

THE STRATEGIC VALUE OF THE INTERNET BROADBAND SERVICE AND ITS IMPACT ON RURAL SMALL BUSINESSES: AN EMPIRICAL STUDY

**Assoc. Prof. Gheorghe Militaru PhD
Politehnica University of Bucharest
Faculty of Entrepreneurship, Business Engineering
and Management
Bucharest, Romania**

Abstract: This study investigates the strategic adoption of the Internet broadband and technology in locations with small density. The goal of this research is to supply some information necessary for take better decisions concerning the implementation of a project regarding the broadband Internet telecommunications services in Cluj district. The results show that: (1) almost 80% from interviewed people said that they use the Internet broadband services and only 8.4% of the questioned person said that they not use the Internet broadband services, approximately 11.1% of surveyed subjects have not responded to this question; (2) the Internet's role in customer service leads to added value and increased loyalty of the customer, and (4) the most used Internet broadband services are Click Net (30.7%) offered by Romtelecom Telecommunications Company after the broadband services offered through the cable (12.4%) and the broadband services offered by UPC Telecommunications Company (11.1%)

JEL classification: O33, O14, L96, L63

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1. INTRODUCTION

To stay competitive small businesses must take full advantage of industry best practices while adopting to changing business requirements. Accessing the Internet broadband services offer both the functionality and flexibility you need to improve operational efficiency and enhance business agility.

Agility in business performance is the ability of a company to prosper in rapidly changing, continually fragmenting global markets for high-quality, high-performance, customer-configured products and services. Agile companies depend heavily on Internet technologies to integrate and manage business processes, while providing the information processing power to treat masses of customers as individuals.

Organizations and people may view and use information technology in many ways. For example, companies may choose to use information systems strategically, or they may be content to use IT to support efficient everyday operations. But if a company emphasized strategic business uses of information technology, its management would view IT as a major competitive differentiator.

The communications speed and capacity of telecommunications networks can be classified by bandwidth. This is the frequency range of a telecommunications channel; it determines the channel's maximum transmission rate. The speed and capacity of data transmission rates are typically measured in bits per second (bps). That is, bandwidth represents the capacity of the connection. The greater the capacity, the more likely that greater performance will follow. Broadband channels provide high-speed transmission rates.

One of the great challenges of broadband is to provide service to potential customers in areas of low population density is high, it is easy for a service provider to recover equipment costs, but each rural customer may require expensive equipment to get connected.

The goal of this research is to supply some information, necessary for take better decisions concerning the implementation of a project regarding the broadband Internet telecommunications services in rural zone. The main objective of this study is the establishment of requirements and likings of broadband Internet telecommunications services consumers.

The purpose of this article is to examine the way in which the Internet broadband services are adoption by users in rural region, and make radical change to business processes that dramatically cut costs, improve quality, efficiency, or customer service, or shorten time to market. To attain this objective we assume that most of the interviewed subjects are using the fixed telephone service for personal purpose [1].

Another objective of this research took into account if the subjects know the Internet broadband services. In addition, this research took into account the source of information of consumer regarding the Internet broadband services.

The paper is divided into four parts. First, a synthesis of the theoretical background is provided, and the respective implications for using the Internet broadband services. Then, the empirical research methodology is explained. This is followed by a discussion of the results. The paper concludes by discussing implications for management and limitations of the study.

2. CONCEPTUAL FRAMEWORK

In IT field firms have the high level of uncertainty in both technology and market, and the interdependency of technology development in other firms. They are notoriously fragile as they fail easily during the periods of start-ups (IP providers). The close link between uncertainty and entrepreneurship is fundamental for the understanding of opportunities in innovation in the high tech field, where conditions are turbulent and innovations may change the market conditions dramatically.

Companies such as IKEA, and Starbucks started as small insignificant companies with revolutionary ideas and poor financial performance. Once they recognized sources of sustainable advantage, they become market drivers and never looked back.

Agility can be defined as an organization's ability to: (1) discover new opportunities for competitive advantage; (2) using the existing knowledge, assets, and relationships to seize these opportunities; and (3) adapt to sudden changes in business conditions. Agility capabilities enhance firms' ability to leverage assets, knowledge (which might be tacit), and competencies of suppliers, distributors, contract manufacturers, and logistics providers to exploit the opportunities for innovation and adapt to these changed business conditions.

Today, the networking is another concept for companies. It is important for all small firms but it is particularly import for small high tech or new technology-based firms. When firms are young and small, they have to deal with external complexity, and they do not have control of strategic resources. Networking is not only a protective mechanism to create benefits of scale, but an active way of creating entrepreneurial opportunities, and organizing for high technology innovation. As shown in Figure 1, there are many examples of the telecommunications transmission speeds of various network technologies, because greater bandwidth allows greater amounts of data to move from one point to another with greater speed.

Network technologies	Typical – maximum bps
Wi-Fi (wireless fidelity)	11-54 M
Standard Ethernet or token ring	10-16 M
High-speed Ethernet	100M – 1G
FDDI (fibber distributed data interface)	100 M
DDN (digital data network)	2.4 K – 2 M
PSN (packet switching network – X.25)	64K – 1.5 M
ISDN (integrated services digital network)	64K/128K – 2 M
ATM (asynchronous transfer mode)	25/155 M – 2.4 G
SONET (synchronous optical network)	45 M – 40 G

Figure no. 1 Examples of the telecommunications transmission speeds of various network technologies

The management of small and high tech firms has to establish a network and create a networking behaviour. Networking is a type of organizing in which new small high tech firms develop projects. A manager may kill creative ideas by control and standard evaluation procedures, which demands a certain level of predictability and maybe incremental innovation. Information about ongoing innovation is not easily accessible, and it is asymmetric. The personal networks not only of managers, but also the innovation people are strategically used to access changes.

The diffusion of a technology can be influenced by the number of standards. On the one hand, multiple standards increase competition and force technology providers to constantly improve the technology and may result in lower product and service prices for consumers, which will lead to increased adoption. On the other hand, a single standard reduces the uncertainty and risks that consumers must bear, hence speeding up the diffusion process. For mobile telecommunications the competing standards have tended to slow diffusion, while the diffusion process appears to be faster in markets with a single standard [2].

Many studies releases that incorporating the impact of prices in a model of the diffusion of two generations of technologies provides important explanatory information. The lower prices of earlier generation technology have increased service subscription rates supported by later generation technologies, for instance, in digital mobile phones and broadband communications.

2.1 Marketing issues in high-tech business

Whilst high-tech firms have traditionally depended on their unique technological competitive advantage, it is increasingly difficult to maintain

competitiveness by depending solely on technological advantage. High-tech firms invest more heavily in R&D activities, employ a higher percentage of engineers and scientists, offer innovative technologically advanced products and are dynamic with high rates of change and have short product development cycles.

In order to proactively change the market, the firm must engage in entrepreneurial behaviour through the process of opportunity discovery and exploitation. Opportunity discovery enables firms to anticipate new needs to envision marketing offerings and to require, develop or create the required resources associated with this proactive innovation, resulting in a sustainable competitive advantage and enduring superior financial performance.

Interaction between the firm's opportunity recognition process in response to its external environments and the firms' internal learning capabilities may lead to market-driving behaviour and superior financial performance as a result of disruptive innovative.

Sustaining innovation is directly prompted by the learning process of firms competing in an existing market or segment based on their comparative advantage and relative financial performance. A robust market orientation can enhance the effectiveness of any strategy, and serve as one of the few sustainable sources of advantage left in an environment of rapid technology change and aggressive competitive imitation.

2.2 Broadband technology and its benefits

Broadband is often called high-speed Internet, because it usually has a high rate of data transmission relative to dial-up access over a modem. In general, any connection to the customer of 256 Kbit/s (0.256 Mbit/s) or more is considered broadband Internet, but the low-end speed bar is continuously rising.

There are many different technologies that enable broadband connection speeds. The most mainstream of these include mobile broadband, WiMax, and satellite communications. The competition among these technologies to offer broadband internet service exists primarily in providing "last mile" service, because the major long distance wires that comprise the Internet backbone around the world are primarily made out of optical fibre. Some of these "last mile" technologies are poised to grow in adoption while others won't be able to compete in the long run primarily due to speed barriers. The ultimate goal for broadband providers today is to be able to offer voice, data, and video over one network which is known as a "triple play." Some companies are well positioned to do this, while others are not. Here's a look at these differing broadband technologies and the companies that will either win or lose the broadband services race. For example, 66% of the world broadband connections are DSL, 22% are cable, and 11% are fibre to the premises [3].

DSL or XDSL is a family of technologies that provides digital data transmission over the wires of a local telephone network. DSL originally stood for digital subscriber loop, although in recent years, the term digital subscriber line has been widely adopted as a more marketing-friendly term for ADSL, which is the most popular version of consumer-ready DSL. DSL can be used at the same time and on the same telephone line with regular telephone, as it uses high frequency, while regular telephone uses low frequency.

DSL that land-line or fixed-line telecommunication is over 125 years old and, up until the recent past, was defined as a telephone line that travelled through metal

wire or optical fibre as part of a nationwide telephone network. These days, a lot more travels through these lines than the sound of your mother's voice yelling at you for not calling more. Because revenues will continue to decrease for traditional local and long-distance voice service due to the advent of wireless telephony and VoIP, fixed-line telephony companies now also provide broadband data and voice as well as managed networking services to enterprise customers, as well as wholesale network capacity, all over fixed wire lines.

DSL is the main consumer broadband offering from carriers (e.g., Romtelecom provider), because it can provide high data speeds over a dedicated telephone line. SDSL and ADSL can reach speeds up to 20 Mbps, are the less expensive versions of the technology.

In mobile case, 3G is the third generation of mobile phone standards. This technology is best defined as the generation that enabled mobile broadband or the ability to wirelessly use the Internet or work over an IP network without becoming ridiculously frustrated by how long it takes. Now that 3G has finally arrived among developed nations (although adoption is still underwhelming), the mobile broadband industry continues to race towards even faster speeds. Currently, most 3G networks offer speeds in the hundreds of Kbps range depending on the network load and the location of the user. It is worth noting that the peak data rates often quoted in the finance literature are essentially meaningless since the peak rates assume the maximum possible transmission rate to a single user when all resources are assigned to that user. What is far more realistic is the capability of the technology to provide an acceptable average per user data rate.

Voice over Internet Protocol (VoIP) is a general term for a family of transmission technologies for delivery of voice communications over IP networks such as the Internet or other packet-switched networks. VoIP is being used more and more to keep corporate telephone costs down, as you can simply run two network cables to a desk instead of separate network and data cables. VoIP runs right over a standard network infrastructure, but it also demands a very well-configured network to run smoothly. Internet telephony refers to communications services - voice, facsimile, and/or voice-messaging applications - that are transported via the Internet, rather than the public switched telephone network (PSTN).

The basic steps involved in originating an Internet telephone call are conversion of the analogue voice signal to digital format and compression/translation of the signal into Internet protocol (IP) packets for transmission over the Internet; the process is reversed at the receiving end. VoIP systems employ session control protocols to control the set-up and tear-down of calls as well as audio codes which encode speech allowing transmission over an IP network as digital audio via an audio stream. Codes use is varied between different implementations of VoIP (and often a range of codes are used); some implementations rely on narrowband and compressed speech; while others support high fidelity stereo codes [3].

IT communication can be defined as utilization of various e-commerce tools, such as web-site, frequently asked questions (FAQ) pages, web advertising, the use of Internet and electronic data interchange (EDI), e-mail, and so on, shortened the time and distance, made the supply chain network efficient, and speed up and automated various internal processes. Thus, IT communication contributes in two ways: internal efficiency improvement, and improvement in the connection and reaction to external factors [4].

Through IT communications, small firms can increase the accessibility and quality of services to established and new customers and have smooth communications with customers. IT communications promote internal efficiency and innovation, external connectivity, and the ability to cope with external factors. Generally, such IT communications can be divided into e-mail, intranet, Internet, EDI, and so on.

E-mail can facilitate one-to-one or one-to-many relationships, meaning a sender can send and receive a message from one person or many people simultaneously. These favourable properties have led to a rapid increase in the number of e-mail users. E-mail has improved the cost, speed and productivity of business when compared with traditional communication methods.

E-mail can be an effective communication method in dealing with customers in the early stage. It can replace or substitute for traditional public relations, advertising, and fax, and so on in establishing perception, knowledge, and connection. The Internet can be used at all stages of the customer service experience: perception, knowledge, connection, preference, assurance, and purchasing. The Internet can replace or substitute for the traditional catalogue, exhibition, tele-marketing, and direct sales.

Internet usage remarkably increased to search products and information. Particularly, the degree and frequency of Internet usage for searching products and information were very high in firms. The Internet's role in customer service leads to added value and increased loyalty of the customer. By implementation of the Internet, small firms gain many benefits such as reducing the distance barrier, improving a firm's image, continuous advertisement, increased sales, effective information collection, extension of customer service, increased customer satisfaction, and enhanced access to markets [5].

As the Internet becomes ever popular, web-EDI is more widely used. Recently, even small-medium sized enterprises from rural medium are adopting web-EDI. EDI is defined as "sending from computer to computer standardized business documents". The method of EDI is generally divided into traditional VAN-EDI and web-EDI accessed through the Internet.

Traditional EDI is considered more suitable for transactions between large scale organizations. On the other hand, web-EDI is more suitable to send standardized messages in rural medium. It is expected that traditional VAN-EDI and new web-EDI may coexist, sharing their roles as the Internet is more widely used. The role of VAN-EDI is to support strategic long-term relationships, and web-EDI to support operational activities, such as order processing.

Web access of rural medium is one of the success factors of Internet applications. Drew showed that e-mail and Intranet support internal efficiency and innovation, and web-site and Internet are good for marketing and customer response. E-mail plays an important role in either internal or external activities of the organization.

A new communication method that can handle image, audio, video, etc. should be combined with traditional EDI which cannot handle those elements. Furthermore, these media should be connected with IT such as e-mail, image processing, file transmission, fax, electronic catalogue, video conferencing, etc. They contend that the relationship with suppliers should be classified from the buyer's perspective as a strategic relationship, supplier relationship, or expendable product relationship. An appropriate communication medium should be employed for each type. For example, it would be more appropriate to use e-mail and EDI for the strategic relationship, and electronic catalogue for expendable product relationship.

3. EMPIRICAL RESEARCH AND RESULTS

The elaboration of the researching plan suppose the taking of some decisions regarding the data sources, researching methods, researching instruments, sampler and gathering of the data. Due to the fact that the number of the broadband telecommunication services consumers was very high in the places with high density population, we want to find out the opinion of the subjects from the places with small density population. The research has been realized in Cluj district, in localities with small density (rural region).

So this research will be based on primary information, obtained through direct research method, on the field, and we trying to obtain direct, specific data, concerning to the clients requirements regarding the broadband Internet telecommunication services in rural zone. To put in the practice the questionnaires we chosen places with high population affluence, from the small density population zone, some main streets of the zone, community centre, the important store of the zone, the town hall, and so on.

The instrument of the data gathering will be the questionnaire, managed by the interview operators. The questionnaire contains definite questions: open, close, with answers in scale, chosen thus to may record the requirements of the broadband Internet telecommunication services clients. The used questionnaire for gathering data will include 27 questions and will be elaborated and tested preliminary.

The preliminary testing will be effectuated on approximately 10 subjects, for observing the reactions and the capacity of subjects to answer, and also the establishment of some mistakes concerning the content and the wording of the questions.

The sample dimension will be calculated with the next formula:

$$n = \frac{t^2 p (1-p)}{e^2}$$

In the following conditions:

t – Specify the level of confidence. Suppose that a 95 percent confidence level is desired. In this case, the *t* value associate with the confidence level will be $t=1.96$

p – Estimate the population proportion. In this study, the population proportion is not known and will be $p = 0.50$

e – Specify the level of precision (error) $e = \pm 5\%$. That is, 5 percent expressed as a decimal equivalent

The development plan of the research contains the following:

The subjects of the study - people are chosen randomly from the places which has the small density population;

Studied population - people's chosen at random from the rural localities;

Method of investigation - survey;

Instrument of data gathering – questionnaires;

Questionnaires number - 323;

Wished precision - $p = 0.5$; $t = 1.96$;

Error - $e = \pm 5\%$

The questionnaire contains a number of 27 questions, most of them closed; the intention was to obtain answers that would be easily recorded and interpreted. Due to the complex character of the research, some open questions were also introduced, since they would better emphasize certain aspects related to the questioned subject. The

questions were formulated in an accessible language, which would obtain the same type of answers from the subjects.

In order to provide the most efficient assistance to the interviewed subjects, they were helped to understand certain issues specific to the questionnaire, so that the subjects could be supervised at all times, in order to remove potential observation errors.

The data were processed and analyzed using the **SPSS** program, which allows us to handle large quantities of data or information. The results obtained from data processing were structured and are presented in this paper [6].

The results of this research shall allow us permit to formulate an idea regarding broadband services consumer's requirements and last but not least we would make a few recommendations in order to improve the activity of the companies which offer these services on the Romanian telecommunications market. The total questionnaires number was 323.

The first objective of the research had in view *the use of fixed telephone services*. The specific hypothesis of this objective assumed that most of the consumers are using the services of fix telephone. Almost 70% of those who answered at this question are using the services of fix telephone; as a consequence the assumed hypothesis was accepted.

The second objectives that the research had in view the identification of consumers which have PC at home. The specific hypothesis of this objective assumed that most of the consumers have the PC (personal computer) at home. Almost 80 % of questioned subjects have a PC at home; as a consequence the assumed hypothesis was accepted.

The questions "*Do you have a mobile telephone?*" it refers to the identification of consumers who have mobile phone and comes in completing the first two. The specific hypothesis of this objective assumed that most of the consumers have the mobile phone at home. Approximately 98.5% of those interviewed are using the mobile phone services and as a consequence the assumed hypothesis was accepted.

Another objective of this research took into account if the subjects know the Internet broadband services. The specific hypothesis of this objective assumed that most of the consumers heard and know about the Internet broadband services. Approximately 84.5% of those interviewed person known the "Internet" broadband services and as a consequence the assumed hypothesis was accepted.

At this question some people who use the Internet broadband services are not knew that they have the broadband access. A lot of people know the Internet services, and because we were in a lot of institutions, firms, police, pharmacy, dispensary, village magazines, bar, the persons who was questioned known about the Internet broadband services. At the question "*Which are the Internet Broadband services which do you know?*", the people were confused, some people did not answer.

Another objective of this research took into account the sources of information of consumer regarding the Internet broadband services. The specific hypothesis of this objective assumed that most of the consumers heard about the Internet broadband services. At this question 56.7% from consumers heard about the Internet broadband services from friends acquaintances, relatives, 53 % heard about this services from TV, 24.8 % from newspapers and magazines, 22.9% from promotional flyers (leaflets). The percentage of 10.8 % of people heard about the Internet broadband services from others sources like as: magazines, at working, at home, newspaper, newsletter, and so on.

Another objective of the research refers to *the purpose of using the Internet broadband services*, the specific hypothesis of this objective assuming that most of the interviewed subjects are using the fixed telephone service for personal purposes. At this question the subjects were confused because they understand the Internet term but "broadband" is unknown for a lot of people.

Almost 80% from interviewed people said that they use the Internet broadband services and only 8.4% of the questioned person said that they not use the Internet broadband services. Approximately 11.1 % of surveyed subjects have not responded to this question.

Another question of this research had in view *the studying of the reasons for what the people don't utilize the broadband Internet services*. From the percentage of 8.4 people who said that they not use the Internet broadband services percentage the reasons for what they don't utilize the broadband Internet services are the following: don't need it (4%), have lower revenues (1.9%) and consider low quality of services (1.5%). At this question 0.3 % of questioned person said that they don't use the Internet broadband services because they are less time at home.

Another objective of this survey has in view *which are the Internet broadband telecommunications services utilized by the questioned persons*. At this question the responses were diverse; some respondents mentioned the company name that provides the Internet broadband services and another manner that provides.

The most used Internet broadband services are Click Net (30.7%) offered by Romtelecom Telecommunications Company, after the broadband services offered through the cable (12.4%) and the broadband services offered by UPC Telecommunications Company (11.1%).

At this question 33.3% of subjects don't response. At this question the responses were diverse; some respondents mentioned the company name that provides the Internet broadband services service and another manner that provides.

From the data gathering we can see that the most used Internet broadband service are those of the Romtelecom company (43.3%) and UPC company (15.,2%). Orange 3.1% and others firms 13.9%, like as OPTICROM-Citcau, TGA Citcau, SAMUS, N Telecom, MAX – Baciú, T Mobil – Juncu, SC PANDO, AIRKAB, RADEX NET, and NET CAFFE. The reasons for what they have chosen that company was the quality of services (38.4%), the tariffs (35.9%) or promotional offers (16.7%).

The most utilizing Internet broadband services subscriber type are Click Net 2 Mbps (18.6%) offered by Romtelecom company: Click Net 6Mbps (5.6%) and 8-10 Mbps (5.3%). At this question 50.2% of questioned persons don't response. Approximately 53.9% from the respondents utilize the Internet broadband services for private goal and only 3.1% for business goal. About 24.8% of them used the broadband for both. In addition, 61.9% of respondents accessing the Internet broadband services from home and 25.7% from work.

Regarding the period while the people access the Internet broadband services the situation is the following: 38.4% of respondents used the internet broadband services between 1-3h at day, and 29.1% of respondents used the broadband < 1h at night.

Most of the respondents to pay the broadband services bill (34.4%) pay the broadband services through the commercial offices of the company at which they are subscriber and (24.8%) trough the postal offices. Almost 76.2% of respondents consider the invoice quite explicit. The questioned people prefer to receive the invoice with

others telecommunications services (telephone, TV) – 43.3% and 40.6% prefer separately.

In what follows, another objective of this research had in view *the degree of customer satisfaction concerning the activity of Telecommunication Company which offers broadband services (the quality of the services, the price/quality ratio of the services)*. The hypothesis with reference to this objective assumed that most consumers appreciate the quality of the services offered by Romtelecom and the price/quality ratio of the services as being good.

Almost 54% of the respondents have a *good opinion regarding* the quality of services provided by Romtelecom. As a consequence, the assumed hypothesis was accepted. Of all the people questioned – 323 persons, approximately 49.5% - we appreciate that the price/quality ratio as being neither good, nor bad. Thus, the assumed hypothesis was accepted.

The results suggests that network of basic activities add value to its broadband services, and thus add a margin of value both to the firm and its customers [7].

4. CONCLUSION

One of the great challenges of broadband is to provide service to potential customers in areas of low population density, such as to farmers, ranchers, and small towns. In cities where the population density is high, it is easy for a service provider to recover equipment costs, but each rural customer may require expensive equipment to get connected.

Several rural broadband solutions exist, though each has its own pitfalls and limitations. Some choices are better than others, but are dependent on how proactive the local phone company is about upgrading their rural technology.

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