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Vic Wheatman Author
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November 11, 1986

Mr. Elliot Berdy
GTE Data Services
111 Madison Street
DC -168
Tampa, Florida 33602

Dear Elliot,

You asked for "one liners" identifying the critical success factors for each delivery mode, and in each delivery segment, to be approached as if GTEDS was a start-up company. As I began this letter, it occurred that there are several recurring themes for each delivery mode. They are:

o The ability of GTEDS to fully understand, in detail, user needs for, and the specific features required in, proposed products and services, and a willingness to participate with clients in developing such products and services, sharing the rewards of joint development as appropriate.

o The ability of GTEDS to create, and maintain, a national/international telecommunications market awareness of its products and services. This is a sales, marketing and image issue.

o The ability of GTEDS to establish its credibility in the specific delivery mode through demonstrated, successful usage of the product or service by others.

o The ability to provide broad geographical customer support.

Some specifics:

Delivery Mode Success Factors

Application Software

o The ability to develop flexible software which will interface with current, and future industry standards, for billing, marketing support and network management.

Professional Services

o The ability to build business relationships with users, at both the executive and functional levels, with a good match between GTED's and the client's corporate culture.

o The ability to build a critical mass of business to leverage developed expertise.

o The ability to accurately appraise costs of specific projects in advance to permit competitive fixed price contract bidding.

o The ability to recruit, and retain, technologists experienced in specific hardware and software, and located in geographic areas where GTEDs is doing business. In telecommunications, this generally translates to UNIX expertise.

o In Systems Integration, the ability to demonstrate capabilities which favorably compare to SI vendors with experience in government markets.

o In Large Scale Software Development, the ability to supplant vendors with long-term relationships with AT&T, the RBOC/BOCs and the IXCs, the ability to develop ongoing relationships with others requiring software development, and in the case of the BOCs, to provide a compelling reason to use a vendor other than Bellcore.

o In network design and management, the ability to penetrate companies planning new data communications services with expertise fitting the requirements these new offerings will demand.

o In project management, the ability to offer more industry specific functionality that the currently available systems.

o In education and training, the ability to sell at the work unit level, and the ability to offer state-of-the-technology training which is kept current with technological changes. Education and training will need to be sold along with other services in order to be profitable.

o In consulting, the ability to demonstrate technical proficiency and managerial perspectives within the specific industry segment or subsegment.

Processing Services

o Having adequate computer capacity to handle additional customer workloads, and able to maintain customer record confidentiality.

o In billing, tha ability to demonstrate flexibility in offered systems, and a record of reliable services.

o In RCS applications, the ability to dislodge customers of MDCISC and Comshare with applications offering more functionality than those now available.

o In facilities management, the ability to match capabilities

to needs in transactional and informational services, and to provide a compelling reason for the client to maintain the contract long-term, rather than migrate processing to internal systems.

Turnkey Systems

o The ability to provide flexible systems supporting operator positions, directory assistance, and network management with a clear upgrade path as requirements change, targeted to both telecommunications entities and corporate endusers (i.e. for resale).

Market Segment Critical Success Factors

AT&T

o The ability to leverage existing relationships into other relationships, and to supplant other vendors with long-term associations.

o The ability to make timely approaches to AT&T corporate management with the best, most cost-effective solution to current and emerging problems.

RBOCs/BOCs

o The ability to provide products and services supporting RBOC/BOC forays into new markets and activities such as equipment manufacturing, and information services.

o The ability to develop marketing support systems which translate network usage statistics and customer databases into qualified prospect lists.

Independent Telcos

o The ability to provide value added services to supplant regional bill processing vendors.

o The ability to demonstrate ability to implement tariff changes on a timely basis, and to integrate bill processing with general accounting applications/systems.

IXCs

o The ability to provide professional services to consolidating firms.

o The ability to avoid the risks inherent in this segment, particularly with resellers.

o The ability to provide systems and services supporting new data communications services.

Cellular

o The ability to provide flexible billing systems while maximizing customer involvement in implementing changes to minimize vendor liability for misunderstandings, errors, and to reduce costly support activities.

Elliot, you also asked for a ranking of opportunity areas to be emphasised as a strategic focus within each industry segment and each delivery mode. These rankings are, in part, conditioned by my understanding of GTED's current activities and capabilities. Starting with "1" as the highest priority, and "5" the lowest:

Delivery Modes

Professional Services/Custom Software Development - 1. This is the largest opportunity area.

Processing Services/Billing - 2. GTEDS does this quite well, and has demonstrated its ability to service others (i.e. AT&T).

Application Software - 3. The fastest growing area.

Processing Services/Applications - 4. Is heavy competition from McDonnell Douglas, and to a lesser extent, Comshare. However, may be opportunity for a "third-source."

Processing Services/Facilities Management - 5. Would appear limited to speculative areas such as transactional and information services, at least in the BOCs.

Industry Segments

Independent Telcos - 1. A large number of mostly unaligned potential clients.

IXCs - 2. Emerging involvement in data communications services creates opportunities, as does industry consolidation.

RBOCs/BOCs -3. Significant needs, however relationship with Bellcore makes it preferred vendor for most needs, and particularly for software.

AT&T -4. Are on-going relationships with GTEDS for billing, however other firms have long-term relationships in other areas.

Cellular -5. Market still too small for profitable, additional entries, and risky in the smaller markets.

I hope this helps! Best regards,

Sincerely,

Victor S. Wheatman
Senior Consultant

MARKET ANALYSIS:

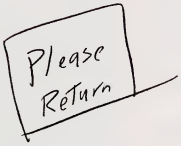
TELECOMMUNICATIONS INDUSTRY EXPENDITURES FOR INFORMATION SERVICES

Prepared for:

GTE Data Services

Tampa, Florida

November, 1986



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PROJECT CODE: ZTMI

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Chapter 1

EXECUTIVE SUMMARY

oThis project examines, and forecasts, end-user expenditures for information services in the telecommunications industry. It is based on refinements of INPUT's forecasts, further informed by sixteen end-user interviews with representtives from five segments of the industry, conducted for this study. These interviews were supplemented with additional interviews of telecommunications company IS managers being conducted for INPUT's user analysis report, and by interviews with vendor representatives.

o Critical success factors for each delivery mode and industry segment are provided, leading companies selling services to the industry are profiled, with their strengths and weaknesses identified, and an analysis of market opportunities offered.

Chapter 2

INTRODUCTION

2.1 PROJECT SCOPE

o INPUT was asked by GTEDS to provide refined end-user expenditures in the telecommunications market for information services by delivery mode, and by industry segments, and to identify the critical success factors in each.

o Further, the major competitors by both sets of categories (delivery modes and industry segments), their strengths and weaknesses, and the factors driving or influencing the purchase of information services by members of the industry were also requested.

o This report focuses on telephony-related segments of the industry, i.e., AT&T, the RBOCs/BOCs, independent telcos,

cellular carriers and IXCs. Consideration is also given to resellers of long distance and cellular services. Excluded from the provide statistics are the media segments of the telecommunications market such as radio, television and cable television (CATV). The "other" category reported contains VANs, fiber optic networks, satellite carriers, radio common carriers and microwave networks (such as those operated by DAMA and LOCATE).

paging companies, TAS?

o It should be noted that while the focus is on telephony segments, the forecast also break-outs these "other" entities. A detailed review of needs in these segments was not requested, and has been limited by the time scope, and research design, of the study.

2.2 METHODOLOGY

o INPUT combined its ongoing research in the telecommunications industry with a customized research program involving 16 user interviews with representatives of the five industry segments, and vendor interviews to gather perspectives on industry trends and the competitive positions of currently participating

vendors. The major findings of INPUT's recent study of the cellular billing market conducted for GTEDS are included in this report.

o The market forecasts, developed from earlier research by senior INPUT staff, were put on a spreadsheet, discussed by the two member project team, and broken-out by delivery mode and market segments. The results are based on various assumptions related to market consolidations, the trends and attitudes towards outside vs. internal systems, and the roles of various user segments in providing new telecommunications services requiring information systems. The limited budget information gathered during this research project was used as a "check" of the assumptions.

Chapter 3

TELECOMMUNICATIONS SEGMENT EXPENDITURES FOR INFORMATION SERVICES 1985-1991 - By Delivery Mode and Industry Segment

3.1 EXPENDITURE BREAK-OUTS

o Table 1 shows the original 1985-1991 forecasts for end-user expenditures, minus non-telco (to media) telecommunications entities, within the industry. Tables 2-7 detail expenditures for each year by delivery mode and for each industry segment. Tables 8-15 detail expenditures for each year, for each industry segment. Table 16 is the accumulated forecast which includes non-telco entity expenditures for information services.

3.1.1 Forecast Criteria

o The criteria used for developing these forecasts combine various data points of information including end-user interviews, vendor interviews, secondary research on individual companies, industries and trends, and INPUT's analysis, and evaluation, of changes in industry dynamics (technology, regulation, competitive environment). INPUT regularly conducts published and proprietary research into the various elements that make up the information services market, and the findings of our ongoing efforts have been used as appropriate to inform the financial, and strategic analyses provided.

Table 1

Telecommunications Industry Sector
Industry Specific User Expenditure Forecast
1986-1991

Service	1985	1986	1987	1988	1989	1990	1991
Applications Sftwr	$ 35M	$ 50M	$ 71M	$ 103M	$ 146M	$ 204M	$ 284M
Professional Svc							
Systems Intg	$ 6M	$ 10M	$ 16M	$ 24M	$ 44M	$ 61M	$ 84M
Project Mgt & Ctrl	$ 20M	$ 24M	$ 31M	$ 38M	$ 0M	$ 60M	$ 75M
Custom Sftwr Dev	$ 161M	$ 194M	$ 239M	$ 295M	$ 364M	$ 449M	$ 554M
Network Design	$ 79M	$ 99M	$ 123M	$ 154M	$ 193M	$ 241M	$ 301M
Education & Tr	$ 44M	$ 54M	$ 68M	$ 85M	$ 106M	$ 132M	$ 166M
People/Cust Site	$ 8M	$ 10M	$ 13M	$ 16M	$ 20M	$ 24M	$ 31M
Consulting	$ 47M	$ 58M	$ 73M	$ 91M	$ 114M	$ 142M	$ 178M
Subtotal	$ 365M	$ 449M	$ 563M	$ 703M	$ 841M	$ 1,109M	$ 1,389M
Processing Svc	$ 144M	$ 175M	$ 219M	$ 270M	$ 329M	$ 401M	$ 495M
Facilities Mgt	$ 12M	$ 15M	$ 17M	$ 25M	$ 29M	$ 35M	$ 41M
Turnkey Systems	$ 174M	$ 206M	$ 244M	$ 296M	$ 360M	$ 435M	$ 530M
Total	$ 730M	$ 895M	$ 1,114M	$ 1,397M	$ 1,705M	$ 2,184M	$ 2,739M

Table 2

Telecommunications Expenditures
in Industry Sector by AT&T

Service	1985	1986	1987	1988	1989	1990	1991
Applications Sftwr	$ 4.2M	$ 6.0M	$ 8.5M	$ 12.4M	$ 17.5M	$ 24.5M	$ 34.1M
Professional Svc							
Systems Intg	$ 0.7M	$ 1.1M	$ 1.9M	$ 2.9M	$ 5.5M	$ 7.9M	$ 10.9M
Project Mgt & Ctrl	$ 2.2M	$ 2.7M	$ 3.7M	$ 4.6M	$ 0.0M	$ 7.8M	$ 9.8M
Custom Sftwr Dev	$ 32.2M	$ 38.8M	$ 47.8M	$ 59.0M	$ 72.8M	$ 89.8M	$ 110.8M
Network Design	$ 3.2M	$ 4.0M	$ 4.9M	$ 6.2M	$ 7.7M	$ 9.6M	$ 12.0M
Education & Tr	$ 13.2M	$ 16.2M	$ 20.4M	$ 25.5M	$ 31.8M	$ 39.6M	$ 49.8M
People/Cust Site	$ 0.9M	$ 1.1M	$ 1.5M	$ 2.0M	$ 2.5M	$ 3.1M	$ 4.0M
Consulting	$ 5.2M	$ 6.6M	$ 8.6M	$ 11.1M	$ 14.4M	$ 18.5M	$ 23.1M
Subtotal	$ 57.5M	$ 70.6M	$ 88.8M	$ 111.3M	$ 134.7M	$ 176.4M	$ 220.5M
Processing Svc	$ 11.5M	$ 13.3M	$ 15.8M	$ 18.4M	$ 21.1M	$ 24.1M	$ 29.7M
Facilities Mgt	$ 0.0	$ 0.0	$ 0.0	$ 0.0	$ 0.0	$ 0.0	$ 0.0
Turnkey Systems	$ 3.5M	$ 4.1M	$ 4.9M	$ 5.9M	$ 7.2M	$ 8.7M	$ 10.6M
Total	$ 77M	$ 94M	$ 118M	$ 148M	$ 181M	$ 234M	$ 295M

Table 3

Telecommunications Expenditures
in Industry Sector by RBOC

Service	1985	1986	1987	1988	1989	1990	1991
Applications Sftwr	$ 11.6M	$ 16.7M	$ 24.0M	$ 35.2M	$ 50.5M	$ 71.4M	$ 99.4M
Professional Svc							
Systems Intg	$ 1.6M	$ 2.6M	$ 4.2M	$ 6.4M	$ 11.7M	$ 16.2M	$ 22.7M
Project Mgt & Ctrl	$ 5.2M	$ 6.2M	$ 8.1M	$ 10.1M	$ 0.0M	$ 15.9M	$ 20.3M
Custom Sftwr Dev	$ 53.1M	$ 64.0M	$ 78.9M	$ 97.4M	$ 120.1M	$ 148.2M	$ 182.8M
Network Design	$ 6.3M	$ 7.9M	$ 9.8M	$ 12.3M	$ 15.4M	$ 19.3M	$ 24.1M
Education & Tr	$ 17.6M	$ 21.6M	$ 27.2M	$ 34.0M	$ 42.4M	$ 52.8M	$ 66.4M
People/Cust Site	$ 2.1M	$ 2.6M	$ 3.4M	$ 4.2M	$ 5.3M	$ 6.4M	$ 8.4M
Consulting	$ 12.2M	$ 15.1M	$ 19.0M	$ 24.1M	$ 30.2M	$ 37.6M	$ 48.1M
Subtotal	$ 98.1M	$ 120.1M	$ 150.5M	$ 188.5M	$ 225.1M	$ 296.3M	$ 372.7M
Processing Svc	$ 20.2M	$ 24.5M	$ 30.7M	$ 37.8M	$ 46.1M	$ 56.1M	$ 69.3M
Facilities Mgt	$ 2.9M	$ 3.5M	$ 3.8M	$ 5.4M	$ 6.0M	$ 7.0M	$ 8.2M
Turnkey Systems	$ 62.6M	$ 75.0M	$ 89.8M	$ 110.1M	$ 135.4M	$ 165.3M	$ 201.4M
Total	$ 195M	$ 240M	$ 299M	$ 377M	$ 463M	$ 596M	$ 751M

Table 4

Telecommunications Expenditures
in Industry Sector by Independent Telco

Service	1985	1986	1987	1988	1989	1990	1991
Applications Sftwr	$ 7.7M	$ 10.8M	$ 15.1M	$ 21.4M	$ 29.8M	$ 40.8M	$ 56.8M
Professional Svc							
Systems Intg	$ 1.9M	$ 3.2M	$ 5.0M	$ 7.3M	$ 13.2M	$ 18.0M	$ 24.4M
Project Mgt & Ctrl	$ 6.4M	$ 7.6M	$ 9.6M	$ 11.6M	$ 0.0M	$ 17.7M	$ 21.8M
Custom Sftwr Dev	$ 35.4M	$ 42.7M	$ 52.6M	$ 64.9M	$ 80.1M	$ 98.8M	$ 121.9M
Network Design	$ 22.9M	$ 28.7M	$ 35.7M	$ 45.4M	$ 56.9M	$ 71.1M	$ 90.3M
Education & Tr	$ 8.8M	$ 10.8M	$ 13.6M	$ 17.0M	$ 21.2M	$ 26.4M	$ 33.2M
People/Cust Site	$ 2.6M	$ 3.2M	$ 4.0M	$ 4.9M	$ 6.0M	$ 7.1M	$ 9.0M
Consulting	$ 15.0M	$ 18.3M	$ 22.6M	$ 27.8M	$ 34.2M	$ 41.9M	$ 51.6M
Subtotal	$ 93.1M	$ 114.3M	$ 143.1M	$ 178.9M	$ 211.6M	$ 280.9M	$ 352.1M
Processing Svc	$ 56.2M	$ 66.9M	$ 81.9M	$ 98.8M	$ 117.8M	$ 140.4M	$ 173.3M
Facilities Mgt	$ 4.6M	$ 5.7M	$ 6.5M	$ 9.5M	$ 11.0M	$ 13.3M	$ 15.6M
Turnkey Systems	$ 52.2M	$ 61.8M	$ 73.2M	$ 88.8M	$ 108.0M	$ 130.5M	$ 159.0M
Total	$ 214M	$ 259M	$ 320M	$ 397M	$ 478M	$ 606M	$ 757M

Table 5

Telecommunications Expenditures
in Industry Sector by Cellular Companies

Service	1985	1986	1987	1988	1989	1990	1991
Applications Sftwr	$ 2.8M	$ 4.0M	$ 5.7M	$ 8.8M	$ 12.4M	$ 17.3M	$ 25.6M
Professional Svc							
Systems Intg	$ 0.2M	$ 0.4M	$ 0.6M	$ 0.8M	$ 1.5M	$ 2.1M	$ 2.5M
Project Mgt & Ctrl	$ 0.8M	$ 1.0M	$ 1.2M	$ 1.3M	$ 0.0M	$ 2.1M	$ 2.3M
Custom Sftwr Dev	$ 6.4M	$ 7.8M	$ 9.6M	$ 11.8M	$ 14.6M	$ 18.0M	$ 22.2M
Network Design	$ 9.5M	$ 12.3M	$ 15.7M	$ 20.3M	$ 26.2M	$ 33.7M	$ 42.1M
Education & Tr	$ 1.3M	$ 1.6M	$ 2.0M	$ 2.6M	$ 3.2M	$ 4.0M	$ 5.0M
People/Cust Site	$ 0.3M	$ 0.4M	$ 0.5M	$ 0.6M	$ 0.7M	$ 0.8M	$ 0.9M
Consulting	$ 1.9M	$ 2.3M	$ 2.9M	$ 3.2M	$ 4.0M	$ 5.0M	$ 5.3M
Subtotal	$ 20.5M	$ 25.7M	$ 32.7M	$ 40.6M	$ 50.2M	$ 65.7M	$ 80.3M
Processing Svc	$ 10.1M	$ 12.3M	$ 15.3M	$ 18.9M	$ 23.0M	$ 28.1M	$ 34.7M
Facilities Mgt	$ 0.0	$ 0.1M	$ 0.3M	$ 0.6M	$ 0.9M	$ 1.4M	$ 1.6M
Turnkey Systems	$ 20.9M	$ 23.9M	$ 27.3M	$ 32.0M	$ 37.4M	$ 43.5M	$ 53.0M
Total	$ 54M	$ 66M	$ 81M	$ 101M	$ 124M	$ 156M	$ 195M

Table 6

Telecommunications Expenditures
in Industry Sector by Interexchange Carriers

Service	1985	1986	1987	1988	1989	1990	1991
Applications Sftwr	$ 2.8M	$ 4.0M	$ 5.7M	$ 7.7M	$ 11.0M	$ 15.3M	$ 19.9M
Professional Svc							
Systems Intg	$ 1.2M	$ 2.0M	$ 3.1M	$ 4.5M	$ 8.1M	$ 11.0M	$ 15.1M
Project Mgt & Ctrl	$ 4.0M	$ 4.7M	$ 6.0M	$ 7.1M	$ 0.0M	$ 10.8M	$ 13.5M
Custom Sftwr Dev	$ 17.7M	$ 21.3M	$ 26.3M	$ 32.5M	$ 40.0M	$ 49.4M	$ 60.9M
Network Design	$ 19.8M	$ 24.8M	$ 30.8M	$ 37.7M	$ 47.3M	$ 59.0M	$ 72.2M
Education & Tr	$ 1.8M	$ 2.2M	$ 2.7M	$ 3.4M	$ 4.2M	$ 5.3M	$ 6.6M
People/Cust Site	$ 1.6M	$ 2.0M	$ 2.5M	$ 3.0M	$ 3.7M	$ 4.3M	$ 5.6M
Consulting	$ 9.4M	$ 11.4M	$ 14.0M	$ 17.1M	$ 21.0M	$ 25.6M	$ 32.0M
Subtotal	$ 55.4M	$ 68.2M	$ 85.3M	$ 105.4M	$ 124.3M	$ 165.4M	$ 206.1M
Processing Svc	$ 30.2M	$ 37.5M	$ 47.7M	$ 59.9M	$ 74.4M	$ 92.2M	$ 113.9M
Facilities Mgt	$ 3.6M	$ 4.4M	$ 5.0M	$ 7.2M	$ 8.2M	$ 9.8M	$ 11.5M
Turnkey Systems	$ 29.6M	$ 34.2M	$ 39.5M	$ 46.8M	$ 55.4M	$ 65.3M	$ 79.5M
Total	$ 122M	$ 148M	$ 183M	$ 227M	$ 273M	$ 348M	$ 431M

Table 7

Telecommunications Expenditures
in Industry Sector by Other Carriers

Service	1985	1986	1987	1988	1989	1990	1991
Applications Sftwr	$ 6.0M	$ 8.5M	$ 12.1M	$ 17.5M	$ 24.8M	$ 34.7M	$ 48.3M
Professional Svc							
Systems Intg	$ 0.4M	$ 0.8M	$ 1.3M	$ 2.0M	$ 4.0M	$ 5.8M	$ 8.4M
Project Mgt & Ctrl	$ 1.4M	$ 1.8M	$ 2.5M	$ 3.2M	$ 0.0M	$ 5.7M	$ 7.5M
Custom Sftwr Dev	$ 16.1M	$ 19.4M	$ 23.9M	$ 29.5M	$ 36.4M	$ 44.9M	$ 55.4M
Network Design	$ 17.4M	$ 21.4M	$ 26.1M	$ 32.0M	$ 39.4M	$ 48.2M	$ 60.2M
Education & Tr	$ 1.3M	$ 1.6M	$ 2.0M	$ 2.6M	$ 3.2M	$ 4.0M	$ 5.0M
People/Cust Site	$ 0.6M	$ 0.8M	$ 1.0M	$ 1.4M	$ 1.8M	$ 2.3M	$ 3.1M
Consulting	$ 3.3M	$ 4.4M	$ 5.8M	$ 7.7M	$ 10.3M	$ 13.5M	$ 17.8M
Subtotal	$ 40.5M	$ 50.1M	$ 62.7M	$ 78.4M	$ 95.0M	$ 124.3M	$ 157.4M
Processing Svc	$ 15.8M	$ 20.7M	$ 27.6M	$ 36.2M	$ 46.7M	$ 60.2M	$ 74.3M
Facilities Mgt	$ 1.0M	$ 1.3M	$ 1.5M	$ 2.3M	$ 2.8M	$ 3.5M	$ 4.1M
Turnkey Systems	$ 5.2M	$ 7.0M	$ 9.3M	$ 12.4M	$ 16.6M	$ 21.8M	$ 26.5M
Total	$ 68M	$ 87M	$ 113M	$ 147M	$ 186M	$ 244M	$ 311M

Table 8

Telecommunications Expenditures
in Industry Sectors for 1985

Service	AT&T	RBOC	Ind	Cellular	IXC	Other
Applications Sftwr	$ 4.2M	$ 11.6M	$ 7.7M	$ 2.8M	$ 2.8M	$ 6.0M
Professional Svc						
Systems Intg	$ 0.7M	$ 1.6M	$ 1.9M	$ 0.2M	$ 1.2M	$ 0.4M
Project Mgt & Ctrl	$ 2.2M	$ 5.2M	$ 6.4M	$ 0.8M	$ 4.0M	$ 1.4M
Custom Sftwr Dev	$ 32.2M	$ 53.1M	$ 35.4M	$ 6.4M	$ 17.7M	$ 16.1M
Network Design	$ 3.2M	$ 6.3M	$ 22.9M	$ 9.5M	$ 19.8M	$ 17.4M
Education & Tr	$ 13.2M	$ 17.6M	$ 8.8M	$ 1.3M	$ 1.8M	$ 1.3M
People/Cust Site	$ 0.9M	$ 2.1M	$ 2.6M	$ 0.3M	$ 1.6M	$ 0.6M
Consulting	$ 5.2M	$ 12.2M	$ 15.0M	$ 1.9M	$ 9.4M	$ 3.3M
Subtotal	$ 57.5M	$ 98.1M	$ 93.1M	$ 20.5M	$ 55.4M	$ 40.5M
Processing Svc	$ 11.5M	$ 20.2M	$ 56.2M	$ 10.1M	$ 30.2M	$ 15.8M
Facilities Mgt	$ 0.0M	$ 2.9M	$ 4.6M	$ 0.0M	$ 3.6M	$ 1.0M
Turnkey Systems	$ 3.5M	$ 62.6M	$ 52.2M	$ 20.9M	$ 29.6M	$ 5.2M
Total	$ 77M	$ 195M	$ 214M	$ 54M	$ 122M	$ 68M

Table 9

Telecommunications Expenditures
in Industry Sectors for 1986

Service	AT&T	RBOC	Ind	Cellular	IXC	Other
Applications Sftwr	$ 6.0M	$ 16.7M	$ 10.8M	$ 4.0M	$ 4.0M	$ 8.5M
Professional Svc						
Systems Intg	$ 1.1M	$ 2.6M	$ 3.2M	$ 0.4M	$ 2.0M	$ 0.8M
Project Mgt & Ctrl	$ 2.7M	$ 6.2M	$ 7.6M	$ 1.0M	$ 4.7M	$ 1.8M
Custom Sftwr Dev	$ 38.8M	$ 64.0M	$ 42.7M	$ 7.8M	$ 21.3M	$ 19.4M
Network Design	$ 4.0M	$ 7.9M	$ 28.7M	$ 12.3M	$ 24.8M	$ 21.4M
Education & Tr	$ 16.2M	$ 21.6M	$ 10.8M	$ 1.6M	$ 2.2M	$ 1.6M
People/Cust Site	$ 1.1M	$ 2.6M	$ 3.2M	$ 0.4M	$ 2.0M	$ 0.8M
Consulting	$ 6.6M	$ 15.1M	$ 18.3M	$ 2.3M	$ 11.4M	$ 4.4M
Subtotal	$ 70.6M	$ 120.1M	$ 114.3M	$ 25.7M	$ 68.2M	$ 50.1M
Processing Svc	$ 13.3M	$ 24.5M	$ 66.9M	$ 12.3M	$ 37.5M	$ 20.7M
Facilities Mgt	$ 0.0M	$ 3.5M	$ 5.7M	$ 0.1M	$ 4.4M	$ 1.3M
Turnkey Systems	$ 4.1M	$ 75.0M	$ 61.8M	$ 23.9M	$ 34.2M	$ 7.0M
Total	$ 94M	$ 240M	$ 259M	$ 66M	$ 148M	$ 87M

Table 10

Telecommunications Expenditures
in Industry Sectors for 1987

Service	AT&T	RBOC	Ind	Cellular	IXC	Other
Applications Sftwr	$ 8.5M	$ 24.0M	$ 15.1M	$ 5.7M	$ 5.7M	$ 12.1M
Professional Svc						
Systems Intg	$ 1.9M	$ 4.2M	$ 5.0M	$ 0.6M	$ 3.1M	$ 1.3M
Project Mgt & Ctrl	$ 3.7M	$ 8.1M	$ 9.6M	$ 1.2M	$ 6.0M	$ 2.5M
Custom Sftwr Dev	$ 47.8M	$ 78.9M	$ 52.6M	$ 9.6M	$ 26.3M	$ 23.9M
Network Design	$ 4.9M	$ 9.8M	$ 35.7M	$ 15.7M	$ 30.8M	$ 26.1M
Education & Tr	$ 20.4M	$ 27.2M	$ 13.6M	$ 2.0M	$ 2.7M	$ 2.0M
People/Cust Site	$ 1.5M	$ 3.4M	$ 4.0M	$ 0.5M	$ 2.5M	$ 1.0M
Consulting	$ 8.6M	$ 19.0M	$ 22.6M	$ 2.9M	$ 14.0M	$ 5.8M
Subtotal	$ 88.8M	$ 150.5M	$ 143.1M	$ 32.7M	$ 85.3M	$ 62.7M
Processing Svc	$ 15.8M	$ 30.7M	$ 81.9M	$ 15.3M	$ 47.7M	$ 27.6M
Facilities Mgt	$ 0.0M	$ 3.8M	$ 6.5M	$ 0.3M	$ 5.0M	$ 1.5M
Turnkey Systems	$ 4.9M	$ 89.8M	$ 73.2M	$ 27.3M	$ 39.5M	$ 9.3M
Total	$ 118.0M	$ 298.7M	$ 319.7M	$ 81.3M	$ 183.2M	$ 113.1M

Table 11

Telecommunications Expenditures
in Industry Sectors for 1988

Service	AT&T	RBOC	Ind.	Cellular	IXC	Other
Applications Sftwr	$ 12.4M	$ 35.2M	$ 21.4M	$ 8.8M	$ 7.7M	$ 17.5M
Professional Svc						
Systems Intg	$ 2.9M	$ 6.4M	$ 7.3M	$ 0.8M	$ 4.5M	$ 2.0M
Project Mgt & Ctrl	$ 4.6M	$ 10.1M	$ 11.6M	$ 1.3M	$ 7.1M	$ 3.2M
Custom Sftwr Dev	$ 59.0M	$ 97.4M	$ 64.9M	$ 11.8M	$ 32.5M	$ 29.5M
Network Design	$ 6.2M	$ 12.3M	$ 45.4M	$ 20.3M	$ 37.7M	$ 32.0M
Education & Tr	$ 25.5M	$ 34.0M	$ 17.0M	$ 2.6M	$ 3.4M	$ 2.6M
People/Cust Site	$ 2.0M	$ 4.2M	$ 4.9M	$ 0.6M	$ 3.0M	$ 1.4M
Consulting	$ 11.1M	$ 24.1M	$ 27.8M	$ 3.2M	$ 17.1M	$ 7.7M
Subtotal	$ 111.3M	$ 188.5M	$ 178.9M	$ 40.6M	$ 105.4M	$ 78.4M
Processing Svc	$ 18.4M	$ 37.8M	$ 98.8M	$ 18.9M	$ 59.9M	$ 36.2M
Facilities Mgt	$ 0.0M	$ 5.4M	$ 9.5M	$ 0.6M	$ 7.2M	$ 2.3M
Turnkey Systems	$ 5.9M	$ 110.1M	$ 88.8M	$ 32.0M	$ 46.8M	$ 12.4M
Total	$ 147.9M	$ 377.0M	$ 397.4M	$ 100.8M	$ 227.0M	$ 146.9M

Table 12

Telecommunications Expenditures
in Industry Sectors for 1989

Service	AT&T	RBOC	Ind.	Cellular	IXC	Other
Applications Sftwr	$ 17.5M	$ 50.5M	$ 29.8M	$ 12.4M	$ 11.0M	$ 24.8M
Professional Svc						
Systems Intg	$ 5.5M	$ 11.7M	$ 13.2M	$ 1.5M	$ 8.1M	$ 4.0M
Project Mgt & Ctrl	$ 0.0M	$ 0.0M	$ 0.0M	$ 0.0M	$ 0.0M	$ 0.0M
Custom Sftwr Dev	$ 72.8M	$ 120.1M	$ 80.1M	$ 14.6M	$ 40.0M	$ 36.4M
Network Design	$ 7.7M	$ 15.4M	$ 56.9M	$ 26.2M	$ 47.3M	$ 39.4M
Education & Tr	$ 31.8M	$ 42.4M	$ 21.2M	$ 3.2M	$ 4.2M	$ 3.2M
People/Cust Site	$ 2.5M	$ 5.3M	$ 6.0M	$ 0.7M	$ 3.7M	$ 1.8M
Consulting	$ 14.4M	$ 30.2M	$ 34.2M	$ 4.0M	$ 21.0M	$ 10.3M
Subtotal	$ 134.7M	$ 225.1M	$ 211.6M	$ 50.2M	$ 124.3M	$ 95.0M
Processing Svc	$ 21.1M	$ 46.1M	$ 117.8M	$ 23.0M	$ 74.4M	$ 46.7M
Facilities Mgt	$ 0.0M	$ 6.0M	$ 11.0M	$ 0.9M	$ 8.2M	$ 2.8M
Turnkey Systems	$ 7.2M	$ 135.4M	$ 108.0M	$ 37.4M	$ 55.4M	$ 16.6M
Total	$ 180.5M	$ 463.1M	$ 478.2M	$ 124.0M	$ 273.3M	$ 185.9M

Table 13

Telecommunications Expenditures
in Industry Sectors for 1990

Service	AT&T	RBOC	Ind	Cellular	IXC	Other
Applications Sftwr	$ 24.5M	$ 71.4M	$ 40.8M	$ 17.3M	$ 15.3M	$ 34.7M
Professional Svc						
Systems Intg	$ 7.9M	$ 16.2M	$ 18.0M	$ 2.1M	$ 11.0M	$ 5.8M
Project Mgt & Ctrl	$ 7.8M	$ 15.9M	$ 17.7M	$ 2.1M	$ 10.8M	$ 5.7M
Custom Sftwr Dev	$ 89.8M	$ 148.2M	$ 98.8M	$ 18.0M	$ 49.4M	$ 44.9M
Network Design	$ 9.6M	$ 19.3M	$ 71.1M	$ 33.7M	$ 59.0M	$ 48.2M
Education & Tr	$ 39.6M	$ 52.8M	$ 26.4M	$ 4.0M	$ 5.3M	$ 4.0M
People/Cust Site	$ 3.1M	$ 6.4M	$ 7.1M	$ 0.8M	$ 4.3M	$ 2.3M
Consulting	$ 18.5M	$ 37.6M	$ 41.9M	$ 5.0M	$ 25.6M	$ 13.5M
Subtotal	$ 176.4M	$ 296.3M	$ 280.9M	$ 65.7M	$ 165.4M	$ 124.3M
Processing Svc	$ 24.1M	$ 56.1M	$ 140.4M	$ 28.1M	$ 92.2M	$ 60.2M
Facilities Mgt	$ 0.0M	$ 7.0M	$ 13.3M	$ 1.4M	$ 9.8M	$ 3.5M
Turnkey Systems	$ 8.7M	$ 165.3M	$ 130.5M	$ 43.5M	$ 65.3M	$ 21.8M
Total	$ 233.6M	$ 596.1M	$ 605.9M	$ 156.0M	$ 348.0M	$ 244.4M

Table 14

Telecommunications Expenditures
in Industry Sectors for 1991

Service	AT&T	RBOC	Ind	Cellular	IXC	Other
Applications Sftwr	$ 34.1M	$ 99.4M	$ 56.8M	$ 25.6M	$ 19.9M	$ 48.3M
Professional Svc						
Systems Intg	$ 10.9M	$ 22.7M	$ 24.4M	$ 2.5M	$ 15.1M	$ 8.4M
Project Mgt & Ctrl	$ 9.8M	$ 20.3M	$ 21.8M	$ 2.3M	$ 13.5M	$ 7.5M
Custom Sftwr Dev	$ 110.8M	$ 182.8M	$ 121.9M	$ 22.2M	$ 60.9M	$ 55.4M
Network Design	$ 12.0M	$ 24.1M	$ 90.3M	$ 42.1M	$ 72.2M	$ 60.2M
Education & Tr	$ 49.8M	$ 66.4M	$ 33.2M	$ 5.0M	$ 6.6M	$ 5.0M
People/Cust Site	$ 4.0M	$ 8.4M	$ 9.0M	$ 0.9M	$ 5.6M	$ 3.1M
Consulting	$ 23.1M	$ 48.1M	$ 51.6M	$ 5.3M	$ 32.0M	$ 17.8M
Subtotal	$ 220.5M	$ 372.7M	$ 352.1M	$ 80.3M	$ 206.1M	$ 157.4M
Processing Svc	$ 29.7M	$ 69.3M	$ 173.3M	$ 34.7M	$ 113.9M	$ 74.3M
Facilities Mgt	$ 0.0M	$ 8.2M	$ 15.6M	$ 1.6M	$ 11.5M	$ 4.1M
Turnkey Systems	$ 10.6M	$ 201.4M	$ 159.0M	$ 53.0M	$ 79.5M	$ 26.5M
Total	$ 294.9M	$ 751.0M	$ 756.7M	$ 195.2M	$ 430.8M	$ 310.5M

Table 15

Telecommunications Industry Sector
Industry Specific User Expenditure Forecast
1986-1991

Service	1985	1986	1987	1988	1989	1990	1991
Applications Sftwr	$ 35M	$ 50M	$ 71M	$ 103M	$ 146M	$ 204M	$ 284M
Non-Telco Sftwr	14M	18M	25M	34M	45M	60M	79M
Subtotal	$ 49M	$ 68M	$ 96M	$ 137M	$ 191M	$ 264M	$ 363M
Professional Svc							
Systems Intg	$ 6M	$ 10M	$ 16M	$ 24M	$ 44M	$ 61M	$ 84M
Project Mgt & Ctrl	$ 20M	$ 24M	$ 31M	$ 38M	$ 48M	$ 60M	$ 75M
Custom Sftwr Dev	$ 161M	$ 194M	$ 239M	$ 295M	$ 364M	$ 449M	$ 554M
Network Design	$ 79M	$ 99M	$ 123M	$ 154M	$ 193M	$ 241M	$ 301M
Education & Tr	$ 44M	$ 54M	$ 68M	$ 85M	$ 106M	$ 132M	$ 166M
People/Cust Site	$ 8M	$ 10M	$ 13M	$ 16M	$ 20M	$ 24M	$ 31M
Consulting	$ 47M	$ 58M	$ 73M	$ 91M	$ 114M	$ 142M	$ 178M
Non-Telco Pro Svc	$ 27M	$ 34M	$ 43M	$ 53M	$ 67M	$ 84M	$ 104M
Subtotal	$ 392M	$ 489M	$ 611M	$ 764M	$ 955M	$ 1,193M	$ 1,492M
Processing Svc	$ 144M	$ 175M	$ 219M	$ 270M	$ 329M	$ 401M	$ 495M
Non-Telco Pro Svc	$ 196M	$ 219M	$ 254M	$ 232M	$ 323M	$ 365M	$ 415M
Subtotal	$ 340M	$ 394M	$ 473M	$ 558M	$ 652M	$ 766M	$ 910M
Facilities Mgt	$ 12M	$ 15M	$ 17M	$ 25M	$ 29M	$ 35M	$ 41M
Non-Telco Fac Mgt	$ 5M	$ 5M	$ 6M	$ 7M	$ 8M	$ 8M	$ 9M
Subtotal	$ 17M	$ 20M	$ 23M	$ 32M	$ 37M	$ 43M	$ 50M
Turnkey Systems	$ 174M	$ 206M	$ 244M	$ 296M	$ 360M	$ 435M	$ 530M
Non-Telco Trnky	$ 25M	$ 29M	$ 35M	$ 42M	$ 51M	$ 62M	$ 76M
Subtotal	$ 199M	$ 235M	$ 279M	$ 338M	$ 411M	$ 497M	$ 606M
Total	$ 983M	$ 1,206M	$ 1,482M	$ 1,829M	$ 2,246M	$ 2,763M	$ 3,421M

Chapter 4

CRITICAL SUCCESS FACTORS - DELIVERY MODE

4.1 Applications Software

o The rapid growth of applications software in the telecommunications and other industry markets is evidenced by the growing number of companies providing products in specific areas.

o Applications software will see rapid growth for primarily the telco related segments including AT&T. This is because it is cheaper and easier to purchase industry specific software than it is to develop it internally.

o Most of this software will be available on a microcomputer basis even though the majority was developed originally on a mainframe system. Still, because of the environments involved, the demand for minicomputer and mainframe applications software will remain strong throughout the forecast period.

4.1.1 Survey Findings - Software

o The RBOCs/BOCs will be the largest spenders on applications software which is indicative of their current behavior. Most of this software will be for internal use although we expect some will be for resale. Applications include call/cost accounting, traffic engineering and management, inventory management, work order processing, service ordering, facilities assignment, scheduling and budgeting.

o Users require packages providing needed facilities, and a compelling reason to buy, rather than build, the software. Because needs vary in the individual segments, and indeed, within those segments and among individual companies, "flexibility" becomes a key word in designing packaged software. The user needs the ability to tailor the package for unique requirements.

4.2 Professional Services

o Professional services (PS) encompass several components, individually analyzed below.

o Telecommunications companies (along with banks and financial institutions) lead in the drive to use PS in developing automated systems that will establish, and maintain their competitive edge. Industry participants are replacing systems previously supplied by AT&T and new systems for new lines of business are also being developed and implemented.

o The key motivators for using PS include the need for new systems to replace those lacking the transaction speed and memory to satisfy current, and future, requirements. Systems are being upgraded, requiring selection, installation and management, all functions provided by PS firms.

o While large companies may have adequate staffs to handle such projects, smaller firms may not have the contigency resources to make capitial investments, nor the desire to hire necessary staff which will be needed only short term.

o Also driving PS are "super systems," integrating various applications bound to fourth generation languages, data base management systems, code generators and the like, using data hosted in processors from micros to mainframes, and therefore requiring micro-mainframe links.

o Another driver is the fact of multi-vendor environments calling for integration of voice, data and image. This becomes

important for electronic publishing applications, among others.

o IS staffs are often dedicated to operation and maintenance of aging systems (hardware and software) and unable to adequately address development. This means new starts are contracted out.

o The following sections examine each component of PS.

4.2.1 Systems Integration

o Systems integration has been defined by INPUT as "A single firm would undertake responsibility for the design, development and implementation of a system or sub-system. This could include the integration of the hardware, software and communications facilities required. When the system or subsystem was complete and fully tested, it would be turned over to the customer for operation."

o INPUT had done custom work on commercial systems integration, and is planning a published report for late 1986. Without revealing any proprietary information, some findings of a survey in a segment other than telecommunications may be helpful in gaining a preliminary understanding of users requirements.

o Among the most important characteristics of systems

integrators (i.e. critical success factors), are the ability to integrate, and select the hardware, software and communications facilities necessary, overall project management, system design skills, and the ability to define project requirements. Less important characteristics are the ability to design custom hardware and integrate voice and data.

o The types of firms most likely to be used were fairly evenly rated among professional service firms, aerospace vendors, computer manufacturers and communications suppliers. However, when rating specific companies, AT&T fared rather poorly while the major hardware manufacturers were rated highest.

o The types of business contracts perferred were fixed price, with performance guarentees, - by a wide margin.

o One of the central findings of the survey ~~were~~ was the importance of the role of communications networking (although voice/data integration was not deemed very important).

o INPUT feels that senior executives are more amenable to systems integration than IS executives, requiring a sales strategy which focuses on upper management.

o Commercial customers are learning from the federal government the place of systems integration which brings together systems design and development under one contractor, whereas earlier, the

two elements were treated separately.

o GTEDS is reminded that these findings were based on a survey sample in an industry other than telecommunications. The current research sample found little activity in systems integration, as those interviewed (IS Managers) presented a position of self reliance.

o Systems Integration (SI) is a complicated area. Opportunities range from activities in support of internal needs, to those required in a consolidating market. SI projects are often high risk efforts such as substantial systems upgrades and replacements.

o The experience GTEDS has acquired in the formation of US Sprint and Telenet Communications Company can be used to advantage in offering SI services to consolidating firms. Examples include:

- Mergers of IXCs such as AllNet, Litel and Argo, and of resellers.

- Integration of BOC packet networks (LADTs) with wide area VANs, IRCs or other LADTs.

- The expected consolidation of fiber optic and satellite networks, and the interconnection of those networks to other

carriers.

o Internal systems integration opportunities may be found in linking marketing systems and network planning functions, linking textual data bases and other document handling routines with digital image processing for electronic publishing, tying together incompatible office systems hardware, and providing improved management information systems.

o A speculative area is supercomputer-based applications. Users are getting more comfortable with super, and mini-super computers, and business applications (rather than scientific/engineering) are being evaluated to take advantage of the transactional speed such systems offer.

o The leaders in commercial SI are primarily vendors with a history of federal government contracts. The are Computer Sciences Corporation, IBM, GM/EDS, Sperry, BB&N, Science Applications International, Martin Marietta, and Planning Research Corporation.

4.2.1.1 Survey Findings

o Overall, systems integration in telecommunications has not shown to be a high revenue segment, accounting for only $6

million in expenditures in 1985. The largest spending segment came from the independent telco's although the BOCs also spend a substantial amount.

4.2.2 Project Management and Control

o This element of professional services is often integral to other functions. Generalized project management remote computing services and applications software (notably for micros) are available to both users and contractors to handle these functions.

- Among processing service vendors are ADP (Costrak), Boeing Computer Services (Project/2), GEISCO (Project Visibility System) and McDonnell Douglas (Management Scheduling/Control System and Cost Planning/Evaluation System). The McDonnell Douglas services are offered through the Communications Industry Services Company which is focused on the telecommunications industry.

- Mainframe/Mini project management software vendors include AGS, IBM, Metier Management Systems (now part of Lockheed), Planning Control International, Project Software Development and Systonetics.

- Micro project management software is available from Primavera Systems, Strategic Softwware Planning, North American Mica, Westminster Software, Breakthrough and Harvard Software (now part of Software Publishing Company).

- Project management consultants can be found in large firms such as Battelle Memorial Institute and the consulting arms of the "Big Eight" accounting firms, as well as small independents that work at the project site.

4.2.2.1 Survey Findings

o The overall demand for project management and control services was substanially larger than for systems integration - $20 million in 1985. However, the growth rate of this segment will prove to be substantially less throughout the forecast period largely because the chaos of deregulation will have subsided in the later part of the decade.

o This conclusion is supported by the fact that the majority of demand for project management and control services for telecommunications is derived from the Bell and Independent telephone companies in the early part of the forecast. Once internal systems are in place, we anticipate a reduction in the

need for management services although continuing changes and acquisitions in the telecom industry will leave opportunities for providers in this segment.

o The total aggregate market for project management and control services will reach $84 million in 1991, perhaps large enough to warrant professional services in this area on a limited basis.

4.2.3 Large Custom Software Development

o Software development generally is the largest segment of professional services, driven by the lack of skilled in-house personnel who are mostly responsibile for maintaining existing systems, leaving little time to develop needed new systems.

o The demand for large custom software development services is extremely high in the telecom industry, spearheaded by the ambitious plans of AT&T and the RBOCs to offer products and services in targeted industry segments, including the entire range of telecommunications industry and product areas. Several opportunity areas stand out.

o The need for network management services and systems (and the software to drive them) by corporate end users (i.e., not telecom carriers) is extremely high since the user is inclined to assume

more and more responsibility for the management and operation of the network.

- The line of demarcation between customer premise responsibility and telco or product vendor responsibility is increasingly esoteric.

- Hence, if the telephone company, AT&T or other entity can offer a system or service which assist the telecom manager to monitor, design, diagnose and administrate the network, they are in a good position of controlling the account and capturing future revenue streams.

o Other software applications include custom billing services for large corporate customers, trouble tracking systems, work order processing and auxiliary switch products. Spending for these products and services will more than triple over the course of the forecast period.

4.2.3.1 Survey Findings

o New systems mentioned by interview respondents are billing systems to handle the requirements of deregulation, and service and engineering applications. One repondent notes a marketing department requirement to relate usage to specific customers to

identify prospects for new services and products.

o Expenditures by the RBOCs/BOCs will almost be equalled by AT&T and the independent telcos. This is because they are often all competing for the same client base and new products or services represent the greatest opportunity for new revenues. Furthermore, spending in this segment may offer the greatest return on investment when compared to other industry segments over the forecast period.

4.2.4 Network Design and Management Services

o Network design and management service needs by the smaller telcos may be too costly to pursue on a direct sales basis, but rather would be sought by customers seeking alternatives to their current methods. The primary direction in this area is believed to be in relatively inexpensive microcomputer software packages and in customized network control centers.

4.2.4.1 Survey Findings

o Network design and management needs are generally serviced internally by the individual telecommunications segments

examined. The strict requirements of the carriers necessitate internally available resources and tools to perform this periodically. However, we believe spending on products and services will be substantial, outside the telecommunications industry itself, i.e. in the end-user marketplace.

o Despite these survey findings, we believe the growth in network design and management services spending will be strong and continuous over the entire forecast period. It is primarily fueled by the explosion of data communications services and special network considerations required for optimization. The variety of data communications services available, coupled with expanding demand and improved performance requirements will necessitate continued spending for these services.

o The segment most severely impacted by this trend are the independent telephone companies who lack the vast internal resources and capital of the BOCs to manage and optimize their networks on a continuous basis. Heavy spending will also come from the interexchange carriers and emerging network services such as LADTs, fiber and satellites networks. Cellular carriers will also require network design and management services as they respond to increased competitive pressures for improved services and advanced technologies (such as mobile data capabilities, and ultimately, the digitization of cellular systems). Spending by

AT&T and the BOCs will be comparitivly low because this capability has been previously, and extensively, developed by these companies.

4.2.5 Education and Training

o Very few professional services vendors do not offer education and training, but what is available is of an ancillary, add-on, customer service nature.

o Among critical success factors here include the ability to identify the key contacts at the work unit level requiring these services and these users tend to be price sensitive, impacting profitability.

o As a stand alone service, education and training are not generally profitable. It is difficult to keep materials current in the rapidly changing technological environment, and the perceived value of education outside a specific application is generally quite low.

4.2.5.1 Survey Findings

o Most telecommunications organization offer training and education to their employees and customers, however, due to the changing rate of technology and product specialization, internal staff is not always on the leading edge. Services offered to telecom companies in this areas will be substantial for AT&T and the BOCs while less significant for the other industry segments.

o The survey indicated that virtually all industry segments were spending money on education and training, and will continue to do so. While this does not represent an extremely large segment in terms of revenues, it is also not small, and will demonstrate good growth over the forecast period, increasing nearly four-fold.

o The most significant aspect of this service offering is the extremely high demand by AT&T, the BOCs and independent telcos for training and education. These companies already have substantial organizations dedicated to this function. However, it became apparent that they simply could not handle the increase in demand or the rate of change.

o Small companies were frequently mentioned suppliers of education as they are significantly more adept and agile in addressing the niche market.

o The largest spenders for such services will be AT&T, the

BOCs and independent telcos. The smaller spenders will be the IXCs, cellular or "other" carriers.

4.2.5.2 Analysis

o Technical training is an ongoing industry need, one recognized by a variety of vendors including the major equipment providers, service organizations, technology training institutes and an increasing number of academic institutions.

o Areas requiring support in the telecommunications industry mirror those of other industries, including training in complex software development tools, advanced hardware, end-user computing, micro-mainframe implementation, data administration, operations and software maintenance. Of course, the industry has unique needs for training in the installation, and maintenance of advanced telecommunications equipment.

o The new competitive environment has also created needs for what could best be called strategic training: recognizing how technology can be used internally for improved customer service, and externally, for new, but clearly needed services, ideally tied to the evolving ISDN environment. Strategic training would encompass areas such as customer response and service centers,

using network information to identify prospects for enhanced services, and for training marketeers.

4.2.6 "Body Shop" Services

o For short term projects requiring specialized skills and knowledges, users may turn to vendors offering technologists with the requisite qualities to work on a project basis at the customer's site, and under the customer's direction. Competition for qualified staff, and job turnover rates, are high, suggesting vendor opportunities, assuming these inherent problems affecting vendors as well as users, can be overcome, and high quality staff maintained.

4.2.6.1 Survey Findings

o The revenue expenditures for "body shop" is not high, beginning at $8 million in 1985 and growing to $31 million in 1991. While this indicates good growth, it is more on the coat tails of the overall growth of the telecommunications and data communications industry than in specific demand for customer site project work.

o The largest spending will be by the independent telcos who

often less insulated with internal engineering and consulting staff. The BOCs will also make up a substantial portion of the total spending as internal resources become stretched on other projects. The IXCs will also show some requirements for body shop type services over the course of the forecast period as data communications offerings, and the needs they create, increase.

4.2.7 Consulting

New product analysis
spotting

o Consulting ranges from special studies to the specification of needed systems. The services provided are management oriented, including feasibility studies, requirements analysis, system audits and technical direction and assistance consulting.

o Critical success factors here include the vendors ability to establish their credentials both technically, and within the vertical industry segments.

4.2.7.1 Survey Findings

o The demand for consulting services will continue to be a permanent part of the entire telecom industry. This is implicit by the very nature of this industry which is rapidly changing,

improving, innovating and growing. Consulting services is a cost-effective way for large companies to obtain specific expertise without incurring any long-term liabilities.

o Specifically, consulting spending for telecommunications will grow from $47 million in 1985 to $178 million in 1991. This growth is relatively consistent as the needs of the industry expand in proportion with the technology.

- The largest spenders will be the independent telcos because of their lack of comparative internal resources to address new products and services.

- While the BOCs have considerable design and planning resources available to them, they will continue to use outside firms to supplement their needs.

- Finally, the interexchange carriers will also require significant consulting services as the find it necessary to respond to competitive pressures and offer new services.

4.3 Professional Services - Overall Critical Success Factors

o The critical success factors in PS overall include the business

relationship between the vendor and customer, and the vendor's ability to build a critical mass of business to leverage expertise. Because professional service activities involve close working relationships, the match between the vendor's and customer's culture is also important.

o Other critical success factors facing vendors are understanding the user organization, including gathering pre-bid intelligence in order to better prepare the proposal, and early executive management involvement. Frequently, PS vendors will enjoy repeat business due to understanding the client better than would another vendor.

o The contractor should be able exhibit objectivity without being influenced by internal client politics, or by equipment biases.

o Fixed price contracts are preferred by users, requiring the vendor to accurately appraise, in advance, the costs of the specified project.

o Vendors may also face labor pools shortages in specific hardware or software expertise, or in particular geographic areas. These shortages must be resolved in the pre-bid stage to avoid unanticipated expense in overhead and management costs after contract award.

o Vendors without specific skills or expertise should evaluate strategic partnering in professional services, understanding that such partnering cannot compensate for fundamental weaknesses.

4.4 Processing Services

4.4.1 Overall

o The market for processing services is captive and finite. While substantial revenues are being spent on billing and management processing services, this is a marketplace that is increasing in competition and product offerings.

o The largest segment of this market, that controlled by AT&T and the RBOCs, is almost entirely captive. What does remain are exploited segments that were largely determined prior to the breakup of the Bell System, and by deregulation. Today, we have successful niche marketing to independent telcos, interexchange carriers, and cellular. The potential exists for success with new value-added carriers and services.

o It should be pointed out that there is substantial interest in consolidating current billing systems among the various BOCs

under one operating system. However, this opportunity will present itself under custom software development services and turnkey system rather than processing services.

o In sum, processing services will continue to grow as a result of the overall growth of the telecommunications industry and in alignment with new products and services.

o INPUT's continuing research in the telecommunications market with regards to processing services indicates low loyality to currently used vendors. The primary criticisms are related to the service's ability to adapt to rapid changes in a competitive environment.

o Revenue expenditures for processing services stand at $144 million for 1985 and will grow to $495 million in 1991.

- The majority of this growth will be comprised of demand for services from the interexchange carriers who will benefit most from services that respond rapidly to tariff changes and who will need data communications billing services.

- Also, the independent telcos will make a large part of the total spending as they respond equally to competition and new service offerings which they have not previously provided.

- Both the BOCs and the "other" service category will also spend substantially for processing services over the forecast period for similar reasons. The BOCs will find it cost-effective in some cases to use outside processing services on a temporary basis while value-added and service carriers will find it cost-effective on a more permanent basis.

4.4.1.1 Analysis

o GTEDS' ability to implement changes for its captive clients can be leveraged to advantage in selling processing services to unaffiliated LECs (that is stand-alone independents and smaller groups without their own processing facilities), in the cellular market, and in both long distance and cellular resale businesses. This record of experience should be a cornerstone of any promotional and advertising campaign, coordinated with direct sales efforts to significant accounts, and telemarketing to develop smaller accounts.

o The key barrier to GTEDS success in processing would appear to be dislodging customers from the two primary providers of on-line applications processing addressing telecommunications: Comshare and McDonnell Douglas, or from using specialized

consultants.

o It is assumed that companies requiring such services lack continuing needs to justify internal installation of applications assisting these areas, or have limited personnel familiar with the processes involved for utilizing on-line or internal software solutions.

4.5 Facilities Management - ~~Customer~~ Vendor Owned, Vendor Operated

4.5.1 Survey Findings

o The demand for facilities management processing services will not be significant over the course of the forecast period. This is because interest will be off-set by spending for turnkey systems and products which provide the same or more functionality. Subsequently, in 1985 expenditures will amount to $12 million and will rise to $41 million in 1991.

o The largest segment will come from the independent telcos who traditionally subscribe to most of the billing and management

processing services previously described.

o Interexchange carriers also will make up a large segment of the total spending due to their need to stay competitive and profitable. The BOCs will also show some spending in this area but this will generally be on an exception basis.

- BOC facilities management contracts will be found as they enter areas previously forbidden: transactional and information services.

- These contracts may be short-term, piloting projects, which, if successful, may be brought in-house. Examples are credit card pay phones and commercial directory information services such as New York Telephone's "Hello Yellow" project.

4.6 Turnkey Systems

o The growth in demand for turnkey systems will be significant, due primarily to the requirements previously discussed for services and systems in network management, and also for customer service.

4.6.1 Survey Findings

o Spending will increase from $174 million in 1985 to $530 million in 1991 for telecommunication turnkey products.

o As anticipated, the largest buyer of these systems will be the RBOCs/BOCs and independent telcos who will use these systems internally and for resale to corporate end-users.

o The interexchange carriers will also spend substantially in this area for systems with the same objectives. Telecom vendors are seeking to provide better management and performance of their networks, and products or services that address these needs will lead in sales.

Chapter 5

CRITICAL SUCCESS FACTORS: SEGMENTS

5.1 AT&T

o Sources at AT&T report a complete reorganization of IS functions, with the details known only at the Chairman of the Board level. Staff is uncertain as to what the configuration or their responsibilities will be in 1987.

o This suggests that sales of additional services to AT&T need to be handled at the highest levels.

o AT&T has been cutting staff significantly, although primarily in the computer hardware area. Regardless, the volatile situation suggests opportunity in the chaos.

o Opportunities will be found primarily in customizing software, education and training.

o AT&T has established regional centers to handle bill processing formerly done by the BOCs. Although GTEDS has agreements in place for such processing within its own territory, AT&T will likely continue to maintain and operate its own facilities. Complete cutover of billing services by AT&T will not be complete for some time. It will be a gradual process, with high density centers converting first, with remote/rural regions later - if at all.

5.2 RBOCs/BOCS

o Indications are that the RBOCs and BOCs are gearing up for participation in the interconnect market, in virtually all product and service areas, and will require systems and services to support sales.

o This translates into opportunities across the range of services GTEDS may provide: software development, turnkey systems, and possibly processing services to manipulate customer data to identify prospects for CPE and services, and for general sales management, and education and training services in marketing, and technical areas such as system configuration and

installation.

o The BOCs are emerging from their monopolistic mindsets in the face of new competition. An NTIA survey of state PUCs has found increasing receptivity to new technologies and competition by the PUCs. The findings show that 36 of 38 multiple LATA states allow interLATA competition, and 14 allow intraLATA competition with four others expected with the new year. Also, interLATA and intraLATA resale is permitted in 38 states.

o The research shows that 28 states permite flexible IXC pricing, and 35 allow flexible LEC pricing. Deregulation and detariffing of competitive services are being pursued on an accelerated basis, local measured services is authorized in most states, lifeline programs are found in 12 states, and shared tenant services have been approved in 32 states.

o The principal impact of these findings is the need for flexibility and easy implementation of changes in pricing structures associated with any bill processing.

5.3 INDEPENDENT TELCOS

o There are in excess of 1440 independent telephone companies, many aggregated into major groups, but many small "stand-alone" companies with relatively few subscribers. Sales to small accounts can be costly, with the payoff unacceptable. Conversely these accounts are most receptive to cost-effective service offerings hense this segment remains the highest user of processing services, with turnkey systems second, followed by software development.

o This segment has indicated low loyality to processing services if they are used, but the primary direction in bill processing is turnkey systems.

o If bill processing is used, it is critically important for the service to be able to implement tariff changes on a timely basis, and to integrate processing with general accounting applications.

o Value added services such as advanced usage reports, public service bill "stuffers," and advertising to reduce user costs, financial management services, and marketing support systems, and services for customer services and CPE sales may be useful in dislodging customers from the regional RCS firms providing processing to independents.

o Acquisition of RCS firms servicing this market is a worthy

consideration.

5.4 IXCs

o The majority of the IXCs are doing their own bill processing. Some are buying bill processing services from the BOCs for billing, and a ~~few~~ many are using the on line applications now available for network management, planning and other functions.

o Significant opportunities exist in this segment for network design services and turnkey systems, however processing services will be the dominant revenue segment.

o Resellers are consolidating, and/or building their own networks, creating professional service, systems integration, and possibly facilities management opportunities.

o A critical success factor in this segment is avoiding the risks of undercapitalized firms which may fail, preventing recovery of sales and system development expenses.

o IXC are providing more data communications services, necessitating cost effective billing, network design, system

management and software development services, with consulting services also high.

5.5 Cellular

o The keyword associated with the cellular market is "flexibility." The greatest opportunities lie in turnkey systems, followed by network design services, with processing services also strong.

o The cellular subsegment is characterized by volatility.

- This means that products and services offered to cellular operators (and resellers) must be flexible to allow quick implementation of promotional pricing schemes, including discounts, credits, premium gifts and other incentives which may be offered by operators.

- Changes should be handled by the user to minimize vendor liability for misunderstandings, errors, and to reduce costly support activities, making interactive, or distributed processing services attractive.

o It appears that most of the bill processing services used by

cellular operators accept diskettes, with some providing for processing on the customers premises, with diskettes transfered to the service for actual bill preparation, envelope stuffing, and mailing. This method may well serve the still small cellular carriers, but as volume grows, on-line transmission of billing records will become more desirable, with the attendant ability to run ad-hoc and current, reports.

Chapter 6

GENERAL COMMENTS RELATIVE TO CRITICAL SUCCESS FACTORS

6.1 Marketing and Image

o The success of any GTEDS initiatives to broaden its market hinge in large part on the marketing effort. INPUT is aware of past GTEDS institutional advertising, but a review of recent industry publications fails to show any such advertising. Certainly such efforts can be costly, and if planned without a coordinated marketing program, will likely been less than successful.

o Since potential targets in some industry segments for GTEDS products and services may be relatively small accounts, a focused marketing effort is required, backed with a more general awareness campaign, with the ultimate benefit being ongoing relationships with new, or upgraded accounts. This means a

combination of advertising, direct mail, inquiry response/ follow-up, telemarketing and trade shows to both close sales, and to qualify prospects for direct sales efforts.

o A key consideration of any coordinated campaign is the image presented.

- Clearly GTEDS has a history of experience in providing services and systems to its captive accounts which can be beneficial to others, but it may be necessary to overcome its "institutional" image as a captive organization of what some might consider a competitor, or even a personal threat, to those making buying decisions.

- For example, if GTEDS were to provide processing, facilities management or other services which give it intimate knowledge of the customer's business, will the prospect fear that this knowledge will be used in unfriendly takeover efforts, or for competitive advantage?

o This is a non-trivial matter, and represents a challenge to GTEDS public relations and advertising agencies, as well as the company's key decision makers.

o Large scale projects and services, such as professional services, systems integration, etc., will often require high level, peer-to-peer sales efforts, leveraging personal

relationships into business relationships where the relationship "makes sense."

o Account knowledge, and constant industry monitoring to identify new opportunities, emerging companies requiring services, new applications and new services is required to anticipate needs, and to position GTEDS for offering vital systems and services addressing prospects' needs.

o It may be useful for GTEDS to conduct its own institutional audit, identifying and evaluating its strengths against market needs, and focusing its efforts on niches which are not already saturated, or for which opportunities for change exist. Examples include the cellular area, and the "other" telecommunications entities such as LADTs, fiber optic, and satellite networks.

Chapter 7

MAJOR COMPETITOR PROFILES

o This chapter profiles the leading vendors selling software, systems and services to the telecommunications (i.e. telco related) industry. Each profile includes the primary delivery modes and industry segment addressed, along with an assessment, where available, of the individual company's strengths and weaknesses.

o Some of this information has been provided earlier to GTEDS in draft form. This reporting consolidates the information, and updates it with the findings of INPUT's research. Some of the "captive" or "quasi-captive" suppliers (Bellcore, AT&T Network Systems) have been excluded from this analysis except when new information is available.

7.1 Advanced Cellular Technologies, Inc. (ACTI)

7.1.1 Primary Delivery Modes:

Processing.

7.1.2 Primary Market Segments:

Cellular.

o ACTI, headquartered in Creve Coeur (MO) was recently formed as a cellular roaming clearinghouse, as a joint venture of Auxton Computers, Cincinnatti Bell Information Systems, Cellular Business Systems, Inc. (recently purchased by CBIS), and McDonnell Douglas Information Systems Group.

7.1.3 Strengths and Weaknesses

o This new joint venture has impressive backing, however is targetted towards a rather small niche, i.e. cellular roamers. INPUT feels the market for such services will remain rather small throughout the forecast period, with the market bearing only a

few clearinghouses, which may be bypassed through clearinghouse agreements among major carriers.

o Also, with the number of participants involved, there is a question of "who does what." For example, CBIS and Auxton are direct competitors for some services.

7.2 AGS Computers, Inc.

7.2.1 Primary Delivery Modes:

PS, S/W

7.2.2 Primary Market Segments:

AT&T

o AGS (Mountainside, NJ) provides custom software development, professional services, systems, and applications software for the telecommunications, banking/finance, and computer manufactuuring

industries, with approximately 25% of its 1985 computer services revenue of $117.4 million was derived from AT&T. AGS employes approximately 2,300.

7.2.3 Strengths and Weaknesses

o AGS Systems Development has provided services to AT&T since 1970 and was engaged in more than 70 AT&T and affiliate projects at the end of 1985. As a result of this association, the unit has a large UNIX consulting staff. Since divestiture, AGS has also supplied UNIX services to other computer companies and large end user organizations.

o AGS, like other companies selling to AT&T, is vulnerable based on the amount of revenue derived from a single customer. However the company is not focued on telecommunications, but with its UNIX expertise, ~~the company~~ is well positioned to assist other telecom entities with ISDN related projects.

7.3 American Management Systems, Inc.

7.3.1 Primary Delivery Modes:

PS, S/W.

7.3.2 Primary Market Segments:

Independent telcos, IXCs (MCI).

o In 1985, AMS (Arlington, VA) acquired the rights to a software package developed by Pacific Telecom, Inc. for its telephone operating companies and also used by 29 telcos in the Alltel group. The package, called Carrier Access Billing System Plus, has been enhanced with updated tariff information, and is targeted to local telcos to generate reports and handle billing for interexchange carriers accessing local telco networks.

7.3.3 Strengths and Weaknesses

o For ten years, AMS has been providing systems development and support services for MCI in order processing, billing, accounts receivable and collections.

o The company provides services and software to this segment as well as others. It appears focused on independents for a single software package, and on MCI for professional services.

o AMS reported 1985 revenues of $112.2 million, with $3.1 million from the telecommunications industry. It has established a revenue growth goal of 15%-20% annually.

o One part of AMS' strategy is to work contractually and jointly with clients in software development projects, thus "locking in" the customer.

7.4 Auxton Computer Enterprises Company (AUXCO)

7.4.1 Primary Delivery Modes:

Processing, S/W, PS.

7.4.2 Primary Market Segments:

IXCs, Cellular, resellers.

o In addition to management consulting and customized software, the firm offers processing services for long distance carriers, resellers, cellular operators, and paging services.

o The company is also developing software for a planned cellular clearinghouse for roaming applications and is participating with Cincinnati Bell Information Systems and others in such a clearinghouse (ACTI).

o In late 1986, AUXCO announced agreement with AT&T Communications to provide processing services for long distance toll calls placed by cellular users under equal access rules. Services covered include toll rating, billing, collections, toll investigations, and customer inquiry services.

o AUXCO offers software for customer IBM processors covering customer and service records, line utilization, and inventory management.

7.4.3 Strengths and Weaknesses

o The company is currently processing for more than 14 cellular companies, including the subsidiaries of Bell South, Southwestern

Bell, Contel, Pacific Telesis, United Telecommunications, and SNET, representing more than 34 systems. The company claims nearly half of the wireline (i.e., LEC affiliated) cellular processing business.

o Other clients include long distance resellers for billing and processing services.

o AUXCO specializes in services and systems for the telecommunications industry. The company sees its cellular expertise as a principal strength along with service and product quality.

o AUXCO reported 1985 revenues of $28 million, with 65% derived from professional services consulting, 23% from processing services, and 12% from application software products sold to the telecommunications industry. It employs approximately 385.

o Revenues for the three months ending March 31, 1986 were $7.7 million, a 19% increase over the same quarter in 1985.

o Auxco is currently developing a software package to support private networks, with beta testing to begin in January, 1987.

o The company's processing facilities are based on IBM 43XX, with the MVS operating system, and IMS/CICS for data base management, for a "classical" 3270 online SNA/bisynch

environment. Twenty-five standard reports are available, and ad-hoc reports are billed at $65 each. General ledger software (MSA) can be integrated with Auxco's processing.

o The company reportedly handles cellular domestic toll rating manually.

o Auxco places a strong emphasis on custom reporting through its Easytrieve offering.

o Auxco is a very agressive competitor, claiming to hold the largest market share in the cellular area, with over 250,000 bills processed monthly as of December, 1985. It has multiple field offices, and is technologically advanced.

o A survey of five AUXCO cellular customers conducted for GTEDS found a mid-range rating in the quality of services satisfaction, with indications that 60% of those questioned would be very likely to consider changing to another service.

7.5 Bank of Illinois

7.5.1 Primary Delivery Modes:

Processing.

7.5.2 Primary Market Segments:

Cellular, Independent Telcos

o The Champaign (IL) bank operates a data center which provides processing services to telecommunications and other entities, however in the case of cellular, PC/DOS micros perform basically all functions except rating, with diskettes shipped to the bank for handling. The bank indicates plans for electronic receipt of updates in the future.

o Its cellular systems were revised in April, 1985.

7.5.3 Strengths and Weaknesses

o The Bank sees its major competitive strength as its stability. Backed by a financial institution, it's able to expand without needing external resources. It also claims to compete on price ($1.86 per bill in quantity of 4-5 thousand) and service. For example, to schedule the necessary programming

changes, bank personnel work with cellular marketing departments to provide insight into the data processing required due to service pricing changes.

o Customers for cellular services include Mobilnet, some Cellular One, resellers in New York, Los Angeles, Tampa, Akron and Buffalo.

o INPUT's research indicates that the Bank's customers in the cellular area are quite unsatisfied with the services offered, with all questioned indicated they are likely to change vendors. The bank does not apparantly have standard reports available, although it was planning to augment them. Maintaining its current customers will require a bit of effort.

7.6 Bell Atlantic

7.6.1 Primary Delivery Modes:

Processing, S/W.

7.6.2 Primary Market Segments:

Cellular, BOCs.

o For its cellular bill processing, Bell Atlantic places Micro VAX processors on the customer site as part of the service contract. This machine handles call rating, with a very extensive data base maintained, including OCCs. IBM micros are used to actuate the switching and 3270-type terminals may also be used.

o Resellers can activate cellular customer phone numbers. Reports are handled by the VAX, accessing the data center's mainframes for extract files. The system is said to be highly flexible, able to handle changing business terms.

o In June, 1986, Bell Cellular (a subsidiary of Bell Canada), Bell Atlantic Mobile Systems (BAMS), NYNEX Mobile Communications and Sonecor Cellular joined to form the North American Mobile Association with plans to improve inter-system service in the Northeast and to facilitate stolen equipment tracking. The trade group intends to make it easier for users to travel between cities serviced by its members, and to develop a "roaming" customer billing clearinghouse.

o On September 25, 1986, Bell Atlantic Enterprises and Appex

Lunayach Systems Corp. announced agreement to establish a gateway between their cellular roamer positive validation systems to become operational in October.

- Both companies reportedly developed such systems featuring realtime validation of roamers and on-line exchange of negative file information for denying service to unauthorized or fraudlent users.

- The gateway will be for wireline and non-wireline roaming on A and B systems linking major areas of the northeast.

- INPUT has thus far been unable to find any additional information on Appex Lunayach.

o Earlier, Bell Atlantic Enterprises was granted a waiver to provide nationwide roaming clearinghouse services for all wireline and non-wireline carriers.

- It had been providing such services since August, 1984 to Bell operating companies only.

- As of February, 1986, the company had nine carriers covering 40 US and nine Canadian markets.

- The plan is to provide cellular carriers a list of costs accrued by roamers with an account summary noting net charges for settlement. Carriers would be charged on a per

message usage basis.

- The company was also reportedly enhancing a system called Positive Roamer Validation to check a roamer's identity against any other carriers negative file.

o In late 1985, Bell Atlantic Mobile Systems announced participating with Cellnet of London to provide international roaming services.

- ServiceLink will allow customers to contact their home carrier before traveling abroad to reserve portable cellular phones for pick up at their destination airport.

- The host cellular company then tracks calling charges and daily rental fees for transfer to the home carrier for final billing.

o Bell Atlantic reportedly sold a wireline billing software system to Michigan Bell recently, and is involved in selling software to other telcos.

7.6.3 Strengths and Weaknesses

o Bell Atlantic has a fairly sophisticated, distributed processing system. The company has demonstrated flexibility in

seeking to build relationships with its customers, and flexibility in building the system.

o Its regional and international activities are impressive, providing a high profile for its cellular billing and roaming services, positioning it well as this market grows.

7.7 Cincinnati Bell Information Systems, Inc. (CBIS)

7.7.1 Primary Delivery Modes:

S/W, processing.

7.7.2 Primary Market Segments:

BOCs, independents, cellular (through CBSI subsidiary and ACTI joint venture).

o Among CBIS' software products and services are those supporting customer billing, order entry, inquiry, toll billing,

plant administration, construction crew management, and cellular account mangement and billing.

7.7.3 Strengths and Weaknesses

o Cincinatti Bell is CBIS' primary telco user (i.e. captive), along with AT&T Communications, for Megacom billing, a WATS-type service, and other new services. The company would not provide is non-captive revenues.

o CBIS has acquired several entities to bolster its service and software offerings. For example:

- Cellular Business Systems, Inc. (CBSI - Park Ridge, IL.), was acquired in 1986 as a division of CBIS.

  * CBSI's professional and processing services and software support a variety of industry-specific applications such as customer database and telephone number management, call rating and billing, charge reconciliation, and billing for car rental cellular services.

  * The combined companies provide billing services in most of the top 30 cellular markets, billing in excess of

200,000 cellular users. They claim to have the dominant market share.

* CBIS, its new CBSI division, Auxton Computer and McDonnell Douglas Information Systems Group have formed a cellular clearinghouse headquarted in Creve Coeur (MO) called Advanced Cellular Technologies, Inc.

- Creative Management Systems, Inc. (McLean, Va.) a designer of telephone call accounting software systems, was acquired in 1985.

- CBIS has also purchased the Commtrack unit of United Information Services. UIS (Overland Park, KS.) once part of United Telecommunications, was sold to Control Data Corporation in 1983. Commtrack's services are used by large telecommunications users, resellers, two independent telcos, and two BOCs for internal Station Message Detail Recording (SMDR).

o As reported in INPUT's custom study on the cellular industry for GTEDS, about half of the client base for both CBIS and is now acquired CBSI subsidiary were highly likely to consider changing vendors, suggesting that CBIS has not acquired a strong and loyal client base, and may in fact have problems with its current cellular clients.

o Further, INPUT feels CBIS has a major challenge in stabilizing its two cellular client bases on two separate systems which remain to be integrated.

o The company is agressively pursuing opportunities both within the industry, and in commercial telecommunications user accounts. As a non-divested company, it is exhibiting more marketing initiative than other divested companies which are still overcoming monopolistic thinking, but may be limited in its direct marketing resources.

7.8 Computer Consoles, Inc. (CCI)

7.8.1 Primary Delivery Modes:

Turnkey Systems.

7.8.2 Primary Market Segments:

Independents, BOCs

7.8.3 Strengths and Weaknesses

o CCI, a major provider of turnkey systems, experienced declining revenues in 1985, attributed to various factors including overly optimistic sales projections, inadequate marketing resources to support diversification efforts, and organizational and internal communications problems.

- After 10 years of steady growth, revenues declined 15% from $131.2 million to $111.9 million, representing a net loss of $41.9 million.
- However, CCI is making progress with a return to profitability expected in 1986 due to new marketing strategies, cost control measures, restructuring, and new management.

o CCI has cut its workforce and now employs approximately 1200. Development and manufacturing are being geographically consolidated and product development is being downscaled.

o The company is drawing back from its focus on the telephone industry where it is facing increased competition from U.S. West, IBM and other turnkey system providers. It is adding integrated

office systems, which will be sold along with other large customized turnkey systems to telcos, the federal government, and special vertical markets such as law firms.

o In late 1986, CCI announced a development agreement for an interface between CCI's directory assistance/enhanced listing services data base and Northern Telecom's digital central office switches supporting the Traffic Operator Position System (TOPS). The agreement is said to be the first between a directory assistance data base supplier and a digital switch maker.

7.9 Computer Horizons Corp. (CHC)

7.9.1 Primary Delivery Modes:

PS

7.9.2 Primary Market Segments:

AT&T, BOCs

such as utilities, defense and manufacturing, where its fastest growth rates have been over the past two years.

o 1984 projects included design and development services for various aspects of new telephone billing systems created by AT&T's reorganization, as well as other administrative and financial information systems.

- However, AT&T's internal consolidation efforts have affected CHC's business.
- AT&T administrative offices have been closed and AT&T asked for volume discounts from its vendors. AT&T's need for services are expected to continue growing despite these measures.

7.10 Computer Sciences Corporation (CSC)

7.10.1 Primary Delivery Modes:

Professional Services

7.10.2 Primary Market Segments:

AT&T

o In late 1983, CSC (El Segundo, CA) was awarded a five year contract, with an estimated value of $30 million, to continue maintenance and enhancement work on what it calls "the largest application system in commercial use" for AT&T Communications. The Trunks Integrated Records Keeping System (TIRKS) automates provision and planning management of telephone circuits, facilities, and equipment.

o TIRKS incorporates more than 350 databases and over 18,000 software modules.

o Also in 1983, CSC had a three year contract with what was then AT&T Long Lines to provide systems integration of CSC-suplied micros with INFONET and AT&T hosts, and to provide software for a distributed information system for use in sales management and office automation.

o In early 1986, CSC received a "multimillion dollar" contract from AT&T to assist development of office automation software running under UNIX. CSC was to provide market research, software design, turnkey development and adapt certain CSC software into

new product offerings.

o In other work for telecommunications companies (although not industry specific), CSC received a 1985 contract to install a central control and monitoring system at Bell Labs, to control energy usage, alarms and access, using H-P series 1000 computers.

7.10.3 Strengths and Weaknesses

o CSC is well known for professional services in government markets, and has maintained a 17 year relationship with AT&T on typically large projects. With AT&T deemphasizing its computer business, the professional services contract started early in 1986 may be terminated.

o CSC's involvement in the telecommunications industry does not appear to extend beyond AT&T, although the capabilities are certainly there. The company is believed to be discussing linkages between Infonet and LADT networks being developed by the LECs. These discussions may lead to professional service work in actually developing the LADT networks, as well as providing wide area network capabilities.

7.11 Comshare, Inc.

7.11.1 Primary Delivery Modes:

S/W, Processing, turnkey (one system), PS.

7.11.2 Primary Market Segments:

Independent Telcos.

7.11.3 Strengths and Weaknesses

o Comshare is focusing its efforts on its decision support systems (DSS), while maintaining its processing services as a major business in telecommunications, human resources administration, and database management systems.

o The telecommunications industry applications are called 4.1.1. which includes an integrated system for telcos to control

administrative activities such as telephone number assignments and voice traffic load balancing.

o Comshare recognizes that the deregulation of AT&T has opened additional markets in selling 4.1.1. products to independent telephone companies and has found new customers for System W, an integrated DSS mainframe and micro product.

o All applications are available through remote computing and can be licensed for IBM MVS environments.

o The company sells a single turnkey system, for directory assistance, which operates on Data General minicomputers.

o The company sells to all major independent telcos including Contel, GTE and United companies, several Caribbean and many smaller domestic telcos including Standard Telephone and Enterprise, for a total of between 25-30 companies.

o Comshare has had difficulty selling into BOC environments because of competitive software products from AT&T and Bell Communications Research (Bellcore).

o The company claims 1985 revenues for 4.1.1. products between $9-10 million. Its major strengths are its software for IBM systems configurable to any central office switch. Its major competitors (AT&T and Bell Communications Research) require

telcos to use AT&T or other hardware for software installation, while 4.1.1. products are available both as software or as remote computing services.

o Comshare also has professional services available for large, one-time applications, as well as field services for routine consulting and maintenance.

7.12 Data Architects, Inc. (DAI)

7.12.1 Primary Delivery Modes:

PS

7.12.2 Primary Market Segments:

IXCs, RBOCs

7.12.3 Strengths and Weaknesses

o DAI (Waltham, MA) believes the growth in demand for voice and data telecommunications services has led to major communication network expansions by carriers and new requirements for automated support systems to collect billing information, manage switched networks, and market new services.

o In January, 1983, GTE Sprint (now U.S. Sprint) awarded DAI a

contract to develop and install the Call History Information Processing System, a nationwide network of more than thirty Tandem NonStop computers located at each major voice switching center. The system collects, processes and relays the records for all toll calls to national centers.

o In 1985, DAI completed two major business support systems for RBOCs.

- For U.S. West, it built the SONAR system (Service Order Negotiation and Retrieval) which automates the service order process for ordering phone and line equipment with interfaces to all associated computer system applications such as inventory, billing, customer records, and scheduling.

- For the British Columbia Telephone Company, it built the NICS (Network Information and Communications System) network management support system, which takes data from twelve different types of voice network switches to help monitor and manage traffic patterns.

- DAI maintained exclusive marketing rights to the two systems and has a letter of intent with an eastern RBOC to install the SONAR system.

o While 45% of DAI's business comes from the banking industry,

and 35% from insurance, telecommunications products and services represent only 20% (or $4.2 million) of its 1985 revenues of $20,945,000, a 35% increase over 1984.

o DAI's 1985 net income increased 108% to $1.25 million.

o DAI's corporate goal is to become a leading supplier of business applications, primarily to the financial services and telecommunications industries. It expects to double current revenues and increase software product revenues to more than 50% of total revenues by 1990.

o The company sees its consulting and custom work as contributing to its experience with advanced technology, building a staff of technologists and managers, and leading to the development of software which can be resold in their target markets.

7.13 McDonnell Douglas Communications Industry Systems Company (MDCISC)

7.13.1 Primary Delivery Modes:

Processing (distributed), S/W, Turnkey.

7.13.2 Primary Market Segments:

Independents, BOCs, RBOCs, AT&T.

7.13.3 Strengths and Weaknesses

o As part of McDonnell Douglas Automation Information Services Group (ISG), this company has had its burden to bear due to the group's reported 1985 loss of some $110 million.

o Its processing services include adaptations of general services as well as those especially designed for the telecom industry. Applications available track telephone equipment, manage repair, maintenance, large projects, personnel, and for forecasting, marketing and other functions. Distributed processing (with a minicomputer supplied by the company), RCS timesharing, turnkey systems, and packaged software and offered, although distributed and RCS processing are believed to account for the bulk of the company's business.

o The company also markets general business software (e.g. a 3-dimensional spreadsheet and software for hospitals, universities and hotels to account for resident calls) and is marketing and supporting two software packages developed by the Southern New England Telephone Company (SNET) which track and correct dedicated line usage errors.

- One package, called Verification of Lines in ESS (VOLESS) audits ESS switches and compares capacity in use with customer billing records.

- The other, called Charging Instruction Analysis (CHINA) tracks long distance and other measured service calling not correctly programmed in the central office.

o MDCISC will be enhancing the software as required, and will make it compatible with switches other than AT&T's ESS.

o MDCISC is the largest processor for the industry outside the former Bell system, with all 22 BOCs, the RBOCs, AT&T, as well as the major independents as customers. The company has managed the equal access balloting system for several of the BOCs.

7.14 National Data Corporation(NDC)

7.14.1 Primary Delivery Modes:

Processing, Facilities Management

7.14.2 Primary Market Segments:

BOCs

o In 1983, NDC entered a three year agreement with the New York Telephone Company to provide dedicated processing and programming services (facilities management), based on DEC equipment in support of the "Hello Yellow" service, an advertiser supported directory assistance program.

- Due to the MFJ, the BOCs were prevented from engaging in such information services, and the project is on hold pending regulatory relief.

- NDC would have supported the entire operation, providing transaction services, operators, software and support. The contract was valued at over $17 million.

o In 1984, NDC entered agreement with AT&T, and separately with

BellSouth Corporation to sell a telephone credit card processor as part of a system allowing callers to use major credit cards.

- The initial AT&T three year contract, said to be valued at several million dollars, called for NDC to provide processors linked to NDC's network for transaction services, and a voice synthesis system for giving customers calling instructions.

- The initial one year contract with BellSouth was valued at $312,000.

- NDC currently reports the system is still being tested in some 20 locations in Georgia and Florida.

7.14.3 Strengths and Weaknesses

o NDC provides a range of services to the banking, health care and telemarketing industries. It's involvement in telecommunications FM and processing services is an outgrowth of its transaction and credit card services.

o "Hello Yellow" is "on-hold," but with expected liberalization of the MFJ, the company will be well positioned to participate in providing information services support for the BOCs.

o The fact that its credit card call processing is still being tested after three years is probably indicative of client delays in evaluating consumer acceptance.

7.15 Science Dynamics, Corp.

7.15.1 Primary Delivery Modes:

Turnkey systems.

7.15.2 Primary Market Segments:

BOCs, Independents, IXCs.

7.15.3 Strengths and Weaknesses

o Science Dynamics designs, manufacturers and markets modular microprocessor based telecom equipment and systems (i.e. turnkey)

for central offices.

o The company has concentrated on the demand for accurate measurement and billing equipment and new services that many older installed switches cannot provide. Products include equal access systems, access charge measuring, lifeline metering units and voice response intercept systems. The company has also introduced toll restriction devices and a multi- access cable billing system being trialed by at least one BOC.

o Science Dynamics sells directly and through industry resellers (including GTE Supply). The company employs 69 people.

o In April, 1986, Michigan Bell placed into service a multi-access cable billing system (MACBS) which permits telephone companies to offer automatic number identification for order input to cable TV franchises.

- The system enables the subscriber to obtain impulse pay-per-view programming.

- Science Dynamics, Michigan Bell, Centel Cable and Zenith CATV computer systems have worked together to implement what is considered to be the first operational impulse pay-per-view cable TV service utilizing customers' existing telephone facilities.

- MACBS is located in the telephone switching center(s) and receives calls from cable TV customers who desire to view a premium program offering. The cable TV company's equipment is accessed by MACBS which transmits the customer and program identity. Cancellations are also accommodated automatically by the customer calling alternate numbers.

- All requests receive an appropriate announcement from Science Dynamics' standard digitally synthesized voice response equipment.

o The ability to intercept calls, translate information, access an on-site database, process the data, and respond with a voice announcement is inherent to MACBS. Science Dyanamics intercept and billing equipment is installed in over 2,000 switching centers of Bell and independent telephone companies.

o An alternate application, which is being trialed by Michigan Bell, is the ability to intercept and restrict traffic to "976" information providers on a pre-subscription basis.

- This capability resolves the telephone dilemma of offering the lucrative "976" services (such as adult entertainment and audio-text), on an impulse basis while restricting access to specific offerings based on customer request.

- Central office-based restriction is available regardless of

whether the customer is served by an electromechanical or stored program control switching system.

o In October, 1985, the company announced it has placed its Audio Response Unit into service with United Telephone Company of Florida for the Directory Assistance Bureau. Others involved were Rockwell International and Comshare, Inc.

o Science Dynamics, a public company, reported sales of $2.7 million for the six months ending June, 1986, reflecting both higher revenues and increased profit margins. Sales for the six months were 53 percent higher than the 1985 period with net income 225 percent higher than the comparable six month period.

7.16 U.S. West

7.16.1 Primary Delivery Modes:

Turnkey, S/W.

7.16.2 Primary Market Segments:

BOCs, Independents.

7.16.3 Strengths and Weaknesses

o The Knowledge Engineering Division sells an IBM XT-based Multiple Purpose Operator Workstation (MPOW), designed to Bellcore specifications, which is compatible with digital toll switches.

- MPOW features enhanced graphics and handles toll, directory assistance, and supervisior functions, with access to LAN-based data bases for rate and route information.

- Because it is a DOS-based system, it will also operate telco developed applications.

o The company cites the system's adaptability to changing switches, information and software as a key benefit over competitive products based on minicomputer hosted dumb terminals. Another benefits is faster response time.

o Systems have been sold to BOCs and independent LECs.

Chapter 8

DRIVING FACTORS IN PURCHASING

o The demand for telecommunications systems and services provided by outside sources will continue to grow throughout the forecast period. The reasons vary according to individual segments as a function of their maturity levels, and they vary in the individual delivery modes.

o In general, the use of outside sources is driven by one or more factors:

- A lack of, or shortage of, internal resources to address the problem.
- Capital or time restrictions.
- The turnkey nature of the solution.
- The demonstrated expertise of the vendor/provider.

o As long as one or more of these conditions exist, spending with external sources will continue.

o Also important to outside purchasing is the relative maturity of the technology or service within the industry. In most situations, outside sources have the greatest penetration, and offer the most cost effectiveness, in the early, introductory stages of a new technology or service.

o Small system houses are typically considered the most responsive to emerging opportunities, unless certain products have been developed on a customized basis by a larger company. Niche products can be modified or augmented to take advantage of a market need or cross-disciplinary skills can be added to a given project.

o Overall, the strongest segment of outside assistance can be found in professional services, with 1985 revenues creating the largest delivery mode, and with spending increasing fourfold in the forecast period.

o A key element driving growth in professional services (in general) is the fact that companies are questioning the size of the internal staffs. Many are having problems in recruiting, and keeping, qualified staff; others require services on a special project basis and don't wish to carry the overhead long term.

o The largest service in this delivery mode will be the need for customized software development, reflecting needs to have

software providing, and controlling, new services for both voice and data communications. Internal talent is not always available, especially when new or innovative approaches are required.

o There were virtually no surprises when subjects were asked about how they make their decisions: the tendency is to first say "cost" but on probing, most respondents agree that the fit of the service or product to the need is most important. Joint user/vendor development is one way of insuring this fit and one vendor credits this approach for his success.

o Historically, the sales cycle in this industry has been long. There are signs this is changing, but attitudes and approaches may change slowly in some environments.

o On critically important projects, IS managers would tend to want control of the undertaking, but upper management may have other thoughts, recognizing that outside sources are needed if the project is to be accomplished within the necessary timeframe, in order to hit the window of opportunity. This is an increasingly important consideration given the newly competitive nature of the industry.

o This may lead to management/IS conflicts, with the vendor in a difficult political position, requiring IS support, but in

effect working for senior management. It therefore becomes critically important for vendors to involve IS in any approaches to, or solicitations from, upper management.

o Respondents did not reveal any bias towards vendors affiliated with companies which may be considered "rivals." Telcos have their franchise areas, and competition for customers is not generally felt at this level. However, such concerns may be ~~present~~ a on ~~the~~ hidden agenda which was not acknowledged by those interviewed. Superior products and services, industry understanding, and the confidentiality (and the confidence) borne of good working relationships, work to overcome these concerns.