

THE DIVESTITURE OF AMERICAN TELEPHONE & TELEGRAPH :  
STRATEGIC IMPLICATIONS

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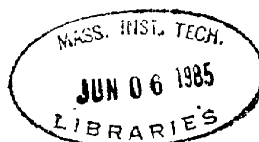
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ABSTRACT

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ABSTRACT

On January 1, 1984, the Federal Communications Commission ordered the divestiture of American Telegraph and Telephone. This ruling ended the regulated monopoly that AT&T had over the telecommunications industry since the beginning of this century.

As a result of deregulation, and with equal access charges, common carriers will lose the cost leadership they enjoyed in the transmission segment of the industry. Overcapacity will add up to the decrease in attractiveness of this segment, and companies will switch to value added services, a more attractive group.

The exponential growth of corporations entering the product and equipment market can not continue, and a shake out can be expected.

IBM, leader in the computer industry, is getting into the information transmission industry via office automation equipment, and through its association with ROLM and SBS, can be anticipated to challenge AT&T's supremacy in the next years.

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INDEX

INDEX

Abstract : .....Page 2

Chapter 1 : Industry Background.....Page 4

Chapter 2 : Regulation of the  
Telecommunications  
Industry.....Page 22

Chapter 3 : Industry Competitive  
Analysis.....Page 38

Chapter 4 : Analysis and Conclusions....Page 87

Footnotes : .....Page 108

Bibliography : .....Page 113

Appendix : .....Page 117

## CHAPTER 1: INDUSTRY BACKGROUND

**1.01 The Beginnings of the Telephone Industry:  
Alexander Graham Bell**

The word "telephone" originates from the Greek and means far-speaking. It was apparently coined in Germany in 1796, to describe an artefact composed of megaphones. It did not use electricity. In 1821, Sir Charles Wheatstone used the word "telephonic" to describe his "enchanted lyre" which transmitted music acoustically using rods of different materials. In 1839, Wheatstone invented a sort of telegraph - an electric bell - and called it "rythmical telephone".

The word as it is used now was adopted by Alexander Graham Bell, known as the inventor of the telephone. Bell was trained from an early age in techniques of elocution (speech transmission). His grandfather Alexander Bell, was a Scottish shoemaker who became a Shakesperian actor, then a public reader of Shakespeare, and funded an elocution school in London.

His father Melville Bell, was a teacher of elocution at the University of Edinburgh, and became famous as the inventor of "Visible Speech", a written code that showed the precise position and actions of throat, tongue and lips during speech.

Alexander Graham Bell, born on March 3, 1847, followed since early childhood, the steps of his distinguished father. When he was twelve years old, his mother started to lose her hearing, and since then he empathized with the problems of the deaf.

After finishing school he started working at Weston House, a boys' school near Edinburgh where he taught music and elocution and carried out a series of experiments on acoustics and electricity. Through a scientist acquainted to his father he learned about the work of the German scientist Hermann von Helmholtz, whose book "The Sensations of Tone as a Physiological Basis for the Theory of Music" gave him the idea of the feasibility of telegraphing vowel sounds over a wire.

After meeting Sir Charles Wheatstone, who showed him a primitive talking machine, he began studying electricity as applied to telegraphy.

The family moved to Brantford, Ontario in Canada, after his two brothers died of tuberculosis and he himself was given six months to live.

Soon the fame of the Bell family spread, and they were on lecture tours. He was hired in Boston to train teachers in his father's system and became a professor of "Vocal Physiology" at the Boston School of Oratory, later to become part of Boston University.

There he taught the son of Thomas Saunders, a Boston capitalist, and met Gardiner Greene Hubbard whose daughter was deaf as a consequence of scarlet fever.

Hubbard was the first president of the National Geographic Society, a Regent of the Smithsonian Institution, a member of the State Board of Education, and practiced law before the Supreme Court in Washington (1). He funded new ventures in street railways, gas lighting and similar technology related enterprises making and losing money in the process.

During the next years, Bell lectured at the Massachusetts Institute of Technology on Visible Speech, and was welcomed as an associate by the M.I.T. acoustical scientists (2), where he continued his experiments. He was spurred to do so by the efforts of Elisha Gray, the foremost electrician in America, who was making parallel experiments.

In 1874 he met Thomas A. Watson (3), a young machinist who would be instrumental in the manufacturing of the first telephone. After trying unsuccessfully to be a carpenter, he started working at the Boston Electrical Machine shop of Charles Williams, on July 1, 1872 (4). Watson had been fascinated by spiritism throughout his life, and tried to communicate with the dead by means of table-tapping, rather unsuccessfully (5).

As many youths in those years, he was not only interested in electricity, but also in steam engines and boilers. Bell, at the time, was working on a harmonic telegraph, intended to transmit multiple, separate messages over a single wire, and Watson was able to build the instrument following Bell's idea.

One night, while experimenting with the harmonic receiver, Bell's model of the human ear, Watson accidentally plucked a reed that was not vibrating. Bell, who was in the next room, heard a faint sound. After investigating the origin of it, the idea of the modern telephone was born.

Bell applied for a patent on February 14, 1876. It was granted on March 3rd., the day of his twentyninth birthday, with number 174,465.(6)

The celebration of the Philadelphia Centennial was a unique opportunity for Bell to publicize his invention. On Sunday, June 25th, 1876, Dom Pedro de Alcantara, Emperor of Brazil, whom Bell had met previously in Boston, showed interest in the instrument. Sir William Thompson, later Lord Kelvin, was surprised when he realized that it really worked.

The first sustained telephone conversation was held between Boston and Cambridgeport, over the telegraph line of the Walworth Company, and in November 1876, the wires of the Eastern Railway were used between Boston and Salem, a distance of 26 miles.(7)



A controversy over the invention of the telephone started in 1877. Elisha Gray had filed a caveat only a few hours after Alexander Graham Bell applied for his patent. The Western Union Telegraph Company challenged Bell's patent. In order to do so, Western Union set up a subsidiary, the American Speaking Telephone Company in December 1877. (8)

Previously, Bell had applied for a second patent for the "box telephone" on January 15, 1877. The patent was issued on January 30, 1877 (9), but as Western Union had ownership of rights to the work of Elisha Gray, they sought to eliminate what appeared to be possible competition.

Eventually Gray and Bell settled the matter among themselves, Gray lamenting that his application for patent was filled hours later, and that his invention was a mere idea. Nevertheless, Western Union charged the Bell interest, taking the position that Gray had invented the phone. In September 1878, Bell commenced suit against Western Union to protect its patents. Meanwhile, Jay Gould, a financier, who was trying to acquire Western Union decided to end one of its problems and on

..."November 10, 1879, before the Dowd case could be decided by the court, an agreement was reached under which Western Union gave up all its patents,

claims, and facilities in the telephone business: the Edison transmitter, various other technical improvements, and a network of 56,000 telephones in fifty-five cities in return for 20 percent of telephone rental receipts over the seventeen-year life of the Bell patents."

It was a famous and decisive victory for the Bell interests, giving National Bell a monopoly of the telephone business in the United States until the expiration of the Bell patents in 1893 and 1894. Growth would become the issue and Theodore N. Vail would be instrumental in this crucial mission.

#### 1.02 Strategy and Structure: Theodore N. Vail

Theodore N. Vail started working as a railway clerk in 1868. He had a passion for efficiency and reorganized the railway mail service with a simple idea: to sort out mail in the train, to later distribute it to post offices, minimizing handling.

Vail joined Western Union as an apprentice telegrapher in New York City, in 1864. In 1866 he moved to Waterloo, Iowa and became a telegraph operator for the Union

Pacific. He married in 1869 and settled in Omaha, reading law on the side. His abilities as an executive gained him promotion after promotion; he moved to the Washington headquarters of the Railway Mail Service in 1873, was named assistant general superintendent in 1874, and superintendent in 1876.

Gardiner Hubbard was also a member of the Congressional Postal Committee, and in that capacity he got to meet Vail. He convinced Vail to take charge of his company with a salary of \$3500 a year. Against the advice of his friends, Vail, who was making already \$5000 a year, took the job.

He started working with an immediate objective in mind: raising capital. He sold shares in a non-existing New York Company. He also realized that in order to have a national telephone system he would have to raise capital locally ...

"a percentage of the stock taken by the Bell company for the franchise while income would be realized from rental charges" (14)

Vail was instrumental in the suit against Western Union and achieved his victory by threatening Western Union to go into the telegraph business. The Bell company promised to keep out of telegraph and Western Union reciprocated with respect to telephones. The big Bell monopoly started to take shape.

The association of Bell, Hubbard, Sanders and Watson took corporate form as the Bell Telephone Company. In 1878, the New England Telephone Company was formed to sell licenses and was superseded in 1879 by the National Bell Company, that was supposed to speed licenses over the country. When Western Union sold its telephones to Bell in 1880, their operation with National Bell was chartered as the American Bell.

In 1880, William H. Forbes, the son of John Murray Forbes, representing a group of Boston capitalists, who had been involved in financing railways, provided a needed injection of capital.

The company also needed a long-term strategy and a rational structure:

Vail's long-term strategy was to control the through traffic between local telephone companies. He also stressed the importance of legally protecting patents, and of generating new patents through research and development(16).

"In addition, Vail argued that American Bell must continue to maintain and if possible expand its stocks ownership in the major operating companies that licensed its phone and switchboard equipment. When such an operating company expanded its facilities, the parent company's investment should increase proportionately(17).

Clearly, growth was a priority in Vail's agenda. The American Telegraph and Telephone company was formed in 1885 to build and operate the long lines:

" The charter of AT&T reflected Vail's ideas:"...the lines of this association... will connect one or more points in each and every city, town or place, in the State of New York with one or more points in each and every other city, town or place in said State, and in the rest of the United States, Canada and Mexico, and also by cable and other appropriate means with the rest of the known world as may

hereafter become necessary or desirable in conducting the business of the association"(18).

This ideas conflicted with those of the investor, and Vail collided with the President of American Bell, William H. Forbes, eventually resigning in May 1885. Forbes persuaded him to stay as head of AT&T, but after completing the first long distance line of the country, from New York to Albany and Boston, Vail left the company.

In 1902, he returned as member of the Board, and four years later he convinced investment bankers to finance a program of expansion by selling \$100 million in convertible bonds in 24 months (19).

In 1907, Vail was appointed President once again, and proceeded to design a structure for AT&T:

"Then he set up the "central administration" at American Telephone and Telegraph to provide common services and evaluate and appraise operating performance, as well as to define policy and determine long-term plans for the operating

companies and the enterprise as a whole. Central administration had, in turn, eight and then ten regional divisions which supervised a number of local districts. This structure, perfected by 1910, remained unchanged until the 1970s (20).

1.03 The Consolidation of a Regulated Monopoly

On January 1, 1912 the British Government took over the telephone system of Great Britain. This was a precedent for the U.S. telecommunications industry. Vail was determined to build such an efficient system, that government ownership would never be a serious issue. He thought that a government owned system would constitute the worst sort of monopoly.

Nevertheless, he accepted the fact that there had to be some sort of government regulation or control:

"Public control or regulation of public service corporations by permanent commissions" he said in 1910, "has to come to stay" (21).

But he expected a quid-pro-quo: he argued that if there was State control and regulation, there should be also some kind of State protection. He pointed out that there was hardly a telegraph or telephone system in the world, operated by any government which showed a profit.

Vail stressed the fact that government ownership and operation would destroy individual initiative, create monopoly and place the system in the hands of officials responsible only to themselves and a political party.

What he argued for was government regulation. He believed that government regulation could curb monopoly and selfish exploitation and improve the system without destroying it by subordinating it to public advantage.

On July 25, 1913 (22) the government charged the Northwestern Telephone Company with violating the Sherman Act, and the violation of anti-trust laws by buying out independents in Oregon. Congressman Lewis took the case of government ownership and argued that the government could finance the taking over the lines and make a profit on them, charging the Bell system of "institutional inefficiency" and operating very far below capacity.

Eventually, a report signed by Daniel C. Roper, first assistant Postmaster General, J.C.Koons, superintendent of the Division of Salaries and Allowances of the Post-Office Department and M.O.Chance, Chief Clerk, recommended postalization of the system. The capitalization of the telephone system was estimated at \$900,000,000 (23), but the signatories said that in taking over, the government should not purchase real estate holdings.



To reassure AT&T stockholders, Vail wrote them a letter saying that the system could only be taken over after compensation based on fair valuation and finally that the public had confidence in the Bell system, and that no such measures could be taken in such times of unemployment.

In 1916, World War I raised again the issue of government ownership, this time in the name of national security. A mobilization of communications facilities was carried out by staff of the telephone company in coordination with naval officers. War simulations were conducted for three days and it was proved that the Pacific coast could communicate with a battleship in the Atlantic. The Bell system proved with this test that it was not necessary for the government to take over the Bell system during wartime.

After the threat of a government takeover passed, the system went through a period of consolidation. A regulated monopoly emerged and the agency in charge of the regulation was named the Federal Communications Commission, which acting in the name of the Public Interest recommended the divestiture of AT&T at the end of 1983.

#### 1.04 The Merging of Computers and Telecommunications: Telematics

During the last four decades the telecommunications industry has undergone enormous changes: the first computer, ENIAC, invented in 1946, and the invention of the transistor (24), by scientists of Bell Labs in 1947 created the information era.

The telecommunications industry was changed in two ways:

1) With the technological advances that started with the invention of the transistor, the theory of the natural monopoly i.e. the economic justification for a regulated monopoly was hard to defend.

2) Applications of computers expanded the industry into a new area called telematics.

Between 1966 and 1971, the FCC conducted an investigation known as Computer Inquiry I (CII).

In Computer Inquiry I, the FCC:

1) Segmented the telecommunications industry into three kinds of services: communications, data processing and hybrid services.

2) Ruled that data processing was not subject to FCC regulation under the Communications Act of 1934.

3) Ruled AT&T out of the data processing business, but allowed it to offer hybrid services.

4) Permitted other common carriers to engage in data processing, but only through subsidiaries.

Given that the computer and communications industries continued to merge, hybrid services increased, and thus CII became unpractical. The FCC, recognizing this reality launched the Computer Inquiry II in 1976, in order to get a better grasp on the issues.

In 1980, CI II concluded that:

1) Communication services were segmented into basic services and enhanced services. Only the former were to be regulated.

2) Customer Premises Equipment was deregulated.

3) AT&T was allowed to sell enhanced services and customer premises equipment (CPE via subsidiaries).

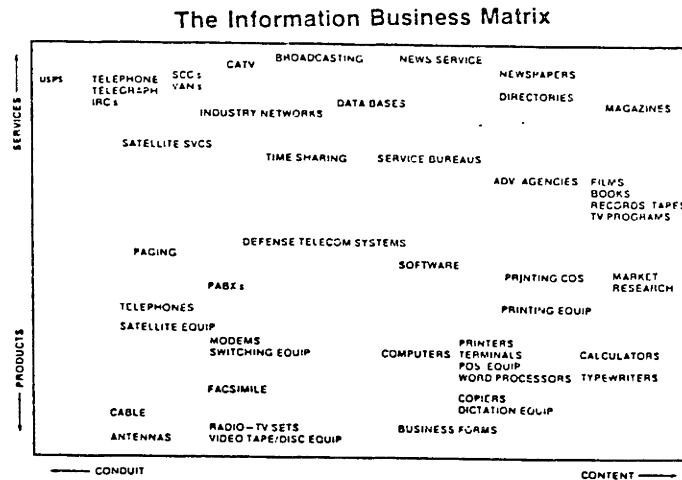
In effect what the CI II did was to acknowledge the merger of the computer and the telecommunications industry into a single entity referred to as Telematics or Communications.

At this point, International Business Machines, IBM, until then a potential entrant, officially got into the scene as a major challenger of AT&T's supremacy.

The information industry, thus formed encompasses four major segments:

- a) data processing companies that processed information
- b) common carriers that transmitted information
- c) media companies that collected, owned or distributed information, and
- d) equipment manufacturers that supplied each of the other segments.

The Harvard University Program on Information Resources Policy adopted the following matrix:



The vertical axis indicates the extent to which the company provides a service or a product. The horizontal axis indicates the extent to which the product or services are a source of information (denominated as content), or a means of transmission of information from one place to another.

This matrix provides a powerful segmentation of the business. Indeed each niche is an industry of its own, and clearly the boundaries between telecommunications and computers are gone for good.

## 2.0 Regulation of the Telecommunication Industry:

### 2.01 Origins of Regulation:

On June 18, 1910, the U.S. Congress via the Mann-Elkins Act (27) gave the Interstate Commerce Commission (ICC) the authority to regulate rates for interstate telephone, telegraph and cable systems. After the Titanic disaster, the Federal Radio Commission was created, after it had been found out that the ship's S.O.S. had not been received because the radio operator had gone to bed.

In 1913, the Kingsbury Commitment gave Bell protection as a natural monopoly; in exchange, Bell accepted Federal regulation, disposed of its interests in Western Union, and agreed to allow intercommunication with local telephone companies.

The Transportation Act of 1920, expanded the authority of the ICC and gave it the mission of developing and maintaining adequate interstate service in public interest. A year later, the Willis-Graham Act concluded that the Bell monopoly was in the public interest and that it could be regulated and controlled by the ICC and the states Public Utility Commissions (PUC's).

The concept of separation of assets was first developed in 1930, in the case Smith vs. Illinois; and it was agreed that they were to be separated into interstate and intrastate basis.

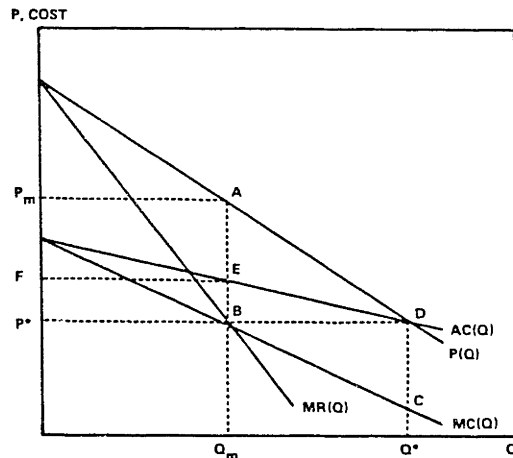
State Regulation:

Regulation at state level came early in the life of the telephone system, when it was recognized that the telephone was no longer a luxury or a mere curiosity, but a necessity of everyday life. It was part of the infrastructure of society upon which all other businesses and social commerce soon came to depend. Therefore, the provision of telephone service was considered too important to be left to unregulated market forces.

In the initial phase, there was a lot of inefficiency, both in the service as such, and in the wasteful use of resources. As an example, two telephone companies would serve the same town, doubling the infrastructure, but the customers of either company could not communicate with each other, i.e. the service was costly and inefficient.

Different states acted throughout the country, pursuing the goal of eliminating competitors by refusing to certify competing telephone companies (28). Therefore the state could order a company to furnish safe, adequate, and proper service and to keep and maintain its property and equipment in such conditions as to be able to do so (29). In this way, state regulatory commissions were granted authority to subject nearly every action of the telephone companies to regulatory control.

As a "quid pro quo", the carrier was granted the right to provide exclusive telephone service within its operating territory. Thus came the idea of the telephone system as a natural regulated monopoly(30).



Costs and Benefits of Perfect Regulation.

We can define  $P(Q)$  as the demand curve,  $AC(Q)$  as the average cost curve,  $MC(Q)$  as the marginal cost curve,  $MR(Q)$  as the marginal revenue curve. In a non-regulated



environment, the producer would get monopoly profit by equating marginal revenue to marginal cost, at the output  $Q_m$ , charging  $P_m$ . The profit for the producer would be:  $P_m A E F$ .

What regulators are supposed to do is force the price down to cover average costs at  $P^*$ , for an output of  $Q^*$ . The benefits of this regulation can be measured by  $A B C D$ . This area represents the increase in total value including the customers' surplus, of the additional output  $Q^* - Q_m$ , minus the increase in cost incurred because of that expansion.

Economists postulate four basic questions that should be answered before concluding whether a natural monopoly justifies regulation:

- 1.- Are the scale economies that create the natural monopoly large, especially in comparison with the costs of regulation?
- 2.- Is the market power of the potential natural monopolist substantial?
- 3.- If the market power is substantial, will regulation limit its exploitation?

4.- Is regulation more effective than other remedies? (31)

Obviously the questions are value laden, and that is the point where lobbying and political pressures can change, and often do, the outcome of a situation, as in the case of the divestiture of AT&T.

### 2.02 Federal Regulation: The FCC:

In 1932, the interdepartmental Committee on Communications was created to recommend what federal government should do with respect to interstate communications; the Roper report concluded that communication companies should be privately owned and operated, allowed to consolidate with regulatory approval and on June 19, 1934. the Federal Communications Commission was created with authority to set rates, standards, accounting and control practices, approve expansion and termination of services, control mergers, make investigations, allocate radio frequencies, administer international communication treaties and participate in the development of U.S. positions regarding international standards for and regulation of communications. Congress made explicit the mission of AT&T:

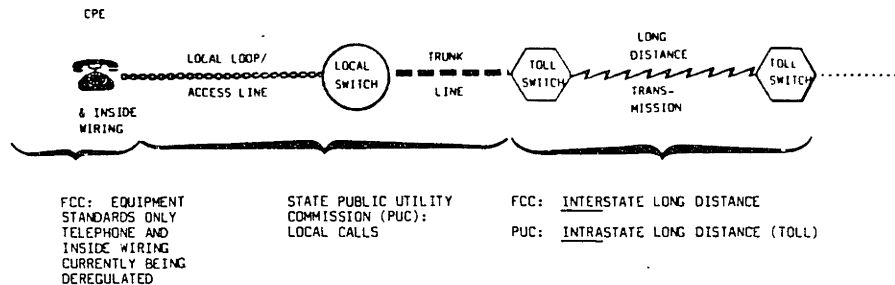
"to make available, so far as possible, to all the people of the United States a rapid, efficient, Nation-wide, and world-wide wire and radio communication service..." (32)

in other words, the objectives of regulation were twofold:

- i) Universal service at fair rates;
- ii) High quality service.

the regulatory jurisdiction can be depicted as follows:

(Reproduced with the permission of ICGS, Inc.)



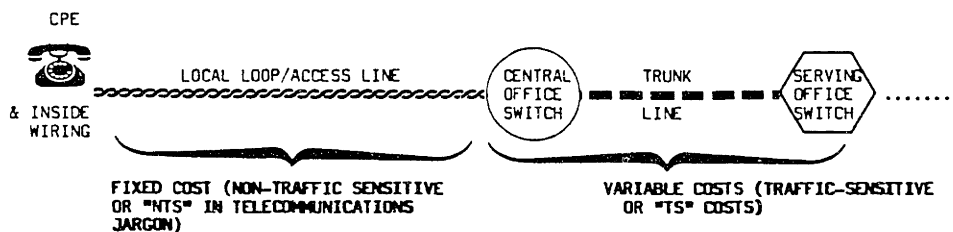
To achieve those two objectives, both state and federal regulators decided on a rate system based neither in the true costs of services nor in conventional business practice: they designed a rate system that would reflect the importance the service had for the customer, i.e. business customers would pay higher rates than residential customers for the same local and interexchange service. It was a

crosssubsidy that made sure that prices were lower than average, for the general public and, indeed, it did not reflect the real installation and maintenance costs.

The procedure was known as "rate averaging": customers in the same service area were charged the same rate regardless of the costs required to install the line; in this manner, all customers paid identical interstate long distance rates, based on air-mile.

As technology progressed, residential local service costs went up, and interexchange cost became lower. Regulators attempted to solve this conflict instituting a process of jurisdictional separations.

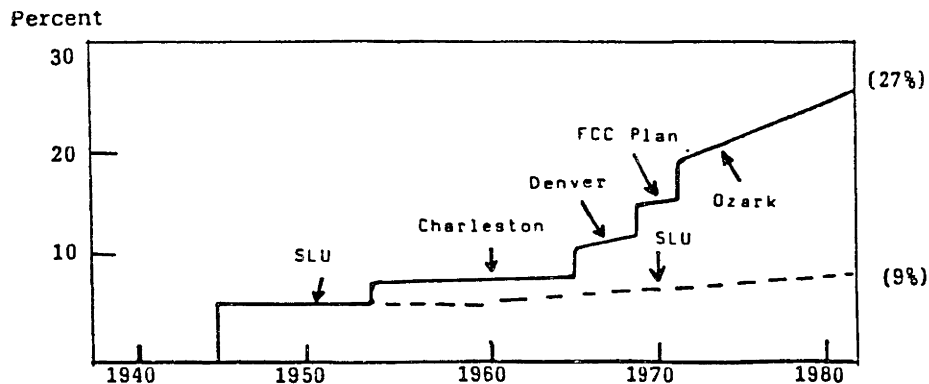
These separations divided costs and allocated them between local and long distance. basically, the two categories were non-traffic sensitive and traffic sensitive, or in the other words fixed and variable costs. Fixed costs are function of age, population density and topography.



In 1943, federal and state regulators met in "Joint Board" proceedings, to formulate a plan where by requirements created by these costs would be distributed in proportion to the state and interstate jurisdictions; the rationale was clear: as local exchange plant and equipment were used to complete intrastate and interstate exchange calls, these interstate and intrastate services should pro-rate part of the local exchange fixed costs. A mechanism called the "settlement process" was instituted to regulate the payments made by the interexchange carriers to the local exchange carriers. This process expired on January 1, 1984.

The net result of this mechanism was to reduce the local rate base and therefore reduce the revenue requirements of the local exchange carriers.

ALLOCATIONS OF NON-TRAFFIC SENSITIVE PLANT TO INTERSTATE THROUGH SUCCESSIVE SEPARATIONS PLANS TO 1984



The separations formula has been then a public policy tool whereby long distance users subsidize local users in addition to paying for their use of local plant and equipment.

Summarizing these concepts we have:

NTS COST CATEGORIES\* (% TO BE PAID)

WHEN: COST BANDS (% OF NATIONAL AVERAGE) ARE:	THEN: CUSTOMERS AND INTERSTATE SERVICE PROVIDERS PAY	AND: INTERSTATE CARRIERS PAY:	AND: INTRASTATE CARRIERS AND LOCAL EXCHANGE CARRIERS PAY:
0 - 115%	25%	0%	75%
115 - 160%	25%	50%	25%
160 - 200%	25%	60%	15%
200 - 250%	0%	95%	5%
250+%	0%	100%	0%

### 2.03 The Issue of Equal Access Charge (33):

In the late 1960's and 1970's deregulation began to take place in the Telecommunications industry, and competition started to emerge. The Commission then realized the need to allocate costs on a "causation" basis, i.e. the corporation who causes the cost should pay for it. A committee formed by the F.C.C., state regulators, telecommunication carriers, and users worked on a system to try to allocate

costs in a different manner, that is to remove distortions and at the same time try to maintain and protect universal service. Obviously, this was a change in public policy, to suit a different, competitive environment. A decision was made in December 1982, and revised in 1983, whereby the F.C.C. mandated that local exchange NTS costs assigned to the Federal jurisdictions under separations were as follows :

**-Customer Access Line Charge (CALC)**

Fixed charged to customers for local loop connection.

a) Business Customers: \$ 6/ month

b) Residential Customers: \$ 2/month in 1984, \$3/month in 1985, \$ 4/month in 1986 and up to \$6/month in 1989.

**-Interexchange Carriers Charge:** were to be paid during the phase-in of CALC, and discontinued at the end of the transition period.

-**Universal Service Fund:** was established to insure reasonably priced local exchange service in high cost (rural) areas. It was to be paid by interexchange carriers, and the size and administration of the fund were to be determined by the Joint Board on Separations.

**Premium Access Charge**

AT&T was supposed to pay \$2.2 billion in 1984, and this was to be phased out as other carriers gained access of equal quality to AT&T.

Additionally interexchange carriers were to pay charges for their use of traffic sensitive local exchange plant and equipment used in connecting their users to their interexchange networks.

The FCC revised the Access Charge Decision on January 19, 1984, modifying charges as follows:

**Customer Access Line Charge (CALC)**

a) Multiple Business CALC: \$ 6/month beginning on 5/25/84.

b) Residential and single-line Business CALC: expected to be applied beginning 6/85 with multiyear phase-in.



**Interexchange Carriers Charge:** will diminish as residential and single-line business CALC increases.

**Universal Service Fund:** to be paid by interexchange carriers commencing 1/1/84.

**Premium Access Charge:** was to be applied on an exchange-by-exchange basis; the same rate would apply for AT&T and other common carriers (OCC's), on an equal access level.

For the time being, OCC's would receive a 55% discount based on a flat, per line charge. Unequal access would be phased out as other interstate carrier gained access of equal quality to AT&T.

This last decision was crucial because of the way it affected competition: OCC's would soon lose their cost advantage, and would have to compete in other manners.

#### 2.04 The divestiture of AT&T:

The divestiture of AT&T, as from January 1, 1984, proved to be a rather traumatic experience for all parties involved. The popular saying: "If it works, do not fix it", was repeated by word of mouth by households and irate consumers, who were flooded by large monthly bills, fairly unintelligible and cumbersome, and worst of all, saw their monthly bills going up.

Competitors took a different viewpoint: new and aggressive companies such as MCI, argued that competition was in the benefit of consumers, that with deregulation they would provide better services at a lower price, and that market forces should be allowed to operate.

But what happened in AT&T? AT&T, was a large mature company, with a strong corporate culture (34), whose mission had to change because of deregulation (35)

Instead of providing the best quality service, at the lowest cost, for the largest number of customers, the mission of AT&T would be "universalize the information age" (36) a rather vague statement, in contrast with the very precise former one.

The company culture suffered a tremendous shock: employees feelings ranged from sad to scared, to outrage to excitement about the future. (37)

The strategic changes can be summarized as follows (38):

Strategic Component	Historic Regulated Environment	Emerging Competitive Environment
General Strategic Orientation	<ul style="list-style-type: none"> <li>Strategies driven by regulatory and technological considerations</li> </ul>	<ul style="list-style-type: none"> <li>Strategies driven by market opportunities and financial needs</li> </ul>
Planning Process	<ul style="list-style-type: none"> <li>Plans derived mostly from below</li> <li>Construction program oriented</li> </ul>	<ul style="list-style-type: none"> <li>Tied more to top-down strategy</li> <li>Cash flow oriented</li> </ul>
Financial Policies	<ul style="list-style-type: none"> <li>Predisposition toward dividends</li> <li>Long capital recovery schedules</li> <li>Higher debt structure</li> <li>Heavy external financing</li> </ul>	<ul style="list-style-type: none"> <li>Predisposition toward growth of stock</li> <li>Short capital recovery schedules</li> <li>Lower or no debt structure</li> <li>Mostly internally generated financing</li> </ul>
Technology Development	<ul style="list-style-type: none"> <li>Emphasis on fruits of basic research</li> <li>R&amp;D driven by technological opportunity</li> </ul>	<ul style="list-style-type: none"> <li>Emphasis on application of mature technology</li> <li>R&amp;D driven by customer needs</li> </ul>
Pricing Philosophy	<ul style="list-style-type: none"> <li>Subsidization of local service</li> <li>Prices based on value of service</li> <li>National price averaging for long distance calls</li> <li>Comparative costs not relevant</li> </ul>	<ul style="list-style-type: none"> <li>Each product line self-sufficient</li> <li>Prices based on cost competitor's prices and market strategy</li> <li>Route-by-route pricing</li> <li>Goal is to be low-cost producer</li> </ul>
Market Strategy	<ul style="list-style-type: none"> <li>Monolithic markets</li> <li>Standardized offerings</li> <li>Demand expected</li> </ul>	<ul style="list-style-type: none"> <li>Segmented markets</li> <li>Customized offerings</li> <li>Demand stimulated</li> </ul>
Product Strategy	<ul style="list-style-type: none"> <li>Product timing not crucial</li> <li>Long product life cycles</li> </ul>	<ul style="list-style-type: none"> <li>Product timing critical</li> <li>Short product life cycles</li> </ul>
Organizational Orientation	<ul style="list-style-type: none"> <li>Large/centralized</li> <li>Functional structures</li> <li>Geographic operational profit centers</li> </ul>	<ul style="list-style-type: none"> <li>Smaller/decentralized</li> <li>Market segmented structures</li> <li>Market/product line of business profit centers</li> </ul>
Corporate Culture	<ul style="list-style-type: none"> <li>Consensus oriented</li> <li>Regulatory "mindset"</li> <li>Reward system slow, steady progress for majority of employees</li> <li>Bias toward deliberation</li> </ul>	<ul style="list-style-type: none"> <li>Risk oriented</li> <li>Marketplace "mindset"</li> <li>Reward system weighted more to individual performance. Large differences in salary treatment</li> <li>Bias toward action</li> </ul>

In order to get a precise idea of the changes in AT&T, the former Bell Operating companies, and the OCC's, it is necessary to perform an industry competitive analysis, but

previously, it is important to mention briefly the role of the government in future changes.

### 2.05 The Government Role in Technological Innovation

The concept of government intervention is grounded in a fairly simple concept: markets are not perfect; they have imperfections, and government should step in and make the necessary adjustments. How can this be done? (39)

#### Technology Push Actions

1. Education
2. Basic research and advanced development
3. Mission R&D program (leading to prototype)
4. Demonstration programs

#### Technology Pull Actions

6. Procurement
7. Tax Relief
7. Regulation

Given the complexity of all these seven issues, there is an obvious dilemma: public policy aimed at deregulation provides positive feedback to the rate of industrial changes; comprehensive planning can result in inefficiency, waste of resources, but free enterprise might

not be the optimal solution. There is a challenge for public policy makers in finding the right proportion of each for the advance of the industry and the general public interest.

**Chapter III : Industry Competitive Analysis**

In order to do an industry competitive analysis, the framework of M. Porter will be adopted :

- Industry competitors .
- Suppliers
- Buyers
- Substitutes
- Regulators

There is a slight modification to Porter's framework: given the importance of regulation in the industry, potential entrants have been replaced by regulators. In addition to this, it will be shown that the number of industry competitors has grown exponentially in the last decade for most lines of businesses. Given the scope of this work, I have chosen 13 companies as representative of the industry. They are: MCI, GTE, IBM, ROLM, Harris, United Telecommunications, AT&T, and the former Bell Operating Companies. Summaries of these companies follow.

### 3.01 Industry Competitors

#### 3.01.1 AT&T: Background

This company, recently divested, was established in 1885 as a subsidiary of American Bell. In the early 1900's, Theodore Vail, its president, consolidated the local exchange territories under Bell Operating Companies, which in due course received administrative direction and interexchange service from the Bell parent.

Eventually, the company grew into a giant whose annual operating budget was larger than that of many developing countries. It operated as a monopoly.

In 1968, the Federal Communications Commission started removing competitive barriers in a long process that culminated in January 1984 under the 1982 Consent Decree. AT&T divested itself of its Bell Operating Companies and created seven independent regional holding companies, all fairly equivalent in size: NYNEX, AMERITECH, PACIFIC TELESIS, SOUTHWESTERN BELL CORP., BELL SOUTH, BELL ATLANTIC, and U.S. WEST.

What remained of AT&T includes AT&T Bell Laboratories, AT&T Communications, AT&T Information Services, AT&T International Inc., Western Electric, and others.

The original AT&T saw its mission as providing telephone services to all possible customers at low cost. With this objective in mind, it caused costs of interchange service to drop, but local exchange costs went up given higher capital and labor costs.

Some figures will help to give an idea of the size of the Regional Companies:

Regional Phone Companies at the Breakup

	AMERITECH	BELLSOUTH	BELL ATLANTIC	SOUTH- WESTERN BELL	NYNEX	PACIFIC TELESIS	US WEST
REVENUE (billions of dollars)	\$8.34	\$9.8	\$8.32	\$7.76	\$9.83	\$8.1	\$7.44
ANTICIPATED 1ST QUARTER INCOME	\$1.50	\$1.95	\$1.60	\$1.40	\$1.50	\$1.35	\$1.35
1984 ESTIMATED NET INCOME (millions of \$)	\$923.7	\$1,200	\$952.2	\$869.6	\$937.6	\$827.7	\$877.8
1984 ASSETS (billions of \$)	\$16.26	\$20.81	\$16.26	\$15.51	\$17.39	\$16.19	\$15.05
1984 EMPLOYEES	79,000	99,100	80,000	74,700	98,200	82,000	75,000
DEBT-EQUITY RATIO (percent)	43.8	43.1	43.3	44.6	45.1	46.5	43.3

All figures for 1982 except as noted

The Washington Post,  
11/20/83

3.01.2 Structure



The American Telephone and Telegraph Company, as of January 1, 1984 had the following subsidiaries:

- AT&T Communications
- AT&T Technologies, Inc. (Formerly Western Electric)
- AT&T International, Inc.
- AT&T Bell Laboratories, Inc.
- AT&T Information Systems
- AT&T Resource Management
- AT&T Credit Corporation
- American Transtech, Inc.

From these companies, there are two which deserve special study: AT&T Technologies which will be analyzed under suppliers, and AT&T Bell Laboratories Inc. (Formerly Bell Labs.)

#### 3.01.2.1 AT&T Bell Laboratories:

Bell Laboratories have always been at the vanguard of pure research. At all times they have shown again and again their ability to take science one step ahead. Some examples of their work are (40):

- Karl G.Jansky founded the science of radio astronomy in 1933.
- Designed the first electrically operated digital computer and the first with remote terminals.
- In 1947, invented the transistor.
- In 1954, made the first proposal for a satellite.
- In 1964 they identified the source of the "big bang", the explosion by which the universe was born about 20 million years ago.
- Invented in 1965 the first electronic switching system.
- Installed in 1977 the first integrated light-wave communications system, to carry voice, data and video.

The list can be extended, but the question is whether with the divestiture, Bell Labs will be able to carry out pure research or will have to do mostly applied research, given the new mission of AT&T. The future of the American industry might be at stake in the path that AT&T Bell Laboratories will take.

### 3.01.3 Financial Indicators (41)

In order to evaluate the performance of AT&T during 1984, there are some ratios that are useful:

- Price/Earnings =  $18.06/1.25 = 14.4$
- Operating/Return = Pre Tax Operating Profit/Total Assets=  
 $1951.4/39826$
- Profit Margin = Net Income/Net Sales Revenue=  
 $1369.9/25,970.2=0.0527$
- Earnings Per Share = \$ 1.25
- ROE = 0.148
- Equity Turnover = Net Sales/Equity = 1.9877
- Days Receivables = Acc. Receivables/Sales/365=  
 $9370.8/71.15=131.70$
- Current Ratio = Current Assets/Current Liabilities =  
 $17,333/11,243.6=1.54$
- Marketing/Sales =  $14,142/25970.2=0.54*$   
\* includes administrative expenses.
- R&D/Sales  $2368/25970.2=0.091$

### 3.01.4 Strategy

AT&T strategies are cash-flow oriented, and their mission is to increase the value of their stocks.

The emphasis seems to be in the application of mature technology, and R&D will be marketing driven, i.e. applied research will be the focus.

In order to be able to battle competition, AT&T will have to take more risks, and the reward system will have to be tied to individual performance.

### 3.02.1 MCI:Background

This company started in 1963 as Microwave Communications, Inc. and applied to the FCC for the construction of a microwave net between Chicago and St. Louis. The FCC approved the request in 1969. In 1968, William McGowan, a former railroad official and graduate of the Harvard Business School, had joined the organization. McGowan formed 17 subsidiaries which raised \$ 7 million in capital. MCI went public in 1972 (by then, McGowan had raised \$ 100 million in capital). 1975 was a turning point for MCI: access circuit had grown to 4.500 and 1.8 million circuit miles. The network encompasses New York, Washington D.C., Pittsburgh, Detroit, Chicago, and a North-South line from Minneapolis to Houston. By 1978, MCI serviced more than 85% of the main long distance market.

The growth of MCI is impressive by any standards: it has grown at a compound rate of 50 - 60 % per year since 1978. Nevertheless, profit slowed down somewhat in 1984. MCI attributed this to its massive investment needed to expand the network. Wall Street reacted to this situation, and MCI's stock prices dropped from \$28 per share in 1983 to \$10 in February 1984.

A crucial issue for MCI and similar companies is the phasing in of increased access charges (ENFIA), as the quality of access connections is equalized for all competitors. These companies pay currently only a proportion of AT&T's total costs for connecting the local exchange to the interstate networks. The Federal Communications Commission has proposed a formula by which the OCC's will pay increasingly higher access costs until, when universal access is available to all, their costs will equal 100% of AT&T Communication's costs.

MCI has a very aggressive and effective market organization, and its strategy so far has been to offer a lower quality service at a lower price. You get what you pay for. This strategy is giving MCI good results. In the first city to get equal access, Charleston, W.Va., MCI grabbed 15% of the market, and GTE Sprint Communications Corp. took 6%.

(42)

### 3.02.2 The Mission of MCI

On page two of MCI's annual report to stockholders of December 31, 1984, the mission of the firm is clearly articulated:

#### "MCI's Mission

MCI's objective is leadership in the global telecommunications services industry. Profitable growth is fundamental to that objective, so that we may serve the interests of our shareholders and our customers.

**To maintain profitable growth, MCI will:**

Provide a full range of high-value services for customers who must communicate or move information electronically throughout the United States and the world.

Manage our businesses so as to be the low-cost provider of service.

Make quality synonymous with MCI to our growing customer base.

Set the pace in identifying and implementing cost-effective technologies and services as we expand our state-of-the-art communications network.

Continue to be an entrepreneurial company, built of people who can make things happen in a competitive marketplace. (43)

It is important to realize that MCI aims for low cost, growth, new technologies and entrepreneurship.

### 3.02.3 Structure:

In a fairly evident movement to emulate the Bell Regional Companies, MCI was given a new structure:

Seven business units were formed:

- . MCI Pacific
- . MCI West
- . MCI Southwest
- . MCI Midwest
- . MCI Southeast
- . MCI Mid-Atlantic
- . MCI Northeast.

3.02.4 Strategy

MCI is not only expanding in domestic long distance, but it is also following a strategy of related diversification: it is expanding its network with the use of fiber optics, microwave, and satellite.

MCI is also expanding internationally, and now services countries such as Argentina, Brazil, Greece and Belgium. In 1985, other countries such as the United Kingdom, Spain, Canada and Singapore will be added to the network.

Another service is MCI Mail, a worldwide service provided by MCI in conjunction with Belgium's National Postal Service. MCI Mail domestic has been serving the US since 1983.

MCI also transmits data via a packet switched transmission service, which links 10 cities in the U.S. In 1985, this service will be connected to MCI's international packet switching network servicing more than 40 countries. Personal communications such as paging and cellular radio are also on MCI's agenda. A cellular radio system was installed last year in Minneapolis, at a cost of \$ 9.6 million.



3.02.5 Financial Indicators (44)

- Price/Earnings =  $14.43/0.25 = 57.72$
- Operating Return =  $50.534/3893.818 = 0.0129$
- Profit Margin =  $59.203/1959.291 = 0.0302$
- Earnings Per Share = \$ 0.25
- R.O.E. = 0.0510
- Equity Turnover =  $1959.291/1159.35 = 1.6899$
- Days Receivables =  $305.190/5.3679 = 56.8544$
- Current Ratio =  $1233.414/640.986 = 1.9242$
- Marketing/Sales =  $240.131/1959.291 = 0.1225$

3.03.1 GTE :Background

GTE is the second largest telephone company in the U.S. It has two major operating groups: the Diversified Products Services Group, and the Telephone Operations Group. The latter has 10 million lines, revenues in excess of \$8 billion. GTE Telephone Operations and the U.S. Department of Justice have entered into an agreement which permitted the acquisition of Sprint. The company, as opposed to MCI, has gone through some organization problems and transitions. (45) The president of GTE Corp., Thomas A. Vanderslice, resigned on Dec. 1, 1983, after disagreements with Theodore F. Brophy, Chairman. Brophy, an ivy-leaguer (Yale, Harvard Law School),

had a different style than Vanderslice (Boston College, Catholic University), a "street fighter" who gave a sense of aggressiveness to the company. Apparently, Brophy wanted to step down, but after the turnaround situation engineered by Vanderslice, changed his mind. Vanderslice, who had made no secret about his wish to become Chairman, decided to quit. Clashes between the management people brought into the organization by Vanderslice, and "the old guard" headed by Brophy, are conspiring against efficiency and cohesiveness.

As opposed to MCI, GTE's marketing is neither very effective nor innovative, but rather persistent. The marketing effort is closer to consumer goods than to "High Tech" or industrial selling. Sprint focuses on the residential market.

Sprint's network lacks capacity (vs. the ample network of MCI), and this is the largest barrier to growth that it faces. About 1000 miles of fiber-optics cable are being laid in California and Texas.

GTE's strategy is to erode the AT&T, based on lower price (for markets with elastic demand).

### 3.03.2 Structure

GTE Corporation offers local telephone service, long-distance telephone service through GTE Sprint, and worldwide data communications through GTE Telenet. It also markets telecommunications systems and equipment, as well as Sylvania lightning products.

It is organized in four groups:

- Telephone Operating Group:

- . GTE Telephone Companies
- . GTE Directories
- . GTE Mobilnet

- Communication Services Group:

- . GTE Sprint
- . GTE Spacenet
- . GTE Telenet

- Diversified Products Group:

- . Communications Products
- . Electrical Products

- Financial Subsidiaries and others.

### 3.03.3 Strategy

GTE aims to erode AT&T's market share, focusing on the residential market, and small/medium size corporations. They take away AT&T's business via lower cost.

### 3.03.4 Financial Indicators (46)

- Price/Earnings =  $35.25/5.55 = 6.35$
- Operating Return =  $1805.55/26,364 = 0.0684$
- Profit Margin =  $1125.11/14547.34 = 0.077$
- Earnings Per Share = \$ 6.35
- R.O.E. = 0.1449
- Equity Turnover =  $14547.34/7764.40 = 1.8735$
- Days Receivables =  $2061.11/39.85 = 51.71$
- Current Ratio =  $4264.21/4355.27 = 0.9790$
- Marketing/Sales =  $150,202/14,547.34 = 0.0103$

### 3.04.1 Bell South:Background

BellSouth Corporation was incorporated in Georgia on December 31, 1983. It was formed by 100% ownership of South Central Bell Telephone Co. and 100% ownership in Southern Bell Telephone and Telegraph Co. Also it has a cellular mobile business known as Bell-South Mobility and a one-seventh interest in Bell Communications Research Inc.

It provides exchange communications and exchange access service to the states of Alabama, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina and Tennessee.

#### 3.04.2 Structure:

BellSouth Corporation, as of January 1, 1984, has the following subsidiaries, in addition to Corporate Headquarters:

- Telephone Subsidiaries:

- . BellSouth Advertising and Publishing Corp.
- . BellSouth Advanced Systems, Inc.
- . BellSouth Mobility, Inc.
- . BellSouth Enterprises, Inc.
- . BellSouth Financial Services Corporation
- . Sunlink Corporation.

### 3.04.3 Strategy:

BellSouth has three fundamental strategies: (47)

- 1) To be financially driven, while maintaining emphasis on services.
- 2) To emphasize telecommunications - stick to your knitting.
- 3) Pursue orderly diversification.

As evidence of the latter, BellSouth has expanded via BellSouth Advertising & Publishing Corporation, BellSouth Mobility, BellSouth Advanced Systems, and a shared tenant services operation through BellSouth Systems Technology.

### 3.04.4 Financial Indicators

- Price/Earnings =  $30.75/4.28 = 7.18$
- Operating Return =  $2205.3/23,673.2 = 0.0931$
- Profit Margin =  $1257.2/9518.6 = 0.1320$
- Earnings Per Share = \$ 4.28
- R.O.E. = 0.1392
- Equity Turnover =  $9518.6/9030.20 = 1.054$
- Days Receivables =  $1861.0/26.0783 = 71.3620$
- Current Ratio =  $2876.5/3195.5 = 0.9001$
- Marketing/Sales =  $1658.8/9518.6 = 0.1742$

### 3.05.1 Bell Atlantic: Background

Bell Atlantic was incorporated in Delaware on December 31, 1983. AT&T transferred to it 100% ownership in seven telephone subsidiaries: New Jersey Bell Telephone Company, The Bell Telephone Company of Pennsylvania, The Cheasapeake and Potomac Telephone, The Cheasapeake Potomac Telephone Company of Maryland, The Cheasapeake and Potomac Telephone Company of Virginia, The Cheasapeake and Potomac Telephone Company of West Virginia, and the Diamond State Telephone Company. It also received a cellular mobile service subsidiary, Bell Atlantic Mobile Systems, and a one-seventh interest in Bell Communications Research Inc. It serves Washington, D.C., Delaware, Pennsylvania, Virginia, West Virginia, New Jersey, and Maryland.

### 3.05.2 Structure: (48)

Bell Atlantic is structured in: Corporate Headquarters and two large groups: Enterprises Group, and Network Services Group.

- Enterprises Group: It has eight subsidiaries that deal in personal communications financing and information products and services. They are:

- . Bell Atlantic Enterprises Corporation
- . Tri Continental Leasing Corp.
- . Sorbus Inc.
- . Telecommunications Specialists, Inc.
- . Bell Atlanticom Systems, Inc.
- . MAI Canada, Ltd.
- . A Beeper Company Associates
- . Bell Atlantic Mobile Systems Inc.

- Network Services Group: it is composed of the seven telephone companies, plus Bell Atlantic Management Services and Bell Communications Research, Inc.

### 3.05.3 Strategy: (49)

Bell Atlantic has five major strategies:

- I) Introduce new technology to meet market demands and improve efficiency;
- II) Promote growth in the variety and value of network services provided by the operating telephone companies;



- III) Engage in new enterprises that are compatible with our objective of becoming a preferred source of communications systems and provide for revenue and income growth that increase shareowner value;
- IV) Improve our position as the major low-cost supplier of local exchange telephone service; and
- V) Alter our telephone companies' pricing structures so that rates are based on costs.

#### 3.05.4 Financial Indicators:

- Price/Earnings =  $72.62/9.94 = 7.30$
- Operating Return =  $1705.1/18,684.3 = 0.0912$
- Profit Margin =  $973.1/8090.1 = 0.1202$
- Earnings Per Share = \$ 9.94
- R.O.E. = 0.1346
- Equity Turnover =  $8090.1/7227.90 = 1.1192$
- Days Receivables =  $1770.2/22.1646 = 79.8660$
- Current Ratio =  $2600.4/2741.2 = 0.9486$ .

#### 3.06.1 American Information Technologies - Background.-

As the rest of the Regional Companies, Ameritech, as it is also known, was incorporated on January 1, 1984, in Delaware. It has 100% ownership in five telephone subsidiaries: Illinois Bell Telephone Company, Indian Bell Telephone Company, Inc., Michigan Bell Telephone Company, The Ohio Bell Telephone Company and Wisconsin Bell Inc. They received from AT&T also a cellular mobile service subsidiary, Ameritech Mobile and a one-seventh interest in Bell Communications Research, Inc.

### 3.06.02 Structure.

The parent company is Ameritech, whose headquarters presides over the five telephone companies above mentioned. These companies provide communications products and services to more than 30 million people in five Midwest states.

It also owns six subsidiaries:

- Ameritech Services, Inc.: it enhances the productivity of the five Bell operative companies, and assists in their attainment of their goals.

## CHAPTER 3

## INDUSTRY COMPETITIVE ANALYSIS

- Ameritech Communications Inc: provides voice and data products and systems.
  
- Ameritech Development Corporation: identifies new technology and business opportunities which complement Ameritech strategic direction, and develops new products in profitable segments.
  
- Ameritech Mobile Communications Inc.: provides cellular mobile services.
  
- Ameritech Publishing, Inc.: publishes and provides Yellow Pages advertising.

### 3.06.03 Strategy

Ameritech's strategy seems to be:

- Use of low cost-high efficiency technology (such as fiber optics).
- Tapping related unregulated new markets.
- Price products and services so as to be competitive.
- Expand in new ventures, such as shared tenant services: Ameritech has signed a five year agreement to provide \$100 million in equipment

## CHAPTER 3

## INDUSTRY COMPETITIVE

to RealCom, a subsidiary of satellite Business in due course is owned by IBM. Installation and account for (50) Ameritech 1984 Annual Report.

- An additional \$30 million.

### 3.06.04 Financial Indicators. (51).

- Price/Earnings =  $54.43/10.17 = 5.35$
- Operating return =  $1776/17,635.1 = 0.1007$
- Profit Margin =  $990.6/8346.8 = 0.1187$
- Earnings per Share = \$10.17
- R.O.E. = 0.1448
- Equity Turnover =  $8346.8/6836.8 = 1.2208$
- Days Receivables =  $1590.1/22.8679 = 69.5341$
- Current Ratio =  $2328.7/2356 = 0.9884$

### 3.07.1 NYNEX: Background.

It was incorporated in Delaware on October 7, 1983. AT&T transferred to NYNEX 100% in two telephone companies: New York Telephone Company and New England Telephone and Telegraph Company, a cellular mobile subsidiary, and a one seventh interest in the Central Services Organization.

### 3.07.2 Mission of the Firm. (52)

The mission of NYNEX, stated rather vaguely in their 1984 Annual Report, is to serve enough of a rapidly avolving marketing to make NYNEX a recognized leader in the information industry.

### 3.07.3 Structure.

NYNEX Corporation has two main companies: New England Telephone and New York Telephone and several subsidiaries:

- NYNEX Service Company: established to help both telephone companies to contain costs, maximum of efficiency and ensure technological superiority.
- NYNEX Mobile Communications: Provides cellular mobile service.
- NYNEX Business Information Systems: acts as a communications adviser coordinator and systems integrator for NYNEX customers.
- NYNEX Information resources: is a marketing and sales organization. It publishes and distributes Yellow Pages and White pages directories.

## CHAPTER 3

## INDUSTRY COMPETITIVE ANALYSIS

- NYNEX Material Enterprises: it evaluates, purchases and distributes equipment and services for the NYNEX companies.

### 3.07.4 Strategy. NYNEX strategies are: (53)

- Increase its technical superiority in local exchange networks.
- Getting regulatory freedom, so as to be competitive.
- Use superior technology, smart marketing and the best trained professionals in the industry.
- Drive costs down, keeping quality high.

### 3.07.5 Financial Indicators. (54)

- Price/Earnings =  $66.75/10.10 = 6.61$
- Operating Return =  $1623.5/19.853.4 = 0.0817$
- Profit Margin =  $986.4/9506.8 = 0.1037$
- Earnings per Share = \$10.10
- R.O.E. = 0.1309
- Equity Turnover =  $9506.8/7533.75 = 1.2618$
- Days Receivables =  $1952.2/26.046 = 74.952$
- Current Ratio =  $3002.5/2684.1 = 1.1186$
- Marketing Sales =  $1097.4/506.8 = 0.1154$

3.08.1 US WEST : Background.

It was incorporated in Colorado in 1983; AT&T transferred 100% ownership of the Mountain States Telephone and Telegraph Company, Northwestern Bell Telephone company and Pacific Northwest Bell Co., a cellular mobile subsidiary called AT&T New Vector Communications, Inc. and a one-seventh interest in Central Services Organization.

3.08.2 Structure.

In addition of the three Telephone companies already mentioned, that provide communication services to 14 states, US WEST has the following subsidiaries:

- LANDMARK Publishing: publishes telephone directories
- New Vector Communications: provides cellular mobile services.
- Interline Communications Services: is US WEST service company.
- Firstel Information Systems: sells and services business communications equipment in US WEST territory, Nevada and California.

- US WEST Financial Services: provides leasing and sale financing to customers.
- BetaWest Properties: deals in commercial real estate.
- NETECH Communications: supplies internal communications to all US WEST companies.

### 3.08.3 Strategy.

Although US WEST strategies are not made explicit, there is an interesting point that makes them different: they state (55) that the Board of Directors is involved in setting the strategies of the corporation. The strategies seem to be:

- Growth (with internally generated funds).
- Encourage a change in culture within the company, geared towards a competitive environment.
- Related diversification in unregulated segments of the industry.

### 3.08.4 Financial Indicators. (56)



## CHAPTER 3

## INDUSTRY COMPETITIVE ANALYSIS

- Price Earnings =  $61.56/9.24 = 6.66$
- Operating Return =  $1520.6/17,017.4 = 0.0893$
- Profit Margin =  $887/7279.6 = 0.1218$
- Earnings per Share = \$9.24
- R.O.E. = 0.1367
- Equity Turnover =  $7279.6/6488.35 = 1.1219$
- Days Receivables =  $1199.4/19.9441 = 60.1380$
- Current Ratio =  $2135.7/2095.2 = 1.0193$
- Marketing sales\* =  $2530/7279.6 = 0.3475$

\* Includes administration costs.

### 3.09.1 Southwestern Bell Corporation: Background.

It was incorporated in Delaware on October 5, 1983. On January 1, 1984 AT&T transferred 100% ownership of Southwestern Bell Telephone Company, and AT&T Southwestern Bell Mobile Systems, and a one-seventh ownership in the Central Services Organization. It serves five states: Arkansas, Kansas, Missouri, Oklahoma and Texas.

### 3.09.2 Structure.

Southwestern Bell Corporation has four principal subsidiaries:

- Southwestern Bell Telephone , with headquarters in St. Louis.
  - Southwestern Bell Mobile Systems: provides cellular mobile systems.
  - Southwestern Bell Publications: publishes Yellow Pages, White Pages and specialty directories.
- Southwestern Bell Telecom: markets telecommunication systems and products for consumers and businesses.

### 3.09.3 Strategy.

Southwestern Bell's primary goal has been to improve the profitability of the telephone companies. It also wants to follow a strategy of related diversification. Additionally, it plans to lobby Federal and State regulators to work in equal access charge plans to reduce the threat of bypass.

### 3.09.4 Financial Indicators. (57)

- Price/Earnings =  $62.12/9.04 = 6.87$
- Operating Return =  $1462.5/18,042.1 = 0.0810$

- Profit Margin =  $883.1/7191.3 = 0.1228$
- Earnings per Share = \$9.04
- Return on Equity = 0.1234
- Equity Turnover =  $7191.3/7154.15 = 1.0051$
- Days Receivables =  $1437/19.7021 = 72.9363$
- Current Ratio =  $2508.1/2588.1 = 0.9690$
- Marketing/Sales =  $513/7191.3 = 0.0713$

### 3.10.1 Pacific Telesis - Background.

It was incorporated in Nevada in 1983. After the AT&T divestiture on January 1, 1984, AT&T transferred Pacific Telesis 100% ownership of the Pacific Telephone and Telegraph Company, as well as a cellular mobile subsidiary, a one-seventh interest in the Central Services Organization, and the Bell Telephone Company of Nevada.

### 3.10.2 Structure.

The Pactel Group is the parent company of two telephone companies: Pacific Bell and Nevada Bell and seven subsidiaries as follows:

- Pactel Mobile Companies: that oversees two cellular mobile telephone services, Pactel Mobile Access and Pactel Mobile Services.
- Pactel Communications Systems: markets and services telecommunications and data systems, from small multi-line systems to large PBX systems.
- Pactel InfoSystems: markets micro-computers, software, etc. through telemarketing centers.
- Pacific Telesis International: to market telecommunications and information systems to business governments and telecommunications administrations outside the United States, Canada and the Caribbean. It has offices in Spain, Malaysia, Thailand, Korea and Japan.
- Pactel Publishing: it publishes specialized regional, national and international directories for consumer and business markets.
- Pactel Finance: provides financial services for the Pactel companies and their customers.
- Pactel Properties: is a real estate subsidiary, that emphasizes office and light industrial properties concentrated in California.

### 3.10.3 Strategy:

The Factel Group has six fundamental strategies (58):

1. Achieving public policies that ensure Information Age access.
2. Expansion of the network.
3. Targeting adequate technology, for flexibility and profitability.
4. Lead in product and service innovation.
5. Capture the potential of the California market.
6. Related diversification.

In fact, some of these strategies seem to be objectives, but not strategies in themselves.

#### 3.10.4 Financial Indicators. (2)

-  $\text{Price/Earnings} = 60.37/8.46 = 7.13$

-  $\text{Operating Return} = 1487.8/18,076.5 = 0.08230$

- Profit Margin =  $828.5/7894.3 = 0.1049$
- Earnings per Share = \$8.46
- Return on Equity = 0.1257
- Days Receivables =  $1107.4/21.6282 = 51.2016$
- Current Ratio =  $1651.2/2003.7 = 0.8061$
- Marketing/Sales = 0.0782

### 3.02 Suppliers

#### 3.02.1.1 AT&T Technologies Inc.:Background

Formerly known as Western Electric Company, Inn., it changed its name to AT&T Technologies, Inc. on January 3, 1984

The Company incorporated in New York on August 19, 1966 as a wholly-owned subsidiary of American telephone and Telegraph Co. This company started on March 29, 1872, and since then, was the main supplier of AT&T. In November 1980, it formed a joint venture acquiring 44% interest in Gold Star Semiconductor Ltd., a South Korean company.

Western Electric played a key role in World War II, manufacturing radar systems. After the war they became involved in cold-war communications and defense projects (60) in satellite tracking systems and posteriorly, producing electronic switching machines.

They also produced computer software to manufacture, install, and test systems. At the moment, they are also involved in technology as applied to medicine, transportation and many other fields.

### 3.02.1.2 Structure

The activities of AT&T Technologies are organized as follows:

- + AT&T Network Systems.- manufactures, markets and services switching equipment, transmission systems, cable and wire, including lightwave and operation systems.

- + AT&T Technology Systems.- has three lines of business:

- Components and Electronic Systems
- Federal Systems
- Computer Systems

- + AT&T Consumer Products: responsible for home communications systems and apparatus (61)

It has the following subsidiaries:

- . Teletype Corporation: manufactures teleprinters and data transmission equipment
- . AT&T Nassau Metals Corporation: recycles, reclamates and sales nonferrous scrap metals, mainly copper
- . Bell Telephone Laboratories: basically for R & D
- . Manufacturers' Junction Ry Co.: an industrial railroad to provide transportation to the corporation

. Sandia Corporation: operates the U.S. Atomic Energy Commission Laboratories, under a non-profit agreement

. Western electric Co. Ltd: a United Kingdom subsidiary, to perform patent activities to the company.

### 3.02.1.3 Strategy

AT&T Technologies strategy is basically one of innovation and product differentiation, aiming at high quality, and not necessarily at low costs.

### 3.02.1.4 Financial Indicators

They are consolidated under AT&T in 3.01.4

### 3.02.2.1 International Business Machines (IBM):Background

Given the scope of this work, and that IBM is the leading computer manufacturer in the world, attention will focus on IBM's efforts to penetrate the communications market.

As the telecommunications industry changed to become the information transmission industry, IBM moved into, this field rather naturally. Because of regulations it entered the industry purchasing a majority interest in Satellite Business Systems (SBS) and recently total ownership of ROLM.

### 3.02.2.2 Structure



One can only speculate about the merging of these three organizations into an overall IBM system.

There are two interesting factors to be considered:

a) Cultural and b) Technological.

a) Cultural: IBM's culture is world famous. IBM employees are known as the persons with the grey pin-stripe suit, and white starched collar shirt. In stark contrast, ROLM is a Santa Clara, California, modern, entrepreneurial corporation, with a creative and imaginative approach to the business, and a rather liberal and free-spirited culture.

b) Technological: SBS can become more effective insofar as how fast fiber can be deployed.

#### 3.02.2.3 Strategy

IBM is famous for its marketing skills. Presumably, IBM/ROLM/SBS will try to force prices down by following a price differentiation strategy. Given that they can provide total integrated office systems, that the best software is synonym with IBM compatible, they can be a formidable competitor, offering what no other competitor can do: one-stop shopping at market competitive prices.

#### 3.02.2.4 Financial indicators (62)

To give an idea of the strength of IBM, it is relevant to look at its financial performance:

- Price/Earnings:  $91,31/10.77 = 8.47$

- Operating Return:  $11,263/42,808 = 0.2631$

- Profit Margin:  $6582/29,753= 0,2212$
- Earnings per share= 10.77
- Return on Equity= 0.2648
- Days Receivables:  $8111/81.515=99.5030$
- Current Ratio;  $20,375/9640= 2.1135$
- Marketing/Sales:  $11,587/29,753=0.3894$
- R&D/Sales:  $4200/29,753=0.1411$

### 3.02.3.1 ROLM Corporation: Background

It was incorporated in California in 1969. It designs and manufactures general purpose computers and business communication systems. The latter include a private branch exchange for use by commercial and institutional customers. It is wholly owned by IBM.

### 3.02.3.2 Structure

The parent company owns the following subsidiaries:

- ROLM Corporation of Colorado (California)
- ROLM Corp. of Texas (California)
- ROLM Hong Kong Ltd. (Hong Kong)
- ROLM International Japan Co. (Japan)
- ROLM European Ltd. (Cal.)
- ROLM U.K. Ltd. (United Kingdom)
- ROLM Corp. Employee Benefit Association (Cal)
- ROLM Credit Corp. (Cal.)
- ROLM of New York Corp. (Cal.)

## CHAPTER 3

## INDUSTRY COMPETITIVE ANALYSIS

- ROLM Northern California Corp. (Cal.)
- ROLM Southern California Corp. (Cal.)
- ROLM Southeast Corp. (Cal.)
- ROLM Corp. of Florida (Cal.)
- ROLM Delaware Corp. (Delaware)

### 3.02.3.3 Strategy

ROLM strategy has been based on technological innovation, but since its acquisition by IBM, they are stressing marketing. In its 1984 Annual Report, they state the importance of customer support:

"Providing outstanding customer support is our principal goal as a Company...and the most important responsibility of every ROLM employee" (63)

### 3.02.3.4 Financial Indicators (64)

- Price/Earnings:  $48.62/1.43=34.00$
- Operating Return:  $62.754/736.64=0.0851$
- Profit Margin:  $37.731/59.704=0.0571$
- Earnings per share=\$1.49
- Return on Equity=0.0817
- Equity Turnover:  $659.704/461.527=1.4293$
- Days Receivables:  $146.015/1.8074=80.7873$
- Current Ratio:  $558.606/394.024=1.4176$
- Marketing\*/Sales:  $217.616/659.704=0.3298$
- \* includes administrative costs
- R&D/Sales:  $49.251/659.704=0.0746$

#### 3.02.4.1 Harris Corporation:Background

Harris Corporation was incorporated in Delaware in December 6, 1926, as Harris-Seybold-Potter Co. The present name was adopted on May 15, 1974. It conducts its operations through five operating sectors corresponding to its different business segments: Information Systems, Communications, Semiconductor, Government Systems and Lanier Business Products Co.

#### 3.02.4.2 Structure

The operating divisions are organized on the basis of technology and markets.

- Information Systems: offers the following products:

- Computer Systems

- Interactive Products:terminal systems compatible with IBM 3270 terminals

- Distributed Products

- Digital Telephone Systems

- Computer Application Markets

- Customer Application Markets

- Customer Support

- International

- Lanier Business Products: organized into three product areas:

- +Electronic Office Systems

- +Thought Processing Systems and Copying Systems
- +Copying Products
- Communications: organized in:
  - +Broadcast Equipment
  - +Two-way Radio
  - +Satellite Communications
  - +Microwave and Lightwave Systems
  - +Auxiliary Telecommunications Equipment
  - +Network Services
- Semiconductors: organized into the following businesses:
  - +Digital Products
  - +Analog Products
  - +Custom Integrated Systems
  - +Gallium Arsenide Products
  - +Matra-Harris
  - +Advanced Technology
- Government Systems: this sector is organized in the following manner:
  - +Aerospace Systems
  - +Communications Systems
  - +Information Systems
  - +Support Systems
  - +Advanced Technology

3.02.4.3 Strategy

Harris Corp. strategy is based on technological innovation and strong R&D. They do not make their strategy explicit in their Annual Report.

#### 3.02.4.4 Financial Indicators (65)

-Price/Earnings:  $40.31/2.02=19.95$

-Operating Return:  $95.466/1696.863=0.0562$

-Profit Margin:  $80.410/1995.80=0.0403$

-Earnings per share=2.02

-Return on Equity=0.1018

-Equity Turnover:  $1995.80/799.678=2.527$

-Days Receivables:  $342.366/5.4679=62.6138$

-Current Ratio:  $1048.840/556.663=1.8841$

-Marketing/Sales:  $485.871/1995.80=0.2434$

-R&D/Sales:  $105/1995.80=0.0526$

#### 3.02.5.1 United Telecommunications Corp.: Background

It was incorporated in Kansas on November 15, 1938 as Organization Utilities Inc.. Its present name was adopted on June 1972. It has 27,000 employees and is a leader in telecommunications technology.

#### 3.02.5.2 Structure

United Telecommunications has three basic business groups:

+United Telephone System

+US Telecom (that has formed a joint venture with Olympia and York, the largest owner of office buildings in North America, to offer Shared Tenant Services)

+Diversified Operations: there are six business units Amerisource, Information Systems of America, Market Information, Megatek, North Supply Company and UIS Ltd; the latter offers computer services and software in Great Britain.

#### 3.02.5.3 Strategy

United Telecom follows a strategy of cost leadership (between limits) and related diversification. A most important new joint venture has been the launching of United Business Communications, the Shared Tenant Services Corporation. UBC had more than 20 millions square feet of office apace under contract at the end of 1984 (66)

#### 3.02.5.4 Financial Indicators (67)

-Price/Earnings:  $19.50/2.57=7.58$

-Operating Return:  $215.871/5440.680=0.0396$

-Profit Margin:  $235.238/2855.515=0.0823$

-Earnings per share=\$2.57

-Return on Equity=0.1401

-Days Receivables:  $544.243/7.8233=69.5669$

-Current Ratio:  $854.448/899.571=0.9498$

3.03 Buyers

Can be classified in three categories:

.Residential

.Government -State

-Federal

.Corporations -Small

-Medium

-Large

Of these three groups, Government and Corporations deserve special mention because of the issue of By-pass.

3.04 Substitutes

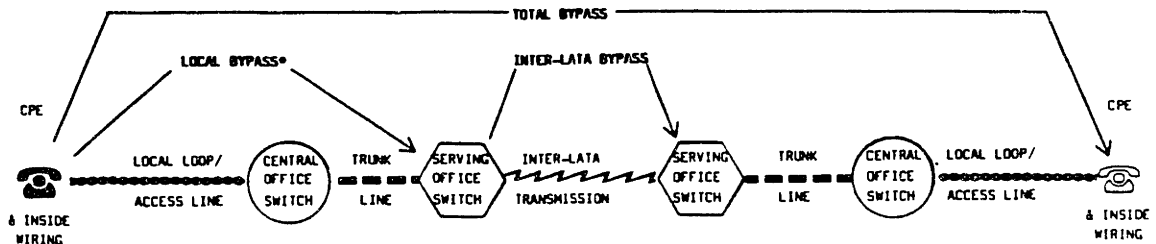
Are companies who by-pass. They can be either cable companies, local area networks or private networks.

By-pass occurs when a communications carrier or user buyer, leases or builds a system that serves specific telecommunications needs and is independent of part or all the public switched telecommunications network.



It can happen in three ways: total, local, or inter-LATA\*

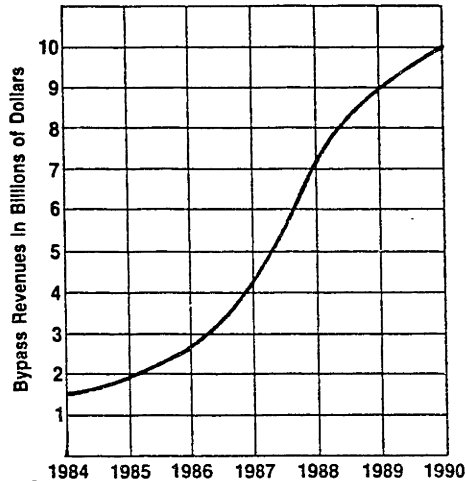
\* Graph reproduced with permission of I.C.G.S., Inc.



\*Local bypass is bypass of the local exchange either to gain access to inter-LATA services, as depicted above or to reach another local customer (not shown).

By-pass revenues were of the order of \$ 1.5 billions in 1984, and are projected to reach \$ 10 billions in 1990 (68).

**GROWTH OF BYPASS  
(BYPASS OF CARRIER FACILITIES  
BY PRIVATE NETWORKS)**



A number of users, which are potential competitors are large corporations who have installed private networks and have excess capacity, and want to cover their fixed costs, if possible making a profit.

Examples are Boeing Corporation, J.C. Penney Co., and Federal Express Co; they have begun reselling their facilities to other end users (69).

### 3.05 Regulators

Are State and Federal Commissions, and have been described in detail in Chapter 2.

### 3.06 Industry Growth

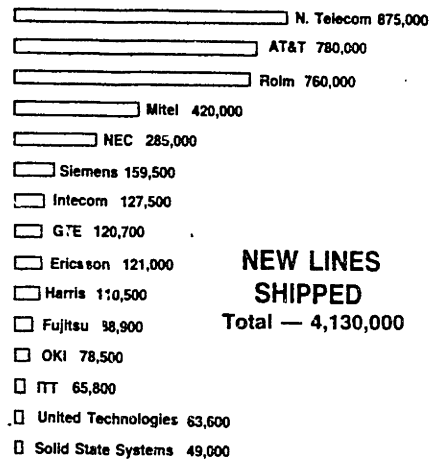
To have an idea of the attractiveness of the products and services of the telecommunications industry, as opposed to transmission, the industry has been segmented in 26 types of services listed in Annex 1

The rationale has been to classify corporations according to the service or product they give or manufacture, and according to their date of incorporation. Although this approach is not academic, it serves as a rough cut of the attractiveness of the industry. Five segments will be analysed somewhat in detail, giving market share and magnitude of sales or revenues per year. Annex 2 shows 26 graphics with new and cumulative number of businesses in each segment.

3.06.1 Industry Growth PBX

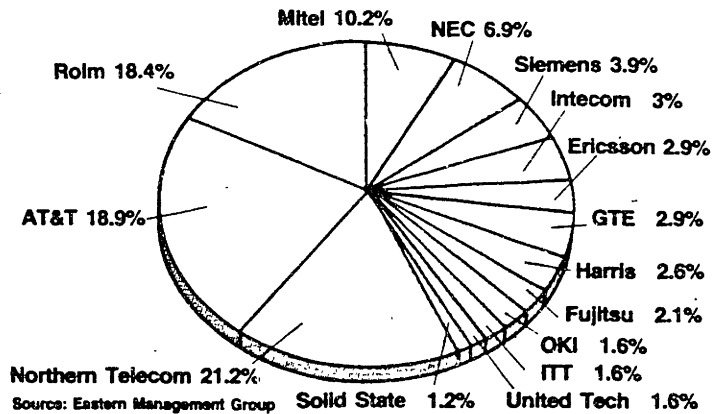
in 1983 the PBX market reached about \$3 million (70), with about 3.35 million lines. In 1984 the market was about \$4 million with around 4.13 million lines (71).

**PBX MANUFACTURERS — 1984**



Northern Telecom has the largest market share with 21%, followed by AT&T with 18.9%, RoIm with 18.4%, Mitel with 10.2%, and several others with less than 10%.

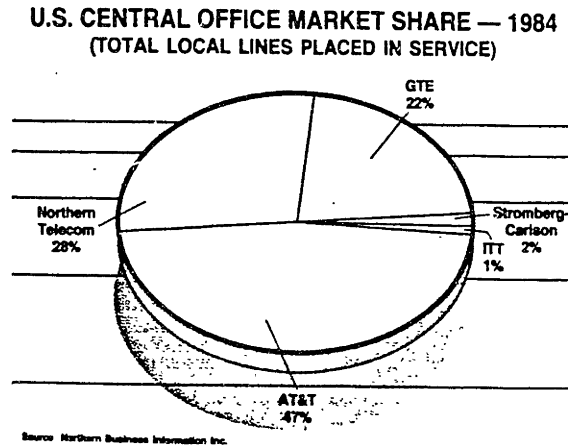
**MARKET SHARE**



3.06.2 Industry Growth, Central Office Switching:

This market is projected to reach \$ 2.5 billion in 1987 (72).

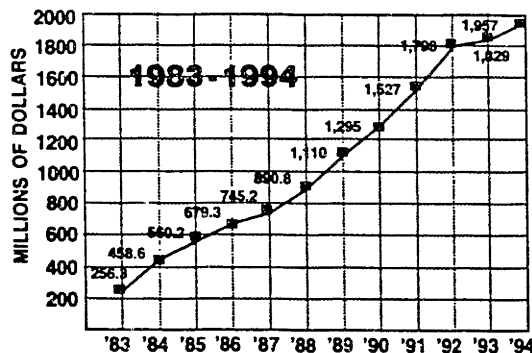
AT&T has the largest market share with 47%, followed by Northern Telecom with 28%, GTE with 22% , and others with less than 5%.



3.06.3 Industry Growth, Fiber Optics:

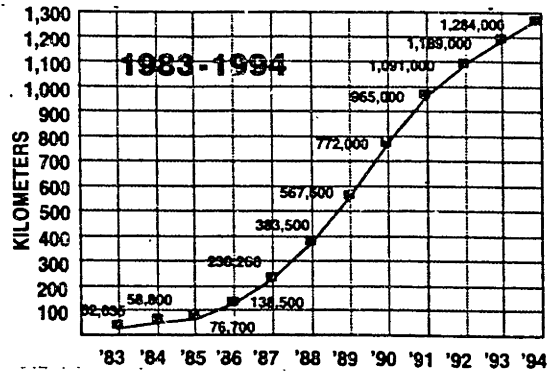
Fiber Optics is substituting copper in the transmission business. The market for fiber optics cable in the U.S.A. was \$294 million in 1984, and it is projected to reach \$964 million in 1989 (73).

**FIBER OPTIC CAPITAL PURCHASES  
BY TELCOS IN NORTH AMERICA**



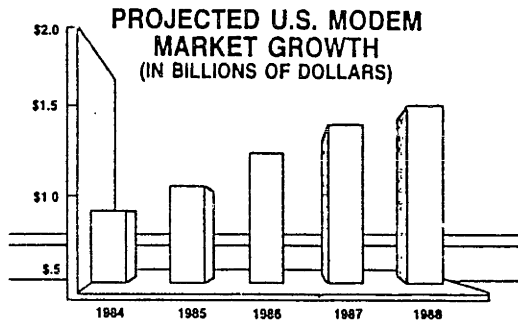
CHAPTER 3

**FIBER OPTIC CABLE INSTALLED  
IN NORTH AMERICA  
(BASED ON CONTRACT AWARDS)**



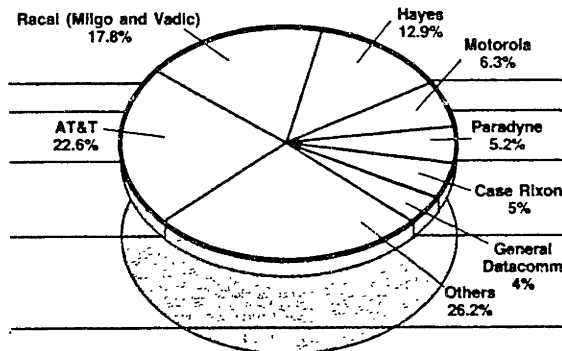
3.06 Industry Growth, Modems:

The market for modems is expected to grow from around \$1 billion in 1984 to \$1.5 billion in 1988 (78).



AT&T has the largest market share with 22.6%, followed by Racal with 17.8%, Hayes with 12.9%, and others with less than 10% market share(75).

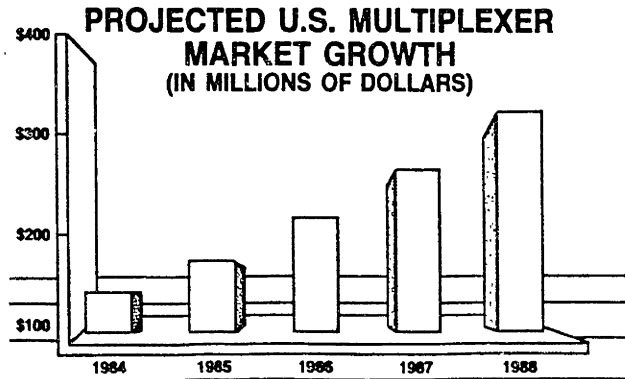
**U.S. MODEM MARKET SHARE  
(1.3 MILLION UNITS SHIPPED IN 1984)**



Source: PA Computing Inc.

3.06 Industry Growth, Multiplexers:

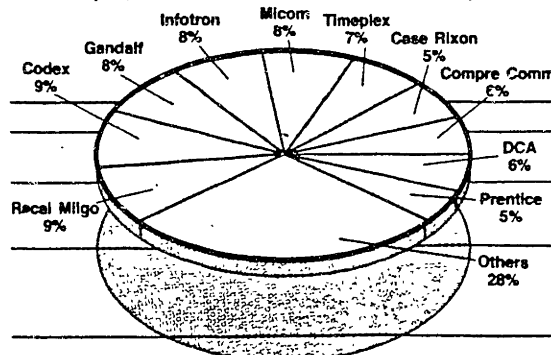
The U.S.A. multiplexer market is expected to grow from \$140 million in 1984 to around \$300 million in 1988 (76).



Source: Strategic Inc.

Several companies have from 7% to 10% in market share, but clearly there is no dominant presence in the MPLX market: Racal Milgo, Codex, Infotron, Micom, and Timeplex (77).

U.S. MULTIPLEXER MARKET SHARE (80,000 UNITS SHIPPED IN 1984)



Source: Frost & Sullivan

**Chapter IV : Analysis and conclusions.**

In order to analyze the industry attractiveness of the communications industry, it is necessary to segment it roughly in a) Transmission and b) Products and services.

An environmental scanning will be made in both segments, and in order to use the Industry Attractiveness-Business Strength Matrix, an assesment of the business strengths of AT&T and MCI will be made; they have been chosen because of their differents approaches to the market and differences in style and culture.

Additionally, different strategic groups will be studied, based on cost, customer size, quality, reliability, marketing and vertical integration.

Finally, for a more rigorous approach to the performance of the companies studied in Chapter 4, the Fruhan Model suggested by Hax and Majluf, will be used.

The timeframe will be 1982 and 1984, or pre and post divesture of AT&T.

4.01 The Industry Attractiveness-Business Strength Matrix:

In order to use this matrix, it is important to segment the industry into transmission and products/services. An environmental scanning will be done for both segments. The matrix will be applied as AT&T versus MCI, and the business strength of both companies will be assessed in 1982 (pre-divestiture) and 1984 (post-divestiture).

4.01.2 Industry Attractiveness

## a) Transmission Segment:

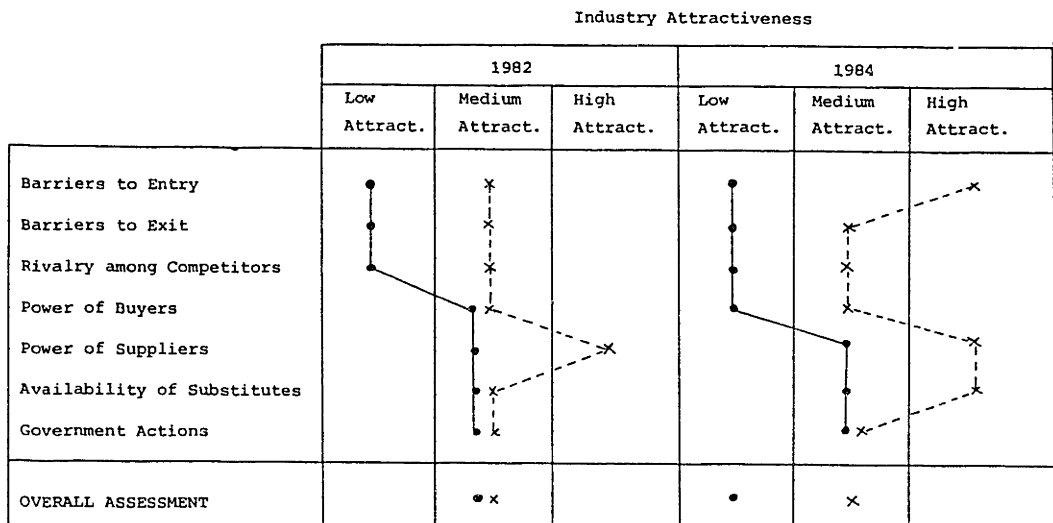
The Industry Attractiveness of the Transmission segment changes from medium in 1982 to medium/low in 1984, mainly because of the increasing power of buyers, who by-pass their system through their private networks, becoming resellers, and part of the competition.

## b) Products/Services Segment:

The Industry Attractiveness of the Products/Services segment changes from medium in 1982 to medium/high in 1984, because of two factors: deregulation and decreasing



government protection is decreasing barriers to entry, and the availability of substitutes is increasing, showing clearly how attractive this segment is. Nevertheless, given the almost exponential increase in the number of businesses entering this segment, as shown in Annex 1, a shake out of the industry in most segments can be expected.



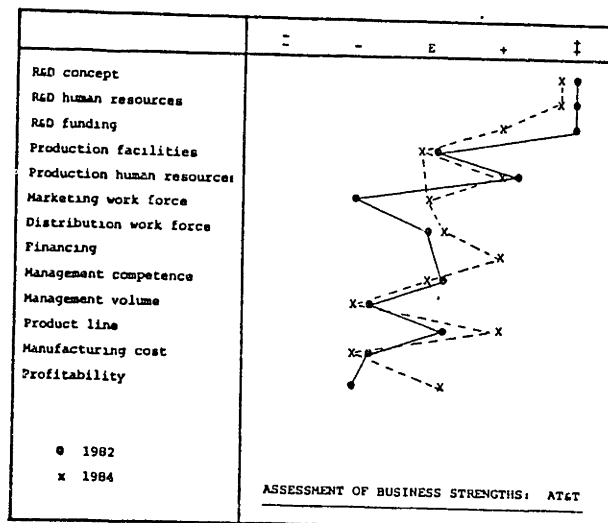
○ TRANSMISSION: M to M/L  
 x PRODUCTS/SERVICES: M to M/H

4.01.2 Business Strengths:

a) AT&T: all the Regional Bell companies are included under this name, given their almost universal lack of differentiation at this point in time.

Comparing the pre- and post-divestiture situation, there are two areas where AT&T has improved slightly: marketing and finances. A heavy loss is the likely change of direction of

Bell Labs from pure to applied research, but given the change of mission of AT&T, this might turn an asset in the short term. In the long run, it will surely have a negative impact on the capacity for innovation, not only of the firm but of the country, which raises the issue of the need of industrial policy for the country.



AT&T and the Baby-Bells are rather mature (78), vertical organizations which deal in a Mode III of the Horwitch-Prahalad Model type of environment, multiorganization and usually multisector setting. (79) But their rationality, seen many times as a weakness because of what Allison denominates its Model I (80), can be an enormous source of strength mainly in the transmission segment of the business.

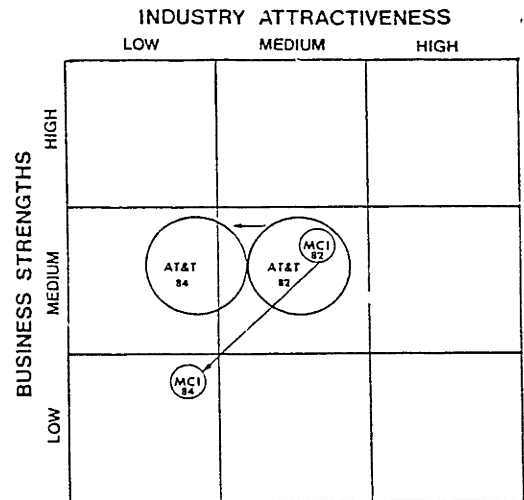
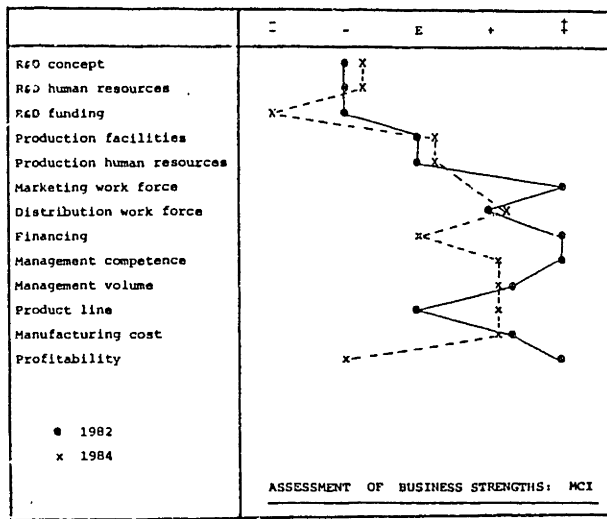
In the long run, and with the coming of equal access charge, it can be a decisive factor to eliminate the competition represented by MCI.

b) MCI:

Comparing MCI's situation in 1982 and 1984, it is obvious that the business strength of the company has deteriorated enormously. MCI has suffered heavily because of its long term investment strategy making use of fiber optics to extend its network. Another factor conspiring against MCI's strength is that it has changed its structure at the end of 1984, to accommodate it to its growth strategy; this new structure has created internal frictions and constitutes a weak point which will have to be dealt with (81).

The market has reacted negatively to this strategy and the market price of MCI's shares has greatly diminished, and with it, the business strength of the company. Using the Horwitch-Prahalad Model, MCI is a peculiar case of a company that operates in Mode III, but has characteristics of Mode II as well: it is directed by a professional manager and it maintains a lot of rationality. McGowan plays a leadership role, and also what Schoen (82) has described as the champion: a man willing to fail but capable of using any and

every means of informal sales and pressure in order to succeed. Given the actual situation, he might need to use all capacity for lobbying, to stop equal access charges, that would no doubt make MCI less compitative and would make impossible to carry on with its strategy of cost leadership and "cream skimming".



With these data, the Industry Attractiveness-Business Strength matrix, can be formulated for the Transmission segment. AT&T has consolidated its position not only in terms of market share, but of financial credibility.

### 4.01.3 Strategic implications

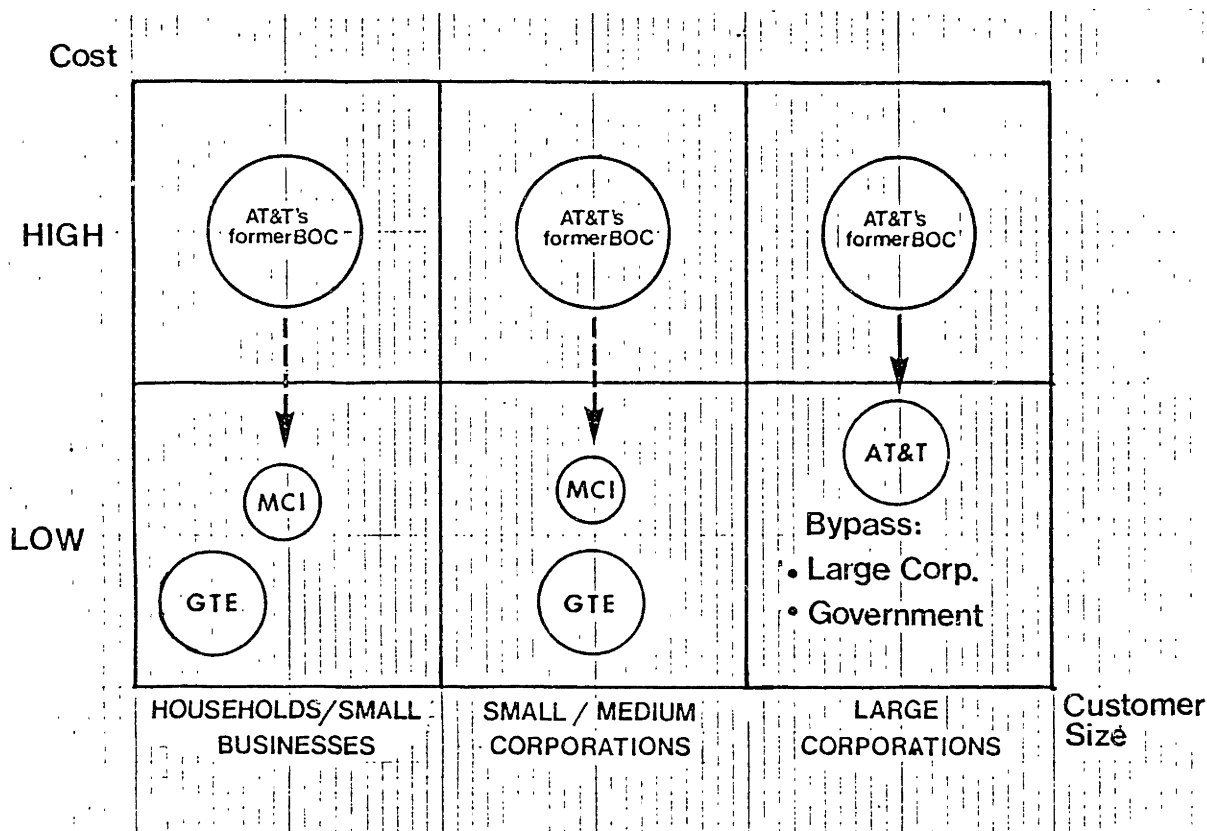
All strategies (83) suggested for MCI's situation, recommend a careful assessment of the situation by MCI: they range from selective investment, to phased withdrawal trusting the leader's statemanship. AT&T, on the other hand can identify growth segments, build on its strengths, identify weaknesses and remedy them, as it seems to be doing.

### 4.02 Strategic Groups

Another possibility to analyze the telecommunications industry is to map the main industry actors in strategic groups. A strategic group is (84) the group of firms in an industry following the same or a similar strategy along the strategic dimensions.

#### 4.02.1 Cost-Customer Size:

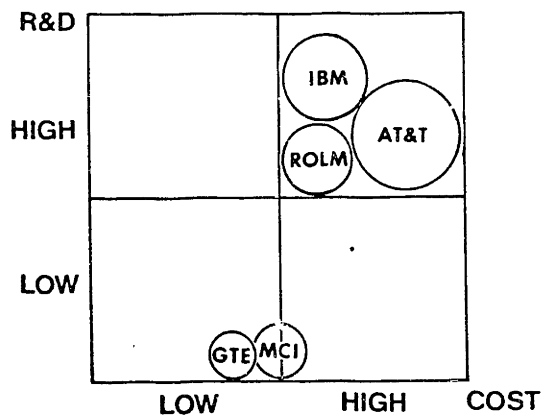
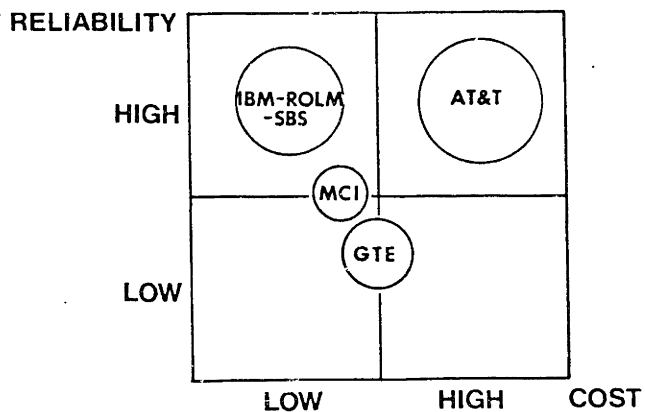
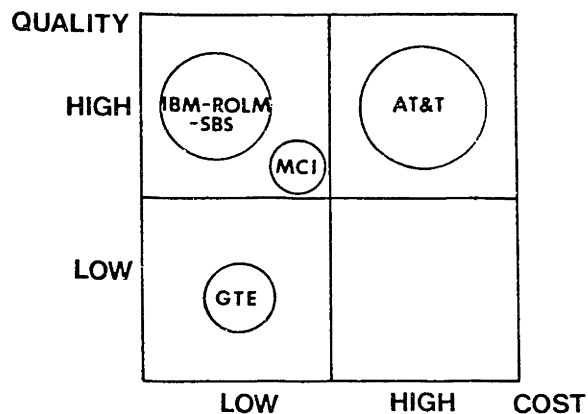
This is at present the most important strategic group, because the carrier's strategies to erode AT&T's market share are based on cost leadership.



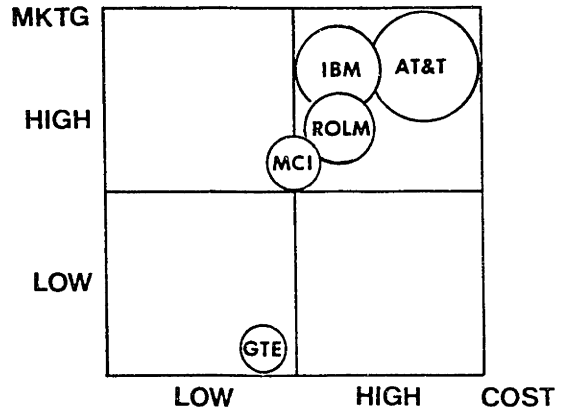
An interesting phenomenon occurs: AT&T is trying to adapt to a non-regulated environment and lower its costs, whereas large customers, i.e. government and large corporations by-pass exiting the market, the latter becoming resellers to cover fixed costs of their private networks.

4.02.2 Other Strategic Groups

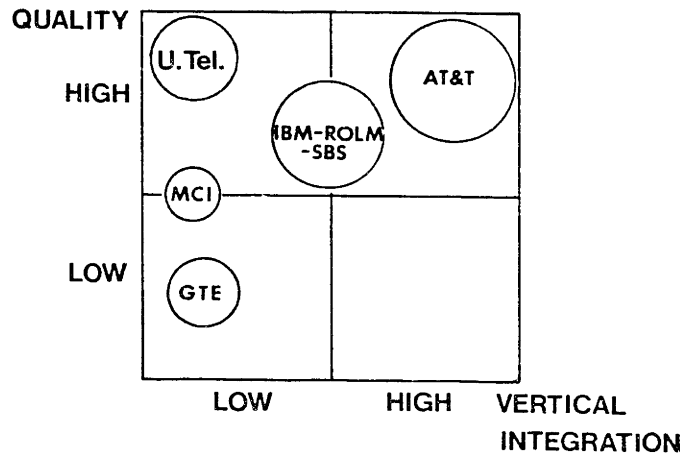
Other strategic groups can be presented, such as



. Marketing vs. Cost



. Quality vs. Vertical Integration



The relevance of these strategic groups is in the presence of the IBM/ROLM/SBS group: They compete on equal terms with AT&T in terms of reliability, quality, R&D (the former AT&T had an advantage here, but the situation has changed after the divestiture), and IBM/ROLM/SBS has an enormous advantage in marketing experience and capability.



What seems evident from this analysis is that both AT&T and IBM/ROLM/SBS, because of their market share and financial strength can create mobility barriers or build a stark structural position, threatening the cost leadership strategies of carriers such as MCI or GTE 'Sprint' (85).

#### 4.03 Financial Analysis:

In order to evaluate the performance of the companies mentioned in Chapter 3, the Market to Book value model will be used, assuming constant growth for a limited period of three years, as suggested by William E. Fruhan. (86)

The M/B model, as it is also known, assumes that a firm grows steadily in the following way:

- 1) Book value of equity equals B
- 2) Total debt equals D
- 3) A constant yearly rate of growth of equity is equal to g
- 4) A constant Debt/Equity ratio
- 5) A constant Return on Assets (ROA)
- 6) A constant Return on Equity (ROE)
- 7) A constant cost of debt ( $k_d$ )
- 8) A constant cost of equity ( $k_e$ )
- 9) A constant payout ratio equal to  $(1-p)$ , where p equals

retained profits/net profits.

- 10) Reinvestment of all depreciation and retained earnings
- 11) New debt replaces the mature debt outstanding every year, in addition to the resources required to increase the total debt at the rate  $g$
- 12) New Equity is never issued.

In order to apply the M/B model to the Telecommunications Industry, with the thirteen actors described in Chapter 3, and given that growth  $g$  is defined as  $p \times \text{ROE}$ , the total yearly growth of the industry  $G$  has been assumed to be a weighted average of the 13 companies that will constitute the industry. Clearly, this is an assumption intended to simplify the application of the model. The market value  $M$  is the year average for 1982, and a 4 year average for 1984. IBM is not considered to form part of the industry to avoid gross distortions.

Fruhan compares then the M/B value as obtained from stock prices and the books of the company, with the E/B (Economic to Book value), derived with the following expression:

$$E/B = (\text{ROE} - g / k_e - g) [1 - (1 + g / 1 + k_e)^n] + (1 + g / 1 + k_e)^n$$

where  $n$  is the limited growth horizon of the firm.

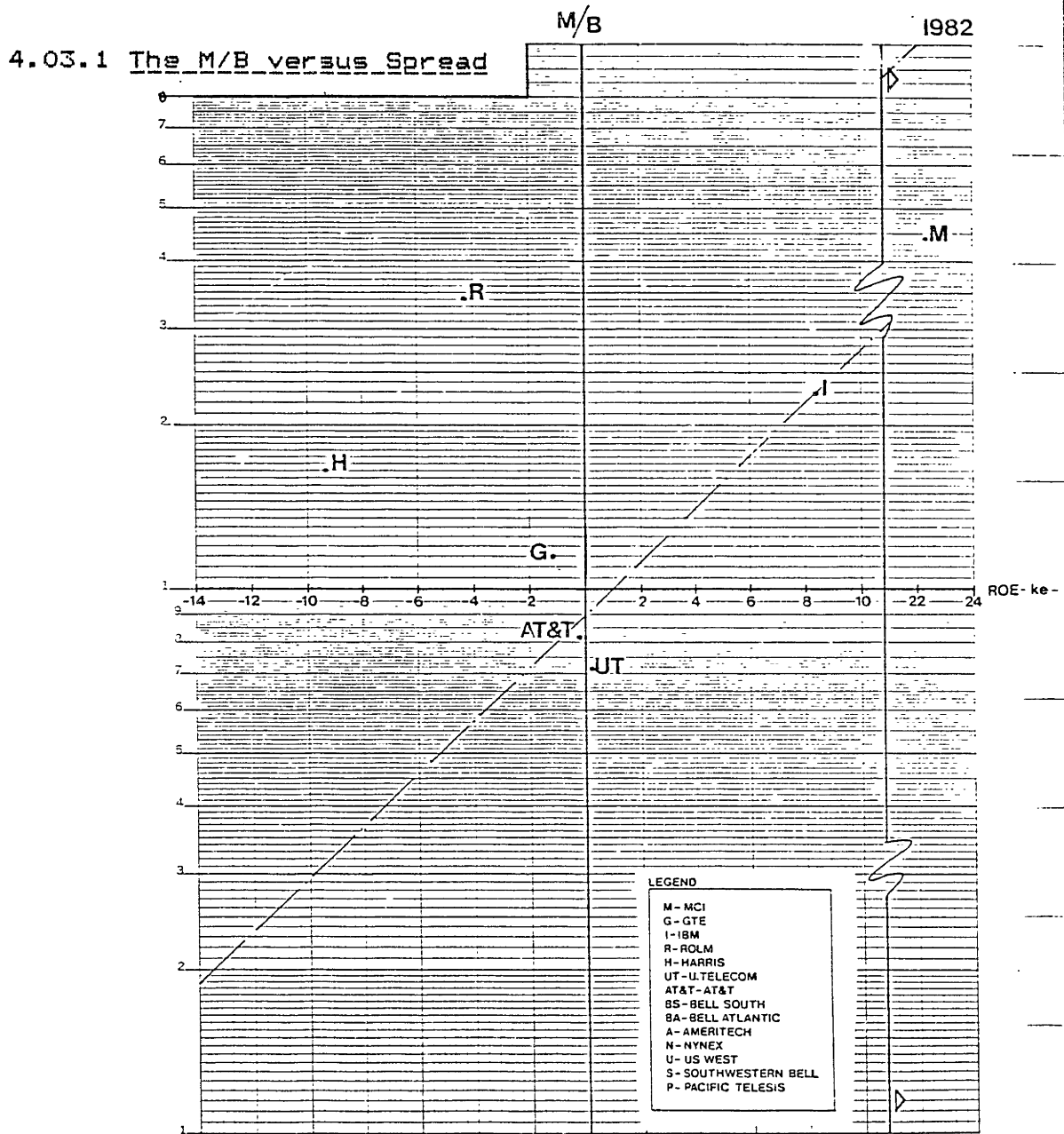
The cost of equity capital  $k_e$  has been derived using the Capital Asset Pricing Model:

$$k_e = \text{Risk free rate} + \beta (\text{Average risk premium})$$

The risk free rate used has been approximated by the use of a three-month treasury bill. The beta values were obtained from Merrill Lynch, Pierce, Fenner and Smith, Inc. "Security Risk Evaluation", January 1985. (87)

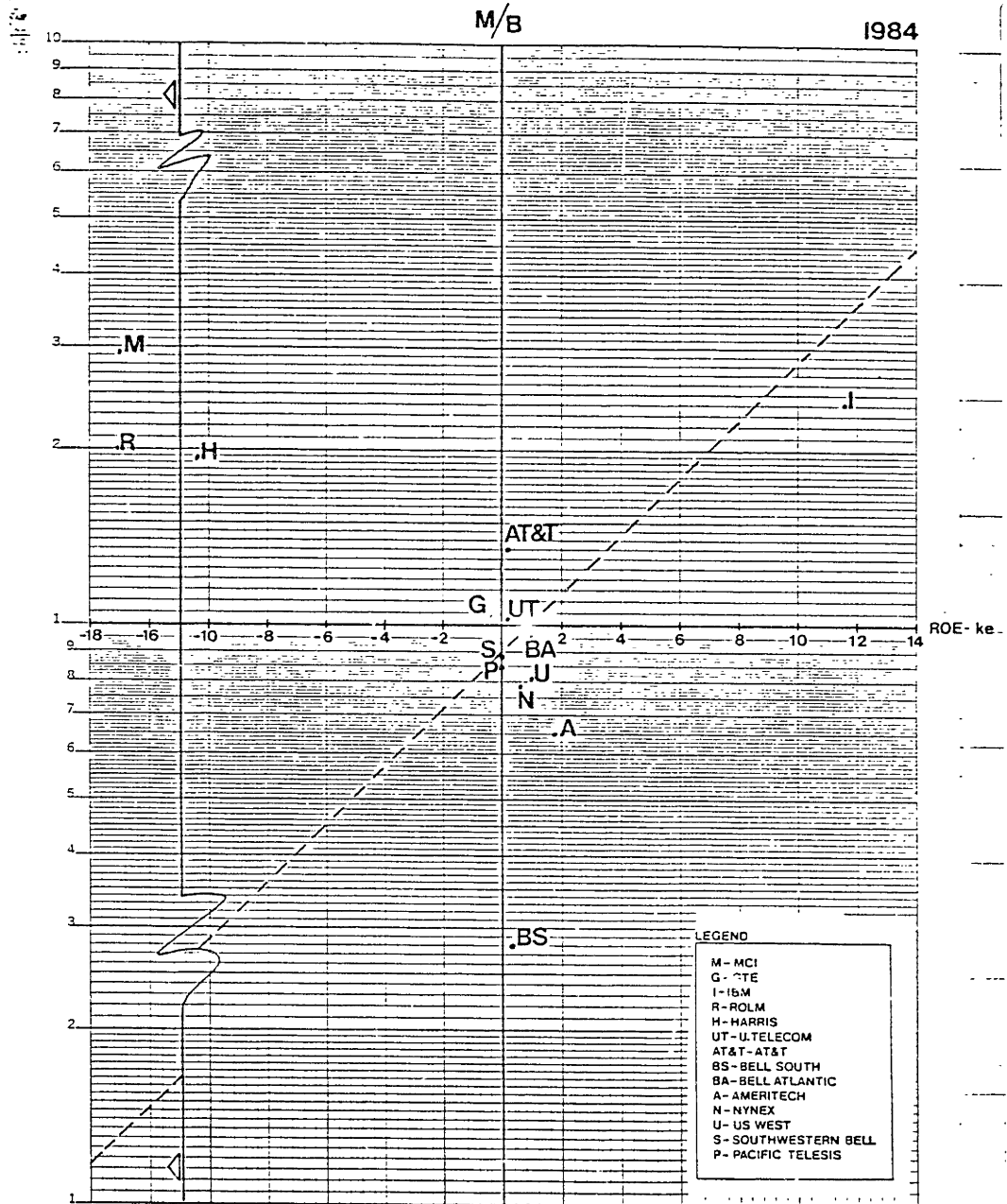
The average risk premium has been taken as 8.8 percent as suggested by Brealy and Myers (88); the beta value for telephone companies has also been taken from the same source. (89)

Tables 1 and 2 show the numerical values relevant to the M/B model, for the pre-and post-divestiture situation, i.e. 1982 and 1984.



In this graph, the very strong position of MCI and IBM is relevant, and also that of ROLM, Harris and GTE which are creating value for their shareholders, although the latter group has a negative spread, i.e. does not make its cost of

equity capital. AT&T and United Telecommunications Corp. have a neutral to slightly weak position.

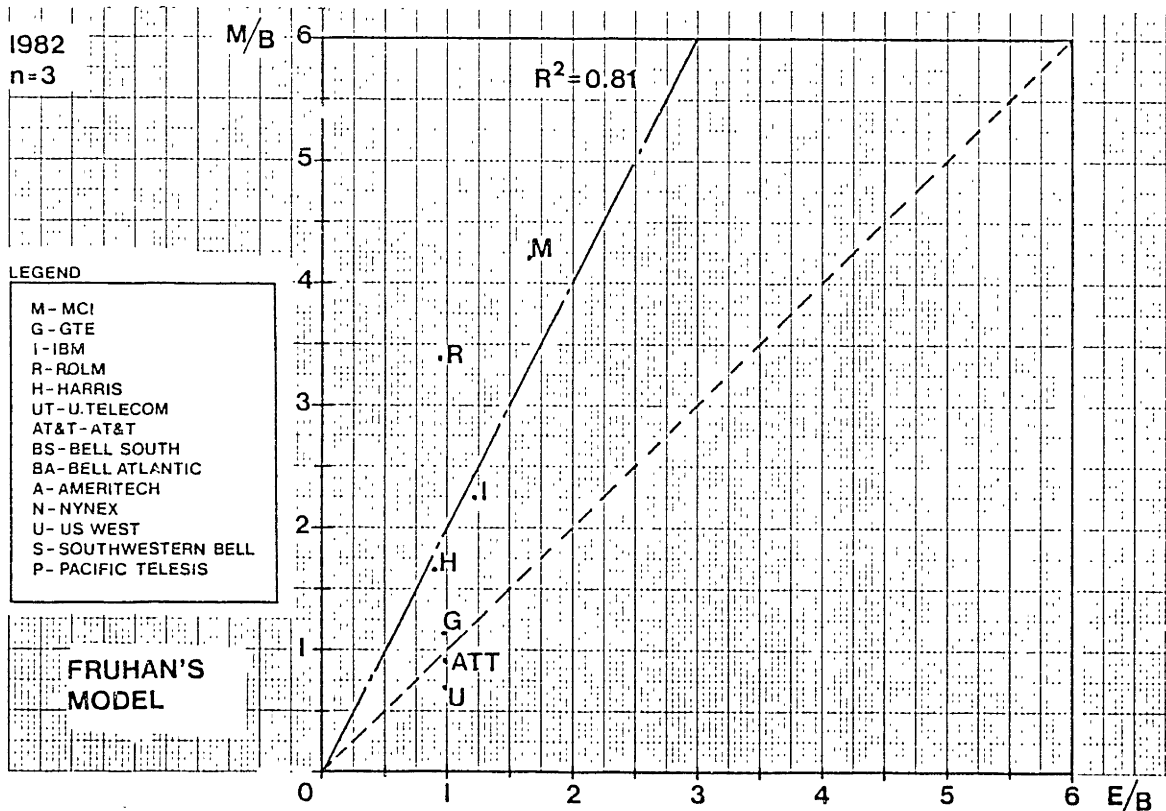


In this graph it can be appreciated that although all the "Baby-Bells" have a positive or zero spread, having in this way improved somewhat their financial position,

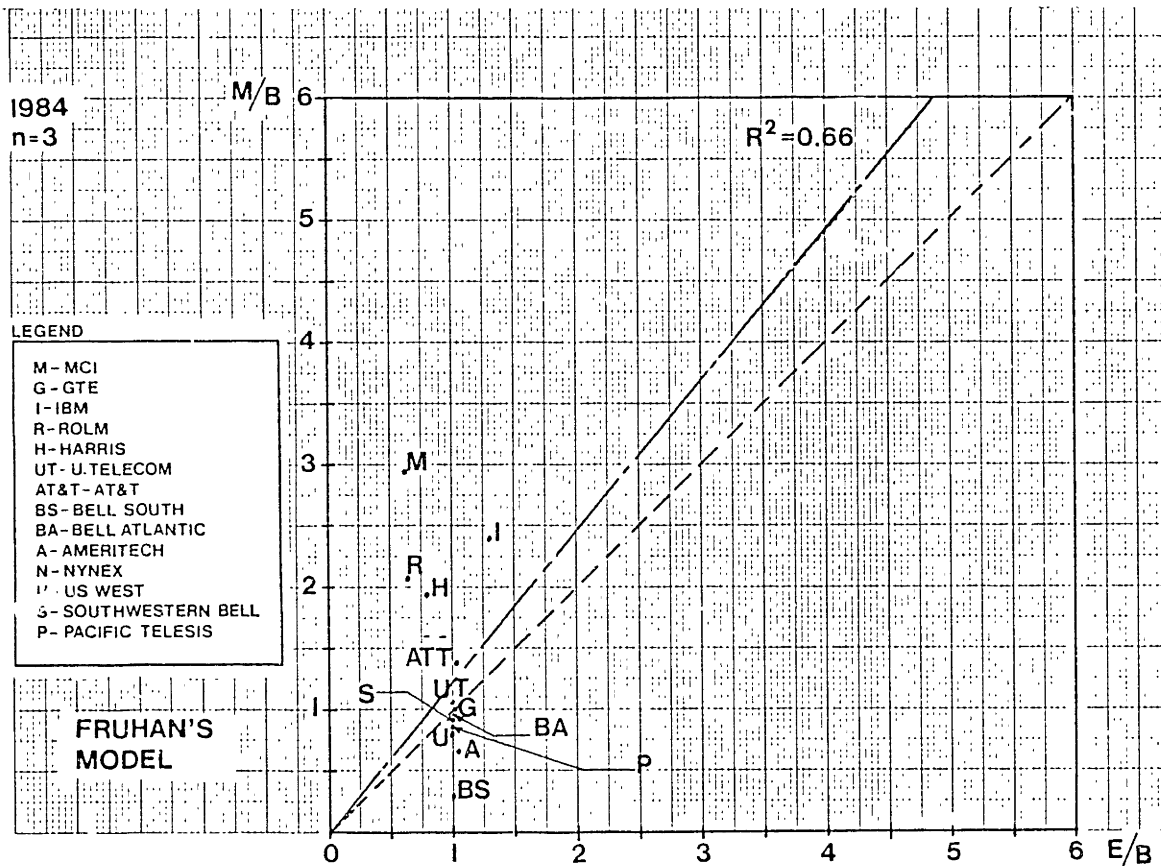
market does not believe in them, with the exception of BellAtlantic and AT&T, which have a M/B higher than one. The financial position of MCI has vastly deteriorated, but the market hopes it will recover. ROLM continues creating value for its shareholders in spite of its negative spread, presumably because of the synergy that IBM spills over it.

The case of BellSouth is strange, and M/B will surely bounce up given its positive spread.

4.03.2 The M/B versus E/B



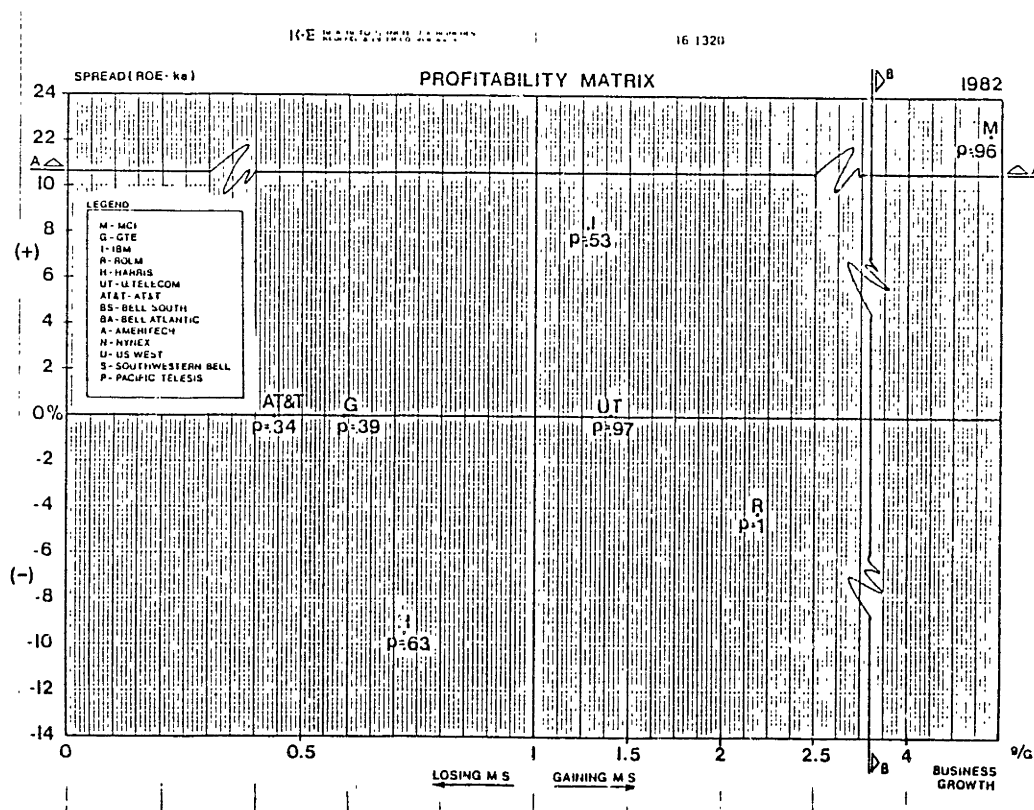
In this graph we can appreciate the expected MCI and ROLM to perform very well with respect to the rest of the industry as opposed to, for instance, United Telecommunications.



In examining this graph, we can see that expectations with respect to MCI have decreased and it is nearing average. AT&T has improved its image vis-a-vis the market, and so has United Telecom. The rest of the Baby Bells continue to be underrated, but Rolm and Harris still have an excellent standing inspite of their poor spread.

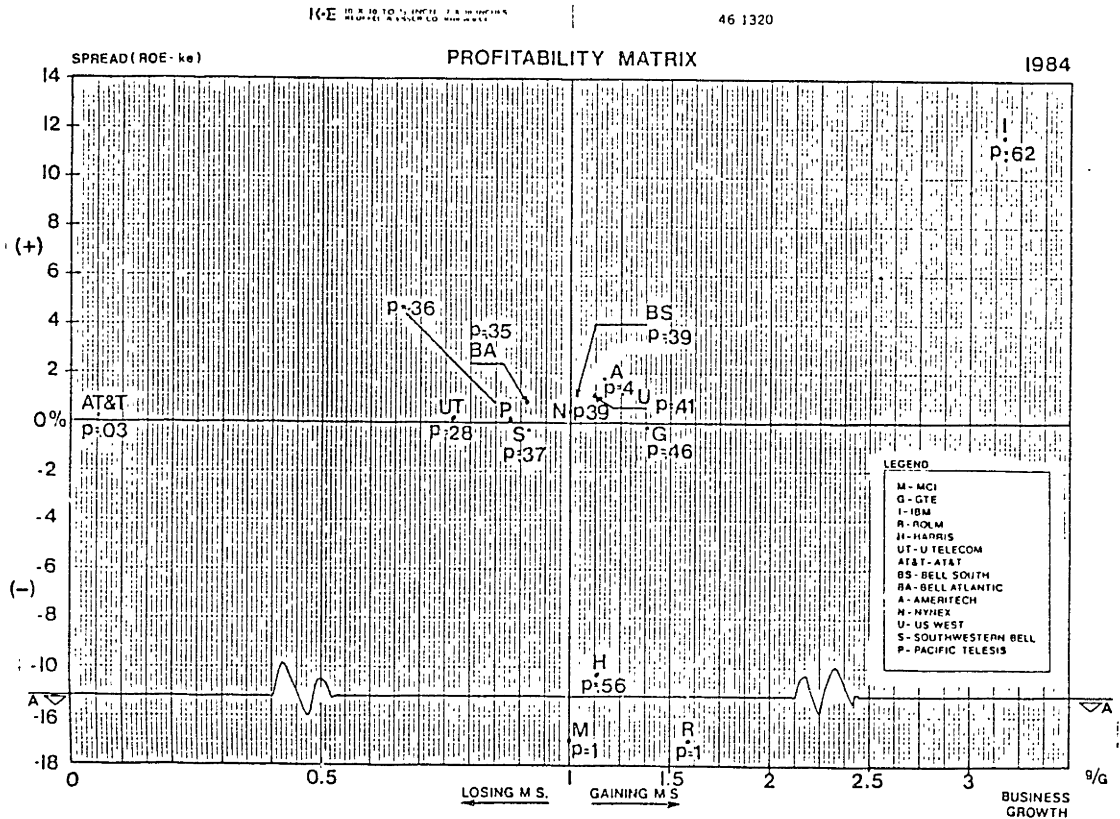
4.03.3 Profitability Matrix:

This matrix is relevant because it contrasts spread versus relative growth.





This matrix shows that AT&T, Harris and GTE have their market share eroded by the other companies, but of those only MCI, IBM, and United Telecommunications have a positive spread. In other words, the others are growing at the expense of their financial situation.



In 1984, a healthy recovery can be noticed by most of the Regional Bell companies, but something interesting happens: MCI only matches industry growth as opposed to its pre-divestiture growth rate. IBM continues its healthy growth with a positive spread, announcing itself as the most formidable competitor of AT&T.

All three models and approaches show the deterioration of MCI's position, some recovery on the part of AT&T and the Regional Companies, and the stark presence of IBM in the new Telematics or Communications market.

#### 4.04 Conclusions

The divestiture of AT&T has changed the telecommunications industry: the new regional companies are facing competitors from carriers such as MCI and GTE, in the transmission segment of the industry, that is losing attractiveness due to overcapacity and the equalization of access charges for all carriers.

Customer equipment is becoming more attractive but given the rise in the number of competitors and the power of some of the new entrants, one of which is IBM, a shake out can

be expected.

Most of the former Bell Operating Companies have marginally improved their financial performance, but the market is pessimistic about their long-term performance.

The market has reacted negatively to the strategy of MCI, whose financial situation has deteriorated enormously in the last two years. In contrast GTE has improved slightly its position, and is growing at a steady pace.

From the suppliers' point of view, ROLM's situation has deteriorated, but the market believes it will do better, given IBM's 100% ownership of its stocks.

Most carriers are expected to follow related diversification strategies in value added services, such as shared tenant services, which is representative of a profitable niche.

## FOOTNOTES

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- 2) op.cit., p. 51
- 3) op.cit., p. 52
- 4) op.cit., p. 56
- 5) Coon, Horace. American Tel & Tel -The Story of a Great Monopoly , p.21
- 6) op.cit., p. 22
- 7) op.cit., p. 25
- 8) Brooks, John. Telephone, the First Hundred Years, p.62
- 9) Boettinger, op.cit., p. 93
- 10) Brooks, op.cit., p. 71
- 11) Coon, op.cit., p. 57
- 12) Brooks, op.cit., p. 68
- 13) Ibid
- 14) Coon, op.cit., p. 58
- 15) Boettinger, op.cit., p. 101
- 16) Chandler Jr., Alfred D. The Visible Hand - The Managerial Revolution in American Business p.201
- 17) Ibid
- 18) Boettinger, op.cit., p. 102
- 19) Chandler, op.cit., p. 202
- 20) Ibid
- 21) Coon, op.cit., p. 137

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- 22) Coon, op.cit., p. 140
- 23) op.cit., p.143
- 24)
- 25) Cespedes, Frank V. Busy Signals: Telecommunications in Transition , p.14
- 26) op.cit., p. 15
- 27) Civil Action No. 74-1698:United States of America vs. AT&T , p. 105
- 28) op.cit., p. 99
- 29) op.cit., p. 103
- 30) Meyer, John R., Wilson, Robert W., Baughcum, Alan M., Burton, Ellen, Caouette, Louis. The Economics of Competition in the Telecommunications Industry, p.113
- 31) op.cit., p. 114
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- 33) Davidson, Dekkers L. AT&T and the Access Charge,p.
- 34) Schein, Edgar. Organizational Culture and Leadership, p. 271
- 35) Tunstall, W.Brooke. Disconnecting Parties: Managing the Bell System Break Up. An Inside View  
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- 36) op.cit., p. 155
- 37) op.cit., p. 154
- 38) op.cit., p. 185

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- 39) Starling, Grover. Technological Innovation in the Communications Industry p. 185
- 40) Penzias, Arno A. Where R meets D , p. 57
- 41) AT&T. Annual Report 1984
- 42) Business Week, December 3, 1984, p. 87
- 43) MCI. Annual Report 1984
- 44) Ibid
- 45) Business Week, Dec. 9, 1983, p. 107
- 46) GTE Annual Report 1984
- 47) BellSouth Annual Report, 1984 p.3
- 48) Bell Atlantic Annual Report 1984, p.4
- 49) op.cit., p.5
- 50) Ameritech Annual Report 1984
- 51) op.cit.
- 52) NYNEX. Annual Report 1984, p.3
- 53) op.cit., p. 29
- 54) op.cit.
- 55) US West. Annual Report 1984, p.4
- 56) Ibid
- 57) Southwestern Bell. Annual Report 1984
- 58) Pacific Telesis. Annual Report 1984, p.8
- 59) Ibid
- 60) Prescott, C. Anne. The Big Skill, p. 63
- 61) Moody's Public Utility Manual 1984, p. 201
- 62) IBM. Annual Report 1984

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- 63) ROLM. Annual Report 1984, p. 5
- 64) Ibid
- 65) Harris Corporation. Annual Report 1984
- 66) United Telecom. Annual Report, p. 11
- 67) Ibid
- 68) Communications Week, 10/8/84, p.C6
- 69) Ibid
- 70) Communications Week, 4/9/84, p. C2
- 71) Communications Week, 4/1/85, p. C1
- 72) Communications Week, 3/18/85,p. C2
- 73) Communications Week, 4/29/86,p. C2
- 74) Communications Week, 3/25/85,p. C1
- 75) Communications Week, 3/25/85,p. C5
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- 84) Porter, Michael. Competitive Strategy:Techniques  
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- 85) op.cit., p. 148
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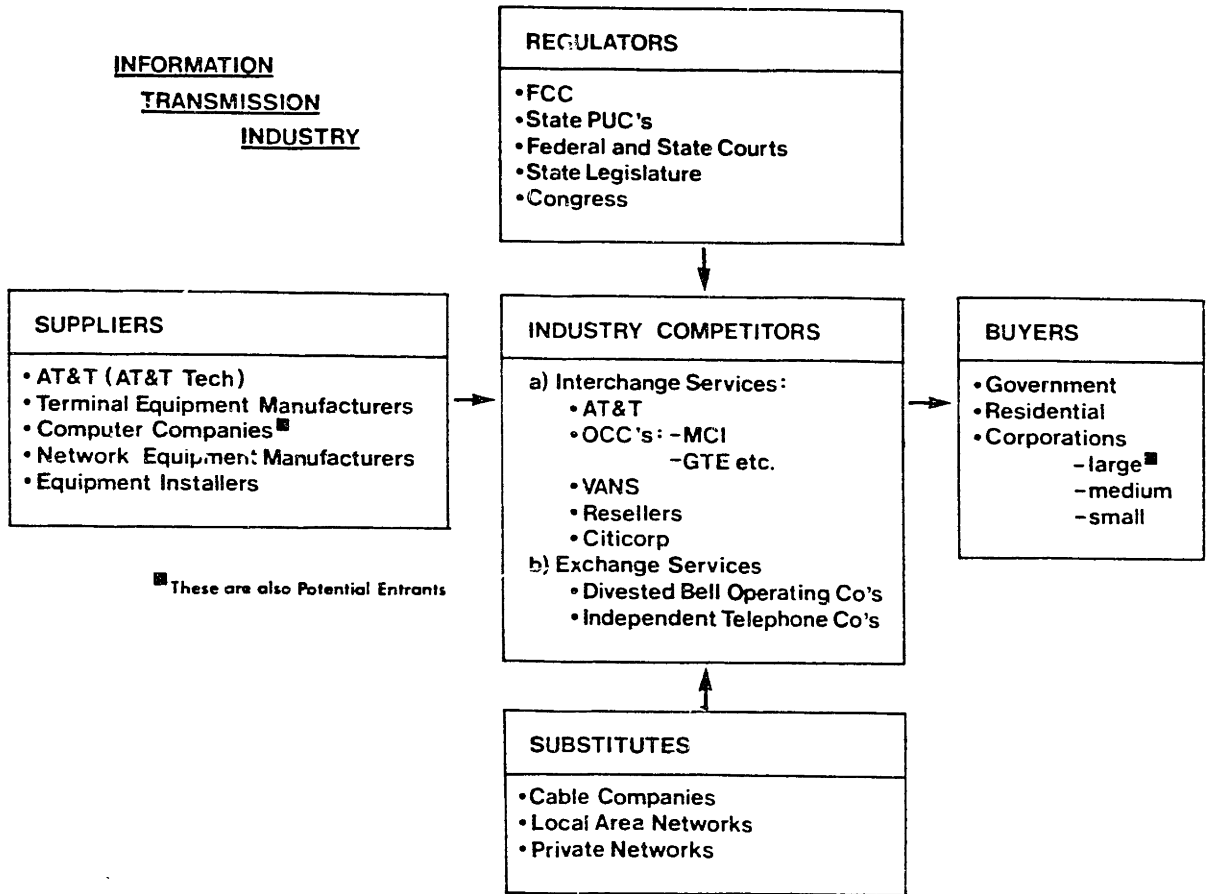
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APPENDIX 0



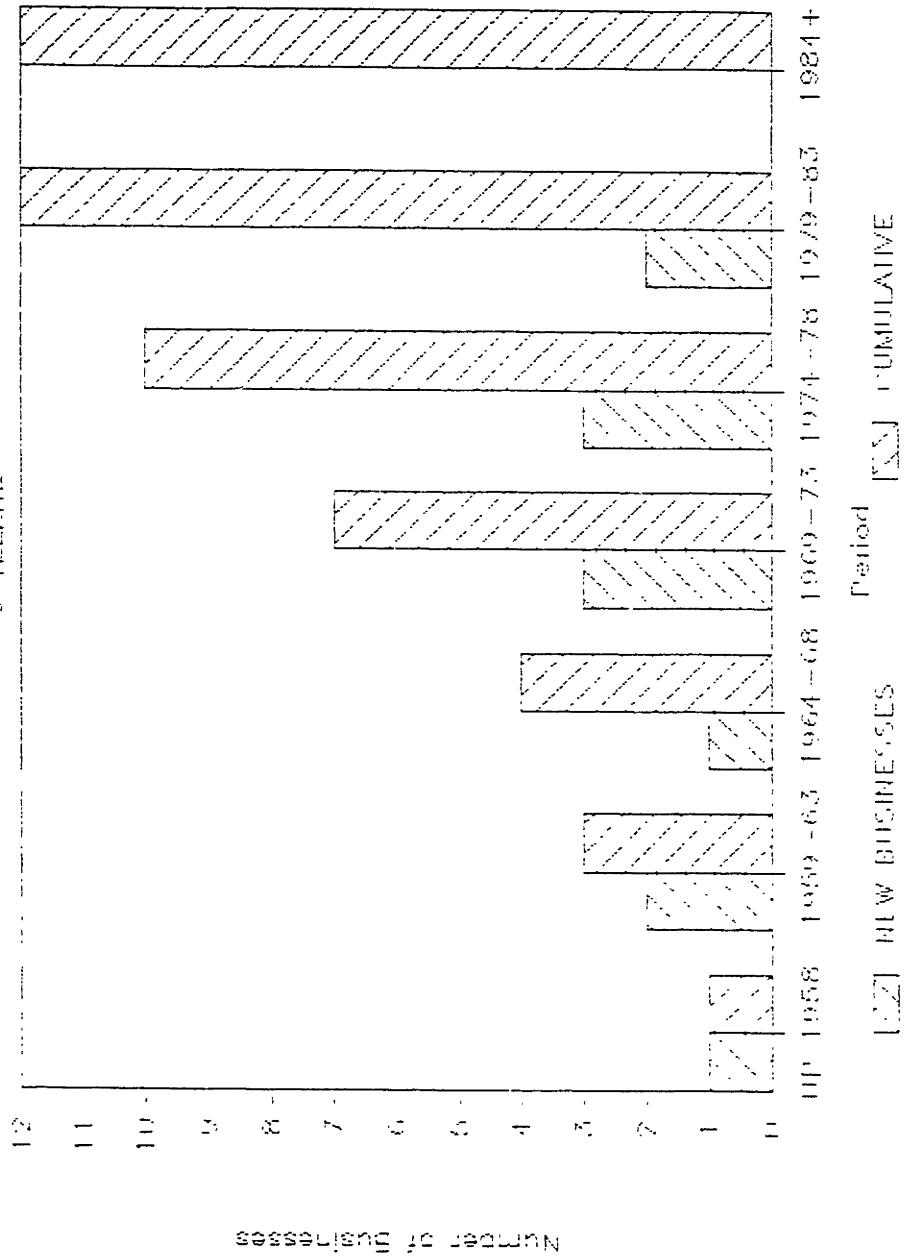
APPENDIX 1

TYPE	UP TO 1968		1969 - 1963		1964 - 1968		1969 - 1973		1974 - 1978		1979 - 1983		1984 +	
	New	Cumulative	New	Cumulative	New	Cumulative	New	Cumulative	New	Cumulative	New	Cumulative	New	Cumulative
SAT	1	1	2	3	1	4	3	1	3	10	2	12	0	12
WAN	1	1	0	1	1	1	1	2	2	4	3	7	0	7
BXC	5	5	5	10	4	14	13	27	5	32	19	51	2	53
C	13	13	5	18	12	30	22	52	26	78	28	106	1	107
CC	6	6	0	6	1	7	1	8	1	9	1	10	0	10
CH	1	1	4	5	1	6	0	6	0	6	4	10	4	14
CD	4	4	1	5	1	6	2	8	4	12	5	17	0	17
DDE	4	4	5	9	6	15	25	40	26	66	22	88	0	88
DCSE	22	22	12	34	27	61	39	100	54	154	53	207	3	210
STS	0	0	0	0	0	0	0	0	0	0	3	3	6	9
FAX	5	5	1	6	0	6	1	7	3	10	2	12	1	13
FCC	2	2	0	2	2	2	2	4	2	6	1	7	1	8
FUTS	6	6	3	9	0	9	8	17	9	26	5	31	0	31
OFM	2	2	0	2	1	0	0	3	1	4	1	5	0	5
LAW	6	6	2	8	9	17	12	29	19	48	44	92	0	92
LAW (P)	2	2	0	2	1	3	2	5	4	9	2	11	0	11
H	24	24	4	28	24	52	32	84	44	128	30	158	3	161
MPLX	8	8	1	9	12	21	27	48	23	71	19	90	1	91
MW	3	3	2	5	1	6	2	8	0	8	1	9	0	9
OAE	3	3	1	4	2	6	4	10	2	12	3	15	0	15
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RES	4	4	2	6	1	7	2	9	5	14	6	20	0	20
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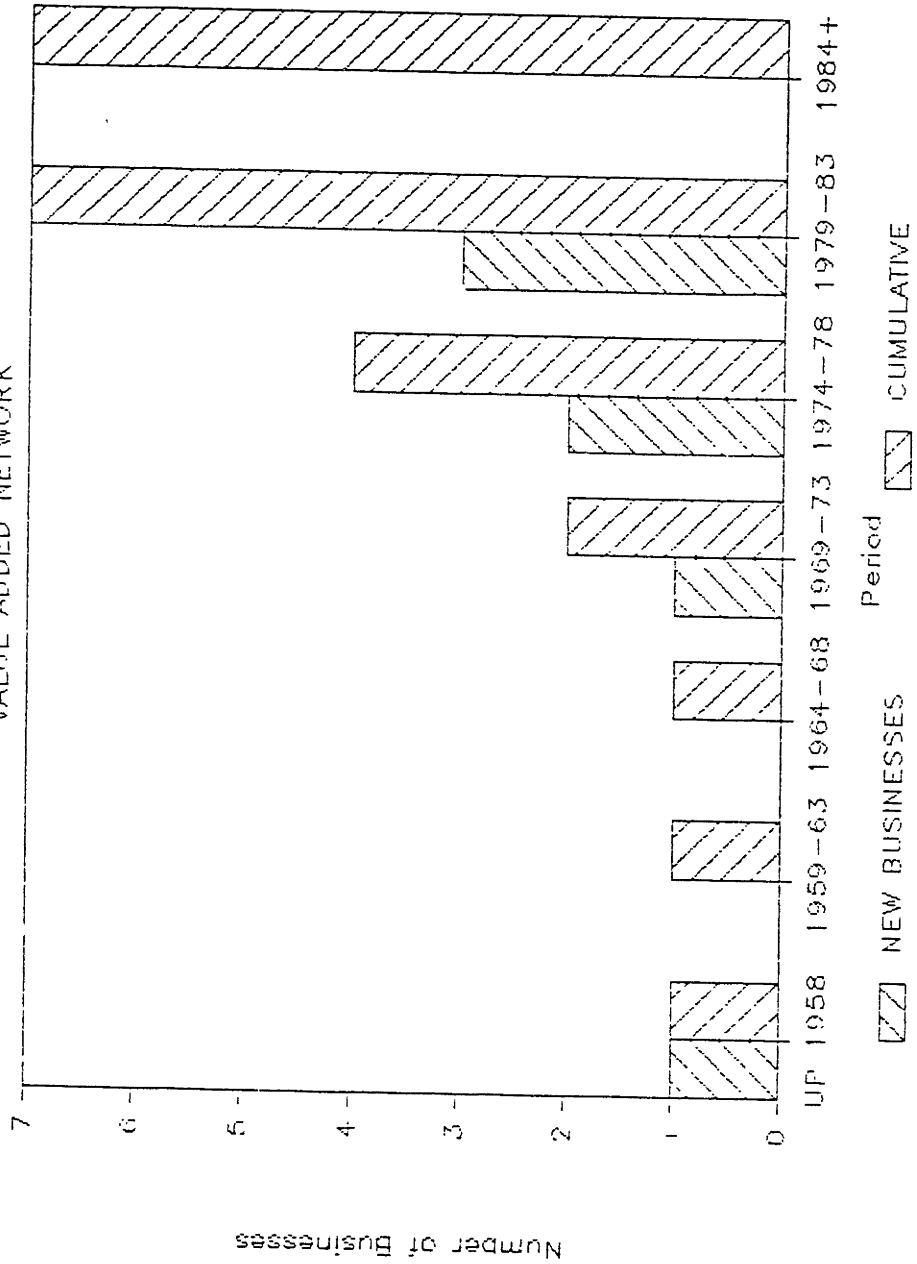
**TELECOMMUNICATIONS INDUSTRY GROWTH  
LINES OF BUSINESSES**

APPENDIX 2

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SATELLITE

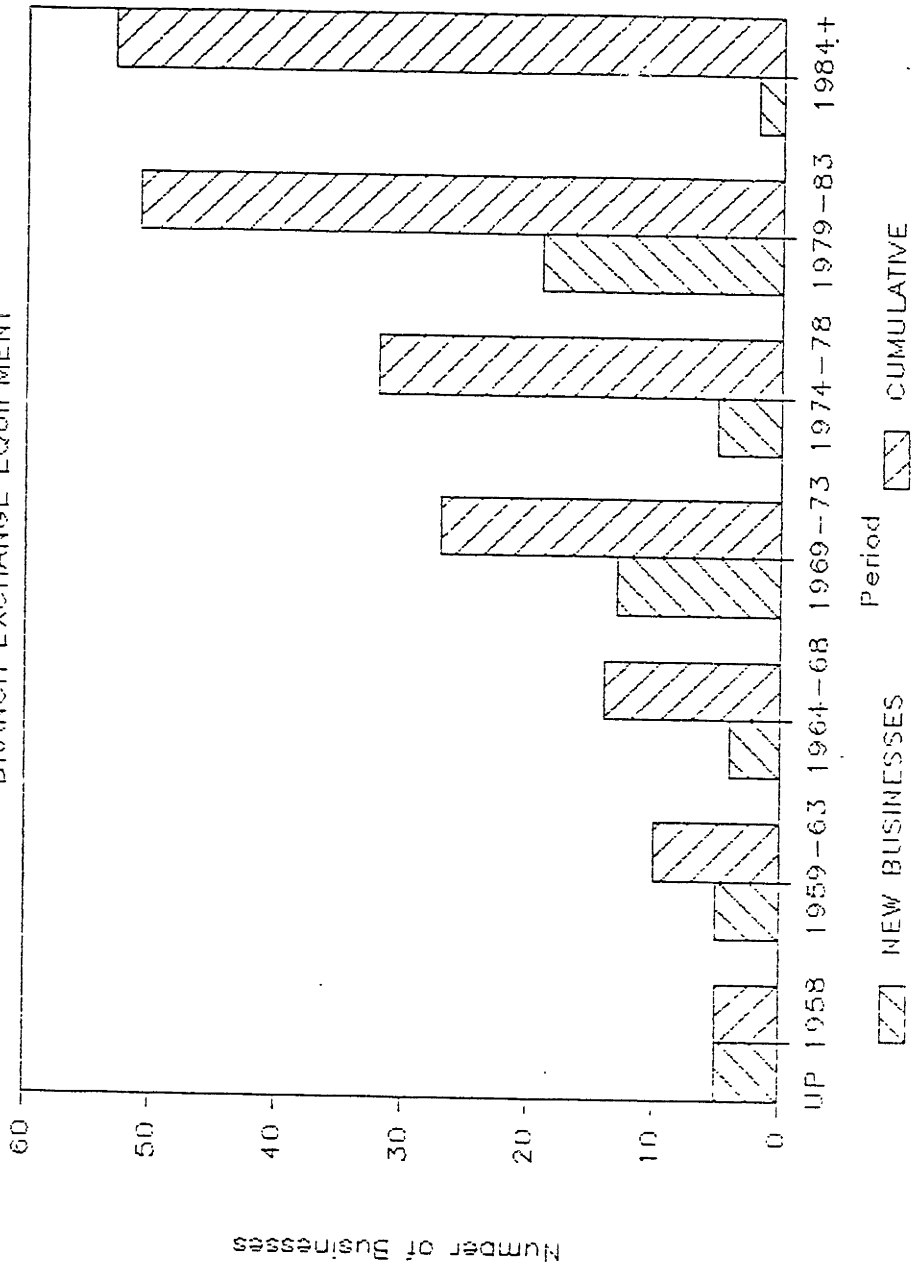


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 VALUE ADDED NETWORK

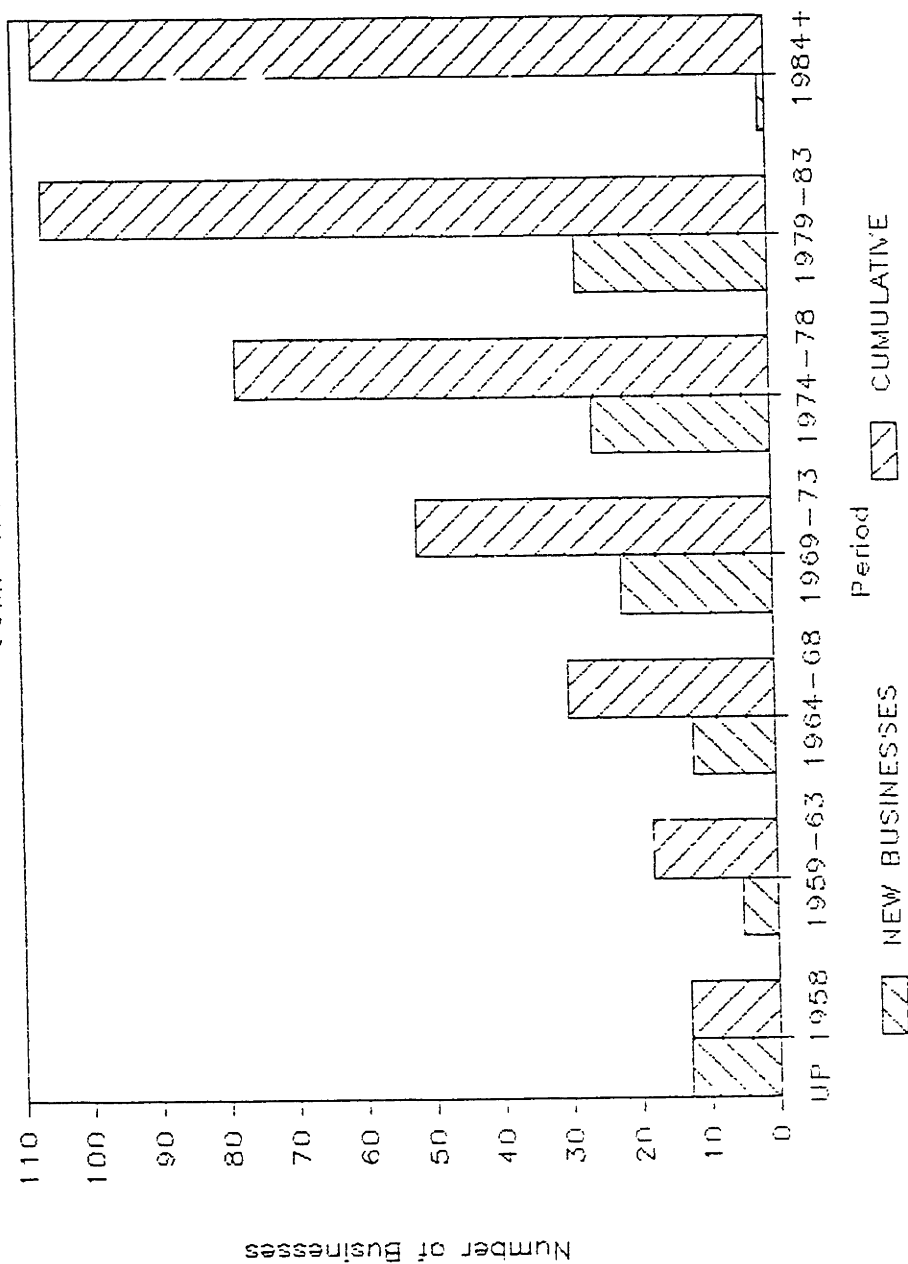




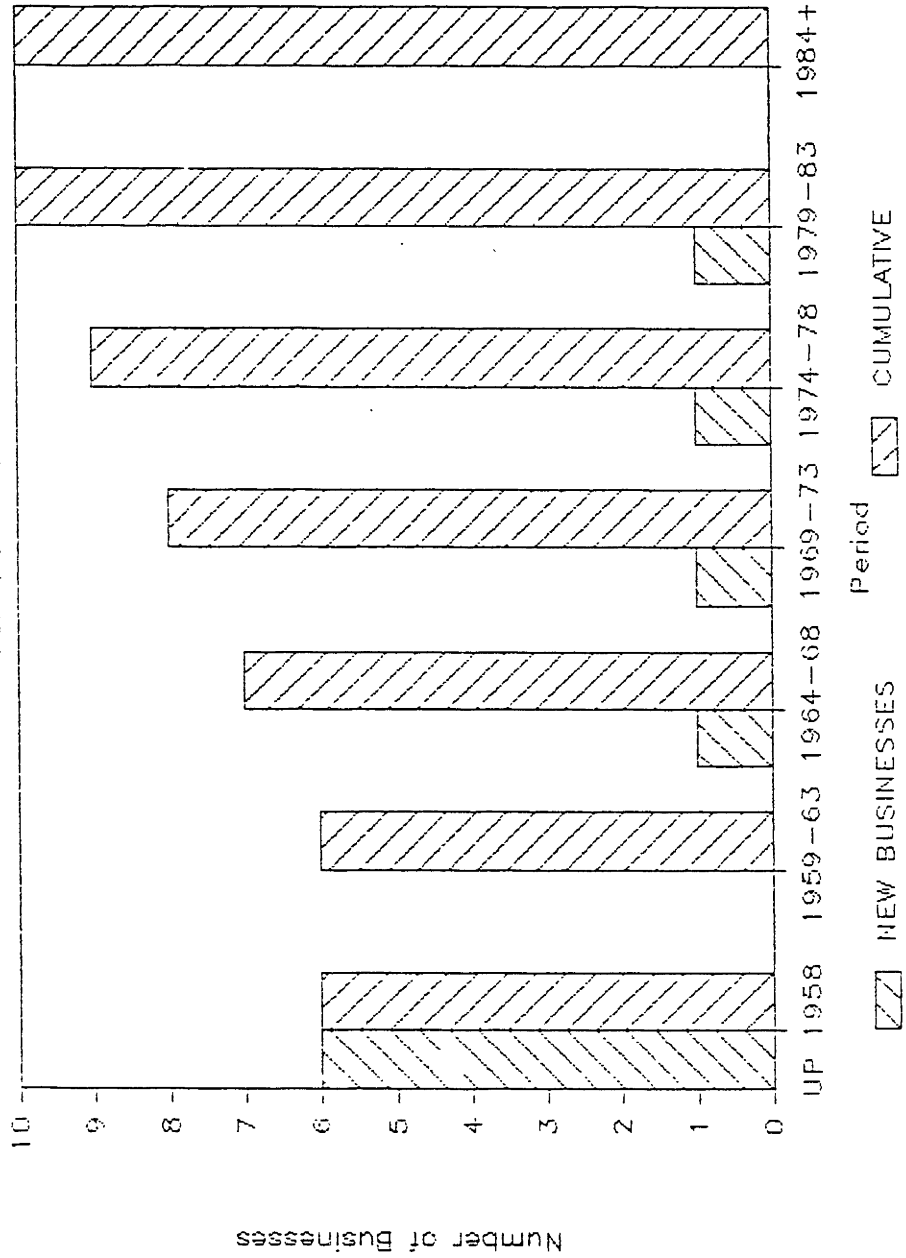
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BRANCH EXCHANGE EQUIPMENT



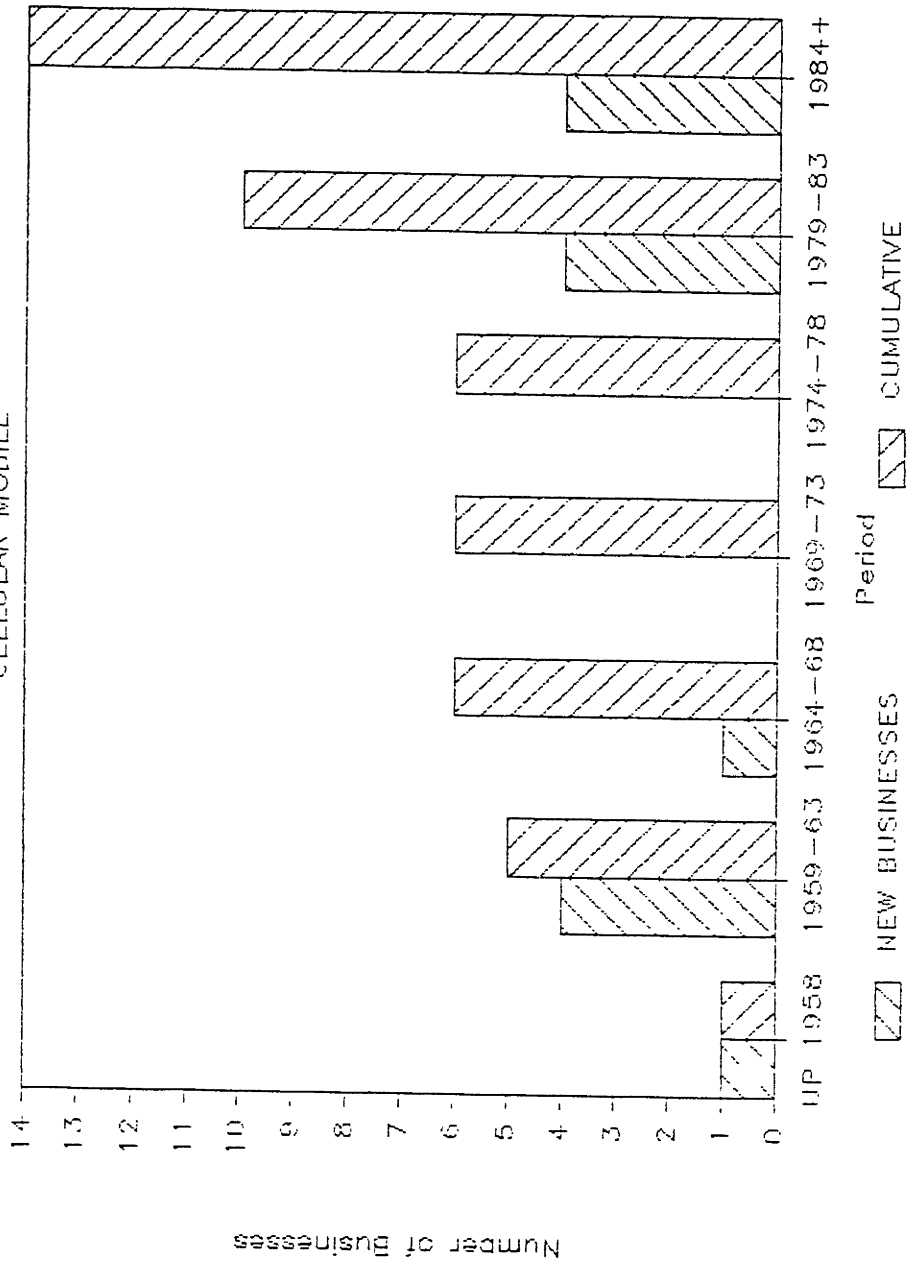
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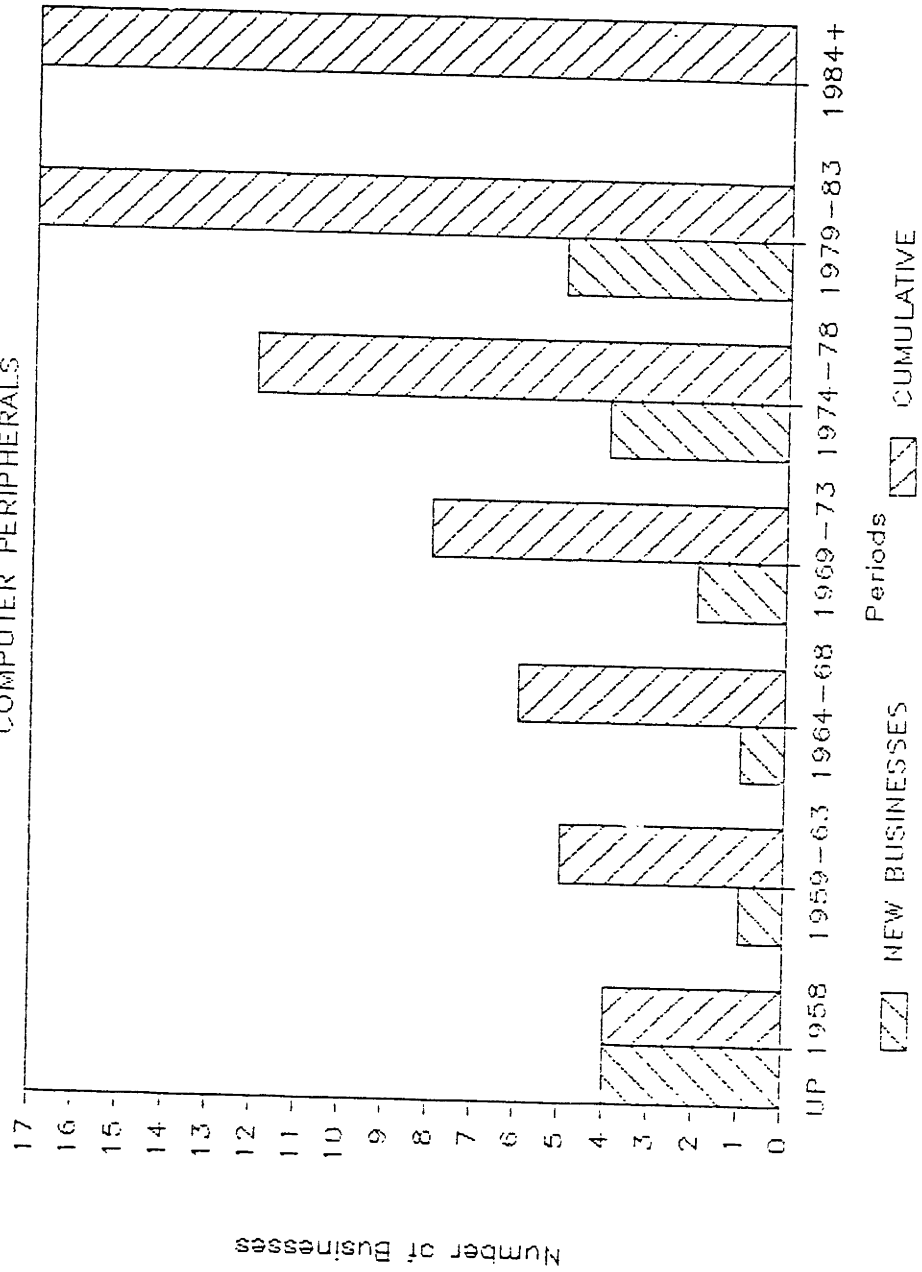
# L.O.B. 5 COAXIAL CABLE



L.O.B. 6  
CELLULAR MOBILE

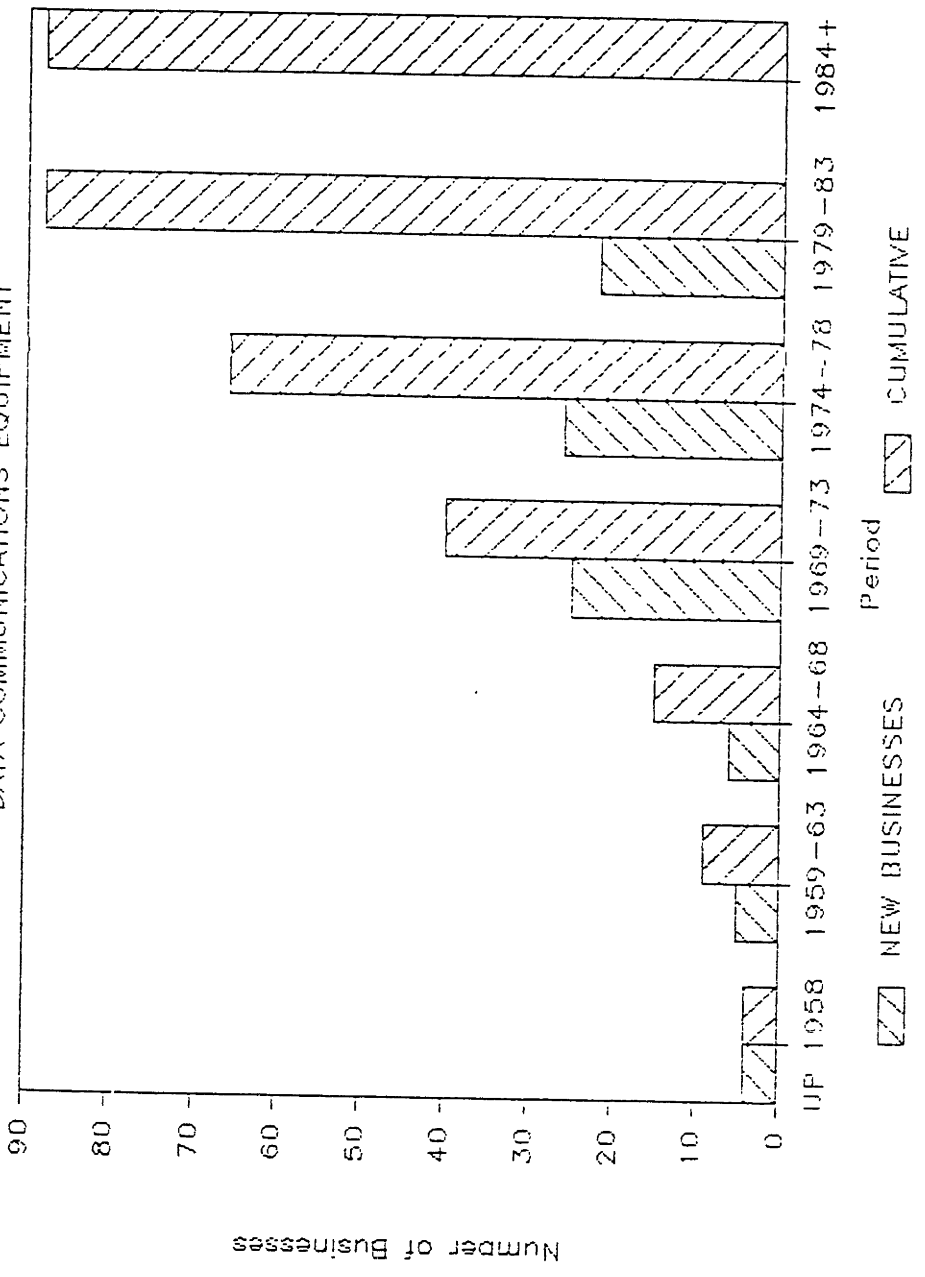


L.O.B. 7  
COMPUTER PERIPHERALS



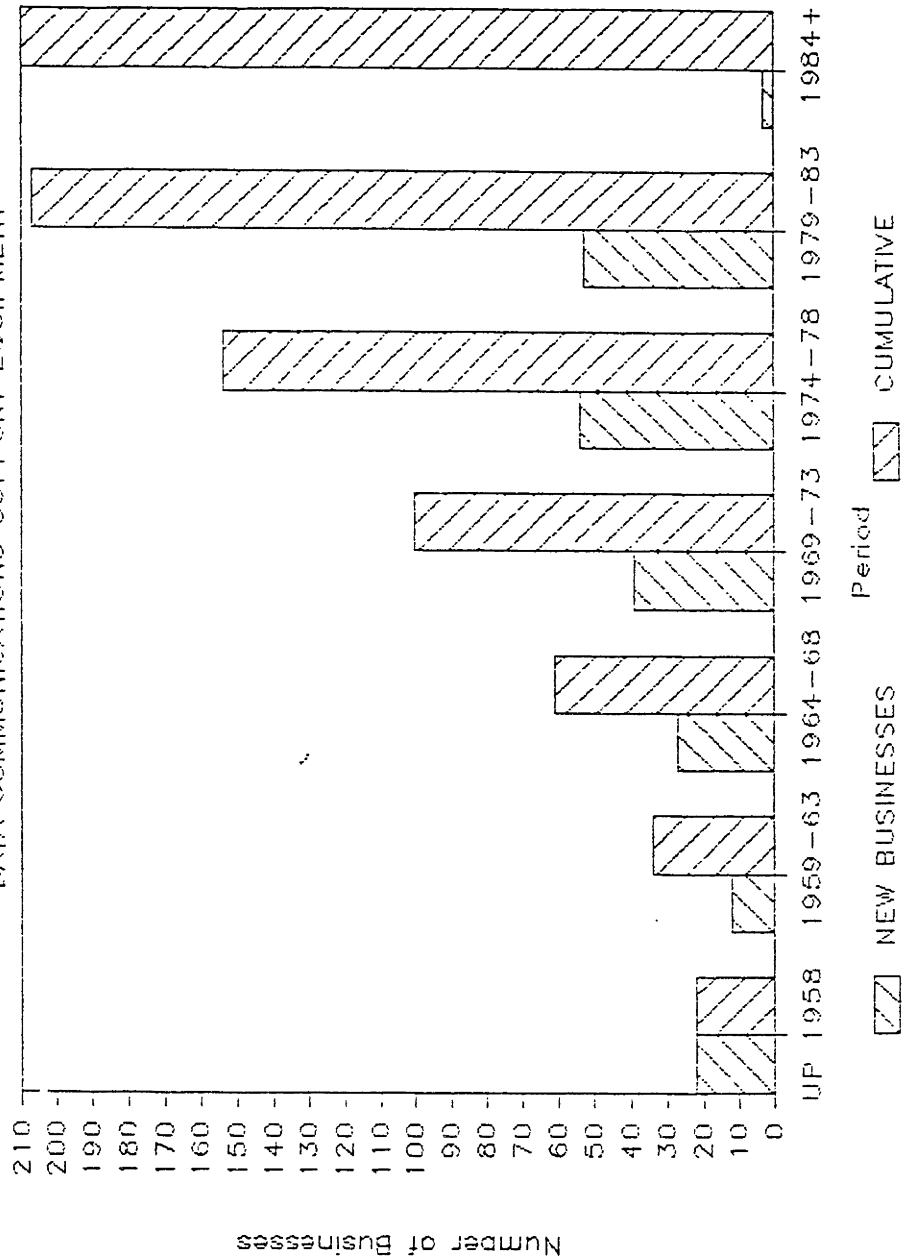
# L.O.B. 8

## DATA COMMUNICATIONS EQUIPMENT

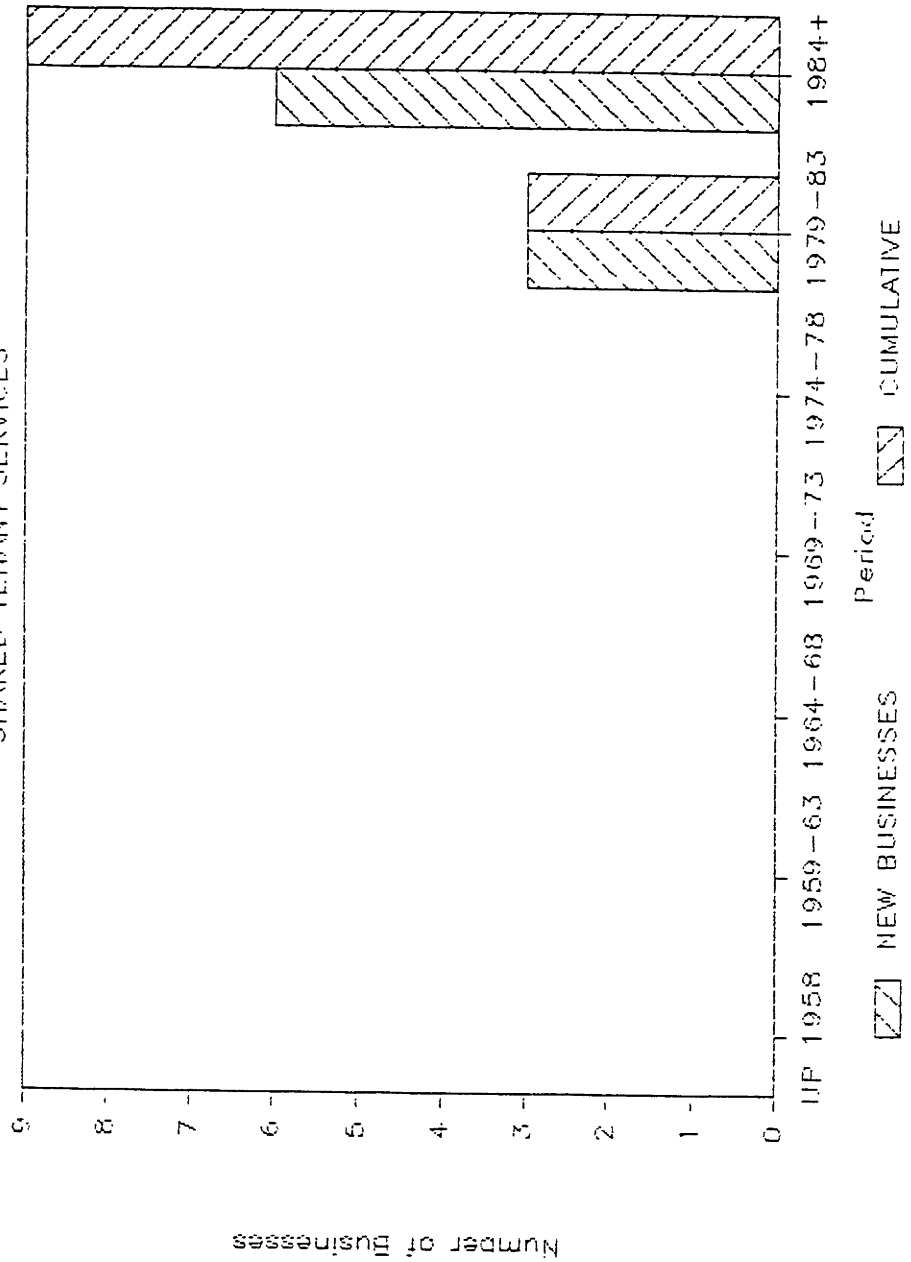


# L.O.B. 9

## DATA COMMUNICATIONS SUPPORT EQUIPMENT

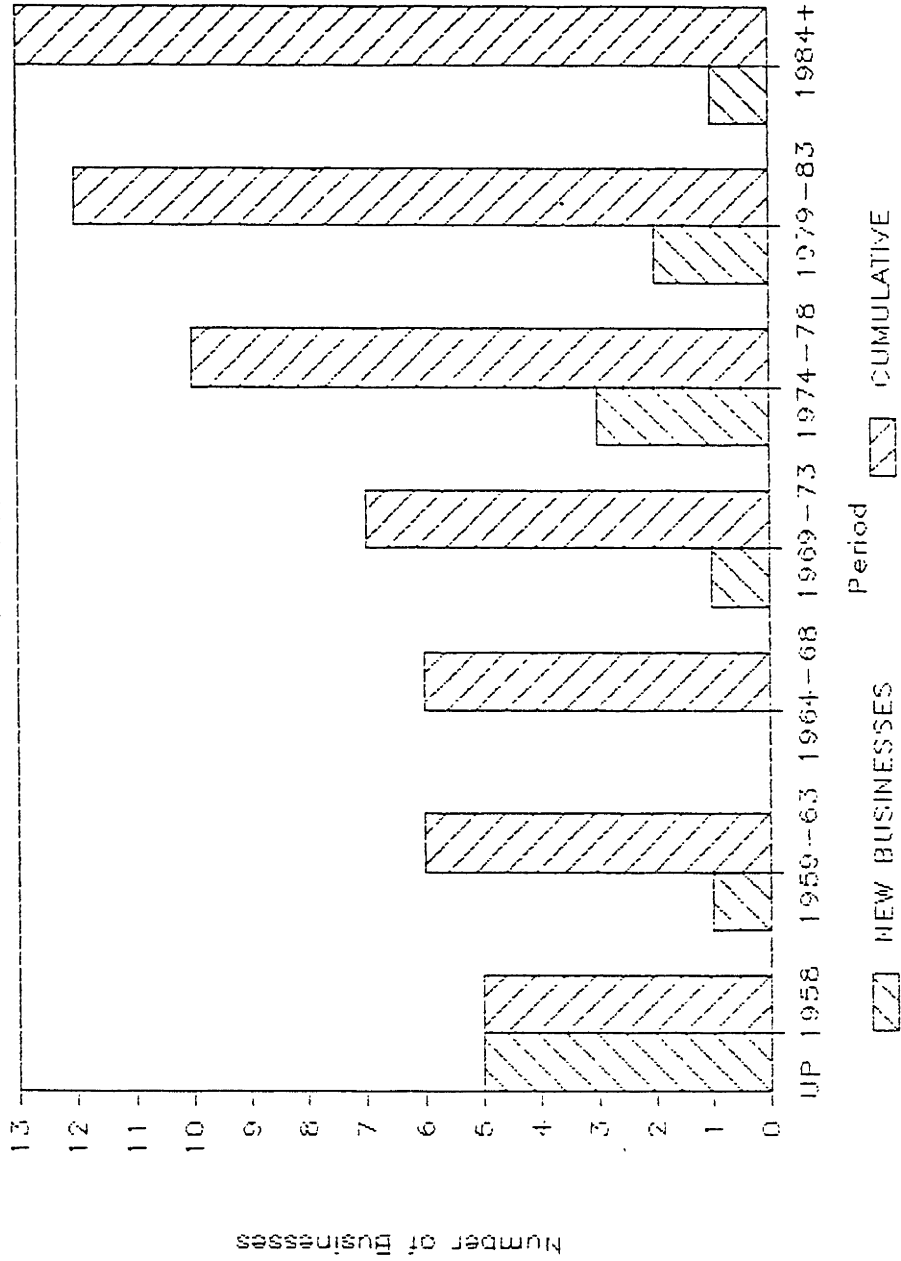


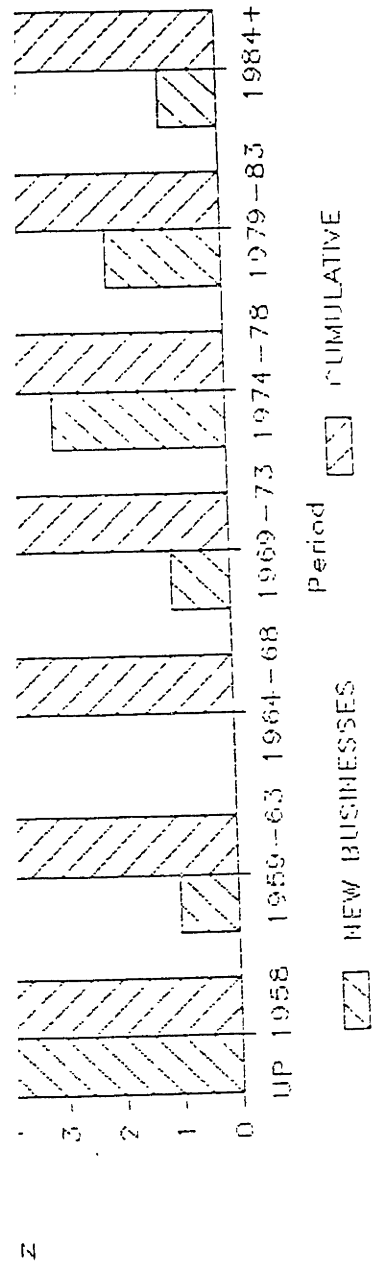
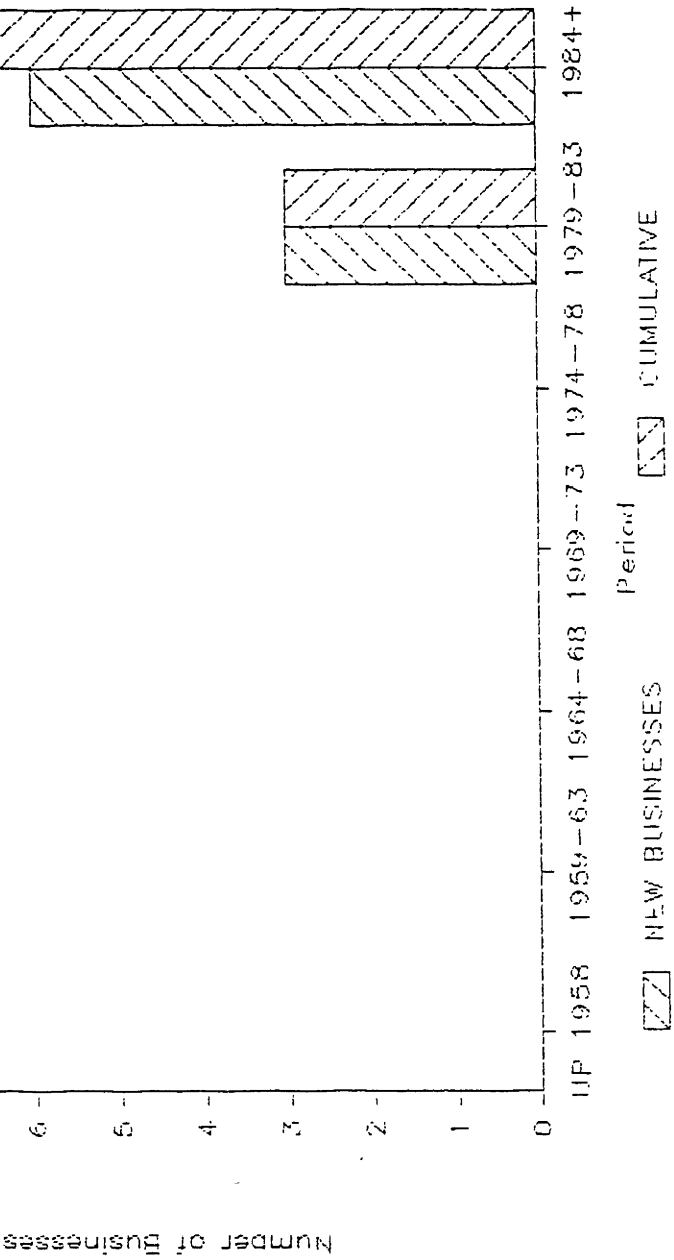
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 SHARED TENANT SERVICES



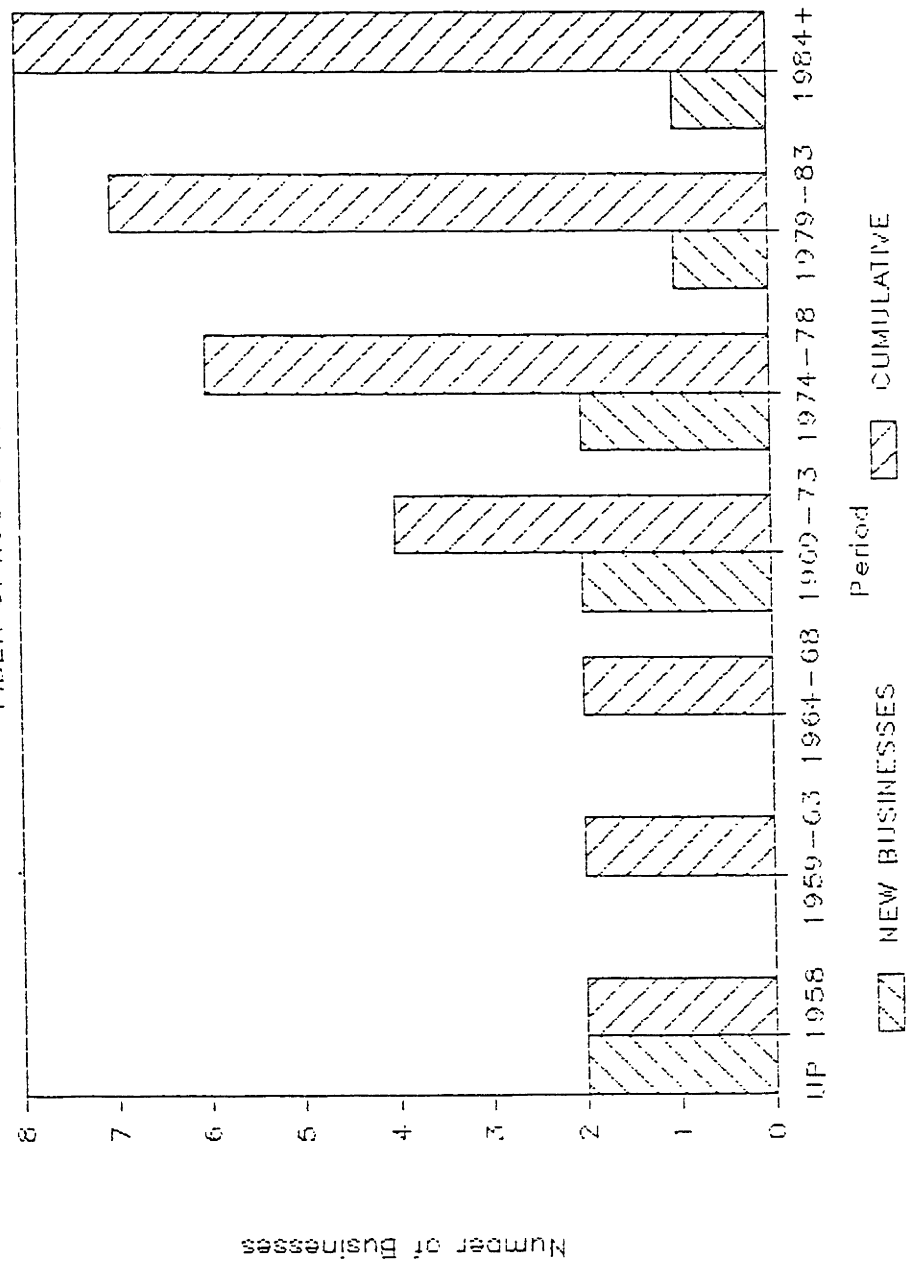


L.O.B. 11  
FACSIMILE



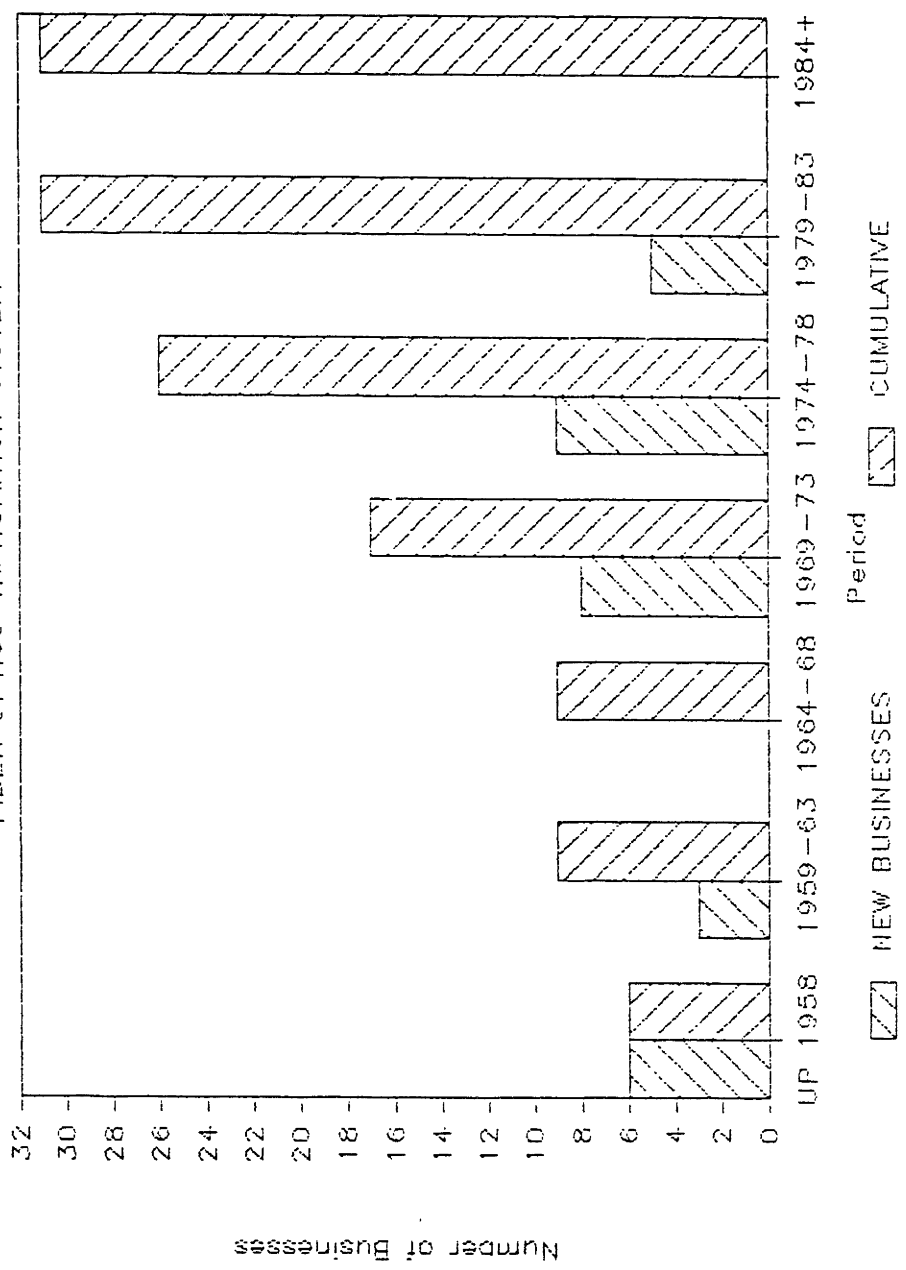


L.O.B. 12  
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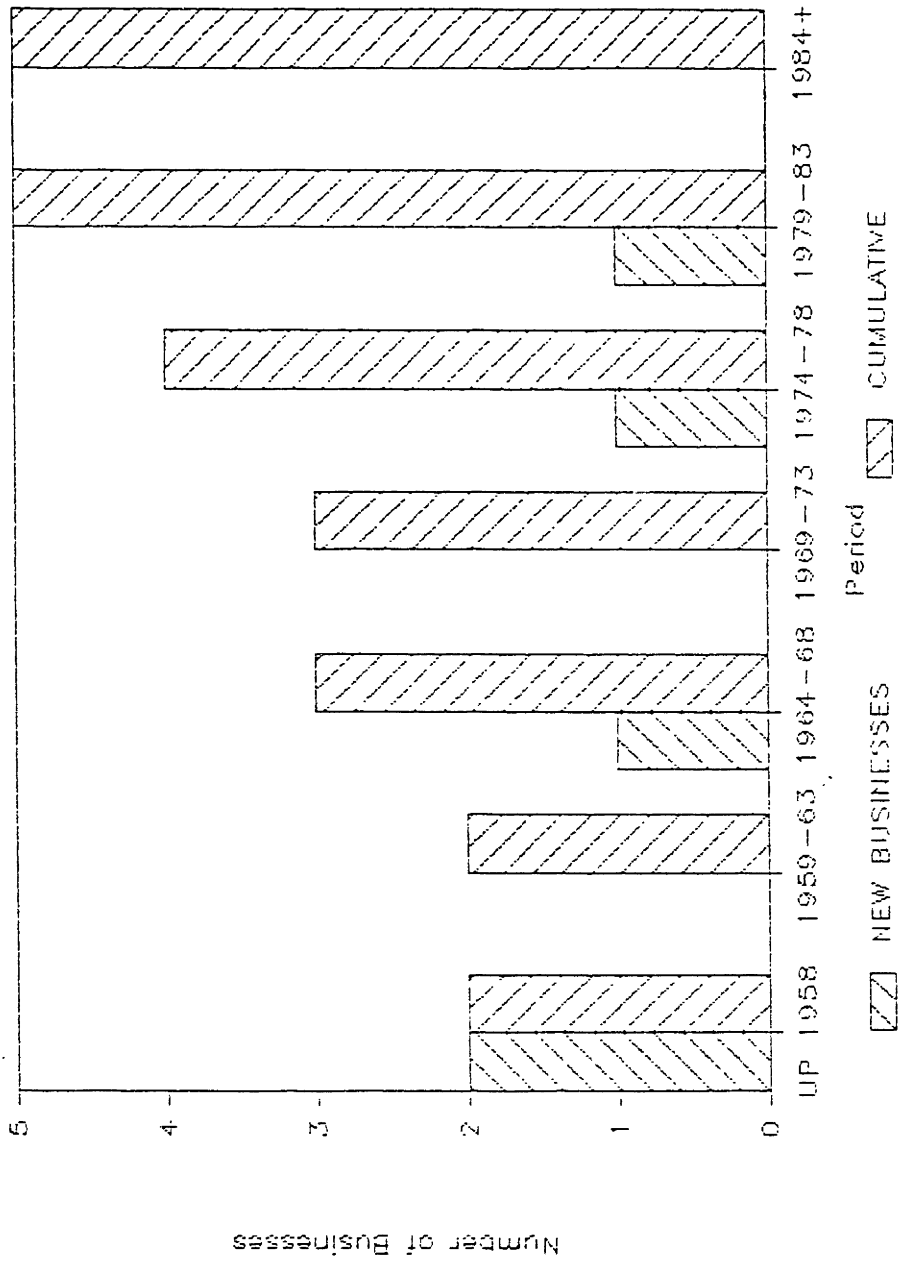


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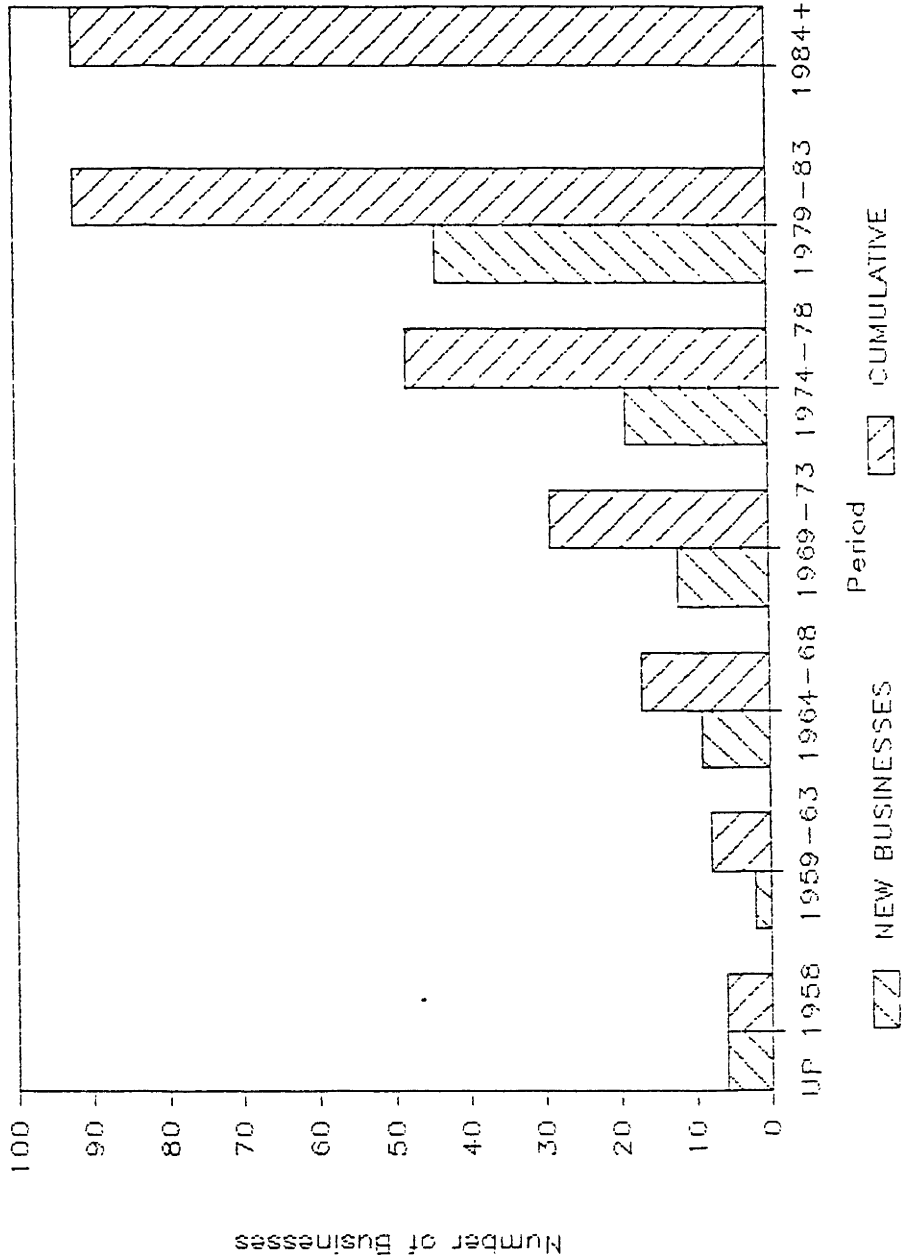
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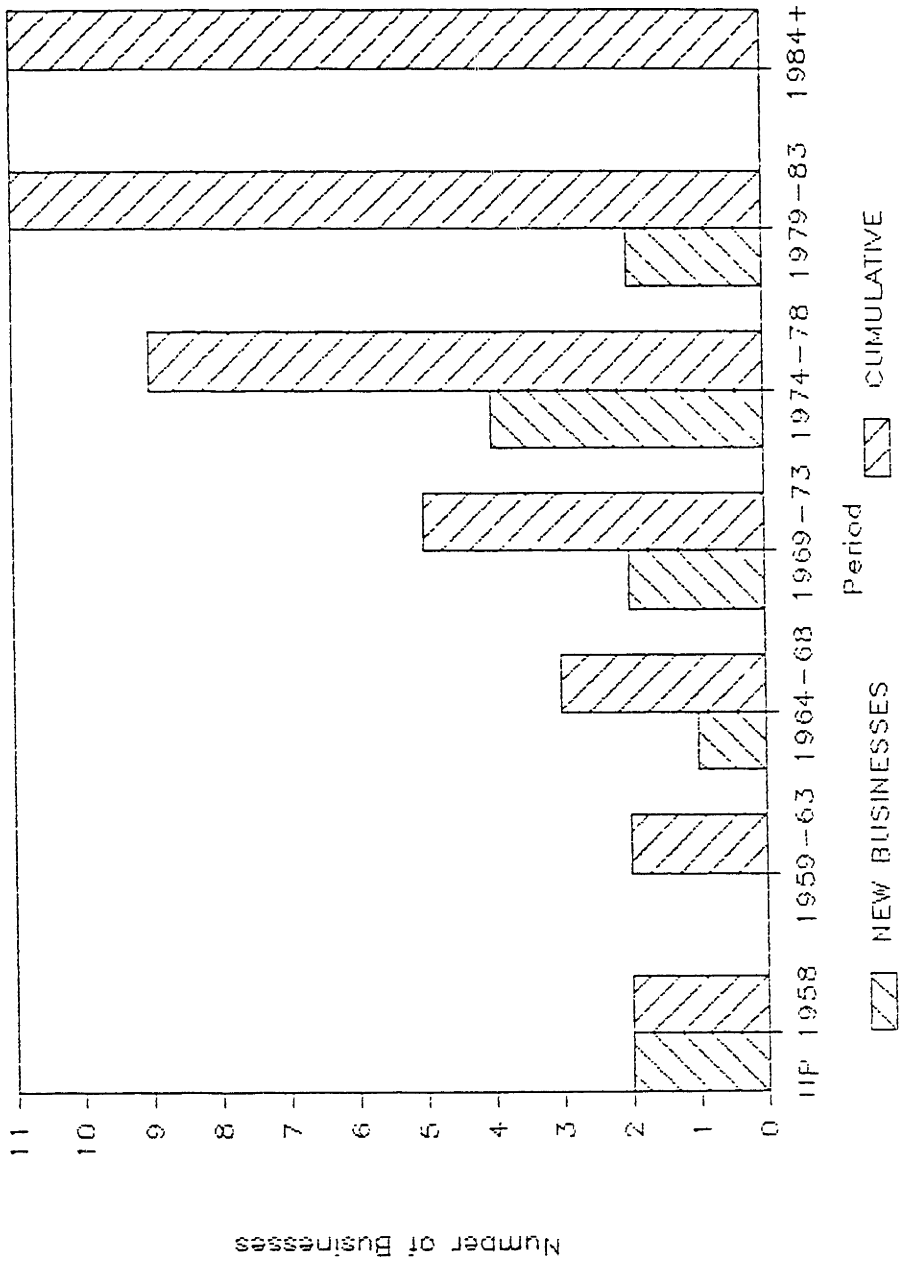
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OPTICAL FIBER MANUFACTURER



L.O.B. 15  
LOCAL AREA NETWORK

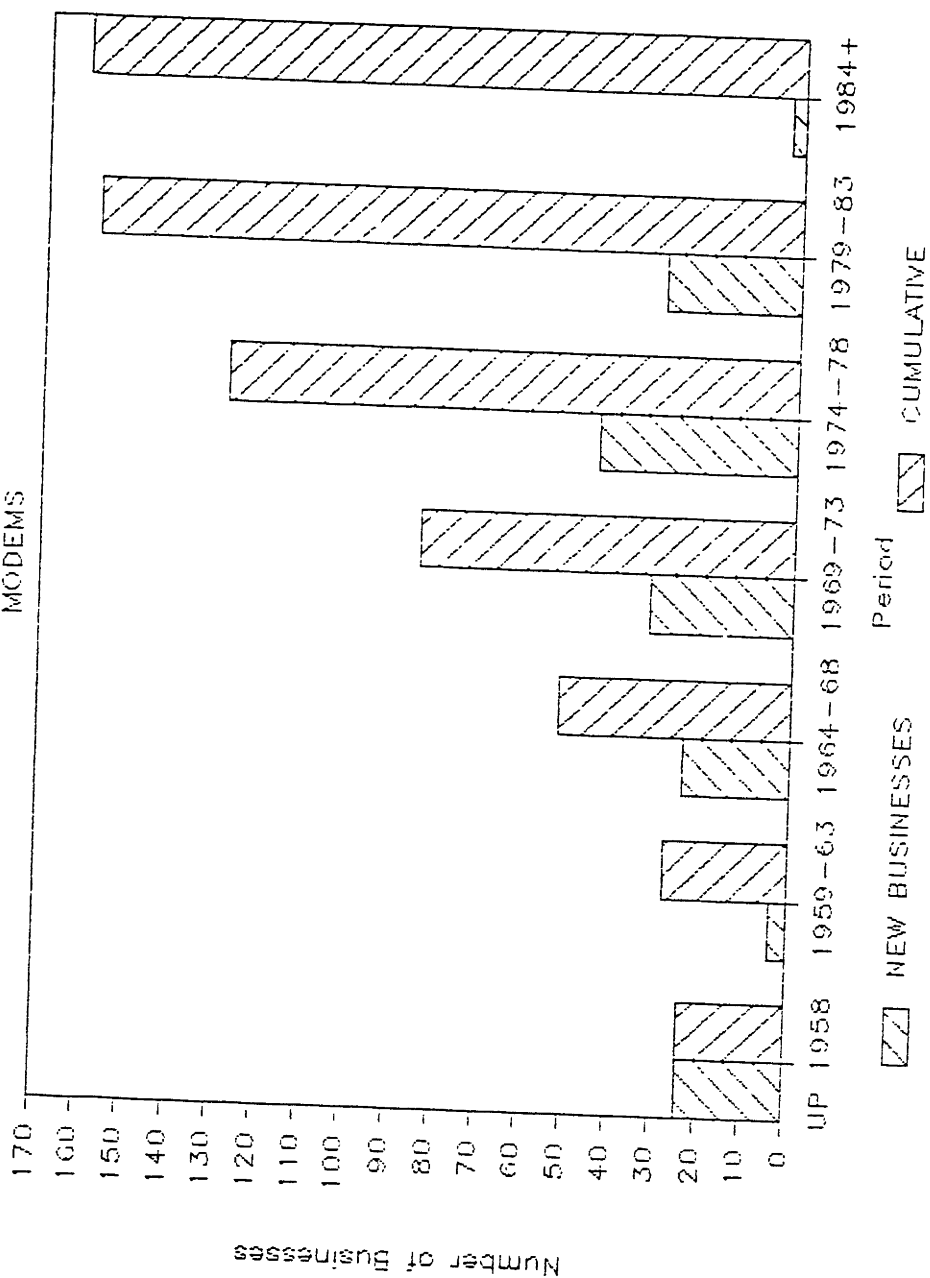


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 PROPRIETARY LOCAL AREA NETWORK



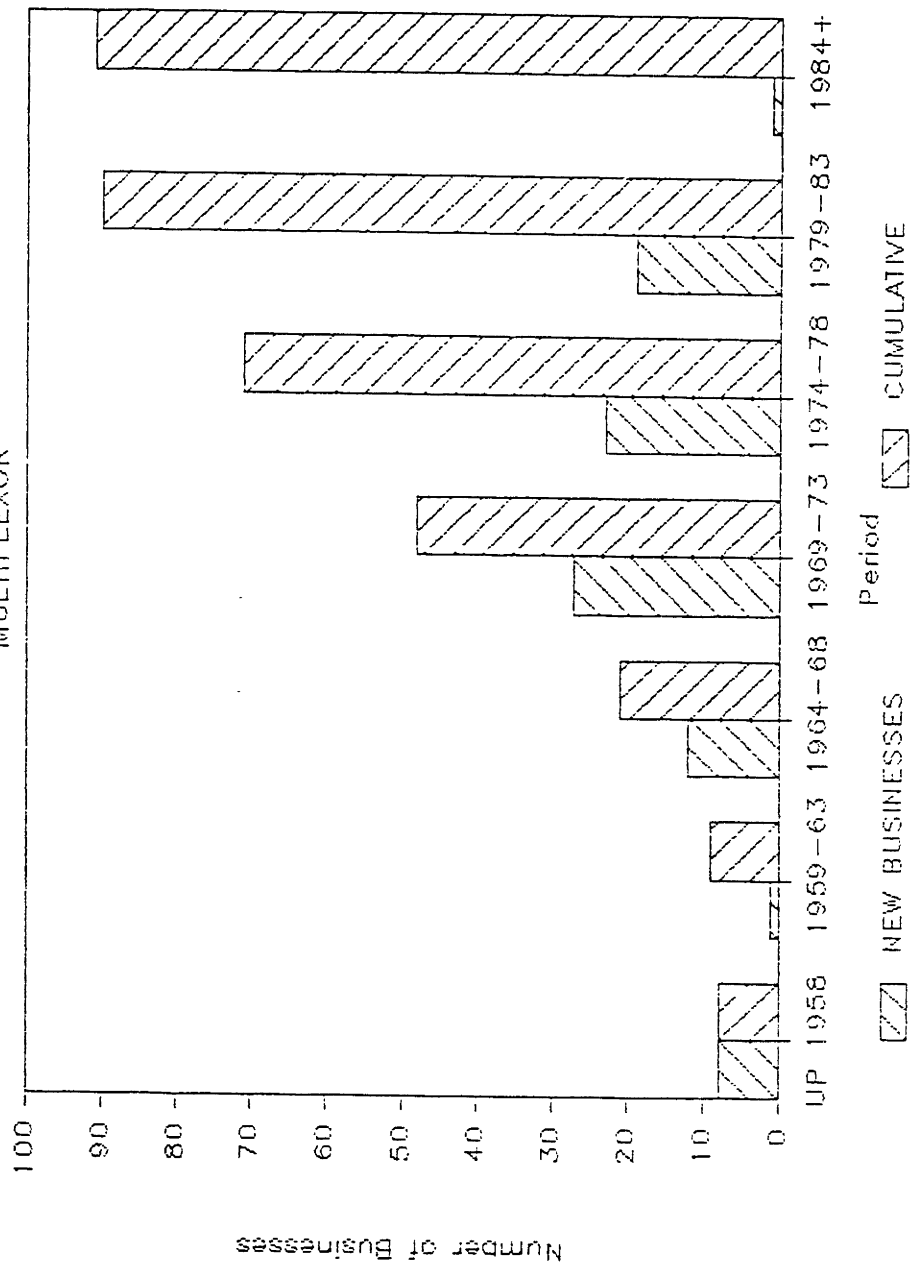
# L.O.B. 17

## MODEMS

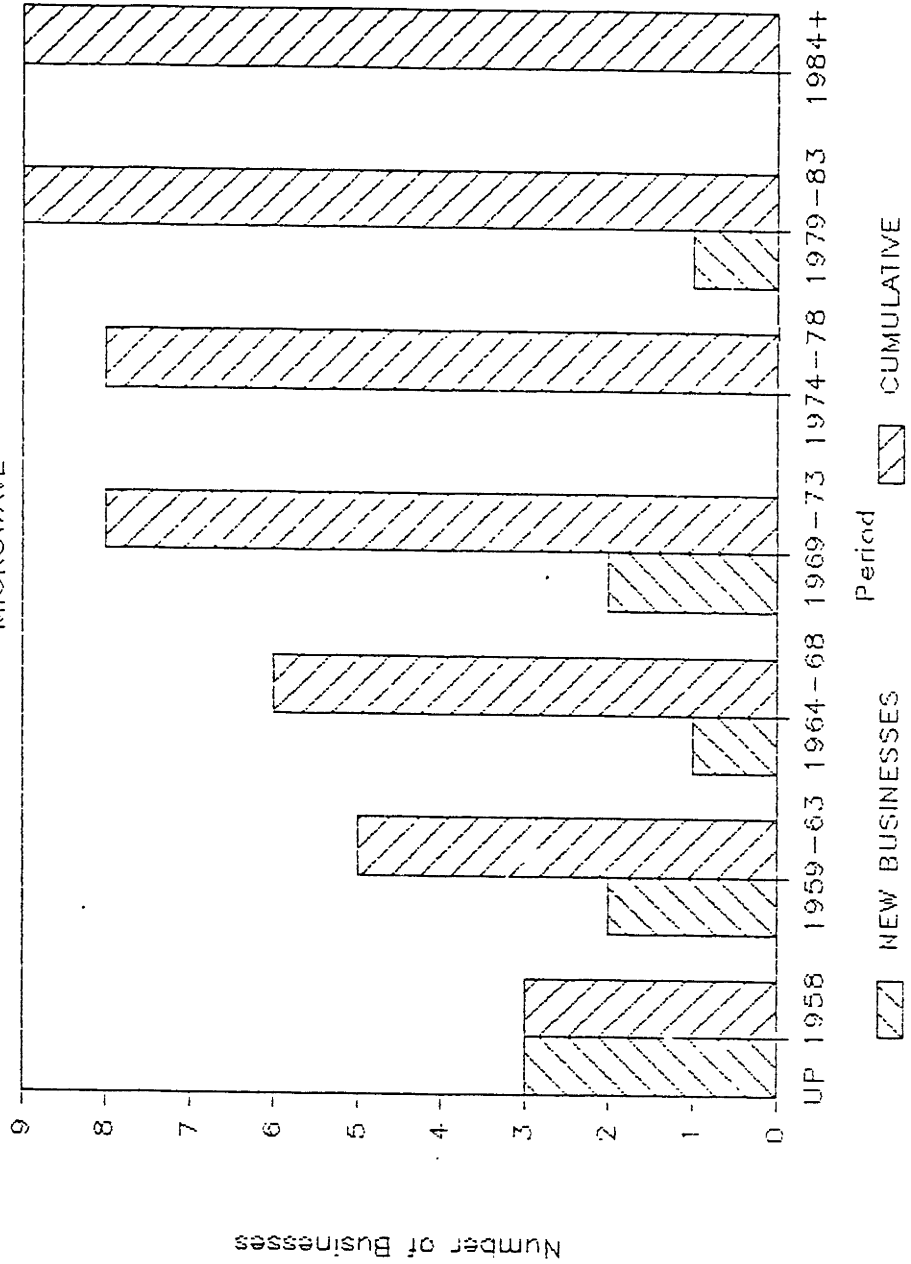




L.O.B. 18  
MULTIPLEXOR

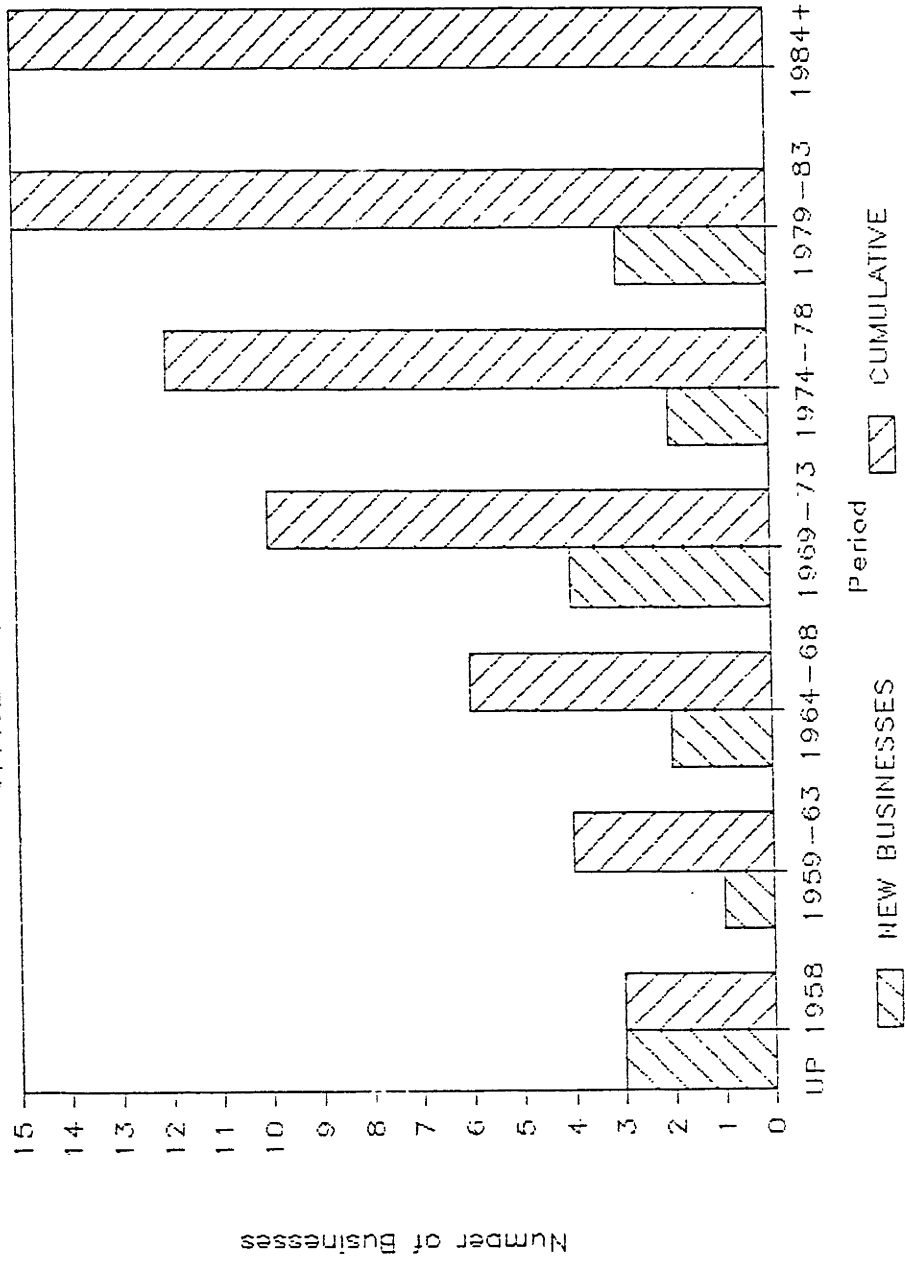


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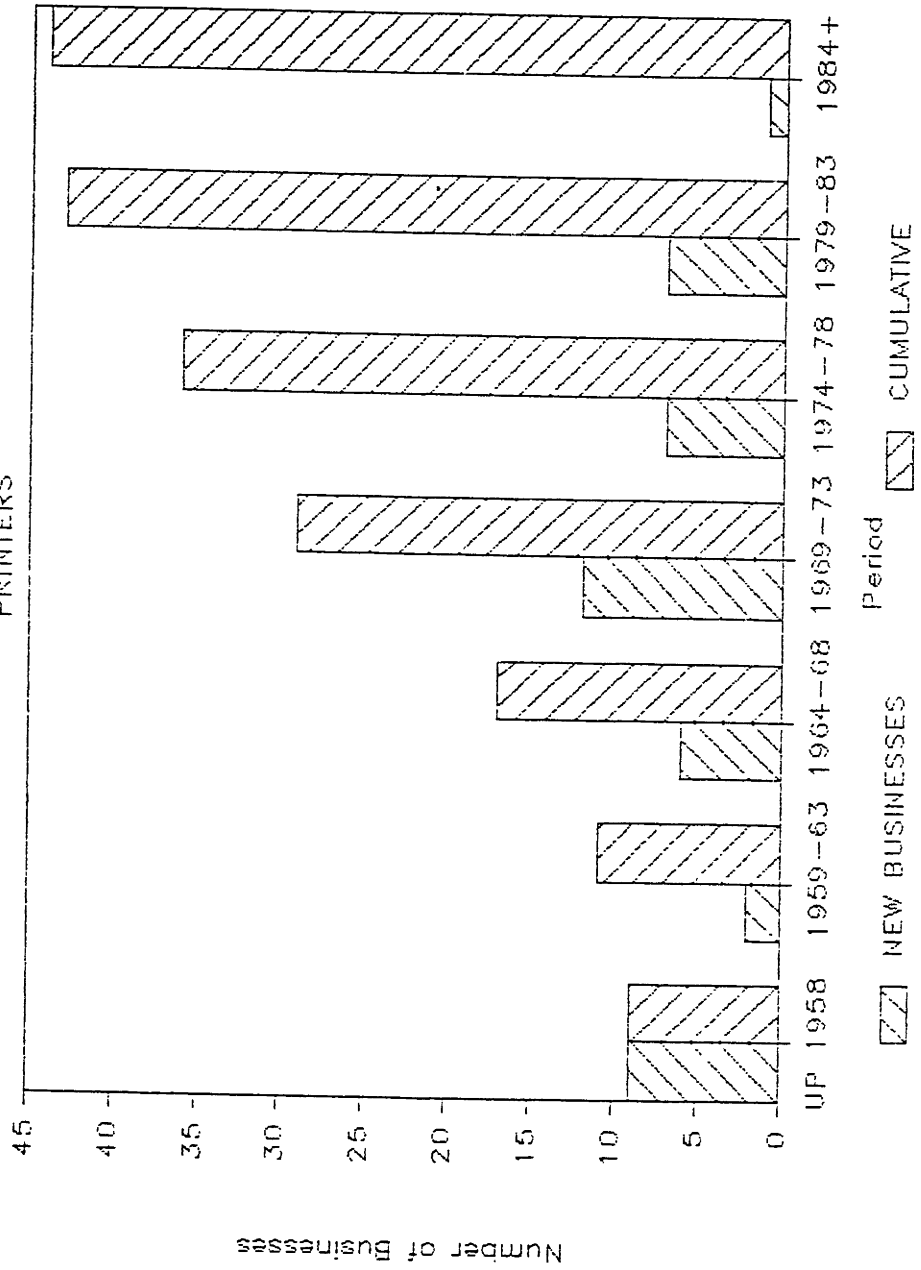


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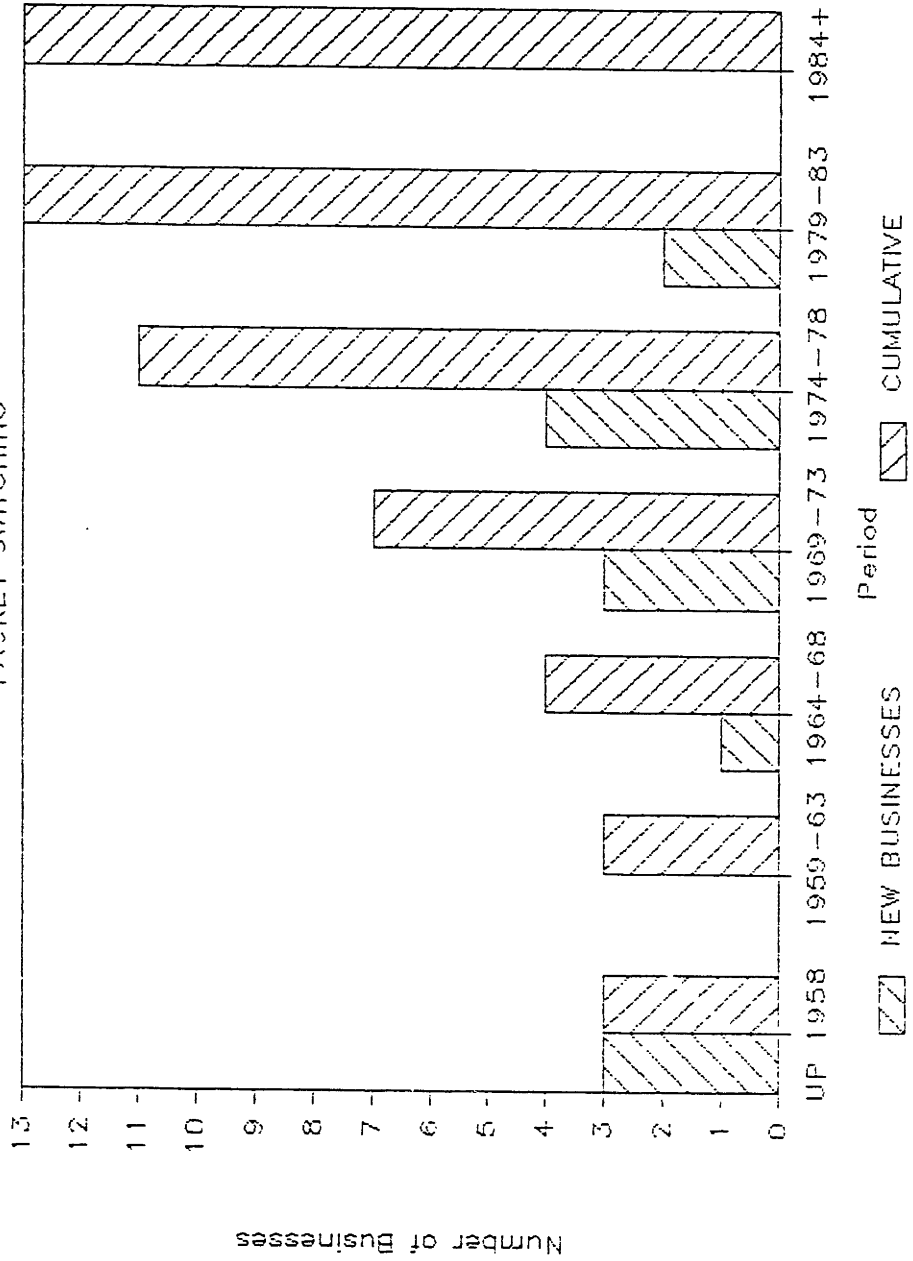
## OFFICE AUTOMATION EQUIPMENT



# L.O.B. 21 PRINTERS

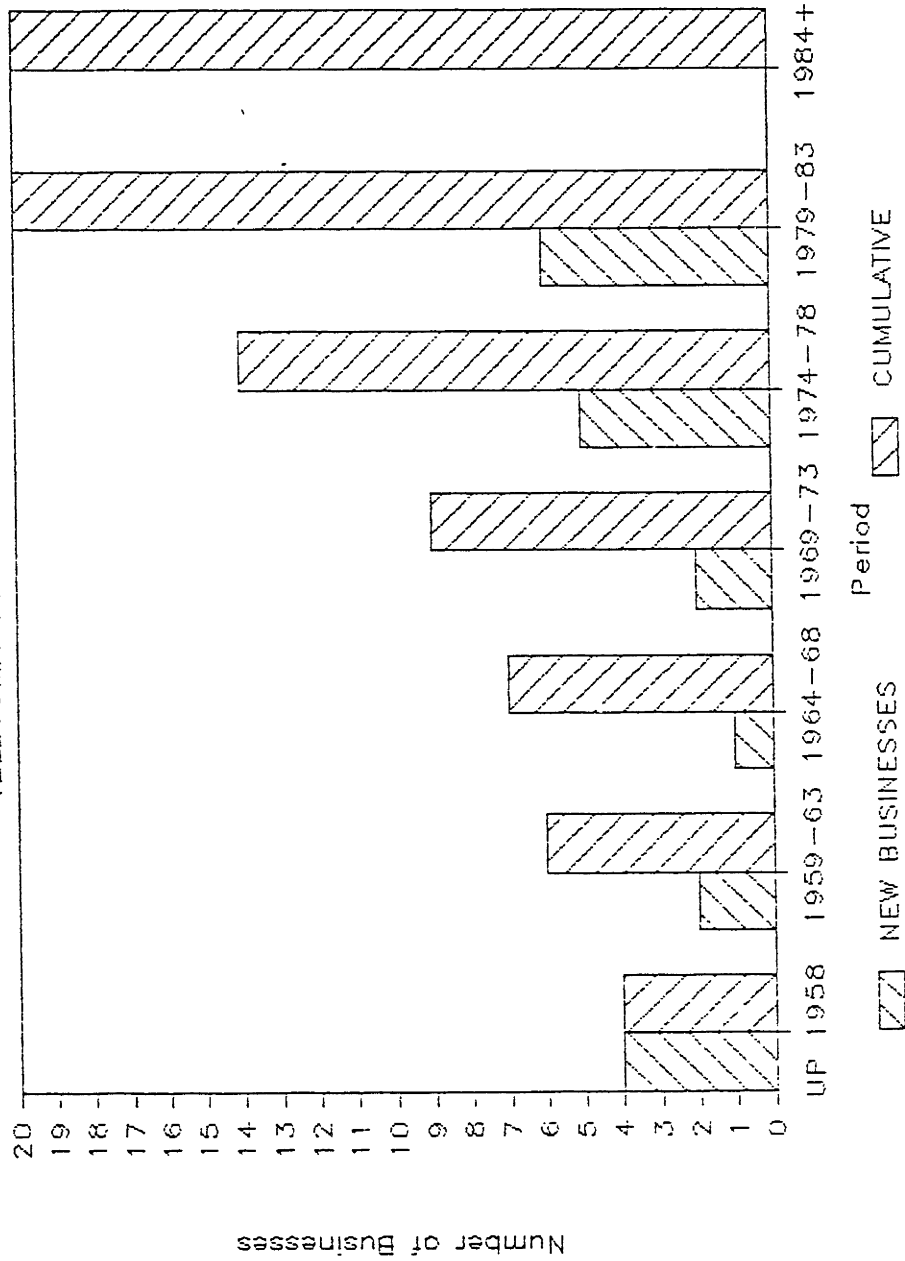


L.O.B. 22  
 PACKET SWITCHING

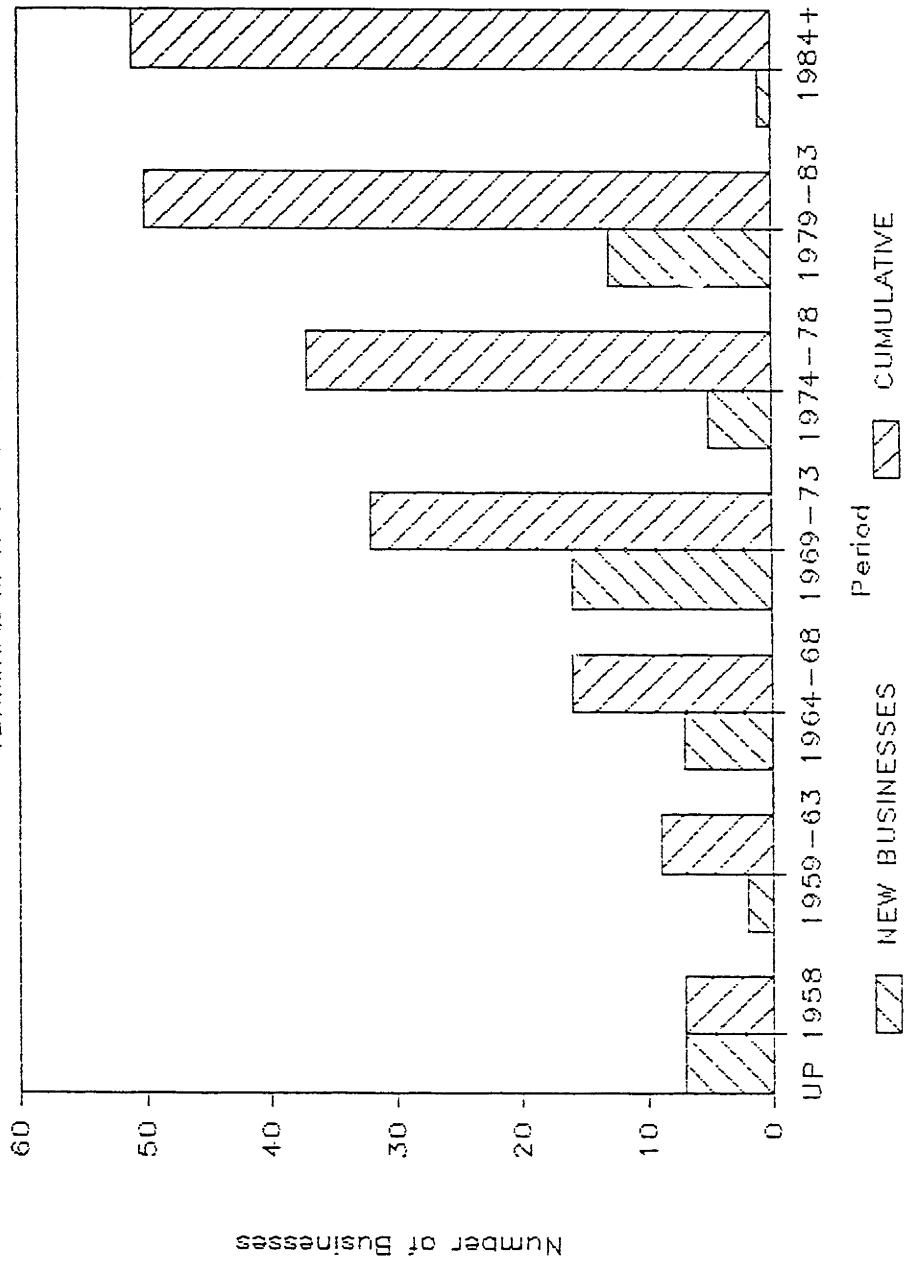


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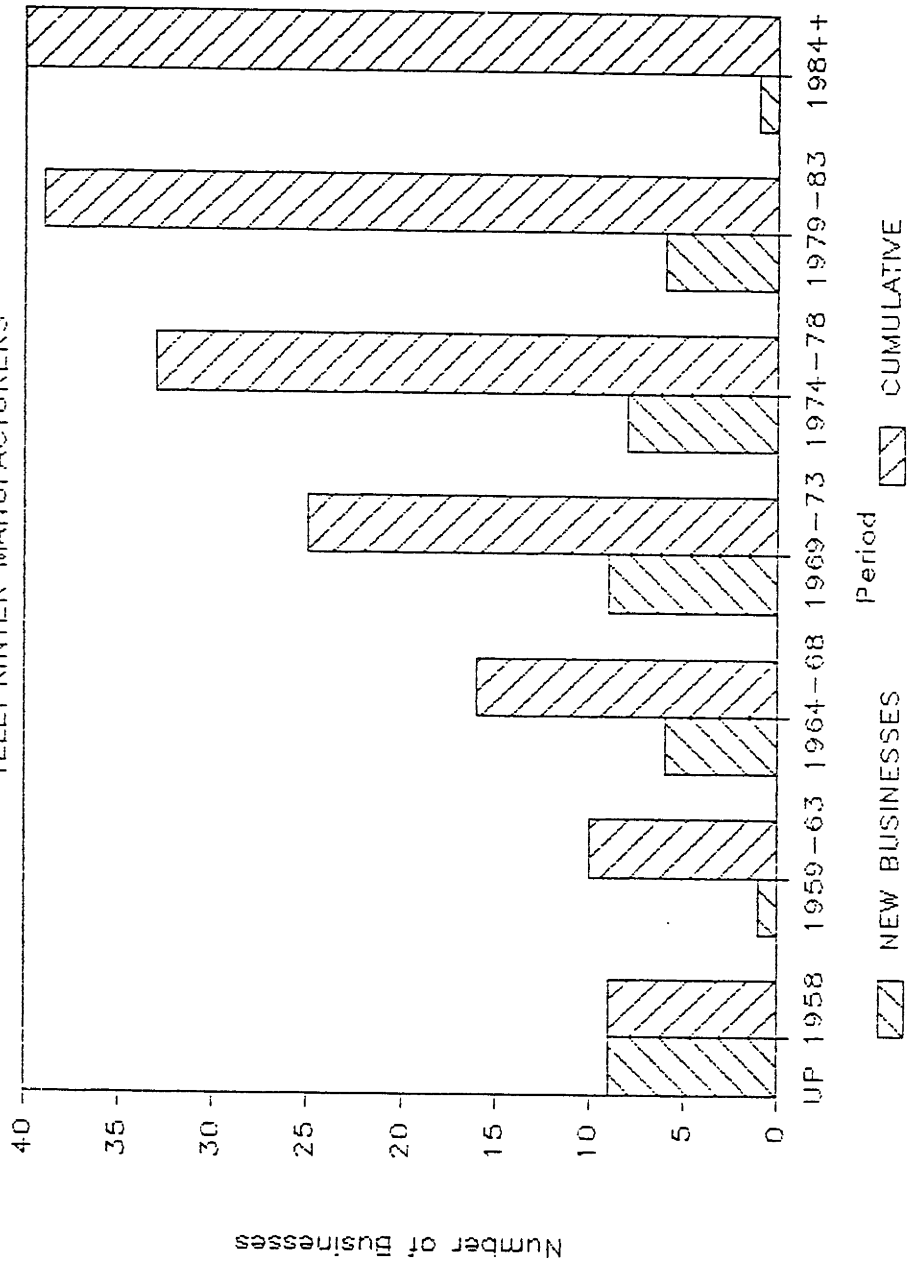
## TELECOMMUNICATION RESELLERS



L.O.B. 24  
 TERMINAL MANUFACTURERS



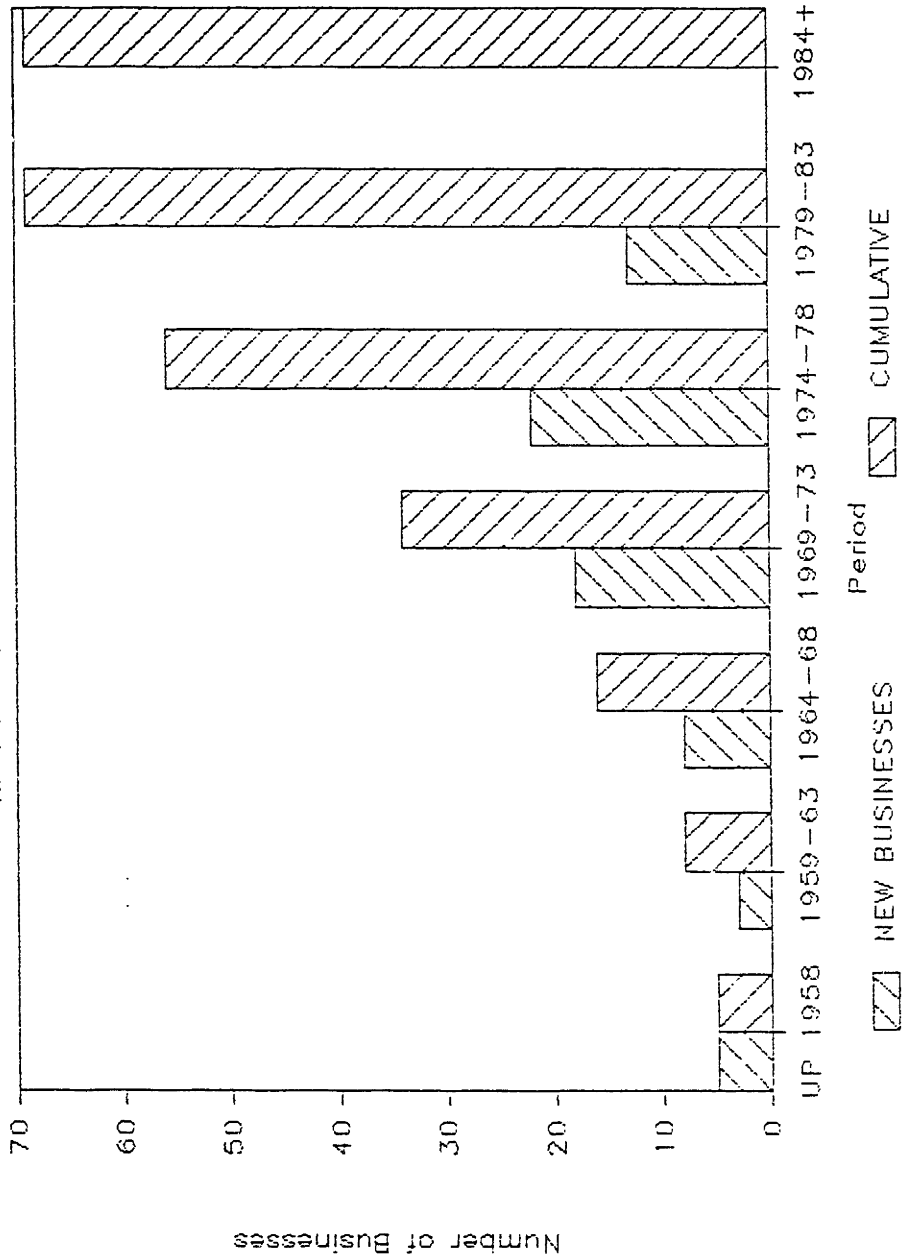
L.O.B. 25  
TELEPRINTER MANUFACTURERS





# L.O.B. 26

## TEST EQUIPMENT MANUFACTURERS



APPENDIX 3

			Highly Unatt.	Mildly Unatt.	Neutral	Mildly Att.	Highly Att.	Transmission
BARRIERS TO ENTRY	Economies of Scale	Small						Large
	Product differentiation	Little						
BARRIERS TO EXIT	Brand identify	Low						High
	Switching cost	Low						High
RIVALRY AMONG COMPETITORS	Access to distribution channel	Ample						Restricted
	Capital requirements	Low						High
BARRIERS TO ENTRY	Access to latest technology	Ample						Restricted (Proprietary)
	Access to raw materials	Ample						Restricted
BARRIERS TO EXIT	Government protection	Nonexistent						High
	Experience effect	Unimportant						Very important
BARRIERS TO EXIT	Asset specialization	High						Low
	One time cost of exit	High						Low
RIVALRY AMONG COMPETITORS	Strategic inter-relationship	High						Low
	Emotional barriers	High						Low
RIVALRY AMONG COMPETITORS	Government and social restrictions	High						Low
	Number of equally balanced competitors	Large						Small
RIVALRY AMONG COMPETITORS	Industry growth	Slow						Fast
	Fixed or Storage cost	High						Low
RIVALRY AMONG COMPETITORS	Product features	Commodity						Specialty
	Capacity increases	Large increments						Continuously
RIVALRY AMONG COMPETITORS	Diversity of competitors	High						Low
	Strategic stakes	High						Low

			Highly Unatt.	Mildly Unatt.	Neutral	Mildly Att.	Highly Att.	Transmission
AVAILABILITY OF SUBSTITUTES	Availability of close substitutes	Large						Small
	User's switching cost	Low						High
AVAILABILITY OF SUBSTITUTES	Substitute producer's profitability and aggressiveness	High						Low
	Substitute price/value	High						Low
GOVERNMENT ACTIONS	Industry protection	Unfavorable						Favorable
	Industry regulation	Unfavorable						Favorable
GOVERNMENT ACTIONS	Consistency of policies	Low						High
	Capital movements among countries	Restricted						Unrestricted
GOVERNMENT ACTIONS	Custom duties	Restricted						Unrestricted
	Foreign exchange	Restricted						Unrestricted
GOVERNMENT ACTIONS	Foreign ownership	Limited						Unlimited
	Assistance provided to competitors	Substantial						None

		Highly Unatt.	Mildly Unatt.	Neutra	Mildly Att.	Highly Att.	Transmission:
POWER OF BUYERS	Number of important buyers	Few					Many
	Availability of substitutes of the industry products	Many					Few
	Buyer switching costs	Low					High
	Buyer's threat of backward integration	High					Low
	Industry threat of forward integration	Low					High
	Contribution to quality or service of buyer's products	Large					Small
	Total buyer's cost contributed by the industry	Large fraction					Small fraction
	Buyer's profitability	Low					High
POWER OF SUPPLIERS	Number of important suppliers	Few					Many
	Availability of substitutes for the supplier's products	Low					High
	Differentiation or switching cost of supplier's products	High					Low
	Supplier's threat of forward integration	High					Low
	Industry threat of backward integration	Low					High
	Supplier's contribution to quality or service of the industry products	High					Small
	Total industry cost contributed by suppliers	Large fraction					Small fraction
	Importance of the industry to supplier group	Small					Large

			Highly Unatt.	Mildly Unatt.	Neutra	Mildly Att.	Highly Att.	Products
POWER OF BUYERS	Number of important buyers	Few						Many
	Availability of substitutes of the industry products	Many						Few
	Buyer switching costs	Low						High
	Buyer's threat of backward integration	High						Low
	Industry threat of forward integration	Low						High
	Contribution to quality or service of buyer's products	Large						Small
	Total buyer's cost contributed by the Industry	Large fraction						Small fraction
	Buyer's profitability	Low						High
POWER OF SUPPLIERS	Number of important suppliers	Few						Many
	Availability of substitutes for the supplier's products	Low						High
	Differentiation or switching cost of supplier's products	High						Low
	Supplier's threat of forward integration	High						Low
	Industry threat of backward integration	Low						High
	Supplier's contribution to quality or service of the industry products	High						Small
	Total industry cost contributed by suppliers	Large fraction						Small fraction
	Importance of the industry to supplier group	Small						Large

			Highly Unatt.	Mildly Unatt.	Neutral	Mildly Att.	Highly Att.	Products
BARRIERS TO ENTRY	Economies of Scale	Small						Large
	Product differentiation	Little						Big
	Brand identify	Low						High
	Switching cost	Low						High
	Access to distribution channel	Ample						Restricted
	Capital requirements	Low						High
	Access to latest technology	Ample						Restricted (Proprietary)
	Access to raw materials	Ample						Restricted
	Government protection	Nonexistent						High
	Experience effect	Unimportant						Very Important
BARRIERS TO EXIT	Asset specialization	High						Low
	One time cost of exit	High						Low
	Strategic inter-relationship	High						Low
	Emotional barriers	High						Low
Government and social restrictions	High						Low	
RIVALRY AMONG COMPETITORS	Number of equally balanced competitors	Large						Small
	Industry growth	Slow						Fast
	Fixed or Storage cost	High						Low
	Product features	Commodity						Specialty
	Capacity increases	Large increments						Continuously
	Diversity of competitors	High						Low
	Strategic stakes	High						Low

			Highly Unatt.	Mildly Unatt.	Neutral	Mildly Att.	Highly Att.	Products
AVAILABILITY OF SUBSTITUTES	Availability of close substitutes	Large						Small
	User's switching cost	Low						High
	Substitute producer's profitability and aggressiveness	High						Low
	Substitute price/value	High						Low
GOVERNMENT ACTIONS	Industry protection	Unfavorable						Favorable
	Industry regulation	Unfavorable						Favorable
	Consistency of policies	Low						High
	Capital movements among countries	Restricted						Unrestricted
	Custom duties	Restricted						Unrestricted
	Foreign exchange	Restricted						Unrestricted
	Foreign ownership	Limited						Unlimited
Assistance provided to competitors	Substantial						None	

TABLE 1 - 1982

COMPANY	REVENUES	NET PROFITS	RETAINED PROFITS	AVERAGE EQUITY	p	ROE	g
MCI	506.352	86,451	83,099	194,414	0.961	0.4467	0.4292
GTE	11,767	835,626	313,488	5,675.40	0.389	0.1472	0.0572
AT&T	65,093	7,278.8	2523.60	58,396.05	0.346	0.1246	0.0431
IBM	34,364	4,409	2356	19,060.00	0.534	0.2313	0.1235
ROLM	380.577	29,827	29,827	140,834	1.000	0.2117	0.2117
HARRIS	1,301.754	75,550	47,947	683,377	0.634	0.1105	0.0700
U. TELECOM	2,414.354	201,563	196,666	1,441,800	0.975	0.1398	0.1364

COMPANY	M	B	M/B	D	D/E	Bu	Ke
MCI	14,6875	3.31	4.43	400.018	1.661	1.59	.2219
GTE	36.00	31.51	1.14	8,301	1.459	0.75	.1480
AT&T	57.25	69.07	0.82	44,105	0.712	0.50	.1260
IBM	76.81	38.02	2.31	2,815	0.142	0.76	.1488
ROLM	60.12	17.39	3.46	35,122	0.219	1.95	.2536
HARRIS	30.75	19.05	1.66	222,891	0.373	1.40	.2052
U. TELECOM	19.62	27.27	0.72	1,845,440	1.227	0.64	.1383

COMPANY	ROE-ke	E/B	g/G	(ROE-g)/(ke-g)
MCI	0.2248	1.6508	4.4661	-0.0844
GTE	-0.0008	0.9980	0.5952	0.9911
AT&T	-0.0014	0.9965	0.4484	0.9831
IBM	0.0825	1.2107	1.2851	4.2608
ROLM	-0.0419	0.9021	2.2029	0.0000
HARRIS	-0.0947	0.7878	0.7284	0.241186
U. TELECOM	-0.0015	1.0039	1.4193	1.789474

TABLE 2 - 1984

COMPANY	REVENUES	NET PROFITS	RETAINED PROFITS	AVERAGE EQUITY	P	ROE	g
MCI	1,959,291	59,203	59,203	1,159,350	1.000	0.0510	0.0510
GTE	14,547,344	1,125,118	527,040	7,764,4045	0.468	0.1449	0.0697
IBM	45,937	6,582	4,075	24,854	0.619	0.2648	0.1639
ROLM	659,704	37,731	37,731	461,527	1.000	0.0817	0.0817
HARRIS	1,995,800	80,410	45,584	789,678	0.567	0.1018	0.0577
U. TELECOM	5,440,680	235,238	66,244	1,678,141	0.281	0.1401	0.0394
AT&T	33,187,500	1369,900	36,100	13,065,15	0.263	0.1048	0.0027
B. SOUTH	9,518,600	1257,200	491,200	9,030,20	0.390	0.1392	0.0543
B. ATLANTIC	8,090,100	973,100	344,300	7,277,90	0.353	0.1346	0.0476
AMERITECH	8,346,800	990,600	404,800	6,836,80	0.408	0.1448	0.0591
NYNEX	9,506,800	986,400	393,600	7,533,75	0.399	0.1309	0.0522
US WEST	7,279,600	887,000	369,200	6,488,35	0.416	0.1367	0.0568
S. BELL	7,191,300	883,100	334,100	7,154,15	0.378	0.1234	0.0466
PAC. TELESTIS	7,824,300	828,500	297,300	6,590,00	0.358	0.1257	0.0451

COMPANY	M	B	M/B	D	D/E	Bu	Ke
MCI	14.43	2.96	1.565	1,821,138	1.5187	1.59	.2219
GTE	35.25	1.04	1.190	8,599,275	1.0363	0.75	.1480
IBM	91.31	2.40	3.220	9,640,000	0.3639	0.76	.1488
ROLM	48.62	2.095	2.960	3,528,000	0.0065	1.95	.2536
HARRIS	40.31	1.96	1.350	213,296	0.2607	1.40	.2052
U. TELECOM	19.50	1.030	1.170	1,836,239	1.0704	0.64	.1383
AT&T	18.06	1.36	1.410	8,717,500	0.6334	0.18	.0978
B. SOUTH	30.75	0.28	0.300	6,440,500	0.6841	0.50	.1260
B. ATLANTIC	72.62	0.96	1.023	4,745,000	0.6319	0.50	.1260
AMERITECH	54.43	0.65	0.880	4,799,300	0.6771	0.50	.1260
NYNEX	66.75	0.79	0.870	5,442,600	0.7545	0.50	.1260
U. WEST	61.56	0.81	0.860	4,854,900	0.7303	0.50	.1260
S. BELL	62.12	0.88	0.920	4,934,700	0.7054	0.50	.1260
P. TELESTIS	60.37	0.85	0.930	5,384,500	0.8306	0.50	.1260

TABLE 2 - 1984

COMPANY	ROE-Ke	E/B	g/G	(ROE-g)/(Ke-g)
MCI	-0.1709	0.6363	1	0.000
GTE	-0.00031	0.9924	1.3666	0.9604
IBM	0.1160	1.3069	3.2137	-6.6821
ROLM	-0.1719	0.6424	1.6019	0.000
HARRIS	-0.1034	0.7728	1.1313	0.2989
U. TELECOM	-0.0018	1.0043	0.7725	1.0182
AT&T	0.0070	1.01751	0.0529	1.0736
B. SOUTH	0.0132	1.0329	1.0647	1.1841
B. ATLANTIC	0.0086	1.021354	0.9333	1.1096
AMERITECH	0.0188	1.047172	1.1588	1.2810
NYNEX	0.0049	1.0122	1.0235	1.0663
US WEST	0.0107	1.0267	1.1137	1.1546
S. BELL	0.0026	0.9935	0.9137	0.9672
P. TELESIS	0.0003	0.9992	0.8843	0.9962



TABLE 1 (a) - 1982

COMPANY	$\left( \frac{ROE - g}{Ke - g} \right)$	$\left( \frac{1 + g}{1 + Ke} \right)^n$	1 - (3)	(2) x (4)	$\frac{(5) + (3)}{E/B}$
MCI	-0.0844419	1.600192	-0.600192	0.050681	1.65087
GTE	0.991189	0.780991	0.219009	0.217080	0.998071
AT&T	0.983112	0.794992	0.205008	0.201546	0.996538
IBM	4.260870	0.935375	0.064625	0.275357	1.210732
HARRIS	0.241186	0.720404	0.279596	0.067435	0.787839
U. TELECOM	1.789474	0.995001	0.004999	0.008946	1.003947
ROLM	0.000000	0.902179	0.097821	0.000000	0.902179

TABLE 2 (a) - 1984

COMPANY	$\left( \frac{ROE - g}{Ke - g} \right)$	$\left( \frac{1 + g}{1 + Ke} \right)^n$	1 - (3)	(2) x (4)	$\frac{(5) + (3)}{E/B}$
MCI	0.000000	0.636357	0.363643	0.000000	0.636357
GTE	0.960409	0.809022	0.190978	0.183417	0.992434
IBM	-6.682119	1.039953	-0.039953	0.266971	1.306924
ROLM	0.000000	0.642456	0.357544	0.000000	0.642456
HARRIS	0.298983	0.675943	0.324057	0.096888	0.772831
U. TELECOM	1.018200	0.761339	0.238661	0.243005	1.004344
AT&T	1.0736007	0.761980	0.238020	0.255539	1.017519
B. SOUTH	1.184100	0.820876	0.179124	0.212101	1.032977
B. ATLANTIC	1.109694	0.805325	0.194675	0.216029	1.021354
AMERITECH	1.281016	0.832139	0.167861	0.215033	1.047172
NYNEX	1.066396	0.815980	0.184020	0.196238	1.012218
U.S. WEST	1.154624	0.826729	0.173271	0.200063	1.026792
S.W. BELL	0.967254	0.803021	0.196979	0.190529	0.993550
P. TELESIS	0.996292	0.799573	0.200427	0.199683	0.999256