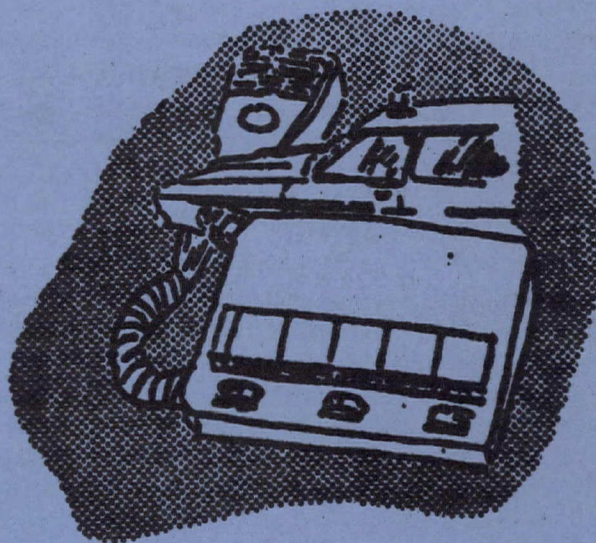


QUEEN
TK
6570
.M6
Z32
1974

UNICATIONS CANADA



DEMAND FOR LAND-MOBILES

(MONTREAL REGION)

(TORONTO REGION)

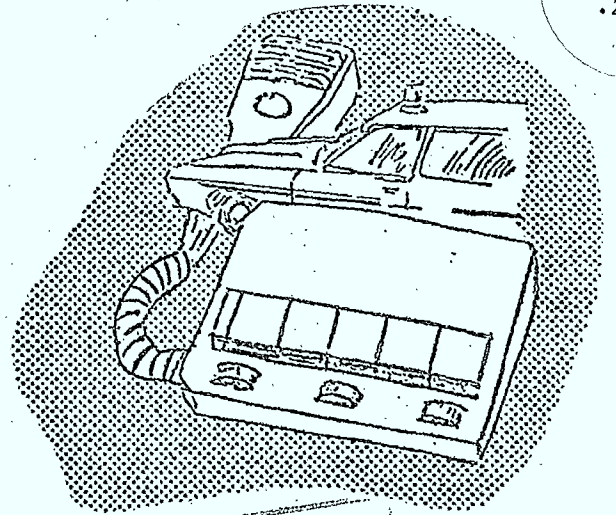
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Z32

A. Zalatan, Director
Economic Policy
Ste. Adèle, P.Q.
JUNE 20, 1974

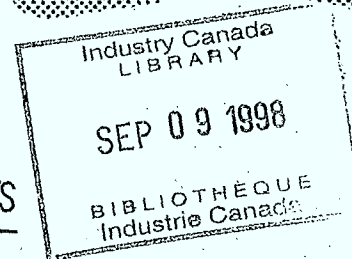


COMMUNICATIONS CANADA

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DEMAND FOR LAND-MOBILES



(MONTREAL REGION)

(TORONTO REGION)

A. Zalatan, Director
Economic Policy
Ste. Adele, P.Q.
JUNE 20, 1974

TK

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Mib

Z32

STUDY OBJECTIVE:

HELP TO IDENTIFY POTENTIAL SHORTAGES OF SPECTRUM FOR LAND MOBILE

THEREFORE, THE NECESSITY OF PLANNING:

- BUT PLANNING REQUIRES HARD NUMBERS
- IT REQUIRES AN ASSESSMENT OF FUTURE GROWTH
- IT REQUIRES FORECASTING THE DEMAND FOR MOBILE COMMUNICATIONS AND THE SUPPLY OF AVAILABLE SPECTRUM GIVEN LEVELS OF TECHNOLOGY AND MANAGEMENT ALLOCATION OF SPACE TO OTHER USERS OF THE SPECTRUM
- THIS EXERCISE IS THE FIRST STEP TOWARDS AN OVERALL PLAN FOR SPECTRUM UTILIZATION

WHY FORECASTING THE DEMAND FOR LAND-MOBILES

A FORECAST SHOULD HAVE AN OBJECTIVE. IT SHOULD BE DIRECTLY RELATED TO THE PROBLEMS WE ARE FACING OR EXPECTED TO FACE

BETTER PLANNING

ON A REGIONAL BASIS THERE ARE CLEAR "INDICATIONS" OF PRESSURES ON THE VHF BAND

TORONTO REGION

UHF CHANNELS AS PERCENTAGE OF VHF CHANNELS IN USE

1965 = 6.4%

1970 = 22.0

1972 = 38.0

IT IS EVEN MORE DRAMATIC IF WE CONSIDER ADDITIONAL CHANNELS SINCE 1968 FOR THE 150.8 - 174.07 AND 450-470 BANDS

ADDITIONAL CHANNELS 1968-1972

VHF 150.8 - 174.0 MHz = 100

UHF 450 - 470 MHz = 135

FORECASTING

- . UNCERTAIN
- . IMPRECISE
- . UNAVOIDABLE

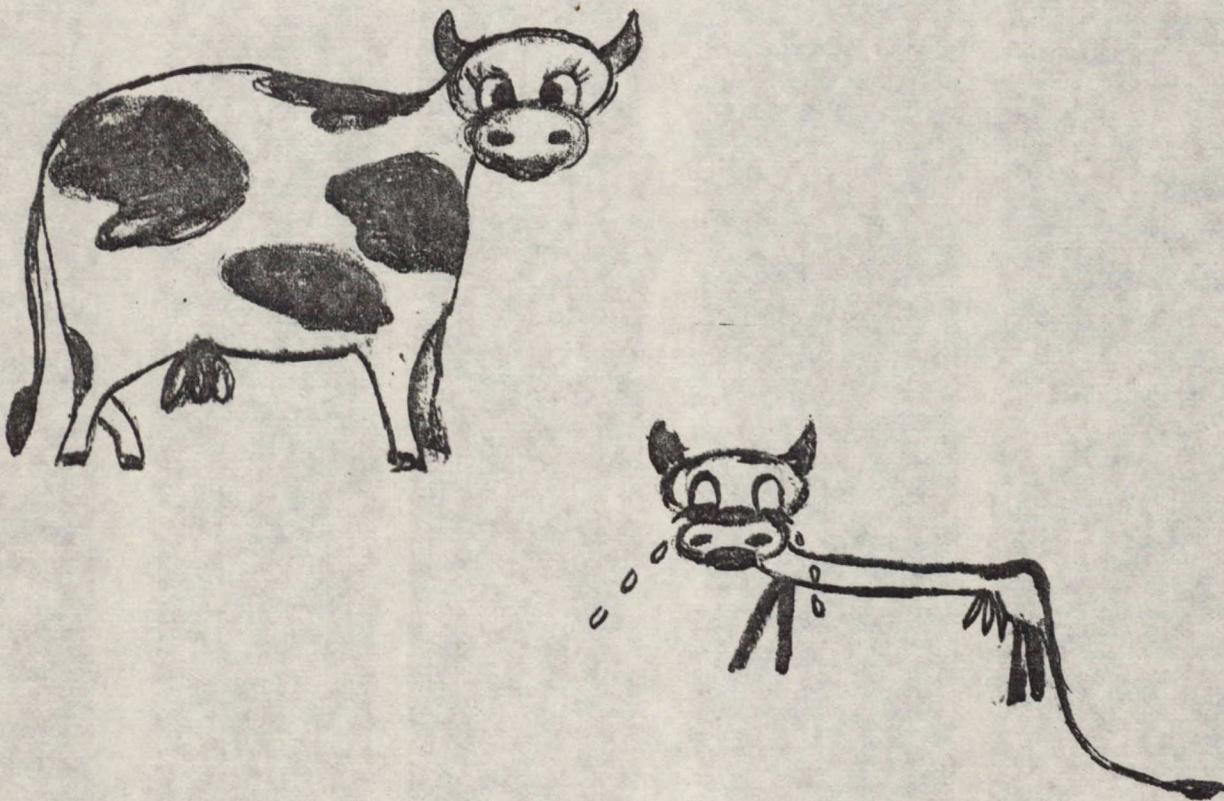
TWO CHOICES

- . DO IT
- . "ABANDON ALL HOPE YOU WHO ENTER HERE"

DANTE (INFERNO)

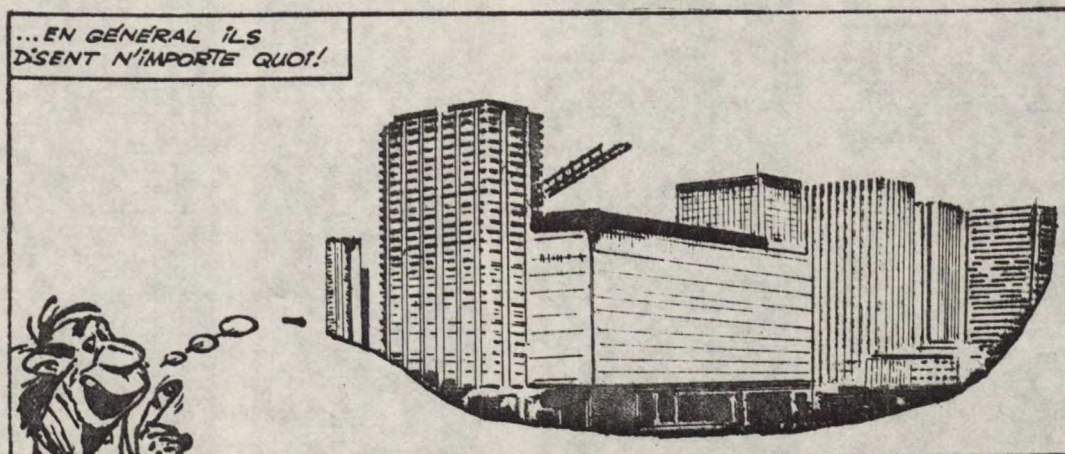
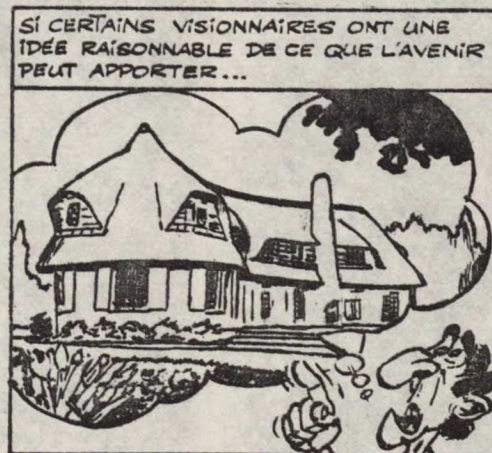
FORECASTING HAS BEEN PRACTICED FOR LITERALLY THOUSANDS OF YEARS--IF JOSEPH'S OLD TESTAMENT PROPHECY ABOUT THE SEVEN GOOD YEARS AND THE SEVEN LEAN YEARS IS CONSIDERED TO BE THE FIRST VALID EXERCISE OF THIS FUNCTION. JOSEPH'S RECORD ON THAT OCCASION WAS PERFECT; ACCORDINGLY, PHAROAH REWARDED HIM HANDSOMELY.

IT WOULD BE DIFFICULT TO MATCH THAT EXAMPLE, BOTH IN TERMS OF THE PRECISION OF THE FORECAST AND...THE REWARDS ACCRUING TO THE PRACTITIONER.



BUT THE WORK GOES ON.....

SOME OF IT BASED UPON THE DREAM THAT DID SO WELL
FOR JOSEPH



- . BUT FAR MORE OF IT BASED UPON CERTAIN FUNDAMENTAL APPROACHES

1) NONNUMERICAL METHODS

BASED ON QUALITATIVE APPRAISALS RELATED TO THE
JUDGMENT AND EXPERIENCE OF INDIVIDUALS

- . EXECUTIVE CONSENSUS
- . SALES MANAGERS' ESTIMATES
- . SAMPLING OF GROUP OPINIONS
- . DELPHI METHOD

2) NUMERICAL METHODS

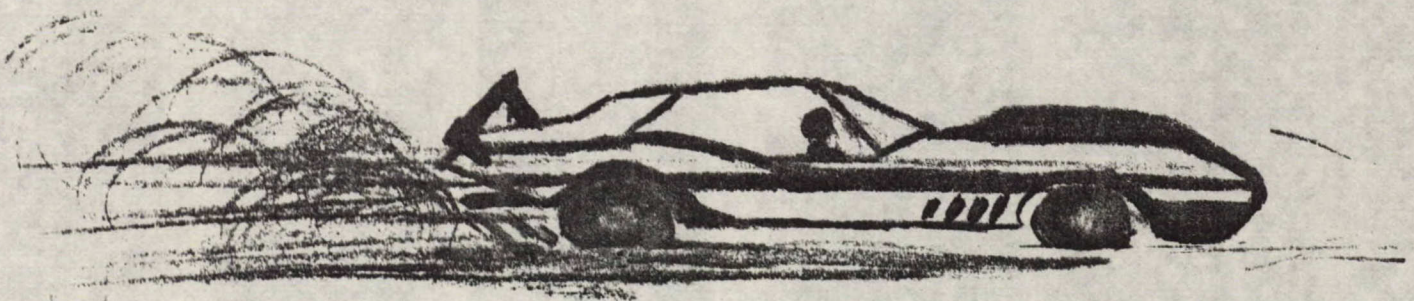
EMPLOYING EXTENSIVE NUMERICAL DEVICES, STATISTICS,
AND MATHEMATICS, CULMINATING IN THE METHODS OF
ECONOMETRICS

- . CORRELATION ANALYSIS
- . EQUATION SYSTEMS OR MODELS
- . TREND AND CYCLE ANALYSIS
- . INPUT/OUTPUT ANALYSIS

WHY 1980?

"THE FASTER A RACING CAR TRAVELS OVER A CROSS-COUNTRY COURSE TO ITS DESTINATION, THE FARTHER AHEAD THE DRIVER MUST LOOK IF HE IS TO AVOID COLLISIONS AND MANAGE THE OBSTACLES IN FRONT OF HIM"

- LAND-MOBILES	=	RACING CAR
RACE	=	RATE OF GROWTH
DESTINATION	=	"OPTIMIZING THE UTILIZATION OF THE ELECTROMAGNETIC SPECTRUM"



TALKING ABOUT SPEED

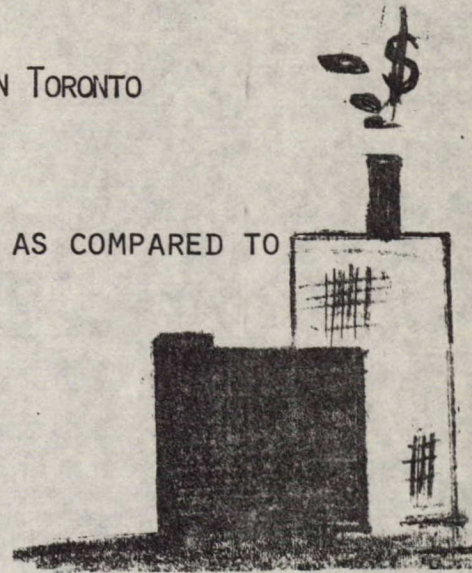
BETWEEN 1962 AND 1972 THE NUMBER OF LAND-MOBILES IN TORONTO
INCREASED BY

17.1 PERCENT

PER ANNUM AS COMPARED TO

5.4 PERCENT

REAL GNP



6.5 PERCENT

AVERAGE WEEKLY WAGES AND
SALARIES IN MANUFACTURING

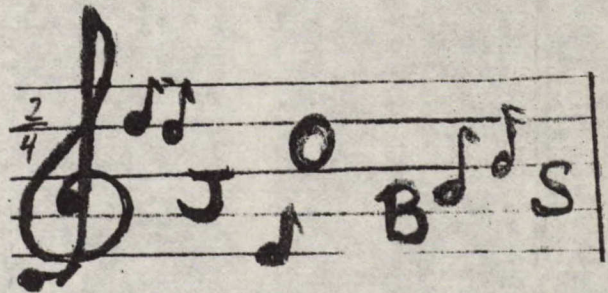


BUTTER



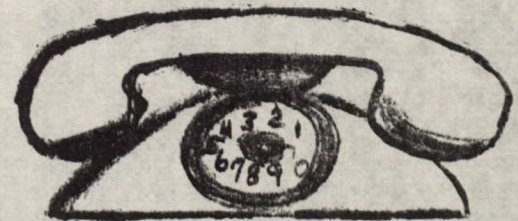
2.9 PERCENT

EMPLOYMENT



5.4 PERCENT

TELEPHONE CALLS



TO FORECAST THE NUMBER OF RADIO-MOBILES IN MONTREAL
AND TORONTO WE FOLLOWED A SECTORAL APPROACH:

. THE USERS WERE CLASSIFIED BY INDUSTRIAL SECTORS

- . PUBLIC ADMINISTRATION
- . MANUFACTURING
- . SERVICES
- x . PUBLIC UTILITIES
- x . COMMUNICATIONS
- . TRADE
- . TRANSPORTATION
- . CONSTRUCTION

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METHODOLOGY

WE WILL GIVE A FEW EXAMPLES TO HIGHLIGHT THE FORECASTING METHODOLOGY

1 FIRE SERVICES

(MONTREAL REGION)

1962

42 RADIO-MOBILES

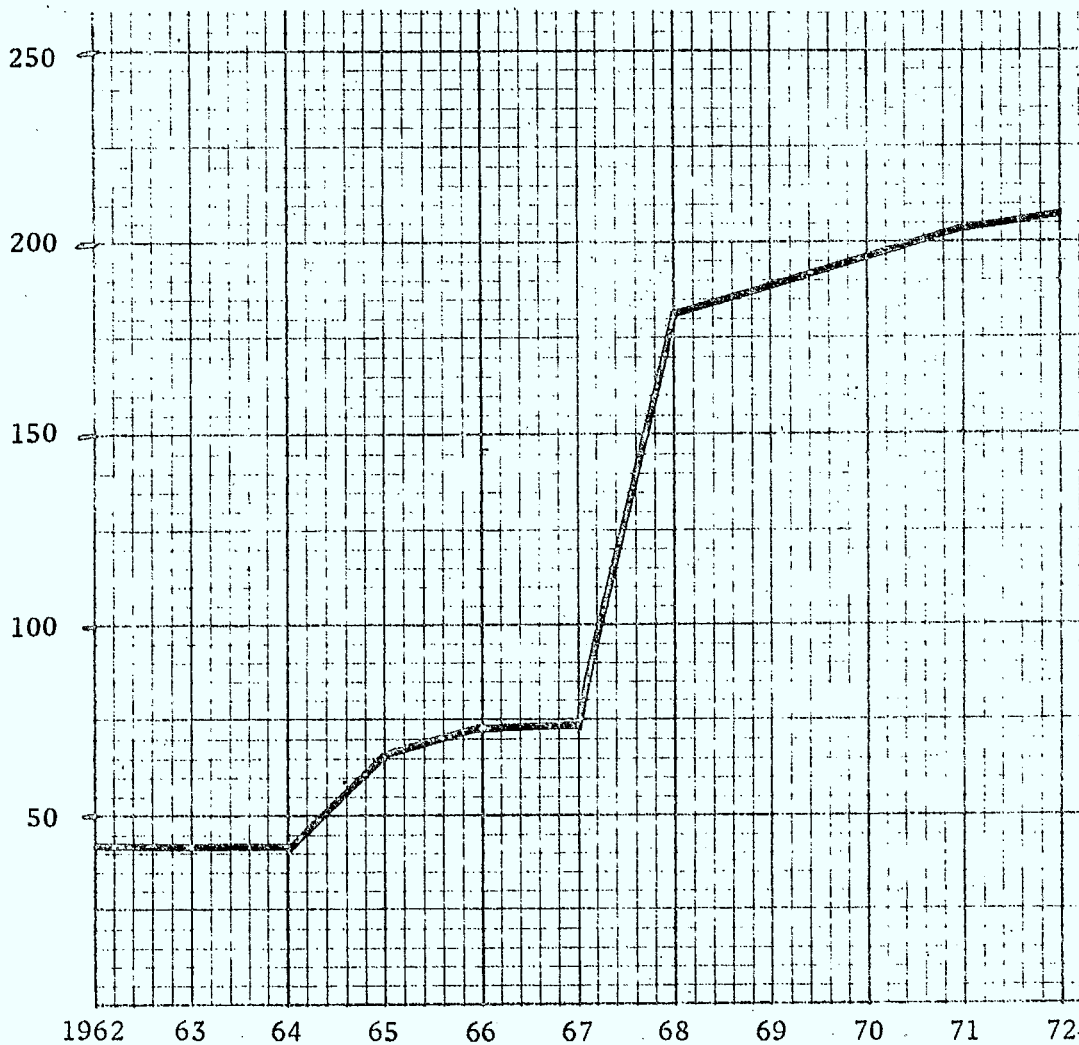
1972

207 RADIO-MOBILES

FIRE SERVICES

MONTREAL REGION

NUMBER OF RADIO-MOBILES



FACTORS USED TO EXPLAIN THE DEMAND FOR LAND-MOBILES IN
FIRE SERVICES

- 1) NUMBER OF FIRE CALLS (X_T)
- 2) THE RISK OF A FIRE AND THEREFORE THE
DEMAND FOR LAND-MOBILES MAY BE
DETERMINED BY THE LEVEL OF POPULATION (P_T)
- 3) A VARIABLE (Z) WHICH ACCOUNTS FOR ADMINISTRATIVE,
POLITICAL AND SOCIAL DECISIONS WHICH CANNOT
BE QUANTIFIED AND ARE RESPONSIBLE FOR THE
MORE-THAN-USUAL INCREASE IN THE DEMAND FOR
LAND-MOBILES.

THE DEMAND SHOWED A SIZEABLE MOVE IN 1968.
THIS SUDDEN INCREASE WAS CAPTURED BY Z WHICH
TAKES THE VALUE 1 FROM 1962 TO 1967 AND 2
FROM 1968 TO 1972.

ESTIMATED BY THE LEAST-SQUARE METHOD:

$$L_T = -282.6 + 107.0 Z + 1.84 P_T + 22,933.6 X_T$$

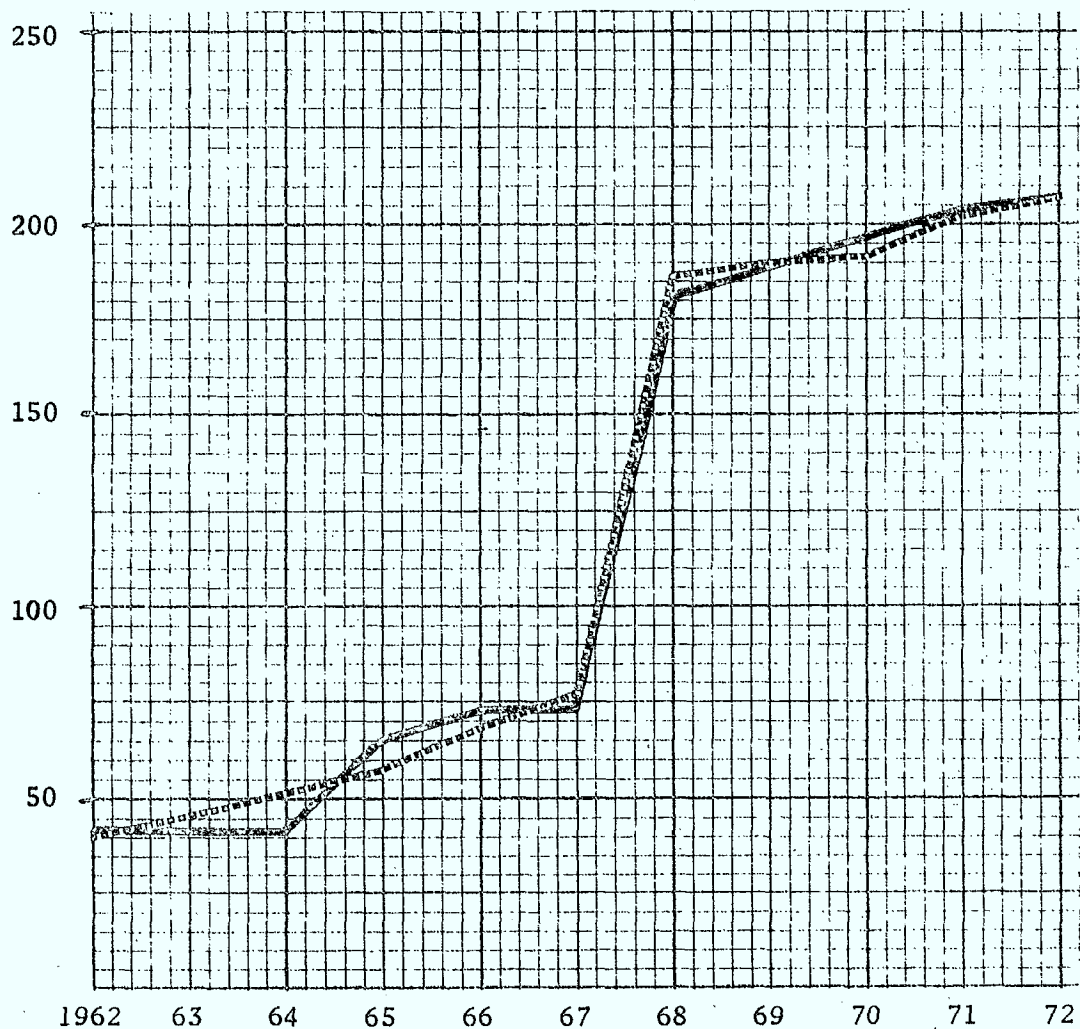
(17.3) (4.0) (2.2)

$$R^2 = .996$$

$$D.W. = 2.00$$

ACTUAL AND CALCULATED

NUMBER OF RADIO-MOBILES



II PUBLIC UTILITIES (TORONTO REGION)

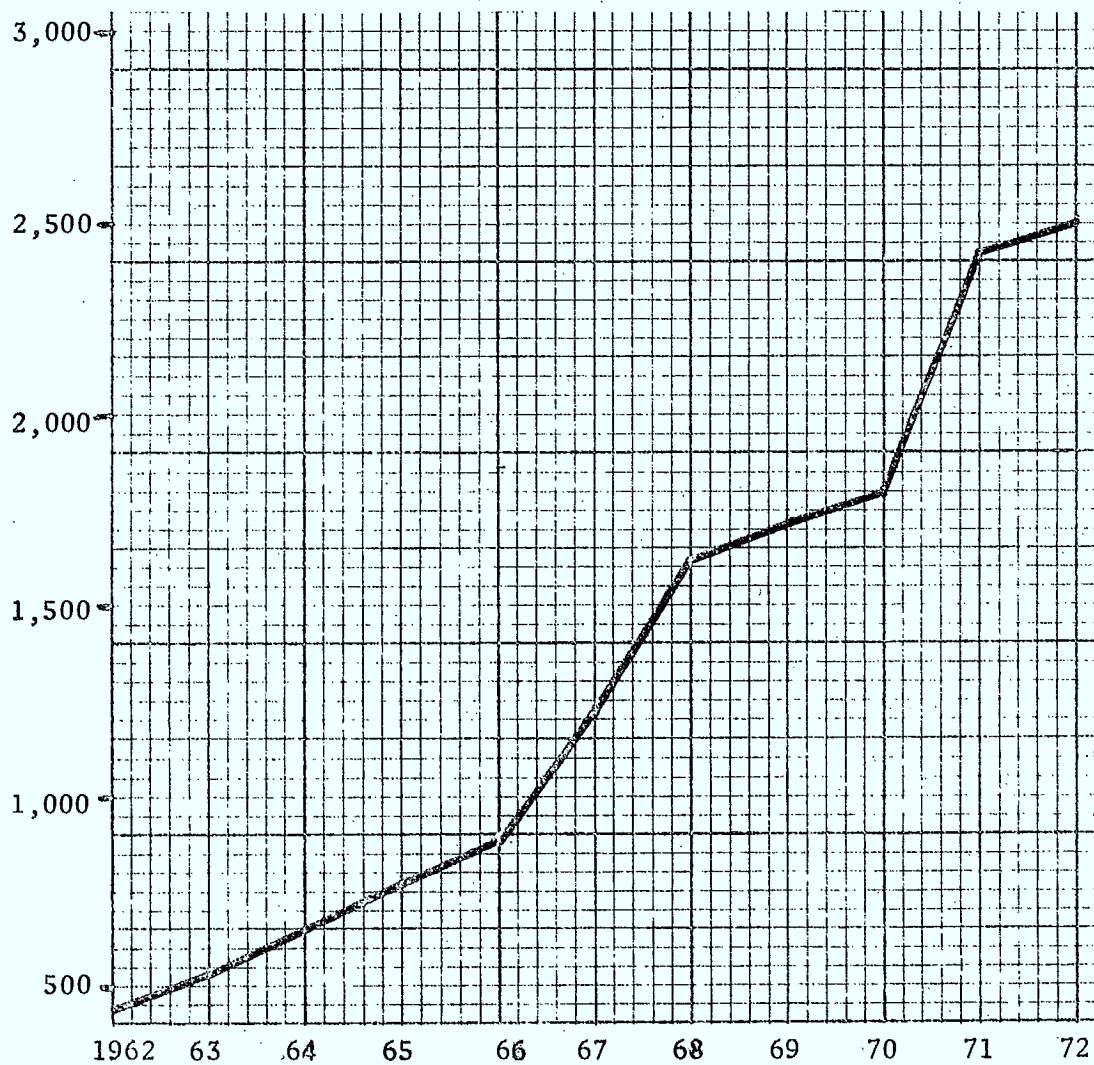
1962 439 RADIO-MOBILES

1972 2,497 RADIO-MOBILES

PUBLIC UTILITIES

TORONTO REGION

NUMBER OF RADIO-MOBILES



- . MODERN SOCIETY HAS BECOME COMPLETELY
DEPENDENT ON RELIABLE ELECTRIC POWER AND
RADIO-COMMUNICATIONS HAS PLAYED AN IMPORTANT
ROLE IN PROVIDING THIS LEVEL OF RELIABILITY
- . DURING MAJOR INTERRUPTIONS (SNOW, ICE, WIND,
ETC...) SERVICE HAS BEEN RESTORED HOURS, OR
EVEN DAYS SOONER THAN WOULD HAVE BEEN POSSIBLE
WITHOUT THE USE OF RADIO-FACILITIES
- . RADIO CIRCUITS USED FOR PROTECTION OF
TRANSMISSION LINES FORM NOW AN INTEGRAL PART
OF THESE TRANSMISSION LINES
- . RADIO-COMMUNICATIONS ARE IN CONTINUOUS DEMAND
FOR REMOTE CONTROL OF POWER EQUIPMENT,
SURVEILLANCE OF THE STATUS OF POWER EQUIPMENT
AND TELEMETERING OF POWER LOADS

IT IS NOT SURPRISING THEREFORE THAT THE GROWTH RATE IN
THIS SECTOR AMOUNTED TO 19.5 PERCENT PER ANNUM OVER THE
PERIOD 1962-1972.

TO EXPLAIN CHANGES IN THE LEVEL OF RADIO-MOBILES IN THE PUBLIC UTILITIES SECTOR, "VALUE ADDED" IN ELECTRIC POWER WAS USED AS A GOOD PROXY FOR THE LEVEL OF ACTIVITY IN PUBLIC UTILITIES.

ESTIMATED BY THE LEAST-SQUARE METHOD, THIS RELATIONSHIP YIELDS THE FOLLOWING RESULTS:

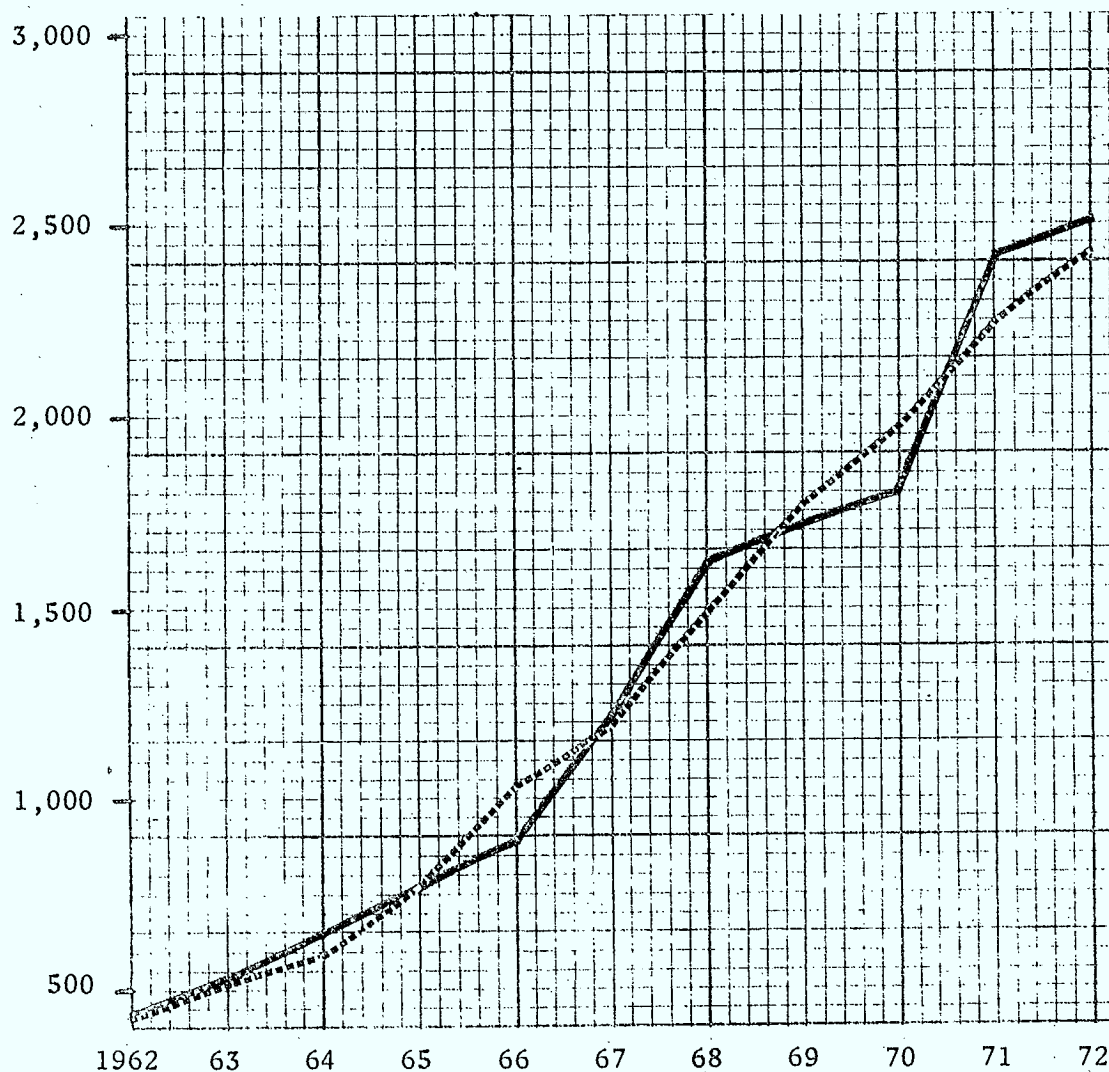
$$L_T = -1270.7 + 20.1 Q_T$$

(23.3)

$$R^2 = .986$$

$$D.W. = 2.00$$

ACTUAL AND CALCULATED
NUMBER OF RADIO-MOBILES



MAJOR USERS OF LAND MOBILES

MONTREAL REGION

	<u>1962</u>	<u>1972</u>	<u>1980</u>
	%	%	%
TRANSPORTATION	38.1	32.9	33.1
PUBLIC ADMINISTRATION	44.5	19.1	9.6
PUBLIC UTILITIES	8.6	13.7	9.5
CONSTRUCTION	2.9	8.7	8.9
TRADE	1.6	6.5	10.5
SERVICES	<u>1.5</u>	<u>4.8</u>	<u>9.2</u>
TOTAL	97.2	85.7	80.8

TOTAL NUMBER OF LAND-MOBILES	3,508	18,741	45,600
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ANNUAL COMPOUNDED	1962-1972	18.2%
RATE OF GROWTH	1973-1980	11.6%

1 TRANSPORTATION

- . OVERALL THIS SECTOR WILL RETAIN ITS IMPORTANCE DESPITE THE MARGINAL GROWTH FORESEEN IN TAXIS ACTIVITY DUE TO:
 - . FREEZE ON TAXIS LICENCES: 4,495
(COMPARED TO 2,000 FOR TORONTO)
 - . LITTLE SCOPE FOR MARKET PENETRATION.
MOST OF THE TAXIS ARE EQUIPPED WITH
RADIO
- . ABOUT 92 PERCENT OF THE GROWTH (1972-1980) WILL BE GENERATED BY "OTHER TRANSPORTATION" (COMMERCIAL CARS, BUSES, PRIVATE CARS, ETC...)

11 PUBLIC ADMINISTRATION

BETWEEN 1972 AND 1980 A MODEST ANNUAL RATE OF GROWTH OF 2.5 PERCENT IS FORECASTED FOR THE FOLLOWING REASONS:

- . THE NEED FOR RADIO-COMMUNICATIONS IS BEING RECOGNIZED FOR SOME TIME IN THE PUBLIC SECURITY SECTOR AND A LARGE COMMUNICATION SYSTEM WAS IMPLEMENTED IN THE EARLY SIXTIES.
- . ADDITIONAL INCREASES ARE GEARED TO POPULATION GROWTH AND NOT TO MARKET PENETRATION
- . POPULATION GROWTH = 1.8 PERCENT PER ANNUM

111 PUBLIC UTILITIES

- . IN THE MID-SIXTIES, PRESSURES ON POWER RESOURCES DEVELOPED, RESULTING IN THE EXPLOITATION OF HYDRAULIC POWER IN REMOTE AREAS LIKE THE MANIC PROJECTS.
- . THESE PROJECTS IMPLIED THE BUILDING OF A COMPLEX OF TRANSMISSION SYSTEMS OVER LONG DISTANCES TO HAUL THE POWER ENERGY TOWARDS THE CONSUMPTION CENTRES.
- . THE BUILDING AND THE INSPECTION OF THESE TRANSMISSION LINES DETERMINE THE DEMAND FOR RADIO-MOBILE COMMUNICATIONS.
- . THE SHARE OF THIS SECTOR
 - 8.6 PERCENT IN 1962
 - 13.7 PERCENT IN 1972
 - 9.5 PERCENT IN 1980
- . A DECREASE IN THE SHARE WILL FOLLOW THE INITIAL INVESTMENT.

IV CONSTRUCTION

THE SHARE OF THIS SECTOR

- 2.9 PERCENT IN 1962
- 8.7 PERCENT IN 1972
- 8.9 PERCENT IN 1980
- . FAST GROWTH IN THE CONSTRUCTION INDUSTRY
- . MARKET PENETRATION
- . CHANGE IN THE CONSTRUCTION MIX: MORE HIGH-RISES AND LESS BUNGALOWS
- . 1976 OLYMPIC GAMES

V TRADE

THE SHARE OF THIS SECTOR

1.6 PERCENT IN 1962

6.5 PERCENT IN 1972

10.5 PERCENT IN 1980

- . MARKET PENETRATION
- . EFFICIENT STORAGE AND DISTRIBUTION FUNCTIONS
- . CHEAPER DISTRIBUTION OF GOODS
- . REDUCTION OF LABOUR COSTS IN A LABOUR INTENSIVE AREA

VI SERVICES

THE SHARE OF THIS SECTOR

1.5 PERCENT IN 1962

4.8 PERCENT IN 1972

9.2 PERCENT IN 1980

THE DEMAND FOR BUSINESS MANAGEMENT SERVICES INCREASED, THUS CREATING NEW NEEDS FOR RADIO-COMMUNICATIONS IN NEW AREAS (ENGINEERING, PUBLICITY...)

- . NEW APPLICATIONS IN HEALTH AND EDUCATION SERVICES IE:

A STUDY CONDUCTED IN LOS-ANGELES SHOWED THAT BETWEEN 70 TO 80 PERCENT OF HEART ATTACK CASES, THE PATIENT DIES IN THE AMBULANCE BEFORE REACHING THE HOSPITAL. THE USE OF RADIO-COMMUNICATIONS REDUCED THE MORTALITY RATE BY HALF.

MAJOR USERS OF LAND-MOBILES

TORONTO REGION

	<u>1962</u>	<u>1972</u>	<u>1980</u>
	%	%	%
TRANSPORTATION	40.8	32.2	32.7
PUBLIC ADMINISTRATION	30.9	21.9	11.3
PUBLIC UTILITIES	8.5	9.9	9.4
CONSTRUCTION	1.7	6.2	9.9
TRADE	0.7	2.9	5.2
SERVICES	<u>4.1</u>	<u>4.5</u>	<u>6.9</u>
TOTAL	86.7	77.6	75.4

TOTAL NUMBER OF
LAND-MOBILES

5,184

25,190

58,600

ANNUAL COMPOUNDED
RATE OF GROWTH

1962-1972
1973-1980

17.1%
10.2%

SITUATION

- DATA SHOWS THAT, AS OF 1972, THERE IS NO PROBLEM
- ANALYSIS INDICATES THAT A CERTAIN LEVEL OF CONGESTION IS PROBABLE BY THE END OF THIS DECADE IN FEW LARGE URBAN CENTRES



QUEEN TK 6570 .M6 Z32 1974
Zalatan, Antoine
Demand for land-mobiles, (Mo

Date Due

MAY 25 1978

JUN 27 1978

NOV 2 1978

MAR 14 1979

JUN 25 1979

FORM 109

