascribed to companies is roughly 20%, which illustrates the predominance of residential access. Therefore, broadband suppliers are interested in developing products for and allocating commercial efforts to this audience. Concurrently, suppliers are also interested in large corporations, a highly profitable audience because, individually, they consume large volumes of more expensive products, even though these corporations are limited in number.

The needs of small companies, however, normally lie somewhere in between those of these two other audiences (residential and large corporations). Thus, the Brazilian market can be seen as an underdeveloped one to date. At one end, we have products for homes provided largely through DSL or cable technology (offered, respectively, by the wireline phone and cable TV operators). For large companies, at the other end, there are other products (called IP links) that ensure greater connection stability (which implies in greater reliability of service), but at a cost roughly five times greater for the same speed of access.

For small companies, the wireline phone operators, cable TV operators and other suppliers created "evolutions" of the residential plans. However, in terms of benefits, these plans do not differ much from the "original" ones, although their end cost present significant differences for the clients. This product positioning also generates a potential barrier to the use of broadband in small companies.

METHODOLOGICAL ASPECTS OF THE STUDY

In line with this study's overall objective, the structuring of the problem will occur by means of a set of independent and complementary studies, according to the origin of the barrier to adopting the use of broadband among small companies, which may be: (i) suppliers' deficiencies in the rendering of services and/or (ii) potential clients having a low perception of value.

Regarding the first case (suppliers' deficiencies in the rendering of services), a qualitative study was conducted based on the quality gaps model (PARASURAMAN *et al.*, 1985, p. 44 and ZEITHAML, 1988), under the assumption that these gaps can degrade the value of the service and therefore generate barriers to adoption among potential clients.

As for the second case (potential clients having a low perception of value), a qualitative study was conducted among small companies including both users and non-users of broadband. This research was based on UTAUT (VENKATESH *et al.*, 2003) and tried to explain the factors that drive this poor perception of value among potential users that have not adopted broadband.

Two sources of information were used for the set of studies: (i) a qualitative interview with supplier and (ii) qualitative interviews with users of dial-up Internet access.

Qualitative research with supplier

The objective of the qualitative research with the supplier was to identify possible gaps in the quality of the supply of the broadband Internet service. This research was guided by the quality gaps model proposed by Parasuraman *et al.* (1985, p. 44) and Zeithaml (1988). Table 4 indicates the sources of information of the model's constructs.

Table 4 – Data sources – qualitative interview with supplier

Construct	Source
▪ Perception of the executives about client expectations	▪ Qualitative interview with supplier
▪ Service quality specifications	▪ Secondary supplier data
▪ Service delivered	▪ Secondary supplier data
▪ External communication to consumers	▪ Secondary supplier data
Service expected (by the client)	▪ Qualitative interview with users of dial-up Internet access

The supplier selected for this research was Telefônica, which offers the Speedy product to the market. It was chosen for reasons of convenience (ease of access to people), but this choice is also supported by the company's leadership of the domestic market, with a strong concentration in the state of São Paulo (where client research is also focused).

The interviews were held with five key individuals where the marketing of Speedy to the market under study (small companies) is concerned, from the sales and marketing areas and of middle-management level. Their job titles are shown in Table 5:

Table 5 – Experts interviewed

Job	Responsibilities
▪ Manager of the Speedy product	▪ '*Product*' and '*price*' according to the 4 Ps model
▪ Commercial development manager	▪ '*Promotion*' and '*area*' (interface between product marketing and sales channels) according to the 4 Ps model
▪ "Marketing Laboratory" manager	▪ Identification of more effective ways of selling
▪ Inbound telemarketing sales manager	▪ Sales through inbound telemarketing (main channel for selling Speedy to this audience)
▪ Service manager	▪ Customer service

Table 6 – Summarized qualitative guidelines for in-depth supplier interview

Part	Question
PART I: Management perception of client expectations	1. What do you believe are client expectations regarding broadband?
	2. When a client proactively seeks broadband Internet service, what is the benefit he expects? In other words, what generates value for the client?
	3. When a supplier seeks a client to offer a broadband Internet service, what leads the client to be persuaded of the value of this service?
	4. What are the key points a broadband Internet supplier must offer for potential clients to perceive that the service adds value for them?
	5. What is the message that a broadband Internet supplier must convey to a potential client in its communication to persuade him to adopt the service?
PART II: Supplier self-critique relative to the variables that enhance quality gaps	*Gap 1* 6. Do you think Telefônica invests enough and appropriately in getting to know the client and understand his expectations?
	Gap 2 7. Do you think that Telefônica focuses enough on guaranteeing the quality of the services it offers? How is this reflected in "concrete evidence"?
	Gap 3 8. To what extent is the service delivered to the client actually in line with his specifications?
	Gap 4 9. Do you think that Telefônica's communication could cause the client to experience some frustration?
PART III: Supplier perception of UTAUT variables	*Effort expectations* 10. Can the adoption of broadband Internet imply in any added learning or knowledge acquisition effort?
	Social influence 11. Is social influence (other people's opinion) relevant for forming the opinion of a potential small company client?
	Facilitating circumstances 12. What are the circumstances that may restrict the decision to buy of a potential client that is interested in the service?
	Moderators (experience) 13. How does broadband experience (at other companies or at home) influence the company's decision to adopt it?
	Moderators (personal factors) 14. Is the small entrepreneur's decision totally rational or is he influenced by personal factors?

Qualitative research with dial-up Internet users

The qualitative study with dial-up Internet users had the objective of obtaining information on *client expectations,* complementing the quality gaps analysis.

This research phase was based on five in-depth interviews with dial-up Internet users from the small company category, represented by the person responsible for IT or telecom decisions-making (who are generally one and the same among this audience). The interviews were conducted by phone.

The desires, expectations and frustrations of this audience were investigated. Because of their exploratory nature, results cannot be generalized.

The guidelines adopted for the qualitative interviews with Internet users were structured into two parts, summarized in Table 7.

Table 7 – Summary of guidelines for qualitative interview with dial-up Internet users

Part	Question
PART I: Client expectations and expected performance.	1. What do you expect from a broadband Internet service?
	2. What relative advantage would you expect from a broadband Internet service? In other words, what generates value for you?
	3. If a supplier contacts you to offer you a broadband Internet service, what would persuade you of the added value of the service?
	4. What are the key points that a broadband Internet supplier must have to generate a good perception of the value of the service?
	5. What is the message that a broadband supplier should convey to you in its communication to persuade you to adopt its service?
PART II: Qualitative perception of dial-up Internet users about the UTAUT variables	*Effort expectations* 6. Do you think that adopting broadband Internet can imply in some added learning or knowledge acquisition effort?
	Social influence 7. Is the opinion of other people relevant for you to form your opinion about adopting broadband?
	Facilitating circumstances 8. What are the circumstances that could restrict your purchase decision?
	Moderators (experience) 9. How do experiences with broadband (at other companies or at home) influence the decision to adopt it at the company?
	Moderators (personal factors) 10. Are there any personal factors that influence your decisions or do you feel that you always manage to make the most rational decisions?

ANALYSIS OF THE RESULTS

Qualitative research with supplier

The objective of the qualitative research with a supplier was to evaluate service quality from the standpoint of the quality gaps proposed by Parasuraman *et al*. (1985), including: gap 1 (complemented by the interviews with dial-up Internet users) and gaps 2 to 4 (complemented by the analysis of the supplier's internal data). Gap 5 will not be evaluated as it involves the perception of users of the service, whereas this study focuses on non-users.

It is important to stress that this research was conducted with one supplier only (Telefônica). However, as this company holds a leading position in the market (its market share is greater than that of all the other competitors together), we suppose that some of its opinion traits and positions may be different from those of the other suppliers.

Gap 1

Gap 1 consists of the difference between *client expectations* and the *perception of executives about client expectations.*

In the qualitative interviews with dial-up Internet users, what we observed in terms of client expectations is, in sum, a **high-speed service, with costs compatible with the level of usage.**

In the qualitative interviews with suppliers, we observed that the perception of client expectations focuses on **convenience,** which is actually reflected in the three attributes that are valued the most at the time of the sale of the service: high speed, always switched on (the user being permanently connected to the Internet, at no added cost) and free phone line.

However, as this expectation manifests itself at different levels among Internet users, one arrives at the formation – to put matters simply – of two user groups: (i) those that are willing to pay for this convenience; and (ii) those who aspire to this convenience, provided it does not cost them any more. At present, it is generally thought that most of the users in the first group have already adopted broadband Internet, whereas among the second group there is the cost barrier. Given that dial-up Internet has a variable cost (proportional to the amount of time it is used) and that broadband has a fixed cost, it is

expected that only those users who use the Internet little will continue to rely on dial-up connections.

In other words, for the audience in question, one can state that client expectations ("high-speed service, with costs compatible with the level of usage") are in line with the supplier's perception of expectations ("convenience"), indicating gap 1 does not exist.

Gap 2

Gap 2 consists of the difference between the *perception of executives about client expectations* and the *specifications of the service.*

Based on the *perception of executives about client expectations,* the specifications of the services are simple, conceptually speaking, as they consist of only a few attributes, notably:

- Nominal speed: the product's theoretical speed. In practice, it may be lower, both because of network restrictions of the point where downloading occurs and of the uploading;

- Pricing: the end price to the user (including expenses in which clients must incur involving third parties, such as content providers);

- Price structure: options for a fixed price, or one that varies according with the number of hours used, or that varies according to consumption (measured in megabytes), or a combination of these criteria;

- Band assurance: minimum speed guaranteed by the supplier (as a percentage of the nominal speed);

- Availability: percentage of time during which the product was working well (considering that the service may be "off the air" for part of the time).

- Service level in connection with operating support processes: time to installation and for repairs, exactness of collections, and speed and efficiency of customer service.

In practice, however, other factors must also be taken into account regarding the service's specifications (from the supplier's point of view), of which the following stand out:

1. Technical viability: capacity and limitations of the network infrastructure;

2. Viability of support operating processes: capacity and limitations of the support teams (for example: installation and repairs);

3. Profitability: maximization of the margin, considering a favorable price/cost balance, besides the price elasticity of demand.

Specifically in relation to profitability, a point the experts from the supplier reiterated was the risk of "**revenues cannibalization",** i.e., a price reduction designed to increase product penetration (as expected by clients) would automatically reduce revenues from clients who already have the service at the current price level. This begs the following question: will the gain in the number of clients, due to the price cut, offset the loss of revenues from current clients? To answer this question, is it not enough to think about the revenues balance, but also about the end margin.

Below, we discuss the attributes highlighted by the supplier, trying to understand the dimensions of gap 2.

Nominal speed

User expectations and the executives' perception of these expectations coincide: the higher the better, without a precise definition of a minimum level that satisfies the client. As a result, occasionally the supplier raises the speed of its offerings, maintaining the prices at the same levels. However, at present there are technical restrictions that

limit these speed increases (which may be attenuated by investing in the network). Besides the technical limitation, there is also concern with not encouraging downgrading (client migration to lower plans, that generate less revenue). However, the recent intensification of competition in certain specific areas – with the offering of high speed and low price – has added one more concern for executives: not losing their current client base. In sum, specifications are aligned with the executives' perception, but are limited by technical restrictions in areas in which there is strong competition.

Pricing

Where this criterion in concerned, the supplier's specifications are deliberately not aligned with client expectations. Whereas the client expects a price reduction, the supplier is concerned with profitability. To minimize this non-alignment, the supplier frequently works with acquisition promotions that offer discounts for a limited amount of time (for example: a 50% discount during the first three months).

Price structure

The supplier's perception of client expectations indicates that the service should have a fixed price, regardless of use. However, some of the current offerings have a fixed amount (measured in megabytes) that clients can use at no added cost, paying extra only once they exceed this amount. According to the supplier, this amount is quite high and only a few clients exceed it; it was created to cover the variable costs at clients with very high use. However, since this fixed amount raises the barrier for new sales, the supplier has been offering successive promotions that exempt the client from this additional cost (and align the perception of expectations and the service specifications).

On the other hand, the qualitative interviews with dial-up Internet users indicate that some potential clients are unwilling to pay for a service they do not use much. This aspect, which the supplier is also aware of, generates an additional question (for which

the supplier has not reached a conclusive answer): is it worth having a broadband product with variable pricing for low-use clients? Again, the doubt concerns the profitability of the portfolio (margin and risk of cannibalizing revenues). In practice, the supplier has a product with this characteristic in its portfolio; however, in commercial terms, it does not focus much on it.

Band Assurance

In the supplier's view, bandwidth guarantee, defined as the minimum guaranteed data transmission speed, is an element of little relevance for most clients (both actual and potential): "generally, the client doesn't even know that there's a speed fluctuation and, when he does, he is more interested in the average speed than in the minimum one". In practice, there is a formal specification that can give clients a negative impression because of how low it is (10% of the nominal speed) and in general this is actually higher. Thus, from the commercial point of view, it would be more interesting to define bandwidth guarantee using the average speed, but this would stumble upon technical measurement restrictions (for example: the average would be different for each client, varying according to the time of use).

Availability

In the supplier's view, potential clients expect the service to function 100% of the time; however, they are unconcerned about this when they hire the service (they consider this an essential product feature). Coupled with this "unconcern", there is also the technical difficulty of guaranteeing this level of availability. In practice, efforts are made internally to maintain the availability of service (something that clients begin paying attention to and demanding as soon as a problem materializes); however, there is no formal specification (something that is communicated to the client) regarding this criterion.

Service levels in operating support processes

As is the case of availability, concern with support services is relevant in order to guarantee the satisfaction and retention of current clients, rather than to acquire new clients. Additionally, similarly to availability, there is no formal specification regarding these services.

Gap 3

Gap 3 consists of the difference between the *specification of the services* and the *service actually delivered.*

Analyzing the six attributes discussed under Gap 2, one sees that there are two groups that call for separate evaluations:

1. Attributes that the supplier considers relevant (from the point of view of new client acquisition, the focus of our work, rather than of maintaining the current clients): *nominal speed, pricing* and *price structure.* Regarding these three criteria, the alignment between specification and reality depends only on decision-making (i.e., there are no operating process difficulties to fulfilling these specifications), which makes it easy to eliminate gap 3;

2. Attributes that are seen as less relevant (also from the point of view of new client acquisition): *bandwidth guarantee, availability* and *support services.* One sees that, concerning these, operating difficulties can occur that hamper the alignment of service execution and its specifications (contrary to the attributes listed in item 1). These attributes include:

    – Band assurance have a formal specification (which is actually fulfilled);

–   The availability and the services connected with operating support processes, lack formal specifications and are monitored through managerial targets that may or may not be linked to client expectations.

Gap 4

Gap 4 consists of the difference between the *service actually delivered* and the *external communication to the client.*

The external communication to the client focuses on the main points of client expectations as perceived by the supplier:

▪   Convenience, reflected in high speed, being always switched on (the user is permanently connected to the Internet, at no added cost) and free phone line;

▪   Low cost, thanks to acquisition promotions (for example: a discount for the first few monthly payments).

As justified in Gap 3, it is easy to align the communication and the reality of these items, thereby eliminating gap 4.

However, this communication does not necessarily include points that may lead to a resistance to purchasing (for example: bandwidth guarantee that is lower than nominal speed) or subsequent dissatisfaction (for example: the risk of technical problems). In practice, these factors are only communicated when the buyer asks questions about them. In other words, despite there being no gap 4 (difference between communication and reality), one may state that under certain circumstances communication omits facts.

Communication gap

Though this gap is not included in the original model of PARASURAMAN *et al.* (1985), we will evaluate it in this study, defining it as the difference between *client*

expectations and *external communication to the client.* In other words, it evaluates the alignment between what the suppliers says and what the potential client wants to hear (clearly a relevant element for acquiring new clients).

Regarding this aspect, we see that client expectations partially diverge from the supplier's communication, once again in terms of the cost of the service: given that the client expects "costs compatible with the level of usage", the supplier's communication tries to meet this expectation offering discounts for a limited amount of time (in line with the promotions that are in effect at the time). Thus, communication emphasizes "low cost" (minimizing the gap in question); however, one cannot fail to communicate that this is a promotional price (thus creating, in part, the gap in question). Leaving the cost issue and turning to the service's benefits, communication is in line with client expectations.

Qualitative research with users of dial-up Internet access

In this stage of the study, five dial-up Internet users were interviewed, including professionals and small businessmen: one automotive accessories store, two restaurants, one cosmetics store and one dentist.

All the interviewees had a common reason for not using broadband Internet: **they thought the cost was too high for their level of use.** Besides low use, the interviewees also used the Internet in similar ways: for e-mailing and simple browsing (i.e., activities that do not necessarily require fast speed).

This perception, however, is still influenced by certain particularities in some cases:

- A negative experience with the service at home, where the product provided by a specific supplier functioned poorly; this substantially reduced the perception of

the benefit. Consequently, a balance between cost and benefit would only occur if the service were offered at a substantially lower price (cosmetics store);

- Lack of a fixed computer at work: one of the interviewees uses a laptop PC for dial-up Internet connections and feels this is a limitation relative to acquiring broadband, coupled with the need to cut costs (automotive accessories store).

Below, an analysis of interviewee opinions from the viewpoint of UTAUT:

Table 8 – Results of the qualitative interviews with dial-up Internet access users

Construct	Evaluation	Comments

Expected Result	Ranges from "indifferent" to "favorable"	▪ The main expectations of all the interviewees regarding broadband are "*just having greater speed*".
		 ▪ However, for some users this benefit is irrelevant (given their level of usage), whereas for others this could even increase their usage of the Internet. In all cases, the higher speed was seen as a convenience rather than as a productivity element.
		 ▪ Other aided items during the interview (mentioned by the supplier or identified in the review of the literature) were not taken into account by the clients:
		    – Practicality of being permanently connected;
		    – More technology in the office; and
		    – Social influence

Expected ease of use	Favorable	▪ None of the interviewees has expects to have to make an extra effort in order to use broadband Internet. ▪ There were also expectations that, should broadband be acquired, the supplier should offer technical service so as to eliminate this user barrier.
Viability	Favorable	▪ Despite stating cost as the chief barrier to broadband, the interviewees argue that they can afford it (except for the automotive accessories store that stated "going through a year in which it is necessary to cut costs"), but do not see that it would provide them with sufficient benefit. ▪ All the interviewees commented that they would hire the service if it were offered at a lower cost. ▪ In referring to "high cost", the users generally compare it to their current dial-up solution (again, the exception was the automotive accessories store, which evaluates the absolute cost of the service).
Social Influence	Low influence	▪ All the interviewees say they are not very influenced by the opinion of third parties.

Experience	Inconclusive	▪ Three different situations were encountered in the five interviews:
		    – *Positive experience (two interviewees):* they know the service and evaluate it favorably, regarding the cost of the service as the main barrier to acquisition;
		    – *Negative experience (one interviewee):* respondent is familiar with the service but has a negative evaluation, feeling its performance is below expectations (too many functioning problems);
		    – *No experience (two interviewees):* they have very little or no familiarity with the service. In this case, although the declared barrier is the cost, one sees they seem rather skeptical about the service's benefits (which reduces the expected results).

Moderating Factors (personal profile)	Low influence	▪ None of the interviewees showed any signs that the decision to adopt broadband or not might depend on their personal profile (taking into account age, gender and level of schooling).

MAIN CONCLUSIONS

Supply-side barriers

Regarding the *"extent of suppliers' awareness of the expectations of clients and potential clients",* this factor does not appear to be critical: the main attributes that potential clients highlighted were also stressed by the supplier.

Concerning the *"extent to which suppliers manage to convert their understanding of client expectations into appropriate service specifications",* one observes the first relevant barriers: pricing and price structure (fixed value options, variable price options connected with the amount of time used, variable price options connected with the amount of volume used, in megabytes, or a combination of the three). The supplier is aware of both and both have been generated consciously so as to maintain the profitability of the business. In other words, the prices are defined in such a way to try to maximize the product's income by balancing margin and penetration (consequently going against the objective of only maximizing penetration). Similarly, the variable-price broadband plans (which could serve users with low Internet consumption quite satisfactorily) are not pushed commercially, because of the risk of "cannibalizing revenues". Regarding the other attributes evaluated (nominal speed, bandwidth guarantee, availability and service level of operating support processes), there is no relevant divergence that might raise an additional barrier.

Regarding the *"extent to which the suppliers' operating areas manage to adequately fulfill the defined specifications",* one also sees that this factor is not critical in terms of creating a barrier to adoption. One sees that the most relevant attributes at the time of adoption (nominal speed, pricing and price structure) are clear and fully met. Other less relevant attributes are also met (bandwidth guarantee) or lack formal specifications. It is important to stress that this evaluation was conducted from the standpoint of acquiring

new clients and might change if it were carried out from the standpoint of client satisfaction and retention (which was not the focus of this study), due to a change in the relative weight of the attributes.

Regarding the *"extent of the coherence between communication to the clients (during the sale or post-sales period) and the services actually delivered",* one sees that the two are in synch. However, in certain circumstances there are some communication omissions that might generate subsequent dissatisfaction, although this omission does not turn this factor into a relevant barrier to adopting broadband.

Finally, regarding the *"extent to which the supplier's communication fulfills the expectations of potential clients",* one sees that these two elements are only partially in line with each other: on one hand, the client expects a low-cost service; on the other hand, the supplier's message promises low price only for a set promotional period.

In sum, one can state that the only barriers generated on the supplier's side concern the pricing and the price structure, i.e., both are reflected in what the client regards as *cost.*

Potential client-side barriers

The barriers on the clients' side were identified based on the qualitative study with dial-up Internet users.

The qualitative research clearly identified a *perceived value* barrier, which can be seen as being comprised of the *expected results* and *viability.* This value perception gap was observed among some of the interviewees who saw no benefit as well as among those who recognize the existence of benefits, but are unwilling to shoulder yet another burden (in this case, the monthly cost of the service). In the qualitative research, the *expected ease of use* and *social influence* were also evaluated, with neither of them being considered a barrier to the adoption of broadband. Finally, we observed that the

experience of using broadband may contribute positively or negatively to the perception of value.

Practical applications of this study

Complementing the conclusions presented, this study can also be of aid to the management of companies that supply broadband Internet services (or related services) to small companies. Thus, three contributions stand out:

1. The price of the service is the most relevant barrier to its adoption: a price reduction has a high potential for increasing service penetration (as one would intuitively imagine). However, as one normally cannot give up profitability (considering a for-profit company), it is highly recommended that research on elasticity be conducted.

2. There is demand for a variable-price service: a low fixed cost service can be perceived as highly valuable among clients who want the convenience of high speed but are unwilling to pay a high fixed amount due to their low consumption. For these cases (identified in the qualitative research with users of dial-up Internet), a variable price solution should meet with good acceptance.

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