Regional Cluster Analysis in the Mexican Telecommunications Sector.

Impact of Economies of Agglomeration, Clusters and networking in medium-sized Mexican Telecommunication firms.

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Abstract: There have been many empirical studies analyzing telecommunications clusters across countries and regions since the late eighties and nineties. Recently, much attention has been paid in the literature of cluster analysis in telecommunications. Knowledge and technology transfer matter for economic growth. Most formal analyses of knowledge driven economies have focused on the supply side: research and development and productivity. In modern high-tech economies, like telecommunications, the demand side of markets for goods are important. The paper develops a model of demand and supply for Mexico looking at a cluster formation in a regional geographical space. Concentrations in space spontaneously emerge, even when one considers quality of products, physical distance and transportation costs. These clusters arise to resolve the tension between spatial spillover externalities and the costs of adapting to new sophisticated telecommunications products. Telecommunications clusters in Mexico affect competition in three broad ways: first, by increasing the productivity of companies based in a region; by driving the direction and pace of innovation in telecommunications, which underpins future productivity growth; and by stimulating the formation of new business communications technology, which expands and strengthens the cluster itself. I describe most of the largest cable/satellite TV and related telecommunications clusters in Mexico.

Sumario: Se han tenido diversos estudios empíricos en los ochentas y noventas que tratan de comprobar la teoría de los clusters o concentración de empresas interrelacionadas entre sí y concentradas en una zona geográfica concreta. De igual manera se han realizado estudios empíricos de cómo estos clusters pueden traer beneficios económicos a las empresas de telecomunicaciones. Los clusters aumentan la productividad de las empresas de telecomunicaciones, que es uno de los caminos para fortalecer el crecimiento económico. Al aumentar la productividad, las empresas destinan más recursos a innovación y desarrollo, crean más riqueza y siguen ganando productividad; todo ello en un marco de gran competitividad, porque, las regiones más desarrolladas son aquellas en las que existe más competencia. La implantación de una política regional en telecomunicaciones impulsará las concentraciones sectoriales de empresas en zonas geográficas concretas. Esta localización, ya se da en países industrializados como en Estados Unidos, y se empieza a dar en México, lo que ayuda a aumentar la productividad de las empresas de telecomunicaciones. El estudio desarrolla un modelo de oferta y demanda de las empresas de telecomunicaciones para poder observar la formación de clusters en las distintas áreas geográficas de México.

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An earlier draft was published as Working Paper Series # 10, Department of Economic Studies COLEF, 2000.
Presented at the International Conference "Sistemas Productivos Locales: Redes de Empresas, Distritos Industriales y Clusters" in 2000. Also presented at 14th European Institute in Groningen, The Netherlands, July 2001.
The author wishes to thank Cesar Sotelo Salgado for valuable conversations and useful insights.

1.1. Introduction to Agglomeration Economies and Clusters

In an economy characterized by disequilibrium and combined with extensive linkages between firms, the growth injection will be much larger than in an economy where the linkages are not well developed. Endogenous growth theory and new trade theory created a new interest in regional economics and economic geography over the last decade. Economic geography in an era of global competition poses a paradox. In theory, location should no longer be a source of competitive advantage. Open global markets and high-speed telecommunications should allow any company to source any thing from any place at any time.

Regional Economics and geographical space remain an important concept in mainstream economics. In the new perspective internal conditions rather than external demand conditions in an economy are the most important growth stimulating factors. In the new economic models, economies of scale exist in relation to capital, more specific in the production of human capital or knowledge and technology as in Romer (1986) and Krugman (1991). The marginal product of capital grows as the stock of capital expands. Put simply, the more we invest in knowledge the more the economy grows. Under development of technology and accumulation of knowledge positive externalities are often produced.

New firms and related production systems are embedded in territorial entities like cities and regions. The development of economies of scale in relation to knowledge production, technological spillover and institutional or spatial limits to the diffusion of such externalities, are therefore often connected to the spatial context such systems operate in. Regions including dynamic industrial systems with scale economies in knowledge production would grow faster than regions not in command of such elements. As a result spatial differentiation in economic growth would appear.

In analyzing the strength of regions and nations, Porter (1998) mentions that factor creation is related to social, cultural, historical and economic conditions in a specific national context. Demand impulses from the home market is important in development of knowledge as well as a nationally well developed functional division of labor is important in creating dynamic learning externalities and in utilizing economies of scale and scope (Porter 1998). Competitive strength is therefore developed in an interplay between factor conditions, demand conditions and the existence of related industries competing on an arena characterized by tough rivalry and continues improvements in all aspects of economic activities. Dynamic competition is therefore characterized both by rivalry and co-operation.

In Porter's mind a structure including a couple of larger actors and several smaller in open competition is the best premise to develop entrepreneurship and innovations. A vertical and horizontal interplay between many actors in a production system also seems to be essential for a successful development. Again such interaction seems easiest to be

realized inside territorial borders, under the jurisdiction of the nation state or inside regions of particular quality.

Taking into account the arguments of externalities, transaction costs and dynamic competition, territorial clustering has special value to economic actors. The local business environment could function as a social context which produces scale economies through external relations. It also offers an efficient division of labor including specialization economies and opens up for economizing with transaction costs, promoting entrepreneurship and innovations and development of dynamic learning externalities and technological spillovers. Agglomeration theory tells us that territorial clustering of economic activities promotes other advantages as economizing with transportation, information and infrastructure costs and also that negative externalities produced by physical clustering at least partly are transferred from the private to the public sector.

Today's Mexican market economy is characterized by clusters or critical masses in one place of linked industries and institutions, from suppliers to universities to government agencies, that enjoy unusual competitive success in a particular field. The purpose of the paper is to examine one of the most famous examples in Mexico, the Mexico City Telecommunications cluster, a marked cluster, just as Silicon Valley and Hollywood in the world's landscape.

1.2. Agglomeration Economies in the Telecommunications Industry

The expansion of telecommunication networks, due to new technological, economic and political order have set the stage for the globalization of the television industry[2]. Cable and pay TV are booming around the world, but still face rapid transformation in many markets.[3]

The cities in Mexico are becoming more interconnected economically and infrastructurally through the parallel development of global telecommunication and transportation networks. Much of the massive investment in new telecommunications and IT networks either takes place in dense urban regions and interconnects cities together into global networks. As we shift from national telecommunications monopolies to an integrated, liberalized and global telecommunications marketplace, the dominance of cities as sites which articulate electronic networks seems to be growing further.

Subsequent to the passage of the Federal Law of Telecommunications of 1995 which regulates the cable TV industry in Mexico, a number of questions have been raised concerning the cluster arrangements in telecommunications firms.[4] Answers to these questions turn upon a fundamental set of issues regarding the economic relationships of demand conditions, pricing, and regulation of regional telecommunications clusters. In this study, I empirically examine these relationships for the period before and after the

[2] Although there are some mature cable markets in Latin America, primarily in Mexico and Argentina, in areas such as: Brazil, Chile and Venezuela pay TV is getting underway. [2]
[3] Latin America will incorporate 15 million new subscribers in the next five years.
[4] A cluster is a critical mass of companies in a particular field in a particular location, like a state or region.

start of deregulation. This study also examines whether or not telecommunications systems' increased clustering or if their decrease in sectorial clustering, explains the price decreases in Mexico. A number of basic findings emerge. Among them, I find that the demand for specialized telecommunications service after deregulation is inelastic in Mexican urban market clusters. This means that cable companies are not pricing as monopolists and telecommunications industrial clusters are being formed in the Mexican regions. This might be explained by the competition faced by the TV and Cable TV industry from other entertainment sources and the varying forms of clusters formed as sophisticated clusters and firms in the downstream industry.

A great part of the literature in applied industrial organization deals with the problem of not achieving the first best solution or not pricing at marginal cost. One of the solutions of the literature in the telecommunications industry is to auction licenses or to use franchise bidding schemes.[5] Recently, the new schemes have been reviewed by many legislators in Mexico and several regulatory reforms have been implemented. There has been a lot of discussions in Mexico about deregulation[6] of the telecommunications industry. The focus of the deregulation is to support the neoliberal social measures to open the national markets followed by the last two administrations in Mexico.[7]

Telecommunications Clusters in Mexico include a variety of instruments and services, such as different types of wired communications, telegraphic equipment and wireless communications equipment. Growth in the Mexican telecommunications industry took off in the 1940's when radio broadcasting boomed and telephone service expanded. However, until the 1970's, did large plants began to manufacture large scale telecommunications equipment. In 1996, the share of the sector accounted for 1.0% of Mexico's GDP. Although significant strides have been made in providing telecommunications service, Economic Telecommunications studies in Mexico are rarely done.

Television systems were first developed in the late 1940s and early 1950s as community antenna television (CATV). The first cable system in Latin America was installed in 1954, in Nogales, Sonora. The initial role of CATV was to bring television broadcast signals to small and/or isolated communities where signals could not be picked up directly off the air. CATV used microwaves to carry the network signals to unserved areas. Cable television was thought to open up the possibility for a price-rationed system of entertainment in the home which far surpasses the television medium. At the beginning, cable was not seen as a threat to broadcasters due to it's limited audience. But

[5] For example, the telephone service in Mexico (Telefonos de Mexico) has been privatized by giving five-year concessions, granting it a monopoly.

[6] Economic deregulation can be interpreted as the state's withdrawal of its legal powers to direct the economic conduct.

[7] In 1993, the President of Mexico, praised the neoliberal model. In that same year Mexico obtained a reduction in inflation, reduced the debt service and augmented the social expenditure. This was believed to be a consequence of a new legal framework guided by the new economic model.

in the 1990's, cable TV may be considered as competition to over the air national channels, MMDS and DTH[8] systems.[9]

In Mexico, the Telecommunications sector and the Cable TV industry in particular has been under strict federal regulation. The first franchise concession for a cable system was given in 1955 and by 1970 there were already 11 systems in operation. During the 1970's the federal government gave more concessions to deliver the service, increasing the number to a total of 95 in 1979. The high discretionality permitted by the regulation allowed the government officials to assign, retire and restrict the concessions without any apparently justified reason. This created a high risk investment that explains the slow development of the industry.[10] [11]

In the 70's, the National Association of the Cable TV industry, CANITEC Camara Nacional de la Industria de Televisión por Cable, was formed.[12] In the 1980's, the development was slowed, until 1994, year when the concessions increased by 100%. The promotion of competition for local monopoly cable systems would seem to offer a natural solution to the problems widely attributed to the cable industry in Mexico in the 1980's, such as high prices and poor service.

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[8] DTH or Direct To Home refers to the satellite television and broadcasting industries. High Definition Television is a technology which significantly increases the resolution of video signals that will offer vastly improved picture quality over the current standard. Impulse Pay Per View is a technology which allows the consumer to purchase a movie or special event instantly through a computerized order processing center. Satellite Antenna Dish is a parabolic antenna which collects and focuses satellite signals.

[9] The Mexican Government is determined to expand growth for all types of telecommunications services as the economy recovers after the middle 90's recession. In order to achieve this growth the Mexican market requires a substantial injection of capital investment and technology, especially in the Integrated Services Digital Networks. Expanding markets exist for satellite communications, cable TV, cellular telephone service, rural networks, and value-added services. TELMEX, Mexico's chief telecommunications equipment purchaser, has plans to invest nearly US$ 12 billion over the next five years in satellite networks. The so called "Mexican Privatization Drive" is causing several U.S. satellite operators to be extremely interested in the auction of Mexican broadcasting spectrum. Part of the auction includes the sale of the Mexican Morelos and Solidaridad satellites, but of more interest is the DBS slot assigned to Mexico. The Mexican government reports that interested parties include, Echostar, Loral, Lockheed Martin, Daimler-Benz AG of Germany and Nahuelsat SA, MVS Multivision and Hughes, and Mexico's Grupo Televisa SA which owns a large number of commercial TV stations and cable TV stations in Mexico. CANITEC is also negotiating with Hughes's Michael Amstrong in the Mexican satellite privatization.

[10] The license scheme is anything but irrational for the key actors in the policymaking process. As rents emanating from regulation that imposed entry barriers, were used both to compensate licensees and to cross subsidize favored interest groups, political support from the program can be substantial and stable. The Mexican politicians who gain discretion over valuable licenses and access to in kind payments in the form of program content, defended an old structure which encountered opposition from scholars and business. A suboptimal outcome is obtained. There exists a considerable policy payoff from political economy analysis in the Telecommunications sector which incorporates rational rent seeking of interested parties subject to the relevant constitutional constraints.

[11] The remarkable political stability of economically inefficient licensing methods can be explained by the special interest of regulators in influencing broadcasting content; the limits placed on explicit regulatory demand by law and the increase in relative economic importance of nonbroadcast services.

[12] CANITEC was founded in 1975. Recently, CANITEC was composed of more than 280 members.

By 1989, Productora y Comercializadora de Televisión, S.A. de C.V., PCTV was integrated by 200 cable TV systems, PCTV covers 285 of the most important cities in the country and all the Mexican states.[13] PCTV is a company owned by the majority of the Chamber membership which was created in 1988. PCTV objectives are to contract programming for the cable companies with the best prices and conditions. PCTV rents transponders from the Mexican satellite system in order to transmit the signals to all the Cable TV systems. PCTV has its own earth station to transmit the signals using the satellite to distribute it. They have approximately one and a half million subscribers in 1997, almost twice the amount of the competitors, and a 20% annual growth. Mexican cable service is one of the cheapest cable services in the world. In 1997, Mexico will have 20 new satellite signals for the distribution of basic cable service and PPV.[14]

The acceleration of the cable TV multichannel development began in the early 1990's in Mexico and progressively the region has been attracting global investors. The region's deregulation of the media and clustering of the telecommunication industries has played a key role in attracting global investment. This deregulation has allowed foreign investors to participate in local markets once reserved for domestic companies. The new regulation intends to encourage competition for established cable operators by ensuring that these alternative multichannel video programming distributors (MVPDs) have adequate access to programming. By the end of 1995, cable penetration was 13.3%; totaling 1.9 million households.

1. 3. The Role of the Government in Mexican Telecommunications

In the early days of cable, the government routinely granted approval of the microwave relay systems. As the number of television stations grew, other services were developed as a means of attracting customers. When cable systems began to import television signals from distant cities in direct competition with local television stations, the government took notice and developed a series of regulations which were designed to prevent cable television from effectively competing with open air broadcasters, and government owned television.

Since a cable system does not use open air radio frequencies to transmit it's signal, it does not need a federal government license. However, it does need a franchise from the government, whose right-of-way is used by the system's cable. Since the first concession, the jurisdiction over cable TV was given by the Federal Law of Communications (Ley de Vias Generales de Comunicacion). This Federal Law was general enough to allow

[13] To maximize the use of the spectrum, PCTV has implemented digital compression systems that allow the transmission of six digital signals in the same space that it takes to transmit one analog signal without compromising the quality of the signal.

[14] With the possible merger of ASkyB and Echostar, other US providers are looking for more space to offer a larger number of channels and services. Hughes has 70 transponders available (DIRECTV and USSB) while Sky will have 118 (Echostar and ASkyB) The value of the direct-broadcast license could reach as high as $500 million, slightly under what ASkyB paid for its slot. US companies hold three of the five primary North American DBS slots, two of which will be owned by Sky (Echostar/ASkyB). DirecTV, owned by Hughes, needs another slot to compete with Sky. PanAmSat Corp., soon to be a Hughes asset, may actually do the bidding for Hughes.

government officials to have excessive discretionality in franchising. Before 1979, the rates were practically not regulated. In 1979, the Cable Television Service Act was approved.[15] In this new regulation, two ways of delivering the service were implemented, one by franchise and the other by permit. The mechanism to obtain a franchise to deliver the service was not under a competitive process, instead the only thing one needed to do was to make a petition that would have to surpass certain requirements, at the discretion of the government officials. A third way to deliver the service in a city, was by the extension of the geographic region a franchiser served. The price for the basic and pay services was supposed to be fixed, while the programming, the investments and the property of the cable company required the approval of the regulator. The franchise fee charged by the government was 15% of the gross revenues.

Until 1989, the pay television business was controlled by Cablevision when Multivision entered the arena. After four years of lobbying, Multivision obtained a permit from the Mexican government to use Multipoints Multichannel Distribution Systems (MMDS)[16] and acquired four frequencies. Multivision met with government resistance because authorities viewed his application as a conflict of interest with Televisa's Cablevision.[17] The conflict arouse because of Multivision innovative technology would allow his company to reach potential viewers with greater ease and to a larger audience than if a system of physical cables were used. When Multivision was born, the firm tried to reduce the television industry's reliance on physical cables. For example, Multivision is the first company in the world to utilize the Digital Compression system commercially. Digital compression allows Multivision to send signals to viewers nationwide, as well as via satellite to countries in Central America and South America. In the 1990's both Cablevision and Multivision[18] compete fiercely to gain market share. Multivision has had to develop creative strategies to market its services to the Mexican population and compete with Cablevision.[19] Large part of Multivision's strategy lies in marketing the company through customer service booths set up in malls and in some of Mexico's largest supermarkets.[20] During 1995, the monthly cost of multivision was slightly less than Cablevision.[21] The war between these two companies has created a very competitive environment and has driven the development of the cluster medium. The location of the Mexico City Cluster, offered a lower cost and increased the innovation potential.

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[15] This Act didn't have any effect to the discretionality.

[16] MMDS has flourished because it has the ability to target affluent communities without having to cable large areas.

[17] Cablevision is owned by the mayor conglomerate Televisa which is supported by the political party in power in Mexico known as the PRI. A mayor shareholder of Televisa was elected governor of the state of Veracruz in 1998. The PRI has been in power since 1928.

[18] Both Cable distributors are still increasing their coverage and number of channels. A growth in subscriber numbers (3 million households are expected to subscribe within the next 5 years) and improved quality of programming is expected.

[19] Televisa's Media Clusters has traditionally dominated the Mexican broadcasting market and Cablevision is allowed to advertise extensively on Televisa's non cable television stations and other media outlets.

[20] The only advertising media Multivision has at its disposal are StereoRey radio stations, newspapers and magazines.

[21] More channels were included in Cablevision's basic package; while Multivision had a higher installation fee because of the antenna and other equipment.

In August 1993, several articles of the 1979 law were changed, and permitted a 49% participation of foreign investment in Mexican cable TV franchises. In 1995, the Mexican Congress finally approved the new Federal Telecommunications Law. Under this law, a new type of franchise appeared. This new type of franchise was given the name of a public telecommunications network and could offer it's services to companies that provided different telecommunications services and had the advantage that prices were not fixed, and the concessions were less restrictive. A new federal regulator known as the Federal Telecommunications Commission (COFETEL) was created in order to regulate the industry. With the change of the type of franchise the cable companies are now obliged to register their rates to the COFETEL. This new Commission is part of the Ministry of Communications and Transportation (SCT), which has regulatory functions over telecommunications services like: Transmission of TV signals (cable, microwave, frequency spectrum and satellite), radio signals, telegraph services and data transmission networks. The new law treats in similar condition, the different telecommunications services (radioelectric spectrum, satellite and cable TV).[22]

In the early 1990's regulatory and legislative proceedings in Mexico, potential or existing competitors to local cable systems often complained that cable programming networks either refused to do business with them or offered them programming only on discriminatory terms. These competitors include home satellite dish (HSD) owners and program distributors, multichannel multipoint distribution system (MMDS) operators, and operators of direct broadcast satellite (DBS) systems. According to these complaints, established cable system operators are to blame for pressuring the networks, many of them are vertically integrated with those operators, in order to engage in discriminatory actions.

During 1995 and 1996, some of the Telecommunications companies asked for a change of the franchise in order to shift to a more flexible regulation. While others wanted the Cable Television Service Act to apply to them. As we see, the regulatory framework is restrictive and the cable companies are in a peculiar situation as some ask for a less restrictive regulation in the sector, and others for a more complete regulatory framework.

[22] To determine if a company has market power, the New Federal Law of Competition considers the participation in the market, if the company can fix prices unilaterally, if there are barriers of entry and other possibilities of access by economic agents and competitors to alternative sources of entertainment.

Table 1. Regulation of Telecommunications Service Timeline	*Rights Assignment Method and Regulation of Clustered Networks*
Before 1955	Not regulated, open access.
1955	First Concession.
1955-1979	Minor Regulation. Prices were fixed. In 1971, coverage of 11 cities. Signal codification regulation (1979)
1979-1995	New Legislation: Cable Television Service Act (1979) Presidential Decree for cable TV.
1989	Permit given to Multivision.
1993	Artciles 10, 33 and 42, authorize foreign investment.
1995-1996	Deregulation law enacted. New Federal Telecommunications Law, and creation of the regulatory enforcement body known as the COFETEL .
1996-1998	Post deregulation era in the Cable Sector. Cable TV concessions are considered Public Telecommunications Networks.
2000	CANITEC is negotiating with SCT and COFETEL for fast track solutions so as to provide their membership to transport data, voice and Internet using their networks. Technical working group which is working to update the Mexican Official Standard (NOM - Norma Official Mexicana). This NOM will be compatible with international standards.

For example, before 1990, only less than 43% of the current franchises had been awarded. In 1994, 112 franchises were awarded. This is due to the changes in 1993 to the Cable Television Service Act.

In 1996, the two major privately owned subscription cable systems, Televisa's Cablevision[23] and MVS Multivision reached 174 cities in 29 states. In that year, after the deregulation law was enacted, Multivision became the largest pay TV provider in Mexico. In 1996, Mexico had 294 Cable TV franchises. Only 190 systems were in operation. Some of the systems were not in operation due to the time required to operate the network or as a strategy to limit competition in other systems and increase market power. The 10 systems in operation covered 302 cities throughout Mexico. The increment in regional coverage permitted cable systems to give service in cities close to the city where the original franchise was given.

[23] Cablevisión's Televisa operated the biggest Cable system in Mexico. At the end of 1997, Cablevisión had more than 227,000 subscribers for basic cable service, which represented approximately 19% of the national total. In 1995, Televisa sold 49% of Cablevisión to Teléfonos de México, the national telephone company for $211 million dollars. This association enabled Televisa take advantage of the infrastructure of Teléfonos de México, augmenting the economies of scale between both companies and the associative cluster to capture spillovers and linkages .

Table 2. Chronology of the Franchises Awarded for Cable TV Service In Mexico by Year	
1955	1
1962	2
1964	1
1968	3
1969	4
1970	15
1972	5
1973	10
1974	3
1975	8
1976	13
1977	14
1978	13
1979	3
1983	4
1984	9
1985	2
1986	4
1990	7
1991	6
1992	15
1993	9
1994	112*
1995	5

In 1996, only 7 cities had access to the 3 kinds of Cable Systems. In that same year the number of users was in the order of 1.8 million throughout Mexico. From the number of users in pay TV, 97% represent normal Cable TV and the rest include MMDS and DTH. The 1996 average, of people owning a TV set and connected to Cable TV was 10%. This rate of penetration is low compared to the US 70% rate of penetration in TV homes. In 1996, the systems that offered only basic cable service represented more than 60% of the total. This fact indicates that the basic cable service is the most important service offered by the Cable companies in Mexico.

In early 1998, Mexico's cable industry received another boost when 36 licenses were awarded, mostly in small cities throughout Mexico.[24] This development represents another step in the proliferation of cable systems in Mexico.[25] The Ministry of Communications and Transportation (SCT) forecasts initial investments in the new systems of around 110 million pesos. The potential market for cable systems in Mexico is estimated to be around 12,000 million dollars for the year 2000. In then year 2000, twenty groups were holding 86% of the market in terms of subscribers. These same twenty groups serve 275 out of the 425 city clusters with Cable TV systems.

[24] The permits are concentrated in the states of Guanajuato, Mexico and Veracruz, with others given in Chiapas, Michoacan, Puebla, Hidalgo, Morelos and one in the Federal District (Mexico City).
[25] Cable concessions now total 297 nationwide. In 1998, only 14% of the Mexican television homes have cable, but another 10% of households have some form of pirated pay TV.

By 1999, 110 Cable TV systems provided Pay Per View services. Some concessionaires provided Internet access in 24 cities covering 12 states and 21 provided digital music channels. Only eight systems had concessions to transport voice and data in their networks. The Mexican Cable TV market has grown an average of 12% from 1997 to 2000. In the year 2000, Mexico had approximately 2,000,000 Cable TV subscribers served by 335 cluster networks. These cluster networks have a presence in more than 400 cities in Mexico. There are currently 45 concessionaires developing new networks that will start operating in the near future. In terms of infrastructure, Mexico has almost 43,000 kilometers of coaxial cable and more than 5,000 kilometers of fiber optic cable.[26]

Voice over Internet Protocol (VOIP) is not permitted under the actual Mexican telecommunications regulations. However VOIP and in general Internet Protocol (IP) networks and services have drawn enough attention that merit further research. Mexico is not an exception to the global boom of the Value Added Services (VAS). Internet is the most notorious example of how the future of telecommunications is changing. Following NAFTA, Mexico opened to free competition the value added services. The Federal Telecommunications Commission (COFETEL) considers some of these services as e-mail, Videotext, Teletext, Audiotext, Voice Mail, Electronic Data interchange (EDI), Database Remote Access and Remote Data processing.

Internet is also consider a value added service and there are some services related to it that require registration like dial up access and dedicated access. Other services like content provider, web hosting, chat, web design, domain registration or technical support does not require any registration. According to article 33 of the Federal Law of Telecommunications of Mexico the only requirement to provide these services is to register. Internet telephony defined as a telephone call placed from computer to computer is not a concern for the Federal Telecommunications Commission as long as these services are not commercialized in an open manner. Mexico's COFETEL is now working in a new agreement that will clarify many deficiencies of the law and regulate these services in a different way to promote the development of Internet infrastructure. ISPs, long distance and local telephony carriers agree that not only VOIP but also a wide range of IP-based services have become a major driver for the telecommunications industry. Household end users want Internet, TV and Voice altogether in a accessible price. Some Cable TV companies in Mexico are providing Internet access. They have improved their technology to allow their network to be bi-directional. Industry executives estimate that the fastest Internet growth in the coming years will be seen through coaxial cable. Internet penetration will grow benefiting of the last mile access provided by the Cable TV networks.

[26] The total number of distribution and trunk cable is approximately 43,000Km. and 15,000Km. respectively. More than 5,175 kilometers of fiber optic cable have been deployed in Mexico. The average capacity of the Cable TV systems in Mexico is 490 MHz. From the fifty largest clustered systems, 8 systems have a capacity of 750Mhz, 3 with 600MHz and 39 with 550 MHz.

The Mexican Telecommunications cluster perspective in the future is one not only of convergence of networks but also of suppliers. Strategic alliances between all kind of TELCOS will be the solution to survive in a market where de dominant carrier still has an overwhelming advantage over all its competitors in at least five segments of the telecommunications industry. Corporate end users will look for telecommunications companies that can provide solutions to all their telecommunications needs. IP will serve as a platform for future multimedia clustered networks and services. For the moment Internet represents a good source of income. IP based services are not a big worry for them right now. As the Internet grows, IP telephony can be integrated to the actual networks.

There exists a lot of controversy on the potential opportunities of the long distance traffic transported over Internet.[27] According to a study from IDC Latin America, 19% percent of all the national long distance and almost 25% of the international long distance traffic for the six largest Latin American telecommunications markets (including Mexico) travels on Internet. The number of international long distance calls in Mexico has almost quintupled in the last decade. In the same period of time the number if national long distance calls more than tripled. The number of minutes in 1999 was 5.6 billion for national calls with an annual growth of 30% compared to 1998. For international calls the volume of minutes was 14.4 billion with a 235 growth in the same period.[28] Telephone companies argue that the prices of long distance are being reduced at a fast pace and that by the time that the quality of the internet telephony is comparable to the switched one the prices will be very similar to those offered by IP telephony companies.

In the light of the recent debate over the benefits of clustering and deregulation of the Mexican Telecommunications systems and the cable TV industry in particular. It is important to study the clustering characteristics, demand conditions and pricing behavior before and after the deregulation of the cable TV industry in Mexico. The remaining part of the paper is organized as follows: section II describes previous literature and the demand and clustering model, section III discusses the data and empirical exercise is made, and section IV presents conclusions.

2. Literature Review and the Demand and Clustering Model

The empirical evidence in the Cable TV sector in Mexico is lacking the analysis of elasticity of demand, the role of alternative entertainment services and the exercise of market power. In the United States, Comanor and Mitchell (1971) explore the impact of such regulatory changes by means of a detailed simulation model of a typical firm. The

[27] The data transportation rate in Mexico is lower than the average 20% for the developed countries. This is caused by the low Internet penetration and again by the last mile access problem.

[28] Since competition started in 1997 prices of long distance have lowered. For national calls the price reduced 30%, from Mexico to the U.S. and Canada 28.1% and 27.1% from Mexico to the rest of the world. The household sector is a major challenge to the entrant telephone companies with the capacity to exploit their networks and invest in wireless access. Mexico has defined the frequency band to be used for Local Multipoint Distribution System (LMDS) and will auction these spectrum bands in the near future. Another alternative will be the acquisition of or alliance with Cable TV companies.

principal findings were that the proposed regulations, taken together, reduced substantially the rates of return to the point where large-scale expansion of cable service was unlikely except by very large firms in both large and smaller markets.

Mayo and Otsuka (1991) examine empirically the demand and pricing relationships for cable TV in the U.S. for the period prior to deregulation. Sotelo Salgado (1998) did the first rigorous empirical study of the cable TV sector in Mexico. They find that the demand for basic cable service ranges from being generally inelastic in rural areas to elastic in large urban markets. The elasticity of demand for pay cable services is typically well in excess of unity. Also, while regulation did not lead to economically efficient (marginal cost) prices for basic cable service, it did act to keep prices below monopoly levels.[29]

Winston (1993) tested whether regulation of the CAVT natural monopoly in the U.S. was in the public interest or in the interest of producers. He observed that after deregulation of cable TV in the US, there was an increase in consumer surplus of 0.8 billions of dollars in 1990.[30]

3. Empirical Model

In Mexico, just one franchise exists in each region in non major cities. There are 3 exceptions. The exceptions are the country's largest city clusters, like Mexico, Monterrey and Guadalajara, where telecommunications services and resources are clustered and concentrated.[31] Together, they account for more than 80% of resources and infrastructure development in the sector.

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[29] Mayo and Otsuka find that the demand elasticity for basic service displayed considerable variation due to the presence or absence of direct and indirect substitutes. In small urbanized markets, the price elasticity of demand for basic service is considerable less than one, while in large urban markets it was greater than one. They found that the demand for pay services was in the elastic range. There was considerable variation in the demand and the regulation of basic cable rates led to prices that were above marginal cost first best prices, but below the levels that would prevail had regulation been absent or non binding.

[30] Winston shows the before and after measures of consumer welfare gain, and finds a positive price or service quality effect. The range of assessments increased viewing options and enhanced quality signals. The prediction was based on Paul MacAvoy's (1977,p.40).

[31] The situation in the large cities, where there is an "exception" to the monopolistic rule of only few cable companies may operate in a city cluster. Also, these are the cities where competition comes not only from cable companies, but also from new MMDS and DTH companies. Mexico's telecommunications in large cities witnessed the battle between consortia interested in providing direct-to-home television (DTH)services. The main players are Galaxy Latin America, an association of the U.S. satellite maker Hughes Communications; Venezuela's Organizacion Cysneros; Brazil's TV Abril and the Mexican company Multivision owned by Joaquin Vargas. The cluster alliance formed by News Corporation, Tele-Communications Inc. (TCI), Brazil's Globo Organization and Mexico's Televisa of Emilio Azcarraga. Finally, Corporacion Medcom, which belongs to an association of Clemente Serna's Red Group and Scientific Atlanta, who started to compete in the domestic market. Aside from the differences between DTH and the present cable television service via MMDS (Mulitpoint Multichannel Distribution System) offered by Multivision, what is of greatest interest for subscribers are the type of programming and the cost of access. DTH is the most recent technology for pay TV. With DTH, consumers have access to more channels and programs from other countries. The city clusters certainly are the most competitive from all signal and entertainment sources (over the air TV, radio, satellite and movie theatres).

In the Mexican model, I assume that the price and output depends on demand, cost conditions, and the degree in which regulation is binding. The model starts by specifying an inverse demand curve of the form:

$$\rho = f(\chi, Z, Y) + E \qquad (1)$$

where ρ is the market price, χ is the quantity demanded, Z is the vector of quality measures that can shift the demand curve, Y are exogenous factors that can also shift the demand curve and E which represents random fluctuations of demand. Taking the derivative of equation (1) with respect to output, we obtain the marginal revenue curve.

$$MR = f(\chi, Z, Y) + \chi f\chi (\chi, Z, Y) \qquad (2)$$

where $f\chi$ is the partial derivative of the demand function with respect to quantity. Since one company is operating in each market, the model states the quasi supply function of the following form:

$$\rho = \mu (P\text{-}MR) + C (Z, W) + M \qquad (3)$$

where μ **(P-MR)** is the term that represents the effectiveness of regulation of the cable company, **C(Z,W)** is the short run marginal cost function, and W which is a vector of exogenous factors that shift the cost function.
Substituting equations (1) and (2) into (3) gives the following:

$$\rho = -\mu \chi f\chi(\chi, Z, Y) + C (Z, W) \qquad (4)$$

where the marginal cost is assumed to be independent of output.
The model states that a value of μ near to one would be consistent with monopoly levels in the rates charged by the cable companies. And if the value is close to zero, the cable company would be facing competition due to an existing or developing **cluster**.
I assume that the demand function takes the form of

$$\rho = e^{\alpha 0} \chi^{\alpha 1} Z^{\alpha 2} Y^{\alpha 3} e^{\varepsilon} \qquad (5)$$

where for simplicity Z and Y are now taken to be scalars. Taking the derivative of the demand function with respect to χ gives :

$$f\chi = \alpha 1 \rho / \chi \qquad (6)$$

substituting equation (6) into (4), gives

$$\rho = -\mu \alpha 1 \rho + C (Z, W) \qquad (7)$$

Then the marginal cost function takes the form

$$c = e^{\beta 0} Z^{\beta 1} W^{\beta 2} e^{\mu} \qquad (8)$$

Taking the natural log and arranging the terms, results in the following equation:

$$\ln \rho = \beta 0 - \ln (1+ \mu \alpha 1) + \beta 1 \ln Z + \beta 2 \ln W + \mu \qquad (9)$$

This can be simplified if we take into consideration that ln $(1+ \mu \alpha 1)$ is approximately $\mu \alpha 1$, which are relative small values that are likely to be finite in the study. The supply function to be estimated is the following :

$$\ln \rho = \beta 0 - \mu \alpha 1 + \beta 1 \ln Z + \beta 2 \ln W + \mu \qquad (10)$$

The primary parameter of interest μ cannot be identified in the model. In order to calculate the monopoly power a dummy variable is used. The product $\mu \alpha 1$ changes depending on the degree of **clustering driving competition** that cable companies face. The data on this variable was unavailable but I used a proxy to show the degree of urbanization where the system is located. The use of this variable is justified by the saying that larger urbanization in Mexico implies a greater number of cable firms in the region and a higher degree of clustering.

$$\ln \rho = \beta 0 - \mu \alpha 1 - (\mu \alpha 1) \text{ Dummy} + \beta 1 \ln Z + \beta 2 \ln W + \mu \qquad (10a)$$

where Dummy is a variable that takes the value of one where the cable system does not face competition in communities where there are sufficient media available. This change depends upon the degree of clustering they face. The evidence supporting a value of μ greater than zero, confirms the hypothesis that when cable companies are in a small city where there are few substitutes and no firm clustering, they increase their market power.

The choice quality of the cable system is specified as

$$\ln Z = \varnothing 0 + \varnothing 1 \ln \rho + \varnothing 2 \ln \chi + + \varnothing 3 \ln V + T \qquad (11)$$

where V is a vector of exogenous variables that influences the choice of quality and T are random fluctuations in quality.

4. Data and Empirical Results

The data used in this work was collected from cable systems throughout Mexico in 1994 and 1996. Only 109 observations for regional cable systems were collected from the annual directory of associates of the national chamber of the cable TV industry, and the programming directory also published by the chamber. The economic variables were gathered from the National Institute of Statistical, Geography and Informatics annuals in Mexico, the Ministry of Finance and Ministry of Transportation datasets and CANITEC'S Directory. The variables collected were the monthly basic fee, the number of satellite channels available in the basic tier, the number of basic subscribers, the planned kilometers of the system, the number of homes in the system, the channel capacity of the system and the year they started operation. The premium channels in the system are not taken into consideration, because the majority of the systems in the country only have basic tier. The basic service tier of programming offered by cable systems consists of the over-the-air signals of local television stations; public, educational, and governmental channels; and any cable satellite programming that the

cable operator elects to provide on the basic service tier. The cable programming service tier includes most non-broadcast and satellite programming offered by cable systems. A future exercise would take into consideration the premium channels, since the number of subscribers in basic tier would depend in the pay service they deliver.

Table 3. Clustering Model Variables
Log of the monthly basic fee
0 if there is clustering, 1 otherwise.
Log of the number of channels offered in the basic tier.
Log of income per capita.
Log of population density.
Log of the age of the system.
Log of basic subscribers.
Log of urbanization.
Log of ages 15 or more.
Log of homes covered by the system.
Log of age squared.

The full model to be estimated contains 3 equations: the demand function, the supply function and the equation that explains the quality of the cable system. All the variables except the dichotomous variables are expressed in natural logs, and all the equations are linear.

To estimate equation 10a, the price of monthly basic fee is used, where the natural log of the monthly fee is the dependent variable, and the vector of exogenous factors that affect marginal cost (w) consists of three variables: the log of income per capita, the log of population density and the log of the age of the system. This is because more densely populated areas have lower costs due to clustering, so we expect the variable to have a negative sign. The per capita income is included to reflect a proxy for factor costs in the region. This has a positive effect on costs. The age and age squared are used to reflect the costs of older systems that may need more maintenance. The age squared is included since older systems may have different technologies and costs than new systems. This equation has a dichotomous variable to capture changes in prices due to more competitive suppliers and clusters. The log of the number of channels offered in the basic tier tries to capture the different types of quality in any of the systems. The number of channels offered in basic tier is only a proxy to measure the quality. By including this variable, I obtain an approximation to identify that the change in price is due to quality factors and not because of a lesser exercise of competition and clustering.

If the price charged by the system and the number of channels offered are chosen simultaneously, then equation 14 is used to estimate equation 11. Equation 10 is estimated using two stage least squares. The empirical results are presented in the following table.

Table 4. Estimates of the Industry Supply Function With Clusters. *Two Stages Least Squares(TSLS) and GMM[32] Estimates for the Quasi Supply Function.* *With Instrumental Variables* *Dependent Variable: log of monthly fee*	*(GMM) 1994*	*(TSLS) 1994*	*(TSLS) 1996*
INTERCEPT	2.6768	3.4771	2.65*
	(12.23)	(6.668)	(0.22)
DUMMY μ (0 for clustering, 1 otherwise)	-0.0608*	-0.289	0.15*
	(-1.599)	-(1.214)	(0.05)
Log of age squared	0.0017	-0.039	-0.01
	(0.0717)	-(0.44)	(0.01)
Log of income per capita	0.0628	0.098	0.07*
	(2.409)	(1.818)	(0.02)
Log of population density	0.006	0.009	0.003
	(.5186)	(0.27)	(0.01)
Log of number of channels offered in basic tier	.5459	0.371	0.53*
	(7.825)	(3.616)	(0.07)
****Significant at 1% level.***	***R^2=0.5004***	***R^2=-0.96***	***R^2=0.46***
T stats in parenthesis		***Fstat=4.36***	***Fstat=20.79***
Included observations N=99 in 1994, N=109 in 1996.		***Overall significance at 5% level***	***Overall significance at 5% level***
The new federal law of Telecommunications was enacted in 1995.			

The results are as expected. Most of the variables are significant and with the right sign. The variable that presents the number of channels offered in the basic tier is positive and significant, showing that systems with higher quality have higher rates. The per capita income turns out to be positive as expected. The main result of interest is the Dummy variable, which changed from a negative and less than unitary coefficient in 1994, using both TSLS and GMM techniques, to a value of .15 for 1996.[33] This result suggests that clustering and competition increased by 1996.[34] This represents an average in all the studied systems because of the way the model is specified. The market structure after deregulation changes and affects pricing. This result could be influenced by a change in the elasticity of demand in the different cities where service is delivered, due to changes in patterns of consumption of entertainment goods.

Next an estimation is done for the demand. The log of basic subscribers is used as the dependent variable with the independent variables including the dummy for clustering, log of the number of channels, log of urbanization, log of income per capita, log of ages

[32] Generalized Method of moments using a cross section weighting matrix, fixed bandwidth selection and instrumental variables. Convergence achieved after 2 coefficient iterations and 1 weighting matrix.

[33] This means that a regional monopoly in cable drives up the price. There is a urban city clustering cable effect, as compared to a rural one.

[34] Since prices are not fixed anymore, the rates could be at or below monopoly levels depending on the effective market competition. Effective market clustering tends to make prices converge towards the market price in different regions.

15 or more, log of age of the system and the log of the homes covered by the system. This equation is estimated using ordinary least squares. The results are shown in the next table.

Table 5. Estimates of the Demand Equation *Ordinary Least Squares and GMM Estimates with instrumental variable.s* *Dependent Variable:* *Log of basic subscribers*	*1994 (OLS)*	*1994 (GMM)*	*1996 (OLS)*
C	4.41	2.25476	2.25
	(1.41)	(.671337)	(5.32)
Log of monthly basic fee, ρ	-.46	-0.5929	-.59**
	(-1.31)	(-2.0652)	(0.35)
Log of number of channels	0.2565	0.3294	0.32
	(1.12)	(1.3744)	(0.28)
Log of urbanization	-0.61	-0.1431	-0.14
	(-0.99)	(-0.2099)	(1.11)
Log of income per capita	0.096	0.0414	0.04
	(0.93)	(0.6123)	(0.09)
Log of ages 15 or more	0.227	0.2950	0.29*
	(2.78)	(3.4404)	(0.08)
Log of age of the system	0.027	0.3475	0.34*
	(3.11)	(5.0519)	(0.08)
Log of homes covered by the system	0.528	0.4411	0.44*
	(5.951)	(4.0465)	(0.09)
****Significant at 1% level.*** ***** Significant at 10%level.*** ***N=109, K=7*** ***The New Federal law of Telecommunications was Enacted in 1995.***	***Fstat=33.72*** ***Overall Significance at 5.%*** $R^2 = 0.70$	$R^2 = 0.73$	***Fstat=39*** ***Overall Significance at 5.%*** $R^2 = 0.73$

The results are somewhat consistent with the expectations. For example, The number of homes covered by the cable systems has the expected sign.[35] The age and the population that is over 15 years is a determinant for this kind of demand. The result that is not as good for the quality variables since the variable used is not a good measure of the quality of the system.[36] The demand elasticity does not change significantly in a statistical sense between the two periods examined. Therefore the price decrease after deregulation, holding cost and quality constant, con be attributed solely to a positive effect in clustering economies that was made possible by the elimination of price deregulation.

The estimated elasticity of demand is –0.46 using OLS and -0.5929 using GMM in 1994 and -0.59 in 1996 for Mexico's Cable TV sector, whereas the ones estimated for the US

[35] Urban clustered markets have lower costs since more consumers are served per kilometer of cable line.
[36] Greater quality may come from a more complete package of channels in versions such as: CNN International, ESPN International, HBO Ole and MTV Latino.

are elastic and greater than one for large urban markets in the U.S.[37]. Telecom system cluster operators in Mexico do not have a high market power since they face competition from other entertainment sources like over the air channels. [38]

The importance of the national commercial and public TV networks in Mexico might explain the coefficient. Mexican public television is dominated by two companies, Televisa and TV Azteca[39], and the majority of the Mexican population (99%) is covered

[37] The demand in inelastic, meaning that a decrease in price causes a decrease in total revenue. An explanation for the demand to be in the inelastic range is that cable is a good of vital importance and considered a necessity for most regions in Mexico.

[38] A study by Webb (1983) found that the demand of cable TV in the US was inelastic. This is not expected after deregulation since cable systems could increase profits by moving to the elastic portion of the demand curve.

[39] Mexico's broadcasting system is largely dependent on advertising and tax revenues. Mexico's dual system of government and private stations moved toward private control in 1993 when the government sold two of its television networks to private groups. Currently, there are two government funded channels, 11 and 22, and two main terrestrial networks: Grupo Televisa and TV Azteca, both privately owned. **Grupo Televisa**, the largest latin american and Spanish Speaking TV and Telecommunications related group in the world, operates four VHF TV stations in Mexico City, Channel 2 (telenovelas and entertainment), Channel 4 (home shopping/ U.S. shows in prime time), Channel 5 (children's shows, U.S. films) and Channel 9 (telenovelas and movies). It relays them across Mexico via satellite and cable, to a total system of 300 affiliate stations. It also has several radio stations, publishing firms, acting, film production and theaters. Sky TV is Mexico's biggest DBS effort which pairs Televisa with Rupert Murdoch. Grupo Televisa is a world leader in production and transmission of Spanish TV programming in the world. It operates TV services via satellite, the largest Cable TV system in Mexico (cablevision), 17 radio stations, paging services, and movie production and studios. It has a dominant participation in the Mexican market with 74% of the audience. In 1996, Televisa produces more than 100,000 half hours of production distributed in the Mexican market and around the world to more than 58 million TV homes in 40 languages and 98 countries. In Mexico, Grupo Televisa continued to have the largest share of the TV market in 1996, with the transmission of 46 of the 50 most popular programs. They have important operative synergies, due to the vertical and horizontal integration of its divisions, which have significantly lowered production costs. At the end of 1995, Grupo Televisa announced a strategic aliance with The News Corporation Limited, Organizacõnes Globo, and Tele-Communications International Inc, in order to develop and operate a direct TV DTH service via satellite in all of Latin America, US, Southern Canada and the Caribbean. Televisa also received government approval to form a cable TV joint venture with Telmex, Mexico's telephone giant. In December 1996, this association started the operation of DTH in Mexico. This service, known as Sky Entertainment Services transmits more than 150 channels. It also signed an agreement with Telefónica de España and other TV stations in Spain to develop and operate a DTH in Spain. Grupo Televisa also owns part of Univision, one of the US Spanish networks, and part of PanAmSat. Televisa obtained 74.2% of the teleaudience in Mexico City during 1996. The 4 networks include 199 TV stations in Mexico. Televisa owned a total of 242 stations with a mayority participation in other 16. Cadena del Canal 2 has been the Mexico's biggest network since the 1950's. The programming is directed to the typical mexican family reaching more than 16 million of TV homes in Mexico, approximately 97% of the total of TV homes, with 146 affiliate stations. Televisa has traditionally been tight lipped about the size of its debt but some analysts have estimated that Televicentro, Televisa's holding company, has more than $1.0 billion of debt and Televisa's debt was around $925 million in 1998. With Emilio Azcarraga Jean, as Chairman CEO, revenues rose 6% to 14.16 billion. Revenues reflect higher television and audio sales.

TV Azteca, the second largest TV network in Mexico has great programming, and it is in fact making a real assault on Grupo Televisa, which enjoyed a near monopoly in Mexico. TV Azteca was purchased from the Mexican government in 1993 for US$643 million. The Company operates two national television networks (Azteca 13 and Azteca 7), through over 250 owned and operated stations located throughout

by the two biggest TV networks. Televisa enjoys a near monopoly of Mexican TV. Its four national networks have a combined share of nearly 80% of the market and the company runs Mexico's second largest pay television operation, Cablevision. In contrast the number of subscribers of CATV in the the two major privately owned subscription cable systems in Mexico (Multivision and Cablevision)[40] is about 2 million subscribers or 2% of the population (mostly high income people) with a coverage of 174 cities in 29 states. By the end of 1996, cable penetration was 13.3%; totaling 1.9 million households.

In 1995, the Mexican financial crisis started. By 1998, a world financial crisis augmented Mexico's financial difficulties. The worse the economy gets, people have to do something for entertainment, so they'll watch TV or go to the movies. No more expensive luxury items. This is why TV is the king of entertainment sources in Mexico. In the last 4 years, since passage of the new competitive regulations, Mexico's cable rates have decreased. Also, better quality in signal and number of channels, due to new telecommunications clusters and more substitutes to normal cable appear in the market. In contrast, the U.S. cable rates are rising more than three times faster than inflation since passage of the 1996 United States Telecom Act.

As the cable TV sector became deregulated, basic cable prices decreased in Mexico. Some telecom operators have said that they do not have market power because they compete with other entertainment sources, especially the national TV networks. The cable market power in basic services could come form two primary sources. One source

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Mexico. In February 1997, TV Azteca issued US$425 million in publicly-traded bonds. In August 1997, the Company made an initial public offering of approximately 21% of its capital stock. In 1997, TV Azteca won 32% of Mexico's US$1.4 billion broadcast television advertising market with its popular internally produced programming and innovative pricing and payment plans. As of June 30, 1998, TV Azteca had US$578 million of debt. Of that, US$125 million is due in 2004 and US$300 million is due in 2007. TV Azteca and Canal 40 Announce Joint Venture; TV Azteca Purchases 10% of Channel 40. The strategic alliance could lead to the third national network for TV Azteca. They have formed a joint venture that will transform the Mexican television industry cluster. The joint venture, which will result in a 50-50 split of EBITDA generated by CNI, will provide TV Azteca with another vehicle for increasing its share of Mexico's dynamic television advertising market, estimated to reach US$1.6 billion in 1998. With the joint venture, TV Azteca is broadening its broadcast reach and increasing its share of the Mexican television ad market. Controlling the widest possible distribution allows us to maximize the returns from the internally produced programming. CNI broadcasts on channel 40 in the Mexico City metropolitan area and its signal reaches close to 100% of the 22 million television viewers in the world's largest city. Canal 40 also penetrates into the 1.6 million television households in Mexico with pay television. In total, Canal 40 reaches a total of 27% of Mexico's television households.

[40] Cablevision, Mexico's second-largest cable pay TV is operated by Televisa. It's competitor, known as **MVS Multivision**, has become the largest wireless pay television provider in Mexico. It is a subsidiary of JV Corporation, which is family owned and operated by the Vargas family. MVS Multivision has showed an explosive growth, from an initial subscriber base of 2,000 customers in 1989 to more than 400,000 in 1995. Company executives say the subscriber base grows at a rate of approximately 20,000 per month; five times faster than Televisa's pay TV Cablevision service, and it reached 1.8 million subscribers in 1997. MVS Multivision offers 23 cable channels in Mexico, including several corporations with television networks in other nations. The company plans to expand rapidly in the coming years, both as a pay television operator and provider of programming to other companies in about 150 Mexican cities and throughout Latin America.

is that cable provides clear reception of over the air channels, particularly in areas where over the air reception is poor.

This could allow the cable systems to charge more that the competitive price for this reception service because consumers would not have a good substitute available. In areas where the reception is good, then the price would be closer to the competitive price. The other is that prices may decrease because of decreasing quality of the product. The number of over the air channels is a determinant of the size of competitive clusters in the cable TV industry. The following table shows the National Coverage of TV Networks in Mexico.

Table 6. National Coverage of Private Mexican Over the Air TV Networks. (1996-1997)[41]

Channel (Affiliates)	National Coverage	Number of People Serviced (millions)	Number of TV Homes (millions)[42]
TV Azteca	97%	90	15.6
TV7	94%	85	14.9
Canal 2 (146 stations)[43]	97.5%	90.4	16
Canal 5 (80 stations)	90%	83.5	14.4
Canal 9 (21 stations)	64%	59.3	10.3
Canal 4 (49 stations)	54%	50.1	8.6

Another source of entertainment comes from the increasing satellite coverage in Mexico. By September 1997, Mexico accepted the bids of U.S satellite giants General Electric Co., Loral Corp. and Hughes Electronics Corp. for Mexico's satellite system Satmex[44] Satmex owns two operating centres and the right to launch and operate a fourth satellite in addition to the existing Morelos 2 and Solidaridad 1 and 2.[45] Loral and Telefonica

[41] Mexico's broadcasting system is largely dependent on advertising and tax revenues. Mexico's dual system of government and private stations moved toward private control in 1993 when the government sold two of its television networks to private groups. Currently, there are two government funded channels, 11 and 22, and two main terrestrial networks: Grupo Televisa and TV Azteca, both privately owned. Grupo Televisa operates four channels: Channel 2 (telenovelas and entertainment), Channel 4 (home shopping/ U.S. shows in prime time), Channel 5 (children's shows, U.S. films) and Channel 9 (telenovelas and movies). TV Azteca runs two channels: Channel 13, which is its leading service (telenovelas, sports and movies) and Channel 7 (U.S. series and films).

[42] Even if cable TV has not reached most of Latin America, television sets have. There are approximately 80 million of them, including 39.4 million TV households in Brazil, 17.3 million in Mexico, 9.8 million in Argentina, 7.1 million in Colombia, 4.3 million in Venezuela and 3.3 million in Chile. Of those, some 5 million Argentine homes receive cable. And there are another 2 million households in Mexico and 700,000 in Brazil. The rest of the countries carry cable penetration percentages in the single digits, offering a great potential for growth and not a big competition to any new satellite services. The Mexican Cable TV systems transmit 99 different channels of which approximately 15 are national, and 84 international. Around 68 concessionaires transmit local generated channels.

[43] At that time however, TV was under the hegemony of Televisa.

[44] Sixty percent of the government-owned Satelites Mexicanos SA system were to be auctioned, plus an option for further 15 percent.

Autrey, won the bid for the privatization of Mexico's satellite operations. The Mexican government retains a non voting 25 percent interest in SatMex and that there be Mexican ownership of 51 percent of the voting stock, to be exercised by Telefonica Autrey. Loral said SatMex's assets consist of three operating satellites and state of the art tracking, telemetry and control sites in Mexico City and Hermosillo, Sonora. Loral the successful bidder, will receive concessions to use the three orbital slots to provide satellite services for 20 years with automatic renewals for an additional 20 years. The deal also includes a satellite with greater power and coverage, now under construction, to replace the Morelos II, which is nearing the end of its service life in 1998.

The potential of television is greatly underestimated for Mexico if attention is focused solely upon importation of TV broadcast signals and low-quality local originations. The current assumptions for long run projections of the future of the pay cable TV networks are that systems will attract 50 percent of the homes passed by cable and that revenues per subscriber will increase at a rate of 2 percent per year.

Greater competition is expected in Mexico due to Telecommunications clusters which increase productivity and introduces better technologies.[46] [47] In the long run the remaining industries will be determined by the market structure of the regional networks clusters, the financial strength of the company and technology. As open access is achieved in the segmented regional cluster markets and the national cluster markets, prices for this services will tend to converge as the markets become integrated.

5. Conclusions for the Telecommunications Cluster Model

The telecommunications industry in Mexico has seen the emergence of a competitive clustered TV market in the urban cities. New competitors, such as MVS Multivision, with new cable technologies, augmented the interdependencies of an integrated topology in the cable clustered network. Markets succeeded in integrating the Cable TV network that federal regulation had created and competition dissolved the barriers between city and regional markets. [48]

The market power model used gives the first empirical evidence of demand elasticity in the cable TV industry in Mexico. This is of particular interest in the light of the recent questions about demand and pricing that have been raised in the telecommunications industry. The empirical results show that at the current price levels, the basic cable TV

[46] Direct Satellite Systems are being constructed to uplink the European and Latin American markets. U.S. players like GM Hughes Electronic Corp., News Corp., and TCI, have created clustered partnerships with local media corporations. In the fiber optic cable industry, GTE, Bell Atlantic, Southwestern Bell, Nynex and others have teamed up with the Latin American counterparts in the race to build the information superhighway. The major media corporations will be involved in all its activities (telephony, news, information, and entertainment); and all of its forms (cable, traditional radio, TV receivers, computers, over the air television, interactive TV, CD ROM, computing personal digital assistants and cellular phones).

[47] In the next five years there will be three industries conducting a vertical integration, facilitating the complementarities among cluster participants: wireless, cable TV and basic phone service companies.

[48] In addition, competition and clustering has increased in Mexico as new cable operators and telecom companies have begun to enter one another's markets.

services are in the inelastic range, after the start of the deregulation process, despite the great competition faced by other entertainment sources in Mexico (over the air national channels, local channels, and satellite coverage). In Mexico, the price of the basic cable service was influenced not only by the costs of the systems, but by the quality and competition faced from other entertainment sources.[49]

Telecommunications clusters in Mexico affect competition in three broad ways: first, by increasing the productivity of companies based in the city areas; second, by driving the direction and pace of innovation of the telecommunications industry; and third, by stimulating the formation of new vertical integrated businesses within the cluster. Geographic, cultural, and institutional proximity provides companies with special access, closer relationships, better information, powerful incentives, and other advantages that are difficult to tap from a distance. Competitive advantage lies increasingly in local things, knowledge, relationships, and motivation that distant rivals cannot replicate.

Mexico shows a monopolistic competitive structure in the entertainment TV industry. The study finds that Mexico has 9 states that have between 1 - 5 Cable TV systems and four states with 6 - 15 systems. Sixteen states have between 16 - 30 and three largely clustered states with 31 to 50 systems.

The importance of the Telecommunications industry has been generally underestimated in Mexico. The Telecommunications networks infrastructure within Mexico already exists to easily provide services to another 3.5 million homes along streets where cable has already been installed. With appropriate changes to the concession assignments, national and foreign investment, and appropriate technology, the industry should be able to realize their potential for improving teledensity and Internet penetration. Power lines can also be a potential a new telecommunications network in Mexico.

[49] There is a hedonic element in pricing. The market structure after deregulation changes, and this affects pricing. There could be a correlation between the market structure and the quality. In future work an oligopoly model or a model of monopoly by entry deterrance could also be used.

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Table7. Regional Telecom Clusters (States) 1997		
	Important City Clusters covered by Cable TV	***Alternative Entertainment Sources*** ***Radio Stations, TV, Satellite.***
Aguascalientes	Aguascalientes, Calvillo, Jesús María.	Radio Dial: 10 A.M. franchises, 2 permits. F.M stations: 4 franchises, 1 permit. 5 TV channels franchises, 2 permits. Satellite Coverage.
Baja California Norte	Ensenada, Mexicali, Tecate, Tijuana, Guerrero Negro, San Quintin.	32 A.M. franchises stations, 29 F.M. franchise stations, 4 permits. 17 TV franchises, 3 permits stations. Satellite coverage (US and Mexico) . XETV serving Southern California from Tijuana. Cablemás covers the ciities of Ensenada, Mexicali, Tecate and Tijuana.
Baja California Sur	La Paz. Cd. Constitucion, Cabo San Lucas, Loreto.	10 A.M. franchises, 1 permit. 9 F.M. franchises, o permits. 11 TV franchises, 3 permits. Satellite coverage (US and Mexico).
Campeche	Campeche, Cd. Del Carmen, Palizada	9 A.M. franchises, 3 permits. 2 F.M. franchises, 0 permits. 8 TV franchises, 1 permit. Satellite TV
Coahuila	Castaños, Cd. Acuña, Cd. Allende, Cd. Morelos, Frontera, Monclova, Múzquiz, Nava, Nueva Rosita, Parras de la Fuente, Piedras Negras, Ramos Arizpe, Sabinas, Saltillo, San Buenaventura, Torreón, Zaragoza.	Televisa Coahuila Grupo Empresarial RCG operates XHRCG-TV in Saltillo, Coahuila that is relayed by satellite to a network of repeaters and cable systems. 40 A.M. franchises, 2 permits. 24 F.M. franchises, 1 permit. 27 TV franchises, 5 permits. Satellite TV (Mexico and US).
Colima	Armería, Colima, Fondeport, Manzanillo, Tecomán.	Canal 11 based in Colima, the capital of the state. Local news, regional culture, movies and educational programs. 11 A.M. franchises, 1 permit. 5 F. M. franchises, 0 permits. 6 TV franchises, 1 permit. Satellite TV
Chiapas	Cintalapa, Comitán, Huixtla, Reforma, Tapachula, Tuxtla Gutiérrez, San Cristóbal de las Casas.	26 A.M. franchises, 5 permits. 7 F. M. franchises, 0 permits. 26 TV franchises, 5 permits. Satellite TV.
Chihuahua	Cd. Camargo, Cd. Cuauhtémoc, Cd. Delicias, Cd. Juárez, Chihuahua.	51 A.M. franchises, 2 permits. 24 F. M. franchises, 1 permit. 31 TV franchises, 8 permits. Satellite TV (Mexico and US).
Durango	Cd. Lerdo de Tejada, Durango, Gómez Palacio, Santiago Papasquiaro	15 A.M. franchises, 1 permit. 2 F. M. franchises, 1 permit. 11 TV franchises, 0 permits. Satellite TV
Estado de	Atlacomulco, Coacalco,	8 A.M. franchises, 5 permits.

México	Lerma, Metepec, Tenancingo, Toluca, Valle de Bravo, Mexico City Metropolitan Area, Texcoco, Naucalpan, Cuauhtitlan.	8 F. M. franchises, 0 permits. 7 TV franchises, 3 permits. Satellite TV Televisa Mexico City. Grupo Radio Mil owns the powerful XHNX-FM in Toluca, plus tree radio stations. Radio y Television Mexiquense has 2 TV stations and 4 radio stations operated by the government of the state of Mexico.
Guanajuato	Acámbaro, Apaseo el Alto, Celaya, Cortazar, Dolores Hidalgo, Irapuato, León, Salamanca, Salvatierra, San Francisco del Rincón, San Miguel de Allende, Uriangato, Valle de Santiago, Villagrán, Yuriria.	36 A.M. franchises, 2 permits. 14 F. M. franchises, 3 permits. 7 TV franchises, 3 permits. Satellite TV
Guerrero	Acapulco, Arcelia, Atoyac de Alvarez, Cd. Altamirano, Chilpancingo, Iguala, Tecpan, Taxco, Zihuatanejo.	24 A.M. franchises, 6 permits. 11 F. M. franchises, 2 permits. 16 TV franchises, 2 permits. Satellite TV
Hidalgo	Hidalgo, Atotonilco el Grande, Cd. Cooperativa Cruz Azul, Huejutla de Reyes, Pachuca, San Felipe Orizatlán, Tula de Allende, Tulancingo, U.H. Pémex.	6 A.M. franchises, 6 permits. 4 F. M. franchises, 3 permits. 2 TV franchises, 12 permits. Satellite TV
Jalisco	Ajijic, Ameca, Arandas, Atotonilco el Alto, Ayotlán, Colotlán, Chapala, El Grullo, Encarnación de Díaz, Guadalajara, Jalostotitlán, Jamay, Jocotepec, La Barca, Lagos de Moreno, Ocotlán, Puerto Vallarta, San Juan de los Lagos, San Miguel el Alto, Tamazula de Gordiano, Teocaltiche, Tepatitlán, Tizapán el Alto, Tlaquepaque, Tonal, Unión de Tula, Villa Hidalgo, Yahualica, Zacoalco de Torres, Zapopan, Zapotlanejo.	44 A.M. franchises, 2 permits. 24 F. M. franchises, 3 permits. 16 TV franchises, 6 permits. Satellite TV Super 6 TV Information and News for Guadalajara. Televisa Jalisco. Unidifusion has the cable TV operation in Guadalajara, Jalisco, plus five radio stations.
Michoacán	Angamacutiro, Apatzingán, Arteaga, Cd. Hidalgo, Cd. Lázaro Cárdenas, Coalcoman, Cotija, Cuitzeo, Chilchota, Guacamayas, Huandacareo, Huetamo, Isaac Arriaga, Jacona, Jiquilpan, La Mira, Los Reyes, Maravatío, Morelia, Nueva Italia, Pastor Ortiz, Pátzcuaro, Peribán, Playa Azul, Purépero,	36 A.M. franchises, 3 permits. 6 F. M. franchises, 0 permits. 19 TV franchises, 3 permits. Satellite TV

	Puruándiro, Quiroga, Sahuayo, Tacámbaro, Tacátzcuaro, Tangancícuaro, Tanhuato, Tingéindín, Tocumbo, Tumbiscatío, Uruapan, Valle de Juárez, Venustiano Carranza, Villa Morelos, Vista Hermosa, Yurécuaro, Zacapu, Zamora, Zinapécuaro, Zitácuaro.	
Morelos	Cuautla, Cuernavaca, Jiutepec, Temixco.	4 A.M. franchises, 1 permit. 13 F. M. franchises, 3 permits. 2 TV franchises, 2 permits. Satellite TV Televisa Mexico City and Morelos. MVS operates wireless cable plus two FM stations in Cuernavaca, Morelos.
Nayarit.	Tepic, Bahía de Banderas.	14 A.M. franchises, 1 permit. 3 F. M. franchises, 0 permits. 8 TV franchises, 0 permits. Satellite TV
Nuevo León	Apodaca, Cadereyta, Garza García, Gral. Escobedo, Guadalupe, Linares, Monterrey, San Nicolás de los Garza, Santa Catarina Oaxaca, Huajuapan de León, Oaxaca, Tuxtepec.	28 A.M. franchises, 1 permit. 22 F. M. franchises, 9 permits. 8 TV franchises, 2 permits. Satellite TV (Mexico and US). Monterrey's XEFB-TV "La Fuerza del Imagen". Multimedios Estrellas de Oro has TV and radio operations branch out from Monterrey to several other northern Mexico markets. Nucleo Radio Monterrey Group in Mexico's third largest market. It includes XEG, and a 100,000 watt AM station. TV Azteca Monterrey owns channels 4 & 7 which relay Mexico City's channel 13 & 7 respectively. Televisa Monterrey. Canal 2 Monterey. News, variety shows, videos, old Mexican comic shows, children's shows. Canal 12 La Imagen Familiar Monterey. Cartoons, syndiated US programs, movies and news. Canal 22 Cultural channel with interviews with artists and movies. Canal 28 Monterey. State owned station.
Oaxaca	Oaxaca, Bahías de Huatulco, Salina Cruz and Tuxtepec	22 A.M. franchises, 9 permits. 5 F. M. franchises, 3 permits. 19 TV franchises, 8 permits. Satellite TV
Puebla	Ajalpan, Atencingo, Cholula, Izúcar de Matamoros, Puebla, Santiago Miahuatlán, Tecamachalco, Tehuacán, Zacatlán.	19 A.M. franchises, 0 permits. 14 F. M. franchises, 1 permit. 4 TV franchises, 1 permit. Satellite TV Televisa Puebla operates two TV stations in Puebla with links to other stations in the region.

Querétaro	Querétaro, San Juan del Río, Tequisquiapan.	9 A.M. franchises, 2 permits. 7 F. M. franchises, 1 permit. 4 TV franchises, 0 permits. Satellite TV
Quintana Roo	Cancún, Cozumel, Chetumal, Isla Mujeres, Playa del Carmen.	8 A.M. franchises, 5 permits. 3 F. M. franchises, 1 permit. 10 TV franchises, 6 permits. Satellite TV Canal 7 based in Chetumal, capital of the state. State owned station. Cultural programs, local news.
San Luis Potosí	Cd. Fernández, Cd. Valles, Matehuala, Matlapa, San Luis Potosí, Tamazunchale, Tamuín.	19 A.M. franchises, 1 permit. 8 F. M. franchises, 1 permit. 11 TV franchises, 4 permits. Satellite TV (Mexico and US) Televisa San Luis Potosi MVS San Luis Potosi operates wireless cable in San Luis Potosi, plus two FM stations.
Sinaloa	Culiacán, Escuinapa, Guamúchil, Guasave, Los Mochis, Mazatlán.	34 A.M. franchises, 2 permits. 10 F. M. franchises, 1 permit. 13 TV franchises, 1 permit. Satellite TV Promomedios Norte de Sinaloa is a group of six radio stations.
Sonora	Agua Prieta, Altar, Caborca, Cananea, Cd. Obregón, Empalme, Esqueda, Guaymas, Hermosillo, Huatabampo, Imuris, Magdalena de Kino, Naco, Navojoa, Pitiquito, Santa Ana	49 A.M. franchises, 1 permit. 24 F. M. franchises, 13 permits. 28 TV franchises, 27 permits. Satellite TV (Mexico and US) Televisa Sonora Grupo Uniradio has three station group in Hermosillo. Grupo Radio Sonora has 3 AMs and one FM in Cd. Obregón.
Tabasco	Tabasco, Cd. Pémex, Huimanguillo, La Venta, Macuspana, Villahermosa. Villahermosa, Cárdenas, Comalcalco and Paraíso.	13 A.M. franchises, 0 permits. 6 F. M. franchises, 5 permits. 9 TV franchises, 0 permits. Satellite TV
Tamaulipas	Aldama, Cd. Camargo, Cd. Mante, Cd. Mier, Cd. Miguel Alemán, Cd. Victoria, Gustavo Díaz Ordaz, Matamoros, Nuevo Laredo, Reynosa, Río Bravo, San Fernando, Tampico, Valle Hermoso.	44 A.M. franchises, 3 permits. 26 F. M. franchises, 9 permits. 29 TV franchises, 2 permits. Satellite TV (Mexico and US) Televisa Cadena Fox operates English language Fox affiliates XHFOX and XHFTX just over the border from south Texas. Also Televisa Tamaulipas Multimedios Estrellas de Oro Tampico has one TV station in the gulf of Mexico Coast and 2 FM stations. MVS Tampico operates wireless cable plus two FM's in Tampico. Radiorama Nuevo Laredo operates 3 AMs and 2 FMs across the border from Laredo.
Tlaxcala	Apizaco, Huamantla, Tlaxcala	3 A.M. franchises, 0 permits.

	, Calpulalpan	2 F. M. franchises, 1 permit. 0 TV franchises, 4 permits. Satellite TV
Veracruz	Acayucan, Agua Dulce, Alamo, Angel R. Cabada, Catemaco, Cd. Mendoza, Cerro Azul, Coatzacoalcos, Córdoba, Coscomatepec, Cosoleacaque, Fortín, Huatusco, Jalapa, Jaltipán, Las Choapas, Lerdo de Tejada, Minatitlán, Nanchital, Naranjos, Orizaba, Papantla, Poza Rica, Río Blanco, San Andrés Tuxtla, Santiago Tuxtla, Tantoyuca, Tlacotalpan, Tuxpan, Veracruz.	63 A.M. franchises, 3 permits. 22 F. M. franchises, 0 permits. 13 TV franchises, 2 permits. Satellite TV Televisa Veracruz Grupo Avanradio has six station radio group in Xalapa, Veracruz.
Yucatán	Conkal, Kanasín, Mérida, Progreso, Umán, Valladolid.	15 A.M. franchises, 2 permits. 6 F. M. franchises, 1 permit. 9 TV franchises, 5 permits. Satellite TV Televisa Yucatan Grupo Rivas has seven AM's and two FM's in Merida, Yucatan. Telsistema de Yucatan is a government owned system.
Zacatecas	Fresnillo, Juchipila, Nochistlán, Río Grande, Zacatecas.	14 A.M. franchises, 0 permit. 4 F. M. franchises, 1 permit. 12 TV franchises, 3 permits. Satellite TV.
Mexico City, D.F.	Mexico City Metropolitan area.	RadioDial: 34 A.M. stations, 27 F.M. stations. 10 TV stations. 29 A.M. franchises, 2 permits. 23 F. M. franchises, 4 permits. 8 TV franchises, 1 permits. Satellite TV Coverage. XEW 2 Owned by Televisa. Biggest Mexican broadcast TV networks. consortium). MVS Comunicaciones operates huge wireless cable TV in Mexico City. DirecTV is the new Mexican DBS service by Mexico's MVS Comunicaciones and other partners.

Table 8. TV and Cable TV Penetration By States	HOUSEHOLDS WITH TV	CABLE TV SUBSCRIBERS	PENETRATION %
Aguascalientes	197,333	15,123	7.66
Baja California Norte	475,067	67,772	14.27
Baja California Sur	80,414	462	0.57
Campeche	128,961	17,564	13.62
Coahuila	449,906	38,301	8.51
Colima	100,565	23,057	22.93
Chiapas	665,870	17,674	2.65
Chihuahua	619,022	36,520	5.90
Distrito Federal	1,910,103	300,000	15.71
Durango	270,452	3,811	1.41
Guanajuato	772,289	80,739	10.45
Guerrero	542,005	34,158	6.30
Hidalgo	385,543	30,992	8.04
Jalisco	1,173,080	165,966	14.15
Mexico	2,274,063	32,864	1.45
Michoacan	702,449	106,019	15.09
Morelos	290,039	27,930	9.63
Nayarit	179,916	8,588	4.77
Nuevo Leon	723,837	72,842	10.06
Oaxaca	597,105	13,228	2.22
Puebla	847,261	48,078	5.67
Queretaro	225,654	21,998	9.75
Quintana Roo	147,181	30,144	20.48
San Luis Potosi	399,789	18,777	4.70
Sinaloa	471,257	52,662	11.17
Sonora	431,296	79,416	18.41
Tabasco	320,544	31,331	9.77
Tamaulipas	548,484	60,295	10.99
Tlaxcala	155,385	13,557	8.72
Veracruz	1,350,331	93,475	6.92
Yucatán	297,622	26,455	8.89
Zacatecas	246,651	13,857	5.62
TOTAL	17,979,474	1,583,655	8.81

Source: CANITEC with 1999 data.

Table 9. Telecommunications Groups in Mexico				
	# of states	# of Cities	# of subscribers	Market share %
Televisa/Cablevision	1	1	400,249	20.012
Megacable	7	29	255,439	12.772
Cablemas	13	36	234,251	11.713
Acotel	7	21	105,655	5.283
Hevi	6	16	100,087	5.004
Grupo Cable TV	9	23	99,001	4.950
Television Internacional	1	1	85,000	4.250
Telemedia	8	30	74,836	3.742
Grupo Telecable Mexicano	3	13	59,366	2.968
Servicios de Comunicacion por Cable	4	4	52,490	2.625
Oscar Cota Castro	3	10	48,581	2.429
Televicable del Centro	4	7	47,946	2.397
TVI	7	32	40,135	2.007
Television por Cable del Norte de Sonora	1	8	22,675	1.134
MATSA	2	3	19,778	0.989
Enrique Castro y Amaya	2	6	19,111	0.956
Corporativo Nucleo Radio TV	2	10	17,285	0.864
FRAVI	2	5	17,223	0.861
RGT	1	2	12,223	0.611
IRA Consultores Administrativos	8	18	12,084	0.604
Others		150	276,585	13.829
TOTAL		425	2,000,000	100
Source: CANITEC with 1999 data.				

Table 10. Concessionaires in Mexico	*City and State Cluster Network*	*Distribution of Cable in Kilometers*
Cablevision	Mexico, D.F.	6,981.0
Vision por Cable	Guadalajara, Jalisco	1,388.1
Gerardo Jose Millet Palomeque	Merida, Yucatan	1,140.0
TV Cable de Leon	Leon, Guanajuato	815.0
Tele Cable de Zapopan	Zapoan, Jalisco	803.0
Tele Cable de Juarez	Tijuana, BCN	765.1
Alberto Ventosa Aguilera	Puebla, Puebla	764.1
Tele Cable de Juarez	Mexicali, BCN	732.2
Tele Cable de la Laguna	Torreon, Coahuila	655.0
Tele Cable de Morelos	Cuernavaca, Morelos	627.3
Vision por Cable	Hermosillo, Sonora	619.8
Vision por Cable	Culiacan, Sinaloa	526.1
Asistencia Intern. en Cable	San Luis Potosi, SLP	465.9
Cablenet Internacional	Toluca, Mexico	465.0
Tele Cable de Chihuahua	Chihuahua, Chihuahua	463.5
Servicios de Comun. por Cable	Aguascalientes, Ags.	462.7
Tele Cable de Juarez	Cd. Juarez, Chihuahua	459.2
Tele Cable del Centro	Queretaro, Queretaro	439.7
Television de Monclova	Monclova, Coahuila	425.0
Tele-Centro de Occidente	Morelia, Michoacan	400.0
Television por Cable de Tabasco	Villahermosa, Tabasco	393.0
TV Cable de Provincia	Pachuca, Hidalgo	380.5
Vision por Cable	Veracruz, Veracruz	371.9
Vision por Cable	Cd. Obregon, Sonora	359.1
Tele Cable de la Laguna	Durango, Durango	350.0
Comunicable	Matamoros, Tamaulipas	350.0
Francisco Javier Ramirez Diaz	Tampico/Cd. Madero, Tamps.	350.0
Vision por Cable	Mazatlan, Sinaloa	344.4
Telecable Mexicano	Acapulco, Guerrero	336.0
Mario de la Fuente Manriquez	Nogales, Sonora	319.0
Raul Arechiga Espinoza	La Paz, BCS	300.0
Servicios de Ing. Electrónica	Cancun, Quintana Roo	284.7
Roberto Gonzalez Treviño	Saltillo, Coahuila	280.0
Cable Sistema de Victoria	Cd. Victoria Tamaulipas	280.0
Vision por Cable	Xalapa, Veracruz	264.9
Cable de Tuxtla	Tuxtla Gutierrez,Chiapas	257.0
Servicios de Comun. por Cable	Irapuato, Guanajuato	222.2
Leonardo Julian Lopez Sain P.	Orizaba, Veracruz	211.6
Tele Cable de Juárez	Ensenada, BCN	209.1
Tele Azteca	Reynosa, Tamaulipas	203.5
Vision por Cable	Los Mochis, Sinaloa	200.8
T.V. de Uruapan	Uruapan, Michoacan	200.0
Vision por Cable de Oaxaca	Oaxaca, Oaxaca	192.0
T.V. Cable	Coatzacoalcos, Veracruz	187.0
Juan Pablo Balleza Patiño	Colima, Colima	182.0
Tele Cable de Vallarta	Puerto Vallarta, Jalisco	173.4
T.V. Cable de Provincia	Tulancingo, Hidalgo	160.8
T.V. Cable	Minatitlan, Veracruz	160.7
Vision por Cable	Tepic, Nayarit	154.6
Vision por Cable	Guaymas, Sonora	150.0