MAPPING THE
INFORMATION BUSINESS

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Program on Information Resources Policy

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Center for Information
Policy Research

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John F. McLaughlin

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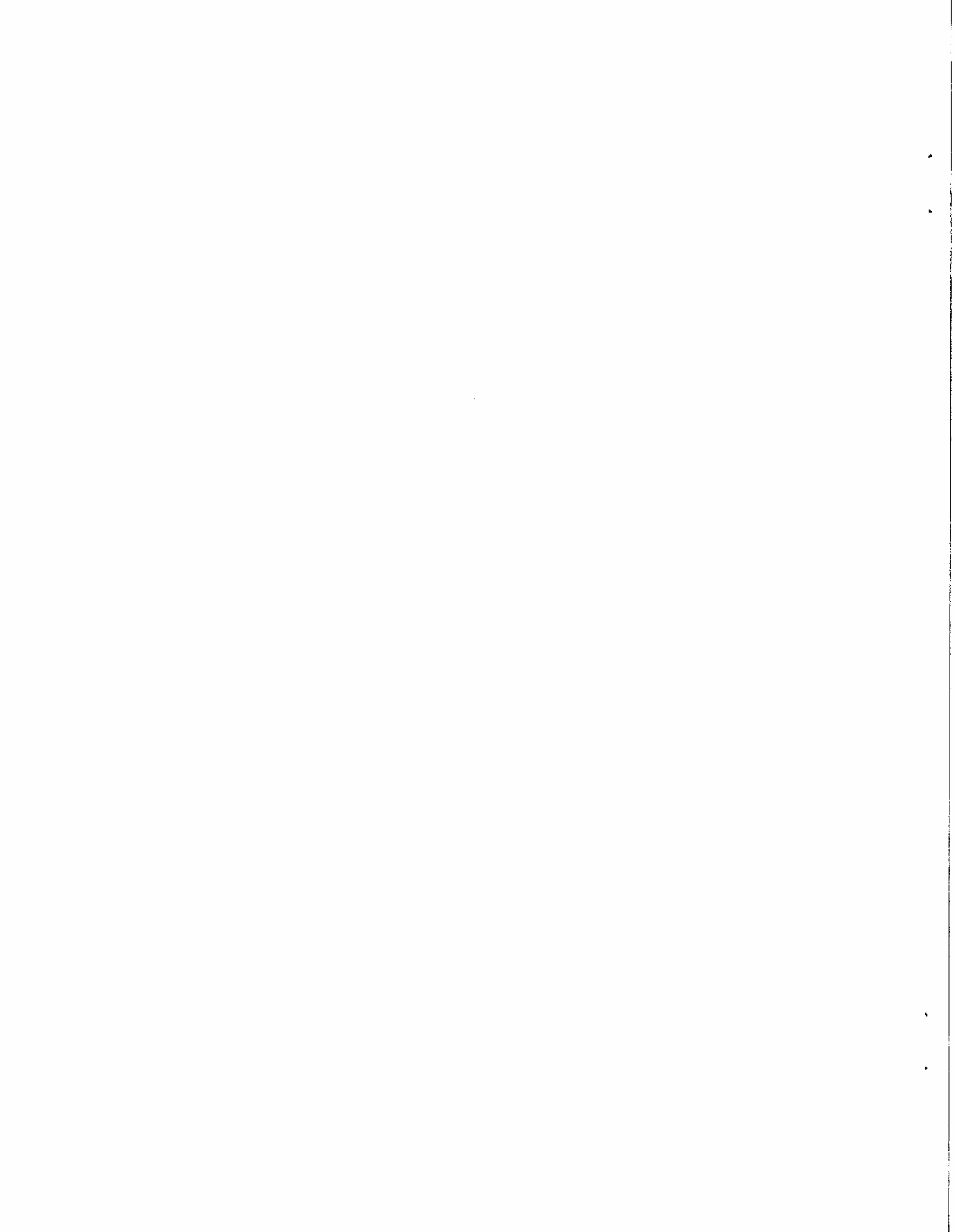**Harvard University**   **Center for Information Policy Research**

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   National Security Agency
   U.S. General Accounting Office
   United States Postal Rate Commission
United Telecommunications, Inc.
US West
The Washington Post Co.

ACKNOWLEDGMENTS

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EXECUTIVE SUMMARY

The information business is a complex of companies and government agencies involved in the acquisition, packaging, processing, storage, transmittal, and distribution of information.
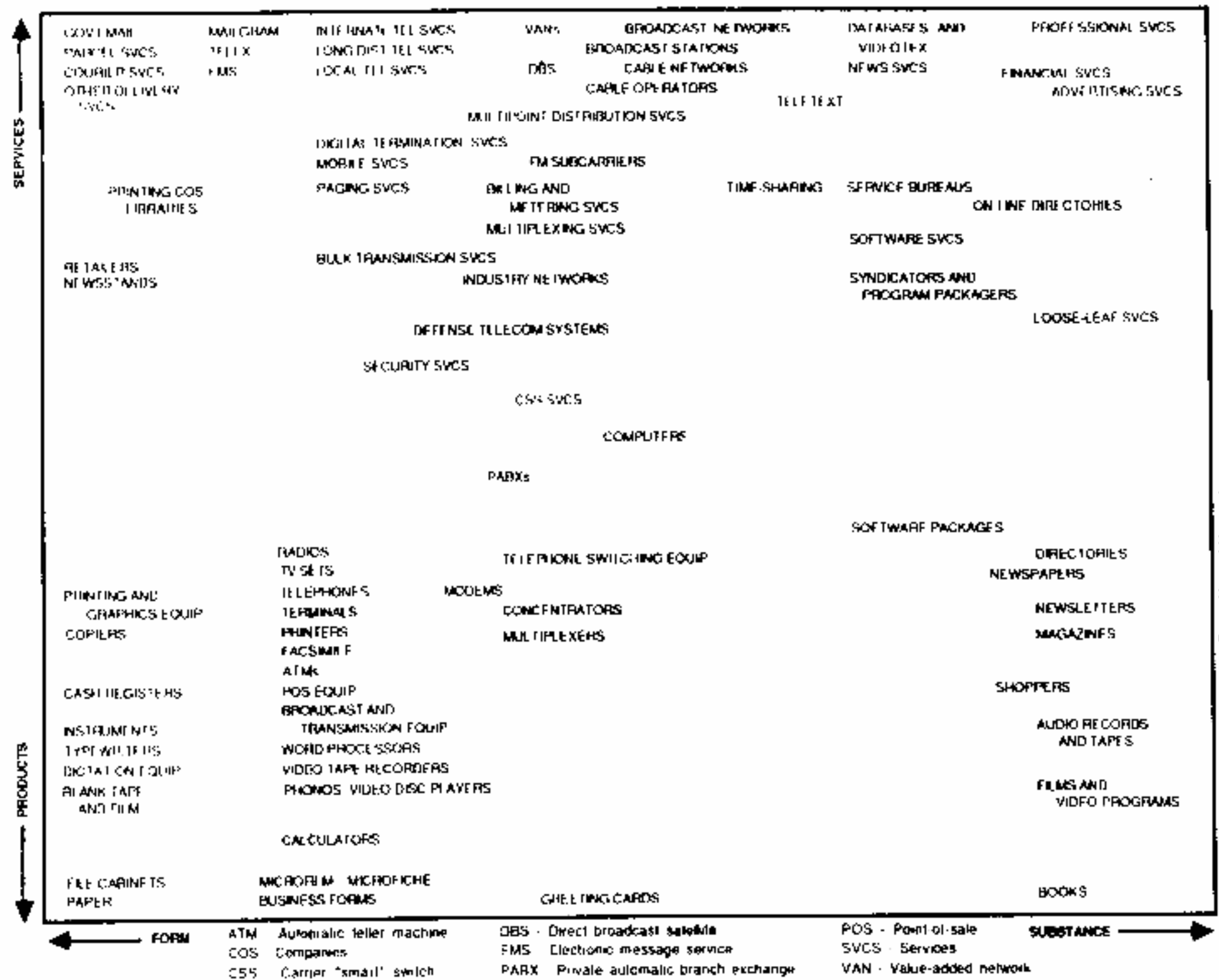
The Information Business

The information business map displays the operating boundaries of players in the information business along product-service and form-substance axes. The map has been useful for illustrating the corporate and regulatory churning underway in the information business in recent years, and serves to highlight areas that invite further attention from financial analysts, public policymakers, and corporate strategists.

The mapping technique can be used to illustrate a variety of relationships and developments in the information business, including:

1. The jurisdictional boundaries of regulatory agencies;

2. The strategic positioning of companies in the information business in relation to regulatory boundaries and competitors' positions;

3. Operations and planning within individual organizations;

4. Some basic forces and trends driving changes in the information business; and

5. The historical evolution of the information business.

The information business map is not a fixed matrix but a dynamic model, and will continue to evolve in response to changes in the information business.

INTRODUCTION

Since its inception in 1972, the Program on Information Resources Policy has been monitoring and analyzing developments in a variety of fields that we have defined (admittedly loosely) as the "information industries." Defining the nature and scope of the information industries -- a field marked by ambiguity and turmoil -- has been a continuing problem for our Program, for policymakers, and for the information industries themselves. While many of the Program's research projects over the years have focused on developments within a specific traditional information industry, such as broadcasting, telephone, or cable TV, we have continually emphasized the interaction among the different information technologies, markets, and types of government intervention. We speak frequently, therefore, about merging technologies ("compunications" and "videotext") and new conflicts among traditional industries: Are information services, whatever they may be, permanently prohibited to the former Bell Operating Companies but open to all other comers? Will provision of such services be regulated, and if so, by whom -- the Federal Communications Commission, the courts, the Department of Justice, or all of the above?

As changes in technology and public policy reshape the traditional information industries, those industries must be viewed as part of a larger world, one that we have termed the information business. Mapping the Information Business presents a framework for viewing the evolving structure of the information business, highlighting not only individual components but also the shifting functional and regulatory boundaries between them. The mapping technique itself is discussed in Chapter 1. Chapter 2 uses the map to review the evolution of the information business. Chapter 3 depicts the scope of government regulation of the business. In Chapter 4, we chart the strategic positioning of individual corporate players. Chapter 5 shows ways of using the map to illustrate some basic forces and trends in the information world at large. Finally, Chapter 6 presents some uses of the map for examining operations and planning within individual organizations in the information business.

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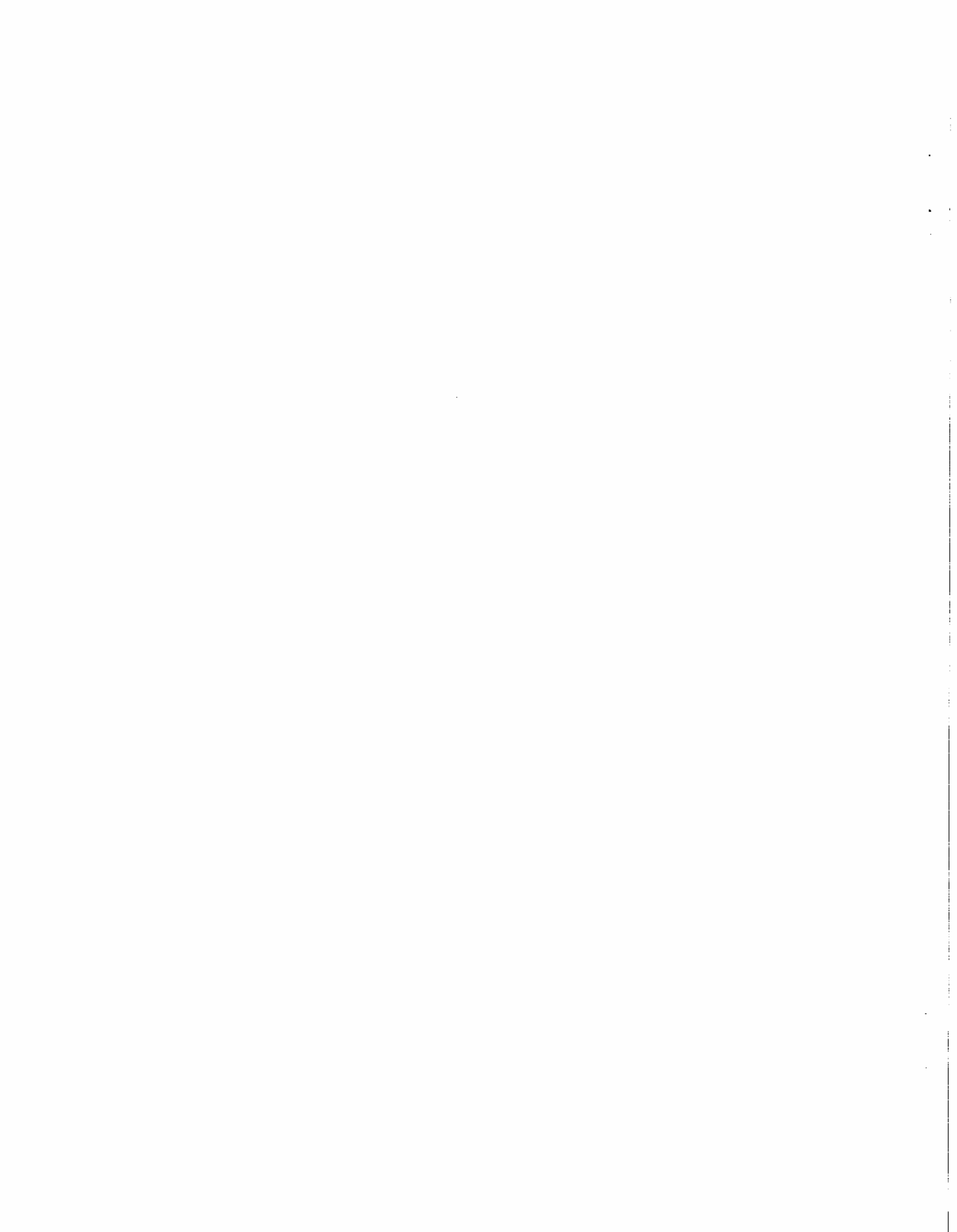
THE INFORMATION BUSINESS MAP

Information comes in many forms. It includes, for example, news, historical statistics, financial transactions, reference materials, advertising, entertainment, and corporate operating data. While different groups may define information differently, for our purposes we have chosen to use the term in its broadest sense.

The companies (and government agencies) that constitute the information business are diverse, with information as their common denominator. Some may exist to acquire information, others to package, store, process, transmit, or distribute it. Some information companies produce and market products to allow companies -- or individuals -- to collect, process, or distribute their own information. Many companies are involved in a wide mix of these functions.

THE BASIC STRUCTURE

Figure 1 is our basic map of the information business. On it we have placed 80-some products and services that, in our view, constitute (or at least suggest) the information business.

We have used the term "information business" for a particular reason. The term "information industry" (or "information industries") suggests a degree of industry structure, cohesion, and integration that is misleading when applied to this collection of products and services. Our collection, moreover, includes many items considered to be industries in and of themselves, plus elements of many other traditional industries.

GOVT MAIL   MAILGRAM   INTERNATL TEL SVCS   VANS   BROADCAST NETWORKS   DATABASES AND   PROFESSIONAL SVCS
PARCEL SVCS   TELEX   LONG DIST TEL SVCS   BROADCAST STATIONS   VIDEOTEX
COURIER SVCS   EMS   LOCAL TEL SVCS   DBS   CABLE NETWORKS   NEWS SVCS
OTHER DELIVERY SVCS   CABLE OPERATORS   FINANCIAL SVCS
  TELETEXT   ADVERTISING SVCS
MULTIPOINT DISTRIBUTION SVCS
DIGITAL TERMINATION SVCS
MOBILE SVCS   FM SUBCARRIERS
PRINTING COS   PAGING SVCS   BILLING AND   TIME SHARING   SERVICE BUREAUS
LIBRARIES   METERING SVCS   ON LINE DATA BASES
MULTIPLEXING SVCS   SOFTWARE SVCS
RETAILERS   BULK TRANSMISSION SVCS
NEWSSTANDS   INDUSTRY NETWORKS   SYNDICATORS AND
PROGRAM PACKAGERS
DEFENSE TELECOM SYSTEMS   LOOSE LEAF SVCS
SECURITY SVCS
CSS SVCS
COMPUTERS
PABXs
SOFTWARE PACKAGES
RADIOS   TELEPHONE SWITCHING EQUIP   DIRECTORIES
TV SETS   NEWSPAPERS
PRINTING AND   TELEPHONES   MODEMS
GRAPHICS EQUIP   TERMINALS   CONCENTRATORS   NEWSLETTERS
COPIERS   PRINTERS   MULTIPLEXERS   MAGAZINES
FACSIMILE
ATMs
CASH REGISTERS   POS EQUIP   SHOPPERS
BROADCAST AND
INSTRUMENTS   TRANSMISSION EQUIP   AUDIO RECORDS
TYPEWRITERS   WORD PROCESSORS   AND TAPES
DICTATION EQUIP   VIDEO TAPE RECORDERS
BLANK TAPE   PHONOS, VIDEO DISC PLAYERS   FILMS AND
AND FILM   VIDEO PROGRAMS
CALCULATORS
FILE CABINETS   MICROFILM, MICROFICHE
PAPER   BUSINESS FORMS   GREETING CARDS   BOOKS

SERVICES — PRODUCTS (vertical axis)   FORM — SUBSTANCE (horizontal axis)

ATM - Automatic teller machine   DBS - Direct broadcast satellite   POS - Point of sale
COS - Companies   EMS - Electronic message service   SVCS - Services
CSS - Carrier "smart" switch   PABX - Private automatic branch exchange   VAN - Value added network

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Figure 1. The Information Business

The axes of the map are Services and Products (north-south) and Form and Substance (west-east). The Products-Services axis was chosen largely because companies and economists traditionally have viewed industrial activity in this manner. Displaying corporate activities along the Products-Services axis helps highlight some facets of vertical integration. It also facilitates display of the fact that traditional notions of "product" and "service" may be blurring into a middle ground of "systems" wherein customers mix and match products and services in order to achieve a desired end. As suggested by Figure 2, a customer might meet a need either by acquiring products such as a multiplexer or a software package or by contracting for multiplexing or software services. Progression along this axis from the product extreme to the service extreme also may be viewed as increasing customer dependence on or interaction with supplying institutions.

SERVICES

GOV'T MAIL MAILGRAM INTERNATL TEL SVCS VANs BROADCAST NETWORKS DATABASES AND PROFESSIONAL SVCS
PARCEL SVCS TELEX LONG DIST TEL SVCS BROADCAST STATIONS VIDEOTEX
COURIER SVCS EMS LOCAL TEL SVCS DBS CABLE NETWORKS NEWS SVCS FINANCIAL SVCS
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BLANK TAPE PHONOS, VIDEO DISC PLAYERS FILMS AND
AND FILM VIDEO PROGRAMS
CALCULATORS
FILE CABINETS MICROFILM, MICROFICHE BOOKS
PAPER BUSINESS FORMS GREETING CARDS

PRODUCTS

◄— FORM SUBSTANCE —►

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Figure 2. Products vs. Services

The Form-Substance axis was chosen because it helps distinguish between those companies that provide means for recording, processing, and transmitting information (recognizing, of course, the problem in trying to differentiate between "processing" and "transmitting") and those companies that traditionally have viewed themselves as producers of information, such as publishers. One definition of "form," according to the American Heritage Dictionary, is "the contour and structure of something as distinguished from its substance." The same source defines "substance" as "the essential nature of anything, as considered apart from its form or attributes...." Progression along this axis from form to substance might best be visualized in terms of increasing "information value added" or, in Marshall McLuhan's terms, a transition from medium to message.

Figure 3 illustrates these distinctions in placement along each axis. All entries are positioned on the map according to these guidelines.
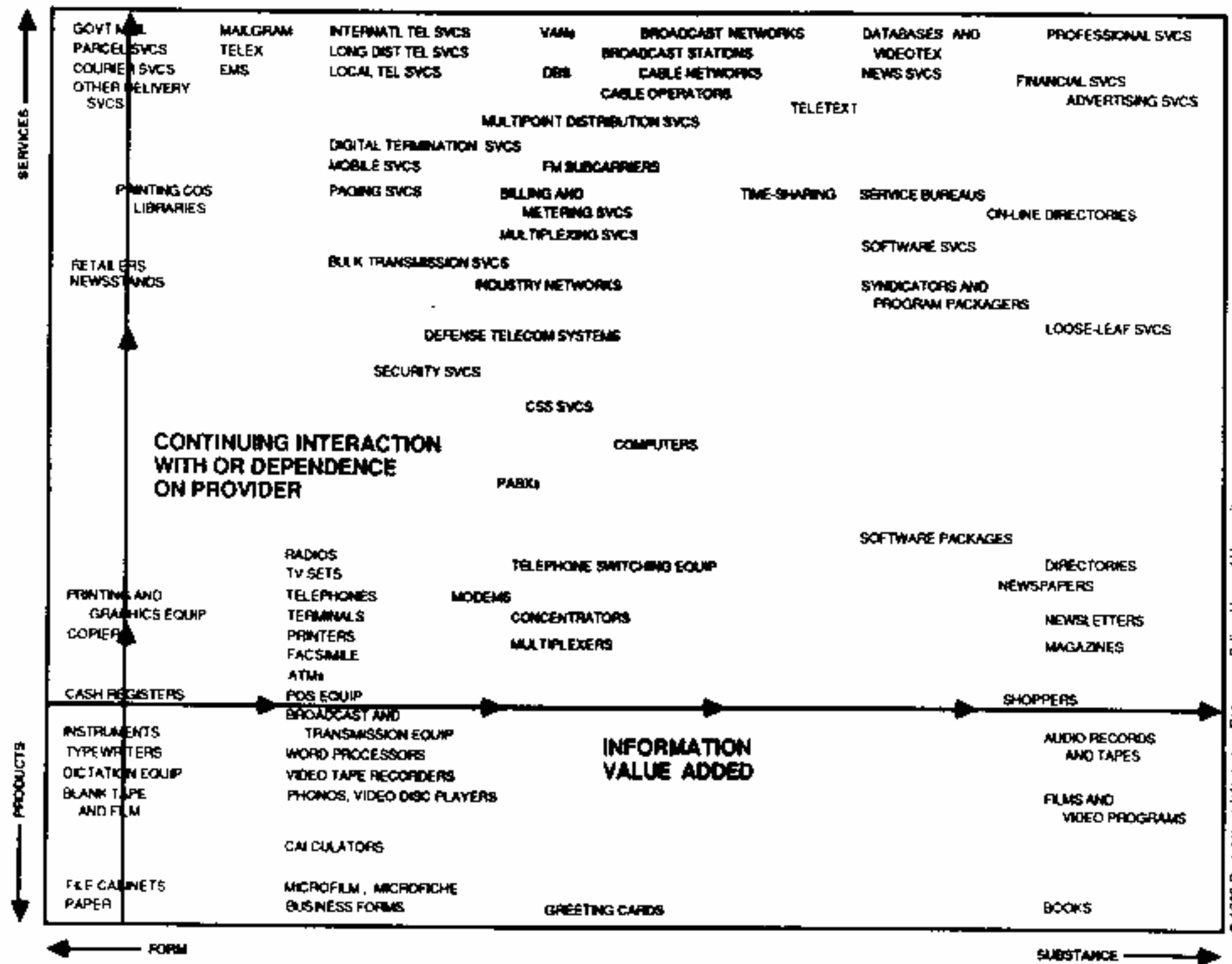
Figure 3. Placement Aids

In the upper left-hand corner are activities such as mail and parcel
delivery that provide almost purely formal services; telecommunications
common carriers are placed slightly to their right. Because of the nature
of the systems that telecommunications common carriers operate, the
carriers may be more involved in the information substance of the message,
at least in terms of duration, entry protocols, urgency of transmission,
and other characteristics. Further to the right are broadcasters, high on
the service axis because they have no physical products and midway between
substance and form because of their role of providing both program material
and the system that distributes the program material.

We have placed professional services in the upper right-hand corner
of the map, and have defined this entry broadly to include writers,
artists, scientists, and others who sell their services in generating
information. The products of their efforts -- such as books, records, and
TV programs -- are shown in the lower right-hand corner.

We have placed newspapers and shoppers slightly to the left of books,
newsletters, and magazines. This is based on the notion -- perhaps

arbitrary -- that <u>most</u> newspapers traditionally have operated their own distribution system, while the publishers of <u>most</u> newsletters and magazines have relied on postal services or other middlemen (jobbers, retailers, and newsstands) to distribute their product.

In the lower left-hand corner we have simple stand-alone (or "dumb") products such as typewriters, paper, and filing cabinets. As information value is added to these products, by adding either intelligence or the ability to communicate with other sources of information, they migrate rightward. Thus a blank piece of paper might be dumb, but the addition of lines and column headings that transform it to a business form represents an addition of information that shapes the ultimate substance. If we move all the way rightward to books, we assume that a consumer normally buys a book as a package of substance, not for the paper it contains.

MAP ENTRIES

The products and services chosen for display on the map are fairly common items. Some, like paper, books, and professional services, are more common than others, but most represent a major industry. A few, such as direct broadcast satellite (DBS) or teletext, represent technological capabilities that may become industries.

The entry labeled "CSS SVCS" (or Carrier Smart Switch Services) is the only exception to this rule of common use. This entry is intended to encapsulate the addition of intelligence to common carrier switches as represented by Centrex-type services today, or more encompassing ISDN services at some later date. The entry is positioned to mirror PABXs on the Service-Product axis, but it is slightly to the right of them on the Form-Substance axis. The latter shift reflects our notion that services provided through the network conceptually offer a higher level of information value added, because the network itself offers additional information such as caller identification.

Specific entries have been selected for inclusion on a variety of grounds. Many represent major markets, growing or shrinking in competition

with surrounding entries. Others either are or will be the subject of
prolonged public policy disputes. A few have been included simply to
illustrate the dimensions of the map and to provide checkpoints for moving
from one sector to another.

Choosing to include or exclude particular items can be an arbitrary
process. The following points illustrate some of the decisions that arise
in the selection process:

1. Numerous technologies or components are fundamental parts of the
   information business but are not amenable to our concept.
   Semiconductors, optical character recognition devices, and
   electric power, for example, are integral to many of the items
   shown. We excluded these items from the map, but included paper
   and blank tape. We believe that speakers or other audio
   components can be subsumed under radios, TV sets, and phonos
   because speakers do not operate on their own, but a similar
   argument could be made for including printers and terminals under
   computers. Frequently it is difficult to determine whether
   something is a component, a technology, or an end product.

2. As in certain geographical maps, portions could be enlarged for
   greater detail. Dozens of additional products and services could
   legitimately be added to the map, but they have been left off in
   the interest of legibility. We have had to forego showing the
   streets of a city in the interest of depicting the major arteries
   of a nation. For specific applications in particular industries,
   users might choose to add entries. Figure 4 highlights some
   examples of additional entries in the northeast quadrant.
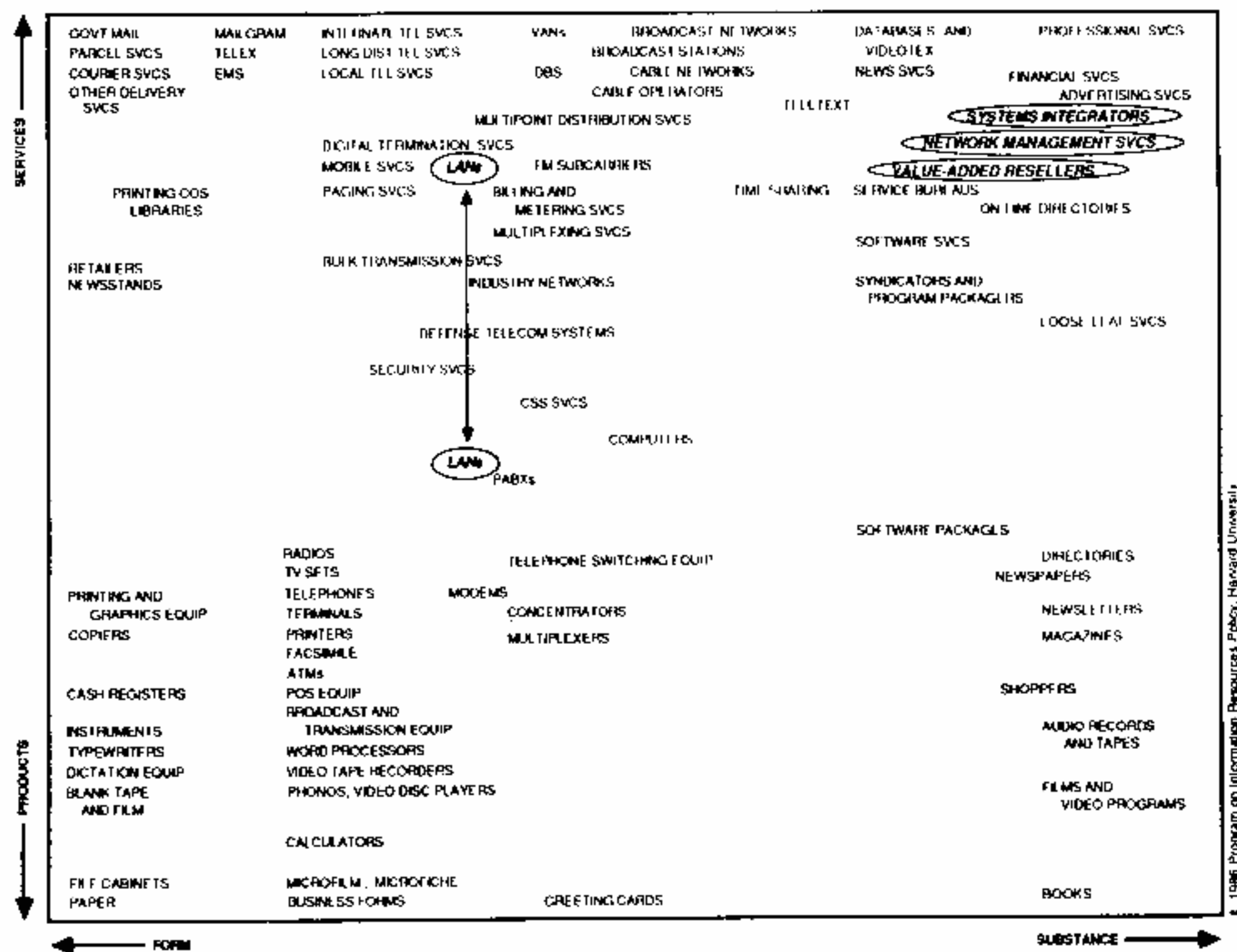
Figure 4. New Entries

3. Because of the underlying dynamics of the information business, map entries are not constant over time and space; the world changes. Users accordingly need not be Procrustean in their application of the map. The maps used to trace the historical development of the information business in Chapter 2 and to illustrate early regulatory regimes in Chapter 3 retain some of the technical-legal language appropriate to those periods, such as "telegraph" and "other common carriers." Similarly, many map entries reflect policy or market labels common in the U.S. but insignificant in other countries. (Appendix A, "A Brief History of the Information Business Map," provides some idea of how the labeling and placement of map entries have changed between 1979 and 1986.)

PLACEMENT OF ENTRIES

Since the initial publication of Mapping the Information Business in 1980, many users of the mapping technique have sought a metric for locating particular products and services upon the surface of the map. We have concluded that there is no mathematically precise means for doing so, at least at the moment. (Never say "never.") There may be equally little

purpose, as well. The map has been constructed on the basis of perceptions rather than precision, illustrating somewhat subjective and often cross-cutting relationships between pieces of the information business. It is in that relational structure that the map conveys its basic information and, moreover, allows users to infer nuances not easily quantified. In short, it illuminates through comparisons rather than instructing through absolutes.

Moreover, even if it were desirable to locate entries mathematically, it would remain a daunting task. The problem might again be compared with topographical mapping; it is easier to map much of the earth's surface today because of the maturity of the sphere. Mapping with accuracy would have been more difficult when continents were first forming or when glaciers and volcanoes kept reshaping geography. Topographical mapping also is easier today because of improvements in measuring devices such as compasses, clocks, and astrolabes over the past few centuries.

Some of the difficulties that we have encountered in the placement of entries on the map include:

1. The "products-services" approach introduces a substantial measure of subjectivity into the mapping process. As a general rule we have tried to place items on the map from the viewpoint of a "customer," but different "customers" could place the same item differently on a products-services axis. Likewise, providers and customers might place things differently. To a certain degree, this may indeed be a shortcoming of the mapping technique; in another sense, it accurately represents some of the structural ambiguities of the information business.

2. For visual clarity we have inserted some items above, below, or next to other items where conceptually they should perhaps overlap each other. In the quadrant at the lower left, for example, telephones, terminals, facsimile transceivers, ATMs, and POS equipment might be viewed as a single, functionally colocated tangle of products that provide information value added by

interacting with a broader information system. The map thus creates an illusion of greater functional differentiation <u>within</u> a grouping of elements than might occur in reality.

3. The white space on the map sometimes implies excessive separation <u>between</u> groupings. In the same lower left quadrant, typewriters and word processors might better be visualized as two points on a continuum of text processing equipment, with varying degrees of "smart" electronic typewriters between them (Figure 5). Across this spectrum one might perceive a blurring of the functional boundary between, for example, "dumb" mechanical typewriters and word processors, or word processors and computers. The continuing evolution of the information business gives rise to considerable functional ambiguity among the various pieces. On the map, separations such as that between typewriters and word processors belie this complexity.
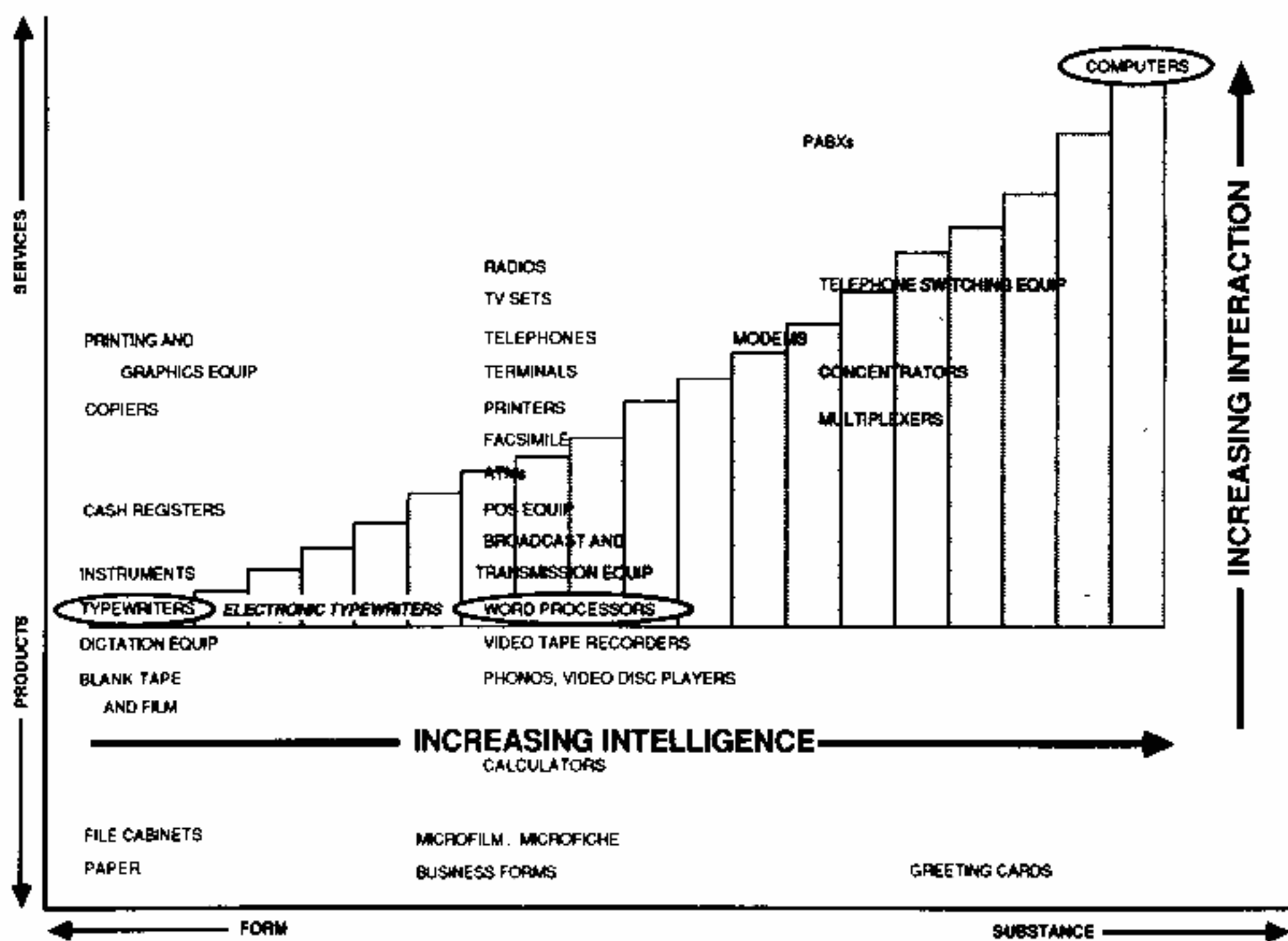
Figure 5. Gradations Between Entries
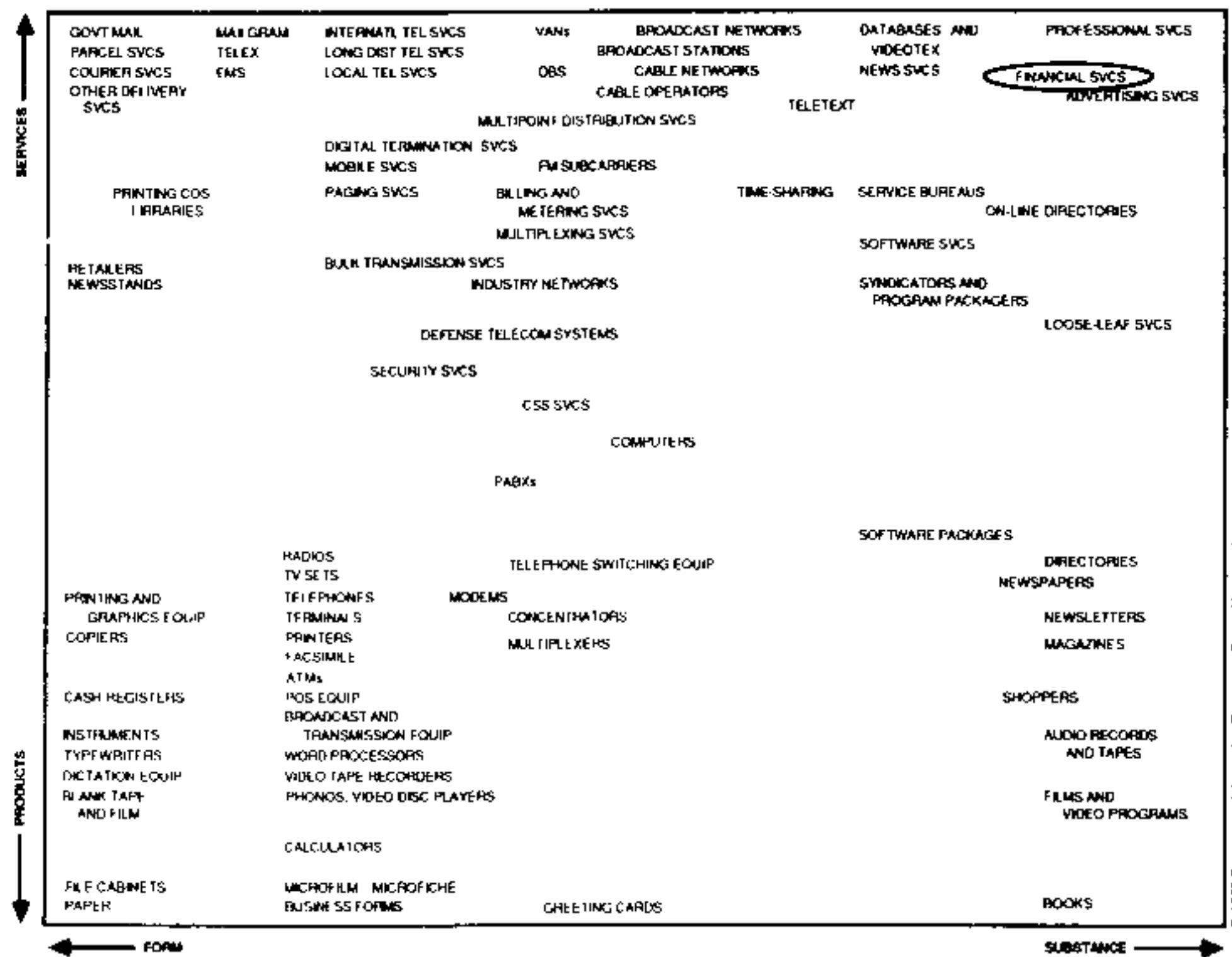
Figure 6. Map Entries as Aggregations

4. Inclusion and placement of a particular item may depend upon the level of aggregation we choose to use. For simplicity, we handled financial services as a single entry on our basic map (Figure 6). As suggested by Figure 7, further disaggregation by specific products or services might cause substantial relocations in financial services.
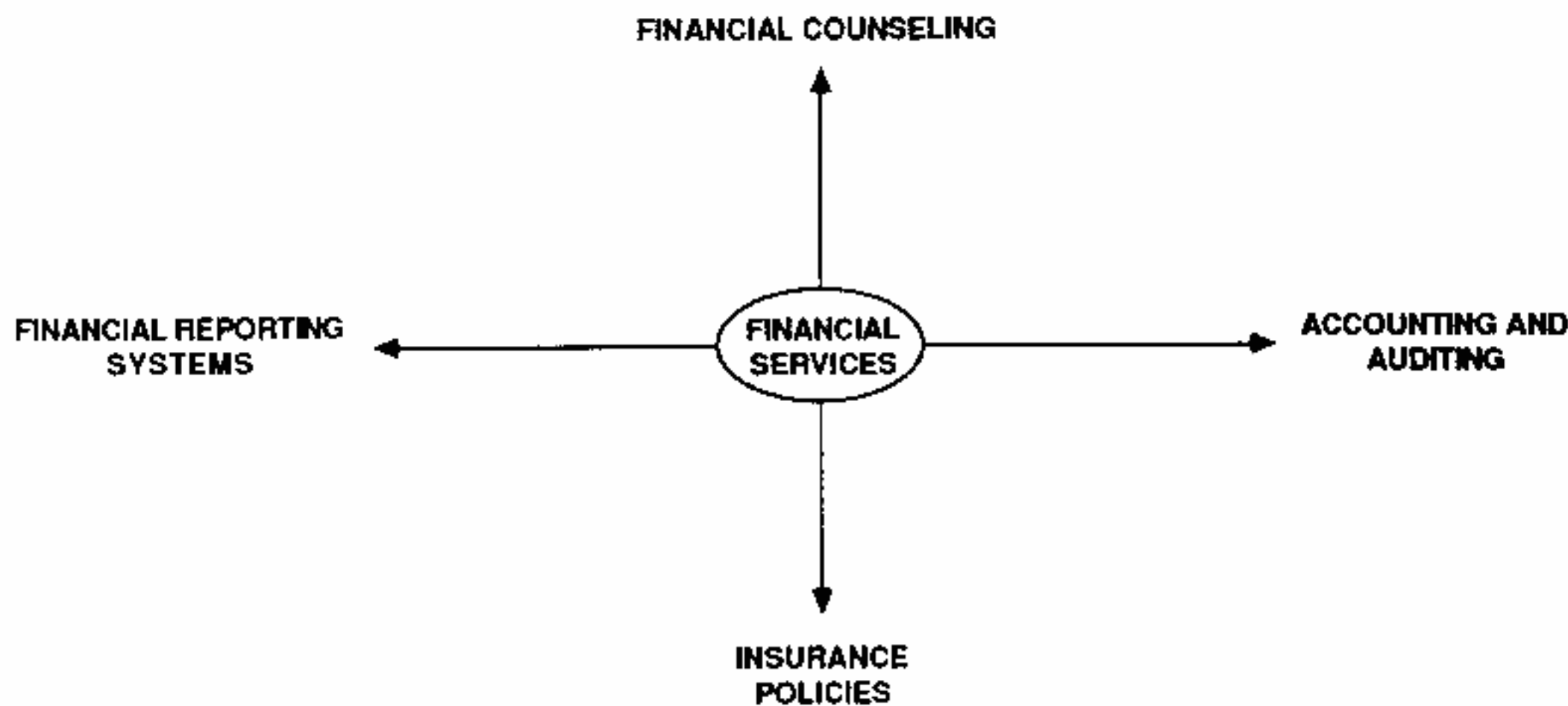
Figure 7. Specific Financial Services

Similarly, while we displayed software packages as a single
element in the southeast quadrant (product/substance), any
particular software package might be placed higher or lower on the
product-service axis depending on the manner in which it is
marketed. A game package such as Sierra On-Line's <u>Frogger</u>
normally is marketed as a one-time sale, like a book or a record,
with no assumptions of further contact between a buyer and the
supplier. Other packages, such as Lotus Development Corporation's
<u>Symphony</u> or <u>Jazz</u>, are marketed with a sizeable service component;
the supplier expects to provide buyers with telephone support for
assistance in using the package. Figure 8 illustrates how these
distinctions might be reflected on the basic map.
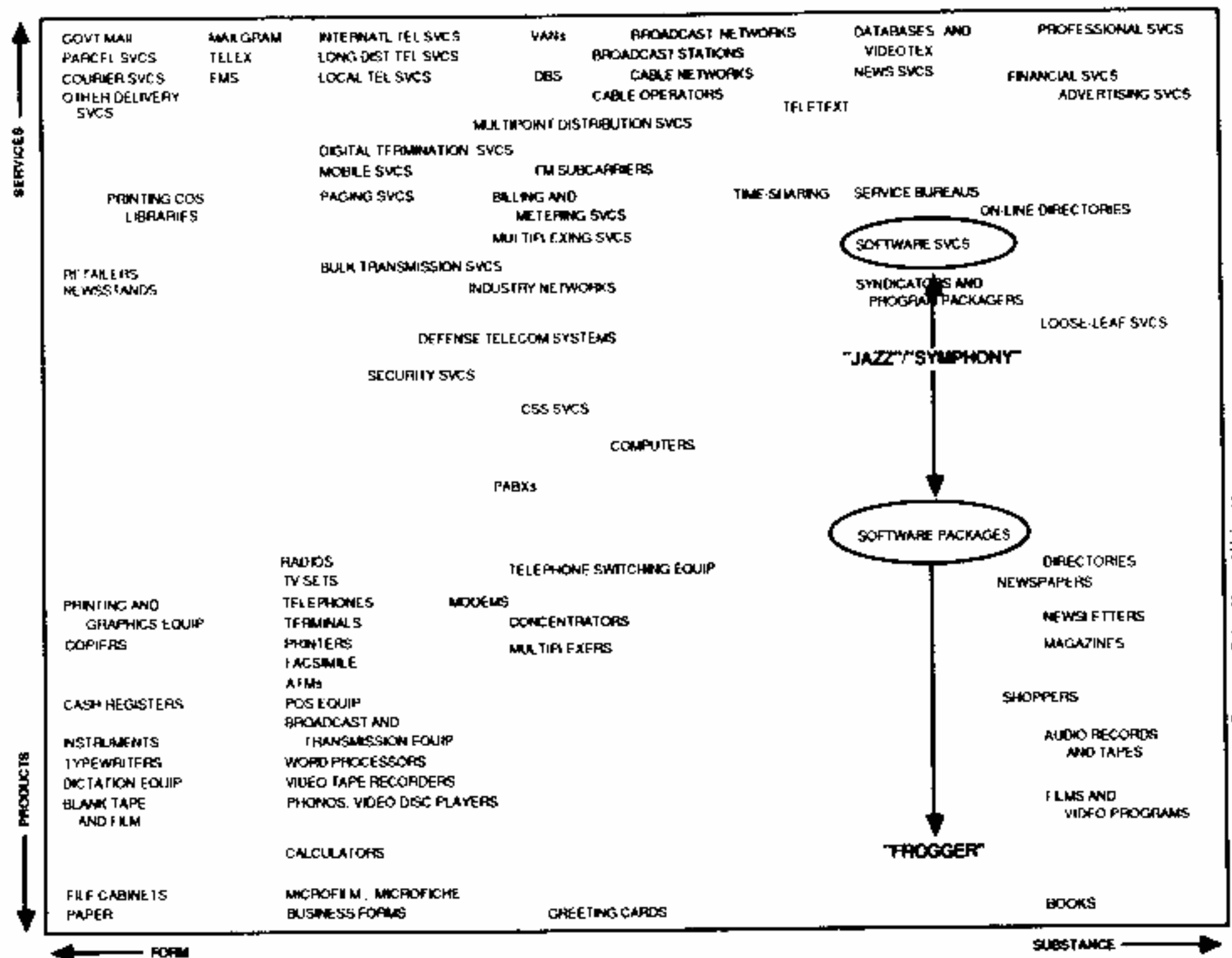
Figure 8. Specific Software Packages

ADDING A THIRD DIMENSION

While some users of the map have sought quantitative means for
locating entries on the surface of the map, others have urged us to add a
third dimension to the map with displays of sales, profits, market shares,

and similar quantitative measures. The approach most commonly suggested by these users might be termed the "macroeconomic" or "macromarket" method: People repeatedly tell us, "That map would be much more valuable if you simply assigned dollar figures to each entry."

This approach looks appealing at first glance, but our experience in pursuing it reveals three major problems:

1. While map entries are terms frequently and commonly used by people to describe various pieces of the business, there is little congruence between some of our entries and the categories that governments, trade associations, or other groups use to collect numbers.

2. When numbers are available for a given entry, we face a multitude of questions concerning their consistency, appropriateness, and accuracy. Figures for some businesses are reported on the basis of total sales, some for value of shipments, some for value added. Many figures are assembled and distributed by consulting firms or trade associations with a vested interest in their magnitude.

3. While the foregoing problems of definitions and numerical accuracy might be reduced by extensive research, the usefulness of the final figures remains problematic because most of them are so large. In 1984, for example, the 13 largest U.S.-based telecommunications companies had sales of $114 billion. The 14 largest computer and office equipment firms had sales of $109 billion. A few dozen other firms in the electronics, media, and financial services industries had 1984 sales accumulating to more than $200 billion.[1] Assuming that we could distill these numbers and accurately assign them to the appropriate map entries (allowing, of course, for differences between domestic and international sales and other such distinctions), it seems that the resulting figures would still represent levels of aggregation that would be of little practical value to anyone trying to forge corporate strategy or public policy.

As an alternative to a more rigorously mathematical third axis, we might indicate quantitative information in a more generalized fashion. Using the analogy to topographical maps again, we could perhaps display terms such as "computers" or "financial services" in large, heavy type and "teletext" and "newsletters" in small type in order to differentiate the relative annual sales of such products and services. The actual usefulness of this technique remains limited to providing an impressionistic overview, rather than a precise analysis, of the information business. Chapter 5 offers one experiment with a variation of this approach, projecting the map into several levels along a rather abstract scale applied to the information business at large.

Applying a third dimension to the map becomes most practicable in a narrower frame of reference, when the axis is well defined for a user's particular objective. Nevertheless, one still encounters some of the same problems as in the broader quantifications discussed above. Chapter 6 includes some techniques for adapting a three-dimensional map to individual organizations.

In both two and three dimensions, the map of the information business clearly operates within certain practical and conceptual limitations. Nevertheless, the map appears to be a useful tool for looking at selected aspects of the subject. Like any tool, of course, the map is more useful for some applications than others; that is why we have screwdrivers and wrenches as well as hammers. Also like those tools, however, the map remains a versatile device for users aware of both its limitations and its virtues. The following chapters address some of those functions, introducing a variety of techniques to help the user apply the map to a wide range of players and issues in the information business.

CHAPTER 1 NOTE

1-1. These figures were compiled from "The Forbes Sales 500," in _Forbes: Annual Directory_, April 29, 1985, pp. 162-170.

2

THE EVOLUTION OF THE INFORMATION BUSINESS

The growing importance of the information business[1] is suggested by
Figure 9, which shows the changing nature of U.S. employment since 1860.[2]

Source: Edwin B. Parker and Marc U Porat. *Social Implications
of Computer/Telecommunications Systems* (Stanford, CA: Pro-
gram in Information Technology and Telecommunications
Systems, Center for Interdisciplinary Research, Stanford Univer
sity, February 1975.)

U.S. LABOR FORCE
Agriculture ——————
Industry ▬▬ ▬▬
Services:
    Information Occupations ▬▬▬▬
    Other Service Occupations ▬·▬·▬
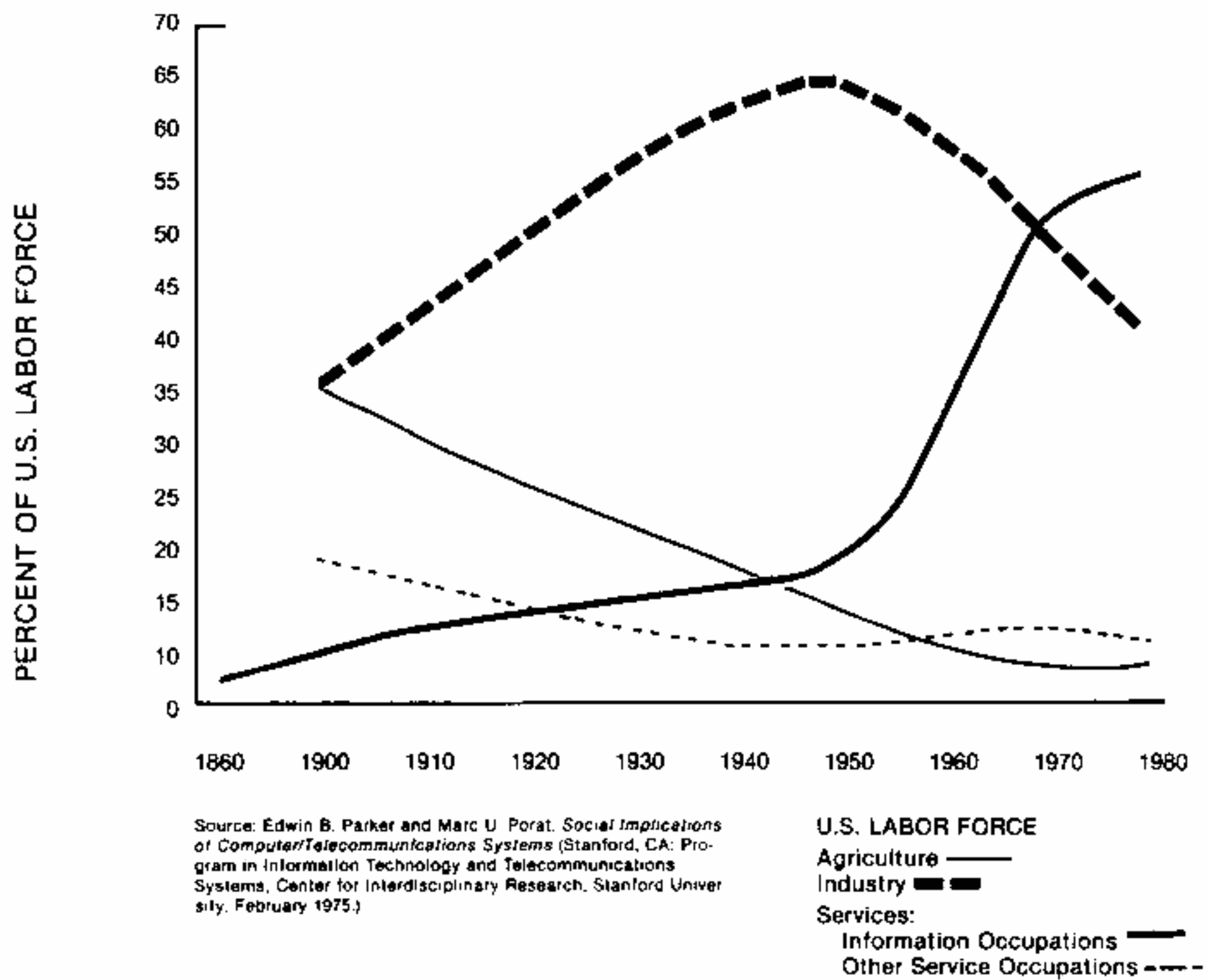
Figure 9. Employment by the Information Sector

In Figure 10, we have used our mapping scheme to suggest the nature of
the information business in 1790. Some important institutions might be
missing from this version (the town crier, the coffee house, or the
tavern), but the overall impression is that information activities once
occupied the corners of our map.[3]
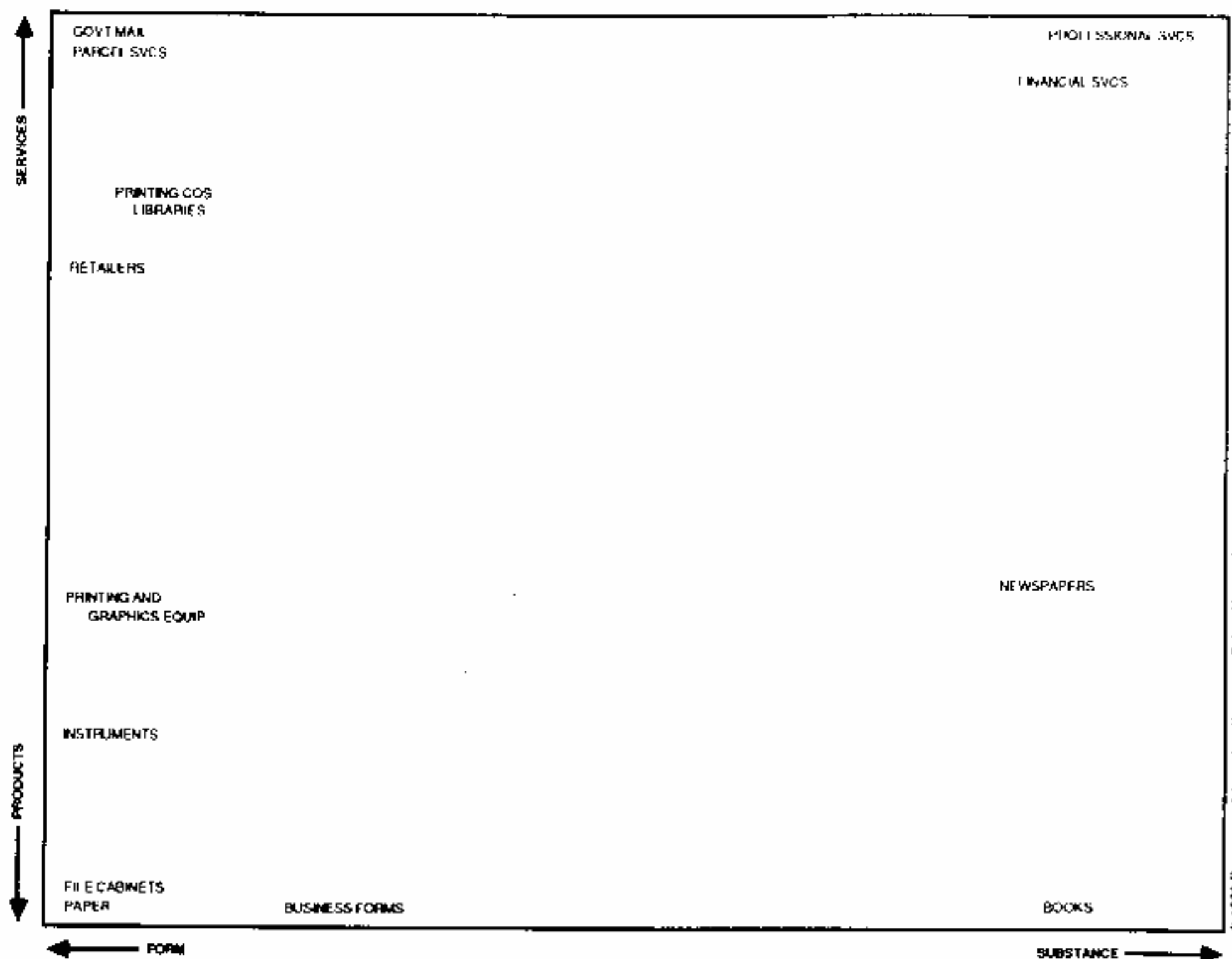
Figure 10. The Information Business in 1790

Some individuals or companies did engage in both vertical and horizontal integration of economic enterprises during this period. Benjamin Franklin worked as a writer, produced books and newspapers and magazines, developed printing equipment, and sold printing services while serving as postmaster general of the colonies. Perhaps Franklin would have placed himself in the middle of our map and labeled himself "printer."

It is possible, of course, that all of the white space shown on the map in 1790 is a distortion caused by our late 20th-century viewpoint. Figure 11 shows an alternative map of the information business in 1790. Perhaps we need to draw larger maps in 1986 because the world that we are trying to portray has grown larger over time.
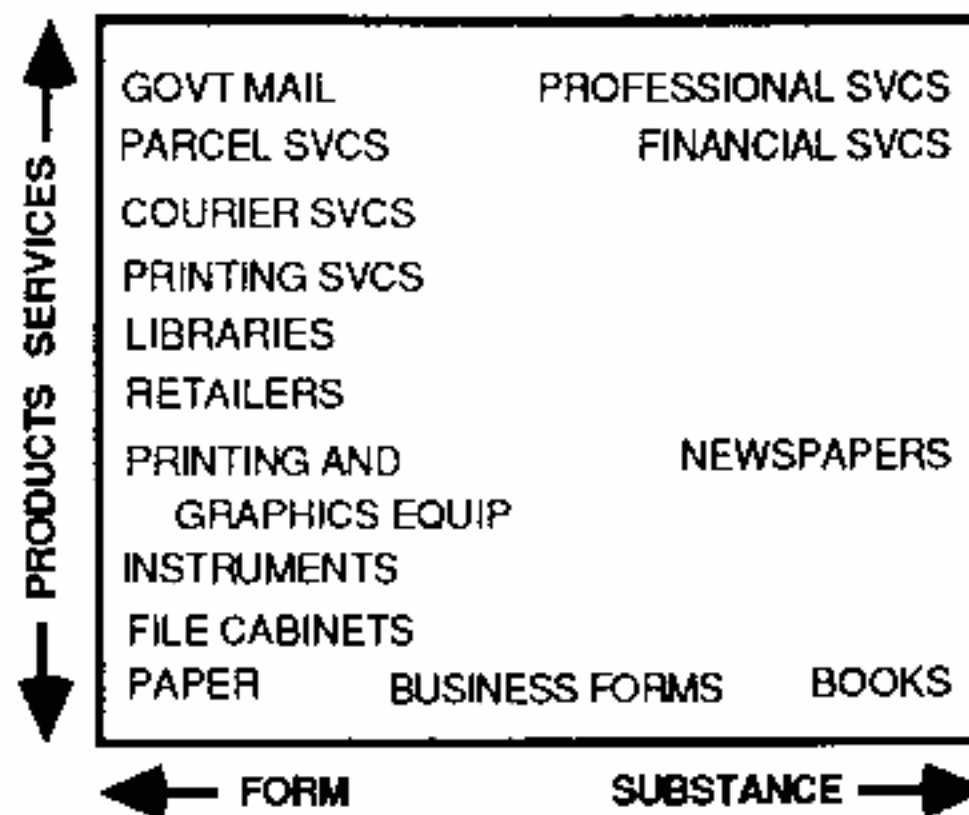
Figure 11. 1790: An Alternative View?

Figure 12, the information business in 1880, shows the establishment of telegraphy, the arrival of the telephone, and the evolution of news services and magazines, but few other changes.[4]
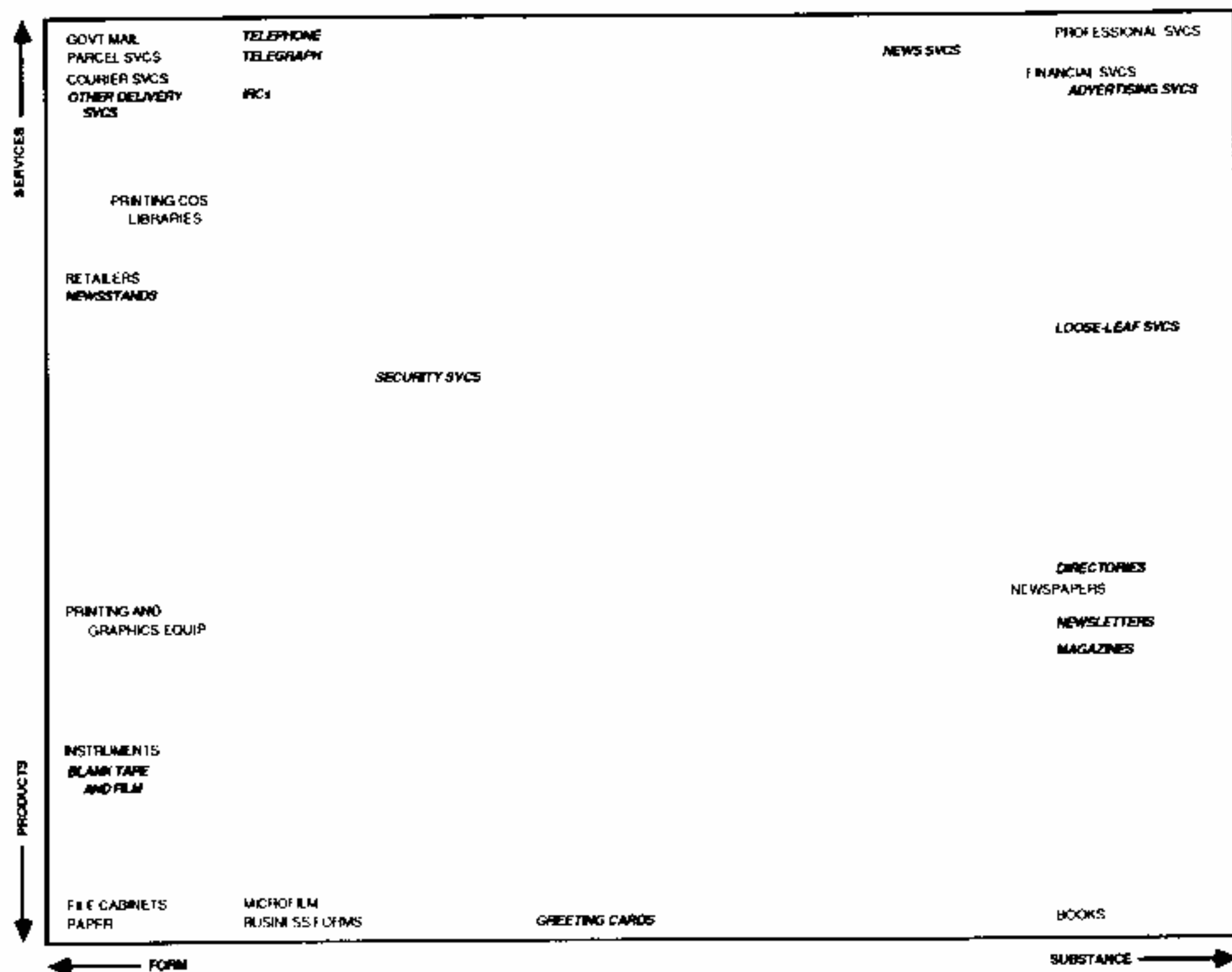
Figure 12. The Information Business in 1880

By 1930 (Figure 13), the information world looks more cluttered and more familiar, although rudimentary compared to the 1980s. The most significant changes in our map between 1880 and 1930 probably were caused

by the growth of telephony, the arrival of "wireless" technology, and the growing appreciation of and demand for information by increasingly sophisticated businesses and individuals.[5]
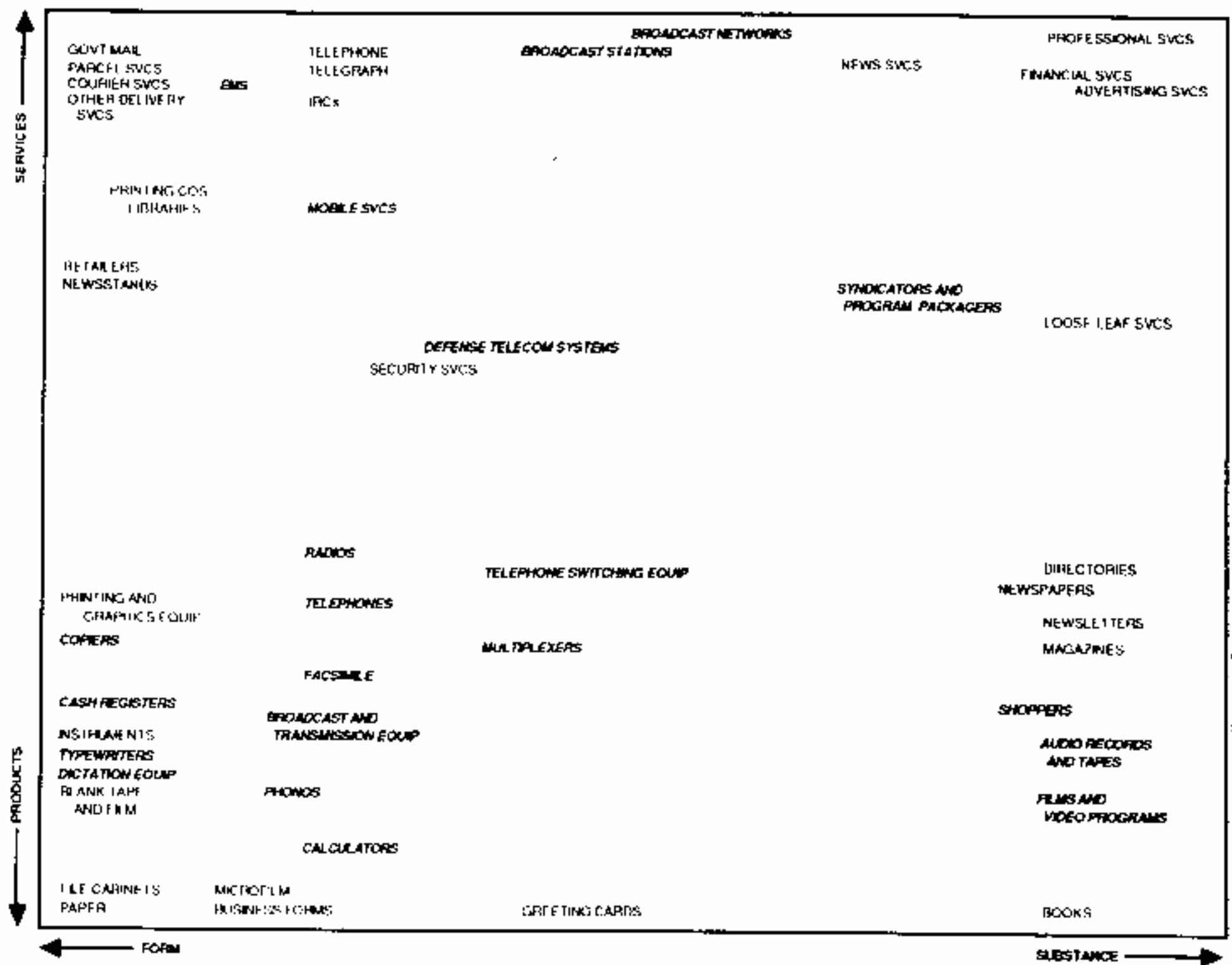
Figure 13.   The Information Business in 1930

Figure 14 displays the products and services that entered the information business (in common use) during the 1930-1985 period.   None of these products and services occupies the corners of the maps.   Each represents an attempt to provide a saleable something that bridges the area between information substance and form.   Moreover, as suggested by the overlap in Figure 15, most of these new products and services are dependent upon the computing and memory power of computers or the miniaturization and economies of the integrated circuitry underlying computers as known in the 1980s.
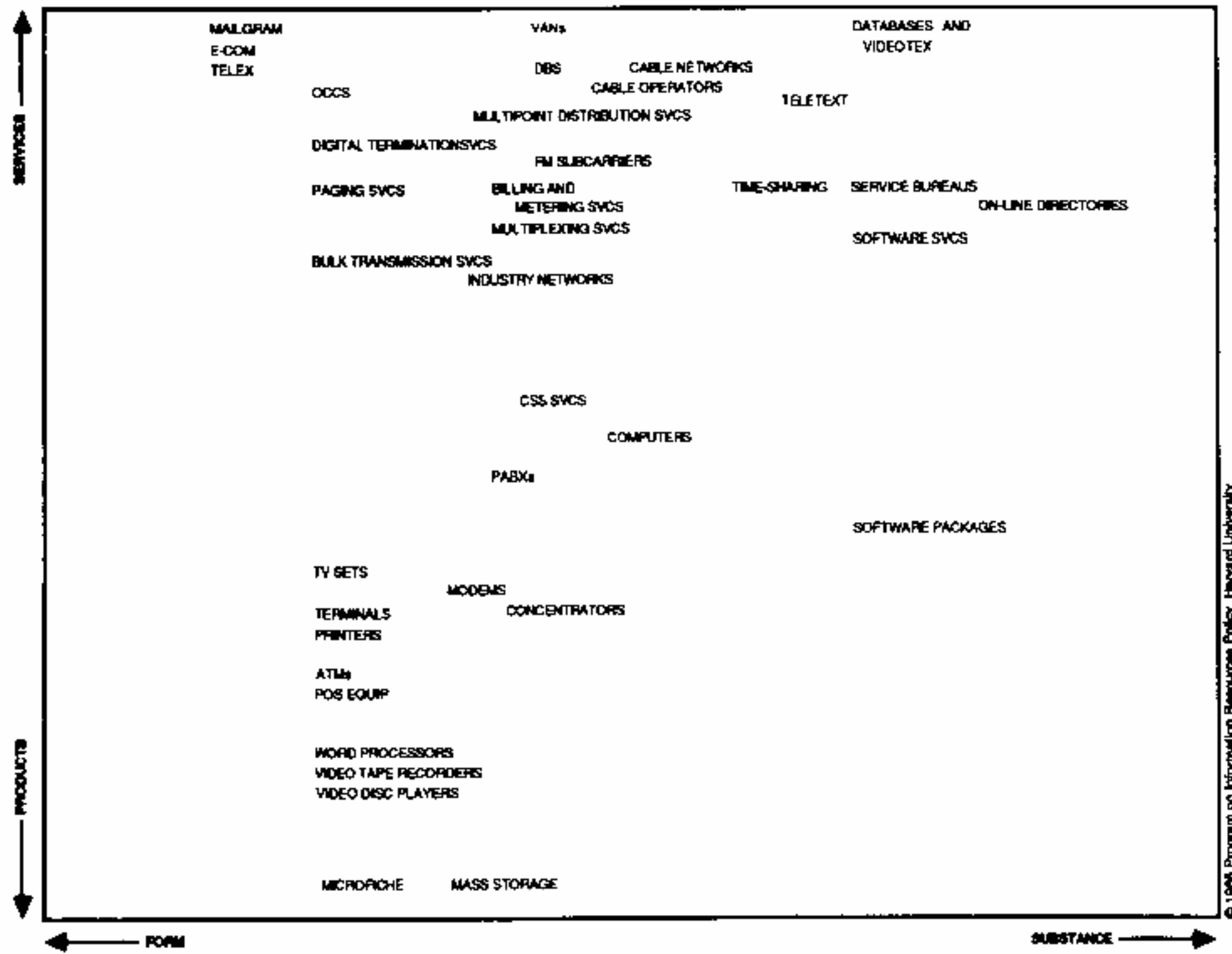
Figure 14. New Products and Services 1930-1985
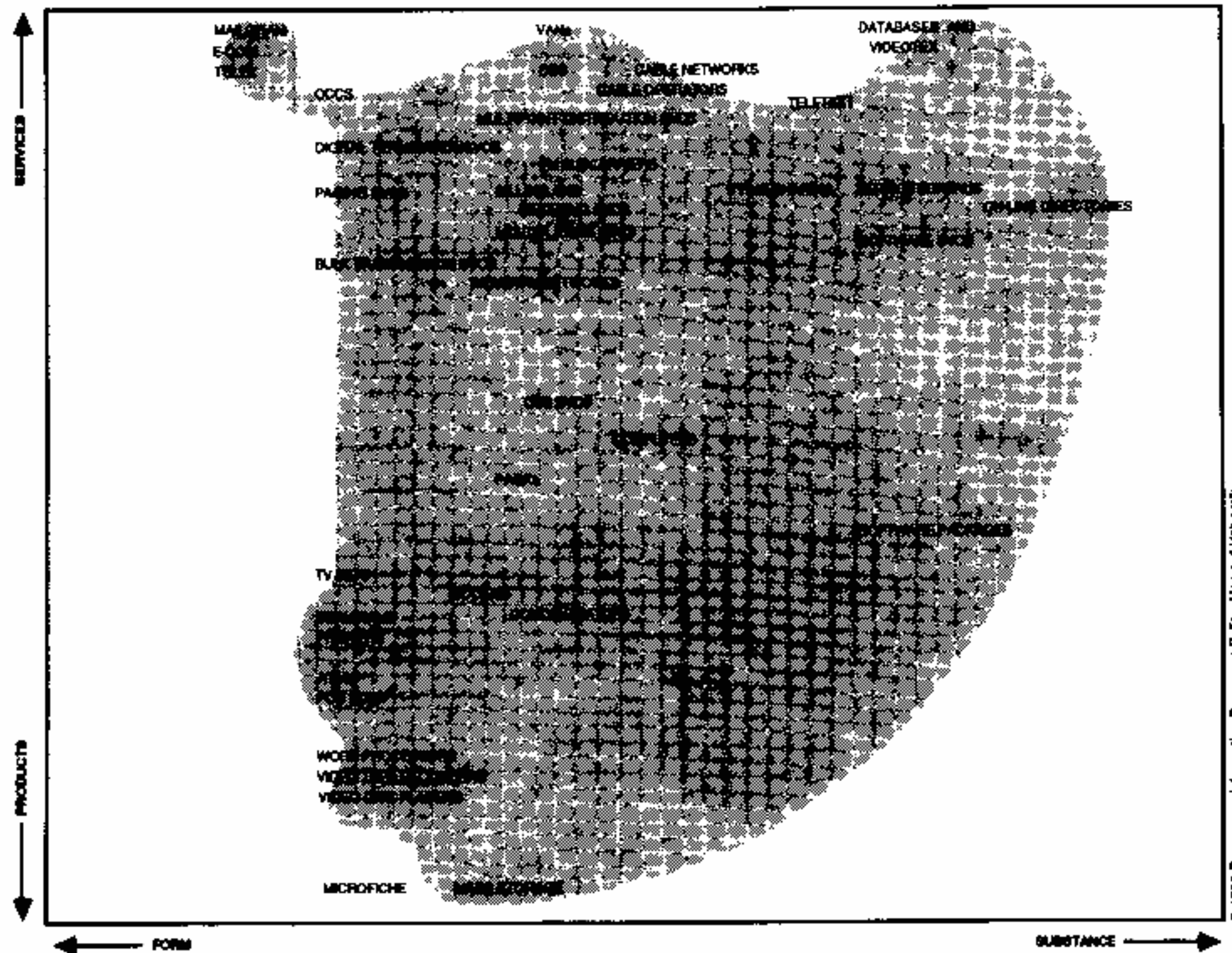
**Figure 15. New Products and Services 1930-1985:
Dependence on Computer Technology**

The explosion of <u>systems</u> of products and services (non-corner activities) and its impact upon public policy are explored in the next section.

CHAPTER 2 NOTES

2-1. In recent years, increasing attention has been paid to the
information business. Academics have written of the "information
economy," the "post-industrial society," and the "information age."
See, for example, Marc U. Porat, The Information Economy: Reports
77-12 (1-9) (Washington, D.C.: U.S. Department of Commmerce, Office
of Telecommunications, May 1977); Daniel Bell, The Coming of
Post-Industrial Society (New York: Basic Books, 1973); Peter F.
Drucker, "Managing the Information Explosion," The Wall Street
Journal, April 10, 1980.

Similarly, at various times corporations have proclaimed themselves
in their advertisements as the "knowledge business," "the informa-
tionalist," or even "the Source;" see, for example, some 1980
advertisements of American Telephone and Telegraph, AM International,
and Telecomputing Corporation of America. (A review of advertise-
ments in business publications during 1986, however, suggests that
advertisers' claims have become somewhat more modest and more focused
upon specific user applications.)

National governments, meanwhile, have debated "national information
policies" and international organizations have debated "the free flow
of information" and "the new world information order." See Simon
Nora and Alain Minc, L'Informatisation de la Societe (Paris: La
Documentation Francaise, 1978) (English translation, The Computeri-
zation of Society [Cambridge, MA: M.I.T. Press, 1980]); Oswald H.
Ganley and Gladys D. Ganley, To Inform Or To Control? The New
Communications Networks, McGraw-Hill Book Co., New York, NY, 1982;
William H. Read, The First Amendment Meets the Second Revolution,
Program on Information Resources Policy, Harvard University,
Cambridge, MA, 1979; and U.S. Congress, Senate, Committee on Foreign
Relations, Subcommittee on International Operations, Hearings on
International Communications and Information, June 8, 9, and 10, 1977.

2-2. According to a forthcoming book by Michael Rogers Rubin and Mary
Taylor Huber, more recent figures for growth in employment in the
information occupations indicate a leveling off of the trend shown in
Figure 9, rising only 2% from 39.2% of the workforce in 1970 to 41.2%
in 1980. See Rubin and Huber with Elizabeth Lloyd Taylor, The
Knowledge Industry in the United States: 1960-1980 (Princeton, N.J.:
Princeton University Press, forthcoming.)

2-3. We have included file cabinets on the 1790 map, but the filing system
then in use was actually the pigeonhole method, as the box file had
not yet entered use. The vertical file was not introduced until
1893. See Joanne Yates, "From Press Book and Pigeonhole to Vertical
Filing: Revolution in Storage and Access Systems for Correspondence,"
in The Journal of Business Communications, Vol. 19, Summer 1982, pp.
5-26.

2-4. Independent delivery services or private express companies evolved
rapidly along with the railroads during the 1840s, but by 1880 many

had been absorbed or eliminated by postal authorities through
enforcement of private express statutes. Security services in 1880
included district telegraphs that could summon police or the fire
brigade to homes and businesses by the crank of a handle.
Phonographs, typewriters and cash registers did not come into common
use until the late 1880s and early 1890s.

2-5. The increasing importance of corporate communications and information
systems during this period is discussed by Alfred D. Chandler, Jr. in
The Visible Hand: The Managerial Revolution in American Business
(Cambridge: Harvard University Press, 1977), pp. 120-121, 490. See
also JoAnne Yates, "Structural Effects of Communication Technologies
on Firms: Lessons From the Past," WP 1655-85 (Cambridge: Alfred P.
Sloan School of Management, Massachusetts Institute of Technology,
May 1985.)

3

GOVERNMENT REGULATION OF THE INFORMATION BUSINESS

Historically, many facets of the information business have been subject to government regulation or control. In the United States, government attempts to regulate the information business have ranged from censorship of substance to government ownership and control of the postal system.

The polarization of form and substance in the 1790 map is reflected in the distinctive political treatment of the two extremes in the United States Constitution (Figure 16).
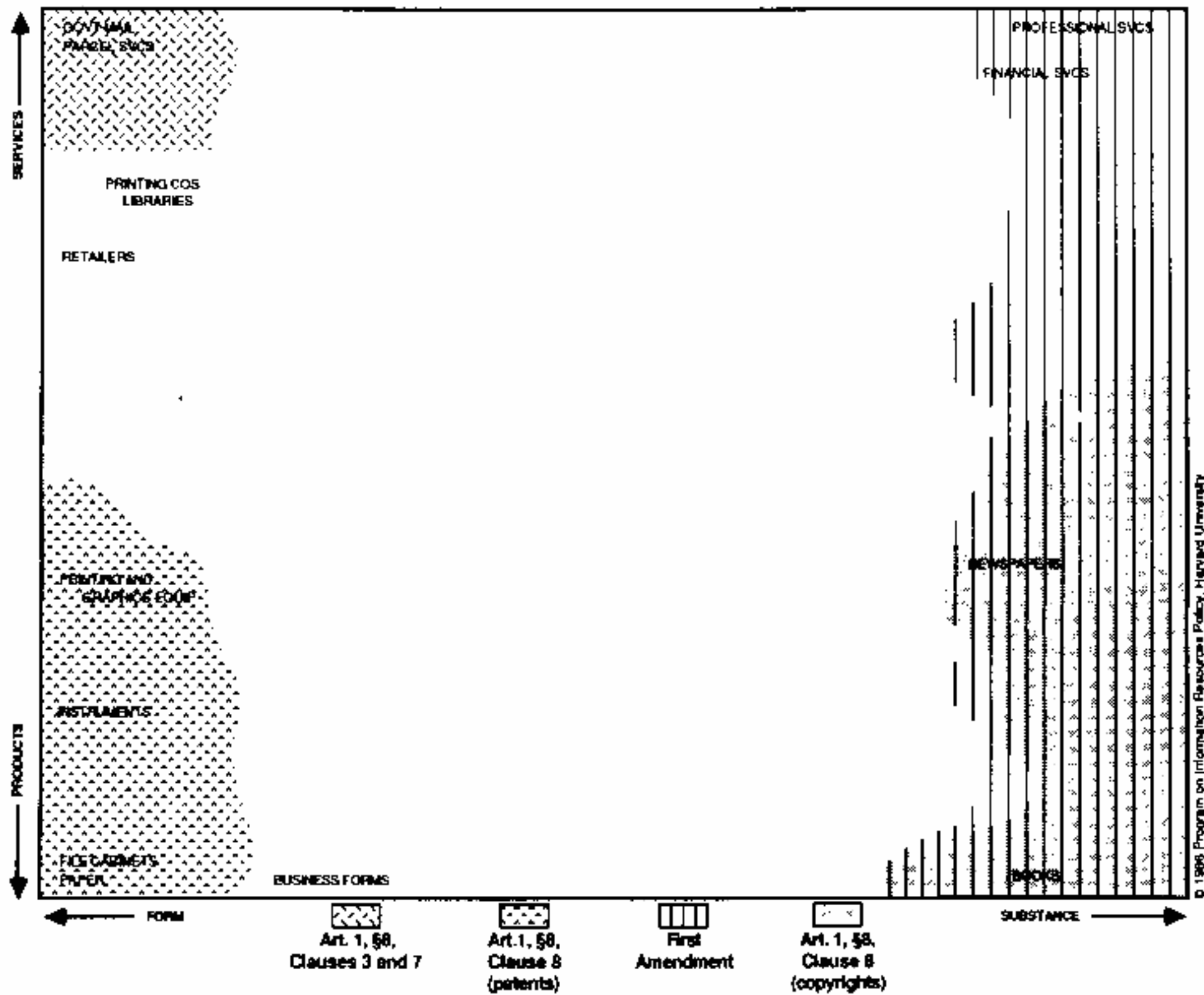
Figure 16. Regulation in 1790

The formal end of the map is treated rather routinely in Article I under the widely accepted responsibilities of a sovereign state -- post

offices and post roads in the northwestern corner, patent and copyright in the southwestern (and southeastern) corner. The First Amendment handled the greater part of the substantive eastern end: "Congress shall make no law ... abridging the freedom of speech or of the press."

By the late 1970s, regulating the information business had become a more complicated task. Figure 17 uses our basic map to show the boundaries of federal government regulation specific to functions of the information business.
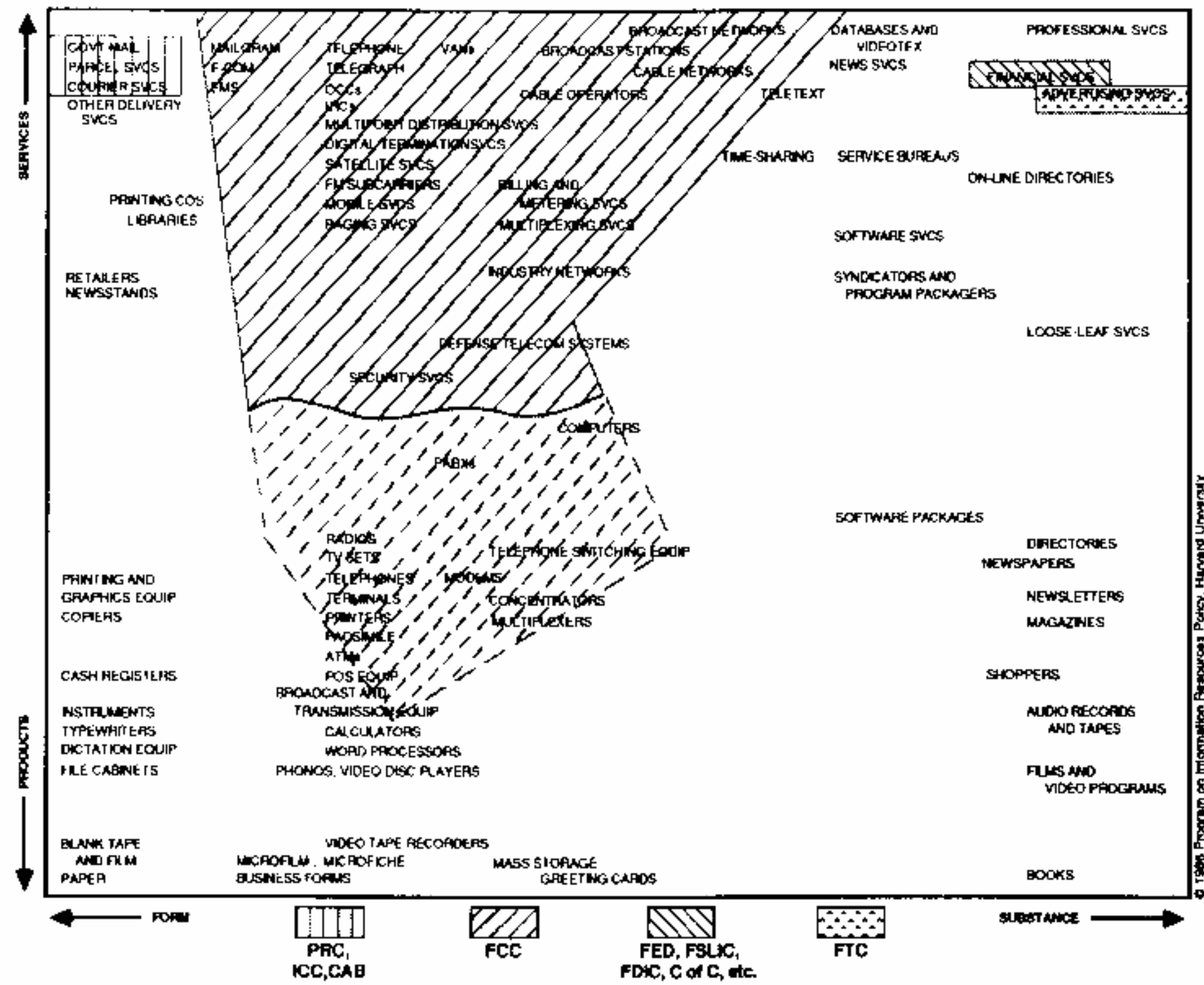
Figure 17. Functional Regulation circa 1978

Thus the Postal Rate Commission (PRC) oversaw the U.S. Postal Service, the Interstate Commerce Commission (ICC) regulated United Parcel Service, and the Civil Aeronautics Board (CAB) regulated air courier services. The Federal Communications Commission (FCC) monitored telecommunications common carriers, broadcasting, cable, and a number of other products and services. The Federal Trade Commission (FTC) regulated some aspects of advertising.

Depending upon the specific activity, financial services were regulated by the Federal Reserve Board (Fed), the Comptroller of the Currency (C. of C.), the Federal Deposit Insurance Corporation (FDIC), the Federal Home Loan Bank Board, the Federal Savings and Loan Insurance Corporation (FSLIC), the Securities and Exchange Commission (SEC), and a host of state government agencies.

As suggested by Figure 18, these regulatory boundaries were neither fixed nor neat in practice. The Postal Rate Commission and the Federal Communications Commission disputed jurisdiction over the regulation of "electronic mail." The Federal Reserve Board got involved in information systems by operating the "Fed Wire" payments system and determining if banks could offer data processing services. In 1975 the FCC involved itself indirectly in the newspaper publishing business by issuing regulations that restricted radio and TV ownership by companies that conducted newspaper and broadcast operations in the same community. The U.S. Postal Service (in its regulatory role), the Federal Trade Commission, and the FCC all exerted some regulatory force over advertising services.
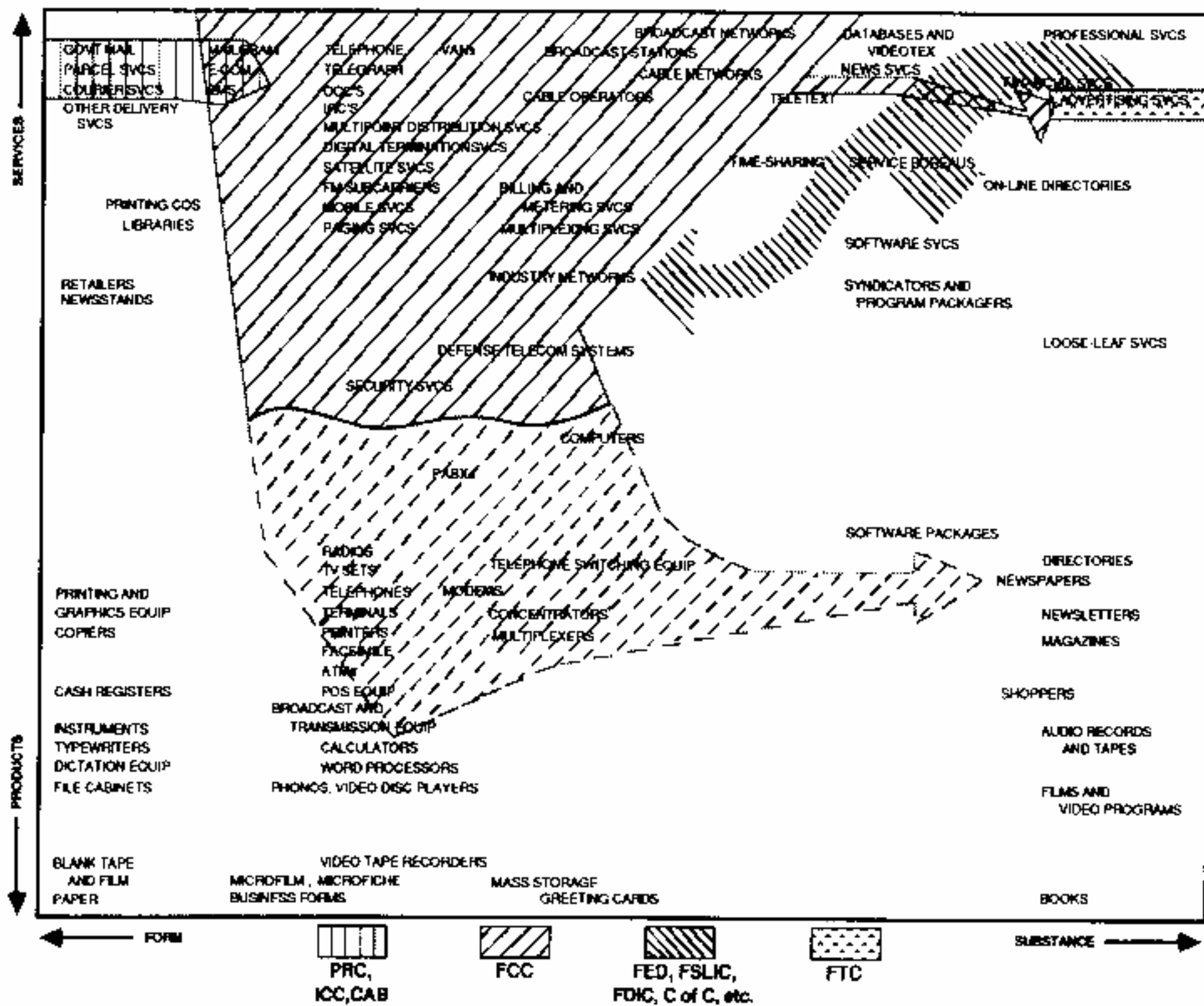
Figure 18. Movement and Conflict in Functional Regulation

Many boundaries are unclear or changing over time. During the late 1970s, for example, efforts to deregulate some telecommunications products and services made the FCC's regulatory boundaries less definitive in a number of areas.

Organizations in the information business, like all other companies, are subject to other types of regulation including that of the Department of Justice, the Federal Trade Commission, the Equal Employment Opportunity Commission, the Occupational Safety and Health Administration, the Environmental Protection Agency, and a variety of other federal and state bodies.

Through the 1960s and 1970s, for example, there were major antitrust actions in the copier, computer, and telephone industries, occasional antitrust forays into the mail and parcel area, and official speculation concerning concentration of ownership in the media (see Figure 19).
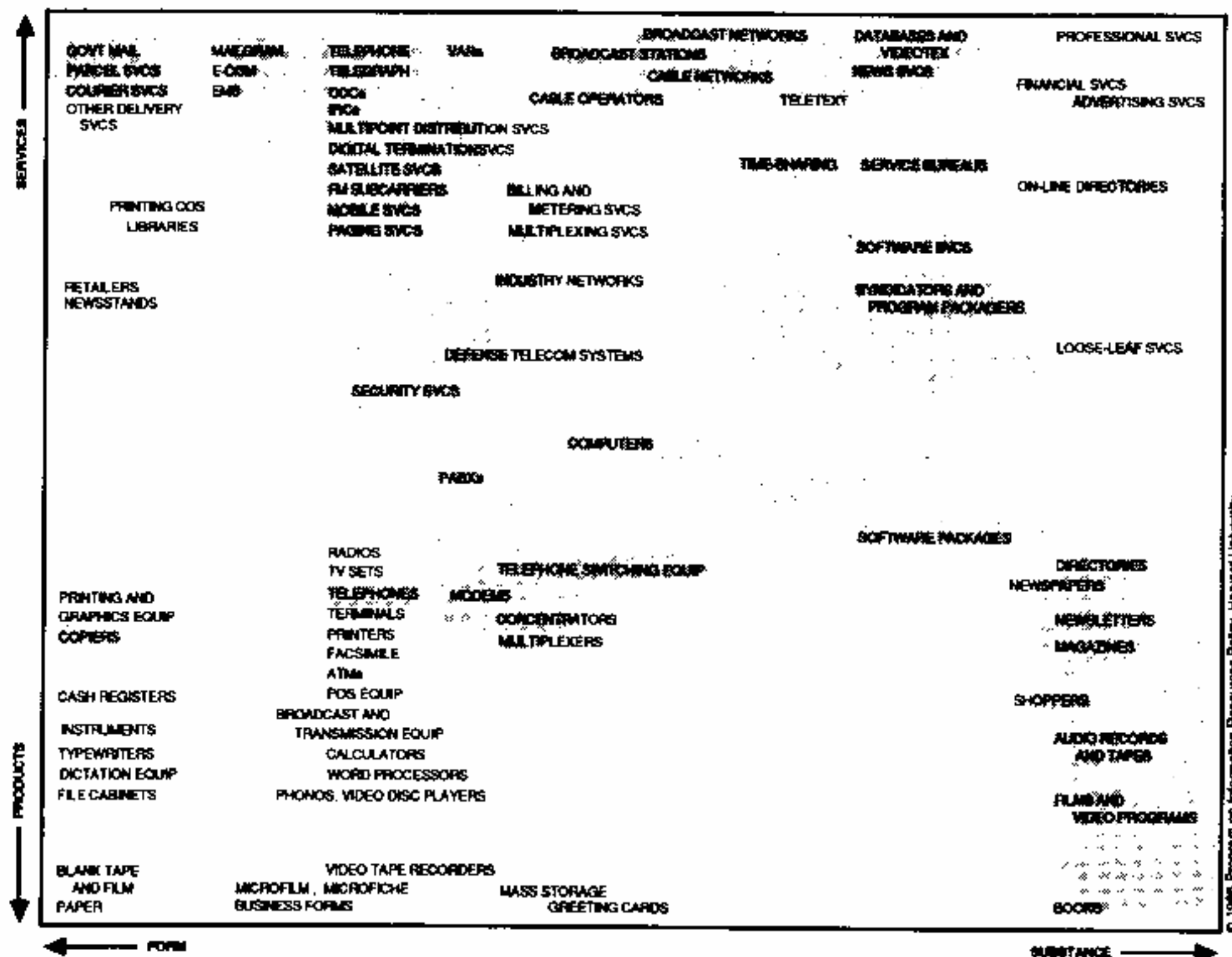
Figure 19. Antitrust Concerns

Figure 20 (which combines 18 and 19) suggests the continuing complexities of regulation of the information business. While some of these regulatory complexities may be the product of political philosophy, others stem from the changes in the technologies of the information business. Figure 21 shows the regulatory boundaries of 1940. The absence of hybrid products and services may have made the process of drawing boundaries somewhat easier then, relative to the 1980s.
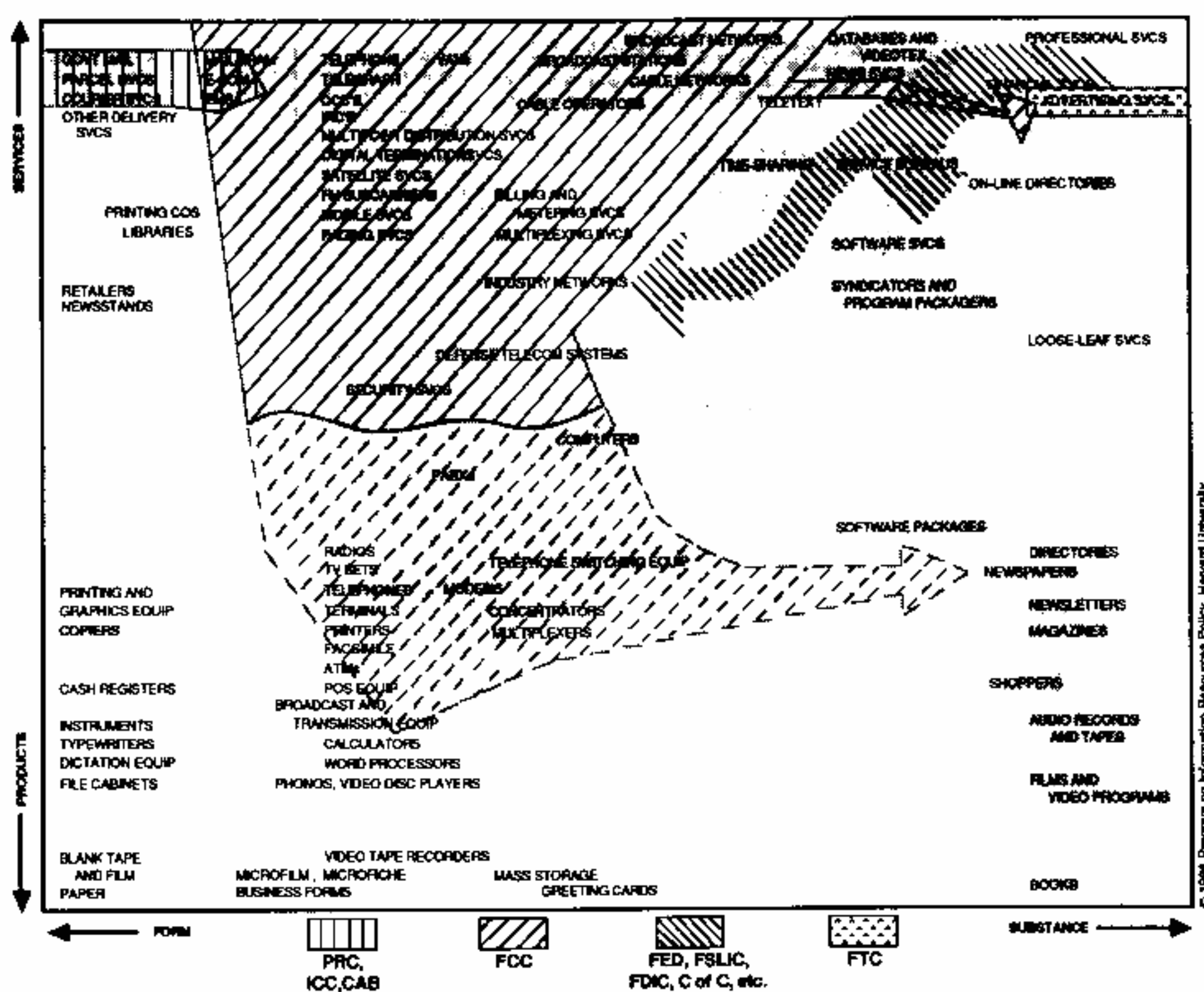
Figure 20. Antitrust Concerns and Changing Functional Regulation
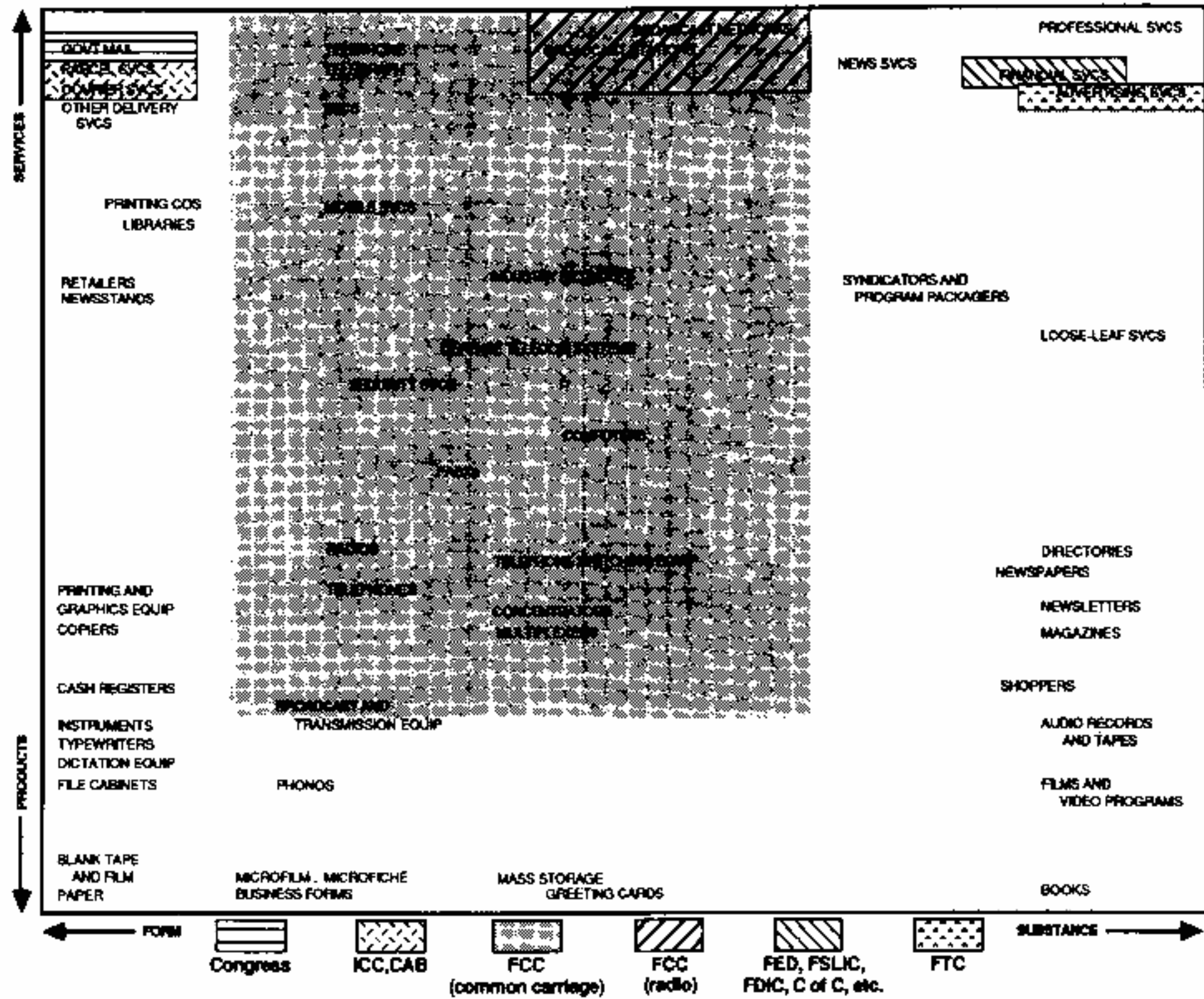
Figure 21. Regulation in 1940

During the late 1970s and the early 1980s, regulatory boundaries continued to shift as Congress, regulators, and courts struggled to cope with new technologies and changing political forces. Figure 22 is a snapshot of the FCC's regulatory boundaries circa 1985. Except for enforcement of technical interconnection standards, the FCC has largely retreated from regulation of customer premises equipment. In differing combinations the FCC, Congress, and the courts have reduced regulatory restraints on broadcasting and cable while attempting to encourage competition in a host of telecommunications services. While some of these efforts might be characterized as "deregulation," others are really "reregulation."
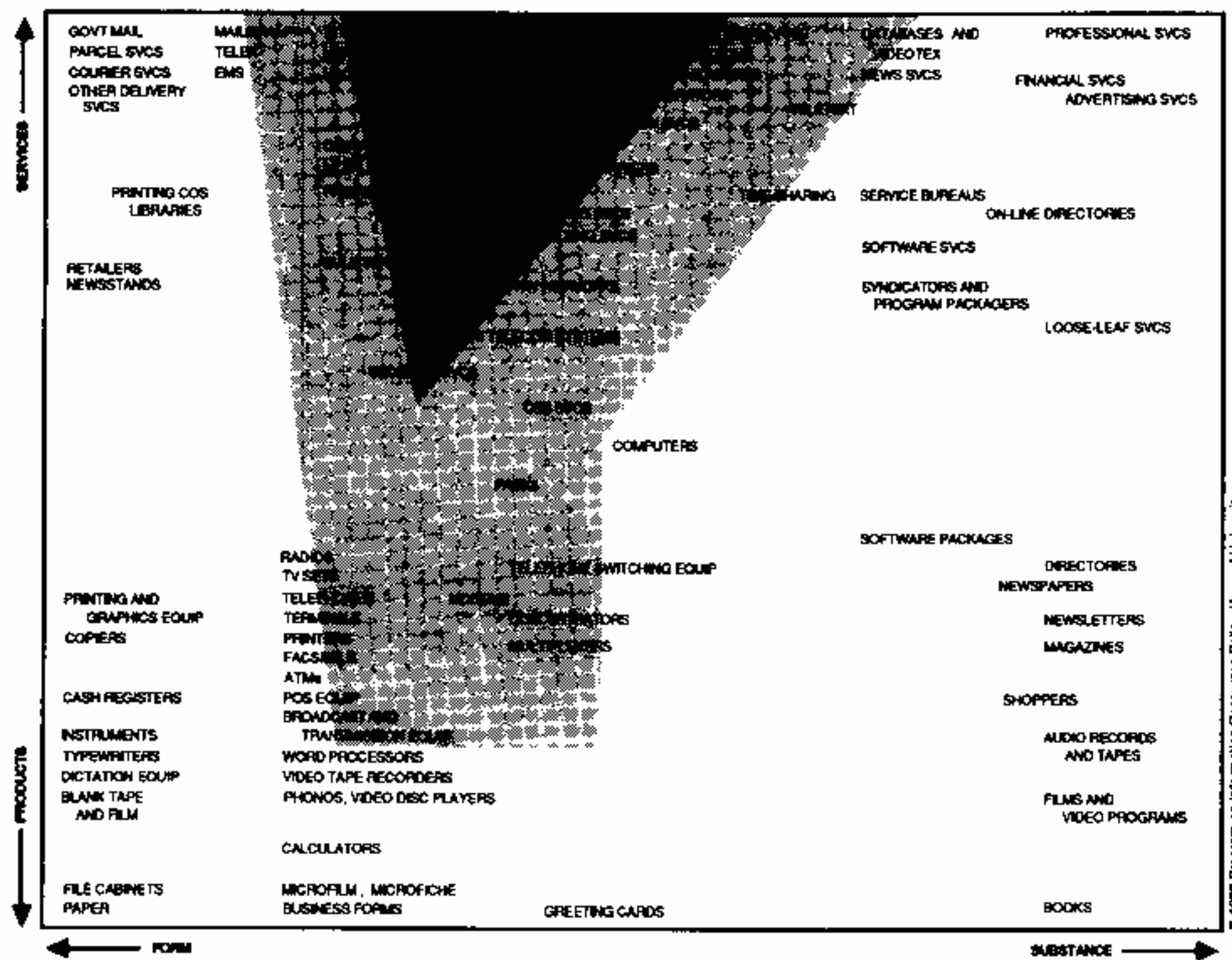
Figure 22. FCC Regulation in 1985

The initiation of the FCC's Computer Inquiry III in 1985, increased regulatory activity at the state level, and continued judicial oversight of the AT&T antitrust settlement guarantee that the FCC's regulatory boundaries will continue to shift during the 1980s.

It should be noted, too, that while government regulation exercises powerful influences over the information business in the United States, such influences are relatively small compared to those in many other countries with a heritage of broad government intervention in business in general and in the information business in particular. Figure 23 illustrates government regulation and ownership of information products and services in France following the Mitterand government's nationalizations of 1981.
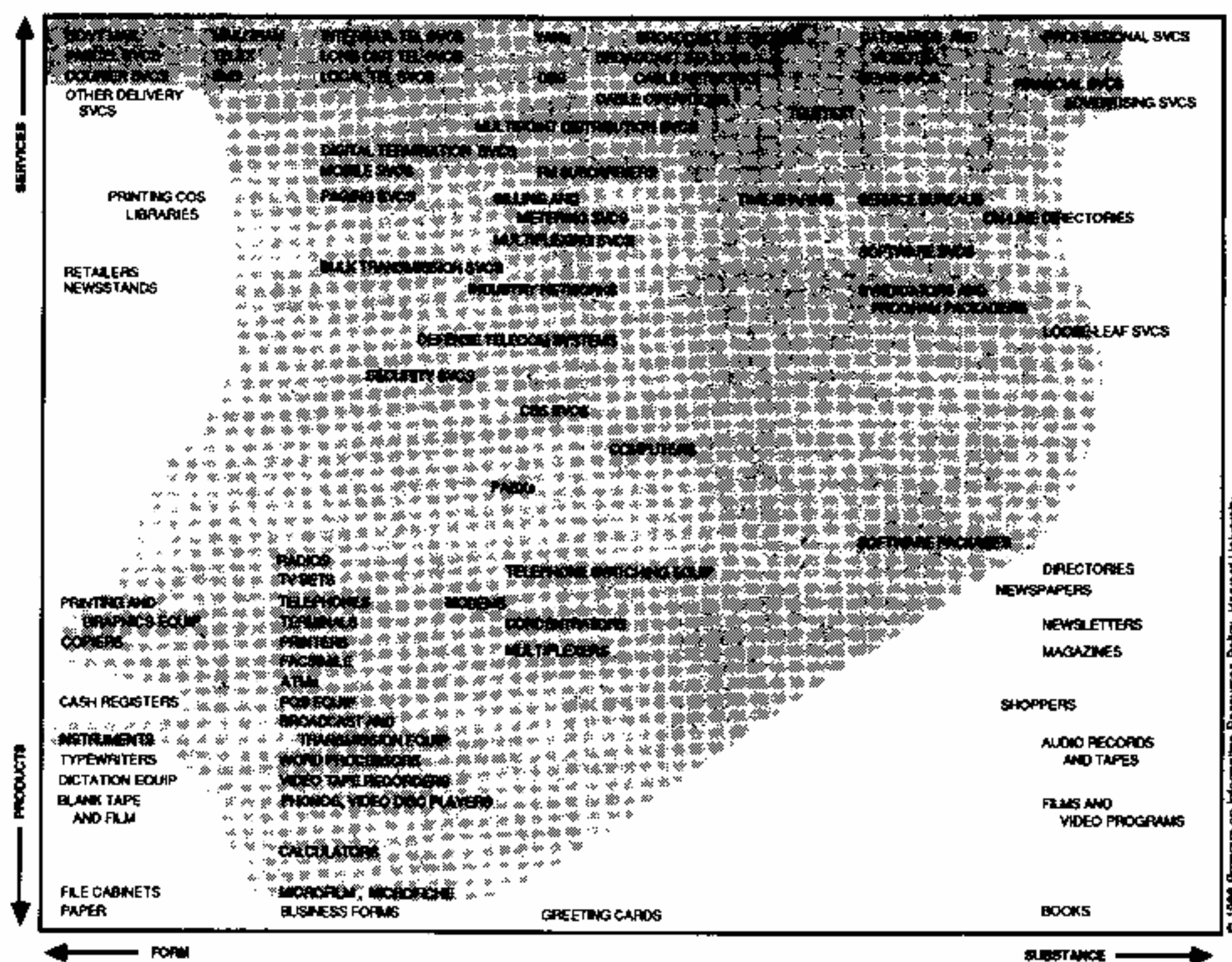
Figure 23. Government Regulation and Ownership in France

In one sense Figure 23 may overstate government "control" of the information business because there are privately held and foreign-based competitors in many of the markets served by government-owned companies (IBM and Olivetti versus CII-Bull, for one example). On the other hand, governments have been known to go to great extremes to protect nationalized industries.

Some of the impacts of shifting regulatory boundaries are revisited in Chapter 4, which looks at corporate positioning and strategies in the information business.

4

CORPORATE POSITIONING IN THE INFORMATION BUSINESS

The map of the information business appears to be a useful tool for looking at the strategic positioning of individual corporations. To apply this technique to specific companies, however, we have had to establish some specific criteria to determine whether a corporation should be shown as being in a particular business:

1. Some companies provide a given product or service for their own use, but do not offer it for sale. We have tried to show companies as engaged in a particular business only when they market the product or service to others.

2. Some companies offer specific products or services in international markets, but do not sell them in the U.S. Unless noted otherwise, we have attempted to display only a corporation's domestic business activities.

3. Many information systems are acquired by lease from the manufacturer. When a company was known to provide leasing of equipment, whether its own or that of third parties, it was shown as engaging in financial services.

Despite these criteria, a company's position on the map can be subject to extensive debate. The following maps, therefore, should be viewed as suggestive, not definitive.

Much of the current turmoil in the information business is attributed to the growth and changing nature of companies that traditionally provided electronically based information services and systems. These include telephone companies and a variety of corporations involved in manufacturing and marketing computers, office equipment, and consumer products.

Figure 24 shows American Telegraph & Telephone's (AT&T) "territory" on the map prior to the 1982 settlement of the antitrust case.
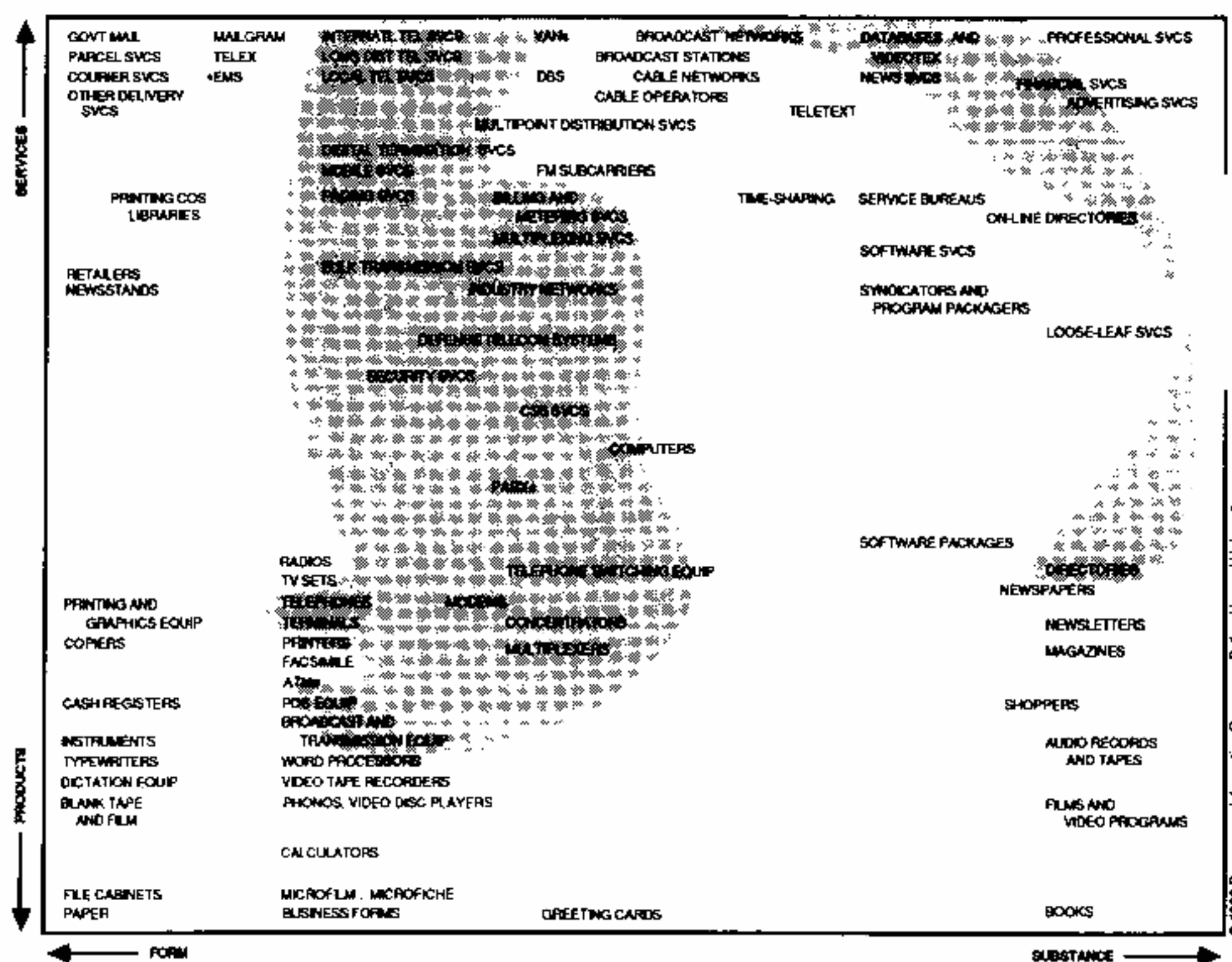
Figure 24. AT&T Pre-Divestiture

While most of Figure 24 seems self-evident, a few items merit explanation. News services and databases were included to reflect substance-oriented "dial it" services such as "Dial-a-Joke," "New York Today," and "Sports-Line." "Phone-power" training and marketing seemed to qualify as advertising services. On the other hand, we did not include professional services because Bell Laboratories' research normally was not marketed to others and American Bell International did not market its services in the U.S.

Government regulation had exercised a strong influence upon the shape of AT&T's business. Figure 25 compares AT&T's business area in 1978 to the regulatory boundary of the FCC as shown earlier in Figure 17. The areas of non-congruence reflected decades of legislative, regulatory, and judicial debate.
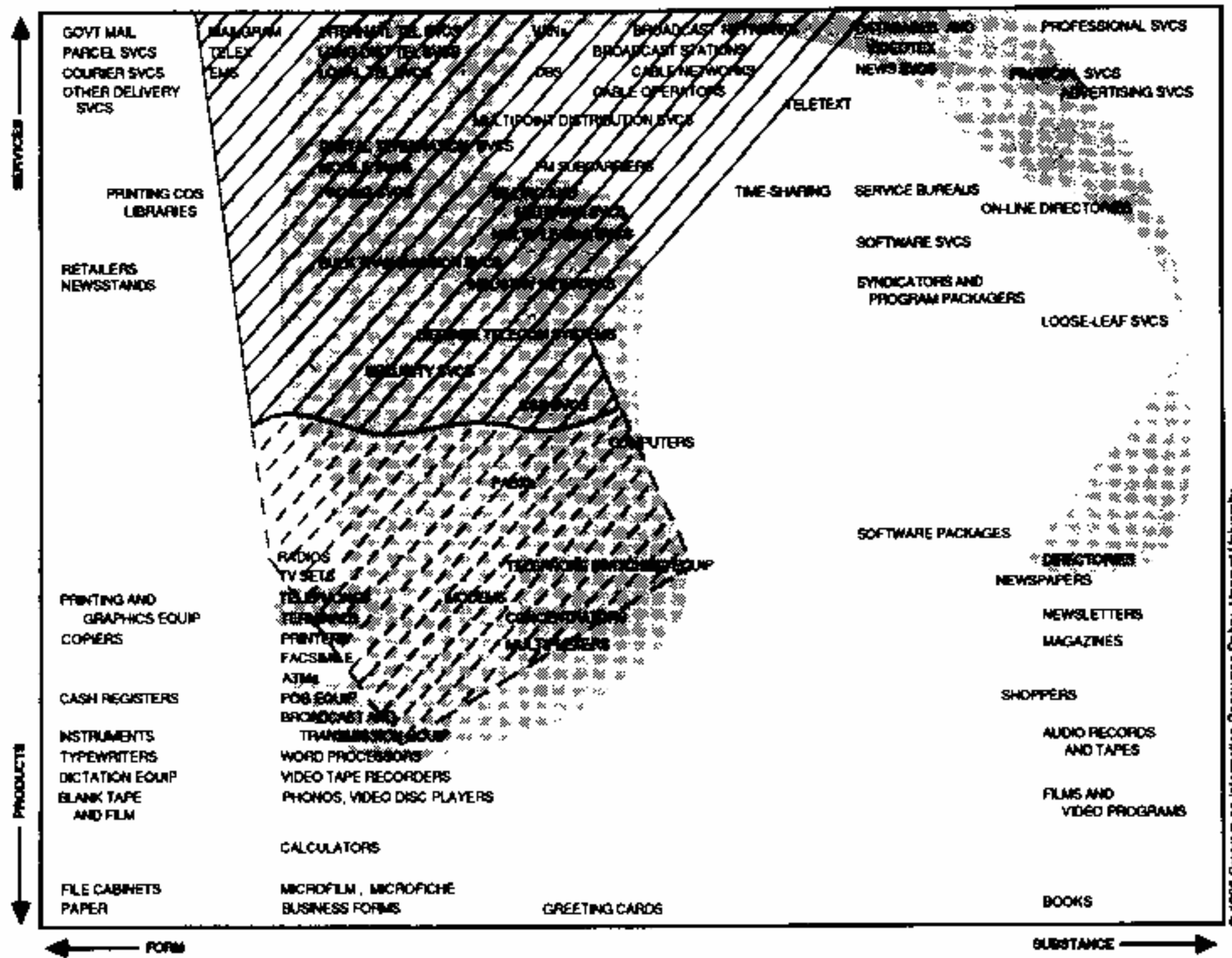
Figure 25. AT&T Pre-Divestiture and FCC Regulation

Figure 26 depicts the potential expansion of a "deregulated" AT&T as described by some current policymakers and a variety of potential competitors. (The term "a deregulated AT&T" is perhaps misleading; most of AT&T's revenues as of 1985 still flowed from heavily regulated services.) AT&T is partially restricted from offering "information services" (in the shaded area at the upper right) until at least 1989. Under the Modification of Final Judgment, AT&T is prohibited from offering information services wherein AT&T would control information content as well as transmission services.[1] Conceivably, the shaded area could be extended downward and to the left to reflect the FCC's Computer Inquiry II prohibitions against offering "enhanced services."
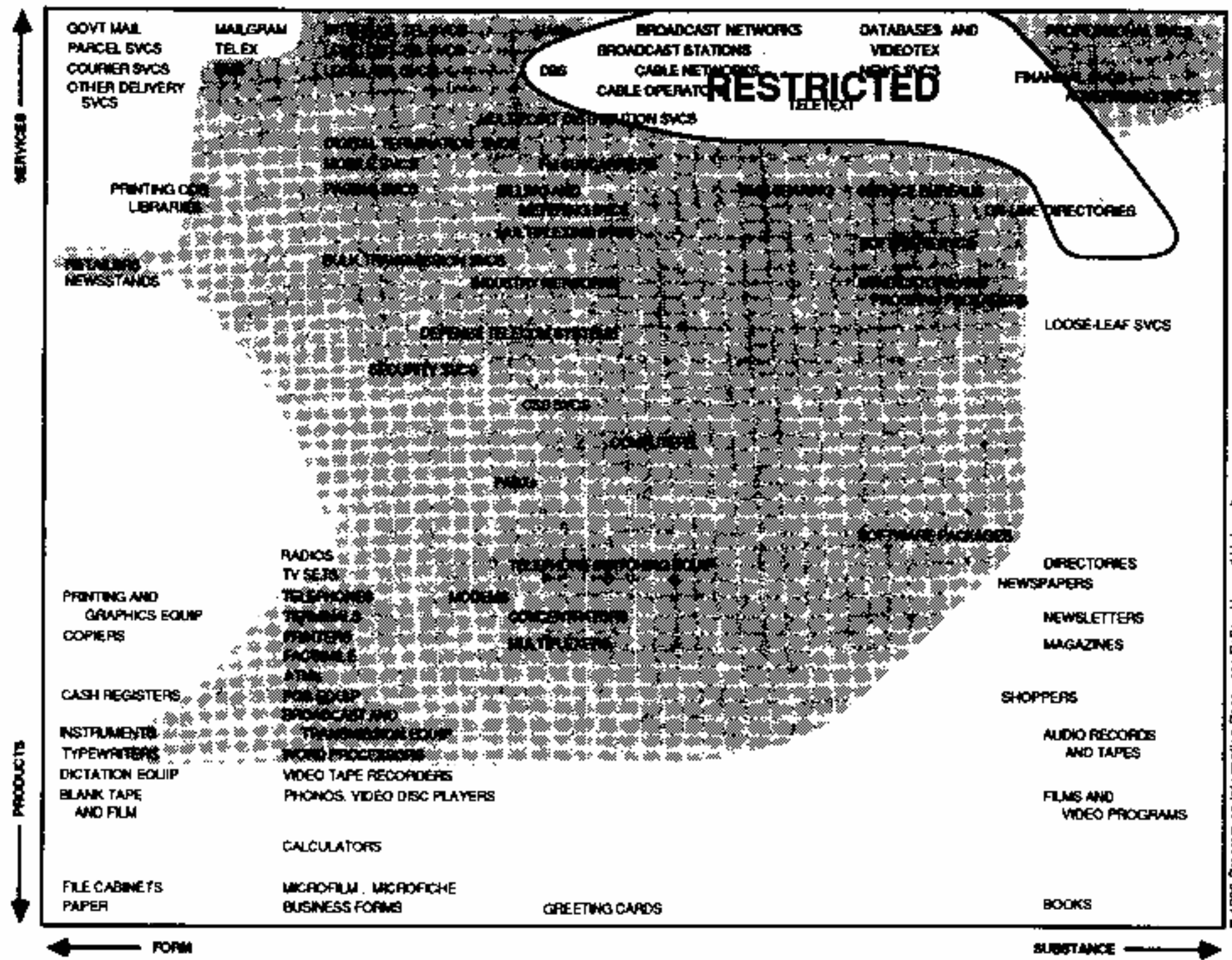
Figure 26. AT&T's Future Business?

Deregulation can be expected to have some similar effects upon the business activities of the larger telephone companies. Since AT&T's divestiture, GTE Corporation, United Telecommunications, and Continental Telecom have all acquired companies, launched new ventures, or reorganized with the aim of winning an enhanced share of the shifting market for telecommunications services.

Figure 27 illustrates the initial corporate boundaries established for the regional holding companies (RHCs) created as part of AT&T's divestiture. As their primary business, the RHCs and their component local exchange companies (LECs) provide local transmission and switching services. In addition, under the terms of the Modification of Final Judgment the RHCs were specifically allowed to engage in marketing of customer premises equipment (CPE) and publishing of yellow page directories.[2]
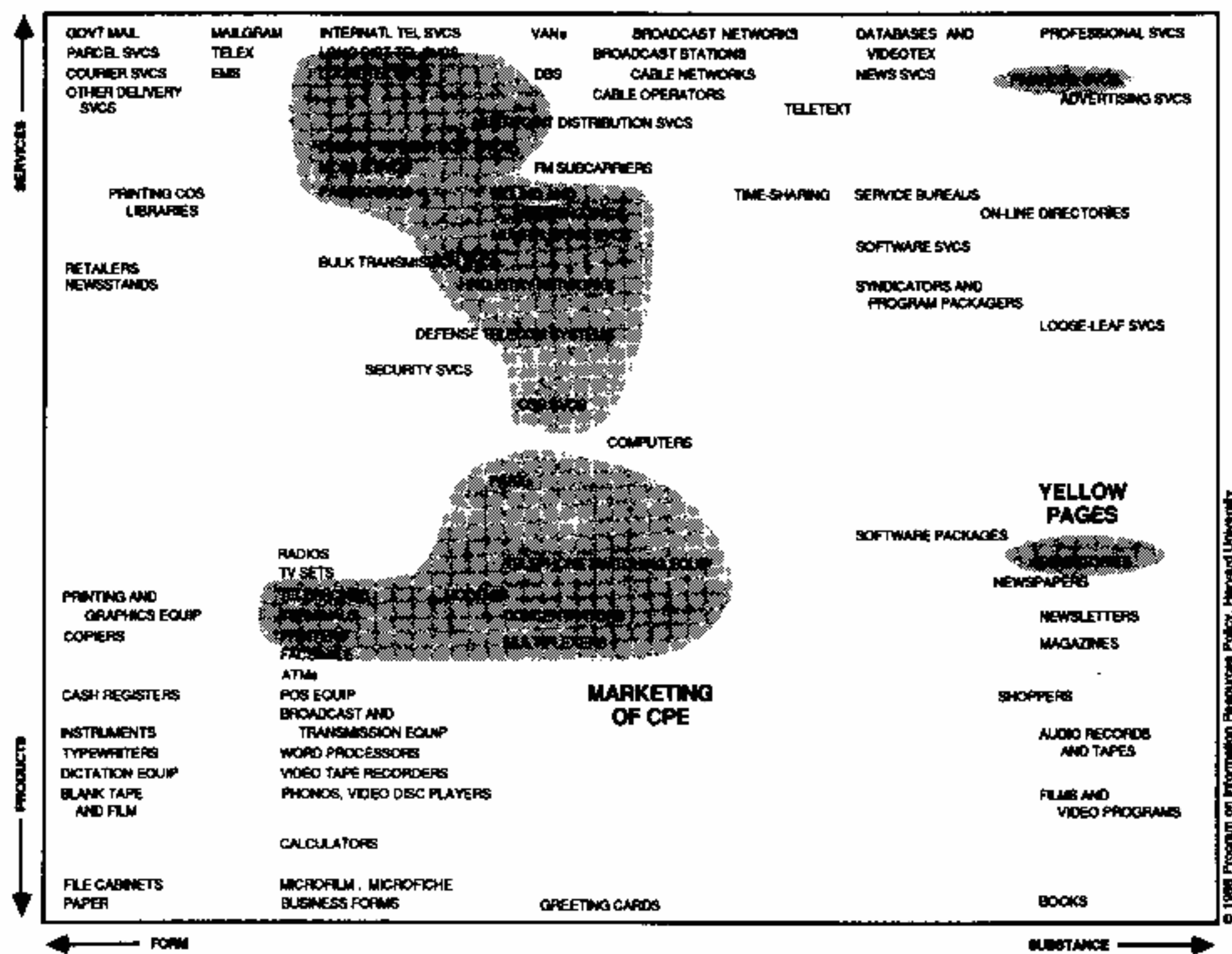
Figure 27. Regional Holding Companies, January 1984

While RHCs generally are prohibited from offering interLATA services, they do provide intraLATA toll services; thus they are shown as partially in long distance telecommunications services. The on-line directories entry reflects standard directory assistance services. Since the Department of Justice interpreted customer premises equipment to include computers, conceptually they could be included on the map of the RHCs, but none of the RHCs was actually marketing them in January 1984.

Since January 1984 the RHCs have succeeded in expanding their areas of operations. Figure 28, for example, illustrates Bell Atlantic Corporation in late 1985. Its expanded boundaries reflect a number of activities:

o   The acquisition of Tricontinental Leasing, putting the company into financial services;

o   The acquisition of the CompuShop retailing chain, making Bell Atlantic a retailer that markets computers, software packages, and a cluster of office supply products in the southwest corner of the map;

o The acquisition of MAI Canada and Sorbus, putting Bell Atlantic into computer systems marketing and maintenance;

o A start-up company called BAC Networks International providing network-related professional services overseas;

o The construction of transmission facilities for a cable system in the District of Columbia under contract to the system operator;

o An on-line directory service in Pennsylvania called DC-DCA (Directory Assistance-Direct Customer Access) providing dial-up computer access to Directory Assistance files.
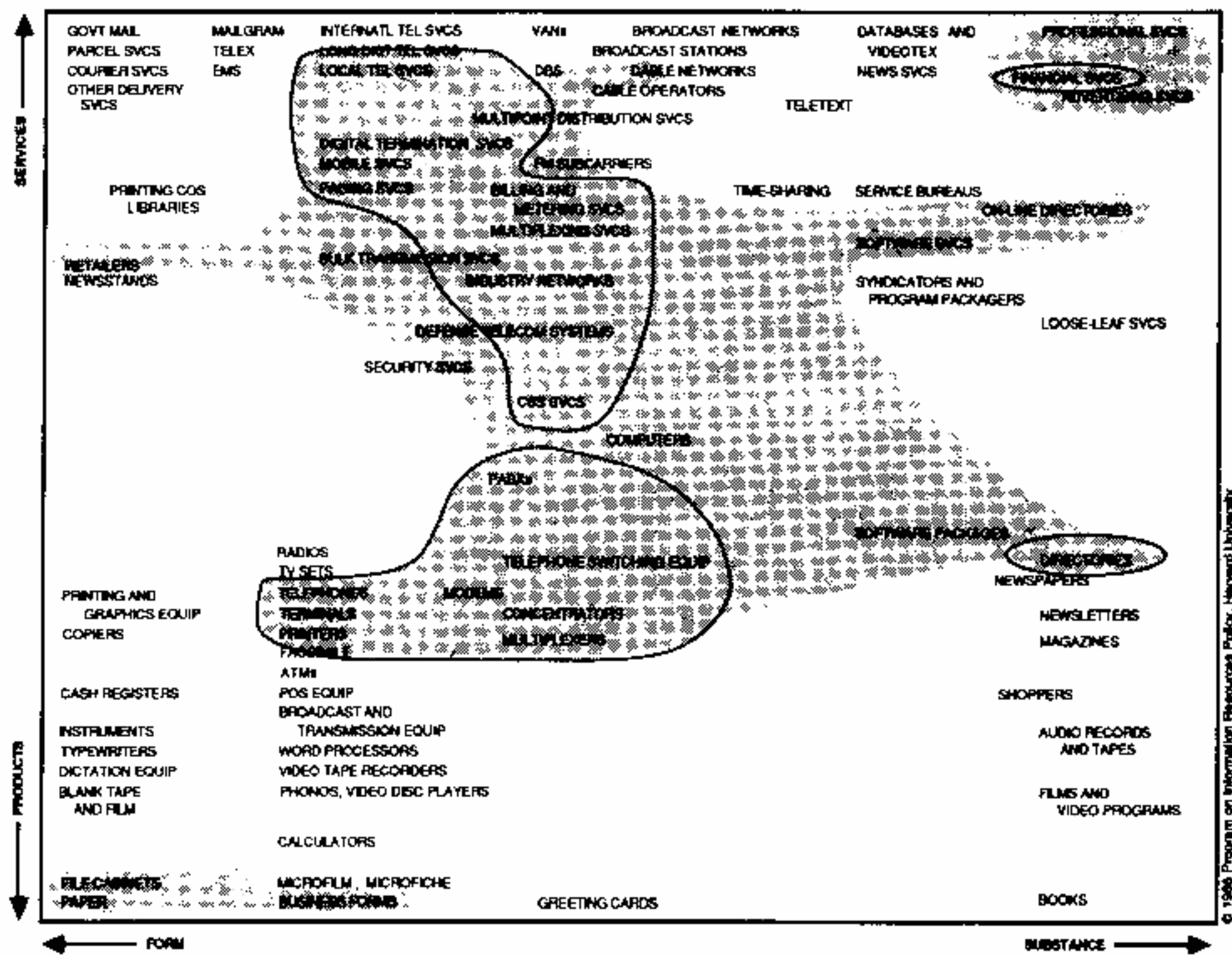
Figure 28. Bell Atlantic 1985

Bell Atlantic has also sought to compete with AT&T by providing a variety of service offerings to accommodate large-volume users and interexchange carriers. Some of these have been specially tailored to serve the large government users that represent a major market in Bell Atlantic's Chesapeake and Potomac territory.

While each of the RHCs has pursued an individual business strategy, many of the others have entered into new businesses similar to those shown for Bell Atlantic.

The relationship between regulation and corporate strategy becomes equally clear in the case of International Business Machines. The 1978 U.S. operations of IBM are illustrated by Figure 29. Overlaying the FCC's 1978 regulatory boundary (from Figure 17) on the map of IBM's domestic operations suggests that IBM had avoided direct entry into regulated sectors in the U.S. as a matter of corporate policy (Figure 30). The areas of overlap occur primarily in the telecommunications equipment sector where FCC regulation was diminishing at the time.
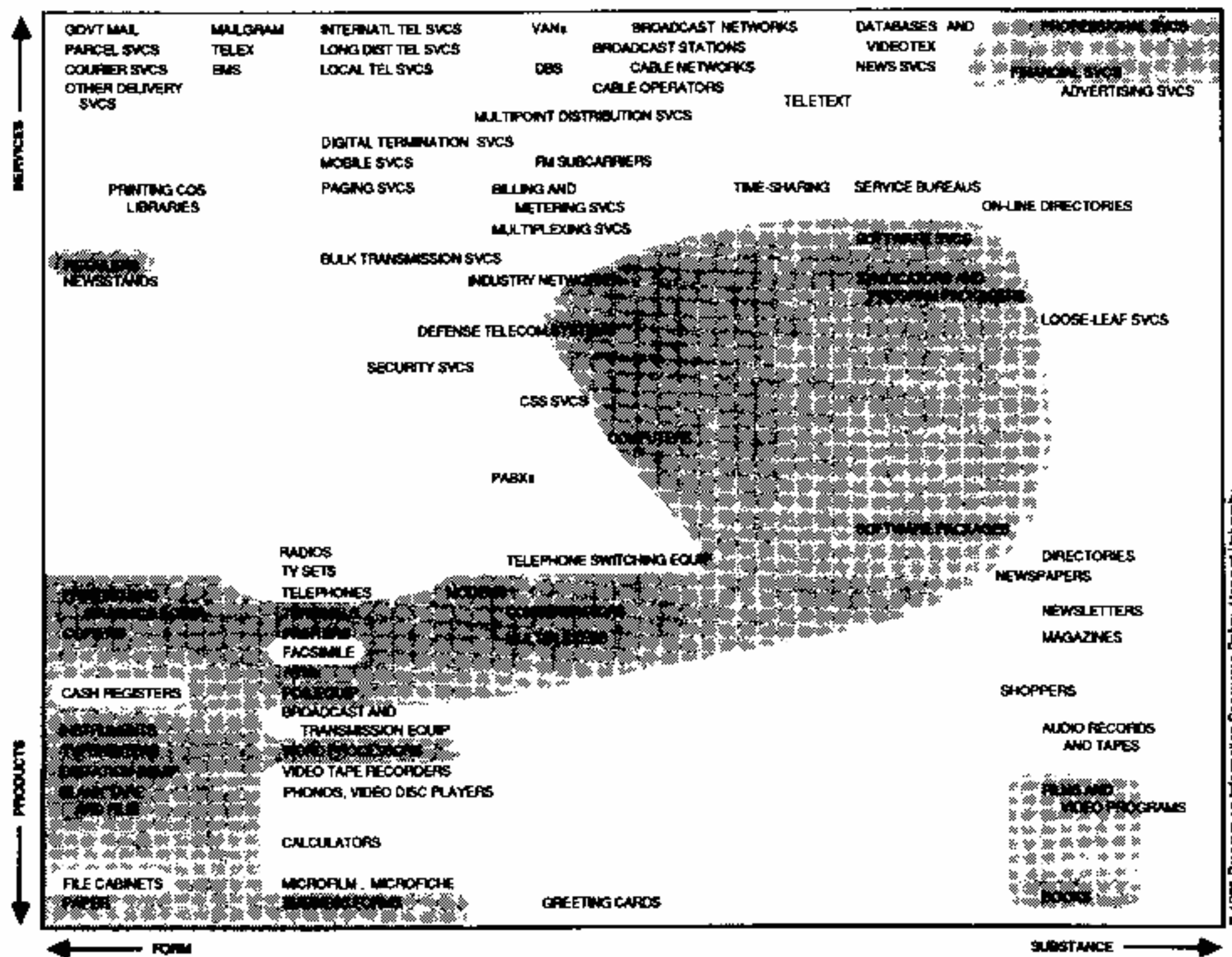
Figure 29. IBM 1978
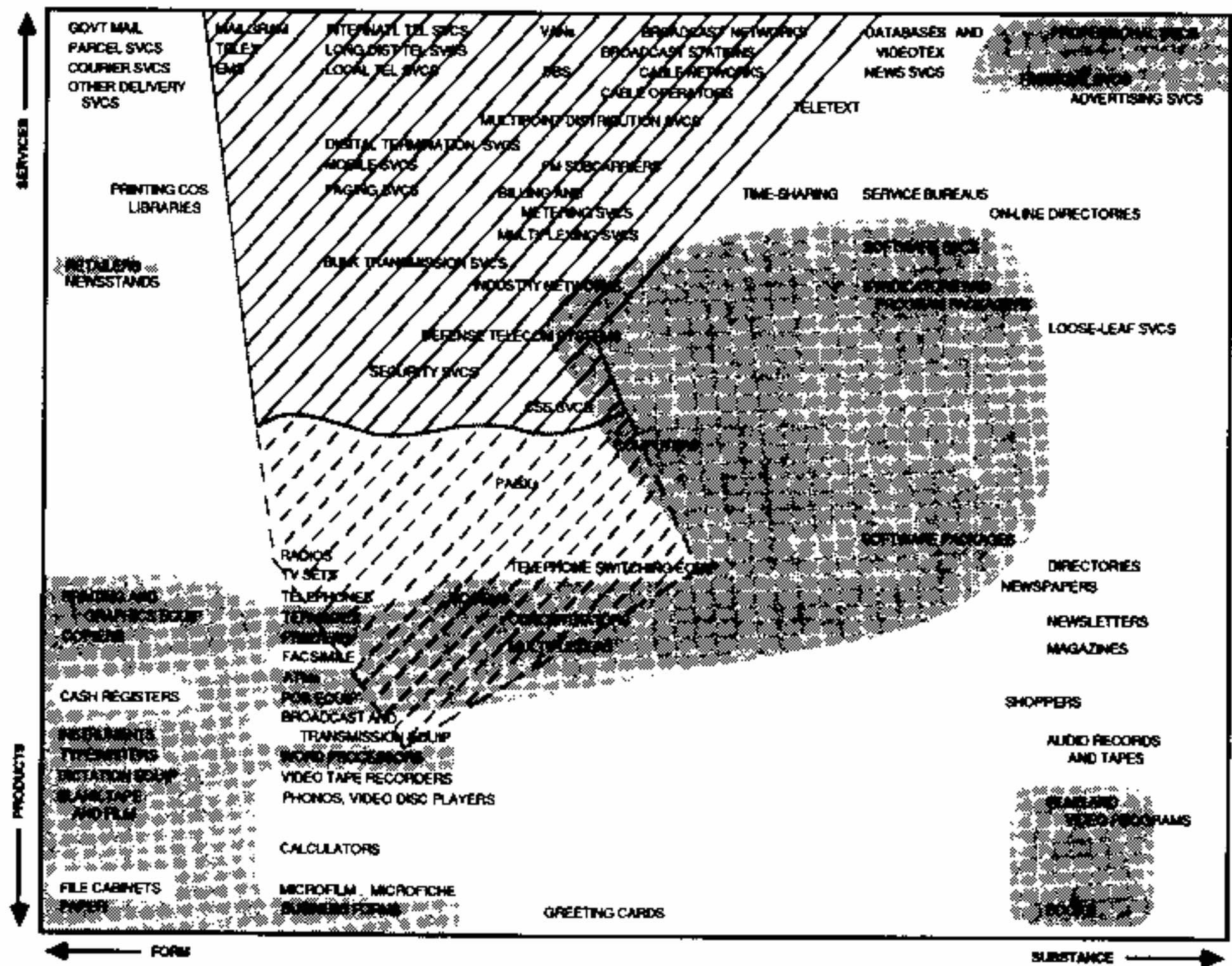
Figure 30. IBM 1978 and FCC Regulation

By 1985 IBM projected a somewhat different picture (Figure 31). Its acquisition of Rolm placed the company firmly in the telecommunications equipment business. In 1979, with the expiration of the consent decree stemming from the Service Bureau antitrust case, IBM reentered the data processing services business through the creation of the IBM Information Network. The partially shaded area to the northeast represents IBM's joint venture with Sears and CBS to explore videotext and database services (Trintex). The partially shaded area to the northwest suggests their continued involvement in the telecommunications service sector, previously through their investment in Satellite Business Systems and, as of 1985, through part ownership of MCI.

Over the years there has been extensive speculation in the trade press about likely competition between IBM and AT&T. The speculation is understandable given the picture of their similar businesses as reflected in Figure 32.

GOVT MAIL | MAILGRAM | INTERNATL TEL SVCS | VANs | BROADCAST NETWORKS | DATABASES AND | PROFESSIONAL SVCS
PARCEL SVCS | TELEX | LONG DIST TEL SVCS | | BROADCAST STATIONS | VIDEOTEX |
COURIER SVCS | EMS | LOCAL TEL SVCS | DBS | CABLE NETWORKS | NEWS SVCS |
OTHER DELIVERY | | | | CABLE OPERATORS | | ADVERTISING SVCS
SVCS | | | | | TELETEXT |

MULTIPOINT DISTRIBUTION SVCS

DIGITAL TERMINATION SVCS
MOBILE SVCS | FM SUBCARRIERS

PRINTING COS | PAGING SVCS | BILLING AND | TIME-SHARING | SERVICE BUREAUS
LIBRARIES | | METERING SVCS | | ON-LINE DIRECTORIES
| | MULTIPLEXING SVCS | SOFTWARE SVCS |

RETAILERS | BULK TRANSMISSION SVCS
NEWSSTANDS | INDUSTRY NETWORKS | SYNDICATORS AND
| | PROGRAM PACKAGERS

DEFENSE TELECOM SYSTEMS | LOOSE-LEAF SVCS

SECURITY SVCS

CSS SVCS

COMPUTERS

PABXs

SOFTWARE PACKAGES

RADIOS | TELEPHONE SWITCHING EQUIP | DIRECTORIES
TV SETS | | NEWSPAPERS
PRINTING AND | TELEPHONES | MODEMS |
GRAPHICS EQUIP | TERMINALS | CONCENTRATORS | NEWSLETTERS
COPIERS | PRINTERS | MULTIPLEXERS | MAGAZINES
| FACSIMILE |
| ATMs |
CASH REGISTERS | POS EQUIP | SHOPPERS
| BROADCAST AND |
INSTRUMENTS | TRANSMISSION EQUIP | AUDIO RECORDS
TYPEWRITERS | WORD PROCESSORS | AND TAPES
DICTATION EQUIP | VIDEO TAPE RECORDERS |
BLANK TAPE | PHONOS, VIDEO DISC PLAYERS | FILMS AND
AND FILM | | VIDEO PROGRAMS
| CALCULATORS |
FILE CABINETS | MICROFILM, MICROFICHE |
PAPER | BUSINESS FORMS | GREETING CARDS | BOOKS

FORM ← | → SUBSTANCE

Figure 31. IBM 1985

GOVT MAIL | MAILGRAM | INTERNATL TEL SVCS | VANs | BROADCAST NETWORKS | DATABASES AND | PROFESSIONAL SVCS
PARCEL SVCS | TELEX | LONG DIST TEL SVCS | | BROADCAST STATIONS | VIDEOTEX |
COURIER SVCS | EMS | LOCAL TEL SVCS | DBS | CABLE NETWORKS | NEWS SVCS | PRINTING SVCS
OTHER DELIVERY | | | | CABLE OPERATORS | | ADVERTISING SVCS
SVCS | | | | TELETEXT |

MULTIPOINT DISTRIBUTION SVCS

DIGITAL TERMINATION SVCS
MOBILE SVCS | FM SUBCARRIERS

PRINTING COS | PAGING SVCS | BILLING AND | TIME-SHARING | SERVICE BUREAUS
LIBRARIES | | METERING SVCS | | ON-LINE DIRECTORIES
| | MULTIPLEXING SVCS | SOFTWARE SVCS |

RETAILERS | BULK TRANSMISSION SVCS
NEWSSTANDS | INDUSTRY NETWORKS | SYNDICATORS AND
| | PROGRAM PACKAGERS

DEFENSE TELECOM SYSTEMS | LOOSE-LEAF SVCS

SECURITY SVCS

CSS SVCS

COMPUTERS

PABXs

SOFTWARE PACKAGES

RADIOS | TELEPHONE SWITCHING EQUIP | DIRECTORIES
TV SETS | | NEWSPAPERS
PRINTING AND | TELEPHONES | MODEMS |
GRAPHICS EQUIP | TERMINALS | CONCENTRATORS | NEWSLETTERS
COPIERS | PRINTERS | MULTIPLEXERS | MAGAZINES
| FACSIMILE |
| ATMs |
CASH REGISTERS | POS EQUIP | SHOPPERS
| BROADCAST AND |
INSTRUMENTS | TRANSMISSION EQUIP | AUDIO RECORDS
TYPEWRITERS | WORD PROCESSORS | AND TAPES
DICTATION EQUIP | VIDEO TAPE RECORDERS |
BLANK TAPE | PHONOS, VIDEO DISC PLAYERS | FILMS AND
AND FILM | | VIDEO PROGRAMS
| CALCULATORS |
FILE CABINETS | MICROFILM, MICROFICHE |
PAPER | BUSINESS FORMS | GREETING CARDS | BOOKS

FORM ← | → SUBSTANCE

Figure 32. AT&T and IBM

Another use of the map to view corporate positioning is illustrated by Figures 33-36. Figure 33 shows Harris Corporation in 1956 as a manufacturer of printing presses. Over the succeeding 20 years, Harris' growth through acquisitions and new ventures resulted in the donut-shaped area shown in Figure 34. The company's acquisition of Farinon in 1980 appeared to fill the previous gap in its territory (Figure 35.) In 1983 the Harris map shifted once more with the acquisition of Lanier and the divestiture of the company's original business (Figure 36.)

SERVICES

GOVT MAIL   MAILGRAM   INTERNATL TEL SVCS   VANs   BROADCAST NETWORKS   DATABASES AND   PROFESSIONAL SVCS
PARCEL SVCS   TELEX   LONG DIST TEL SVCS   BROADCAST STATIONS   VIDEOTEX
COURIER SVCS   EMS   LOCAL TEL SVCS   OBS   CABLE NETWORKS   NEWS SVCS   FINANCIAL SVCS
OTHER DELIVERY   CABLE OPERATORS   ADVERTISING SVCS
SVCS   MULTIPOINT DISTRIBUTION SVCS   TELETEXT

DIGITAL TERMINATION SVCS
MOBILE SVCS   FM SUBCARRIERS
PRINTING COS   PAGING SVCS   BILLING AND   TIME-SHARING   SERVICE BUREAUS
LIBRARIES   METERING SVCS   ON-LINE DIRECTORIES
MULTIPLEXING SVCS
SOFTWARE SVCS
RETAILERS   BULK TRANSMISSION SVCS
NEWSSTANDS   INDUSTRY NETWORKS   SYNDICATORS AND
PROGRAM PACKAGERS
LOOSE-LEAF SVCS
DEFENSE TELECOM SYSTEMS

SECURITY SVCS

CSS SVCS

COMPUTERS

PABXs

SOFTWARE PACKAGES

RADIOS   TELEPHONE SWITCHING EQUIP   DIRECTORIES
1956   TV SETS   NEWSPAPERS
PRINTING AND   TELEPHONES   MODEMS
GRAPHICS EQUIP   TERMINALS   CONCENTRATORS   NEWSLETTERS
COPIERS   PRINTERS   MULTIPLEXERS   MAGAZINES
FACSIMILE
ATMs
CASH REGISTERS   POS EQUIP   SHOPPERS
BROADCAST AND
INSTRUMENTS   TRANSMISSION EQUIP   AUDIO RECORDS
TYPEWRITERS   WORD PROCESSORS   AND TAPES
DICTATION EQUIP   VIDEO TAPE RECORDERS
BLANK TAPE   PHONOS, VIDEO DISC PLAYERS   FILMS AND
AND FILM   VIDEO PROGRAMS

CALCULATORS

FILE CABINETS   MICROFILM, MICROFICHE
PAPER   BUSINESS FORMS   GREETING CARDS   BOOKS

PRODUCTS

FORM ← → SUBSTANCE

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Figure 33. Harris Corporation 1956

GOVT MAIL   MAILGRAM   INTERNATL TEL SVCS   VANs   BROADCAST NETWORKS   DATABASES AND   PROFESSIONAL SVCS
PARCEL SVCS   TELEX   LONG DIST TEL SVCS   BROADCAST STATIONS   VIDEOTEX
COURIER SVCS   EMS   LOCAL TEL SVCS   DBS   CABLE NETWORKS   NEWS SVCS   FINANCIAL SVCS
OTHER DELIVERY   CABLE OPERATORS   ADVERTISING SVCS
SVCS   MULTIPOINT DISTRIBUTION SVCS   TELETEXT

DIGITAL TERMINATION SVCS
MOBILE SVCS   FM SUBCARRIERS
PRINTING COS   PAGING SVCS   BILLING AND   TIME-SHARING   SERVICE BUREAUS
LIBRARIES   METERING SVCS   ON-LINE DIRECTORIES
MULTIPLEXING SVCS

RETAILERS   BULK TRANSMISSION SVCS
NEWSSTANDS   SYNDICATORS AND
PROGRAM PACKAGERS

LOOSE-LEAF SVCS

SECURITY SVCS

PABXs

ES

TELEPHONE SWITCHING EQUIP   DIRECTORIES
NEWSPAPERS

PRINTING AND   TELEPHONES   MODEMS
GRAPHICS EQUIP   CONCENTRATORS   NEWSLETTERS
COPIERS   MULTIPLEXERS   MAGAZINES

ATMs
POS EQUIP
CASH REGISTERS   SHOPPERS

AUDIO RECORDS
AND TAPES
TYPEWRITERS
DICTATION EQUIP   VIDEO TAPE RECORDERS
BLANK TAPE   PHONOS, VIDEO DISC PLAYERS   FILMS AND
AND FILM   VIDEO PROGRAMS

CALCULATORS

FILE CABINETS   MICROFILM, MICROFICHE
PAPER   BUSINESS FORMS   GREETING CARDS   BOOKS

SERVICES   PRODUCTS   FORM   SUBSTANCE

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Figure 34. Harris Corporation 1976

GOVT MAIL   MAILGRAM   INTERNATL TEL SVCS   VANs   BROADCAST NETWORKS   DATABASES AND   PROFESSIONAL SVCS
PARCEL SVCS   TELEX   LONG DIST TEL SVCS   BROADCAST STATIONS   VIDEOTEX
COURIER SVCS   EMS   LOCAL TEL SVCS   DBS   CABLE NETWORKS   NEWS SVCS   FINANCIAL SVCS
OTHER DELIVERY   CABLE OPERATORS   ADVERTISING SVCS
SVCS   MULTIPOINT DISTRIBUTION SVCS   TELETEXT

DIGITAL TERMINATION SVCS
MOBILE SVCS   FM SUBCARRIERS
PRINTING COS   PAGING SVCS   BILLING AND   TIME-SHARING   SERVICE BUREAUS
LIBRARIES   METERING SVCS   ON-LINE DIRECTORIES
MULTIPLEXING SVCS   SOFTWARE SVCS

RETAILERS   BULK TRANSMISSION SVCS
NEWSSTANDS   INDUSTRY NETWORKS   SYNDICATORS AND
PROGRAM PACKAGERS

DEFENSE TELECOM SYSTEMS   LOOSE-LEAF SVCS

SECURITY SVCS

CSS SVCS

COMPUTERS

SOFTWARE PACKAGES
DIRECTORIES
RADIOS   NEWSPAPERS
TV SETS
PRINTING AND   NEWSLETTERS
GRAPHICS EQUIP   TERMINALS
COPIERS   PRINTERS   MAGAZINES
FACSIMILE
ATMs
CASH REGISTERS   POS EQUIP   SHOPPERS
BROADCAST AND
INSTRUMENTS   TRANSMISSION EQUIP   AUDIO RECORDS
TYPEWRITERS   WORD PROCESSORS   AND TAPES
DICTATION EQUIP   VIDEO TAPE RECORDERS
BLANK TAPE   PHONOS, VIDEO DISC PLAYERS   FILMS AND
AND FILM   VIDEO PROGRAMS

CALCULATORS

FILE CABINETS   MICROFILM, MICROFICHE
PAPER   BUSINESS FORMS   GREETING CARDS   BOOKS

SERVICES   PRODUCTS   FORM   SUBSTANCE

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Figure 35. Harris Corporation 1980

Figure 36. Harris Corporation 1983

Another variation of this technique suggests that a company's withdrawal from certain lines of business can be as significant as its new ventures. RCA has long been a major player in many segments of the information business but since 1970 they have exited (or entered and exited) many sectors. Figure 37 illustrates RCA's current businesses and indicates some past ones. Former businesses include greeting cards (Gibson), time-sharing (Cyclix), mainframe computers, local telecommunications service (Alascom), books (Random House), financial services (C.I.T. Financial Corporation), video discs, home audio products, and point-of-sale equipment. RCA has described many of these divestitures as part of a strategy to return to its earlier basic strengths in telecommunications and electronics technology.

CBS, which started in broadcasting like RCA and once tried to rival it in the consumer products field, has shifted over the years to emphasize the substance sectors of the information business (Figure 38).
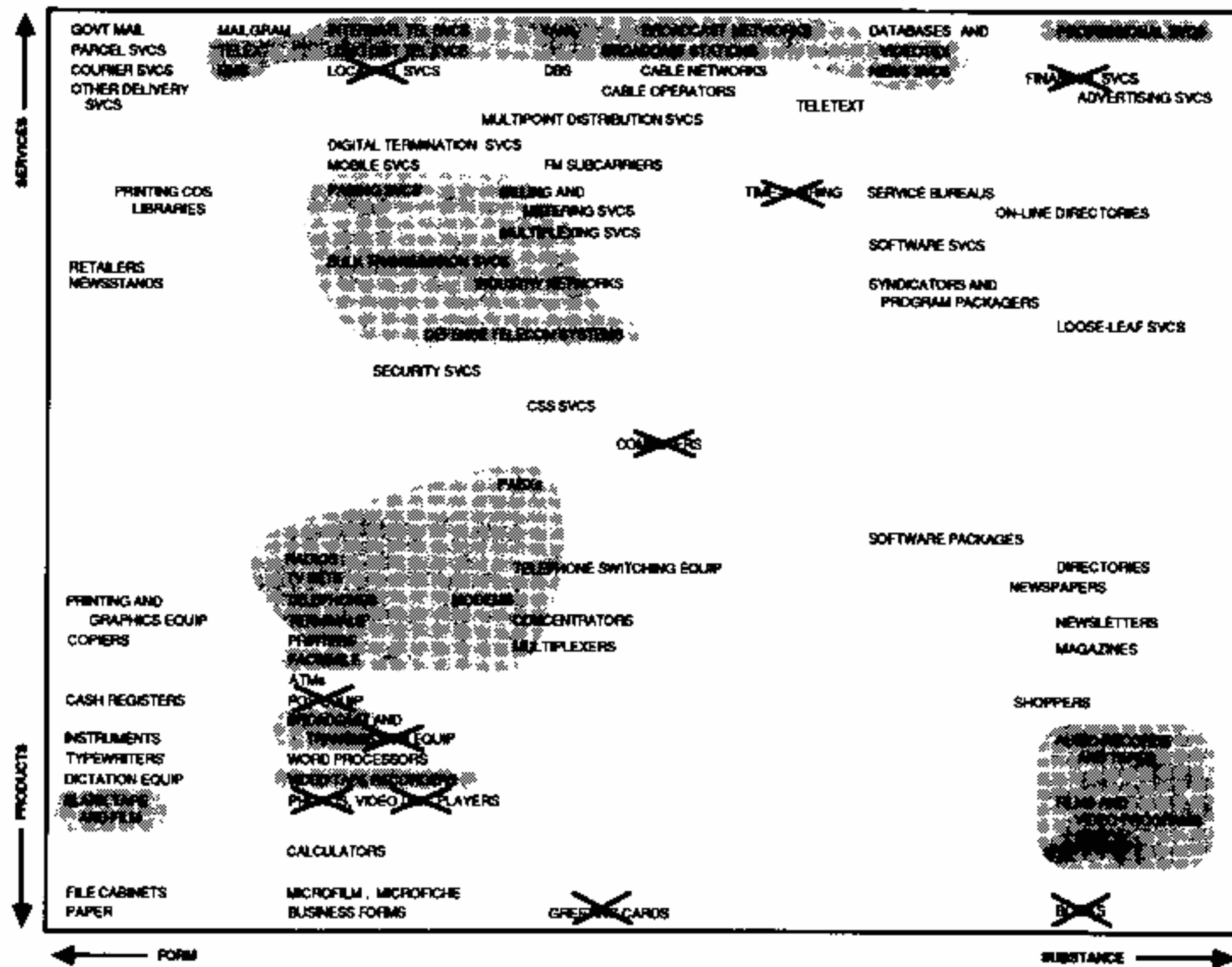
Figure 37. RCA 1985
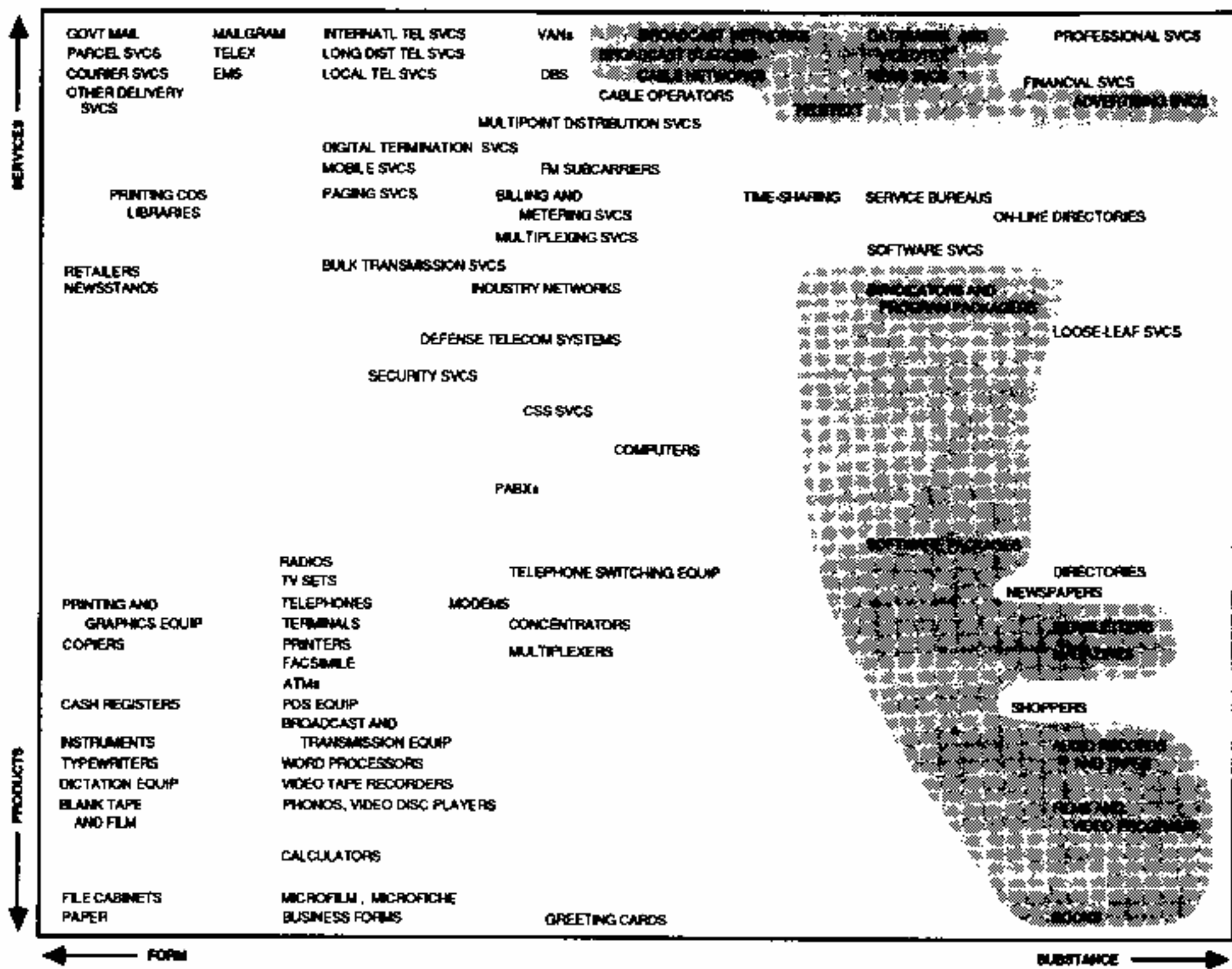
Figure 38. CBS 1985

Another approach to viewing corporate positioning contrasts new
ventures by multiple companies starting out from the same basic business.
Figure 39 illustrates the businesses operated by seven[3] different newspaper
publishers as of early 1985.
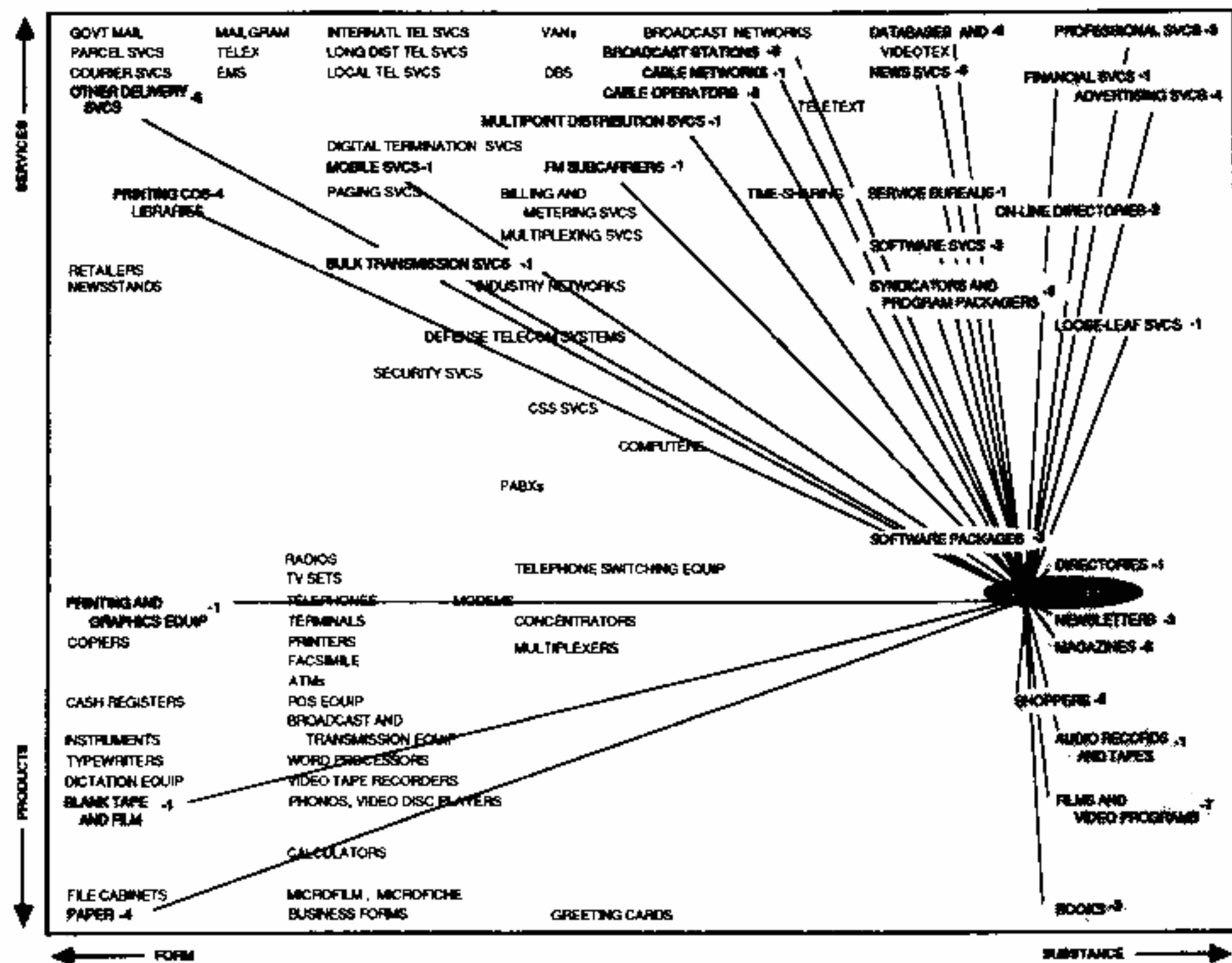
Figure 39. Newspaper Diversification

Some common threads emerge from this overview. Most of the publishers
have sought to exploit their distribution network by offering other
delivery services, most frequently as part of total market coverage (TMC)
programs. Many of them have sought to exercise some control over their
newsprint supply by investing in paper mills. Dow Jones traditionally
avoided the broadcasting business because broadcasting was government
regulated, but the other six chains all own broadcast stations. Most have
sought to leverage their editorial expertise through investment in magazine
and book companies.

As the preceding figures indicate, the map can be useful for looking at the strategic positioning of companies and competitors. However, focusing upon individual companies or small groups as we have been doing sometimes masks more basic forces and trends. We examine the map in this more fundamental respect in the next chapter.

CHAPTER 4 NOTES

4-1. U.S. vs. AT&T, Modification of Final Judgment, 552 F. Supp. 131 (1982) at Sec. VI, p. 186 and at Sec. VIII (D), p. 231 (D.D.C. 1982), aff'd mem., 103 S. Ct. 1240 (1983).

4-2. U.S. vs. AT&T, Modification of Final Judgment, 552 F. Supp. 131 at Sec. VIII (A) and Sec. VIII (B), p. 231 (D.D.C. 1982), aff'd mem., 103 S. Ct. 1240 (1983).

4-3. The seven newspaper publishers are The New York Times Company, The Washington Post Company, Dow Jones and Company, Gannett Company, Harte-Hanks Communications, Lee Enterprises, and The Times Mirror Company.

5

VIEWING BASIC FORCES AND TRENDS

As discussed in Chapter 2, most of the map's newer entries are found
in its center, and most have emerged as a result of modern electronics
technologies. This phenomenon introduces to the map an economic dimension
useful for understanding business developments such as electronic
publishing and office automation. It can also extend to another
application of the map, wherein entries may be seen to migrate between
several distinct market levels of products and services in the information
business as costs of production and other basic factors change.

MAPPING ECONOMICS

Figure 40 highlights the entries in the four corners of the
information business map.   Figure 41 traces the growth in unit costs for
several such entries from 1970 to 1985. Unit costs for these entries have
approximated or exceeded the increase in the Consumer Price Index (CPI)
during those years.
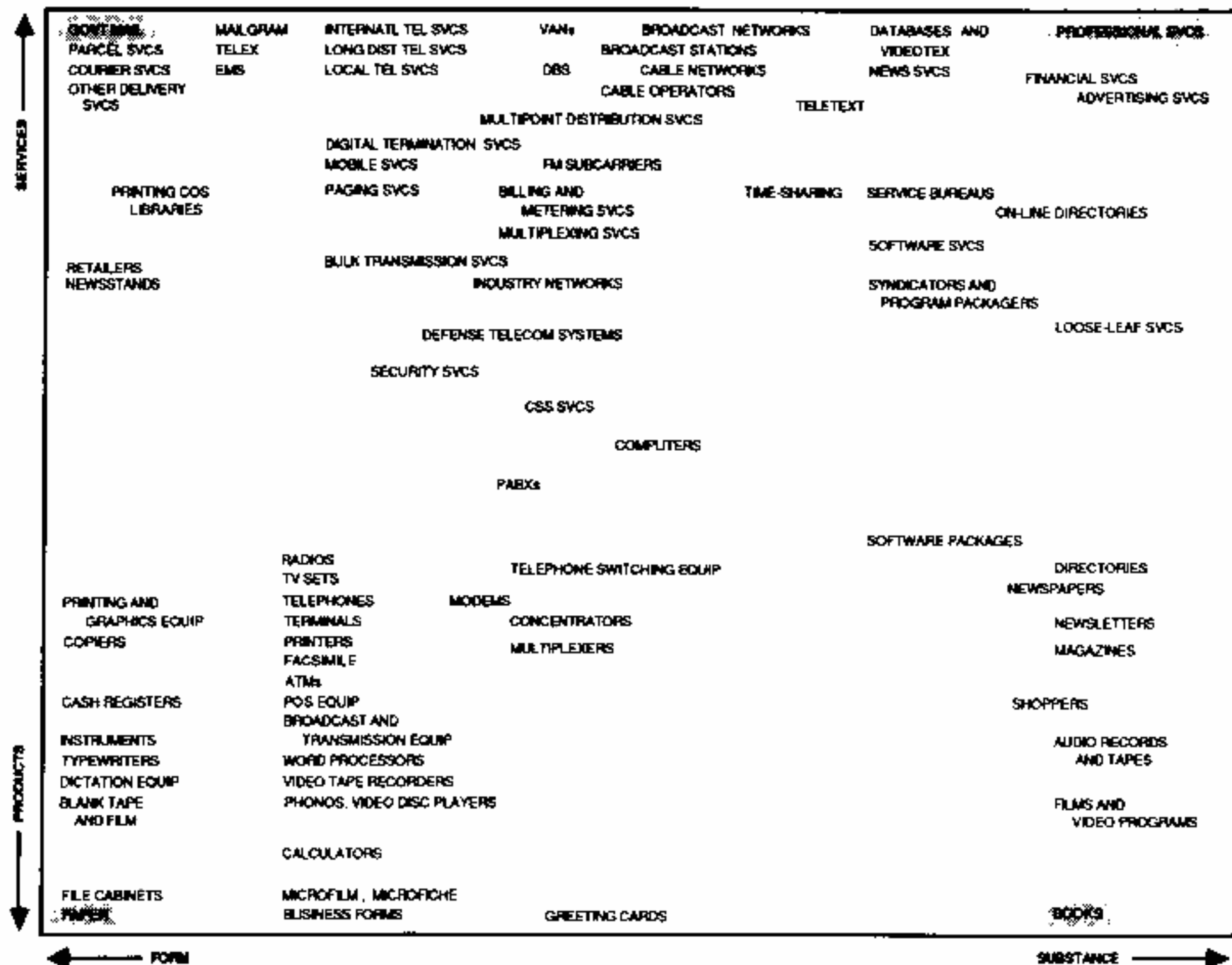
Figure 40. Corner Entries

Adapted from U.S. Department of Commerce, Bureau of the Census.
Statistical Abstract of the United States: 1986. 106th ed.
Washington, DC: Government Printing Office, 1986.
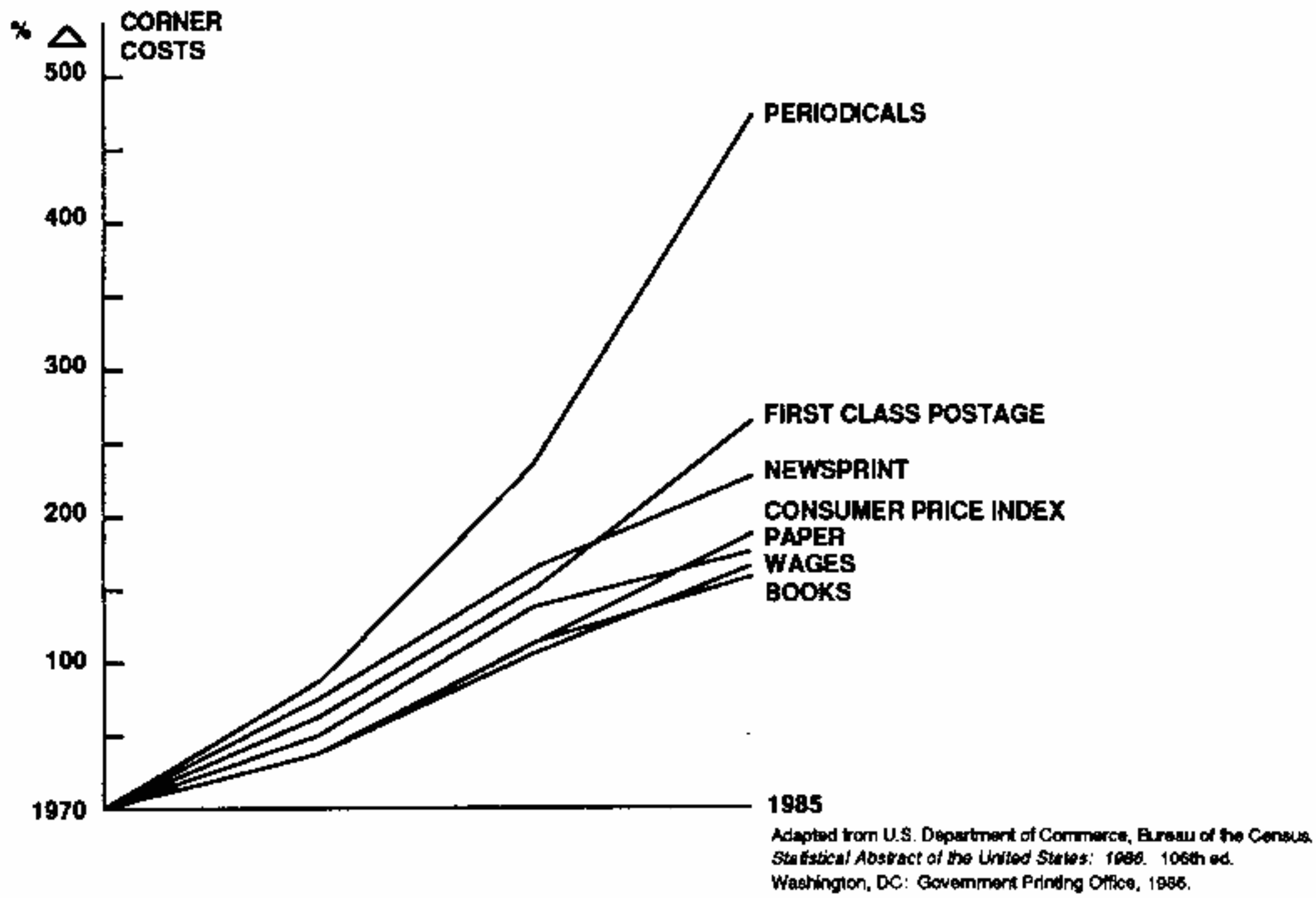
Figure 41. Costs in the Corners
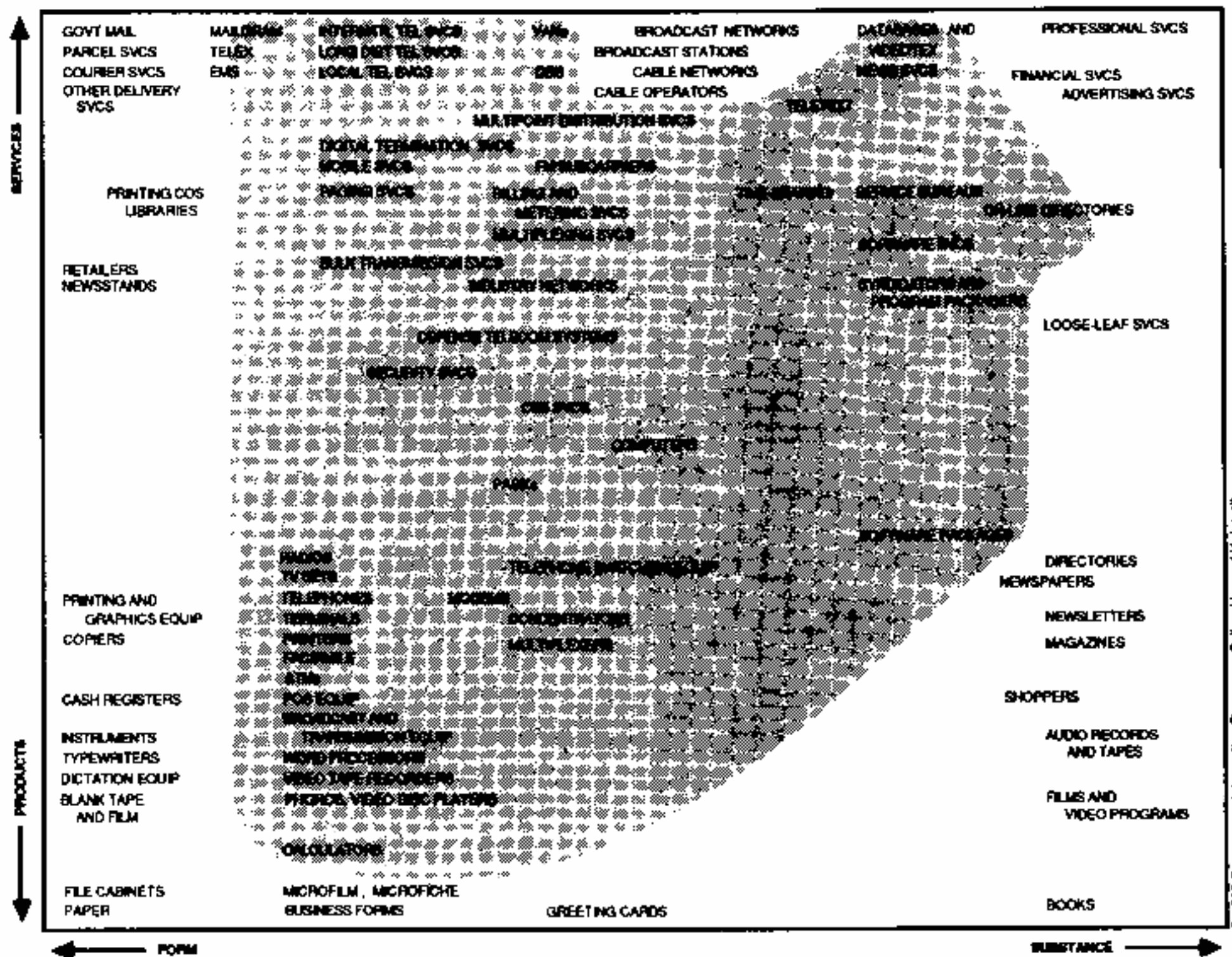
Figure 42. Center Entries

Figure 42 highlights a multitude of entries in the center of the map while Figure 43 traces the dramatic decrease in unit costs exhibited by several representative products. While the rate of decline differs significantly among the various entries, all of those displayed in Figure 42 underwent substantial real unit cost decreases between 1970 and 1985.
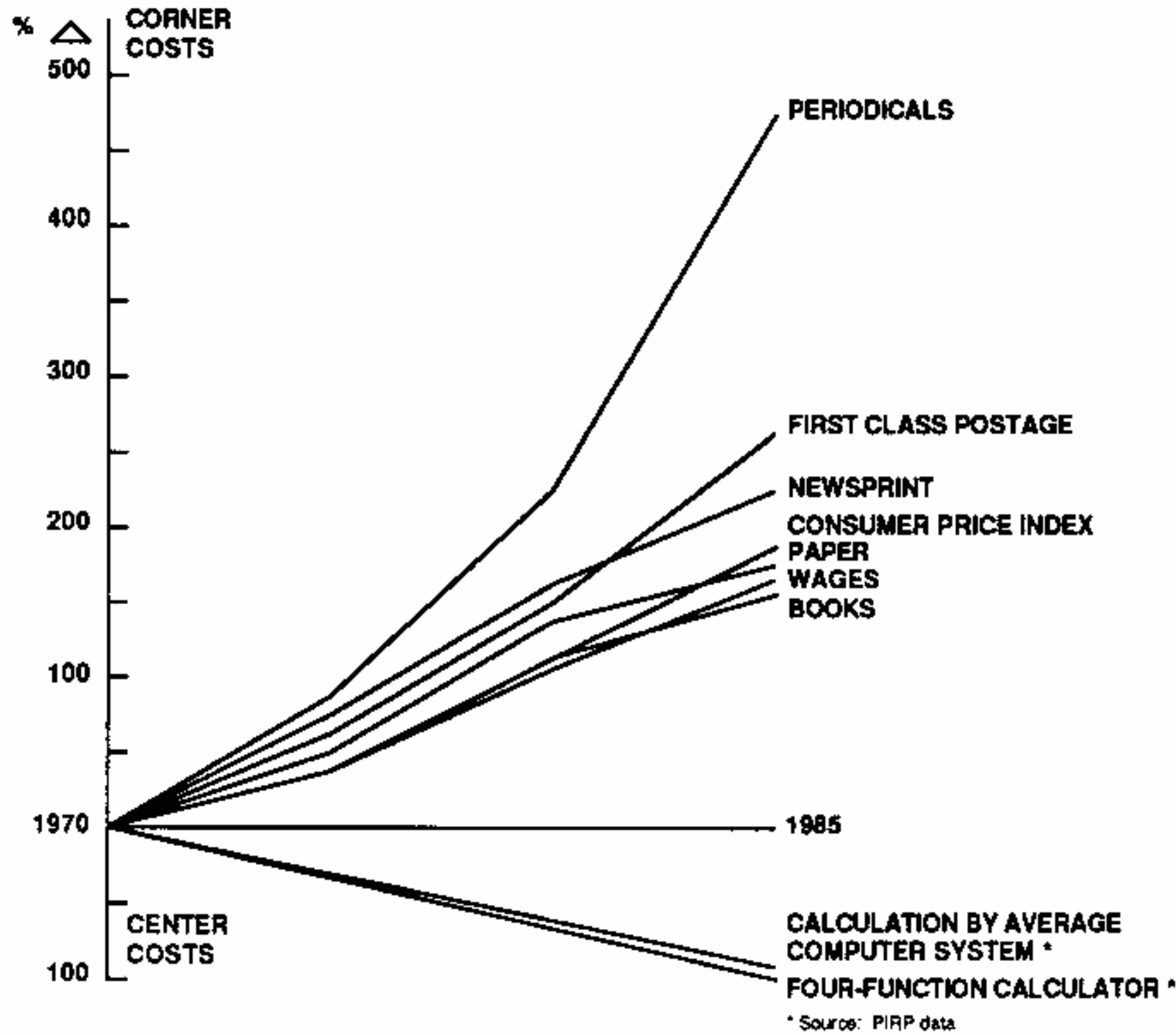
Figure 43. Costs in the Center

MAPPING INSTITUTIONAL RESPONSES

One obvious explanation for these contrasting cost trends resides in the dependence of corner activities upon people and energy. Consequently, industry-wide realignments are underway as businesses seek an improved mix of resources. The following examples, highlighting two trends that have altered the operating environment for many players in the information business, show some ways in which the map can be used to represent such broad developments.

Electronic Publishing

For the better part of a century (1870-1970) a would-be publisher of newspapers, magazines, or books engaged in the basic activities shown on Figure 44. The publisher started off in the northeast corner with writers, illustrators, and other professionals who created information substance. That substance took form in the southwest corner with the application of ink to paper. The final form was a newspaper, magazine, or book as shown in the southeast corner. Finally, the publisher had to turn to the northwest corner to have his product physically delivered to the ultimate consumer.
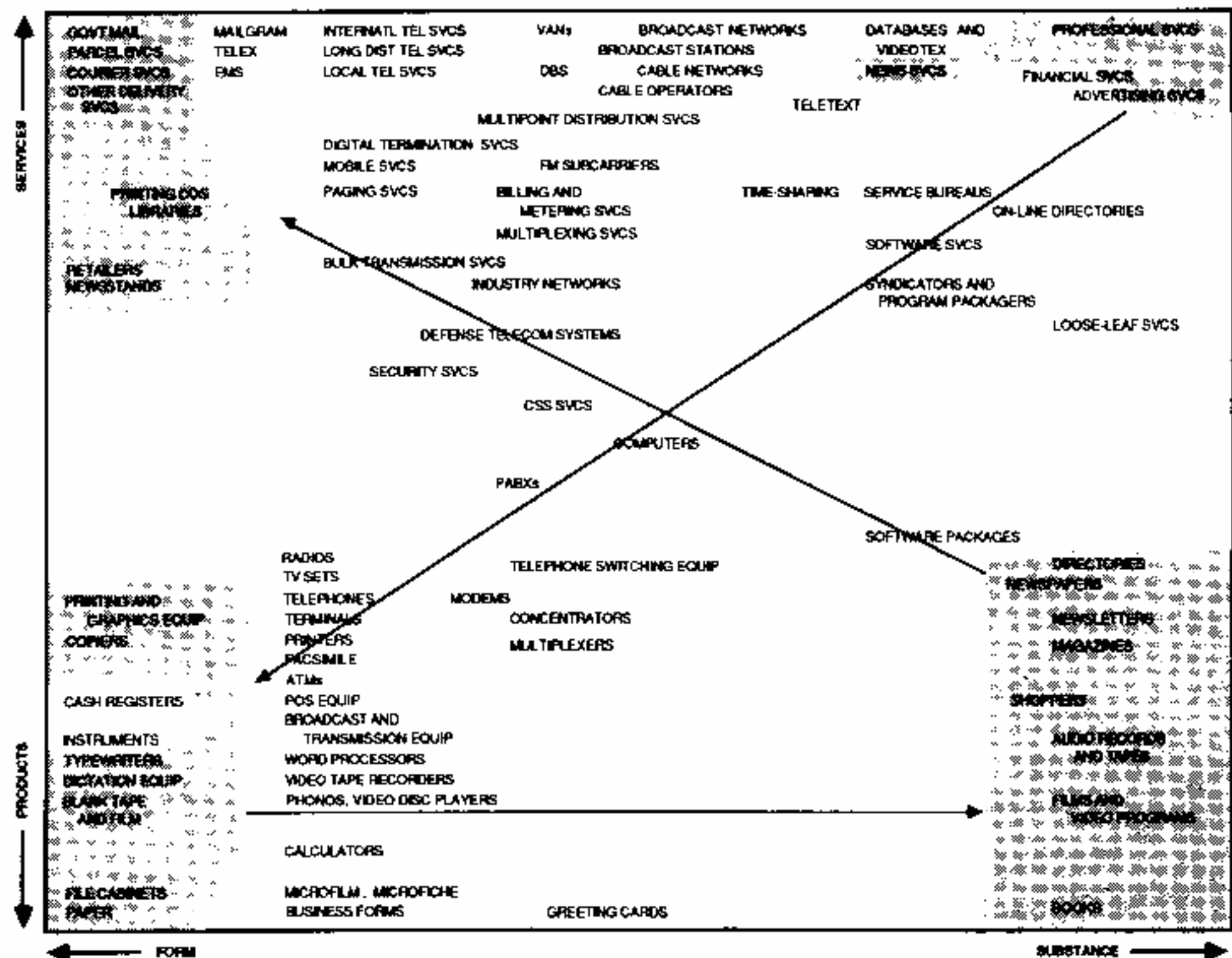
Figure 44. Traditional Publishing

Ownership and management control of each of these steps varied among and within publishing industry groups. Thus the typical newspaper publisher directly employed writers and editors, operated his own printing plant, and distributed his product through an exclusive home and newsstand delivery system. Magazine and book publishers might contract for writers and printing services while depending upon the mails or various jobbers or agents to distribute their products. The overall process nevertheless was fairly uniform.

Energy cost increases during the 1970s presented a double blow to most publishers. The cost of producing paper -- an energy-intensive process -- soared along with the cost of physically distributing final published products. At the same time, however, the advent of low-cost computer and communications technologies allowed many publishers to economize on the people-intensive activities of their internal production processes. Increasingly, text was entered and edited on computer-based systems for composition and final electronic delivery to the printing press.

For most of today's publishers, of course, printing a product and physically delivering it to the consumer remain essential and costly components of the publishing process. One can already see, however, the emerging outline of an electronic publishing process as illustrated in Figure 45. The publisher begins with the same professional staff generating information substance. The information is entered, edited, and stored using the computer-based systems now common to most modern publishers. Finally, the information substance is delivered to the consumer electronically whether by telephone, cable, teletext, or interactive databases, thereby reducing dependence upon paper and physical delivery mechanisms.
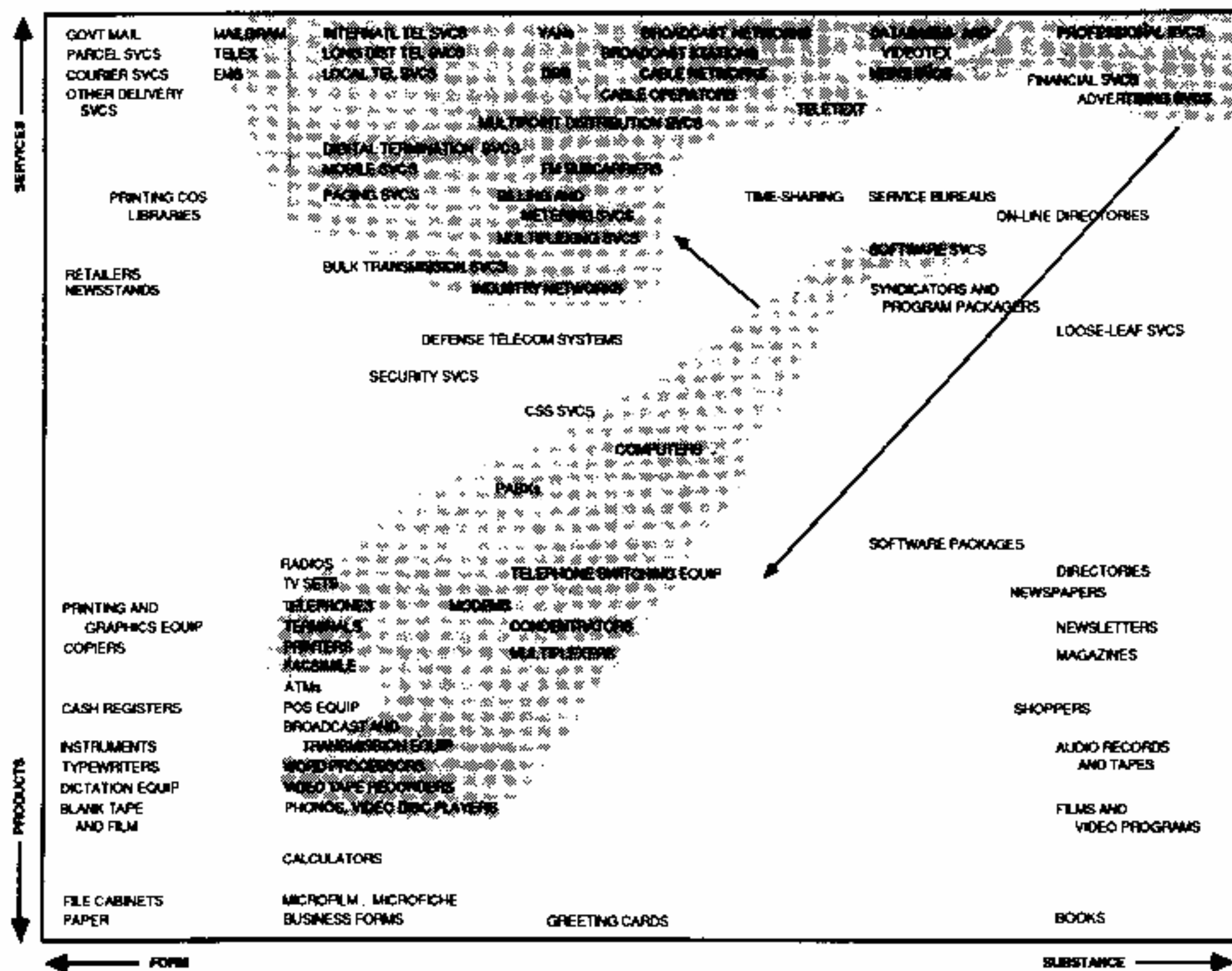
Figure 45. Electronic Publishing

Transition to this type of process can vastly improve the timeliness of information delivery where that is a concern. Modern systems also present opportunities for selective repackaging and marketing of information for selected audiences. The potential interactivity of such systems allows the consumer to search for selected information that was initially gathered and stored by the publishers, but would be excluded from a printed, mass-market publication because of lack of widespread reader interest.

Ideas of electronic publishing are not new. The St. Louis Post Dispatch first experimented with facsimile delivery of newspapers in 1934. Yet the costs of paper, gasoline, and delivery boys were quite low in 1934 relative to those of telephone service and electronic equipment. Given a continued shift in the relative costs of those items on the periphery of the map and those in the center, electronic publishing processes can be expected to gain favor over time.

Office Automation

Publishing, of course, is not the only information institution being reshaped by the relative changes in costs between the corners and the center of the map. Offices, whether business, governmental, or non-profit, are important consumers of most of the products and services shown on the information business map. This is not surprising if we consider that the basic functions of any office are to gather, generate, analyze, store, and transmit information in order to make and communicate management decisions.

On the map in Figure 46 we have shaded in those products and services that might be considered most relevant to the operation of any office. The excluded areas were ruled out on cultural grounds: Offices consume books and films, and their occupants use retailers and watch TV programs, but the office market for such entries is insignificant in comparison to their mass-market consumption.

Figure 46. Traditional Office

As unit costs of items in the corners continue to rise relative to those in the center, managers will be driven to exploit the differential. Figure 47 suggests the likely result as organizations attempt to make trade-offs between the people- and energy-intensive corners and the ever-cheaper products and services toward the center. As in the publishing case, the ability of the new electronic technologies to improve the selectivity, interactivity and timeliness of information flows may rival cost-cutting as a motivation for shifting toward the center of the map.

Figure 47. Office Automation

The information business map can also be used for approaching the topic of office automation from another angle. Much of the analysis and debate of office automation since the mid-1970s has revolved around the likelihood that a single industry or company will come to dominate the entire field. This debate is best illustrated by a diagram used by the Gartner Group, a consulting firm specializing in the computer industry, as shown in Figure 48. (While the diagram uses industry names, it is fair to say that when it first appeared in the 1970s, much of the business world translated "Telecoms" as AT&T, "Data Processing" as IBM, and "Office Equipment" as Xerox.)
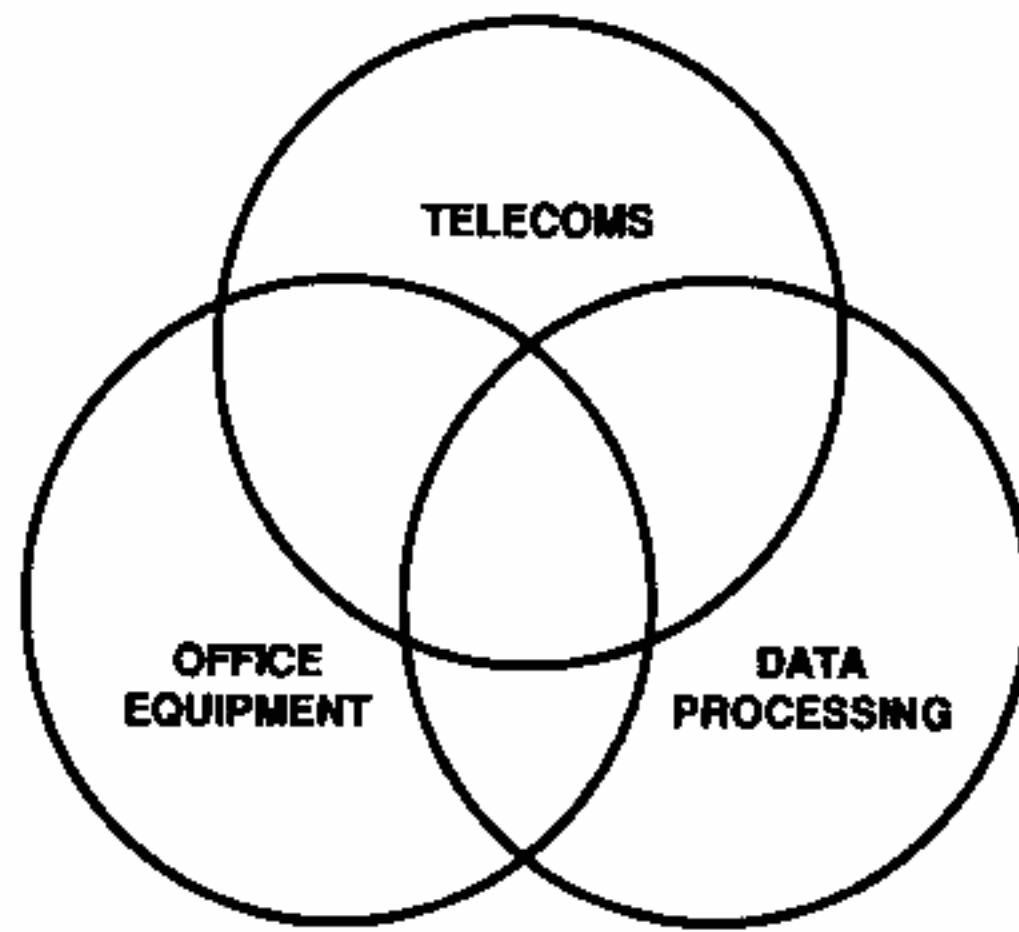
Figure 48.   Office of the Future: The Gartner Group

Figure 49 overlays the Gartner Group's three industry circles on the map of office automation.   The resulting picture suggests a few speculations:
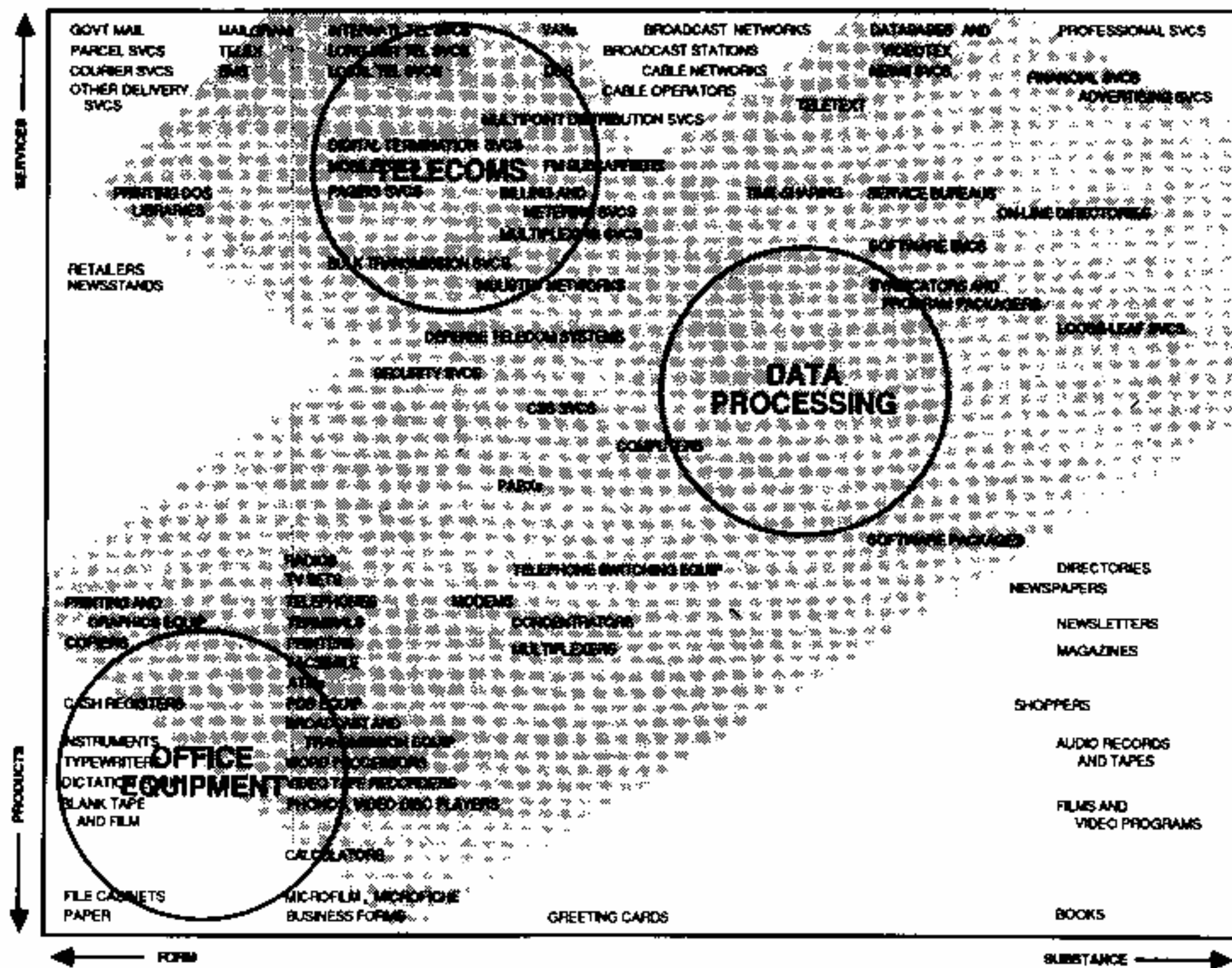
Figure 49.   Office Automation: Three Industries

1.   While one may debate the appropriate size and placement of the three circles as imposed on the map, the overall area of office

automation probably exceeds the range of any given company or industry.

2. As suggested by Figure 50, the earlier three-industry approach to office automation ignores some industries that might yet play a significant role in office automation. While they have not been a major voice as of 1986, consumer electronics companies such as Sony or Commodore may be able to acquire an important stake by exploiting their abilities to design "user-friendly" devices and to market them to individuals at low unit costs. Information vendor companies such as Dow Jones, Dun & Bradstreet, and McGraw-Hill address a sizeable piece of the office automation territory.
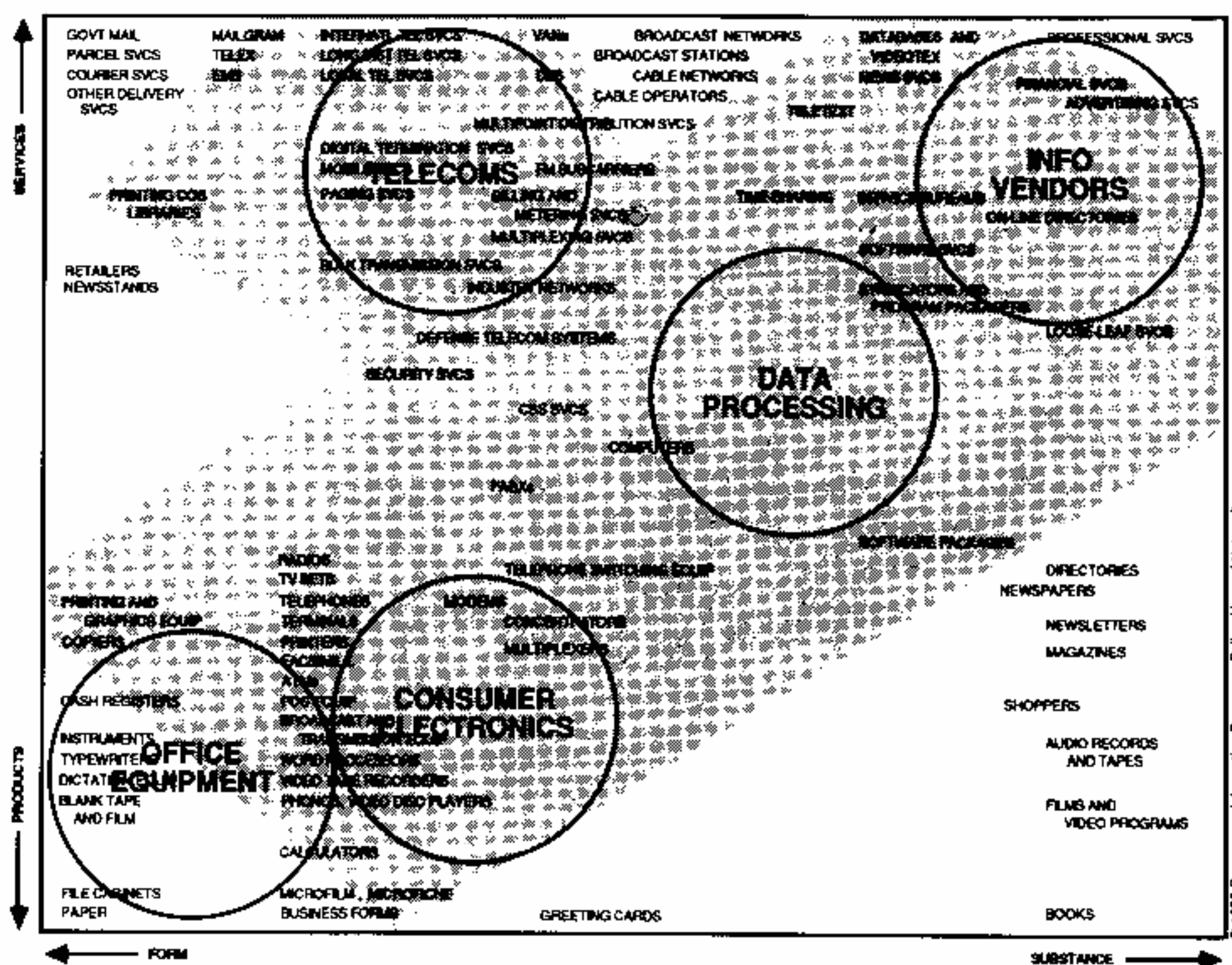
Figure 50. Office Automation: Five Industries

3. As illustrated by Figures 51 and 52, an expanding AT&T (with its Covidea joint venture) and IBM (with Rolm and its MCI and Trintex interests) appear to be addressing much of the office automation market. It should be noted, however, that while both AT&T and IBM cover large areas on the map, each has strengths in various sectors unmatched by the other.
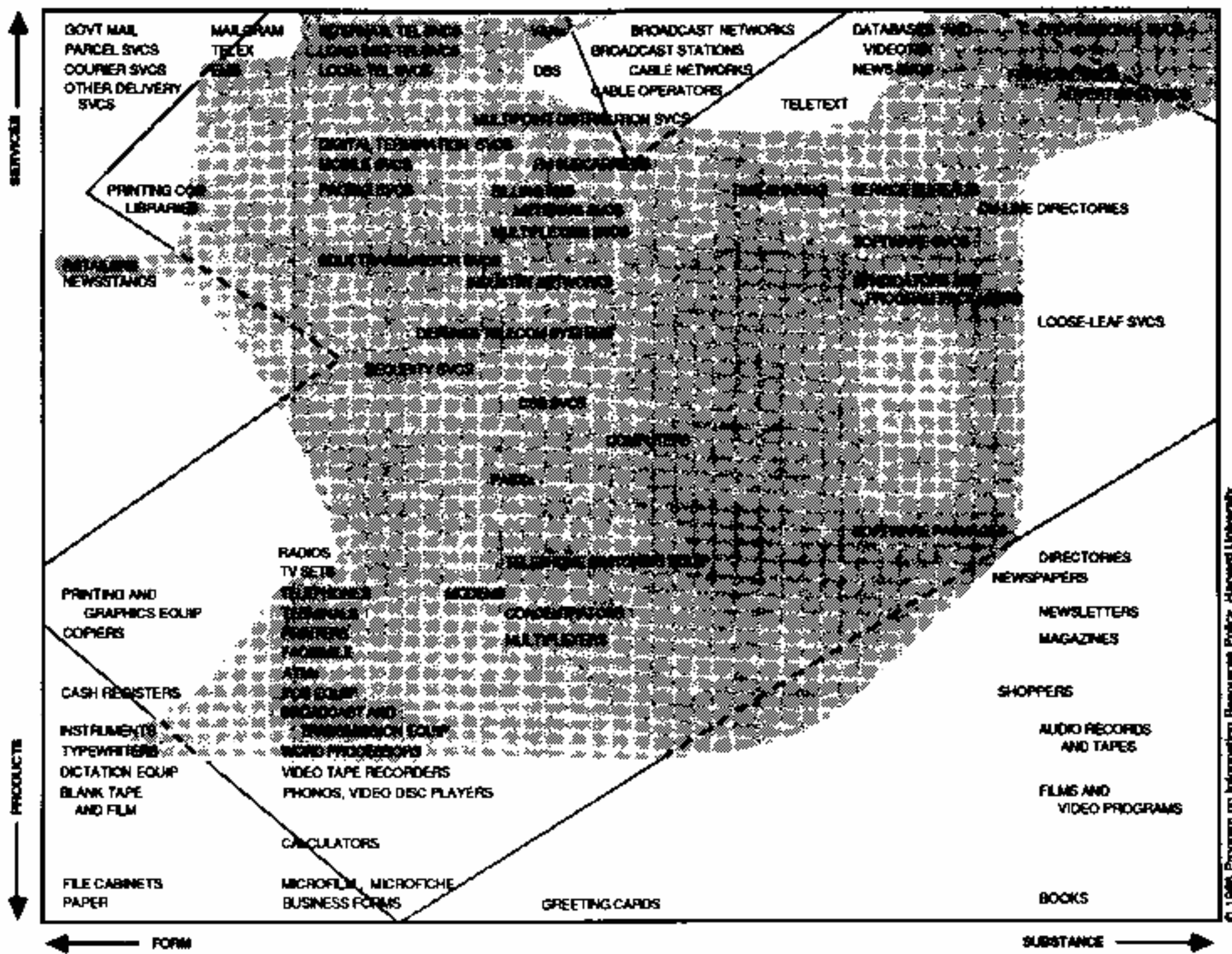
Figure 51. AT&T and Office Automation
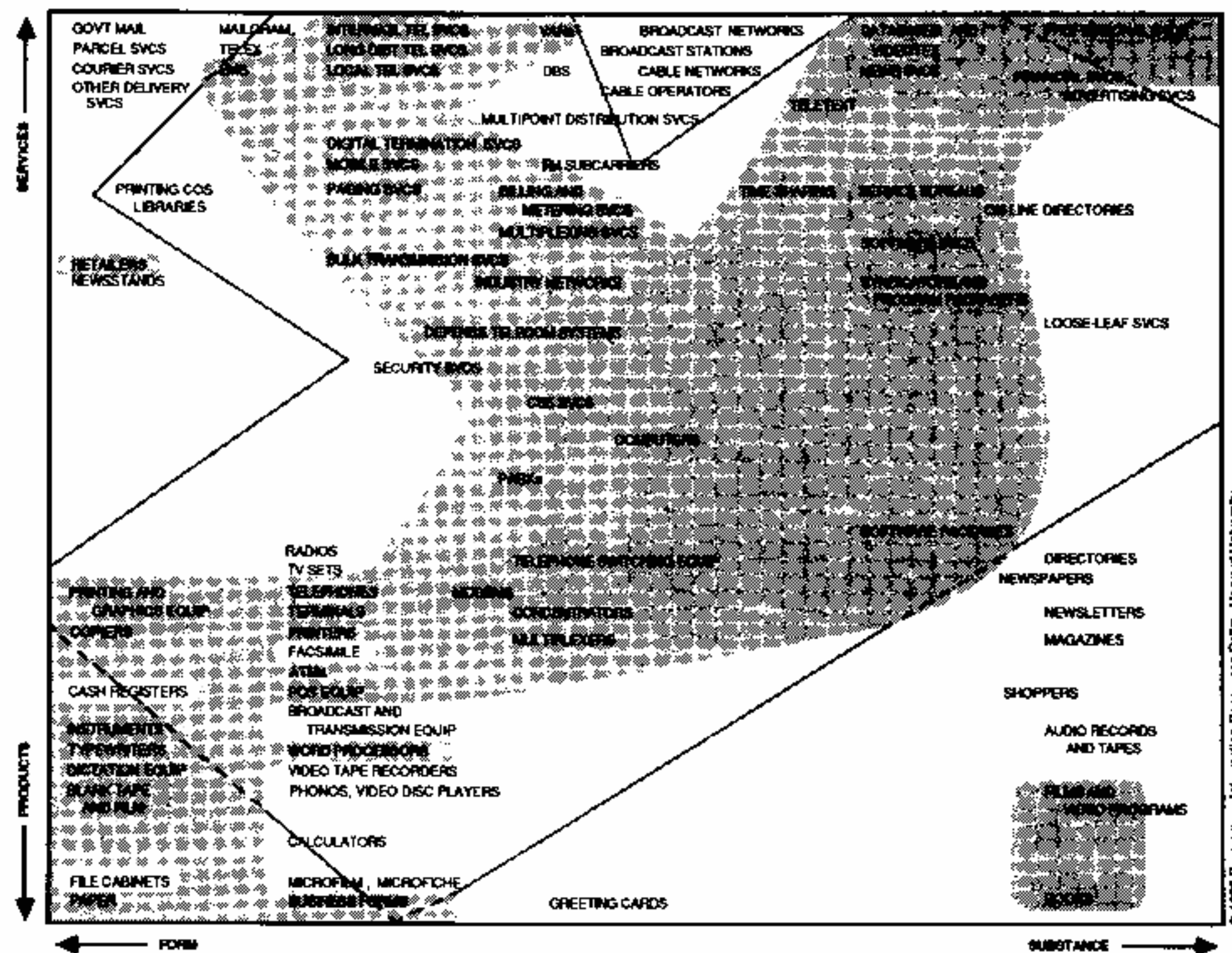
Figure 52. IBM and Office Automation

4.   Xerox appears to have changed its approach to the office automation market during the 1975-1985 period. Figure 53 portrays our impression of Xerox's activities, circa 1980, compared to our depiction of the office automation business. Having tried and failed to enter the office automation business through general computing (with the acquisition of Scientific Data Systems in 1969, renamed Xerox Data Systems and eventually sold off to Honeywell in 1976), Xerox later approached the business through the communications sector (with the acquisition of Western Union International and the XTEN venture), and through the substance, or information provider, route (with extensive acquisitions in the publishing field).
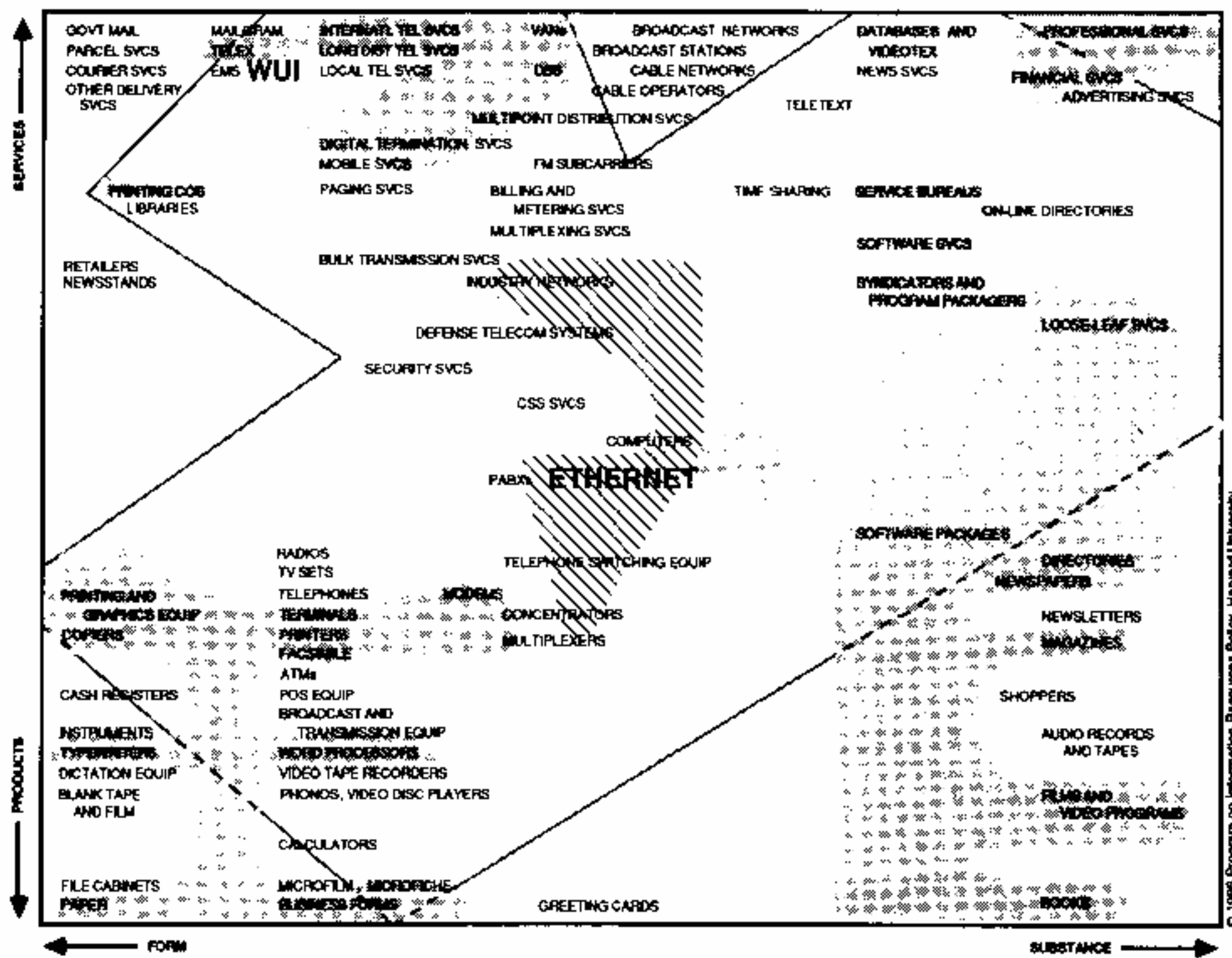
Figure 53. Xerox 1980 and Office Automation

By 1985 Xerox had refocused its activities. The company divested itself of most of its publishing activities (the onetime Xerox Information Resources Group) and Western Union International while terminating XTEN. Figure 54 combines the 1985 positioning of Xerox with the office automation map. While the result suggests a reduced Xerox presence in the office automation sector, it fails to reveal the depth of resource commitments in

some selected areas. During the early 1980s, for example, Xerox redirected its office automation activities toward advanced workstations, desktop publishing, local area network (LAN) equipment (particularly Ethernet), and a range of optical and graphic digitization products related to its basic strengths in the reprographics field. During the same period Xerox also substantially expanded its commitment to the financial services business (through the acquisition of Crum and Forster and Van Kampen Merritt) and developed a substantial market share for its line of Memorywriter electronic typewriters.
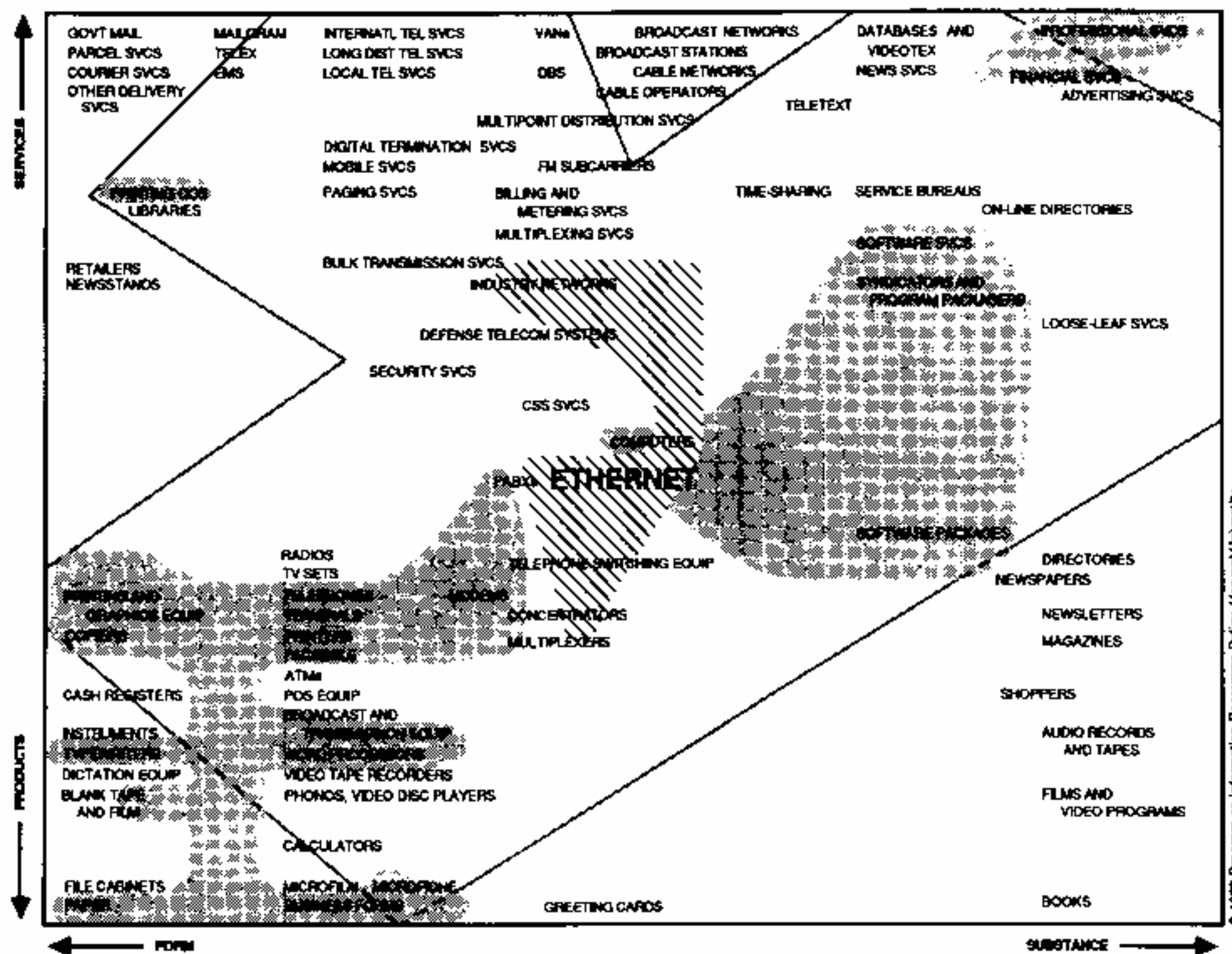
Figure 54. Xerox 1985 and Office Automation

MAPPING MARKET LEVELS

One may also use the map to aggregate elements of the information business on the basis of the size of the markets they reach, portraying market levels that cut across the more continuous operational boundaries that we have been outlining. This market level approach adds a third dimension to the map, involving the construction of a scale such as that shown in Figure 55.

- 3 **Ubiquitous Consumer Product**

- 2 **Up-scale Consumers / Most Businesses**

- 1 **Customized Market**

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Figure 55. Market Level Scale

Using this approach, we assume that for every product and service shown on the map there is at least one customer, even if the product or service is a customized offering designed for a single corporate or governmental buyer. Some market offerings may be sufficiently specialized or expensive that they appeal to a very limited market; as one observer has noted, "The problem with Fortune 500 companies is that there are only 500 of them." These products and services with a limited or highly specialized market constitute the first market level.

Because of declining costs of underlying technologies, economies of scale in production, or other factors, many of the products and services that once addressed limited markets eventually migrate upward on the market scale. In 1965, for example, things such as copying machines, computers, and mobile telecommunications services were still likely to be aimed at very large or very specialized consumers. By 1985 vendors of such items had seen their markets expand to include thousands of organizations and, at least potentially, millions of up-scale consumers. These items constitute the second market level.

By the same token, items such as calculators, costing $1500 in 1965, became ubiquitous consumer purchases by 1985 as their price dropped beneath the ten dollar mark. The video tape recorder, a very specialized item aimed at corporate and government training departments in 1975, became a mass-market product by 1985. These ubiquitous products and services have reached the mass market that constitutes Market Level 3.

Figure 56 illustrates these three market levels. The pattern that emerges from this figure is not surprising, given the historical maps of the information business discussed in Chapter 2 and the economic maps discussed above. The mass market for information products and services tends to consist of the older, more traditional entries around the edge of the map; many entries between the edge and the center of the map have advanced to Market Level 2 since the mid-1960s, while entries toward the center and the north of the map still tend to be oriented toward the more limited markets of Level 1.
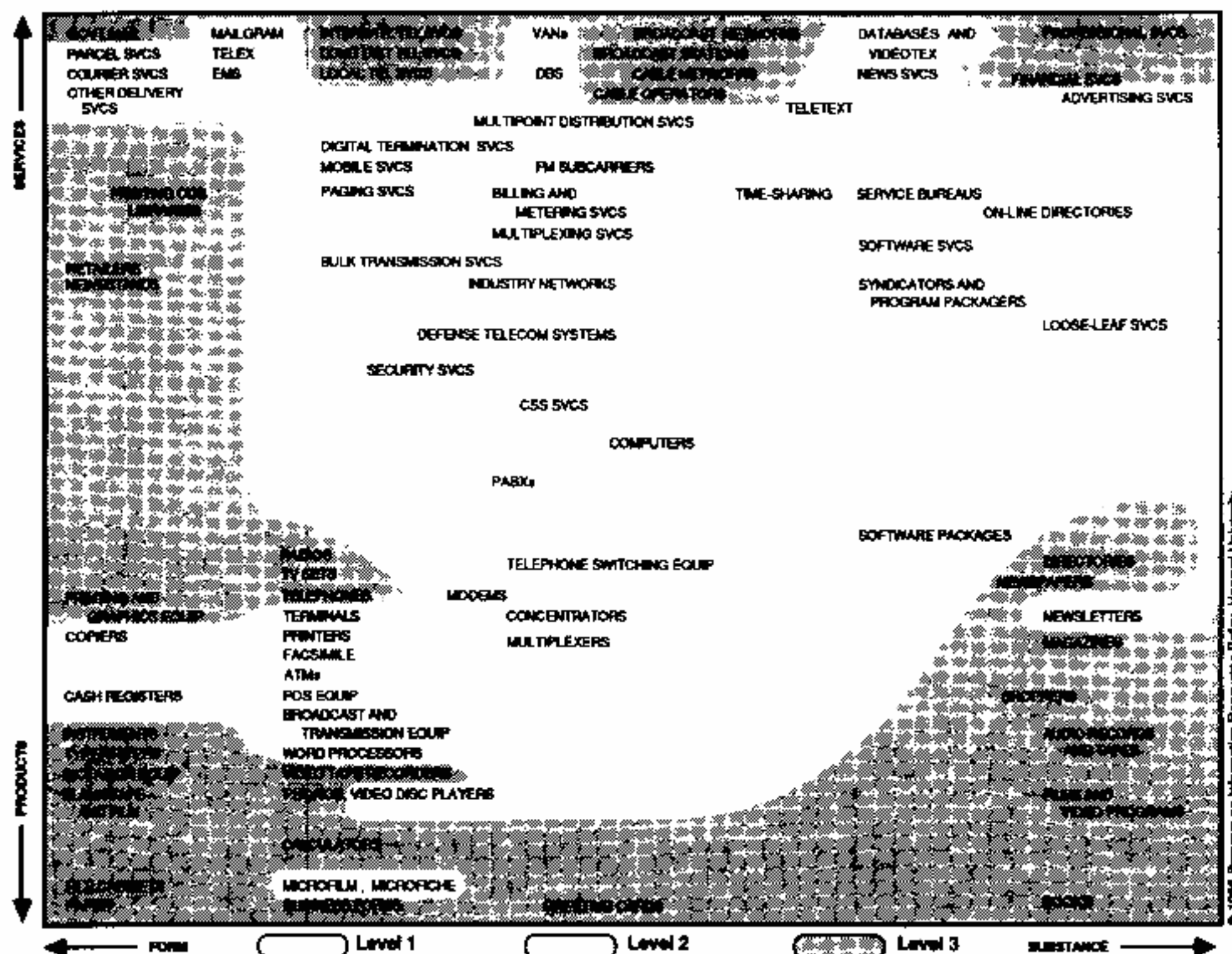
Figure 56. Three Market Levels

Figure 57 highlights those entries on the map that were at Market
Levels 1 or 2 in 1985, but might be expected to jump to Market Level 3 by
1990 or 1995, at least according to their promoters or investors. A reason
for such optimism might lie in the spread of both office automation and
electronic publishing to the personal computing world. Based on the
declining cost trends generally evident in the center of the map, one may
in turn expect continued growth in PCs over the coming decade. Not only
could items such as terminals, printers, and software packages be expected
to share in that growth, but so might PC-accessed services such as
databases, videotex, news services, and electronic message services.
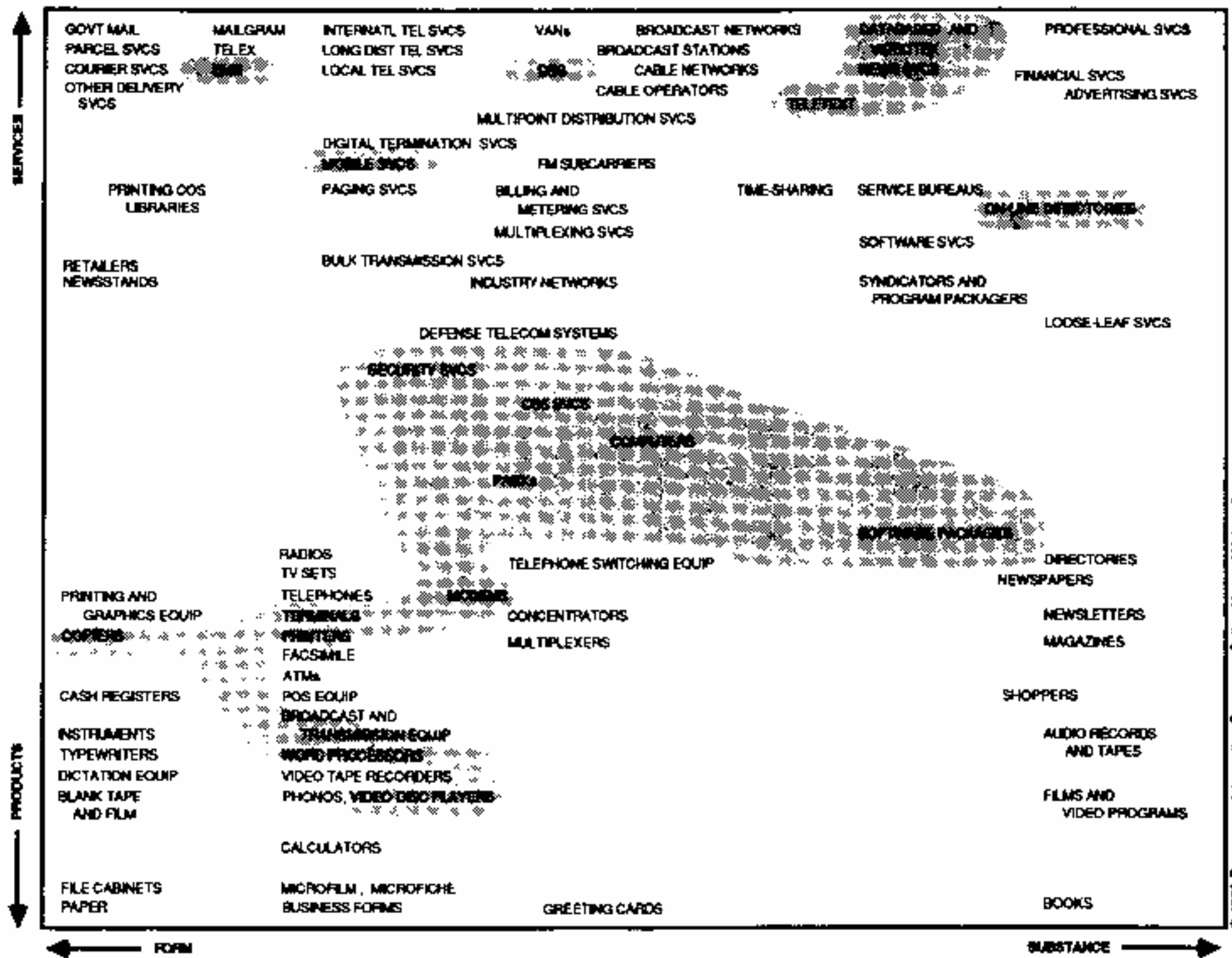
Figure 57. Likely New Entrants into Mass Market by 1995

Declining costs may also drive growth in a number of other entries, as
well as spark innovation in complementary products and services. Broadcast
and transmission equipment, for example, may come to include various
devices linking existing consumer electronics products, much as one such
item, currently available, allows a VCR to broadcast its program to another
television set elsewhere on the premises.

The market level scheme for adding a third dimension to the map might be expanded. Figure 58 illustrates a five-level scale of markets that might be more appropriate for some users of the map.

- 5   Ubiquitous Consumer Product

- 4   Up-scale Consumers / Most Businesses

- 3   Most Large Companies / Agencies

- 2   50 Biggest Companies / Agencies

- 1   Customized Market

Figure 58.   Market Level Scale: Five Levels

6
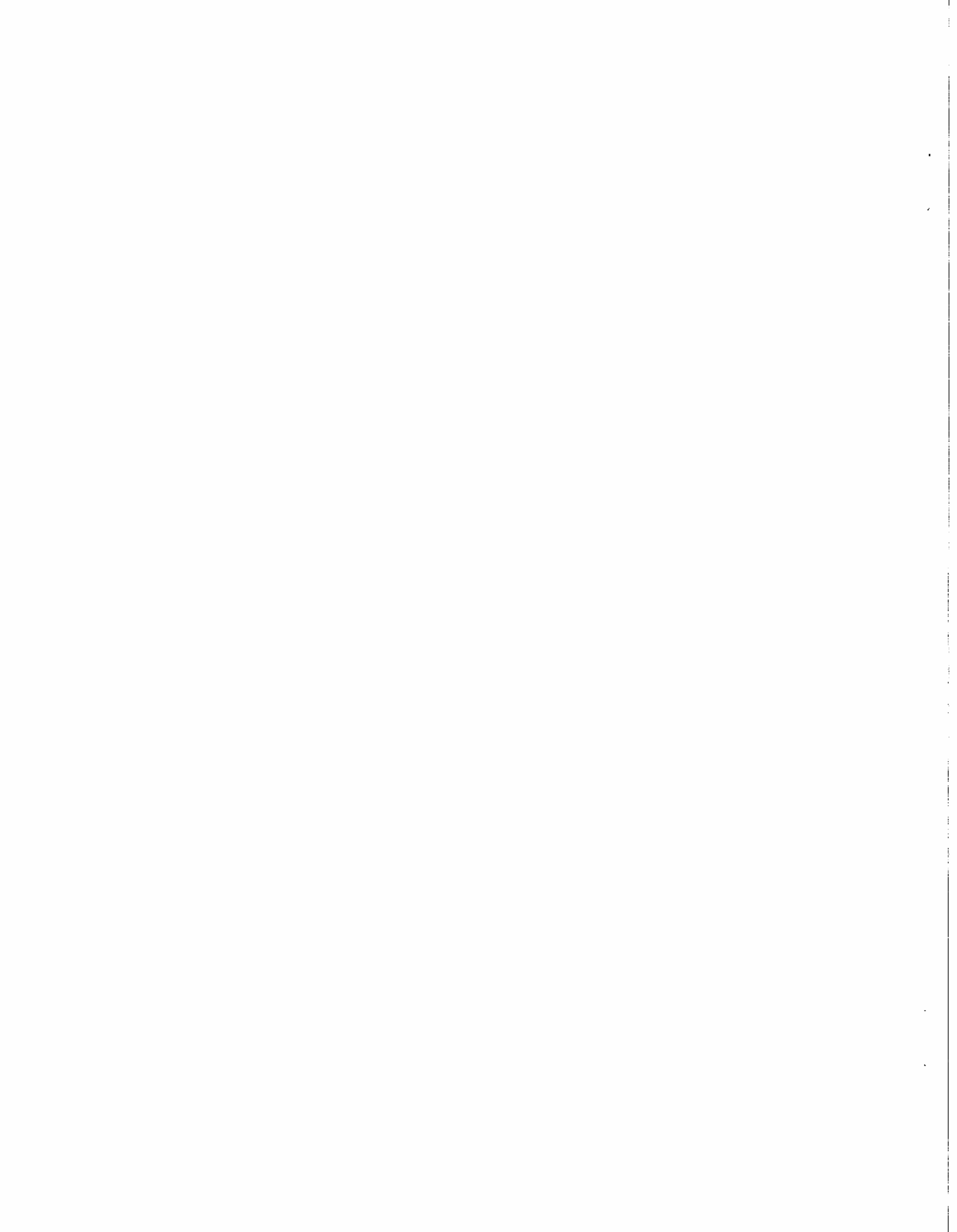
CORPORATE OPERATIONS AND PLANNING

Earlier chapters of this report described means of using the information business map to look at government regulation and corporate positioning as well as industry-wide patterns and processes. Many corporate users of the map look at markets and competitors on it; some have used it to analyze their relationships with suppliers. These applications have in common an external orientation, where the map serves to spotlight events and players in a corporation's operating environment.

In addition, the map can be used as a tool to analyze and illustrate developments and activities within organizations engaged in the information business. This chapter discusses three approaches to using the map for viewing corporate operations and planning.

MAPPING CORPORATE PERFORMANCE INDICATORS

One means of looking at a firm in the information business uses a quantified third dimension to depict elements of corporate performance within given sectors of the overall business. While this "microeconomic" approach exhibits some of the definitional and data analysis problems of "macroeconomic" mapping (discussed in Chapter 1), these problems are somewhat more manageable when the map is used to focus on the activities of a single firm.

Figure 59 indicates the business area of McGraw-Hill, Inc. as described in its 1980 Annual Report. Figure 60 lists McGraw-Hill's business segments and 1980 operating revenues by segment. In Figure 61 we have used the business segment descriptions from the annual report to map the individual segments.

GOVT MAIL MAILGRAM INTERNATL TEL SVCS VANs BROADCAST NETWORKS
PARCEL SVCS TELEX LONG DIST TEL SVCS CABLE NETWORKS
COURIER SVCS EMS LOCAL TEL SVCS DBS CABLE OPERATORS
OTHER DELIVERY TELETEXT
  SVCS MULTIPOINT DISTRIBUTION SVCS

DIGITAL TERMINATION SVCS
MOBILE SVCS FM SUBCARRIERS
PRINTING COS PAGING SVCS BILLING AND TIME-SH
  LIBRARIES METERING SVCS
  MULTIPLEXING SVCS

RETAILERS BULK TRANSMISSION SVCS
NEWSSTANDS INDUSTRY NETWORKS SYNDICATORS AND
  PROGRAM PACKAGERS

DEFENSE TELECOM SYSTEMS

SECURITY SVCS

CSS SVCS

COMPUTERS

PABXs

SOFTWARE PACKAGES
RADIOS
TV SETS TELEPHONE SWITCHING EQUIP NEWS
PRINTING AND TELEPHONES MODEMS
  GRAPHICS EQUIP TERMINALS CONCENTRATORS
COPIERS PRINTERS MULTIPLEXERS
  FACSIMILE
  ATMs
CASH REGISTERS POS EQUIP
  BROADCAST AND
INSTRUMENTS TRANSMISSION EQUIP
TYPEWRITERS WORD PROCESSORS
DICTATION EQUIP VIDEO TAPE RECORDERS
BLANK TAPE PHONOS, VIDEO DISC PLAYERS
  AND FILM

CALCULATORS

FILE CABINETS MICROFILM, MICROFICHE
PAPER BUSINESS FORMS GREETING CARDS

SERVICES ↑ PRODUCTS ↓ ← FORM SUBSTANCE →

Figure 59. McGraw-Hill 1980

Business Segments	1980 Operating Rev. (Mil. $)	% of Total
Books and education services	$ 355	36
Publications	295	30
Information systems	175	17
Financial services (Standard & Poor's)	73	7
Broadcasting operations (DRI)	54	5
Economic information services	48	5
	1000	100

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Figure 60. McGraw-Hill 1980: Operating Revenues
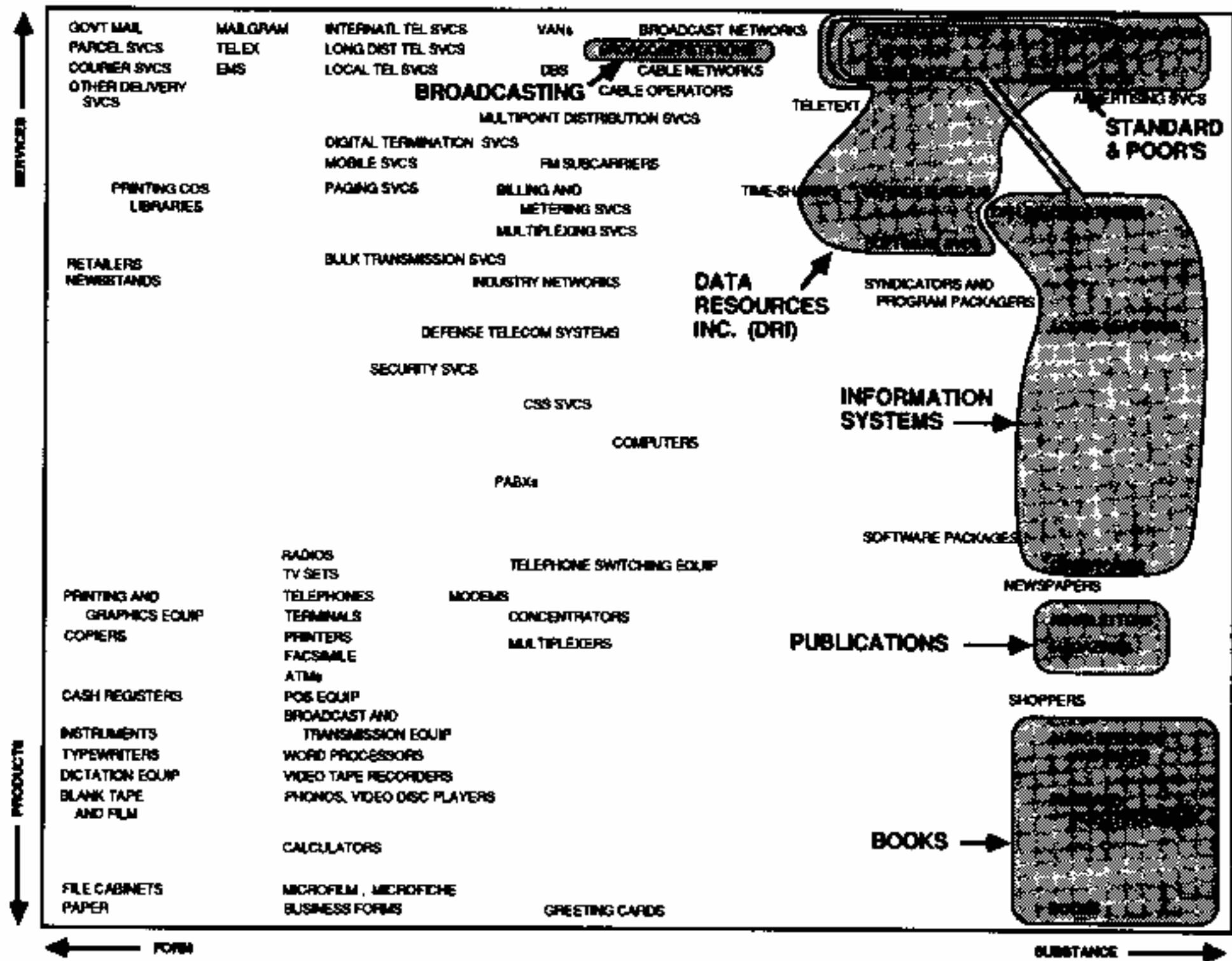
Figure 61. McGraw-Hill 1980: Business Segments

On the map in Figure 62 we have added a third dimension to the previous map by plotting 1980 operating revenues by segment, using an additional line or gradient for each 5% of total corporate revenues produced by that segment. This depiction treats each segment as a free-standing and unrelated entity.

Figure 63 uses a slightly different technique; here we have assumed a relationship among the pieces. It again shows 1980 operating revenues, but as stemming from the total business. Both figures convey the same basic message: McGraw-Hill was active in many areas of the information business in 1980 but it still derived the bulk of its revenues from its traditional publishing businesses.

GOVT MAIL   MAILGRAM   INTERNATL TEL SVCS   VANs   BROADCAST NETWORKS   PROFESSIONAL SVCS
PARCEL SVCS   TELEX   LONG DIST TEL SVCS   BROADCAST STATIONS   VIDEOTEX
COURIER SVCS   EMS   LOCAL TEL SVCS   DBS   CABLE NETWORKS   NEWS SVCS   FINANCIAL SVCS
OTHER DELIVERY   CABLE OPERATORS
SVCS   BROADCASTING   MULTIPOINT DISTRIBUTION SVCS   TELETEXT   ADVERTISING SVCS

STANDARD
& POOR'S

DIGITAL TERMINATION SVCS
MOBILE SVCS   FM SUBCARRIERS
PAGING SVCS   BILLING AND   TIME-SHARING   SERVICE BUREAUS
PRINTING COS   METERING SVCS   ONLINE DIRECTORIES
LIBRARIES   MULTIPLEXING SVCS
SOFTWARE SVCS

RETAILERS   BULK TRANSMISSION SVCS
NEWSSTANDS   INDUSTRY NETWORKS   SYNDICATORS AND
PROGRAM PACKAGERS   LOOSE-LEAF SVCS

DEFENSE TELECOM SYSTEMS

SECURITY SVCS   DATA
RESOURCES
INC. (DRI)

CSS SVCS   INFORMATION
SYSTEMS

COMPUTERS

PABXs

SOFTWARE PACKAGES

RADIOS   DIRECTORIES
TV SETS   TELEPHONE SWITCHING EQUIP   NEWSPAPERS
PRINTING AND   TELEPHONES   MODEMS
GRAPHICS EQUIP   TERMINALS   CONCENTRATORS   NEWSLETTERS   PUBLICATIONS
COPIERS   PRINTERS   MULTIPLEXERS   MAGAZINES
FACSIMILE
ATMs
CASH REGISTERS   POS EQUIP   SHOPPERS
BROADCAST AND
INSTRUMENTS   TRANSMISSION EQUIP   AUDIO RECORDS
TYPEWRITERS   WORD PROCESSORS   AND TAPES
DICTATION EQUIP   VIDEO TAPE RECORDERS
BLANK TAPE   PHONOS, VIDEO DISC PLAYERS   FILMS AND
AND FILM   VIDEO PROGRAMS

CALCULATORS   BOOKS

FILE CABINETS   MICROFILM MICROFICHE   BOOKS
PAPER   BUSINESS FORMS   GREETING CARDS

← FORM   SUBSTANCE →

Figure 62. Business Segment Revenues

GOVT MAIL   MAILGRAM   INTERNATL TEL SVCS   VANs   BROADCAST NETWORKS   DATABASES AND   PROFESSIONAL SVCS
PARCEL SVCS   TELEX   LONG DIST TEL SVCS   BROADCAST STATIONS   VIDEOTEX
COURIER SVCS   EMS   LOCAL TEL SVCS   DBS   CABLE NETWORKS   NEWS SVCS   FINANCIAL SVCS
OTHER DELIVERY   CABLE OPERATORS   ADVERTISING SVCS
SVCS   MULTIPOINT DISTRIBUTION SVCS   TELETEXT

DIGITAL TERMINATION SVCS
MOBILE SVCS   FM SUBCARRIERS
PAGING SVCS   BILLING AND   TIME-SHARING   SERVICE BUREAUS
PRINTING COS   METERING SVCS   ONLINE DIRECTORIES
LIBRARIES   MULTIPLEXING SVCS
SOFTWARE SVCS

RETAILERS   BULK TRANSMISSION SVCS
NEWSSTANDS   INDUSTRY NETWORKS   SYNDICATORS AND
PROGRAM PACKAGERS   LOOSE-LEAF SVCS

DEFENSE TELECOM SYSTEMS

SECURITY SVCS

CSS SVCS

COMPUTERS

PABXs

SOFTWARE PACKAGES

RADIOS   DIRECTORIES
TV SETS   TELEPHONE SWITCHING EQUIP   NEWSPAPERS
PRINTING AND   TELEPHONES   MODEMS
GRAPHICS EQUIP   TERMINALS   CONCENTRATORS   NEWSLETTERS
COPIERS   PRINTERS   MULTIPLEXERS   MAGAZINES
FACSIMILE
ATMs
CASH REGISTERS   POS EQUIP   SHOPPERS
BROADCAST AND
INSTRUMENTS   TRANSMISSION EQUIP   AUDIO RECORDS
TYPEWRITERS   WORD PROCESSORS   AND TAPES
DICTATION EQUIP   VIDEO TAPE RECORDERS
BLANK TAPE   PHONOS, VIDEO DISC PLAYERS   FILMS AND
AND FILM   VIDEO PROGRAMS

CALCULATORS

FILE CABINETS   MICROFILM MICROFICHE   BOOKS
PAPER   BUSINESS FORMS   GREETING CARDS

← FORM   SUBSTANCE →

Figure 63. McGraw-Hill 1980: Composite Business Segment Revenues

Similar maps can be constructed to plot profits, assets, year-to-year changes, and other business data. Colors can be used to distinguish segments, gradients, or positive versus negative changes. Some managers have used maps such as these to compare their company with selected competitors and with merger and acquisition candidates.

As suggested earlier, we have encountered problems with using this approach, perhaps best illustrated in our attempts to update our McGraw-Hill maps by using its 1983 and 1984 annual reports. Figure 64 maps the business segments described in the 1983 Annual Report. The picture shown is considerably more confusing than the 1980 map. The basic segments remained the same (despite some name changes), but most had expanded their activities to encompass additional products and services. More segments marketed software packages, video programs, on-line databases, and professional services.
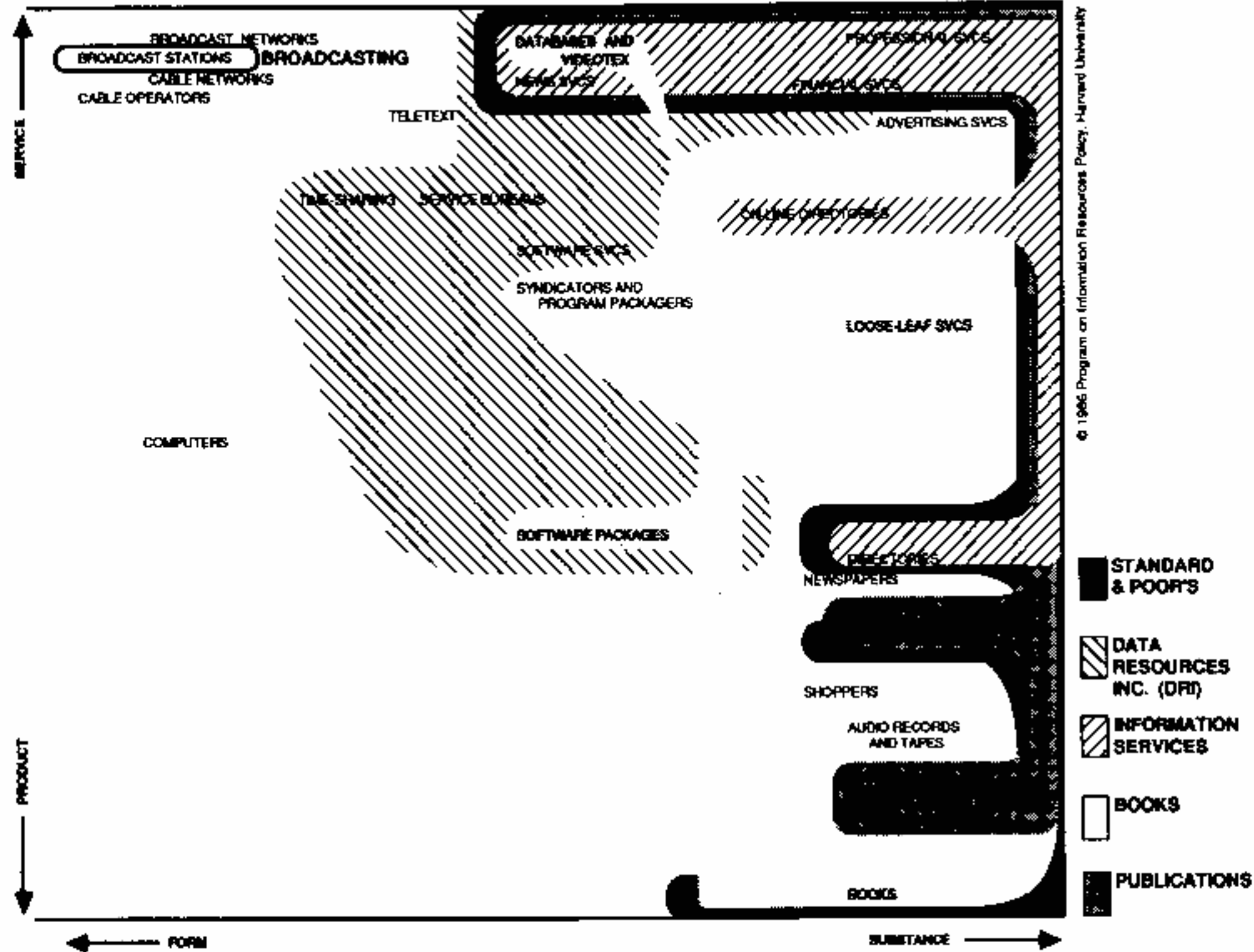
Figure 64. McGraw-Hill 1983: Business Segments

It is impossible, unfortunately, to determine from the published line-of-business data just how significant these extensions and overlaps are to any of the major business segments, therefore making a third-dimensional map less meaningful. They obviously did not go unnoticed at McGraw-Hill, however. The 1984 Annual Report announced the merger of the financial and economic information segments into a single company and described a major management realignment that emphasizes market segments over traditional product lines.

Ultimately, then, the quantitative technique in microeconomic mapping, while a useful internal exercise for many corporate planners, does present many of the same definitional and statistical problems encountered at the macroeconomic level. Few outsiders could expect to find the fine-grained data needed to compile meaningful cross-sections of multiple competitors.

MAPPING MANAGEMENT PERCEPTIONS

Another means of mapping corporate operations uses subjective management appraisals to analyze and illustrate a company's relative positioning in the information business. Figure 65 shows the outline of a large multinational corporation with operations in many sectors of the information business. (Figures 65, 66, and 67 have been doctored to preserve the anonymity of the company involved. Anomalies in these figures may be a result of our changes to protect the identity of the company.)

Figure 66 shows a "strengths and weaknesses" diagram of the subject company. This figure was constructed by the simple and non-scientific method of asking 30 upper-middle managers of Corporation X to evaluate the company's relative strengths and weaknesses as of 1985 in the business lines shown on the map. The managers created the strength chart shown in Figure 66. The diagram indicates managers' asssessments of whether the subject company was "strong," "weak," or "neutral" in a given field. The same managers also were asked to identify the market sectors that they viewed as most attractive for their company in 1995. Figure 67 illustrates the managers' perceptions of Corporation X's current strengths in the information business and those market sectors perceived as most desirable for Corporation X in 1995.

GOVT MAIL · MAILGRAM · INTERNATL TEL SVCS · VANs · BROADCAST NETWORKS · DATABASES AND
PARCEL SVCS · TELEX · LONG DIST TEL SVCS · BROADCAST STATIONS · VIDEOTEX
COURIER SVCS · EMS · LOCAL TEL SVCS · DBS · CABLE NETWORKS · NEWS SVCS
OTHER DELIVERY · CABLE OPERATORS · PROFESSIONAL SVCS
SVCS · MULTIPOINT DISTRIBUTION SVCS · TELETEXT · ADVERTISING SVCS

DIGITAL TERMINATION SVCS
MOBILE SVCS · FM SUBCARRIERS
PAGING SVCS · BILLING AND · TIME-SHARING · SERVICE BUREAUS
PRINTING COS · METERING SVCS · ON-LINE DIRECTORIES
LIBRARIES · MULTIPLEXING SVCS

RETAILERS · BULK TRANSMISSION SVCS
NEWSSTANDS · INDUSTRY NETWORKS · LOOSE-LEAF SVCS

DEFENSE TELECOM SYSTEMS

SECURITY SVCS

CSS SVCS

RADIOS
TV SETS · DIRECTORIES
TELEPHONES · NEWSPAPERS
PRINTING AND
GRAPHICS EQUIP · NEWSLETTERS
COPIERS · MAGAZINES

MODEMS
CONCENTRATORS
MULTIPLEXERS
CASH REGISTERS · SHOPPERS
BROADCAST AND
TRANSMISSION EQUIP · AUDIO RECORDS
AND TAPES
DICTATION EQUIP · VIDEO TAPE RECORDERS
PHONOS, VIDEO DISC PLAYERS · FILMS AND
VIDEO PROGRAMS

CALCULATORS

MICROFILM, MICROFICHE
BUSINESS FORMS · GREETING CARDS · BOOKS

FORM → ← SUBSTANCE →

SERVICES · PRODUCTS

Figure 65. Corporation X: Current Activities

GOVT MAIL · MAILGRAM · INTERNATL TEL SVCS · VANs · BROADCAST NETWORKS · DATABASES AND
PARCEL SVCS · TELEX · LONG DIST TEL SVCS · BROADCAST STATIONS · VIDEOTEX
COURIER SVCS · EMS · LOCAL TEL SVCS · DBS · CABLE NETWORKS · NEWS SVCS
OTHER DELIVERY · CABLE OPERATORS · FINANCIAL SVCS
SVCS · MULTIPOINT DISTRIBUTION SVCS · TELETEXT · ADVERTISING SVCS

DIGITAL TERMINATION SVCS
MOBILE SVCS · FM SUBCARRIERS
PRINTING COS · PAGING SVCS · BILLING AND · TIME-SHARING · SERVICE BUREAUS
LIBRARIES · METERING SVCS · ON-LINE DIRECTORIES
MULTIPLEXING SVCS

RETAILERS · BULK TRANSMISSION SVCS
NEWSSTANDS · INDUSTRY NETWORKS · LOOSE-LEAF SVCS

DEFENSE TELECOM SYSTEMS

SECURITY SVCS

CSS SVCS

PABXs

RADIOS
TV SETS · TELEPHONE SWITCHING EQUIP · DIRECTORIES
TELEPHONES · MODEMS · NEWSPAPERS
PRINTING AND
GRAPHICS EQUIP · NEWSLETTERS
COPIERS · MULTIPLEXERS · MAGAZINES

FACSIMILE

CASH REGISTERS · SHOPPERS
BROADCAST AND
TRANSMISSION EQUIP · AUDIO RECORDS
AND TAPES
DICTATION EQUIP · VIDEO TAPE RECORDERS
BLANK TAPE · PHONOS, VIDEO DISC PLAYERS · FILMS AND
AND FILM · VIDEO PROGRAMS

CALCULATORS

FILE CABINETS · MICROFILM, MICROFICHE
PAPER · BUSINESS FORMS · GREETING CARDS · BOOKS

FORM → ← STRENGTH · NEUTRAL · WEAKNESS · SUBSTANCE →

SERVICES · PRODUCTS

Figure 66. Corporation X: Current Strengths and Weaknesses

Figure 67. Corporation X: Current Strengths and Likely 1995 Markets

MAPPING INTERNAL MANAGEMENT OF INFORMATION RESOURCES

Another use that corporate managers have found for the map is to help illuminate the impact of information technology within their own organization. Just as the emergence of new information technologies confuses and destabilizes relationships among organizations -- giving rise to the jousting and redefinition of regulatory and corporate boundaries discussed in Chapters 3 and 4 -- these new technologies also confuse and destabilize relationships within organizations, particularly large organizations that rely heavily upon a wide range of information products and services. A sampling of trade press publications through the 1970s and early 1980s reveals this intraorganizational turmoil in a continuing flood of articles about "integrating corporate information resources" and "consolidating authority and responsibility" for managing an organization's information functions.

A number of organizations have used the map to analyze their internal management of information resources. In 1982, one large federal agency launched a major new effort to automate its operations. As part of their preliminary planning, the agency's managers used a map to identify those information products and services that the agency used or produced. As suggested by Figure 68, this agency, like most government agencies, is engaged in information-intensive activity.
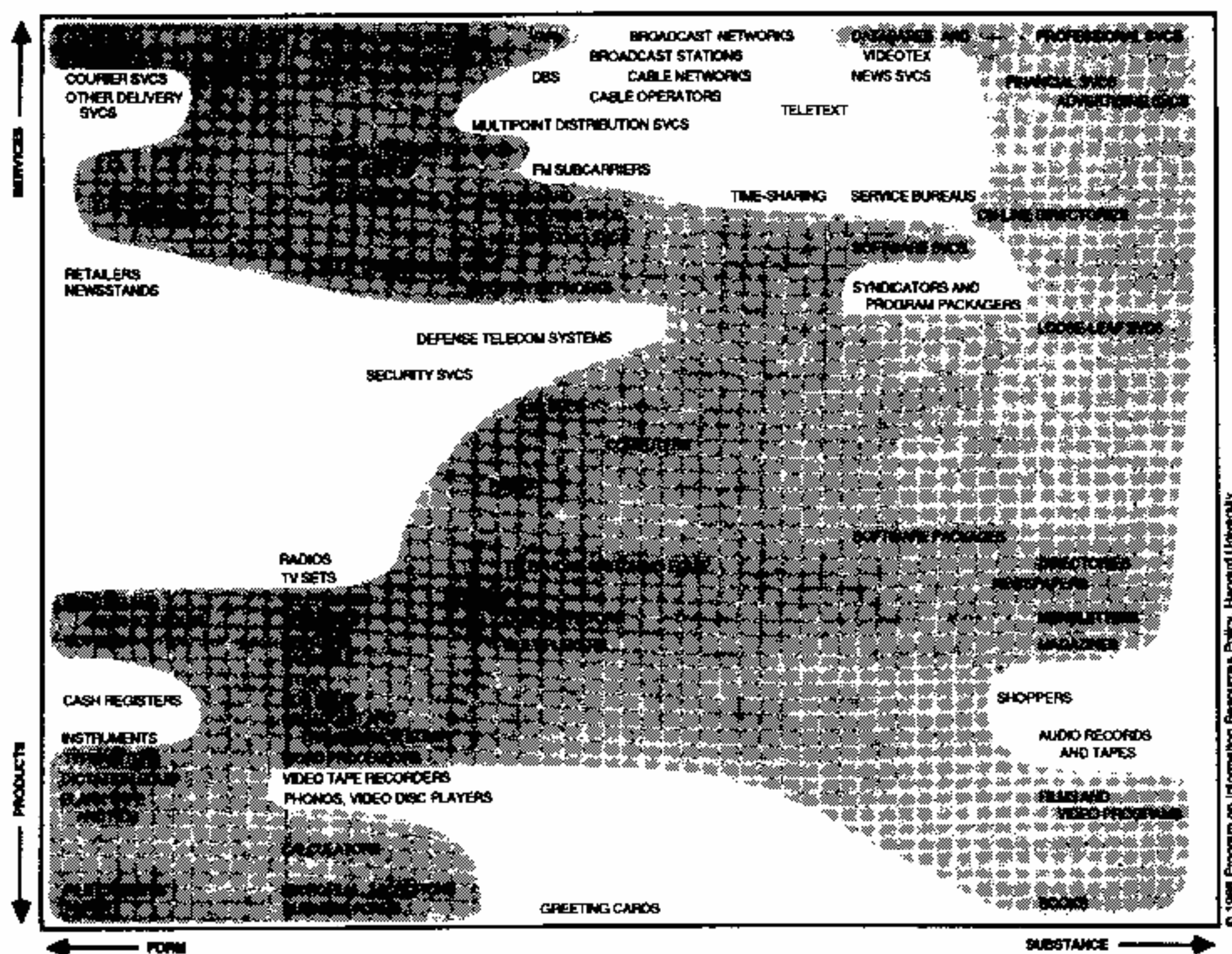
Figure 68. Intra-Agency Consumption/Production of Information Products and Services

Figure 69 is a highly simplified version of the bureaus and offices within the agency that had responsibility for managing the acquisition and use of particular information resources. (It has been simplified to eliminate a great number of "coordinating" and "advisory" relationships.) The patchwork quilt portrayed on the map signifies little, per se. Large organizations with complex missions normally evolve complex organizational relationships. To the agency planners using the map, however, the picture helped to explain their difficulties in designing and implementing sophisticated new systems that sometimes violated a multitude of organizational boundaries that had been defined and fortified over decades.
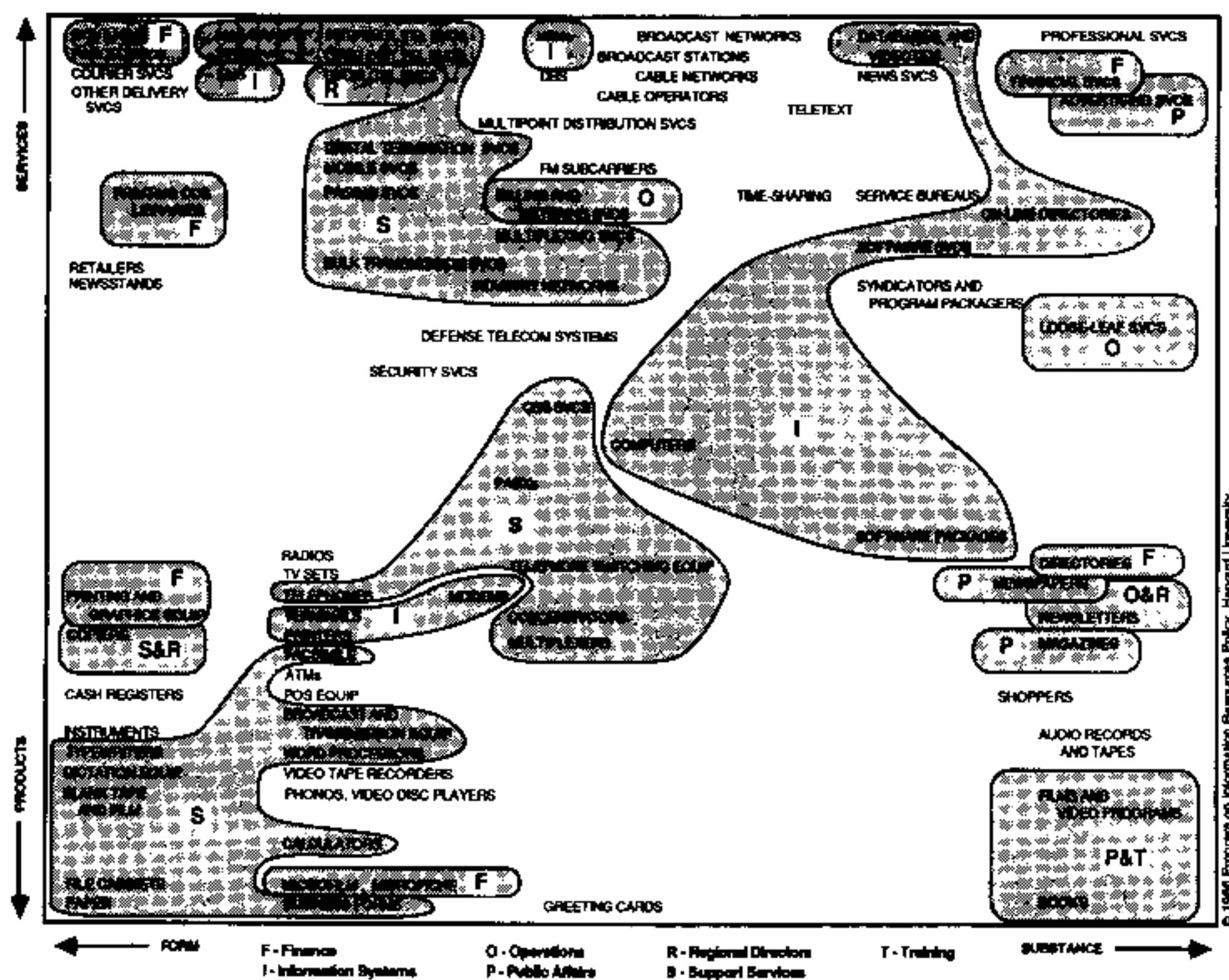
Figure 69. Organizational Responsibilities

Managers may also apply some of the other methods described above when developing internal management maps. Annual operating budgets, capital investment plans, or employment numbers might be displayed to advantage, helping managers to gain perspective or establish priorities.

A variety of organizations have reported using the map for internal analysis but most have been reluctant to disclose their results because of political or competitive reasons.

APPENDIX: A BRIEF HISTORY OF THE INFORMATION BUSINESS MAP

The Program on Information Resources Policy first published the mapping scheme in December 1979.[1]

The original map (Figure 70) was the result of many efforts to depict graphically the interrelationships among various industries and technologies for which "information" was a common denominator. Earlier attempts included efforts to portray telecommunications services, computer hardware, time-sharing, and publishing activities on a single spectrum using some of the terminology such as "data transmission" and "data processing" that arose from the FCC's Computer Inquiry I. This background helps to explain the initial use of Conduit and Content as the horizontal axis of the map.
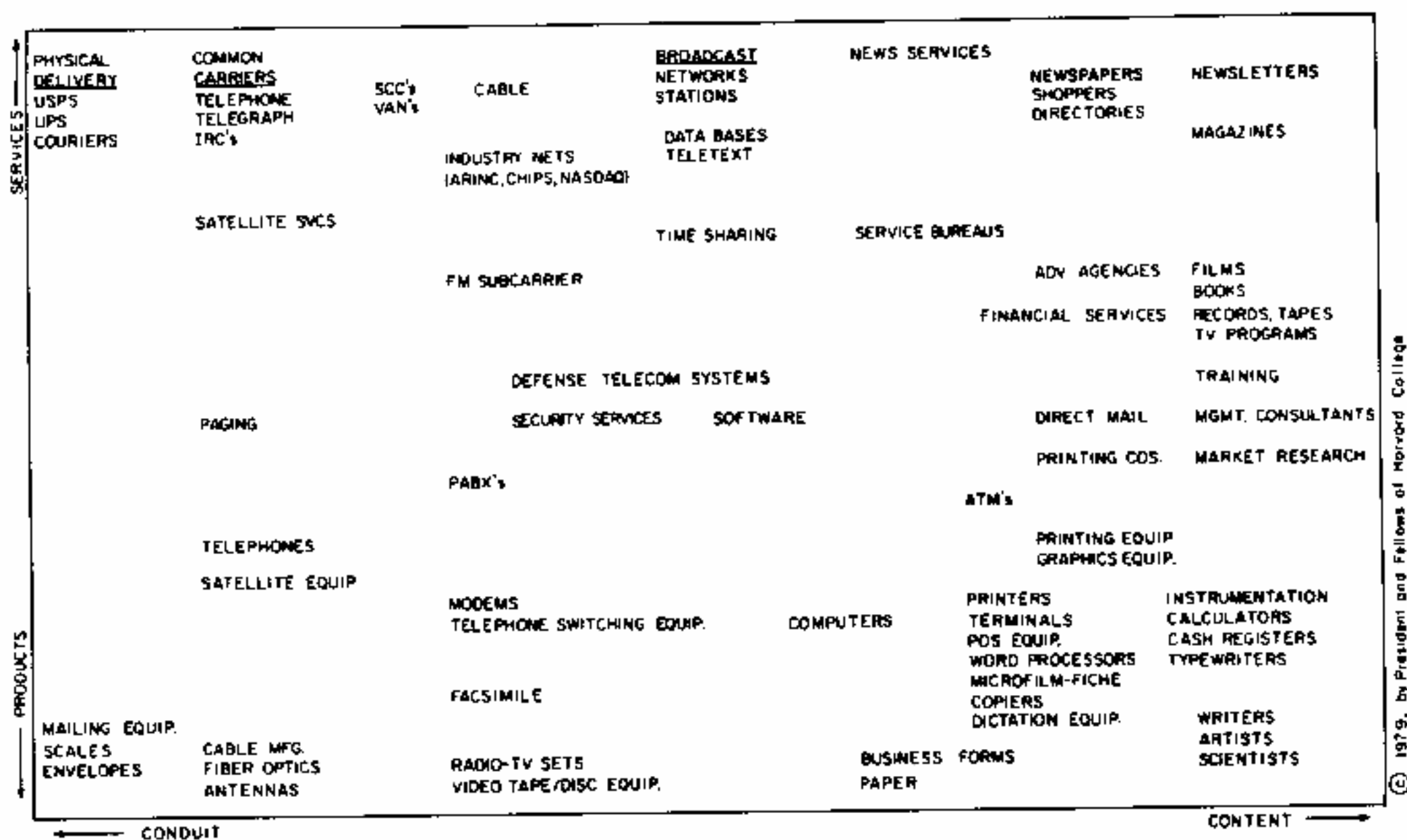
Figure 70. The 1979 Information Business Map

The addition of a second dimension using the Products and Services axis facilitated the portrayal of competing means of satisfying customer needs and reflected a division of the world recognized by both economists and marketing people.

The second version of the map (Figure 71) was published in July 1980.[2] The 1980 map represented a considerable change from the 1979 version. The alterations in map entries and their placement stemmed from critical reviews by many of our associates and reflected extensive discussions with dozens of participants in the information business.

U S MAIL	TELEPHONE	SCC S	BROADCAST NETWORKS	NEWS SERVICES		PROFESSIONAL SVCS
PARCEL SVCS	TELEGRAPH	VAN S	CABLE NETWORKS			
COURIER SVCS	MAILGRAM	CABLE OPERATORS	BROADCAST STATIONS	DATA BASES	FINANCIAL SVCS	
	IRC S			TELETEXT		
OTHER	MULTIPOINT DIST SVCS					ADVERTISING SVCS
DELIVERY SVCS						
	SATELLITE SVCS		TIME SHARING	SERVICE BUREAUS		
	FM SUBCARRIERS					
PRINTING CO'S					ON-LINE DIRECTORIES	
LIBRARIES	PAGING SVCS			SOFTWARE SVCS		
	INDUSTRY NETWORKS					
RETAILERS						
NEWSSTANDS						
	DEFENSE TELECOM SYSTEMS					
	SECURITY SVCS					
		COMPUTERS				LOOSE LEAF SVCS
				SOFTWARE PACKAGES		
						DIRECTORIES
	PABX S					
	RADIOS					
	TV SETS					
	TELEPHONES			NEWSPAPERS		
PRINTING AND	TERMINALS	TELEPHONE SWITCHING EQUIP				
GRAPHICS EQUIP	PRINTERS	MODEMS				
	FACSIMILE	CONCENTRATORS				NEWSLETTERS
COPIERS	ATM S	MULTIPLEXERS				
	POS EQUIP					MAGAZINES
CASH REGISTERS	ANTENNAS					
INSTRUMENTS	FIBER OPTICS	TEXT EDITING EQUIP		SHOPPERS		
	CALCULATORS					
TYPEWRITERS	WORD PROCESSORS	COMMUNICATING WP S				AUDIO RECORDS
DICTATION EQUIP	PHONO'S, VTR'S, VIDEO DISC					AND TAPES
FILE CABINETS	MICROFILM MICROFICHE	MASS STORAGE				VIDEO PROGRAMS
PAPER	BUSINESS FORMS					BOOKS

CONDUIT → ← CONTENT

ATM — Automated Teller Machines
IRC — International Record Carrier
PABX — Private Automatic Branch Exchange
POS — Point-of-Sale
SCC — Specialized Common Carrier
VAN — Value Added Network
VTR — Video Tape Recorder
WP — Word Processor

Figure 71. The 1980 Information Business Map

Some of the major changes between the 1979 and 1980 versions included:

1. Moving a group of items that were obviously products, such as newspapers and magazines, from the upper right quadrant to the lower right quadrant.

2. Moving writers, artists, scientists, and management consultants from the lower right to the upper right and regrouping them as professional services.

3. Moving items such as typewriters, terminals, printing equipment, and paper from the lower right to the lower left.

4. Moving computers, not surprisingly in retrospect, into the central
   spot on the map, as a reflection of their growing centrality in
   both the products-services dimension and the conduit-content
   plane.

Although these shifts appear remarkable now for the very fact that
they were ever necessary, they indicate the importance of two fundamental
and related principles: preserving a consumer orientation in the map and
choosing the proper labels for the axes.

While the first map expanded the original spectrum into two
dimensions, it did so in a fairly rudimentary way that conveyed a
producer's orientation rather than a consumer's. The reason lay in our
failure to define more completely the labels "products" and "services." On
the 1979 map, "services" seemed to consist primarily of distribution
mechanisms for information ouputs -- particularly discrete, packaged
outputs -- while "products" were regarded as inputs or tools, whether human
or machine. These interpretations caused substantial distortions in the
1979 map, particularly on the right-hand side. Writers and scientists
showed up alongside typewriters and calculators as inputs into a production
process rather than as free-standing suppliers of information in their own
right. Meanwhile, the books/films/tapes block floated in the middle,
midway between product and service; they were the final outputs of a
production process, but they lacked the frequency of distribution implicit
in a subscription-based "service" in the 1979 sense, such as a newspaper or
magazine.

The choice of labels for the other axis compounded the problem.
"Conduit" and "content" perpetuated the conceptual bounds of the original
spectrum. "Conduit" remained exclusively a matter of transparent
distribution, shunting all production-related entries over to the right.
"Content," meanwhile, implied containing something and therefore placed
undue emphasis on packaging information in some form; hence the clustering
of all publishing-related entries on the right. This orientation
particularly accounts for how newspapers and magazines were placed in the
upper right corner: They were visible outputs of not merely a distribution

mechanism but a containment process as well. The inconsistency of the original map can be seen in the fact that the middle of the content realm contained two unrelated groups, from opposite ends of the axis, put there for two different reasons -- books because they were containment-based products without inherent distribution mechanisms, and consultants because they were (loosely) distribution-based services without inherent containment processes. Absent from this arrangement was any sense of what constituted an information product as opposed to an information service in the consumer's view.

While the rearrangement of the map from 1979 to 1980 perhaps foreshadowed it, the relabeling of the horizontal axis from "conduit" and "content" to "form" and "substance" ultimately came as a reaction to our growing discontent with the political baggage that "conduit" had acquired over the years.

Subsequent revisions in the map entries have been less dramatic than the initial reordering. Figure 72 is the basic map used in 1984 while Figure 73 is the 1985 version. Other changes during this period reflect developments in both technology and the U.S. regulatory regime. On the technology front, for example, text-editing equipment and communicating word processors seemed to be discrete technologies in 1980. By 1984 these entries appeared to have been superseded or subsumed by word processors, modems, and computers. Conceptually, we had little problem in keeping a single entry for telephone (or perhaps voice telephony), but as the regulatory world has shifted to a division of telecommunications services along geographical rather than functional lines, we have changed the map to show local, long distance, and international telecommunications services.

Between 1985 and the latest version of the map we have made only one change, the addition of CSS SVCS (or Carrier Smart Switch Services), as discussed in Chapter 1. We would expect, however, that the map will continue to change. Some candidates for repositioning in the latter half of the 1980s include:

GOVT MAIL   MAILGRAM   TELEPHONE   VAN's   BROADCAST NETWORKS   DATABASES AND VIDEOTEX   PROFESSIONAL SVCS
PARCEL SVCS   E-COM   TELEGRAPH   BROADCAST STATIONS   NEWS SVCS
COURIER SVCS   EMS   OCC's   CABLE OPERATORS   CABLE NETWORKS   FINANCIAL SVCS
OTHER DELIVERY   IRC's   TELETEXT   ADVERTISING SVCS
SVCS
MULTIPOINT DISTRIBUTION SVCS
DIGITAL TERMINATION SVCS
SATELLITE SVCS   TIME SHARING   SERVICE BUREAUS
PRINTING COS   FM SUBCARRIERS   BILLING AND METERING SVCS   ON-LINE DIRECTORIES
LIBRARIES   MOBILE SVCS   SOFTWARE SVCS
PAGING SVCS   MULTIPLEXING SVCS
SYNDICATORS AND PROGRAM PACKAGERS
INDUSTRY NETWORKS
RETAILERS   LOOSE-LEAF SVCS
NEWSSTANDS
DEFENSE TELECOM SYSTEMS
SECURITY SVCS
COMPUTERS
PABX's
SOFTWARE PACKAGES
RADIOS   TELEPHONE SWITCHING EQUIP   DIRECTORIES
TV SETS   NEWSPAPERS
PRINTING AND   TELEPHONES   MODEMS   NEWSLETTERS
GRAPHICS EQUIP   TERMINALS   CONCENTRATORS
COPIERS   PRINTERS   MULTIPLEXERS   MAGAZINES
FACSIMILE
ATM's
CASH REGISTERS   POS EQUIP   SHOPPERS
BROADCAST AND
INSTRUMENTS   TRANSMISSION EQUIP   AUDIO RECORDS AND TAPES
CALCULATORS
TYPEWRITERS   WORD PROCESSORS
DICTATION EQUIP   FILMS AND VIDEO PROGRAMS
FILE CABINETS   PHONOS, VIDEO DISC PLAYERS
BLANK TAPE   VIDEO TAPE RECORDERS
AND FILM   MICROFILM MICROFICHE   MASS STORAGE
PAPER   BUSINESS FORMS   GREETING CARDS   BOOKS

SERVICES →   PRODUCTS →

← FORM   SUBSTANCE →

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Figure 72. The 1984 Information Business Map

GOVT MAIL   MAILGRAM   INTERNATL TEL SVCS   VANS   BROADCAST NETWORKS   DATABASES AND VIDEOTEX   PROFESSIONAL SVCS
PARCEL SVCS   TELEX   LONG DIST TEL SVCS   BROADCAST STATIONS
COURIER SVCS   EMS   LOCAL TEL SVCS   DBS   CABLE NETWORKS   NEWS SVCS   FINANCIAL SVCS
OTHER DELIVERY   CABLE OPERATORS   ADVERTISING SVCS
SVCS   MULTIPOINT DISTRIBUTION SVCS   TELETEXT
DIGITAL TERMINATION SVCS
MOBILE SVCS   FM SUBCARRIERS
PRINTING COS   PAGING SVCS   BILLING AND METERING SVCS   TIME-SHARING   SERVICE BUREAUS
LIBRARIES   ON-LINE DIRECTORIES
MULTIPLEXING SVCS
BULK TRANSMISSION SVCS   SOFTWARE SVCS
RETAILERS   INDUSTRY NETWORKS   SYNDICATORS AND PROGRAM PACKAGERS
NEWSSTANDS
DEFENSE TELECOM SYSTEMS   LOOSE-LEAF SVCS
SECURITY SVCS
COMPUTERS
PABX's
SOFTWARE PACKAGES
RADIOS   TELEPHONE SWITCHING EQUIP   DIRECTORIES
TV SETS   NEWSPAPERS
PRINTING AND   TELEPHONES   MODEMS
GRAPHICS EQUIP   TERMINALS   CONCENTRATORS   NEWSLETTERS
COPIERS   PRINTERS   MULTIPLEXERS   MAGAZINES
FACSIMILE
ATM's
CASH REGISTERS   POS EQUIP   SHOPPERS
BROADCAST AND
INSTRUMENTS   TRANSMISSION EQUIP   AUDIO RECORDS AND TAPES
TYPEWRITERS   WORD PROCESSORS
DICTATION EQUIP   VIDEO TAPE RECORDERS
BLANK TAPE   PHONOS, VIDEO DISC PLAYERS   FILMS AND VIDEO PROGRAMS
AND FILM
CALCULATORS
FILE CABINETS   MICROFILM MICROFICHE
PAPER   BUSINESS FORMS   GREETING CARDS   BOOKS

SERVICES →   PRODUCTS →

← FORM   SUBSTANCE →

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Figure 73. The 1985 Information Business Map

1. "Networks," in a generic sense, might begin to replace computers as the central portion of the map. The current clustering of PABXs, telephone switching equipment, industry networks, and CSS services probably reflects the continuing convergence of the technologies.

2. The 1986 map shows databases and videotext as being somewhat to the left of the pure substance side of the map. This positioning is accurate within the context of the early 1980s when substance and delivery mechanisms for such services tended to be packaged together. Until recently, for example, a subscriber to Lexis/Nexis or many other database services needed a dedicated, system-specific terminal device to access the particular service. In the past few years, however, many database vendors have expanded their potential market by facilitating the use of personal computers as terminals. This trend may well argue for moving databases further to the right as more substance- and less form-oriented.

APPENDIX NOTES

1. John F. McLaughlin with Anne E. Birinyi, <u>Mapping the Information Business</u>, Working Paper W-79-8 (Cambridge, MA: Program on Information Resources Policy, Havard University, 1979).

2. John F. McLaughlin with Anne E. Birinyi, <u>Mapping the Information Business</u> (Cambridge, MA: Program on Information Resources Policy, Harvard University, 1980).