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PERCEIVED CANADIAN CONSUMER REQUIREMENTS IN THE COMMUNICATIONS INDUSTRY

Research Report Submitted to the D.O.C.

by

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Chapter 1

OBJECTIVES OF THE STUDY

The primary objective of this study is to evaluate Canadian consumers' current ratings of telephone terminal equipment. The ratings are based on an index of salient product attributes, which are in turn derived from a statistical analysis of field data. A secondary objective, the attainment of which is dependent on the results of the first, is to evaluate the probable effect that a proliferation of product offerings in Canada would have. This evaluation will be based primarily on product attributes and stated consumer preferences as per research results.

Through a sequence of literary search, field trips, group indepth interviews, questionnaire formulation and analysis, the work will yield the major objectives sought. For each stage in this sequence, minor objectives must be set, for it is in the formulation of these mile stones that the direction for the work is established.

The literary search is a two fold effort. On one hand the technology, its present state-of-the art and future will be investigated, providing an insight to the subject. The products available, the suppliers and users as well as the market place will be researched. A

second effort is directed to better understanding the research methodology, defining its applicability to the project, and evaluating past performance. With the knowledge gathered from the literature, as reinforced by field trips to suppliers and interviews in the market situation, depth interviews are arranged. Both the English and French sessions serve to define attributes and clarify the vocabulary. Careful structuring and directed leadership of these panel discussions provide operational definitions the variables under consideration, as these are perceived by the consumer.

The questionnaire is formulated, both in structure and in content, based on the data gathered through the above phases, and within the dictates of the Fishbein model.

In order to define the data sample, the first section of the questionnaire deals with background information. In addition to the standard questions such as age, sex, income and education, specific information such as the number of children, heaviest phone user, and number of telephone lines and sets is asked for. The second section permits the respondent to select a preferred communication system based on personal knowledge of current

offerings and preferences, yielding an image of desires v.s personal data for the respondant.

Parts III and IV of the questionnaire deal with the actual products under investigation, the third with selected types of telephone receivers, the fourth with selected telephone accessories. The primary objective of this research is to evaluate "perceived Canadian consumer requirement in the communications industry", and to reach this objective the Fishbein Model is applied. The essence of this model is that an individual may not only evaluate an object (by seeing it as "good-bad"), but he may also believe or disbelieve the existence of the object, or discount the value of this existence. Fishbein(18) defines attitude as:

> "A learned, implicit response that mediates evaluative behavior," where the attitude is a "concept's position on the evaluative dimension."

A belief is defined as:

> "The probability or improbability that a particular relationship exists between the object of belief and some object, concept or goal".

Thus we can measure those beliefs which are salient to the individual, and the attitude object itself, by having the individual rate these attitudes and beliefs on semantic differential scales. These AB-Scales, devised by Fishbein and Raven, (25) are a modified form of the seven-point bipplar objective, semantic differential scale of Osgood, Suci and Tannenbaum (34).

The selection of products for inclusion in each section is based on data gathered in the field, literature and reactions during the in depth interviews. Within each of section III and IV of the questionnaire the products are sequenced from the familiar to the rare, and each device representative of a product class.

A most critical consideration, the saliency of the product attributes presented for evaluation, is derived directly from the consumer. The attributes used are those brought forward by the consumer groups during the

in depth interviews. Furthermore, the adjectives chosen for each attitude and belief scale are those used by the consumer.

In addition to the attribute and belief questions, an overall confidence question is introduced, to permit evaluation of the consumers' confidence in his evaluations of the products. Questions relating to consumer intentions follow the evaluative section. In an attempt to avoid biases due to either price inaccuracies or misunderstanding of the "purchase" idea due to the existing leasing system, questions directed at 'gift' options are included. Further questions relating to ranking of devices and past experience with the products shown are also introduced.

Part V of the questionnaire permits the respondant to repeat his "ideal system design" of Part II, now using the additional information gained from the exposure to the questionnaire.

In an attempt to evaluate possible biases in the responses, a section of service experience is introduced in Part VI. This evaluation is based on the assumption that poor service experience would result in a negative reaction to the intention questions.

The responses to the questions are coded and analyzed by using the SPSS statistical package. This package of computer programs yields:

(i) Statistical analysis of respondents

(ii) Statistical analysis of service experience

(iii) Crosstabulation of product data and respondent data. (including consumer intentions)

(iv) Correlation of responses to detect invalidities in responses.

(v) Regression analysis for each product and the salient product attributes.

(vi) Regression analysis for each product and adjusted attributes (attitude-belief score) and (attitude X confidence scores).

Further analysis is made to yield the secondary objective, i.e. market reaction to new offerings in the communications field.

Each of the steps outlined is essential if the process is to be efficient and the results valid and relevant. At each stage the objectives sought and the procedures to be followed are stated and analyzed, and conclusions formed providing a stepping stone to the next step in the progression.

Chapter 2

BACKGROUND

(2.1) The Evolution of a System

Some three years after he invented the telephone, Alexander Graham Bell travelled to England, to introduce his invention. On the night of March 15, 1878, at his rented house in Kensigton he produced a prophetic document, an extract from which follows:

> "At the present time we have a perfect network of gas-pipes and water-pipes throughout our larger cities. We have main pipes laid under the streets communicating by side pipes with the various dwellings, enabling the members to draw their supplies of gas and water from a common source.
>
> In a similar manner, it is conceivable that cables of Telephone wires could be laid underground or suspended overhead communicating by branch wires with private dwellings, counting houses, ships, manufactories, etc., etc.,uniting them through the main cable with a central office where the wires could be connected as desired, establishing direct communication between any two places in the city. Such a plan as this, though impracticable at the present moment, will, I firmly believe, be the outcome of the introduction of the Telephone to the public. Not only so, but I believe that in the future wires will unite the head offices of the Telephone Company in different cities and a man in one part of the country may communicate by word of mouth with another in a distant place." (7)

As in evident from the document cited, Alexander Graham Bell saw clearly the implications of his invention,

and its dramatic effect on modern society. Although his vision did not carry further, to the potential uses of the network of wires, to in fact the concept of the "wired city," he did set up a structure and a vocubulary. From the common "Hello" to the concept of "central office" and dialing mechanisms, the system as it now stands was conceived in the spring of 1878. By the end of 1878 the telephone was well on its way to becoming big business. The first central switchboard was established in Boston, and the first private line connected between Bell's home and lab. Prestige, as well as efficiency and convenience created high demands, and by December 1879 stock in the New England Telephone Company was selling at $995 a share.

The transmitter into which we speak; the receiver to which we listen; the bell which alerts our attention; the dial which permits selection of the party being called; the wires which carry our voices, even the poles on which these wires are strung have remained essentially the same over the years since 1878. In North America the telephone has become an integral part of society. For the home it implies ease of access to banks of information and services, security, attention, and quality of life. For industry it is instant intra-office and inter-firm

communication, the medium for information retrieval, decision transmission and process and activity monitoring and control. Communication is the nervous system of the modern economy, and the telephone may be likened to the terminal endings of the neurons.

Given the tremendous expansion of the telephone network, as well as the change in relevancy of the telephone, the basic structure of the industry did not change much more than the basic instrument.

Through the 1880's the Bell Telephone Company (now AT & T) advanced through its strong patent position. By the time these patents expired AT & T had established long distance lines and had accumulated sufficient local business to take over the entire industry. Under Theodore N. Vail, a firm believer that one telephone system was enough for the nation, AT & T proceeded to acquire the manufacturing arm of Western Union Telegraph Co. (now Western Electric Co.), and agreed to refrain from participating in telegraph operations while Western Union pledged to get out of the telephone business. By the 1940's Bell controlled 91% of the U.S. telephone business. This monopolistic trend survived both in the U.S. and Canada (which has essentially the same structure, with Bell Canada and Northern

Electric as the counterparts to At & T and Western Electric Co.). The legal battles that resulted from this trend are dealt with in section (2.3) of this paper. The current structure of the indstury is presented under the following section.

(2.2) Some Current Statistics

In the late 1920's there were more than 8500 independent telephone companies operating in the U.S. With the crash of 1929, amalgamations and mergers, and failures due to severe disparaties in size and service advantages, the resulting current situations are shown in Figure 1. Financial data on these firms is shown in Figure 2. The Canadian evolution was similar. Telephone companies in Canada have traditionally operated as monopolies, been granted protection in their operations, and, at the same time, been subjected to governmental regulation. Through a series of amalgamations, takeovers, etc., the large number of telephone companies in Canada has been reduced to 15 major carriers serving 10 million subscribers.

Federal jurisdiction is limited to the following major carriers; Bell Canada, British Columbia Telephone Company, CN/CP Telecommunications, COTC and Telesat Canda.

The major telecommunications carriers are owned by a variety of interests. Bell Canada, approximately 98% owned by Canadians, owns or controls the majority of the shares in Northern Telephone Limited, Telephone du Nord du Québec Inc., the New Brunswick Telephone Company, the Island Telephone Company Limited, Maritime Telegraph and Telephone Company Limited and Newfoundland Telephone Company. Three other companies, British Columbia, and its subsidiary Okanagan telephone Company, and Quebec-Telephone are controlled by General Telephone Electronic Corporation, a U.S. owned communications conglomerate. Manitoba Telephone System, Alberta Government Telephone and Saskatchewan Telecommunications are Crown Corporations of the three prairie provinces. Edmonton Telephone and Thunder Bay Telephone System are municipally owned. CN/CP Telecommunications shows mixed public and private involvement with both Canadian and foreign investment. CN/CP Telecommunications denotes the working relationship between Canadian National Telecommunications (CNT) and Canadian Pacific Telecommunications (CPT). CNT is a department of Canadian National Railways, a crown corporation. CPT is a department of Canadian Pacific Railways, a public company with both Canadian Pacific Railways, a public company with both Can-

adian and foreign investment. The investment level of each of the eight major carriers is shown in Figure 3. Statistics on replacement costs of terminal equipment in Canada are shown in Figure 4,( ) while average cost and revenue figures are shown in Figure 5. ( )

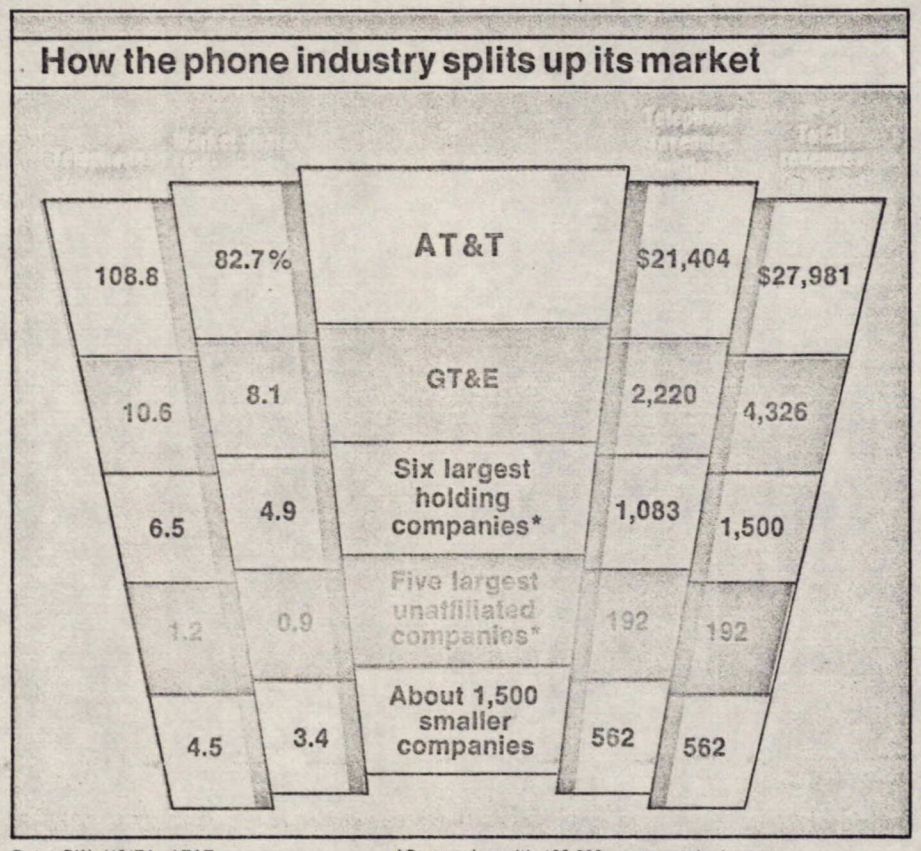
To provide a better perspective, the Canadian system is compared to other systems in the world. Figure 6( ) shows the world's telephones per 100 population. Figure 7 ( ) (a) GNP figures for Canada and U.S.

(b) Number of telephones Canada & U.S.

(c) Number of telephones per 100 Canada and U.S.

Figure 8 ( ) provides an adjusted comparison between Canadian telephone costs and four other countries. Up-to-date statistics reflecting the operations of the Canadian common carriers are given Exhibit 1, the statistics Canada service bulletin on monthly telephone statistics for January 1973.

Figure 1



Source: Business Week, May 5, 1973

Figure 2

The independent phone companies: Fast-paced growth in an almost unknown industry

	Telephones (thousands)	Increase from 1971 (percent)	Telephone revenues, 1972 (millions of dollars)	Increase from 1971 (percent)	Telephone net, 1972 (millions of dollars)	Increase from 1971 (percent)
The independent holding companies						
General Telephone & Electronics Corp.	12,043	6.4%	$2,220	15%	$243	13%
United Telecommunications, Inc.	2,642	7	448.7	14	64.5	10.4
Continental Telephone Corp.	1,946	7.1	323.1	15	47.6	17.6
Central Telephone & Utilities Corp.	1,048.5	14	192.5	16	22.7	21
Mid-Continent Telephone Corp.	593.4	6	82.8	11	10.2	14
Century Telephone Enterprises, Inc.	128.2	7	17.5	18	1.1	40
Allied Telephone Co.	106.4	15	16.3	19	1.8	20
*Not including 72% interest in North Carolina Telephone Co.						
The unaffiliated independents						
Rochester Telephone Corp. Rochester, N.Y.	535.1	3.4%	$ 89.5	8.3%	$ 13.3	9.7%
Lincoln (Neb.) Tel. & Telegraph Co.	239.8	5.2	38.4	9	4.9	9.2
Commonwealth Telephone Co., Dallas, Pa.	154.9	6.9	18.9	11.2	3.1	13.5
Florida Telephone Corp	143.6	16	29.0	27	4.6	44
Winter Park Telephone Co., Winter Park, Fla.	102.4	17.6	16.3	27.4	2.9	32.2
And how they stack up against Ma Bell						
Bell System	108,800	5.1	21,404	13.3	2,172	15.2

Source: Business Week, May 5, 1973

Figure 3

TRANS-CANADA TELEPHONE SYSTEM MEMBER COMPANY INVESTMENT DATA *

(as of 31 December 1970) (figures shown times $1,000)

Investment Categories (1)	B.C. Tel	AGT	Sask Tel	MTS	Bell	NB Tel	MT&T	Nfld. Tel (3)
Transmission Facilities	$ 101,707	$ 94,501	$ 43,514	$ 41,359	$ 472,747	$ 28,021	$ 23,350	$ 3,639
Switching Equip.	173,070	108,052	58,998	67,296	914,824	35,571	43,777	19,010
Outside Plant	184,009	139,683	56,193	103,134	1,205,152	60,740	58,706	22,169
Station Equip.	165,079	87,791	38,921	47,840	814,312	26,836	25,609	11,189
Other Investment (land, buildings, vehicles, etc.)	70,951	70,634	29,924	33,960	373,970	18,129	20,316	6,466
TOTAL	$ 694,816	$500,661	$227,550	$293,589	$3,781,005	$169,297	$171,758	$62,473

NOTES:

1) The investment figures shown represent gross plant investment of the member companies. Each category represents the total of various book accounts which can be broadly classified under the 5 heading shown.
2) In all cases investment in subsiduary companies (including Okanagan Telephone Company) are excluded.
3) Newfoundland Telephone leases a significant proportion of their plant from another carrier.
4) Station equipment equals 20.6 percent of gross plant investment.

*Source: Trans-Canada Telephone System

Figure 4

ESTIMATED REPLACEMENT COST - TERMINAL EQUIPMENT INCLUDING LABOUR

ALL CANADIAN COMMON CARRIERS *

	1	2	3	4	5	6	7
Class of Service	Quantity of Terminal Apparatus (see note 3)	Replacement Costs of Station Equipment per Installation Less Drop Wire (see note 4) Jan 1/70 Estimated	Total Replacement Cost of Station Equipment Less Drop Wire Jan 1/70 Estimated	Projected Annual Increase	1980 Quantity of Terminal Apparatus Column 2 at 5% Average Annual Increase	1980 Replacement Cost Per Installation at 5% Average Annual Increase	Estimated 1980 Investment Less Drop Wire
RESIDENCE:							
Main	5,388,917	40.00	215,556,680	(1975 = 3.9%) (1980 = 3.1%)	7,539,211	65.00	490,048,715
Extension	1,187,703	30.00	35,631,090	12%	3,287,562	49.00	161,090,538
BUSINESS	794,874	150.00	119,231,100	3%	1,036,515	245.00	253,946,175
Main							
Extension	635,006	58.00	36,830,348	8%	1,270,012	95.00	120,651,140
Extension on PBX	1,203,152	60.00	72,189,120	6.7%	2,154,852	98.00	211,175,496
PBX	5,157	4,000.00	20,628,000	6.7%	9,205	6,520.00	60,016,600
PABX	15,263	30,000.00	457,890,000	6.7%	27,336	48,870.00	1,335,910,320
PAY TELEPHONES	73,994	800.00	59,195,000	1.0%	82,503	1,303.00	107,501,409
TELETYPEWRITERS	30,000	2,000.00	60,000,000	5 year estimates 33%	50,000	3,258.00	162,900,000
MOBILE PHONES	12,402	2,000.00	27,284,400	22.3%	41,931	3,584.00	150,280,704
	9,346,468		1,104,435,738 (note 5)		15,499,127		3,053,521,097 (note 1)

Notes:
1. Figures do not include micellaneous equipment in station equipment account, e.g. speaker phone, intercoms, etc. Figures for Trans Canada Telephone System Chart II, which include miscellaneous equipment amount to $1,217,577,000 for Dec. 1970. Carrier and non-carrier equipment is estimated to exceed $4 billion by 1980.
2. Estimated capital requirements of carriers for station equipment in 1980 = $350 million. If C.P.E. = 20% in 1980 carrier reduction of capital = 70 million.
3. Major types of terminal apparatus in service end of 1969.
4. Based on estimated loaded labour rate of $9.50 per hour.
5. To above totals can be added Estimated Replacement cost of Station Drop and Protector (Estimate $26.00 per station where applicable).

* Sourced from literature provided by Canadian Telecommunications Carriers. (5)

Figure 5

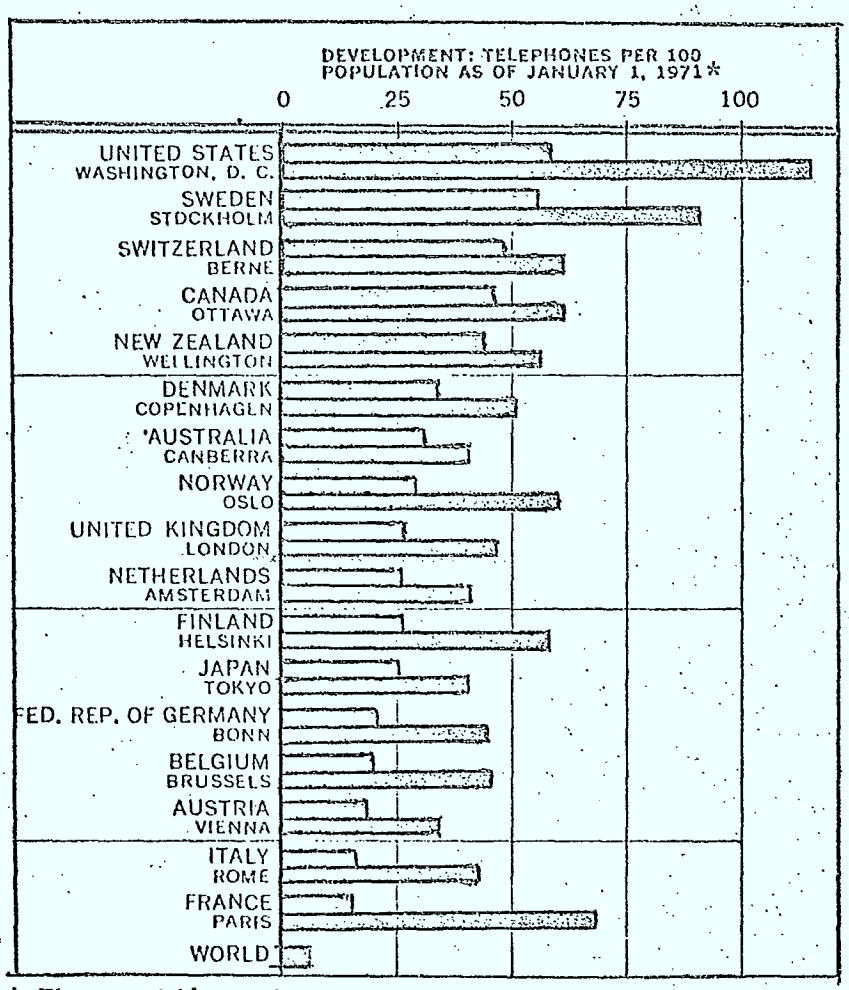
APPROXIMATE COSTS AND REVENUE FIGURES

Average cost of standard telephone set	$ 25.00
PBX average cost per line - 100 line range	$ 150.00
Small dial PABX per line - 20 line range	$ 300.00
Carrier investment per telephone (book value)	$ 650.00
Carrier investment per telephone (replacement value)	$ 1,300.00
Percentage investment in station equipment (book value)	20.6%
Station equipment as a proportion of current construction budget	25 %
Telephone	10 million
Gross annual revenue	1.6 billion
National average revenue (per telephone subscriber)	$ 150.00 per year
Breakdown of $150.00	
Depreciation	$ 35.00
Maintenance and operation	$ 30.00
Administration - Billing - Marketing	$ 10.00
Interest on Debt capital	$ 20.00
Corporation Taxes	$ 30.00
Profit retained for growth	$ 7.00
Shareholders	$ 18.00
TOTAL	$ 150.00

* Source - DOC Statistics

Note: This is a table of approximations suitable for order-ofmagnitude uses.

Figure 6



* The World's Telephones

Figure 7

(a) REAL GROSS NATIONAL PRODUCT* (billions of dollars)

	Canada	U.S.
1967	66	815.9
1968	74	890.2
1969	81	948.9
1970	87	986.3
1971	96	1043.0

*Economic Data prepared by Federal Reserve Bank of St. Louis, Aug. 28, 1972

(b) NUMBER OF TELEPHONES* (000's)

	Canada	U.S.
1967	8,358	103,752
1968	8,818	109,256
1969	9,296	115,201
1970	9,752	120,154

*FCC Statistics

(c) NUMBER OF TELEPHONES PER 100 POPULATION*

	Canada	U.S.
1968	42.1	54.0
1969	43.7	56.7
1970	45.23	58.4
1971	48.	60.

*The World's Telephones

Source: DOC Working Paper (5)

Figure 8

SERVICE CHARGES AND MONTHLY RATE COMPARISONS *

	CANADA (Bell Canada)	GREAT BRITAIN	FRANCE	WEST GERMANY	SWEDEN
Service Charge New Service Individual line	Business - $ 18.00 Residential - $11.00	one charge $ 82.00 see note 3.	one charge $ 120.00 see note 4	one charge $ 29.00 see note 5	one charge $ 60.00 see note 7
Penalty clause for removal	none (except for a few special and/or costly installations)	PABX's over 100 extensions are customer owned. BPO always supplies internal distribution wiring and telephone instruments.	PBX - PABX's are not Carrier owned (contract agreement)	PBX - PABX supplied by private enterprise.	Contracts for all PBX - PABX's.
Local Call Rates	Flat Rate. Varies with class of service and rate group. Unlimited number of calls. No time duration. No service charge. see note 6.	Message Rate - (note 1) 2½¢ per call. Timed duration - varies. Service charge - quarterly. Ind Pty Bus. $15.20 $13.00 Other $13.00 $10.50	Message Rate (note 1) 6¢ per call Service charge - quarterly All one line service = $40.	Message Rate (note 1) 5.75¢ per call. Service charge - quarterly Varies - localities over 100 telephones. Individual Line Ind. $26.00 Party $15.00	Message Rate (note 1) 1.8¢ same office. No timed duration. Junction calls - 9 min. timed. Service charge - quarterly. Individual line = $ 6.00 see note 2.

Notes: Chart shows charges for basic service only - charges other than Canadian are approximate due to currency conversion.

(1) Message rate charges are based on the number of completed calls. Where time duration is used, a second unit or call is charged for each time period.
(2) Sweden - Junction calls are calls to other exchanges in the same local calling area.
(3) Great Britain - Left-in telephones are reconnected free. Installation charge for new extensions = $7.00
(4) France - Left-in telephones are reconnected for 50% of the installation charge or $60.00.
(5) West Germany - Left-in telephones are reconnected for 1/3 of the installation charge (unless alterations are required).
(6) Canada - Nine rate groups for local service - no limit on number of calls or duration of call. A monthly charge is applied to recover remainder of installation costs, and operating expenses. This charge varies with class of service and rate group -
e.g. Ottawa Residential Individual = $ 6.10 monthly
Business Individual = $ 16.35 monthly.
(7) Any subsequent change including removal = $20.00.

* Sourced from literature provided from Telecommunication Carriers in Countries shown. (5)

(2.3) The Legal Environment

Legal battles relating to the telephone system started in 1913 when the U.S. Congress and the Wilson Administration attempted to stop the growth of AT & T. Responding to the threat of nationalization, the giant compromised with the Kingsbury Commitment. The Bell System divested itself of the 30% holdings in Western Union Stock, agreed to cease acquiring competitors, and permitted its lines to be hooked up with those of non affiliated companies. The outcome, an unshaken AT & T, but a slender lifeline for the independents, set the pattern for the subsequent development of the industry. It was partly regulated on its long distance service while it retained control over both Western Electric and Bell Telephone laboratories. Local operations - both Bell and independents - gradually came under state public commissions. In 1934 the Communications Act transferred regulatory authority over interstate telephone and telegraph to the Federal Communications Commission (the FCC). Not until 1949, however, was any action taken to break up AT & T's virtual monopoly. In 1949, the Justice Department filed an antitrust action that sought to sever Western Electric from AT & T, but the 1956 settlement of the case left AT & T intact, while independents were

left without a supplier (AT & T volunteered to stop selling to outsiders.) In reaction, GT & E, Bell's nearest competitor, acquired Automatic Electric in 1955. By 1967 GT & E had acquired 46% of the independents and provided more than half of non-Bell domestic production. In 1967 IT & T filed an antitrust suit against GT & E, and succeeded in forcing GT & E to divest itself of its manufacturing arms, Hawaiin Telephone and a large group of operating companies. GT & E has appealed, and the case is headed for Supreme Court. Antitrust is a dark cloud in the industry.

From the end user's perspective a turning point was reached with the Carterphone decision rendered by the FCC and the U.S. Supreme Court on June 26, 1968. The Carter Phone decision was the outgrowth of several years of legal action resulting from the activities of Tom Carter. Carter invented a device which enabled a telephone to be answered remotely using mobile two-way radio equipment. As sales of the device increased, the users were penalized by having their telephone service discontinued. Tom Carter undertook a private anti-trust action. The ruling read, in part, as follows:

> "We agree with and adopt the examiner's findings that the Carterphone fills a need and that it does not adversly affect the telephone system... We hold, as did the examiner, that application of the tariff to bar the Carterfone in the future would be unreasonable and unduly discriminatory," and further, "...We also conclude

> that the tariff has been unreasonable, discriminatory and unlawful in the past and that the provision prohibiting the use of customer provided interconnecting devices should, accordingly, be strike."(15)

Thus, some ninty years after the original invention, the rules of the game changed, and the interconnect industry was born.

There have been no similar experiences in Canada, although pressure for government action on liberalized conncection policy is mounting. The pressure is bi-modal. Business users require more rapid and more advanced equipment than may be available from the carriers, and consumers are looking for telephone accessories which are in line with present consumption patterns. Simultaneously, potential suppliers of terminal equipment are demanding an opportunity for open competition, stating that such competition will introduce innovation, variety and more competitive pricing into an otherwise utilistic market.

(2.4) The Status-Quo:

Resulting from the Carterfone decision, a growing interconnect market exists in the United States. The suppliers in this market range from small stores and mail order houses which supply and refurbish telephones on a

retail basis, to major manufacturers such as North Electric Company Supply Division, L.M. Ericson. Wire, install and service major industrial accounts and supply the numerous retailers. In typical catalogues obtained from Metropolitan Teletronics Corp. and Grandcom Inc. of New York City, the offerings vary widely, as do the prices. Telephones range from old, used black phones, to exquisitely styles modern replicas of classic French telephone sets, and ultra-modern units from Europe and Japan. Prices for these range from $9.95 for a model 8-D43N1 Regulation Dial Phone to $250.00 for the "VIT" model-A floor stand telephone in Florentine amber and red with inlaid gold leaf decor.

Accessories range from plugs and jacks at $0.99, to $250.00 for a speaker phone, $350.00 for the magicall automatic dialer. Strong consumer demand for this product apparently does exist, at least in larger centers in the U.S. For example, at the Phone-tique Gallery on Madison Avenue in New York, indications were that 300 units ranging in price from $75 to $500 are sold monthly. (The boutique only opened in May 1973). (32) As may be expected,

a multitude of small enterprises dealing with installation and sales have also sprung up. The Telephone Interconnect Journal of August 1973 summarizes clearly both the history of and the current situation on the interconnect scene in the U.S.

Typical products resulting from the competition are included in the Exhibits. A notable example is the name caller (Exhibit 5), which is an automatic telephone dialer. Both in design, price and presentation it is essentially different from a substitute device, Magicall (Exhibit 6 for North America, Exhibit 7 for Europe) manufactured by Bell. Due both to pricing and packaging, the consumer segment of the market at whom the Name Caller is directed, has been unreceptive to Magicall. Exhibit 6 compares how a member of the Bell system presents a product as opposed to an independent manufacturer's representation of the same product into a competitive millieu. As is clear from the exhibits, statements regarding connection to the networks are being made freely, although no actual open interconnection policy exists even in the U.S., only legal precedent. Exhibit 8 (business week, April 28,1973)

further demonstrates the effect of competition on the Bell system, and a resulting innovation.

In Canada, although the legal precedent has not been set, carriers have liberalized their policies in recent years. On June 16, 1969, the members of the Trans Canada Telephone system revised their respective tariffs to permit the attachment of any data communications devices, or alerting device activated by signals from the network, to the public switched networks using approved interface equipment. The federally regulated carriers have gone on record as not opposing in principle the liberalization to permit the telephone user to acquire terminal equipment from diverse sources and to connect this equipment to the public networks, subject to very specific stipulations.

Exhibits 10 and 11 reflect the current interconnect activity on the Canadian scene. Exhibit 10 some of the issues, Exhibit 11 some of the answers.

Chapter 4

THE GROUP-DEPTH INTERVIEWS

(4.1) Objectives

A group depth interview is basically a trial run of the actual research. In an open discussion within a group of consumers, ideas may be made to flow in a direction conducive to idea clarification and attribute definition. The objectives for the in-depth interviews may therefore be stated as follows:

(i) To better understand consumers' reactions to the products under investigation.

(ii) To obtain insight to consumers' perceptions of the products.

(iii) To develop a vocabulary which will be clearly understood by the users.

(iv) To define a broad range of relevant product attributes, as perceived by the actual consumer.

(4.2) Procedures

Arrangements were made to hold two sessions, one English and one French, each consisting of ten telephone users. The group members were recruited by a professional interviewing organization with a premium of $10.00 per attendee. Sessions lasted for two hours. The session was

controlled by the interviewer so as to generage discussion in three major areas:

(i) The Telephone - what is it, what does it contribute to the home, how can it be used? After introducing the topic, the interviewer permitted the discussion to flow freely, interupting only when the group got hung up on an issue, or where cost was dominating the discussion. The interviewer also attempted to avoid airing of complaints and criticisms against the monopolistic market situation.

(ii) Different telephone receivers - what are perceived advantages and disadvantages of these and how are they described? By distributing promotional material on each type of receiver, discussion was innitiated. The discussion was uncontrolled except where cost considerations became the issue. The receiver types which were presented for discussion were:

(1) Plain black phone

(2) Colour telephone

(3) Contempra with dial or touch-tone

(4) Desk-type touch-tone

(5) Wall phone

(6) Speaker phone

(7) Head set

and the related material distributed is shown in Exhibits ( ) to ( ) respectively.

(iii) Telephone accessories - The discussion was directed at defining how the devices presented to the group were perceived. Novel ideas for devices other than those shown were encouraged and discussion related to price was avoided. The possibility of receiving or giving items as gifts was stressed. The products discussed were:

(1) Automatic Dialer

(2) Wall chimes

(3) Code-A-Phone (telephone answering machine)

(4) Wall plugs

(5) Message Light

(6) Volume Control

The literature distributed is shown in Exhibits ( ) to ( ).

Each group session was recorded on tape. A researcher was present at each session to answer any technical

questions which arose as well as personally observe the groups reaction to the subject.

(4.3) Results: The English Group

From the start the conversation centered on costs; colour phones are nice but cost extra; wall plugs are convenient but at $.60/month too expensive; unlisted numbers provide privacy, but have an extra charge attached; directing the discussion to buy vs. lease, the immediate reaction was in terms of quality and service. The interviewer attempted to direct the conversation away from absolute cost, without discouraging opinions regarding method of payment, i.e. buy vs. lease; the group reaction was to defend the monopoly on the ground of superior service. As one of the group members had previously lived in England, the charge per conversation issue was raised, resulting in general agreement that Canada has the best telephone system in the world. Although this overtone was present throughout the discussion on telephones, interesting perceptions were brought forward, and specific attributes mentioned. For the picture phone; "house would always have to be neat." "Make up and hair properly arranged for a conversation." For the contempra touch-tone; "less dialing errors;" "attractive designer;" "awkward to hold."For Con-

tempra dial; "dial too small;" "two hands required to dial." For other phones in general, important points were raised which could be treated as attributes or provide insight to consumer's perceptions. Phones promote laziness. (Visits by phone, shopping by phone). Women rather than men use and answer phones. Teenagers monopolize phones. The dial is hard to clean.

When new items were introduced, starting with the speaker phone, the general interest level increased within the group. For the speaker phone issues such as doing dishes while talking or cleaning up, convenience, non-private, option to turn off, were all introduced by the group. The automatic answering machine created much interest, with both positive and negative perceptions; no calls missed - rather miss a call; everyone would know you were out; messages not private; too impersonal. The operator type headset was introduced as a consumer item. It was perceived as a substitute for the speaker phone, except for the privacy issue. An important observation made was that it would ruin a hairdo! When an automatic dialer was presented the group was absolutely amazed. Although price became an issue (Figures of $10 to $500 were mentioned) attributes were identified. Convenience; no dialing mis-

takes; time saving; misuse by children; make more calls - pay more; too complicated. The same level of interest was maintained for all other accessories presented. Whether positive or negative, the group offered praise and critism, and it was evident that little previous knowledge of the devices existed prior to the meeting.

The session lasted for over two hours.

(4.4) Results - the French Group

Within the first moments after the introduction of the topic, group members commenced to complain about the monthly charge. Words such as "exploiting the poor", "increasing rates for same service unfair," were brought forward. It soon became evident, based on the discussion by the members as well as by the phones they each had, that to the French group the phone was basically a functional item. Used to call a pharmacy or a taxi, with little status connotations. One group member indicated that a way to get a new phone under the present system was to simply break the old one. No charge for replacement.

It was established that a dial is a "roulette", to dial a number is "composer le numero". Touch-tone is "puss-boutton" or "pittons". The discussion continued on general terms; push buttons should be charged for once,

not on a monthly basis; older telephones are too heavy; girls use phones more; men do not answer phones; telephone replaces going out; people who work with phones do not use phones for "socializing" (valid for women as well); phone on wall does not get in the way, phone on table keeps falling on floor; can't take dial off for cleaning; when equipment other than standard telephone receivers was introduced, the gift-giving possibility was favorably considered with further overtones of "we have paid enough." A statement was made that the monthly charge is what holds back the development of "gadgets," people would change phones if they could be purchased. It would be preferable that equipment was purchased with service charged separately. A second contention was that although new models were added, old ones were not deleted or replaced. The complaint was that to renew a telephone one is charged extra.

An interesting demand presented by the French group was for less changes in the equipment and improved service. Rather than deleting operators, and introducing services such as direct-dialing, the group appeared to prefer a more personal service; an arrangement were only a number has to be said after lifting the receiver. The result would be more efficient use of the lines, (less

bad calls), better emergency service, etc.

In terms of attributes, speed, ease of dialing, errors in dialing, easy to clean, stays in position while dialing, were mentioned. Special emphasis was given to the sensitivity of the transmitter so that people around the user would not be needlessly disturbed, and the volume of the receiver to make the received voice more legible.

The "headset", the "speaker phone" and especially the "automatic dialer" were unanamously noted as useful, attractive, and convenient. In each case the device was thought to make an excellent gift.

An evaluation of the probable affect that both purchasing of equipment and gift giving would have on the market was given by the group. A statement was made to the fact that each home has numerous electrical and electronic devices. Not all work, nor are all used simultaneously, but people like to buy them and receive tham as gifts. The ability to purchase telephone receivers and accessories would have the same effect.

A very novel and original idea for a device was also presented by the group, prior to it being presented by the interviewer. The concept of having a signal of

some kind, either a light or a tone, to indicate that someone is trying to reach you so you can hang up and receive the call.

The French group also estimated that a reasonable price for an automatic dialer would be in the $50 to $60 range. (A unit is currently available for $59.95).

This group of people were relaxed, interested and innovative. When given the opportunity to make suggestions, their ideas seemed endless. It required a major effort on behalf of the interviewer to bring the discussion to a close after two and one half hours.

(4.5) Conclusions from Encounter Group Experience:

The interest level generated by the subject matter indicated that potential respondents would welcome the opportunity to provide their opinion, provided the questionnaire is interesting, informative and well presented.

Both encounter group sessions seemed to spontaneously divide into three major areas. An introductory phase, including discussions about service, availability and satisfaction. A second phase during which different types of telephone receivers were evaluated, and a third which was devoted to more innovative items, "gadgets" more than communication equipment. This apparent divi-

sion can be carried to the questionnaire.

Under the heading of telephone receivers the following attributes seemed to be valid, polient product attributes as perceived by the consumer:

(1) Style (conservative - modern)

(2) Dialing (get right number)

(3) Comfort (facility of use)

(4) Utility (hear and speak)

(5) Maintenance (effort in cleaning)

(6) Value, price

(7) Options available.

Under the heading of telephone accessories, based on products presented at the encounter group, the attributes were perceived as follows:

(1) Usefulness (functional)

(2) Convenience (ease of use)

(3) Attractiveness

(4) prestige

(5) Privacy

(6) Security

(7) Value, Price

Regarding both groups of products, the encounter groups reinforced the belief that willingness to give as

gift and desire to receive as gift could be considered in addition to purchase.

Chapter 3

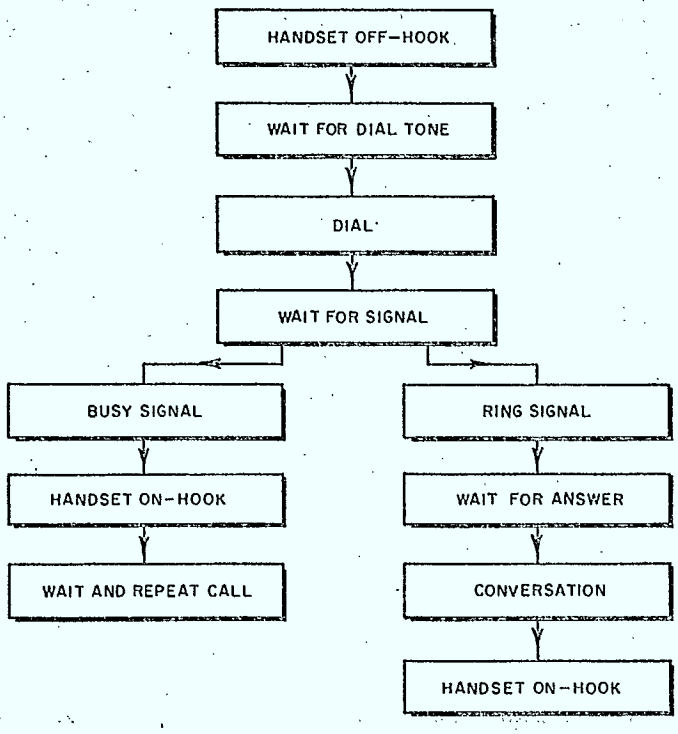
A SURVEY OF THE LITERATURE

In preparation for in depth interviews with consumers and manufacturers, basic understanding of technical concepts re the telephone system is essential. Current theories relating to consumer attitude and behavior as well market research methodology, especially the Fishbein Model, are equally relevant. This chapter is devoted to these topics.

(3.1) The Technology at Present:

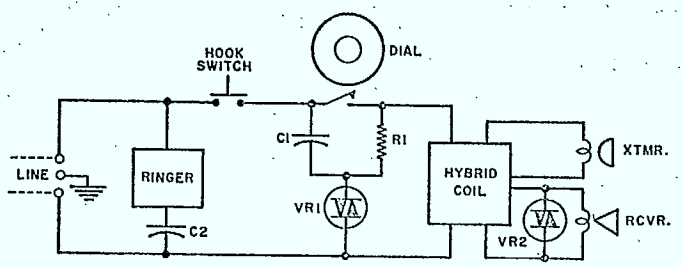
The basic telephone receiver has, at least in concept, changed very little since its invention. Figure 9 shows all the operations required for placing a call. The operations are shown in the form of a flow chart, and for each step the respective component may be found in Figure 10, the simplified schmatic diagram of a standard telephone set. The circuit for almost all phones currently in use is similar to that of Figure 10. When the handset is on the cradle, the hook switch is open and only the ringer (or bell) is connected across the telephone line. Under these conditions only the low frequency A.C. current from the central office can reach the subscriber, causing the bell to ring.

Figure 9



Flow chart showing steps taken when making a call.

Figure 10



Simplified circuit diagram of standard telephone set.

* Source: Electronics World, July 1971.

With the handset off the cradle (i.e. when making or receiving a call), the dialing contact is closed and a D.C. connection is made. This connection causes a line relay at the central office to close, connecting the subscriber to the system. The Hybrid coil is designed to split the two wire line electrically so that most of the incoming sound signal goes to the receiver (earphone) and the outgoing sound from the transmitter (microphone) goes out to the line. There are limiting devices across both the receiver and the dial to avoid overloading of the line.

The dial contains a cam and sprocket which opens and closes the dial contacts as many times as the number dialed. This signal is sent out and is processed at the central office, putting the call through to the proper party.

Many modern phones also contain ringer loudness controls and a number of other features. Telephones are also available with selective line buttons, extension, intercome features, and buzzer or light signalling options.

A recent development in the system is the "touch-

Tone" dialing option. Under this system, the telephone receiver is equiped with transistorized tone generators which are connected to a push-button-controlled matrix switch. A typical tone generator circuit diagram is shown in Figure 11, the physical size of this advanced integrated circuit unit in Figure 12, and the way it fits in a telephone set is indicated in Figure 13. These units generate different tones for each number as opposed to the pulses sent by the dial mechanism.

Although operation of the receiver has changed little since its invention, the telephone system itself has developed to a true communication system, now including numerous other devices and services within the network.

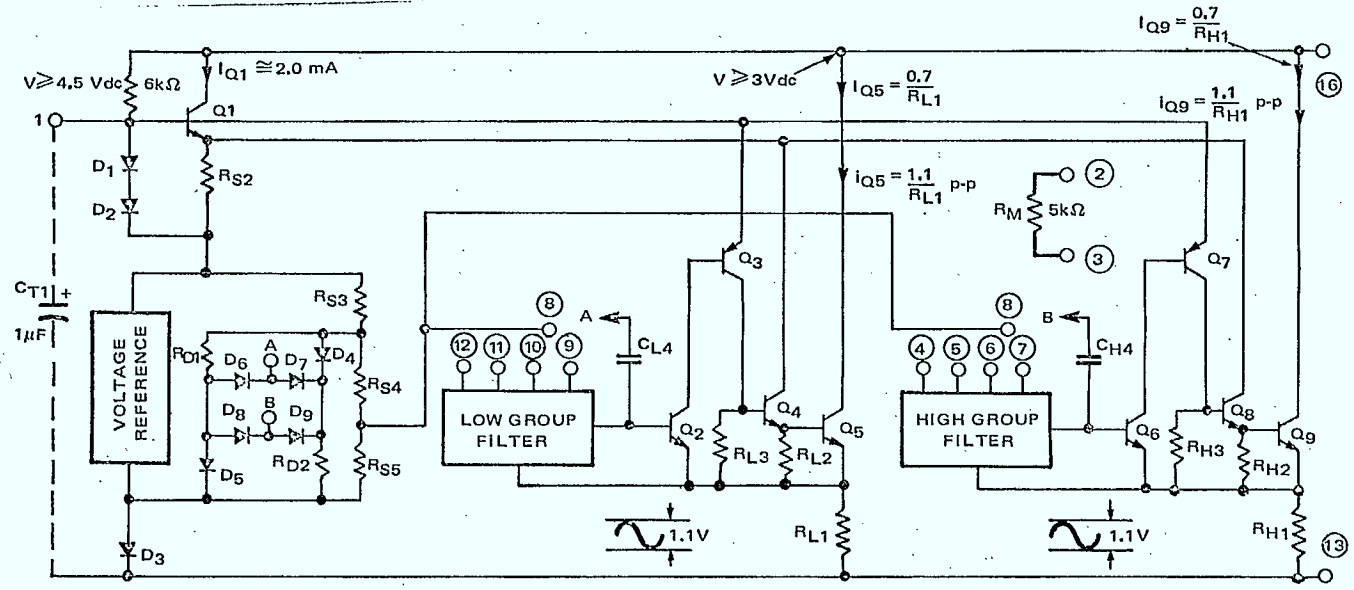
In theory, any device that operates over the 300 H_Z to 3000 H_Z band can be connected to the telephone line. This includes the human voice, digital data and slow scan TV signals, properly modified.

The most basic attachment currently used is the extension phone. This second set may be connected directly across the first, and either one may be used to originate or receive calls. A second popular attachment is an amplifier/loudspeaker combination which permits

Figure 11

MICROELECTRONIC TONE GENERATORS . . . ME8900 AND ME8913
ME8911/8912/8917/8918

schematic diagram

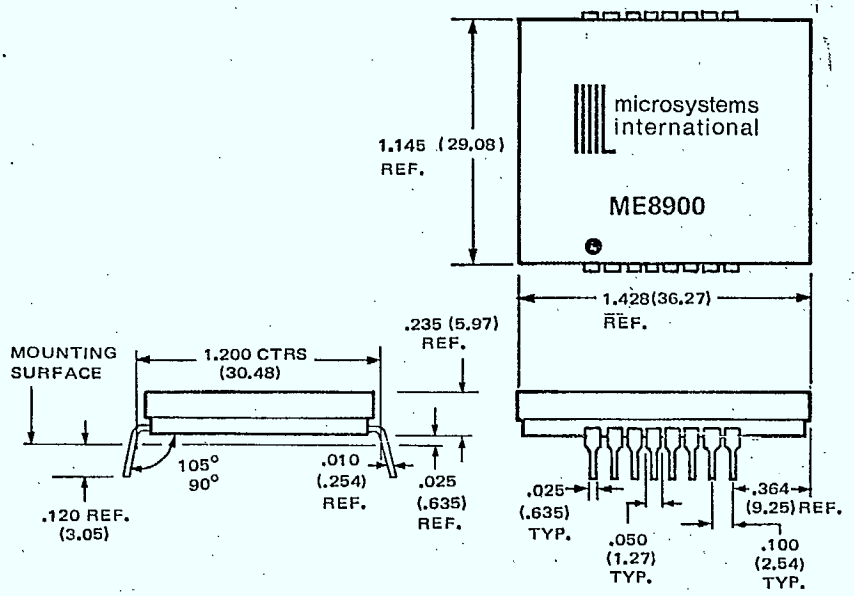


Source: Microsystems International Bulletin 24006.

Figure 12

physical dimensions

16–PIN DUAL IN–LINE PLASTIC PACKAGE

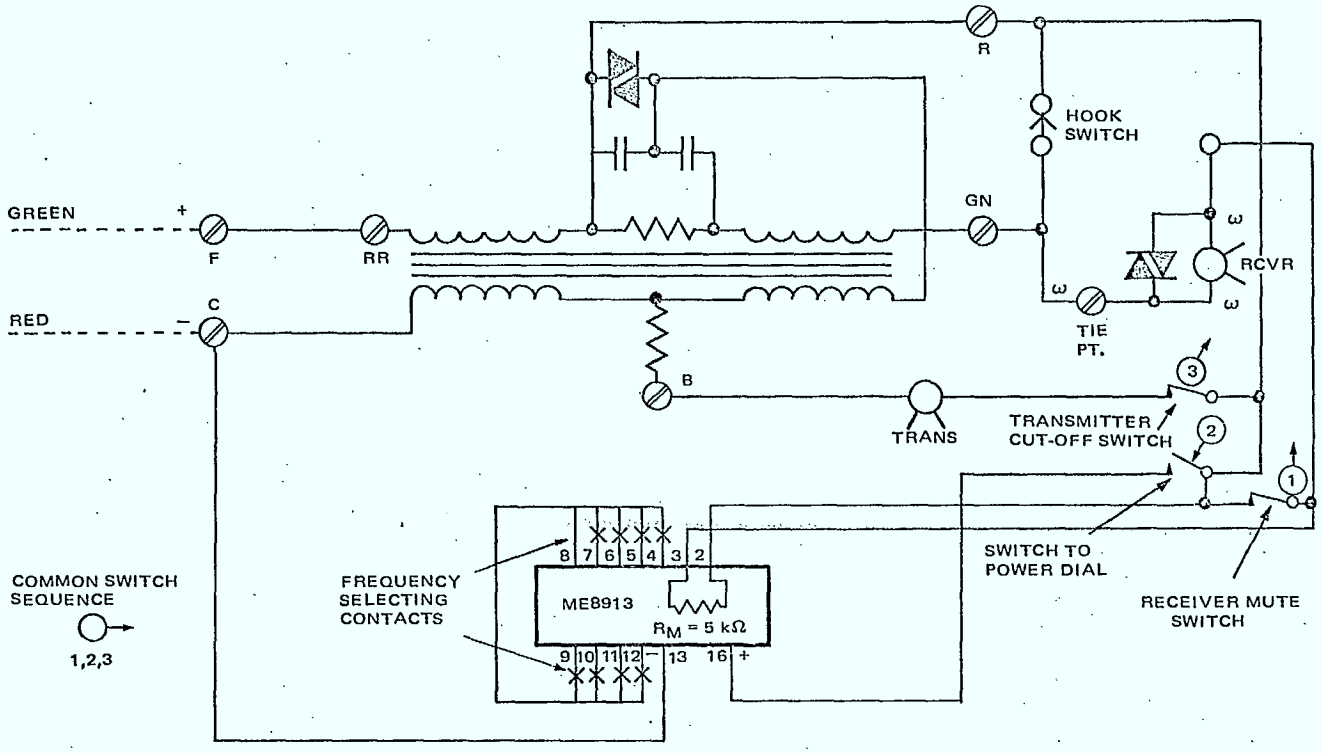


Source: Microsystems International Bulletin 24006.

Figure 13

typical application

ME8913 CONNECTED FOR USE IN NORTH AMERICAN TELEPHONE SYSTEM



Source: Microsystems International Bulletin 24006.

"hands free operation," or potentially, in combination with other phones, an intercom network. Other devices currently available include telephone answering machines, automatic dialers and devices fro controlling or recording duration of calls made.

Commercial accounts can, at least in the U.S., purchase their own internal switching and terminal equipment from the supplier of their choice. The interface equipment which is required fro connection to the telephone network is rented from the telephone company. The telephone company can also supply suitable couplers for facsimilie machines, teletypewriters and other customer owned apparatus. Due to the technical requirements for interfacing, even residential accounts may require special couplers in many cases. These are readily available in numerous versions. Table 3-1 provides a breakdown of terminal equipment. Of more impact to the telephone networks have been the advances which have occured in the communication technology. The United States and Canada are totally interconnected by telephone. The use of microwave and satelite links has further expanded and improved the network, and the introduction of computer

(Table 3-1)

Classification of Communication Products

Category:

1. Does not originate or process (passive devices)
2. Does not originate (address network) but processes (passive devices)
3. Originates but does not process
4. Originates and processes

Definitions:

Process means that terminal equipment acts on control signals from the network.

Addressing the network means that control signals are generated from the terminal equipment to the network.

Control signalling:

1. From the network
   ringing
   proceed to dial (dial tone)
   busy signal
2. To the network
   off hook
   on hook

Passive devices are those terminals which do not address the network but which may or may not process (control signals).

Cont...

Source: DOC Documents

PASSIVE DEVICES

Does Not Originate or Process

- Tape recorders - manual start
- Acoustic pick-up
- Conferencing - not network addressing
- Speaker phone (speaker only - associated with existing telephone)
- Amplifers (hard of hearing devices)
- Intercom using telco sets (home enter phone, apartment door answering, etc.)
- Paging (voice and code using telco sets)
- Head sets (without dial)
- Chimes and bells
- Jacks and plugs
- Automatic and manual cut off
- Monitoring (extension traffic monitoring)
- Telephone busy signals separate from telephone)
- Patching cords
- Hotel message waiting (associated with telco sets)
- Toll denial devices
- Security devices and scramblers
- Decorator shells
- Teletype non-originating, non-processing
- Telephone sundries
- Facsimile
- Electrowriter
- Acoustic coupler
- Modems

Cont...

Does Not Originate but Processes

- Automatic answering (portable)
- Automatic answering and recording (time of day, weather, etc.)
- Utility meter reading
- Remote control devices
- Limited area radio telephone (telephone/radio extension services)
- Teletype (non originates processing, receive only)
- Data terminals (includes teletypes)
- One way mobile paging (Bell Boy, SWAPS)
- Facsimile
- Modems

NETWORK ADDRESSING DEVICES

Originates Does not Process

- Rapid dialers (rotary and touch tone)
- Hand operated dialers

Originates and Processes

- Alarm units with automatic dialers
- Emergency reporting
- Conferencing on Centrex
- Speaker phones including telephone
- Repertory dialers
- Teletypewriters (originating and processing)
- PMTS (mobile)
- Facsimile (modems)
- All telephone sets (PBX, PABX, key systems)

controlled dialing and billing permits direct dialing to most centres in the North American continent as well as some points in Europe.

(3.2) The Future of the Technology

Network improvement and expansion is primarily expected from increased use of satellite links for long distance transmission. The major advantages of satellite links, especially where domestic satellites (i.e. satellites in synchronovs orbit) are considered, may be summarized as follows:

- Domestic satellites can provide, for the same investment, more channels than conventional long distance cables or microwave links.
- A long distance call will cost the satellite carrier virtually the same whatever the ground distance, resulting in a more favourable rate structure.
- Multi-point hookup of communications becomes feasible.
- Potentially direct home-satellite-home complete communications systems may evolve eliminating all wires.

Canada has already launched the Amik Satellite, and the U.S. is expected to launch the Westar Domestic Satellite in mid 1974. The major American carriers plan

to launch their own satellites during the next decade. ATET plans to integrate its satellite system into its United States telecommunications network and thus provide service to Alaska, Hawaii, Puerto Rico and the Virgin Islands as well as the Mainland.

From the consumer's viewpoint, network improvements have only minor significance. A closer look at potential developments in terminal equipment is therefore more relevant. Michael T. Beford, (9) in his study on future communication services for the home, presents an excellent overview of what consumers may expect from the carriers in the future.

He presents four categories of future services:

(i) Consumer oriented services

(ii) Information oriented services

(iii) Household management service

(iv) Data-oriented services.

Within the first category we find the shop at home service; the housewife would be able to obtain product information and order directly from the supplier of her choice. Remote banking service; this service would permit remitting payments, transferring funds and retreiving

funds through direct communications between the consumer and the bank. Home security service; potentially provide protection and emergency dialing under adverse conditions.

Programmed education service; the user can call for "lectures" and learn subjects of interest through an interactive link with a computer.

The second category deals with information retreival. Shopping guides similar to the "yellow pages", service guides which would permit access to service establishments, as well as a rating service which would permit the consumer to evaluate a supplier.

Demand services form the third category. Here are included in the home newsreports, home entertainment the subject of which can be selected, etc.

The final category is data oriented. This system would give the household access to computer storage and computation capability. The first may be used for filling services (names, addresses, etc.) and the second would permit calculations of diverse natures.

It is evident from the above that the prerequisite to these in-home services would be the availability of numerous devices. Beyond the common telephone re-

ceiver, teleprinters, video-screens and key-boards in numerous and diverse combinations will have to be designed.

(3.3) The Research Methodology

To attain the major objectives sought in this study, three aspects of consumer behavior must be measured and evaluated. These are the attitudes, the beliefs and the resultant intentions of the telephone user with respect to various product offerings.

Attitude as a concept has been discussed since the mid 1800's. It was L. Langes discovery (1888) that a subject who was consciously prepared to press a telegraph key immediately upon receiving a signal reacted more quickly than a subject otherwise oriented, that brought attitude studies to the forefront, especially in experimental psychology. A generalized definition of attitude resulting from an analysis on the numerous studies done on the concept (3), is:

"An attitude is a mental and a neutral state of readiness, organized through experience, exerting a directive or dynamic influence upon the individual's response to all objects and situations with which he is related."

The relevance of the attitude concept to studies

of consumer behavior is self evident. Commencing with Thurstone (42), (43), (44) in 1929, numerous procedures have been devised for measuring attitudes. Most methods are based on scoring attitudes on semantic differential scales, where the labelling, scoring and analysis of the results differs depending on either theory or application. The most noteworthy of these approaches are those by Linkert (31), successive interval scales (39) and the Guttman Scales (26) and the more recent approach by Osgood, Suci and Tannenbaum (34).

Osgood et. al. had demonstrated that a reliable and valid measure of attitude could be obtained by having subjects check positions on the series of seven-point bipolar adjective scales. (Good-bad, clean-dirty, etc.). Commencing their work at this point, Fishbein and Raven (25) proceeded with studies into the measurement of "belief", the so defined "probabilistic" dimension, as opposed to "evaluative" dimension of attitude.

(3.4) The Fishbein Model

Martin Fishbein, Professor of Psychology at the Institute of Communications Research, University of Illinois, Urbana-Champaign. Commencing in the mid 1960's,

he developed a new theoretical approach to conceptualize the "attitude" construct, a new method for measuring it, and has advanced new hypothesis about the relationships between attitudes and behavior. Although his work is removed from the realities of market-places, brand-preferences and consumer behavior, his work has opened new avenues of approach to the prediction of future behavior based on known and measurable current attitudes.

There are numerous and varied definitions of attitude (3). It is generally accepted, however, that an attitude comprises three components; (40) an affect or "feeling" component; a cognitive or "belief" component; and a conative or "action tendency" component. It is Fishbein's view (18) that most attitude studies do not measure these three distinct components, rather the scales used stress the evaluative, or affective component, and it is this one aspect of attitude that is generalized to include all three.

It is the distinction between "belief"(6), (18), (30), 'attitude' (17), (20), (24) that is fundamental to Fishbein's approach. (25), (19), (14). There are therefore four parameters to be considered in practice; at-

titudes, beliefs, behavioral intentions and actual behavior. (40).

An individual may not only evaluate an object (on a good-bad scale) but he may also believe or disbelieve the existance of that object. (Probable-improbable). The evaluation of the object is defined by Fishbein as the "attitude" dimension. The probabilistic dimension is defined as the "belief" aspect of the evaluation.

The essence of the Fishbein Model is that the beliefs that are salient to each individual may be measured by having the individual rate those beliefs on a semantic differential scale. (called the B-Scale). Similarly, the attitude is rated on another scale or series of scales. (The A Scales). Thus the AB-Scales (25) yield an individual's attitude towards any object as a function of his beliefs about the object and the individual's evaluation of those beliefs.

Expressed mathematically:

$$A_o = \sum_{i=1}^{n} B_i a_i$$

Where: A_o = Attitude towards object O

B_i = The strength of belief about O (B scale)

A_i = The evaluative aspect of B_i (A scale)

n = The number of beliefs.

Thus A_o, the overall attitude towards an object O is obtained by having individuals rate object O on a seven point semantic scale, e.g.

The A Scale:

Good . 1 . 2 . 3 . 4 . 5 . 6 . 7 . Bad

The B Scale

True . 1 . 2 . 3 . 4 . 5 . 6 . 7 . False

The resulting attitude measure thus includes the evaluation (Good-Bad) and the Belief (True-False).

Application of this model requires a definition of 'attitude' and 'belief' dimensions. More important, Fishbein's departure from current attitude theory is his introduction of "saliency". By 'salient beliefs Fishbein means those beliefs which are foremost in a person's mind when evaluating a given object. Thus Fishbein considers his model a "summation" model of behavior (24), as opposed to a "balance" model, such as proposed by Heider (27); Abelson and Rosenberg (2), (38), or the 'Congruity'

model; Osgood & Tannenbaum (35); the problem in application of the Fishbein Model thus extends to knowing what is salient and what is not. An indication of saliency may usually be found by observing a high correlation between A_o and A given B_i a_i.

The concept of "saliency" is similar to the notion of "determinant attributes." Alpert (4) presents the hypothesis that not all product attributes are equally important in determining consumer preferences. Some approaches to the evaluation of these key attributes are discussed and their effectiveness compared.

(3.5) The Experience of the Fishbein Model

Fishbein has successfully applied his model to the study of E.S.P. (25), negroes (23) political issues (21) and sexual behavior (22). Although the majority of his subjects were university students and may therefore have been more aware than the average consumer, the application of his model to actual market research has also met with considerable success.

In studies of the attitudes of housewives to mail order, Sampson and Harris (40) obtain overall correlation values in orders of $Y = 0.25$, below those of

= 0.8 to -0.9 published by Fishbein.

By reducing the number of variables, and ensuring "saliency" of belief variables, scores of = .56 and .49 where obtained for the correlation between A_o and B_i a_i, during further studies. Chapman (13) indicates that commercial application of the Fishbein Model yields correlations of 0.6 and above. With actual scores for a TV commercial test of = .32 (pre-exposure) and = .51 (post exposure), and 0.7 to 0.9 for testing of a press advertisement, he reinforces the applicability of the model to consumer testing. Chapman further states that a major source of difficulty are the use of non-salient beliefs or the use of incorrect phraseology when constructing the belief statements. The labels attached to the semantic scales, both in connotation and strength of meaning, must be carefully selected.

Chapter 5

THE RESEARCH METHODOLOGY

Original ideas about attributes of telephone terminal equipment have now been transformed into operational definitions of salient attributes of actual products. Visits were made to Bell Telephone headquarters to discuss products and perceptions (9), (16). Retail outlets in New York City specializing in telephone equipment sales and service were interviewed in an attempt to define the product line available. Private manufacturers of equipment were contacted. In an interview with L.M. Ericson, a major Swedish manufacturer of telephone apparatus, information was gathered regarding foreign terminal equipment and the status quo of industrial non-carrier installations. Letters were written to Northern Telecom; North Electric Supply Company; Western Electric Company, Mr. Tom Carter of the North American Telephone Association; the Harding Corporation; and Hammacher-Chlemer Corporation; the replies received added to the information available.

The in-depth interviews were arranged and re-

sulted in clear definitions of product preceptions, an English and French vocabulary applicable to the products, and a set of salient attributes as defined by the consumers. (Chapter 4).

Questionnaire formulation was based on all the above inputs.

(5.1) Guidelines for the Questionnaire Design

(a) The questionnaire was adopted for distribution by hand.

(b) A sealed outside envelope bearing a message for the respondent was required.

(c) A pre-addressed, business reply envelope was included to facilitate replies.

(d) In partial repayment for the contribution, a gift was included, (a dialing pen with holder).

(e) The questionnaire contained a section on personal information in line with the original grouping considered by the agency when selecting the sample. (Exhibit) indicates the agency's grouping of socio-economic data).

(f) The section dealing with telephone receivers and the section dealing with accessories had attitude scales

belief scales and confidence scales (as detailed in sections 3.3 and 3.4).

(g) A section on service experience was included to expand the predictive value of the answers.

(h) Seven products were presented in each category.

(i) The English and French versions were as similar as possible, so as to permit common analysis.

(5.2) Constraints on the Questionnaire Design.

(i) A basic constraint on the questionnaire was that an average consumer should be able to complete it in less than an hour. Experiments with students and housewives indicated that the questionnaire could not exceed twelve double-spaced type written pages.

(ii) A photograph of each product tested was integrated into the questionnaire design. Reactions observed during the in-depth interviews indicated that a photograph created interest and generated responses more directly related to beliefs and attitudes.

(iii) Discussions with the printers indicated that a maximum page size of 11" x 17" could be produced, than folded to the standard page size.

(5.3) Content of the Questionnaire — Should be included as an appendix.

The questionnaire was divided into six sections; background information; the ideal communication system (pre-exposure), evaluation of telephone sets, evaluation of accessories, ideal communication system (post-exposure), and a section on service experience.

Under the heading of background a set of questions regarding personal and demographic data was formulated. These questions were based on the original groupings used by the distribution agency (Exhibit ( ). The information requested was sufficiently varied to permit flexibility and increase the sensitivity during the analysis phase.

An ideal communication system as perceived by the respondent prior to his/hers exposure to the products being tested was introduced in Section II. This question requested the respondent to list a selection of known terminal equipment, chosen amongst those of which the respondent was aware.

Sections III and IV formed the major part of the questionnaire, the evaluation of telephone sets and accessories, respectively. Based on data collected from

all sources, seven products were selected for each category. These were organized in the following order:

Types of Receivers	Types of Accessories
1. black telephone	1. Telephone answering machine
2. touch tone (desk type)	2. automatic telephone dialer
3. wall phone	3. telephone plugs & jacks
4. contempra	4. wall chimes
5. head set	5. message light
6. antique phone	6. volume control (on receiver)
7. ericofon	7. hands free telephone

For the receivers a list of options available was included in the text. A short description of the operation and possible applications of each accessory was presented before Section IV.

The in-depth interviews (Chapter 4) yielded a set of salient attributes for each category:

For Telephone Receivers

1. Style (Conservative-modern)
2. Dialing (ease of getting correct number)
3. Comfort (facility of use)
4. Utility (hearing and speaking)
5. Maintenance (effort in cleaning)

6. Value (price, gift, rank)

7. Options available.

1 to 5 were the independent variables, 6 the dependent variable. The importance of options and price were considered separately, as was the rank. The price assigned to each set was the highest price noted for the particular type of set in catalogues obtained from retailers in the New York City area. Five dependent variables were selected:

(a) likelihood of installation?

(b) Purchase for own use?

(c) Give as gift?

(d) Desire as gift?

(e) Perceived rank.

The in-depth interviews indicated that all the above were potential measures of "value".

Two further questions were included to permit extended analysis. The first regarding the confidence of the respondent in his evaluation and the second relating to the respondents experience with the products shown (tried-seven).

For the Telephone Accessories

The attributes defined by in-depth interviews:

(1) Usefulness (functional)

(2) Convenience (ease of use)

(3) Attractiveness (decor)

(4) Prestige

(5) Privacy

(6) Security

(7) Value (price, gift, rank)

With the exception of the options and likelihood of installation, the same questions were presented in Section IV as in Section III.

An explanatory note describing the answering procedure for the semantic differential scales was included before Section III and IV. An example was given, with emphasis placed correct location of answers in space provided. Section V was a repeat of Section II. In the presentation to the question, the products presented in Section III and IV are mentioned as indicative of potential communication system building blocks. The assumption is also made that any equipment can be purchased and "just plugged in."

Eleven questions on speed of and quality of service and repair are given.

A message to the respondent was included in two places. On the outside envelope a introductory note appeared, stating the purpose and extent of the questionnaire, as well as an emphasized "bonus included". The potential respondent then had the opportunity to read this note and accept or reject the task while the agent waited. A letter of introduction formed an introduction to the questionnaire, stating both purpose, directions for completion and a vote of thanks.

Finally, the gift, a critical item, was selected. A two-tone, attractive "dialing-pen" which could be readily attached to any telephone receiver. The pen could be used for both message taking and dialing. One was enclosed with each questionnaire.

(5.4) Format

An impasse was reached when the question of format had to be resolved. Given the list of attributes (Section 4.5) and the list of devices (Section 5.3), a total of (6 x 7 x 2 x 2) = 168 basic questions had to be asked. Adding to these the background and service quest-

ions, as well as the dependent variables created a sum total of over 300 possible questions.

Noting that a matrix tends to condense information while retaining all the data and improving on the clarity of the presentation, a novel approach to the format was conceived. Both "receiver" and "accessory" sections were structured as a matrix, with devices in successive columns and attributes in rows. A photo and description was located at the top of each column, and questions on each attribute formed the left hand side. The blank scales were provided in the matrix position at each intersection. The questionnaire was so designed and produced. Most questions of interest were included within a total of 12 pages, 4 of which were 11" x 17" foldouts.

Exhibit ( ) presents the first message on the outside envelope, English version. Exhibit ( ) the French version. The business reply envelope is shown as Exhibit ( ), and the English and French versions of the questionnaire are marked Exhibits ( ) and ( ) respectively.

(5.5) Reflections on Questionnaire

In reviewing the questionnaire, both in content

and format, some errors were noted, others were brought to the researchers' attention during the waiting period. The most serious error occured in the French version of the questionnaire. Due to lack of space, question 6.0.0 of the second foldout, Page 6 in the English copy, could not be placed on the same page in the French version. An additional page was typed as a continuation for the fold-out, but it ended up being numbered (11a). The outcome of this error is two-fold.

(a) Question 6.0 in the French version cannot be used.

(b) Since these variables are missing in the French data, all variables beyond 6.0 will be advanced by 14 spaces on the data cards, while the last 14 columns on the French replies will have to be ignored. Separate input format cards for the English and French data will have to be prepared.

A similar error resulted from placing Question 8.0, which appears on Page 10 in the English version, on Page 9 in the French one. Since the coding will have to be identical for both, the input format will have to be modified to permit proper variable identification in the French data.

Part V of both questionnaires carries the same numbers as appear in Part IV. Care will have to be taken to avoid data sorting errors.

The English copy contains some grammatical and layout errors, but none of these is critical to the objectives of the questionnaire. An example of this type of error is Question 1.1; "Family status of person answering questionnaire". The options should have read: "Husband", "Wife" or"Child". Of more consequence, translation errors have been brought to our attention, however, as the translation was intentionally literal, the errors were not considered sufficiently serious to require corrective action. The response rate indicates that the work was well received by both sectors.

(5.6) The Data Sample

The distribution method remained to be finalized. Initially two methods of distribution were considered; personal interviews with 200 telephone users in urban Quebec and Ontario, or distribution by mail to 2000 users in the same area; in both cases in both English and French. A review of the information requirements indicated that the questionnaire would be too lengthy for

mailing, as the expected yield was considered inversely proportional to the work demanded of the respondent.

At that point a third alternative presented itself. The Contemporary Research Centre, a Montreal Market Research Agency, offered to distribute 2200 questionnaires (1600 English, 600 French), by hand, to a representative sample of Canadian homes. The sample selection was statistically matched to the results of the last Canada Census (46). The questionnaires were carried by the agency's interviewers during their scheduled visits to selected homes. Following a personal interview, the agent presented the sealed envelope containing the telephone questionnaire to the potential respondent, who then either accepted or declined the task.

Distribution commenced on August 27. 640 returns were counted by October 9th. (480 English, 160 French). Samples taken indicated that approximately 70% were properly completed. Of the remaining 30% some were partially complete and others blank. 445 English and 143 French questionnaires were coded and keypunched for analysis.

5.7 The Statistical Package

For the analysis of the responses we have

selected to use SPSS (33) (statistical package for the social sciences), an integrated set of programs designed specifically for handling complex data files.

SPSS provides the user with a comprehensive set of procedures for data transformation and file manipulation, as well as a large number of statistical routines. In addition to such descriptive statistics as simple frequency distributions and cross tabulations. SPSS permits simple correlation, partial correlation, multiple regression, factor analysis and Guttman scaling. Additional flexibility is provided through a data-management capability which permits file modifications, sample selection and weighting.

Statistical procedures in SPSS are organized such that specific operations on the data (all or selected parts) can be requested. For each operation options are available which permit selective inclusion or exclusion of cases and optional selection of outputs and formats. Statistics required for each operation on the data is also requested before the test. For hypothesis testing the selected statistics provide the measure of confidence in the results.

Phase I of the analysis consists of condesting and grouping the background and service data to obtain the characteristics of the distribution for each of the variables tested. The statistical procedure chosen for this operation is the "codebook" routine (33). "Codebook" produces histograms for each of the variables entered, and for which a "codebook" frequency table has been generated (Option 4). Requesting all the statistics provides measures of:

(1) Mean
(2) Standard Error
(3) Median
(4) Mode
(5) Standard Deviation
(6) Variance
(7) Kurtosis
(8) Skewness
(9) Range
(10) Minimum
(11) Maximum (33), (36).

(Appendix I includes all "codebook" outputs obtained during Phase I).

"Crosstabs" procedure is used for Phase II of the analysis. Subprogram "Crosstabs" computes two-way to N-way joint frequency distributions, displaying the distribution of cases within each axial variable in the matrix space of the joint frequency distribution table

produced. Statistical analysis can now be applied to yield measures of association between pairs of variables within the joint frequency tables. (33), (1).

Options 3 and 4 are requested for this procedure during the initial run. These options cause the row and column percentages to be deleted, leaving only row and column totals in the outputs.

The Chi square statistic (33), (36) is requested as the measure of significance. Chi square gives the most accurate result when applied to tables with a large number of N. As Chi square distribution tables are based on large sampling. (33), (36) (Appendix II includes all outputs for Phase II of the analysis).

To determine the degree of covariation between belief, attitude and intention scores in the responses, Phase—III applies the Pearson Correlation Subprogram (33) to the data. The application of the Pearson correlation procedure permits a rapid scanning of the data to determine which variables in the data are interrelated and to what extent. This coefficient is a measure of the spread of the data about the linear least squares equation.

As this program automatically generates significance figures, only the options need be selected.

Option 3, request for a two-tail test of significance, and Option 4, for output in matrix form are used. (Appendix IV includes all outputs for Phase III of the analysis).

Phase V of the analysis is forms a major contribution to attaining the objectives sought. Here the data is subjected to multiple-regression analysis (36) (1) by use of subprogram "regression" (33).

Multiple linear regression strives to generate a linear combination of independent variables which will correlate as highly as possible with the dependent variable. (in this case the independent variables are the attributes and the dependent variables are the intentions). The optimum equation is generate through an iterative process yielding a relationship of the form.

$$D = b_1 I_1 + b_2 I_2 + \text{---} b_n I_n + C + r \ (\ )$$

Where D = The dependent variable

I_n = The nth independent variable

b_n = The nth unnormalized regression coefficient

C = Constant

r = Residual

The optimization process is such that the residual has a mean of zero, and its standard deviation is the smallest possible for any linear combination of I's. As a consequence, the residual and D have zero correlation.

The regression equation may now be used to "predict" values of the dependent variable given any combination of independent variables. Another application of this equation is to study the relationship between dependent and independent variables. i.e. to what extent does knowing a respondent's evaluation of attributes "predict" his intention to act?

For each iteration, the following statistics are produced - mutipleR , R-square and the standard error, as well as a summary of the predictive equation. The R - square can be interpreted as the proportion of the variance in the dependent variable which is explained by the equation. The standard error, being in effect equal in magnitude to the residual, is the typical error of pre-

diction. The F statistic is also computed at each step. The F statistic computed is the ratio of two unbiased estimates of the variance in the data (one using the regression variables, the other the residuals). The F statistic can be used for significance testing by consulting a table of the F distribution. The two degrees of freedom ( ) ( ) required are provided by the subprogram "regression".

Option (2) for the pairwise deletion of cases, and statistics (2) to provide the means, standard deviations, and number of valid cases included are requested for phase V.

(All outputs for Phase V of the analysis are included in Appendix IV.

Chapter 6

ANALYSIS OF RESPONSES

(6.1) Coding the Returned Questionnaires:

In reviewing the returned questionnaires, it was decided that some of the data will not be used, at least for the initial runs of the program. Due to the effort required for coding, these sections which required more than a single transformation were not included in the first data bank.

The questions not considered were:

(a) The age portions of question .1.5 in the background part.

(b) The "type of set" and its "location", question (2.1.3) of Part I.

(c) All of Part II (Questions 3.0 to 3.8) and questions 6.1 to 6.8 dealing with the ideal home communications system. Both these sections required an initial transformation of the system as presented into a "value" variable. The transformation required was:

In each case find the nearest equivalent to the products listed under (3.0) and (6.3) by referring to the foldouts. After adding the total value of the system

using the prices given as a case, classification may be as follows:

Total Value	Assign Variable
Less than $25.	0
$26 to $50	1
$51 to $75	2
$76 to $100	3
$101 to $125	4
$126 to $150	5
$151 to $175	6
$176 to $200	7
$201 to $225	8
Greater than $205	9

not necessary as in the transformation to get order out of the section

The variable for question 3.0 could be denoted by "PRFCOMS". And the variable for question 6.3 would be assigned the code "IDLCOMS".

The remainder of the variables have all been coded. Tables 1 to 4 which follow provide a complete listing of these variables and their location in the data bank.

The sequence of analysis for the initial run is given by the source listing for the SPSS package in Appendix I. Commands for each phase of the analysis are included in this document which may be used as a detailed index for the computer printouts included in Appendices II to IV. Appendix I also contains a listing of source

commands which can be used for further analysis of the data. This second listing includes the variable names for the transformed variables, as well as the "compute" statements required to effect the transformations. Both source programs are on cards and on file at the computing center, as are the data files.

(6-2) Statistics on Respondents

Appendix II contains all the "codebook" computer printouts. For each variable in the background and service sections, a histogram is printed, mapping the distribution of replies by province. Table 6-4 presents a condensed statistical breakdown on the responses.

TABLE 6-1

Background

Variable No.	Variable Name	Answer to question No.	Possible Answers and Code	Location on Data Card	
				Card No.	Column No.
1	BK01	Province	(0) = Quebec (1) = Ontario (2) = Manitoba (3) = Saskatchewan (4) = Alberta (5) = British Columbia (6) = New Brunswick (7) = Nova Scotia (8) = Newfoundland (9) = N.W.T.	1	8
2	BK02	1.1	(1) Father (2) Mother (3) Child	1	10
3	BK03	1.2	Age; (1) under 15 (2) 15 - 24 (3) 25 - 34 (4) 35 - 44 (5) 45 - 54 (6) over 54	1	11
4	BK04	1.3	Sex; (1) = Male (2) = Female	1	12
5	BK05	1.4	Marital Status; (1) = Single (2) = Married (3) = Widow (4) = Separated (5) = Divorced	1	13

Table 6-1 Continued

Variable No.	Variable Name	Answer to question No.	Possible Answers and Code	Location on Data Card	
				Card No.	Column No.
6	BK06	1.5	Male children: 0 - 9	1	14
7	BK07	1.5	Female children: 0 - 9	1	15
8	BK08	1.6	Father 0 - 9	1	16
9	BK09	1.6	Mother 0 - 9	1	17
10	BK 10	1.6	1st. son 0 - 9	1	18
11	BK 11	1.6	2nd. son 0 - 9	1	19
12	BK 12	1.6	1st. daughter 0 - 9	1	20
13	BK 13	1.6	2nd. daughter 0 - 9*	1	21
15	BK 14	1.6	3rd. daughter 0 - 9*	1	22
15	BK 15	1.7	(1) = Grade School (2) = High school (3) = Vocational Train-ing (4) = Undergraduate (5) = Graduate	1	23 B - 24
16	BK 15	1.8	Occupation: (0) = Executive (1) = Manager, Supervisor (2) = Professional (3) = Government (4) = Blue Collar, Construction	1	25

Table 6-1 Continued

			(5) = Office Position (6) = House Wife (7) = Retired (8) = Student (9) = Unemployed		
17	BK 17	1.9	Income; (1) = Less than 3999 (2) = 4000 - 5999 (3) = 6000 - 9999 (4) = 10,000 - 14,999 (5) = over 15,000	1	26
18	BK 18	2.0	(1) = own home (2) = rent	1	27
19	BK 19	2.0	Number of rooms (0-9)	1	28
20	BK 20	2.1.1	Number of Lines (0-9)	1	29
21	BK 21	2.1.2	Number of Sets (0-9)	1	30

(*Variables Missing in French Version)

TABLE 6-2

Types of Receivers

Var. No.	Variable Name	Answer to Question No.	Description and Type	Location in Data	
				Card No.	Column No.
22			Style/Beliefs		
22	STBPB	5.1.1a	Black Phone	1	32
23	STTTB	5.1.2a	Touch Tone	1	33
24	STWPB	5.1.3a	Wall Phone	1	34
25	STCONB	5.1.4a	Contempra	1	35
26	STHSB	5.1.5a	Head Set	1	36
27	STAPB	5.1.6a	Antique	1	37
28	STERCB	5.1.7a	Ericofon	1	38
			Style/Attitude		
29	STBPA	5.1.1b	Black Phone	1	39
30	STTTA	5.1.2b	Touch Tone	1	40
31	STWPA	5.1.3b	Wall Phone	1	41
32	STCONA	5.1.4b	Contempra	1	42
33	STHSA	5.1.5b	Headset	1	43
34	STAPA	5.1.6b	Antique	1	44
35	STERCA	5.1.7b	Ericofon	1	45
			Dialing/Belief		
36	DIABPB	5.2.1a	Black Phone	1	46
37	DIATTB	5.2.2a	Touch Tone	1	47
38	DIAWPB	5.2.3a	Wall Phone	1	48
39	DIACONB	5.2.4a	Contempra	1	49
40	DIAHSB	5.2.5a	Headset	1	50
41	DIAAPB	5.2.6a	Antique	1	51
42	DIAERCB	5.2.7a	Ericofon	1	52
			Dialing/Attitude		
43	DIABPA	5.2.1b	Black Phone	1	53
44	DIATTA	5.2.2b	Touch Tone	1	54
45	DIAWPA	5.2.3b	Wall Phone	1	55
46	DIACONA	5.2.4b	Contempra	1	56
47	DIAHSA	5.2.5b	Headset	1	57
48	DIAAPA	5.2.6b	Antique	1	58
49	DIAERCA	5.2.7b	Ericofon	1	59

Table 6-2 Continued

Var. No.	Variable Name	Answer to Question No.	Description and Type	Location in Data	
				Card No.	Column No.
			Comfort/Belief		
50	COMBPB	5.3.1a	Black Phone	1	60
51	COMTTB	5.3.2a	Touch Tone	1	61
52	COMWPB	5.3.3a	Wall Phone	1	62
53	COMCONB	5.3.4a	Contempra	1	63
54	COMHSB	5.3.5a	Headset	1	64
55	COMAPB	5.3.6a	Antique	1	65
56	COMERCB	5.3.7a	Ericofon	1	66
			Comfort/Attitude		
57	COMBPA	5.3.1b	Black Phone	1	67
58	COMTTA	5.3.2b	Touch Tone	1	68
59	COMWPA	5.3.3b	Wall Phone	1	69
60	COMCONA	5.3.4b	Contempra	1	70
61	COMHSA	5.3.5b	Headset	1	71
62	COMAPA	5.3.6b	Antique	1	72
63	COMERCA	5.3.7b	Ericofon	1	73
			Utility/Belief		
64	UTYBPB	5.4.1a	Black Phone	2	8
65	UTYTTB	5.4.2a	Touch Tone	2	9
66	UTYWPB	5.4.3a	Wall Phone	2	10
67	UTYCONB	5.4.4a	Contempra	2	11
68	UTYHSB	5.4.5a	Headset	2	12
69	UTYAPB	5.4.6a	Antique	2	13
70	UTYERCB	5.4.7a	Ericofon	2	14
			Utility/Attitude		
71	UTYBPA	5.4.1b	Black Phone	2	15
72	UTYTTA	5.4.2b	Touch Tone	2	16
73	UTYWPA	5.4.3b	Wall Phone	2	17
74	UTYCONA	5.4.4b	Contempra	2	18
75	UTYASA	5.4.5b	Headset	2	19
76	UTYAPA	5.4.6b	Antique	2	20
77	UTYERCA	5.4.7b	Ericofon	2	21

Table 6-2 Continued

Var. No.	Variable Name	Answer to Question No.	Description and Type	Location in Data Card No.	Location in Data Column No.
			Maintenance/Belief		
78	MANBPB	5.5.1a	Black Phone	2	22
79	MANTTB	5.5.1a	Touch Tone	2	23
80	MANWPB	5.5.1a	Wall Phone	2	24
81	MANCONB	5.5.1a	Contempra	2	25
82	MANHSB	5.5.1a	Headset	2	26
83	MANAPB	5.5.1a	Antique	2	27
84	MANERCB	5.5.1a	Ericofon	2	28
			Maintenance/Attitude		
85	MANBPA	5.5.1b	Black Phone	2	29
86	MANTTA	5.5.2b	Touch Tone	2	30
87	MANWPA	5.5.3b	Wall Phone	2	31
88	MANCONA	5.5.4b	Contempra	2	32
89	MANHSA	5.5.5b	Headset	2	33
90	MANAPA	5.5.6b	Antique	2	34
91	MANERCA	5.5.7b	Ericofon	2	35
			Likelihood of Installation/Intention		
92	INSBPB	5.6.1a	Black Phone	2	37
93	INSTTB	5.6.2a	Touch Tone	2	38
94	INSWPB	5.6.3a	Wall Phone	2	39
95	INSCONB	5.6.4a	Contempra	2	40
96	INSHSB	5.6.5a	Headset	2	41
97	INSAPB	5.6.6a	Antique	2	42
98	INSERCB	5.6.7a	Ericfon	2	43
			Good Value/Belief		
99	INSBPA	5.6.1b	Black Phone	2	44
100	INSTTA	5.6.2b	Touch Tone	2	45
101	INSWPA	5.6.3b	Wall Phone	2	46
102	INSCONA	5.6.4b	Contempra	2	47
103	INSHSA	5.6.5b	Headset	2	48
104	INSAPA	5.6.6b	Antique	2	49
105	INSERCA	5.6.7b	Ericfon	2	50

Table 6-2 Continued

Var. No.	Variable Name	Answer to Question No.	Description and Type	Location in Data Card No.	Location in Data Column No.
			Likelihood of Purchase/Intention		
106	PURBPB	5.7.1a	Black Phone	2	51
107	PURTTB	5.7.2a	Touch Tone	2	52
108	PURWPB	5.7.3a	Wall Phone	2	53
109	PURCONB	5.7.4a	Contempra	2	54
110	PURHSB	5.7.5a	Headset	2	55
111	PURAPB	5.7.6a	Antique	2	56
112	PURERCB	5.7.7a	Ericofone	2	57
			Value for Price/ Belief		
113	VALBPA	5.7.1b	Black Phone	2	58
114	VALTTA	5.7.2b	Touch Tone	2	59
115	VALWPA	5.7.3b	Wall Phone	2	60
116	VALCONA	5.7.4b	Contempra	2	61
117	VALHSA	5.7.5b	Headset	2	62
118	VALAPA	5.7.6b	Antique	2	63
119	VALERC	5.7.7b	Ericofone	2	64
			Give as Gift?/ Intention		
120	GAGBPB	5.7.1c	Black Phone	2	65
121	GAGTTB	5.7.2c	Touch Tone	2	66
122	GAGWPB	5.7.3c	Wall Phone	2	67
123	GAGCONB	5.7.4c	Contempra	2	68
124	GAGHSB	5.7.5c	Headset	2	69
125	GAGAPB	5.7.6c	Antique	2	70
126	GAGERCB	5.7.7c	Ericofone	2	71
			Receive as a Gift?/ Intention		
127	RAGBPA	5.7.1d	Black Phone	2	72
128	RAGTTA	5.7.2d	Touch Tone	2	73
129	RAGWPA	5.7.3d	Wall Phone	2	74
130	RAGCONA	5.7.4d	Contempra	2	75
131	RAGHSA	5.7.5d	Headset	2	76
132	RAGAPA	5.7.6d	Antique	2	77
133	RAGERCA	5.7.7d	Ericofone	2	78

Table 6-2 Continued

Var. No.	Variable Name	Answer to Question No.	Description and Type	Location in Data Card No.	Location in Data Column No.
			Rank Sets/ Intention		
134	RNKBPB	5.8.1a	Black Phone	3	8
135	RNKTTB	5.8.2a	Touch Tone	3	9
136	RNKWPB	5.8.3a	Wall Phone	3	10
137	RNKCONB	5.8.4a	Contempra	3	11
138	RNKHSB	5.8.5a	Headset	3	12
139	RNKAPB	5.8.6a	Antique	3	13
140	RNKERCB	5.8.7a	Ericofone	3	14
			Options/Belief		
141	IMOPBPA	5.8.1b	Black Phone	3	15
142	IMOPTTA	5.8.2b	Touch Tone	3	16
143	IMOPWPA	5.8.3b	Wall Phone	3	17
144	IMOPCONA	5.8.4b	Contempra	3	18
145	IMOPHSA	5.8.5b	Headset	3	19
146	IMOPAPA	5.8.6b	Antique	3	20
147	IMOPERCA	5.8.7b	Ericofone	3	21
			Importance of Price/ Belief		
148	IMPRBPB	5.8.1c	Black Phone	3	22
149	IMPRTTB	5.8.2c	Touch Tone	3	23
150	IMPRWPB	5.8.3c	Wall Phone	3	24
151	IMPRCONB	5.8.4c	Contempra	3	25
152	IMPRHSB	5.8.5c	Headset	3	26
153	IMPRAPB	5.8.6c	Antique	3	27
154	IMPRERCB	5.8.7c	Ericofone	3	28
			Confidence/Belief		
155	CONFBPA	5.9.1	Black Phone	3	29
156	CONFTTA	5.9.2	Touch Tone	3	30
157	CONFWPA	5.9.3	Wall Phone	3	31
158	CONFCONA	5.9.4	Contempra	3	32
159	CONFHSA	5.9.5	Headset	3	33
160	CONFAPA	5.9.6	Antique	3	34
161	CONFERCA	5.9.7	Ericofone	3	35

Table 6-2 Continued

Var. No.	Variable Name	Answer to Question No.	Description and Type	Location in Data	
				Card No.	Column No.
			Seen Set/Belief		
162	SEENBP *	6.0.1a	Black Phone	3	36
163	SEENTT *	6.0.2a	Touch Tone	3	37
164	SEENWP *	6.0.3a	Wall Phone	3	38
165	SEENCON *	6.0.4a	Contempra	3	39
166	SEENHS *	6.0.5a	Headset	3	40
167	SEENAP *	6.0.6a	Antique	3	41
168	SEENERC *	6.0.7a	Ericofone	3	42
			Tried Set/Belief		
169	TRIDBP *	6.0.1b	Black Phone	3	43
170	TRIDTT *	6.0.2b	Touch Tone	3	44
171	TRIDWP *	6.0.3b	Wall Phone	3	45
172	TRIDCON *	6.0.4b	Contempra	3	46
173	TRIDHS *	6.0.5b	Headset	3	47
174	TRIDAP *	6.0.6b	Antique	3	48
175	TRIDERC *	6.0.7b	Ericofone	3	49

* These Variables missing on French version. All data beyond 175 on French replies is advanced by 14 spaces.

TABLE 6-3

Types of Accessories

Var. No.	Variable Name	Answer to Question No.	Description and Type	Location in Data	
				Card No.	Column No.
			Usefulness/Belief		
176	USTAMB	7.1.1a	Tel. Ans. Machine	3	51
177	USATDB	7.1.2a	Auto Dialer	3	52
178	USTPSB	7.1.3a	Plugs & Jacks	3	53
179	USWCHB	7.1.4a	Chimes	3	54
180	USMSLB	7.1.5a	Light	3	55
181	USVOCB	7.1.6a	Vol. Control	3	56
182	USHFTB	7.1.7a	Hands Free	3	57
			Usefulness/Attitude		
183	USTAMA	7.1.1b	Tel. Ans. Machine	3	58
184	USATDA	7.1.2b	Auto Dialer	3	59
185	USTPJA	7.1.3b	Plugs & Jacks	3	60
186	USWCHA	7.1.4b	Chimes	3	61
187	USMSLA	7.1.5b	Light	3	62
188	USVOLA	7.1.6b	Vol. Control	3	63
189	USHFTA	7.1.7b	Hands Free	3	64
			Convenience/Belief		
190	CONTAMB	7.2.1a	Tel. Ans. Machine	3	65
191	CONATDB	7.2.2a	Auto Dialer	3	66
192	CONTPJB	7.3.2a	Plugs & Jacks	3	67
193	CONWCHB	7.3.3a	Chimes	3	68
194	CONMSLB	7.2.5a	Light	3	69
195	CONVOCB	7.2.6a	Vol. Control	3	70
196	CONHFTB	7.2.7a	Hands Free	3	71
			Convenience/Attitude		
197	CONTAMA	7.2.1b	Tel.Ans. Machine	3	72
198	CONATDA	7.2.2b	Auto Dialer	3	73
199	CONTPJA	7.2.3b	Plugs & Jacks	3	74
200	CONWCHA	7.2.4b	Chimes	3	75
201	CONMSLA	7.2.5b	Light	3	76
202	CONVOCA	7.2.6b	Vol. Control	3	77
203	CONHFTA	7.2.7b	Hands Free	3	78

Table 6-3 Continued

Var. No.	Variable Name	Answer to Question No.	Description and Type	Location in Data	
				Card No.	Column No.
			Attractiveness/ Belief		
204	ATRTAMB	7.3.1a	Tel. Ans. Mach.	4	15
205	ATRATDB	7.3.2a	Auto Dialer	4	16
206	ATRTPJB	7.3.3a	Plugs & Jacks	4	17
207	ATRWCHB	7.3.4a	Chimes	4	18
208	ATRMSLB	7.3.5a	Light	4	19
209	ATRVOCB	7.3.6a	Vol. Control	4	20
210	ATRHFTB	7.3.7a	Hands Free	4	21
			Attractiveness/ Attitude		
211	ATRTAMA	7.3.1b	Tel. Ans. Mach	4	22
212	ATRATDA	7.3.2b	Auto Dialer	4	23
213	ATRJPJA	7.3.3b	Plugs & Jacks	4	24
214	ATRWCHA	7.3.4b	Chimes	4	25
215	ATRMSLA	7.3.5b	Light	4	26
216	ATRVOCA	7.3.6b	Vol. Control	4	27
217	ATRHFTA	7.3.7b	Hands Free	4	28
			Prestige/Belief		
218	PRSTAMB	7.4.1a	Tel Ans. Mach	4	29
219	PRSATDB	7.4.2a	Auto Dialer	4	30
220	PRSTPJB	7.4.3a	Plugs & Jacks	4	31
221	PRSWCHB	7.4.4a	Chimes	4	32
222	PRSMSLB	7.4.5a	Light	4	33
223	PRSVOCB	7.4.6a	Vol. Control	4	34
224	PRSHFTB	7.4.7a	Hands Free	4	35
			Prestige/Attitude		
225	PRSTAMA	7.4.1b	Tel Ans. Mach	4	36
226	PRSATDA	7.4.2b1	Auto Dialer	4	37
227	PRSTPJA	7.4.3b	Plugs & Jacks	4	38
228	PRSWCHA	7.4.4b	Chimes	4	39
229	PRSMSLA	7.4.5b	Light	4	40
230	PRSVOCA	7.4.6b	Vol. Control	4	41
231	PRSHFTA	7.4.7b	Hands Free	4	42

Table 6-3 Continued

Var. No.	Variable Name	Answer to Question No.	Description and Type	Location in Data	
				Card No.	Column No.
			Privacy/Belief		
232	PRVTAMB	7.5.1	Tel. Ans. Mach.	4	43
233	PRVATDB	7.5.2	Auto Dialer	4	44
234	PRVTPJB	7.5.3	Plugs & Jacks	4	45
235	PRVWCHB	7.5.4	Chimes	4	46
236	PRVMSLB	7.5.5	Light	4	47
237	PRVVOCB	7.5.6	Vol. Control	4	48
238	PRVHFTB	7.5.7	Hands Free	4	49
			Privacy/Attitude		
239	PRVTAMA	7.5.1b	Tel. Ans. Mach	4	51
240	PRVATDA	7.5.2b	Auto Dialer	4	52
241	PRVTPJA	7.5.3b	Plugs & Jacks	4	53
242	PRVWCHA	7.5.4b	Chimes	4	54
243	PRVMSLA	7.5.5b	Light	4	55
244	PRVVOCA	7.5.6b	Vol. Control	4	56
245	PRVHFTA	7.5.7b	Hands Free	4	57
			Security/Belief		
246	SECTAMB	7.6.1a	Tel. Ans. Mach	4	58
247	SECATDB	7.6.2a	Auto Dialer	4	59
248	SECTPJB	7.6.3a	Plugs & Jacks	4	60
249	SECWCHB	7.6.4a	Chimes	4	61
250	SECMSLB	7.6.5a	Light	4	62
251	SECVOCB	7.6.6a	Vol. Control	4	63
252	SECHFTB	7.6.7a	Hands Free	4	64
			Security/Attitude		
253	SECTAMA	7.6.1b	Tel. Ans. Mach.	4	65
254	SECATDA	7.6.2b	Auto Dialer	4	66
255	SECTPJA	7.6.3b	Plugs & Jacks	4	67
256	SECWCHA	7.6.4b	Chimes	4	68
257	SECMSLA	7.6.5b	Light	4	69
258	SECVOCA	7.6.6b	Vol. Control	4	70
259	SECHFTA	7.6.7b	Hands Free	4	71

Table 6-3 Continued

Var. No.	Variable Name	Answer to Question No.	Description and Type	Location in Data	
				Card No.	Column No.
			Likelihood of Purchase/Intention		
260	PURTAM	7.7.1a	Tel. Ans. Mach.	5	8
261	PURATD	7.7.2a	Auto Dialer	5	9
262	PURTPJ	7.7.3a	Plugs & Jacks	5	10
263	PURWCH	7.7.4a	Chimes	5	11
264	PURMSL	7.7.5a	Light	5	12
265	PURVOC	7.7.6a	Vol. Control	5	13
266	PURHFT	7.7.7a	Hands Free	5	14
			Good Value for Money?/Belief		
267	VALTAM	7.7.1b	Tel. Ans. Mach.	5	15
268	VALATD	7.7.2b	Auto Dialer	5	16
269	VALTPJ	7.7.3b	Plugs & Jacks	5	17
270	VALWCH	7.7.4b	Chimes	5	18
271	VALMSL	7.7.5b	Light	5	19
272	VALVOC	7.7.6b	Vol. Control	5	20
273	VALHFT	7.7.7b	Hands Free	5	21
			Give as Gift?/ Intention		
274	GAGTAM	7.7.1c	Tel. Ans. Mach.	5	22
275	GAGATD	7.7.2c	Auto Dialer	5	23
276	GAGTPJ	7.7.3c	Plugs & Jacks	5	24
277	GAGWCH	7.7.4c	Chimes	5	25
278	GAGMSL	7.7.5c	Light	5	26
279	GAGVOC	7.7.6c	Vol. Control	5	27
280	GAGHFT	7.7.7c	Hands Free	5	28
			Desire as a Gift?/ Intention		
281	RAGTAM	7.7.1d	Tel. Ans. Mach.	5	29
282	RAGATD	7.7.2d	Auto Dialer	5	30
283	RAGTPJ	7.7.3d	Plugs & Jacks	5	31
284	RAGWCH	7.7.4d	Chimes	5	32
285	RAGMSL	7.7.5d	Light	5	33
286	RAGVOC	7.7.6d	Vol. Control	5	34
287	RAGHFT	7.7.7d	Hands Free	5	35

Table 6-3 Continued

Var. No.	Variable Name	Answer to Question No.	Description and Type	Location in Data Card No.	Column No.
			Ranking/Intention		
288	RNKTAM	7.8.1	Tel. Ans. Mach	5	36
289	RNKATD	7.8.2	Auto Dialer	5	37
290	RNKTPJ	7.8.3	Plugs & Jacks	5	38
291	RNKWCH	7.8.4	Chimes	5	39
292	RNKMSL	7.8.5	Light	5	40
293	RNKVOC	7.8.6	Vol. Control	5	41
294	RNKHFT	7.8.7	Free Hands	5	42
			Confidence/Belief		
295	CONFTAM	7.9.1	Tel. Ans. Mach	5	43
296	CONFATD	7.9.2	Auto Dialer	5	44
297	CONFTPJ	7.9.3	Plugs & Jacks	5	45
298	CONFWCH	7.9.4	Chimes	5	46
299	CONFMSL	7.9.5	Light	5	47
300	CONFVOC	7.9.6	Vol. Control	5	48
301	CONFHFT	7.9.7	Free Hands	5	49
			Seen Set?/Intention		
302	SEENTAM	8.0.1a	Tel. Ans. Mach. *	5	50
303	SEENATD	8.0.2a	Auto Dialer *	5	51
304	SEENTPJ	8.0.3a	Plugs & Jacks *	5	52
305	SEENWCH	8.0.4a	Chimes *	5	53
306	SEENMSL	8.0.5a	Light *	5	54
307	SEENVOC	8.0.6a	Vol. Control *	5	55
308	SEENHFT	8.0.7a	Free Hands *	5	56
			Tried Set?/Belief		
309	TRIDTAM	8.0.1b	Tel. Ans. Mach *	5	57
310	TRIDATD	8.0.2b	Auto Dialer *	5	58
311	TRIDTPJ	8.0.3b	Plugs & Jacks *	5	59
312	TRIDWCH	8.0.4b	Chimes *	5	60
313	TRIDMSL	8.0.5b	Light *	5	61
314	TRIDVOC	8.0.6b	Vol. Control *	5	62
315	TRIDHFT	8.0.7b	Free Hands *	5	63

*These answers present a program in the French Questionnaire, as question 8.0. appears on the previous page. See section 5.7 for details.

PROBLEM

Table 6-4
Service and Repair

a = attitude score
b = belief score

Var. No.	Variable Name	Answer to Question No.	Possible Answers and Code	Location in Data	
				Card No.	Column No.
316	SRP01	7.1.1	Installation 1-7 (b)	5	65
317	SRP02	7.1.2	Installation 1-7 (a)	5	66
318	SRP03	7.2.1	Choice 1-7 (b)	5	67
319	SRP04	7.2.2	Choice 1-7 (a)	5	68
320	SRP05	7.3.1	Helpfulness 1-7 (b)	5	69
321	SRP06	7.3.2	Helpfulness 1-7 (a)	5	70
322	SRP07	7.4.1	Breakdowns 1-7 (b)	5	71
323	SRP08	7.4.2	Breakdowns 1-7 (a)	5	72
324	SRP09	7.5.1	No. of Days 1-10 (b)	5	73
325	SRP10	7.5.2	Speed 1-7 (b)	5	74
326	SRP11	7.5.3	Speed 1-7 (a)	5	75

The price variable would have to be inputed separately, since it is common to each column of the foldout, and no purpose is served by repeated data entry.

Table 6-4

Statistics of Respondents

Table 6.4.1: Population by Language Spoken

Province	English		French		Total		1971 Census		
	No.	%	No.	%	No.	%	Eng.	French	Total Province
Quebec	65	14.6	133	93.0	198	33.7	13.1	80.7	27.8
Ontario	170	38.2	3	2.1	173	29.4	77.5	6.3	35.7
Manitoba	30	6.7	2	1.4	32	5.4	67.1	6.1	4.6
Sask.	33	7.4	1	.7	34	5.9	74.1	3.4	4.3
Alberta	38	8.5	-	-	38	6.6	77.6	2.9	7.4
B.C.	62	13.9	2	1.4	64	10.9	82.7	1.7	10.2
New Brunswick	16	3.6	1	.7	17	2.9	64.7	34.0	2.9
Nova Scotia	26	5.8	1	.7	27	4.6	93.0	5.0	3.7
New Found-land	5	1.1	-	-	5	.8	98.5	.7	2.52
N.W.T.	0	-	-	-	-	-	-	-	-
TOTAL	445	100	143	100	382	100			100

Table 6.4.2: Age Distribution

Age Group	English	French	Total		1971 Census	
			No.	%	Actual	Adj.*
Less than 15	4	4	8	1.4%	33.1%	0
15-24	72	25	97	17	16.5	24.6
25-34	120	38	158	27.8	12.4	18.5
35-44	72	28	100	17.5	12.7	19
45-54	71	22	93	16.3	10.4	15.5
over 54	91	22	113	20	15.1	22.6
TOTAL	430	139	569	100	100	100

*(Figures have been normalized to exclude the under 15 group).

Table 6.4.3: Population by Sex

Sex	English	French	Total		Census
			No.	%	
Male	171	68	239	42.5	50.4
Female	253	72	325	57.5	49.6
TOTAL	424	140	564	100	100

Table 4.6.5: Marital Status of Respondents

Status	English	French	Total		1971 Census
			No.	%	
Single (over 15)	68	34	102	18	19.9
Married	310	92	402	70	45.3
Widow	35	5	40	7	4.4
Divorced	16	5	21	5	0.8
TOTAL	432	136	568	100%	100%

Table 4.6.6: Residence

Class	English	French	Total		1971 Census
			No.	%	
Own	321	87	408	76.5	60.3
Rent	84	41	125	23.5	39.7
TOTAL	405	128	533	100%	100%

It is evident that the coded replies are representative of the Canadian population. Future analysis which utilizes detailed socio-economic data may verify the number of children, income and occupation variables.

(6.3) Characteristics of Respondents:

6.3.1 - Confidence in Responses

The confidence level can be interpreted as indicative of information level or experience with a product

or service. During the initial analysis it is only used to form hypothesis, which may be tested during future analysis by incorporating this data into the attitudes and/or beliefs.

Tables 6.5.1 to 6.5.4 summarize the confidence scores for the receivers (English and French) and the accessories (English and French) respectively. Low confidence is a score of 1.0. High confidence is a score of 7.00. No reply is a score of 0.0.

The histograms are included in Appendix I.

Table 6.5.1: Confidence About Receivers (English)

Product \ Score (%)	1.0	2.0	3.0	4.0	5.0	6.0	7.0	No Reply
Black Phone	4.7	2.0	3.4	6.1	4.7	10.3	39.8	29
Touch-Tone	5.2	2.9	2.7	8.1	5.6	13.3	30.8	31.5
Wall Phone	3.1	2.7	1.8	6.5	5.4	10.1	39.1	31.2
Contempra	7.0	2.0	4.5	9.9	7.9	10.8	26.5	31.5
Headset	23.8	5.2	4.7	7.2	3.6	4.0	17.3	34.2
Antique	13.3	4.0	4.9	7.2	4.3	6.3	26.5	33.5
Ericofone	15.3	5.4	4.5	9.7	3.6	7.4	20.9	33.3

Table 6.5.2: Confidence About Receivers (French)

Score (%) / Product	1.0	2.0	3.0	4.0	5.0	6.0	7.0	No Reply
Black Phone	7.7	.7	2.1	3.5	.7	9.1	27.3	49.0
Touch-Tone	2.8	2.1	.7	2.8	1.4	9.1	31.5	49.7
Wall Phone	2.8	2.1	1.4	4.2	1.4	7.0	32.2	49.0
Contempra	4.9	0	2.8	8.4	1.4	5.6	27.3	49.7
Headset	17.5	4.9	.7	7.0	2.8	4.2	10.5	52.4
Antique	10.5	2.8	2.8	7.7	3.5	5.6	14.7	52.4
Ericofone	14.0	4.2	2.8	6.3	2.1	4.2	14.0	52.4

Table 6.5.3: Confidence About Accessories (English)

%

Score (%) / Accessory	1.0	2.0	3.0	4.0	5.0	6.0	7.0	No Reply
Tel.Ans.Mach.	13.5	4.7	4.5	7.4	5.4	7.4	24.5	32.6
Auto-Dialer	11.9	6.1	4.3	7.9	4.9	6.3	24.5	34.2
Plugs & Jacks	6.1	1.6	1.3	3.8	5.4	9.0	39.3	33.5
Wall Chimes	5.8	4.3	3.4	8.3	6.5	9.4	28.1	34.2
Message Light	4.9	3.6	4.5	9.0	5.6	10.3	27.2	34.6
Volume Control	5.6	2.9	4.0	7.2	4.5	9.7	31.7	34.2
Hands Free Phone	12.6	5.4	3.4	8.8	2.9	8.3	24.9	33.7

Table 6.5.4: Confidence About Accessories (French)

%

Accessory \ Score (%)	1.0	2.0	3.0	4.0	5.0	6.0	7.0	No Reply
Tel.Ans.Mach.	11.9	5.6	2.1	4.9	1.4	7.0	12.6	54.5
Auto-Dialer	15.4	2.1	2.8	7.0	2.1	5.6	9.8	55.2
Plugs & Jacks	11.2	2.8	2.1	3.5	.7	2.8	21.0	55.9
Wall Chimes	8.4	2.1	5.6	5.6	.7	4.2	18.2	55.2
Message Light	9.8	3.5	2.8	4.2	4.2	3.5	17.5	54.5
Volume Control	10.5	4.2	1.4	8.4	.7	6.3	14.0	54.5
Hands Free Phone	9.8	7.0	4.2	6.3	1.4	4.2	11.9	55.2

6.3.2 - Respondents Experience with Products Shown

The tried and seen variables (included in Appendix I) are, of course, directly related to exposure and experience. As this data is only available for the English sector, it will not be used for the analysis (see section 5.6 for details). Tables 6.6.1 summarize the responses for the English sample.

(6.4) Correlation Analysis of Responses:

Hypothesis: For any variable pair specified, the two variables are independent at the specified significance level.

Table 6.6.1: Experience with Products (English)

Receivers	Tried (%)	Seen (%)	Accessories	Tried (%)	Seen (%)
Black Phone	77.8	80.4	Tel.Ans.Mach.	6.3	19.6
Touch Tone	55.3	69.4	Auto Dialer	5.6	13.7
Wall Phone	74.4	78.7	Plugs & Jacks	27.2	47.2
Contempra	43.6	63.1	Chimes	11.9	28.1
Headset	7.4	17.1	Signal Light	19.8	30.6
Antique Phone	13.5	46.3	Volume Control	13.0	20.4
Ericofon	18.9	36.6	Hands Free Phone	6.3	12.4

This phase of the analysis is designed to define the covariances that exist between variables. For each set of variables tested, a significance level is printed out, and the hypothesis proved or disproved. Appendix III contains all the printouts for this phase.

(6.4.1) Likelihood of Installation and Good Value; Likelihood of Purchase and Value for Price;

All the variables tested within this catagopy yielded significance figures of 0.000. We cannot reject the hypothesis that these variables are independent.

(6.4.2) All Intention vs All Belief Scores for Receivers

As above, resulting significance figures were .000. The variables are not independent.

(6.4.3) All Intention vs All Belief Scores for Accessories:

As above. Significance levels indicate that the variables are not independent.

(6.5) Crosstabulation of Intention Variables

Crosstabulation is an effective means for establishing the existance and extent of co-variance between two variables, while simultaneously providing a "mapping" of their behaviour. Exhibit IV contains all the crosstabulation printouts. The following tables provide a summary of the results. For this initial analysis run, one of the variable pair is always VAR001 the province of residence. For each class of product, the percentage of respondents that replied (7.0) is given. These are the individuals most likely to translate their intentions into behaviour (install or purchase).

Table 6.7.1 - High Intentions for Receiver Types
English

Variable / Receiver Type	Legend	Likelihood of Installation	Good Value	Likelihood of purchase	Value for price	Suitability as gift	Desire as gift
Black Phone	%	27.2	29.7	21.3	24.0	4.7	8.3
Touch Tone	%	13.3	16.6	5.4	6.5	3.8	16.6
Wall Phone	%	31.2	25.4	30.1	27.9	5.8	11.5
Contempra	%	12.8	10.6	5.2	3.8	4.7	15.1
Headset	%	1.8	4.3	1.6	3.8	2.7	4.5
Antique	%	4.5	7.2	4.5	4.9	8.5	17.3
Ericofon	%	3.8	5.4	3.1	5.4	5.4	9.9

TABLE 6.7.2 - HIGH INTENTIONS FOR RECEIVER TYPES
(French)

Variable / Receiver Type:	Legend	Likelihood of Installation	Good Value	Likelihood of Purchase	Value for Price	Suitability as Gift	Desire as Gift
Black Phone	%	25.9	13.3	23.1	12.6	9.1	8.4
Touch-Tone	%	21.7	11.2	8.4	13.3	5.6	11.9
Wall Phone	%	27.3	11.2	25.9	14.0	10.5	9.1
Contempra	%	21.7	14.7	9.1	13.3	5.6	13.3
Headset	%	6.3	13.3	6.3	11.9	4.9	7.7
Antique Phone	%	5.6	*18.9	8.4	15.4	14.7	18.9
Ericofon	%	8.4	*14.0	6.3	7.0	9.1	11.9

TABLE 6.7.3 - HIGH INTENTIONS FOR ACCESSORY TYPES
(English)

Variable / Accessory Type:	Legend	Likelihood of Purchase	Value for Price	Suitable as Gift	Desire as Gift
Tel. Ans. Mach.	%	3.1	12.4	3.1	13.3
Auto Dialer	%	3.8	11.7	3.6	9.7
Plugs & Jacks	%	38.2	42.9	12.4	19.8
Chimes	%	6.1	10.1	7.9	11.9
Signal Light	%	11.9	12.6	6.3	14.6
Volume Control	%	14.4	18.9	7.0	14.8
Hands Free Phone	%	3.4	4.9	4.0	14.6

TABLE 6.7.4 - HIGH INTENTIONS FOR ACCESSORY TYPES
(French)

Variable / Accessory Type:	Legend	Likelihood of Purchase	Value for Price	Suitable as Gift	Desire as Gift
Tel. Ans. Mach.	%	10.5	4.9	6.3	13.3
Auto Dialer	%	12.6	10.5	8.4	11.2
Plugs & Jacks	%	29.4	28.0	14.0	16.8
Chimes	%	11.9	14.7	7.7	10.5
Signal Light	%	15.4	9.8	9.1	10.5
Volume Control	%	13.3	14.0	10.5	11.9
Hands Free Phone	%	8.4	4.2	6.3	9.8

(6.6) Regression Analysis

Generating a regression equation for an intention variable (install, purchase) as a function of product attributes (style, convenience, etc.) permits an evaluation of consumer's intentions given specified product policies. This section of the analysis is devoted to generating such data. With the computer printouts in Appendix V for reference, the results obtained during this phase are summarized in the following tables. For each intention variable, the regression equation is stated by indicating (b_i) in the table. (See Section 5.5). This (b_i) is indicative of the relative importance of the specific attribute in the resulting intention equation. The constant in the equation is also reported. The R-square is reported in each column for each regression equation. R-square may be interpreted as the percentage (1.00 = 100%) variability in the dependent variable which is explained by the independent variables entered in the equation.

The F-statistic reported is the ratio of the explained to the unexplained variance. Thus the larger the F-ratio, the greater the predictive power of the equation.

To test for significance, the degrees of freedom for the variables in the regression equation and the residuals are reported. (DF regression and of residual). At the .01 level of significance (i.e. 99% confidence in equation) the equation is either accepted or rejected. Acceptance implies that the alternative hypothesis is true; i.e. the relationship indicated by the regression equation shown is significant to the .01 level.

TABLE 6.9.1 - REGRESSION EVALUATIONS FOR RECEIVERS (ENGLISH)

DEPENDENT VARIABLE: LIKELIHOOD OF PURCHASE

Receiver Type: / Attribute	Black Phone	Touch Tone	Wall Phone	Contempra	Head Set	Antique Phone	Ericofon
Style	.049	-.037	.075	.041	.038	-.011	-.021
Dialing	-.203	.077	-.097	.011	.032	.025	.067
Comfort	.154	.043	.223	.017	.027	.106	.039
Utility	.144	-.071	.084	.013	.059	.054	.034
Maintenance	.006	.085	-.041	.122	.012	.030	.075
Value for Price	.644	.481	.688	.487	.275	.414	.462
Constant C	.100	.304	.087	-.003	.193	.152	.033
R - Square	.538	.384	.639	.470	.346	.378	.495
DF Regression	6	6	6	6	6	6	6
DF Residual	438	438	438	438	438	438	438
F - Statistic	85.02	45.5	129.4	64.88	38.56	44.5	71.74
Accept @ .01 Sig.:	Yes	Yes	Yes	Yes	Yes	Yes	Yes

TABLE 6.9.2 - REGRESSION EQUATIONS FOR RECEIVERS (ENGLISH)

DEPENDENT VARIABLE: LIKELIHOOD OF INSTALLATION

Receiver Type: / Attribute	Black Phone	Touch Tone	Wall Phone	Contempra	Head Set	Antique Phone	Ericofon
Style	.295	0	.098	.009	.038	.061	.012
Dialing	-.083	0	-.026	-.022	6008	.010	.039
Comfort	.080	0	.213	.058	.019	.086	.104
Utility	.078	.237	.177	.114	.008	.015	-.065
Maintenance	.036	.165	-.019	.164	.068	.009	.063
Good Value	.522	.466	.504	.429	.149	.289	.320
Constant C	.208	.141	.270	.259	.349	.162	.172
R - Square	.425	.480	.484	.410	.219	.305	.362
DF Reg-ression	6	3	6	6	6	6	6
DF Residual	438	441	438	438	438	438	438
F Statistic	53.96	135.92	68.7	50.84	20.49	32.11	41.45
Accept @ .01 Sig:	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 6.9.3 - Regression Equations for Receivers (French)

Dependent Variable: Likelihood of Installation

Receiver Type / Attribute	Black Phone	Touch Tone	Wall Phone	Con-tempra	Head set	Antique Phone	Eric-ofon
Style	.122	-.017	.035	-.049	.116	-.029	-.170
Dailing	-.042	.045	.064	.118	.077	.160	.109
Comfort	.181	.292	.107	.229	.124	.211	.337
Utility	.212	.074	.198	.200	.120	.160	.092
Maintenance	.329	.471	.424	.464	.080	.128	.234
Good Value	.339	.162	.337	.109	.111	.115	.182
Constant C	.043	.054	.019	.040	-.038	-.023	-.075
R-Square	.565	.669	.615	.647	.425	.478	.521
DF Regression	6	6	6	6	6	6	6
DF Residual	136	136	136	136	136	136	136
F-Statistic	29.47	45.89	36.2	41.6	16.75	20.782	24.65
Accept at .01 Sig.	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 6.9.4 - Regression Equations for Receivers (French)

Dependent Variable: Likelihood of Purchase

Receiver Type / Attribute	Black Phone	Touch Tone	Wall Phone	Con-tempra	Headset	Antique Phone	Ericofon
Style	.029	.137	.05	.063	.096	.036	-.039
Dialing	-.086	-.057	.098	.078	-.025	.097	.117
Comfort	.230	.079	.124	.218	.014	.115	.172
Utility	.218	.116	.198	.027	.040	.066	.103
Maintenance	.299	.162	.164	.139	.142	0	.096
Value for Price	.317	.184	.515	.141	.280	.414	.406
Constant C	.170	.248	.235	.083	.214	.001	-.050
R-Square	.564	.359	.559	.406	.374	.540	.537
DF Regression	6	6	6	6	6	5	6
DF Residual	136	136	136	136	136	137	136
F-Statistic	29.39	12.69	28.81	15.51	13.52	32.17	26.27
Accept at .01 Sig.	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 6.9.5 - Regression Equations for Accessories (English)

Dependent Variable: Likelihood of Purchase

Accessory Type / Attribute	Tel.Ans. Machine	Auto-Dialer	Plugs & Jacks	Chimes	Message Light	Volume Control	Hands Free Phone
Usefulness	.118	.173	.248	.238	.214	.227	.082
Convenience	-.015	0	.021	.031	-.048	0	.055
Attractiveness	.082	-.027	.013	-.036	-.037	-.179	.043
Prestige	.024	.009	-.020	.020	.068	.098	-.036
Privacy	-.022	-.044	-.078	0	0	-.053	-.031
Security	.049	.123	.028	.135	.206	.203	.079
Value for Price*	.194	.322	.673	.419	.468	.532	.259
Constant C	.089	.115	-.057	.083	-.032	-.025	.143
R-Square	.356	.456	.767	.571	.636	.656	.343
DF Regression	7	6	7	6	6	6	7
DF Residual	437	438	437	438	438	438	437
F-Statistic	34.5	61.26	205.5	97.1	127.68	139.4	32.59
Accept at .01 sig.	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 6.9.6 - Regression Equations for Accessories (French)

Dependent Variable: Likelihood of Purchase

Accessory Type / Attribute	Tel.Ans. Machine	Auto-Dialer	Plugs & Jacks	Chimes	Message Light	Volume Control	Hands Free Phone
Useful-ness	.057	.086	.205	.205	.147	-.097	.037
Convenience	.024	-.065	.179	-.122	.014	.137	-.120
Attractive-ness	.204	.262	.213	.152	.306	.223	.182
Prestige	.286	.395	-.011	.033	.130	.301	.304
Privacy	.047	-.145	.145	.109	.117	.111	.268
Security	.201	.222	.097	.137	.284	.245	.232
Value for Price	.395	.350	.402	.408	.160	.280	.164
Constant C	-.285	-.118	-.134	.099	-.156	.026	-.079
R-Square	.680	.652	.798	.489	.664	.607	.549
DF Regression	7	7	7	7	7	7	7
DF Residual	135	135	135	135	135	135	135
F-Statistic	41.03	36.12	76.11	18.47	38.11	29.77	23.47
Accept at .01 sig.	Yes	Yes	Yes	Yes	Yes	Yes	Yes

(6.7) The Indices of Salient Product Attributes

The final task of this initial analysis is to summarize the indices of salient product attributes as computed. For each intention variable (e.g. likelihood of purchase, desire as gift, etc.) each of the attributes previously defined attains a different rank. This rank may be interpreted as the consumers perception of the relative importance of each product attribute as related to specific behavioural intentions.

For the initial analysis run the only dependent (intention) variable which is considered is the "likelihood of purchase" - the behaviour of most interest. For each product class and each of the French and English segments, these indices are tabulated in Tables 6.10.1 to 6.10.4. These indices are in fact the normalized regression coefficients (BETA) which have been generated by the regression analysis (Section 6.6; Appendix V). Each index is tabulated as a decimal, the total of any column is one. The highest value within each column is therefore the highest ranking attribute, and so forth. (Due to the effect of rounding-off to three decimal places the total may not be exact. See computer printouts to obtain higher accuracies).

Table 6.10.1 - Indices of Salient Product Attributes for Receivers (English)

Dependent Variable: Likelihood of Purchase

Attribute \ Receiver Type	Black Phone	Touch Tone	Wall Phone	Contempra	Headset	Antique Phone	Ericofon
Style	.023	-.043	.049	.060	.080	-.021	-.036
Dialing	-.144	.077	-.059	.012	.067	.031	.096
Comfort	.146	.059	.201	.024	.059	.157	.058
Utility	.083	-.053	.044	.011	.089	.059	.040
Maintenance	.006	.119	-.038	.174	.027	.040	.130
Value for Price	.646	.534	.677	.519	.440	.487	.564

Table 6.10.2- Indices of Salient Product Attributes for Receivers (French)

Dependent Variable: Likelihood of Purchase

Receiver Type / Attribute	Black Phone	Touch Tone	Wall Phone	Contempra	Headset	Antique Phone	Ericofon
Style	.016	.143	.032	.079	.130	.053	-.056
Dialing	-.070	-.047	.077	.080	-.032	.104	.127
Comfort	.235	.097	.109	.266	.020	.136	.204
Utility	.170	.118	.155	.027	.048	.074	.112
Maintenance	.308	.207	.167	.175	.194	-	.128
Value for Price	.263	.208	.442	.160	.362	.519	.431

Table 6.10.3- Indices of Salient Product Attributes for Accessories (English)

Dependent Variable: Likelihood of Purchase

Attribute \ Accessory Type	Tel. Ans. Machine	Auto-Dialer	Plugs & Jacks	Chimes	Message Light	Volume Control	Hands Free Phone
Usefulness	.215	.232	.240	.246	.254	.261	.160
Convenience	-.027	-	.020	.040	-.060	-	.114
Attractiveness	.115	-.036	.010	-.047	-.042	-.182	.078
Prestige	.042	.014	-.017	.026	.074	.097	-.068
Privacy	-.030	-.037	-.035	-	-	-.024	-.051
Security	.079	.151	.022	.133	.198	.181	.116
Value for Price	.329	.448	.682	.489	.489	.568	.337

Table 6.10.4- Indices of Salient Product Attributes for Accessories (French)

Dependent Variable: Likelihood of Purchase

	Tel. Ans. Machine	Auto-Dialer	Plugs & Jacks	Chimes	Message Light	Volume Control	Hands Free Phone
Usefulness	.077	.105	.206	.204	.167	-.116	.054
Convenience	.028	-.075	.162	-.131	.015	.151	-.165
Attractive-ness	.217	.266	.172	.161	.291	.217	.235
Prestige	.189	.228	-.005	.021	.073	.149	.212
Privacy	.037	-.095	.081	.071	.068	.072	.246
Security	.235	.219	.080	.131	.282	.249	.278
Value for Price	.317	.338	.395	.433	.143	.284	.126

Chapter 7

CONCLUSIONS

Two major objectives were defined for this study. The primary objective was to evaluate Canadian consumers' current ratings of telephone terminal equipment, and the second was to evaluate the probable effect that a proliferation of product offerings in Canada would have. The first objective has been successfully attained.

Although initially not considered, a national survey was undertaken. The yield of 30% obtained was double the most optimistic predictions. The high yield may be attributed to two major causes; the high level of interest which exists in Canada regarding telephone products, a fact which was uncovered during the in-depth interviews; a second cause may have been the questionnaire design. The respondents may on the one hand been challenged by its complexity and on the other hand gathered new information here to not available to them. The photographs included and the implications of the questions introduced may well have aroused their interest and curiosity.

The high usable yield provided the researchers with a tremendous data bank which could be manipulated

and analyzed in numerous ways. Due to time limitations and financial constraints the initial analysis considered only the first of the background variables (VAR001 - province of residence) as a base. Thus no attempt has been made to uncover the covariance that may exist between socio-economic factors such as age and occupation and product preference or attribute ranking. Similarly, although the SPSS permits great flexibility in data transformation and segmentation, only the raw belief scores have been regressed against the two major intention variables, likelihood of installation and likelihood of purchase. Nevertheless, the results obtained are significant. Chapter 6 contains all the results as condensed from the computer printouts which are appendices to this report. The data sample was shown to be representative of the Canadian population. The socio-economic variables were not used for this analysis, but the extent of the match between sample and national population is high. From Tables 6.7.1 to 6.7.4 we derive the information which permits the attainment of our second objective.

A first order approximation of the probable effect that a proliferation of product attributes will

have on the industry may be obtained as follows; Tables 6.7.1 to 6.7.4 contain data regarding the percentage of respondents that have indicated a score of 7.0 on the intention scale. Thus these are the individuals which are most likely to transform behavioural intentions to purchasing activity when and if this becomes possible. Disregarding other socio-economic factors, and using only the fourteen products introduced in the questionnaire, a conservative estimate of the market size can be computed by multiplying the indicated demand by the price stated for each product. Tables 7.1.1 and 7.1.2 summarize this process (only the purchase option is considered):

Since results regarding the "ideal communication system" (Sections III and V of the questionnaire) have not been analyzed to date, some assumptions regarding cross canibalization of products must be made. i.e. individuals are not likely to buy one of each type of receiver, nor are they likely to buy all the accessories. A valid assumption would be that individuals of the innovative segment (high behaviour intentions) are likely to buy two types of units within each class. Assuming linear relationships, our fair estimate of the initial market size

Table 7.1 - Potential Market Size*

Product	% Population Eng.	Fr.	Potential No. of Buyers	Price $	Indicated Market Size $
Black Phone	21	23	2,660,000	30.00	79,800,000
Touch Tone	5	8	730,000	70.00	51,100,000
Wall Phone	30	26	350,000	27.00	9,450,000
Contempra	5.2	9	775,000	70.00	54,250,000
Headset	1.6	6	378,000	55.00	20,790,000
Antique Phone	4.5	8	686,000	80.00	54,880,000
Ericofon	3.1	6	490,000	50.00	24,500,000
TOTAL Potential Market					294,770,000

* Based on population over 15 years old, or 2/3 of Canadian population. English/French distribution of 60%/70%. (1971 census). The population considered is therefore 8,400,000 English and 3,900,000 French.

Table 7.2 - Potential Market Size

Product	% Population Eng.	% Population Fr.	Potential No. of Buyers	Price $	Industrial Market Size $
Tel.Ans. Machine	3	10	640,000	150.00	96,000,000
Auto. Dialer	4	12	800,000	50.00	40,000,000
Plugs & Jacks	38	29	4,330,000	2.00	8,660,000
Chimes	6	12	970,000	25.00	24,250,000
Signal Light	12	15	1,585,000	20.00	31,700,000
Volume Control	14	13	1,707,000	10.00	17,070,000
Hands Free Phone	3	8	560,000	300.00	168,000,000
TOTAL Potential Market					385,680,000

is the sum of 2/7 of the totals computed in tables 7.1 and 7.2, or $194,414,000.

The second objective has now been attained. Retracing our steps, we now return to the first objective, the indices of salient product attributes are, in

fact, the current consumer ratings of telephone terminal equipment. These indices are tabulated in Tables 6.9.1 to 6.9.4, by product class and by product sector. These indices are the normalized regression coefficients tabulated in Tables 6.8.1 to 6.8.6. The regression equations, as well as the indices, can contribute greatly to a better understanding of the communications market. Through the careful selection of salient attributes, the regression equations produced can predict a large percentage of the behavioural intention based on the attributes, with 99% confidence. It is especially notable for the French sector, where R-square values of .60 and .70 are consistently obtained. This fact is congruent with the theory that the more homogeneous the sample, the more powerful the methodology. This indicates that further analysis, using both sample segmentation to create homogeneity and variable transformation to generate a better regression line, can further improve the results obtained.

From a marketing perspective the results provide valuable insight to the perceptions and behaviour of the Canadian communication consumer. Scanning the indices, the "value for price" is the predominant attribute, with

"usefulness" 2nd. for the English segment, as is "maintenance" for the French segment. This indicates that the Canadian communication consumer is a very rational individual.

Similarly, contrary to expectations, "convenience" does not appear of importance for the auto dialer; "Style" seems irrelevant for the contempra, the antique phone and the erocofon! "Dialing" scores zero or close to it for the touch tone! A general conclusion may be drawn relating these observations and the earlier results to the objectives of this study.

Although the communication industry must be controlled to provide safety of operation and quality of service, only the competetive, free market can be sufficiently sensitive to respond to such minute differences in perceptions as observed during this project. The results indicate that emphasis on technological innovation has only limited utility to the consumer. The telephone user's perceptions of the product are far more subtle and his reactions much less predictable than the direct specification-performance relationship that currently dominates the Canadian communication industry.

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Appendix I

a) Source statements for initial computer runs

b) Potential source statements for future computer run

Appendix II

a) Computer outputs - codebook on background (English)

b) Computer outputs - codebook on background (French)

c) Computer outputs - codebook on service (English)

d) Computer outputs - codebook on service (French)

Appendix III

Cross Tabulations

a) Computer outputs - sample statistics vs service (English)

b) Computer outputs - sample statistics vs service (French)

c) Computer outputs - sample statistics vs ranking (English)

d) Computer outputs - sample statistics vs ranking (French)

e) Computer outputs - sample statistics vs intention variables (English)

f) Computer outputs - sample statistics vs intention variables (French)

g) Computer outputs - sample statistics vs confidence (English)

h) Computer outputs - sample statistics vs confidence (French)

Appendix IV

Correlation Analysis

a) Computer outputs - intention vs belief scores - receiver (English)

b) Computer outputs - intention vs belief scores - receiver (French)

c) Computer outputs - intention vs belief scores - accessories (English)

d) Computer outputs - intention vs belief scores - accessories (French)

Appendix V

Regression Analysis

a) Computer printouts - intention vs beliefs for receivers (English)

b) Computer printouts - intention vs beliefs for receivers (French)

c) Computer printouts - intention vs beliefs for accessories (English)

d) Computer printouts - intention vs beliefs for accessories (French)