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FEASIBILITY
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CENTRAL MANAGEMENT GUIDELINES
for
LOCAL TELEPHONE EXPENDITURES

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I INTRODUCTION

In early 1976, the Economic Policy and Statistics Branch agreed to undertake a study whose objective was defined as follows:

To examine the feasibility of developing cost effectiveness directives and guidelines by a central management authority to assist departments/agencies to acquire and utilize efficiently local telecommunications services.

The study in its present form comprises five parts:

- a) some background discussing the general role of GTA
- b) a statistical profile of local telephone expenditures;
- c) deriving a performance indicator to highlight departmental and agency differences in local telephone expenditures
- d) specifying a model to identify the determinants and explain, to the extent possible, those differences; and
- e) applying the model to standardize local telephone expenditures on a department-by-department basis.

II BACKGROUND

This Section provides a summary of some of the more important development in administrative telecommunications in the Federal Government over the past 10 to 15 years. Highlighting these developments serves a twofold purpose; one, to provide an historical background to the current telecommunications situation in the Federal Government relating to administrative telecommunications and, second, to set the context for the subsequent analysis.

The current telecommunications environment in the Federal Government has been shaped largely by the recommendations of the Royal Commission on Government Organization (Glassco Commission) in 1962. Glassco examined telecommunications in its role as a supporting service in Federal Government operations and found it to be an intermediate rather than a final product of government operations. The Commission's main criticism was that government policy tended to measure administrative telecommunications services in the narrowest possible cost sense, without any assessment of the wider implications or benefits to be obtained through their exploitation. Especially strong criticism was voiced of the control exercised over general administrative communications by the Treasury Board through its agent, the Government telephone Service Office, which

....appears to assume, quite wrongly, that by exercising a veto power over contract proposals, central authority can curb extravagance and ensure that services are economical....(and) overlooks completely the opportunities for improved service and actual savings in pooling and integrating telephone and wire services.

Glassco recommended the establishment of a single, co-ordinating agency in the Department of Public Works (DPW) with responsibility to assist departments to achieve suitable standards for telecommunications services, but emphasized that primary responsibility for efficient use of administrative telecommunications rested with individual departments. This recommendation certainly was in line with the theme of Glassco *to let managers manage.*

4 In the area of specialized telecommunications services Glassco saw no need for unified management, but identified the requirement for a central policy and authority to ensure that a cohesive and economic pattern evolve by recommending that the Ministry of Transport (MOT) be given this responsibility. Following the Royal Commission the Administrative Telecommunications Agency (ATA) was established in 1965, but not as a part of DPW as Glassco had recommended.

5 Telecommunications policies covering administrative telecommunications services were set down in Treasury Board Secretariat (TBS) Circular M-2-1966 Procurement and Use of Administrative Telecommunications Equipment and Services. In line with the recommendations of the Commission, departments and agencies were given primary responsibility for procuring telecommunications equipment and services. More specifically, the main responsibilities given to the ATA were to:

assess requirements in government, evaluate proposals from industry and make recommendations to the Treasury Board on economical utilization of administrative telecommunications services;

advise the Treasury Board in the preparation and continuing review of guidelines related to administrative telecommunications services; and to

administer the consolidated government administrative telephone and other telecommunications services and provide advice to departments in all matters relating thereto.

7 In 1969 the ATA was transferred to DOC and re-named the Government Telecommunications Agency (GTA). Three years later the GTA program objective was re-stated in TBS 714, 755, 2 September 1972:

to plan, establish and manage telecommunications facilities and services that will satisfy the requested needs of federal departments and agencies on an economic basis.

As an initial step in the formulation of new policy DOC and DSS agreed on a division of responsibilities in 1974, outlined in their Memorandum of Understanding in which:

DOC was identified as the department responsible for planning and co-ordination of telecommunications services on a government-wide-basis.

DSS was given responsibilities for the procurement of telecommunications equipment and electronics, logic support and data processing.

In 1975 TBS released a draft paper, Policy on Telecommunications Administration in Departments and Agencies of the Government of Canada, which set down directives and guidelines. The proposed policy had as its main purpose the creation of mechanisms to allow the GTA to meet its responsibilities while ensuring compatibility with national telecommunications policies and objectives. Telecommunications services are identified as shared, dedicated and specialized. It was proposed that GTA be given responsibility for the planning and co-ordination of the first two and departments and agencies for the complete management of their own specialized systems on the basis of operational or security considerations. However, departments and agencies must provide justification that shared or dedicated systems cannot meet their requirements, and ensure the availability of efficient and effective telecommunications services to support their programs. The policy also requires the GTA to submit its telecommunications information needs to TBS for approval, and for TBS to determine the reporting required from departments.

The policy enunciated in the draft paper is currently under review.

III STATISTICAL BACKGROUND

The purpose of this Section is to develop a statistical profile of local telephone expenditures which provides the basis for the analysis in Section IV.

Local telephone expenditures on a departmental basis are sampled by GTA for the month of May each year. For this reason the study statistics are drawn from May 1974 only, and confined to the National Capital Region (NCR) because data are not available on a Canada-wide basis. Although GTA data for May 1975 became available during the course of the study, aggregate economic indicators for that year are not yet available.

The numbers of departmental employees in the NCR were obtained from Statistics Canada publications. A breakdown of employees by occupational classification for the NCR was extracted and compiled from unpublished data also obtained from Statistics Canada. The 27 departments covered in the study account for over 69,000 or 36 per cent of Federal Government employees in metropolitan areas. (See Appendix A for the breakdown of employees in both Canada and the NCR.)

Population figures shown for National Defence are for federal public servants and do not include uniformed personnel based in the NCR. Therefore, costs do not reflect true utilization, and figures for costs per employee in the Department are probably over-calculated by approximately 50 per cent.

Over the period 1971 to 1974 local telephone expenditures almost doubled, from \$16 million to over \$29 million, representing an average of about 52 per cent of total telephone expenditures in the Federal Government. This is illustrated in Table 1.

Table 1 - Federal Government Telephone Expenditures
Total and Local - \$000s

YEAR	Total Telephone Expenditures	Estimated Local Telephone Expenditures
1971	31,160	16,918
1972	39,858	20,200
1973	46,164	24,619
1974	56,332	29,116

Source: Based on GTA estimates.

The statistical profile, which will be instrumental in developing a framework for guidelines and directives is described in Tables 2 and 3. In Table 2 the 27 departments studied are ranked in order of their expenditures for local telephone facilities. Some highlights of these tables are:

- a) The top 10 departments account for 50 per cent of local telephone expenditures.
- b) Main and extension telephones are the major items of expenditure, but in some cases are roughly equal to a department's expenditures for auxiliary equipment such as key systems, call directors, speakerphones, buttons, buzzers and other add-ons.
- c) The percentage distribution of expenditures on main lines-extension, intercom systems, and auxiliary equipment for the 27 departments is 53.2, 8.2 and 38.6 respectively.

Further explanation of the terms main and extension telephones, intercommunication systems, and auxiliary services are given in Appendix B.

Table 2 - Local Telephone Costs - National Capital Region
May 1974

DEPARTMENT*	COSTS \$	PERCENTAGE OF TOTAL %	CUMULATIVE PERCENTAGE %
1 National Defence	98,581	10.6	10.6
2 Supply & Services	61,808	6.6	17.2
3 Transport	44,764	4.8	22.0
4 Environment	43,755	4.7	26.7
5 External Affairs	39,670	4.3	31.0
6 Secretary of State	39,214	4.2	35.2
7 National Health & Welfare	38,894	4.2	39.4
8 National Revenue	37,713	4.0	43.4
9 Energy, Mines and Resources	37,543	4.0	47.4
10 Treasury Board	35,456	3.8	51.2
11 Industry Trade & Commerce	35,011	3.8	55.0
12 Manpower & Immigration	30,915	3.3	58.3
13 Solicitor General	29,494	3.2	61.5
14 Public Works	27,975	3.0	64.5
15 Indian Affairs & Northern Development	23,401	2.5	67.0
16 COMMUNICATIONS	21,610	2.3	69.3
17 Regional Economic Expansion	18,941	2.0	71.3
18 Post Office	18,600	2.0	73.3
19 Agriculture	18,410	2.0	75.3
20 Privy Council	17,638	1.9	77.2
21 Consumer & Corporate Affairs	17,482	1.9	79.1
22 Finance	15,781	1.7	80.8
23 Justice	12,452	1.3	82.1
24 Labour	9,867	1.1	83.2
25 Urban Affairs	7,957	.9	84.1
26 Veterans Affairs	6,620	.7	84.8
27 Science & Technology	3,791	.4	85.2
Sub-Total	793,343	85.2	85.2
Others	138,679	14.8	100.0
TOTAL	932,022	100.0	

Source: GTA

*The organizational units which make up these departments are listed in Appendix C.

Table 3 - Distribution of Local Telephone Service Costs
National Capital Region - May 1974

DEPARTMENT	1 MAINLINES & EXTENSIONS	2 INTERCOM SYSTEM	3 AUXILIARY EQUIPMENT	1 + 2 + 3 TOTAL \$
1 National Defence	62,740	3,986	31,855	98,581
2 Supply & Services	35,612	4,036	22,160	61,808
3 Transport	20,988	5,200	18,576	44,764
4 Environment	21,714	4,257	17,784	43,755
5 External Affairs	21,677	2,370	15,623	39,670
6 Secretary of State	19,413	3,677	16,124	39,214
7 National Health & Welfare	21,393	3,088	14,413	38,894
8 National Revenue	19,774	2,432	15,507	37,713
9 Energy, Mines and Resources	17,981	4,917	14,645	37,543
10 Treasury Board	19,505	2,456	13,495	35,456
11 Industry Trade & Commerce	15,744	4,059	15,208	35,011
12 Manpower & Immigration	17,251	2,024	11,640	30,915
13 Solicitor General	17,939	1,799	9,756	29,494
14 Public Works	14,553	1,667	11,755	27,975
15 Indian Affairs & Northern Development	11,857	1,639	9,905	23,401
16 COMMUNICATIONS	12,595	1,259	7,756	21,610
17 Regional Economic Expansion	8,192	2,881	7,868	18,491
18 Post Office	9,790	1,855	6,955	18,600
19 Agriculture	9,417	2,036	6,957	18,410
20 Privy Council	8,951	1,408	7,279	17,638
21 Consumer & Corporate Affairs	7,492	2,512	7,478	17,482
22 Finance	7,320	1,508	6,953	15,781
23 Justice	5,975	1,029	5,448	12,452
24 Labour	4,374	1,301	4,192	9,867
25 Urban Affairs	3,755	954	3,248	7,957
26 Veterans Affairs	3,390	700	2,530	6,620
27 Science & Technology	1,913	264	1,614	3,791
Sub-Total	421,305	65,314	306,724	793,343
Other	75,009	10,853	52,817	138,679
Total	496,314	76,167	359,541	932,022
Percentage of Total	53.2	8.2	38.6	100

Source: GTA

IV PERFORMANCE INDICATOR AND MODEL

As mentioned earlier, the study is intended to point to possible guidelines for decisions related to the procurement and utilization of local telephone services by federal government departments. This section focused on three tasks:

- i) derivation of a performance indicator to illustrate the variation in departmental expenditures for local telephone services;
- ii) design of an explanatory model to account for the observed variations in departmental expenditures; and
- iii) application of the model to produce expected expenditures by department to be compared with actual expenditures.

1. Derivation of a Performance Indicator

To illustrate the variation in departmental expenditures for local telephone service, two indicators were examined. In one case, the 27 selected departments were ranked by means of local telephone costs expressed as a percentage of wages and salaries; in another case, the local telephone costs per employee was used to rank the departments. The ordering of the departments was identical in both cases and it was decided that local telephone costs per employee be used as the performance indicator.

Table 4 displays the variation in departmental expenditures for three components of local telephone costs. The departments are ranked according to the total costs per employee. As indicated, the average departmental cost per employee for local telephone service is \$11.38 and most of the departments are clustered around this value. For instance, 20 of the 27 departments display a total cost per employee which falls within a range defined as the average cost plus or minus \$5.00. Of the remaining seven, one department has a cost per employee below this range, whereas six departments have costs in excess of this range.

Table 4 - Local Telephone Costs per Employee
National Capital Region - May 1974

DEPARTMENT		MAINLINES & EXTENSIONS \$	INTERCOM SYSTEM \$	AUXILIARY EQUIPMENT \$	TOTAL \$
1	Regional Economic Expansion	17.43	6.13	16.74	40.30
2	Urban Affairs	15.39	3.91	13.31	32.61
3	Privy Council	13.92	2.19	11.32	27.43
4	Science & Technology	12.84	1.78	10.83	25.45
5	Environment	8.62	1.69	7.06	17.37
6	COMMUNICATIONS	10.10	1.01	6.22	17.33
7	National Defence	10.36	.65	5.26	16.27
8	Industry Trade & Commerce	7.05	1.83	6.82	15.70
9	Finance	7.19	1.48	6.83	15.50
10	Justice	7.26	1.25	6.62	15.13
11	Manpower & Immigration	8.27	.97	5.58	14.82
12	Labour	6.49	1.93	6.22	14.64
13	External Affairs	7.59	.83	5.47	13.89
14	National Health & Welfare	6.65	.96	4.48	12.09
15	Consumer & Corporate Affairs	5.16	1.73	5.15	12.04
16	Transport	5.57	1.38	4.93	11.88
17	Secretary of State	5.49	1.04	4.56	11.09
18	Energy, Mines & Resources	5.12	1.40	4.17	10.69
19	Indian Affairs & Northern Development	4.92	.68	4.11	9.71
20	Public Works	4.89	.56	3.95	9.40
21	Treasury Board	5.17	.64	3.57	9.38
22	Supply and Services	5.03	.57	3.13	8.73
23	National Revenue	4.31	.53	3.38	8.22
24	Veterans Affairs	3.39	.70	2.53	6.62
25	Solicitor General	3.99	.40	2.17	6.56
26	Agriculture	3.33	.72	2.46	6.51
27	Post Office	2.59	.49	1.84	4.92
	Sub-Average	6.07	.94	4.42	11.43
	Other	6.02	.87	4.24	11.13
	General Average	6.06	.93	4.39	11.38

2. Design of Explanatory Model

The next task was to design a model which explained the observed variations in departmental expenditures. Local telephone costs are dependent upon a wide variety of complex and interacting factors such as total budgetary expenditures, number of employees, occupation distribution of employees, departmental objectives, telephone configuration within a department, degree of departmental control over telephone expenditures*, and geographical location(s) of a department. However, these factors are often difficult to identify and in many cases even more difficult to quantify in any meaningful way.

Investigation of these factors, using standard econometric methods, identified four variables which were both amenable to measurement and provided the best explanation of the observed variation in local telephone costs per employee across departments. These are:

- i) number of employees,
- ii) the proportion of professional employees
- iii) operational expenditures on plant and facilities (e.g. a proxy for amount of floor space occupied by a department in the NCR); and,
- iv) the degree of budgetary control over telephone expenditures.

These four explanatory variables were incorporated into four equations. In the primary equation the dependent variable was total local telephone costs per employee, whereas in each of three secondary equations one of the components of the total cost (e.g., expenditures on main lines and extensions per employee, intercoms per employee and auxiliary equipment per employee) was selected to be the dependent variable. In all four equations, the objective was to explain the observed variation, across departments, in local telephone costs per employee either in total or by component.

* See Appendix D.

3. Application of the Model and Results

The relationship between the four explanatory variables and the primary dependent variable, total local telephone expenditures per employee, was identified in econometric terms as follows:

$$\begin{aligned} \ln (LC/E) = & 3.13 - .30299 \ln E + .38669 \ln(P/E) \\ & + .17176 \ln (B/E) - .193C \qquad R^2 = .71 \end{aligned}$$

where, in the case of each department

- LC = total local telephone expenditures
- E = total employees in the NCR
- P = total professional employees
- B = operational expenditures on plant and facilities
- C = variable to account for degree of departmental control over local telephone expenditures

Examining the plus and minus signs in the equation suggests the nature of the relationship between the explanatory variables and total telephone costs per employee as follows:

- i) The *negative* relationship between total employees (E) and total local telephone costs per employee (LC/E) suggests that as departments grow larger there is not a proportionate increase in their expenditures on local telephone services.
- ii) The *positive* relationship between the explanatory variable (P/E) and the dependent factor indicates that the telephone requirements for professional employees tends to raise the average cost per employee.
- iii) The *positive* relationship between operational expenditures on plant and facilities (B/E) (e.g., a good proxy for amount of floor space occupied) and local telephone costs per employee indicates a greater need for telephone facilities.
- iv) The *negative* sign in the case of the last variable (C) which accounts for the type of departmental control over local telephone expenditures points to a decrease in cost per employee, given explicit branch or divisional control of the telephone budget.

Application of this equation yielded the estimated cost of local telephone service per employee as seen in Table 5. These *estimated* figures for each department represent the amount per employee each department would be expected to spend on the basis of the model. The residual cost in Column 3 represents the difference between the estimated cost per employee and the actual cost as presented earlier in the paper. Using this approach one observes in Table 5 how much each department either exceeded or fell below the expected cost performance.

Exactly the same procedure was followed for each of the secondary equations (see Appendix E for their specification) in which the dependent variable was costs of main lines and extensions per employee, costs of auxiliary equipment per employee and costs of intercoms per employee respectively. The comparison of expected costs per employee with actual costs for each department for these three components are presented in Tables 6, 7 and 8. Once again the degree to which each department's expenditures either exceeded or fell below the expected level is clearly indicated in Column 3, in absolute dollar terms, and in Column 4, in percentage terms.

Table 5 - Estimated Total Local Telecommunications Expenditures
Per Employee - National Capital Region, May 1974

DEPARTMENT		1 ACTUAL COST \$	2 ESTIMATED COST \$	3 RESIDUAL COST \$	3 ÷ 1 RESIDUAL %
1	Regional Economic Expansion	40.30	23.09	17.21	42.7
2	Urban Affairs	32.61	30.70	1.91	5.9
3	Privy Council	27.43	16.30	11.13	40.6
4	Science & Technology	25.45	37.30	-11.85	46.6
5	Environment	17.37	11.44	5.93	34.1
6	COMMUNICATIONS	17.33	16.91	.42	2.4
7	National Defence	16.27	11.01	5.26	32.3
8	Industry Trade & Commerce	15.70	12.57	3.13	19.9
9	Finance	15.50	21.50	- 6.00	38.7
10	Justice	15.13	14.94	.19	1.3
11	Manpower & Immigration	14.82	14.30	.52	3.5
12	Labour	14.64	14.49	.15	1.0
13	External Affairs	13.89	12.62	1.27	9.1
14	National Health & Welfare	12.09	9.44	2.65	21.9
15	Consumer & Corporate Affairs	12.04	12.64	- .60	5.0
16	Transport	11.88	9.79	2.09	17.6
17	Secretary of State	11.09	14.24	- 3.15	28.4
18	Energy, Mines & Resources	10.69	10.47	.22	2.1
19	Indian Affairs & Northern Development	9.71	13.34	- 3.63	37.4
20	Public Works	9.40	10.34	- .94	10.0
21	Treasury Board	9.38	12.93	- 3.55	37.9
22	Supply & Services	8.73	8.36	.37	4.2
23	National Revenue	8.22	10.49	- 2.27	27.6
24	Veterans Affairs	6.62	10.23	- 3.61	54.5
25	Solicitor General	6.56	7.94	- 1.38	21.0
26	Agriculture	6.51	8.00	- 1.49	22.9
27	Post Office	4.92	5.00	- .08	1.6

Table 6 - Main Lines and Extensions - Estimated Cost per Employee
National Capital Region, May 1974

DEPARTMENT		1 ACTUAL COST \$	2 ESTIMATED COST \$	3 RESIDUAL COST \$	3 ÷ 1 RESIDUAL %
1	Regional Economic Expansion	17.43	10.94	6.49	37.2
2	Urban Affairs	15.39	14.52	.87	5.7
3	Privy Council	13.92	8.08	5.84	42.0
4	Science & Technology	12.84	17.43	-4.59	35.8
5	Environment	8.62	5.69	2.93	34.0
6	COMMUNICATIONS	10.10	8.78	1.32	13.1
7	National Defence	10.36	6.80	3.56	34.4
8	Industry Trade & Commerce	7.06	6.17	.89	12.6
9	Finance	7.19	10.71	-3.52	49.0
10	Justice	7.26	7.10	.16	2.2
11	Manpower & Immigration	8.27	7.23	1.04	12.6
12	Labour	6.49	6.86	-.37	5.7
13	External Affairs	7.59	6.54	1.05	13.8
14	National Health & Welfare	6.65	4.69	1.96	29.5
15	Consumer & Corporate Affairs	5.16	6.09	-.93	18.0
16	Transport	5.57	5.05	.52	9.3
17	Secretary of State	5.49	7.51	-2.02	36.8
18	Energy, Mines & Resources	5.12	5.40	-.28	5.5
19	Indian Affairs & Northern Development	4.92	6.83	-1.91	38.8
20	Public Works	4.89	5.53	-.64	13.1
21	Treasury Board	5.16	6.45	-1.29	25.0
22	Supply & Services	5.03	4.69	.34	6.8
23	National Revenue	4.31	5.57	-1.26	29.2
24	Veterans Affairs	3.39	5.06	-1.67	49.3
25	Solicitor General	3.99	5.05	-1.06	26.6
26	Agriculture	3.33	3.95	-.62	18.6
27	Post Office	2.59	2.53	.06	2.3

Table 7 - Auxiliary Equipment - Estimated Cost per Employee
National Capital Region, May 1974

DEPARTMENT	1	2	3	3 ÷ 1
	ACTUAL COST \$	ESTIMATED COST \$	RESIDUAL COST \$	RESIDUAL %
1 Regional Economic Expansion	16.74	9.42	7.32	43.7
2 Urban Affairs	13.31	12.97	.34	2.6
3 Privy Council	11.32	6.24	5.08	44.9
4 Science & Technology	10.83	16.32	-5.49	50.7
5 Environment	7.06	4.92	2.14	30.3
6 COMMUNICATIONS	6.22	6.38	-.16	2.6
7 National Defence	5.26	3.91	1.35	25.7
8 Industry Trade & Commerce	6.82	5.51	1.31	19.2
9 Finance	6.83	8.15	-1.32	19.3
10 Justice	6.62	5.86	.76	11.5
11 Manpower & Immigration	5.58	6.16	-.58	10.4
12 Labour	6.22	6.87	-.65	10.5
13 External Affairs	5.47	4.37	1.10	20.1
14 National Health & Welfare	4.48	4.00	.48	10.7
15 Consumer & Corporate Affairs	5.15	4.77	.38	7.4
16 Transport	4.93	4.00	.93	18.9
17 Secretary of State	4.56	5.81	-1.25	27.4
18 Energy, Mines & Resources	4.17	3.59	.58	13.9
19 Indian Affairs & Northern Development	4.11	5.64	-1.53	37.2
20 Public Works	3.95	4.14	-.19	4.8
21 Treasury Board	3.57	4.59	-1.02	28.6
22 Supply & Services	3.13	3.17	-.04	1.3
23 National Revenue	3.38	4.27	-.89	26.3
24 Veterans Affairs	2.53	4.55	-2.02	79.8
25 Solicitor General	2.17	2.29	-.12	5.5
26 Agriculture	2.46	3.40	-.94	38.2
27 Post Office	1.84	2.02	-.18	9.8

Table 8 - Intercommunication Systems - Estimated Cost per Employee
National Capital Region, May 1974

DEPARTMENT	1	2	3	3 ÷ 1
	ACTUAL COST \$	ESTIMATED COST \$	RESIDUAL COST \$	RESIDUAL %
1 Regional Economic Expansion	6.13	2.73	3.40	55.5
2 Urban Affairs	3.91	3.21	.70	17.9
3 Privy Council	2.19	1.98	.21	9.6
4 Science & Technology	1.78	3.55	-1.77	99.4
5 Environment	1.69	.83	.86	50.9
6 COMMUNICATIONS	1.01	1.75	-.74	73.3
7 National Defence	.65	.3	.35	53.8
8 Industry Trade & Commerce	1.82	.89	.93	51.1
9 Finance	1.48	2.64	-1.16	78.4
10 Justice	1.25	1.98	-.73	58.4
11 Manpower & Immigration	.97	.91	.06	6.2
12 Labour	1.93	.76	1.17	60.6
13 External Affairs	.83	1.71	-.88	106.0
14 National Health & Welfare	.96	.75	.21	21.9
15 Consumer & Corporate Affairs	1.73	1.78	-.05	2.9
16 Transport	1.38	.74	.64	46.4
17 Secretary of State	1.04	.92	.12	11.5
18 Energy, Mines & Resources	1.40	1.48	-.08	5.7
19 Indian Affairs & Northern Development	.68	.87	-.19	27.9
20 Public Works	.56	.67	-.11	19.6
21 Treasury Board	.65	1.89	-1.24	190.8
22 Supply & Services	.57	.50	.07	12.3
23 National Revenue	.53	.65	-.12	22.6
24 Veterans Affairs	.70	.62	.08	11.4
25 Solicitor General	.40	.60	-.20	50.0
26 Agriculture	.72	.65	.07	9.7
27 Post Office	.49	.45	.04	8.2

V CONCLUSIONS

1. Local telephone costs per employee display significant variation across the 27 selected departments.

2. Four explanatory variables accounted for over 70 per cent of the variation in telephone costs per employee across departments. It would appear that three of these, (e.g. total employees, proportion of professional employees in total, and operational expenditures on plant and facilities) are rough indicators of the relative need for local telephone facilities in each of the 27 departments. The fourth variable picks up the effect of control (or lack thereof) on telephone costs per employee.

3. The performance of the model based on these four explanatory variables suggests that explicit control of local telephone costs at the branch or divisional level has a salutary effect on total costs. On the other hand, one cannot be as definitive about the degree to which the other three variables represent the relative need for local telephone facilities across departments. Although the model has good explanatory power, further debate and feedback is desirable before any guideline on departmental needs is chosen and based on this analysis.

4. The study suggests the need for establishing explicit control of local telephone expenditures at the branch or divisional level in Departments where this is not now implemented.

5. While the model suggests certain variables that can be interpreted as proxies for the benefits that Departments derive from local telephone expenditures, this will have to be supplemented by case studies of individual Departmental needs and technical configurations, if it is proposed to use the model as a basis for the development of actual guidelines relating to local telephone use.

Table A-1 Federal Government Employees
Canada and National Capital Region - September 1974

DEPARTMENT	1 CANADA	2 NCR	2 ÷ 1 %
1 Post Office	39,571	3,780	9.6
2 National Defence	21,757	6,056	27.8
3 National Revenue	19,043	4,588	24.1
4 Transport	12,979	3,768	29.0
5 Solicitor General	12,639	4,496	35.6
6 Supply & Services	9,549	7,080	74.1
7 Manpower & Immigration	9,374	2,086	22.3
8 Environment	8,974	2,519	28.1
9 Veterans Affairs	7,710	1,000	13.0
10 Agriculture	6,940	2,828	40.7
11 National Health & Welfare	6,872	3,217	46.8
12 Public Works	6,672	2,976	44.6
13 Secretary of State	4,786	3,536	73.9
14 Indian Affairs & Northern Development	4,491	2,410	53.7
15 Treasury Board	4,034	3,780	93.7
16 Energy, Mines & Resources	3,874	3,512	90.7
17 External Affairs	2,948	2,856	96.9
18 Industry Trade & Commerce	2,292	2,230	97.3
19 Consumer & Corporate Affairs	2,221	1,452	65.4
20 COMMUNICATIONS	1,714	1,247	72.8
21 Justice	1,420	823	58.0
22 Regional Economic Expansion	1,307	470	36.0
23 Finance	1,124	1,018	90.6
24 Labour	808	674	83.4
25 Privy Council	643	643	100.0
26 Urban Affairs	252	244	96.8
27 Science & Technology	149	149	100.0
Sub-Total	194,143	69,438	35.8
Others	19,619	12,462	63.5
TOTAL	213,762	81,900	38.3

Source: Statistics Canada Federal Government Employment in Metropolitan Areas Cat. No. 72-205, September 1974

APPENDIX BTelephone Equipment and ServicesMAIN AND EXTENSION TELEPHONES

Main Telephone
Extension Telephones
Mileage

INTERCOMMUNICATION SYSTEMS

Dial
Link
Manual
Remote
Mileage

AUXILIARY EQUIPMENT

Key Systems (Pushbuttons)
Call Directors
Speakerphones
Telephone Busy Signal
Bell Boys
Buttons
Code-a-Phone
Buzzers
Add-Ons (PBX)
Paging Systems
Cut-Off Features
Magical Auto-Dialer
Exclusion Buttons
Bells
Jacks
Intercom Telephones
Equivalent Centrex
Recorder Connectors
Contempra Telephones
Miscellaneous

APPENDIX C

ELEMENTS OF DEPARTMENTS

- | | |
|--|--|
| <p>1 AGRICULTURE</p> <ul style="list-style-type: none"> Administration Research Production, Marketing, Health Canada Grain Commission Stabilization Board Prairie Farm Assistance Elevators and Grain | <p>8 INDIAN AFFAIRS AND
AND NORTHERN DEVELOPMENT</p> <ul style="list-style-type: none"> Administration Indian and Eskimo Affairs Northern Affairs Parks Canada |
| <p>2 COMMUNICATIONS</p> <ul style="list-style-type: none"> Department CRTC has been excluded | <p>9 INDUSTRY, TRADE & COMMERCE</p> <ul style="list-style-type: none"> Trade Industrial Program Tourism Grains and Oilseed |
| <p>3 CONSUMER AND CORPORATE</p> <ul style="list-style-type: none"> Administration Consumer Affairs Combines Investigation and
Competition Policy Intellectual Property Superintendent of Bankruptcy Food Prices Review Board | <p>10 JUSTICE</p> <ul style="list-style-type: none"> Department Supreme Court Federal Court Law Reform Commission Tax Review Board |
| <p>4 ENERGY, MINES AND RESOURCES</p> <ul style="list-style-type: none"> Administration Mineral and Energy Resources Earth Science Energy Supplies Allocation Atomic Energy Control National Energy Board | <p>11 LABOUR</p> <ul style="list-style-type: none"> Department Labour Relations Board |
| <p>5 ENVIRONMENT</p> <ul style="list-style-type: none"> Administration Marine Research Surveys Environmental Services | <p>12 MANPOWER AND IMMIGRATION</p> <ul style="list-style-type: none"> Administration Development and
Utilization of
Manpower Immigration Planning
and Research Immigration Appeal Board |
| <p>6 EXTERNAL AFFAIRS</p> <ul style="list-style-type: none"> Consular Interests Abroad World Exhibitions Canadian International
Development Agency International Joint Commission | <p>13 NATIONAL DEFENCE</p> <ul style="list-style-type: none"> Services Research |
| <p>7 FINANCE</p> <ul style="list-style-type: none"> Department Policies Anti-Dumping Tribunal Auditor General Insurance Department Tariff Board | <p>14 NATIONAL HEALTH AND WELFARE</p> <ul style="list-style-type: none"> Administration Non-Med Use of Drugs Health Care
Services Protection Income Security and
Social Assistance Fitness and Amateur
Sport |
| | <p>15 NATIONAL REVENUE</p> <ul style="list-style-type: none"> Customs and Excise
Taxation |

16	POST OFFICE	22	SUPPLY AND SERVICES Administration Supply Revolving Fund Printing and Services
17	PRIVY COUNCIL Office Canadian Interdepartmental Conference Secretariat	23	TRANSPORT HQs Program Marine Airports Air Surface Transportation Development Agency Canadian Transport Commission
18	PUBLIC WORKS Administration Professional and Technical Accommodation Marine Transportation and Other	24	TREASURY BOARD Administration Research Council
19	REGIONAL ECONOMIC EXPANSION Department Prairie Farm Rehabilitation	25	URBAN AFFAIRS
20	SCIENCE AND TECHNOLOGY Science Council	26	VETERANS AFFAIRS Administration Welfare Pensions Advocate Pensions Program Treatment Land Administration
21	SECRETARY OF STATE Administration Bilingualism Arts and Culture Education Support Translation Citizenship Library National Film Board Museums Public Archives Representation Commissioner	27	SOLICITOR GENERAL Administration Correctional National Parole Board RCMP

APPENDIX D

Several branches or divisions in each of the 27 departments in the sample were randomly contacted to determine if local telephone expenditures were explicitly accounted for in annual budgetary estimates prepared for TBS. The figure "1" indicates a positive response and the "0" indicates a negative response in the results of that survey below.

DEPARTMENT

Regional Economic Expansion	0
Urban Affairs	0
Privy Council	0
Science and Technology	0
Environment	1
COMMUNICATIONS	0
National Defence	1
Industry, Trade and Commerce	1
Finance	0
Justice	0
Manpower and Immigration	1
Labour	1
External Affairs	0
National Health and Welfare	1
Consumer and Corporate Affairs	0
Transport	1
Secretary of State	1
Energy, Mines and Resources	0
Indian Affairs and Northern Development	1
Public Works	1
Treasury Board	0
Supply and Services	1
National Revenue	1
Veterans Affairs	1
Solicitor General	0
Agriculture	1
Post Office	1

APPENDIX E
Secondary Equations

Below are listed the disaggregated equations for each category of local telecommunications costs.

Equation 2. Main Lines & Extensions

$$\ln \left(\frac{\text{M.L.E.}}{E} \right) = 2.36 - .27057 \ln E + .32728 \ln \text{Skill} \\ + .19930 \ln (B/E) - .216 C \quad R^2 = .67$$

Equation 3. Auxiliary Equipment

$$\ln \frac{A.E.}{E} = 2.46 - .37744 \ln E + .45268 \ln \text{Skill} \\ + .15478 \ln (B/E) + .437 C \quad R^2 = .73$$

Equation 4. Intercoms

Estimated Intercom costs are calculated residually as follows:

$$\text{Intercom Cost} = \text{Total Local Cost} - (\text{M.L. Ex Cost} \\ + \text{Auxiliary Equipment Cost})$$

