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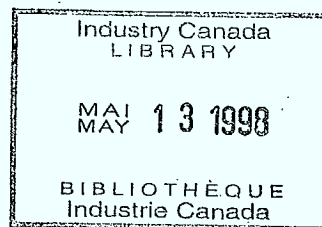
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THE IMPLICATIONS OF
INFORMATION TECHNOLOGY FOR WOMEN



TECHNOLOGY, POLICY AND
PLANNING BRANCH

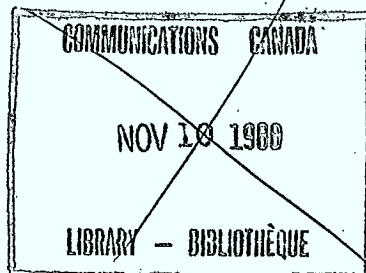
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2/ THE IMPLICATIONS OF
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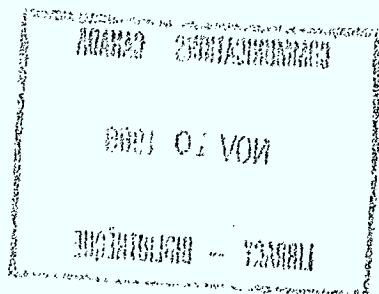
Prepared by:
Bev Hillman & Ward Branch
Technology Policy and
Planning Branch

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EXECUTIVE SUMMARY

I. INTRODUCTION

For a number of years there has been considerable concern about the labour market effects of technological change. Many of the new developments in telecommunications and computing affect work in information processing, distribution and creation - areas of work traditionally dominated by women. Studies have found that the disproportionate problems which women workers face are caused not only by the new technologies, but also by occupational segregation and discrimination in the labour market, which creates a barrier to movement into jobs with greater security and career prospects.

In order to address these concerns, the Minister of Communications, in conjunction with the Ministry responsible for the Status of Women, and the Secretary of State (responsible for the Women's Program) will be discussing the implications of information technology for women, focussing on how it can help promote equitable employment opportunities. The purpose of this background document is to review the available statistics, studies, and task force reports on the position of women in the labour force and the effects of information technologies on the quantity of women's employment opportunities and on the quality of their jobs.

II. STATISTICAL OVERVIEW

- * Significant influx of women into the labour force in Canada.
In 1986 women comprise 43% of the total labour force, compared to 31% in 1966.
- * During 1976-1986, women accounted for 63% of the growth in the labour force.
- * In 1986, over 80% of women worked in the tertiary (service) sector.
- * Almost one out of every three employed women hold clerical positions.
- * In 1986, only 9% of women work in managerial and administrative positions (compared to 3% in 1975).
- * Of all employed women, 26% work part-time, compared with only 8% of men.
- * In 1986, participation rate of women with a university degree was 78% compared to 25% for women with less than grade 9 education.
- * Women's average annual earnings in 1985 were only 65% of men's.

III. EFFECTS OF INFORMATION TECHNOLOGY ON WOMEN'S EMPLOYMENT

Although the above noted statistics demonstrate the clustering of females in certain occupations and their vulnerability to technological changes, there is no clear consensus concerning the extent and scope of technological implications for women. Some studies in the early eighties were pessimistic on what the net employment outcome would be, while other studies indicated that new office technology had not resulted in widespread labour displacement partly because of the moderate rate of diffusion of new technology at that time.¹³

More recent studies conclude that technological change is likely to result in employment and serious adjustment problems for some women. In particular, clerical jobs will experience slower growth in the aggregate⁶ or a significant net loss of employment.¹

In addition to the slowdown of growth in clerical employment, occupational shifts and changes in the quality of employment can be expected due to the technological impact of computers. Some studies argue that new technology will enhance jobs, upgrade skills, and vary the tasks of the information worker. For example:

- If customers perform most routine banking operations using automatic teller machines, then human tellers can handle problems or inquiries that require considerable knowledge of banking procedures and skill at dealing with people.
- According to the Economic Council's case studies in federal government departments, the introduction of technology had either a neutral or an upgrading effect in terms of skills. Many respondents indicated that innovation had enhanced the "interesting nature of the work" and the "opportunity to make full use of abilities and skills."¹

Another view presented is that the technology will de-skill information-handling jobs and will make them more monotonous by fragmenting tasks, lead to more stressful work, employer monitoring of employees, and work speedups. Clerical workers in the Economic Council's survey felt that technology is now an established fact. They said they had to learn it in order to keep their jobs but could not rely on it for promotion.

The lack of agreement in the studies, the different stages of technology and its variety of uses, and the differing economic and social circumstances of the workplaces are all factors which prevent a definitive conclusion about the effects of technology in terms of skills and job content. However, the most recent study, that of the Economic Council, shows that in the process of adapting to technological change, the better educated and higher skilled women stand the best chance of benefiting, though even at the lower skill levels new technologies may bring more challenging and less monotonous jobs.

In terms of working conditions, users of video display terminals (VDTs) and microcomputers have complained about eye strain, muscular discomfort, tension and stress. A recent U.S. National Research Council report was unsure about the causal role that VDTs play versus the physical environment (i.e. improper lighting and table height) and occupational effects (i.e. some of the problems are due to the tasks people perform, not to the technology).

Another area of concern is the technical capability to monitor and assess the amount of work employees do, thus increasing stress. The data on the overall extent of computerized monitoring are both sketchy and contradictory.

The use of computers and telecommunications facilitate telecommuting or remote work from homes or other locations away from the centralized office. A debate exists between those who see telework as an alternative for women to combine paid employment with family and child care responsibilities, and those who see electronic working at home as exploitation of isolated, unprotected, home-based workers. Because telework may be increasing through the use of technology, the extent of telework and its terms and conditions need to be carefully studied.

An important dimension of job quality is the hours worked. Growth in part-time employment is particularly evident in three traditionally female occupations: clerical, sales, and services. For the employees, part-time work often means poorer fringe benefits coverage and pensions, being paid less on an hourly rate, less job security, less seniority, low unionization, and relatively few opportunities for training and career advancement. There is an increasing number of women who work part-time because they cannot find full-time work. The growing importance of part-time work should receive serious consideration with special attention to legislation that will protect workers.

There is no question that wage differentials between the sexes do exist, and that women earn only 65 cents for every \$1 taken home by men (1985 data). Part of the explanation for the earnings gap is the "clustering" of women in certain occupations. Women tend to be concentrated in clerical, sales, and service occupations which are characterized by low pay, high turnover, and low union penetration. A United States Census Bureau study concluded that working in an occupation that has a high proportion of women has a negative effect on earnings. The principle of equal pay for work of equal value is currently being studied by governments. Equal value legislation permits comparison between dissimilar jobs, and is designed to eliminate income differentials which stem from sex-typing certain types of jobs.

IV. SOME RESPONSES TO TECHNOLOGICAL CHANGE

The majority of women are employed in a concentrated range of occupations many of which will be affected by skill changes due to office automation. As well, the labour market segments in which women are concentrated tend to be disadvantaged in terms of skill, status, security, and earnings. Women have more limited access to alternative job possibilities due to a number of factors, namely: limited geographical mobility; family responsibilities; low math, science, and technical skills because of early educational choices; lack of training for non-traditional jobs; and social attitudes and perceptions of women's occupational choices. The disproportionate problems which women workers face are caused not only by the new technologies, but also by occupational segregation and discrimination in the labour market.

The findings in the studies support the need for training programs that will assist workers whose skills no longer match available jobs. It will be particularly difficult for minority women, older women, and those with low levels of education or training. The extent to which women will be able to obtain these new skills also depends a great deal on the rate of diffusion of the new technology. A recent study recommended that training and counselling programs should be aimed more at areas of growth and opportunity, rather than training for fields threatened by automation. It was also proposed that Employment and Immigration Canada set up a task force with the explicit responsibility of investigating discriminatory practices in training programs. Another challenge is to change the traditional attitudes and perceptions which tend to limit the career choices made by girls and women.

The studies also suggest that the government has a crucial role in several areas, namely:

- ° effectively implementing wage equality legislation;
- ° support or conduct research on the effects of technological change on the quantity and quality of work life;
- ° encourage consultation and cooperation in departmental implementation of new technologies;
- ° evaluate training programs in terms of the type of job entered, earnings, and the effects on occupational segregation;
- ° review the issue of health and safety problems due to new technologies;

- ° review current labour codes and the provisions for technological change;
- ° study the growing importance of part-time work and telework with attention to legislation that will protect workers accordingly;
- ° undertake research to determine the speed of diffusion of new technologies in various sectors of the economy and the likely implications.

TABLE OF CONTENTS

	<u>Page</u>
EXECUTIVE SUMMARY	i
CHAPTER I: INTRODUCTION	1
CHAPTER II: WOMEN IN THE LABOUR FORCE	
2.1 Labour Force Distribution	3
(a) Labour Force Growth for Women	3
(b) Female Labour Force by Age Group	4
(c) Labour Force by Industry and Sex	5
(d) Labour Force by Occupation and Sex	6
(e) Full-time and Part-time Employment by Sex	7
2.2 Labour Force Participation	8
(a) Growth in Female Participation	8
(b) Participation by Age Group and Sex	10
(c) Participation by Marital Status	10
(d) Participation by Age of Youngest Child	11
(e) Participation by Education and Sex	11
2.3 Educational Attainment	12
(a) University Enrolment by Sex	12
(b) Degrees Granted by Field of Study	14
2.4 Earnings	14
(a) Earnings Gap by Sex	14
(b) Earnings by Occupation and Sex	15
2.5 Unemployment	16
(a) Unemployment Rates by Sex	16
(b) Unemployed by Reason for Leaving Last Job	17
CHAPTER III: EFFECTS OF INFORMATION TECHNOLOGY ON WOMEN	
3.1 Employment Projections for Women	18
(a) The Debate	18
(b) Employment Projections to 1995	20
3.2 Structural Change in Female Employment	22

TABLE OF CONTENTS

	<u>Page</u>
3.3 Changes in the Quality of Work	23
(a) Job Content	23
(b) Working Conditions	26
(c) Economic Considerations	27
3.4 Wage Disparity	28
CHAPTER IV: SOME RESPONSES TO TECHNOLOGICAL CHANGE	
4.1 Implications for Training and Education	31
4.2 Legislation and Government Policy	34
4.3 Further Research	35
REFERENCES	37
LIST OF FIGURES	40
LIST OF TABLES	41
APPENDIX A: FEDERAL PROGRAMS AND SERVICES FOR WOMEN	
APPENDIX B: WOMENS' ORGANIZATIONS IN THE GOVERNMENT	

CHAPTER I: INTRODUCTION

On June 9, 1987 Cabinet endorsed the MC entitled "Building on Strengths: A Communications and Information Technology Strategy for Canada". The Minister of Communications, in conjunction with the Ministry responsible for the Status of Women, and the Secretary of State (responsible for the Women's Program), was directed to create an Advisory Committee on the implications of information technology for women, focussing on how it can help promote equitable employment opportunities. The purpose of this background note is to review the available statistics, studies, and task force reports on the position of women in the labour force and the effects of information technologies on the quantity of women's employment opportunities and on the quality of their jobs.

For a number of years there has been considerable concern about the labour market effects of technological change. The evidence on the employment effects of technological change is mixed. A federal task force concluded in its 1982 report, *In the Chips: Opportunities, People, Partnerships*, that: "...no consensus exists on the question of the net job balance created by the development and expansion of the new technologies". A more recent Ontario task force on employment and new technology concluded: "While employment dislocations will occur with technological change, and are particularly noticeable in industries affected by slow economic growth, we believe that the contribution of technological change to overall employment can be positive." The recent Economic Council report, *Innovation and Jobs in Canada*, summarized employment projections to 1995 and outlined the future prospects for female employment as follows:

"occupational groups which may be expected to experience the largest employment gains include occupations in sales and services, both of which have historically been large employers of women. On the other hand, clerical occupations, which also employ large numbers of women, are expected to experience a substantial net job loss (i.e. displacement is greater than re-employment) as a result of computer based technological change to 1995." ¹

Clearly, the overall magnitude of the employment effect is a crucial issue, but there is also a concern that it is women workers who will bear the brunt of the impact of information technology. Many of the new developments in telecommunications and computing effect work in information processing, distribution and creation -- areas of work dominated by women.

According to a recent United States study: "Recent research suggests that automation in the clerical sector is altering the numbers and types of jobs available, the nature of jobs and their geographic location, working conditions, and career opportunities."⁶

Since information technologies seem to effect initially areas of work which are dominated by women, this report will examine the employment effects, in both quantitative and qualitative terms, of new technologies on women and the implications in terms of education and training, job opportunities for women, and government roles.

Chapter II of this report discusses the statistics published by Statistics Canada on the present position of women in the Canadian labour market and an historical perspective of the progress made in the last twenty years.

In Chapter III, a review is provided of the major issues which have been discussed in the literature on how technological change is effecting women's employment. Some of the questions being considered are as follows:

- How are working women distributed among the technologically affected occupations and industries?
- What types of jobs are being created by new technologies?
- Has the skill content of jobs been affected by the new technologies?
- Have the new technologies influenced working hours or innovative working arrangements?
- What are the future employment prospects for women due to new technologies?

A summary of the literature review which was conducted is provided in Table 10. Over 20 major studies as well as numerous newspaper articles on the effects of technology on women were reviewed. The development of the arguments over time and either additional evidence or conflicting findings will be presented.

In Chapter IV of the report, the types of initiatives that are being undertaken to respond to technological change are discussed. For example, the implications for education and training for women; and the role for government are examined.

CHAPTER II: WOMEN IN THE LABOUR FORCE

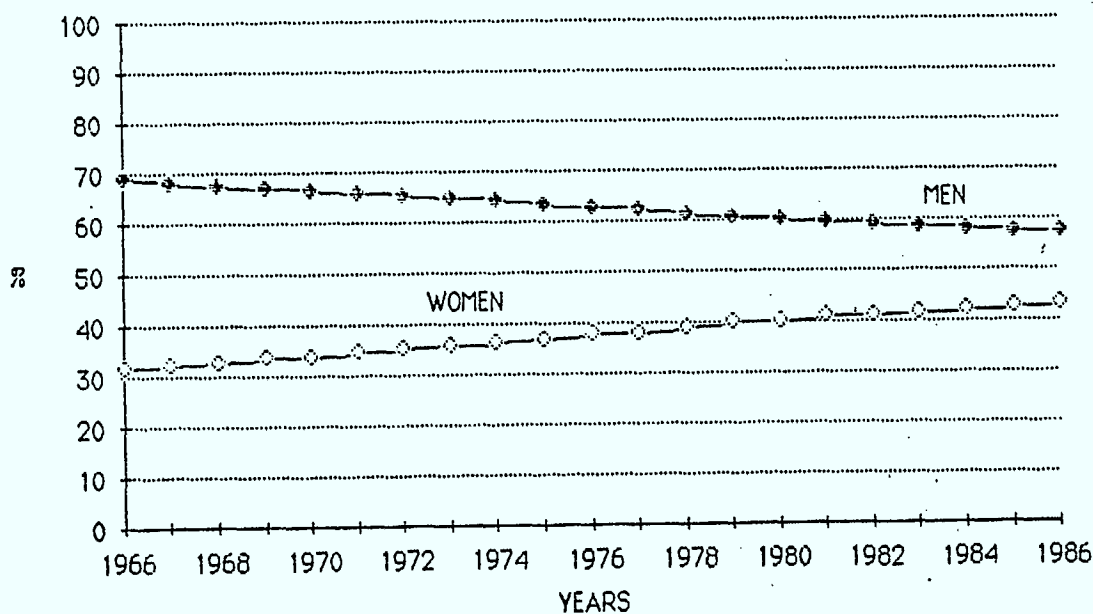
2.1 Labour Force Distribution

(a) Labour Force Growth for Women

There has been a significant influx of women into the labour force in Canada. Between 1966 and 1986, the number of women in the labour force rose by 3.2 million to reach 5.5 million. During the same period, the number of men in the labour force increased by only 2.2 million to 7.3 million. As a result, in 1986 women comprised 43% of the total labour force, up from 31% in 1966. Men's share of the labour force declined from 69% in 1966 to 57% in 1986, as shown in Figure 1.

FIGURE 1:

LABOUR FORCE DISTRIBUTION BY SEX



source: STATISTICS CANADA

The significant increase in women's labour force growth is readily seen by comparing the population and labour force growth rates by sex for the 1976-1986 time period. (Table 1) The population growth rate for women was 18%, similar to men's 17% rate; however, the labour force growth rate for women was 44% versus 15% for men. During the period 1976 to 1986, women accounted for 63 percent of the growth in the labour force.

TABLE 1: Population and Labour Force Growth by Sex, 1976-1986

SEX	POPULATION			LABOUR FORCE		
	1976 '000	1986 '000	GROWTH %	1976 '000	1986 '000	GROWTH %
WOMEN	8494	10019	18.0	3836	5523	44.0
MEN	8207	9576	16.7	6368	7347	15.4
TOTAL	16701	19595	17.3	10204	12870	26.1

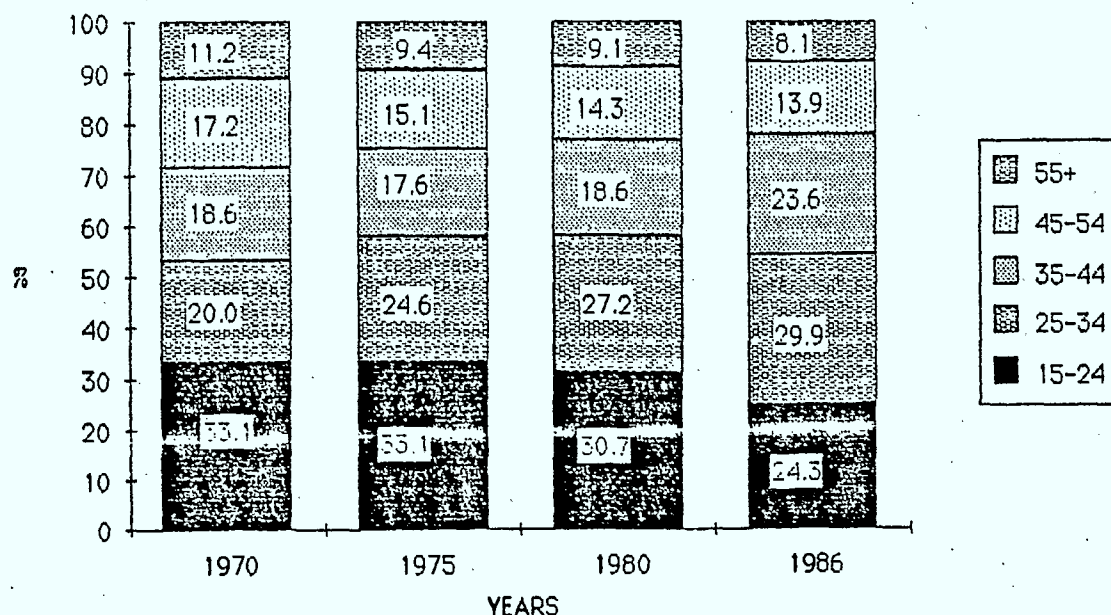
Source: Statistics Canada, Catalogues 71-201 and 71-001

(b) Female Labour Force by Age Group

Women of all age groups are working. As shown in Figure 2, there has been a change in the composition of the female labour force from 1970 to 1986. Women in the 15-24 age group accounted for 33% of the female labour force in 1970 but only 24% in 1986. Similarly those 45 and over declined slightly (29.4% in 1970 to 22.0% in 1986). However, women aged 25-34 increased their share from 20% in 1970 to 30% in 1986; and women aged 35-44 also increased from 18.6% in 1970 to 23.6% in 1986. This indicates that more women of child-bearing years are in the labour force. The percentage distribution in the male labour force has shown a similar pattern, although the increase for men aged 25-44 is not as dramatic as for women.

FIGURE 2:

**DISTRIBUTION OF THE LABOUR FORCE BY AGE GROUP
WOMEN, CANADA**



(c) Labour Force by Industry and Sex

Part of the increased female labour force reflects the changing nature of the Canadian economy. All industries can be grouped into two sectors: the goods producing sector: including agriculture, forestry, fishing and trapping, and mining (i.e. primary industries); and manufacturing and construction (i.e. secondary industries); and the tertiary or service sector, which includes transportation, communication and other utilities, trade, finance, community, business and personal services, and public administration. Of the two sectors, growth in employment has been much slower in the manufacturing and other goods-producing industries in which male workers predominate, than in the more female-oriented service sector.

In 1986, 82% of women worked in the tertiary or service sector compared to 60% of men being employed in these industries. Notice that almost half of the women in the labour force worked in community, business and personal services. Within the goods producing sector, the manufacturing industries employed most of the women and few females worked in the primary industries or in construction. (Table 2) As shown in the last column of Table 2, women were underrepresented in the goods producing industries and only accounted for 24% of their total labour force. In the tertiary sector, about half of these workers were women. Women made up the majority of workers in finance, insurance and real estate and in community, business and personal services.

TABLE 2 : Labour Force by Industry and Sex, 1986

	Males % Distribution	Females	Women as % of Total Industry
All Industries	100.0	100.0	43%
Goods Producing Industries			
Agriculture	4.9	2.9	31%
Other primary industries	4.1	0.8	12%
Manufacturing	21.3	11.7	29%
Construction	9.4	1.3	9%
Subtotal of Goods Producing	39.7	16.7	24%
Tertiary/Service Industries			
Transportation, Communication & other Utilities	10.0	4.2	24%
Trade	17.7	17.7	43%
Finance, Insurance & Real Estate	3.7	7.5	60%
Community, Business and Personal Services	21.4	46.7	62%
Public Administration	7.1	6.3	40%
Subtotal of Tertiary Industries	59.9	82.3	51%

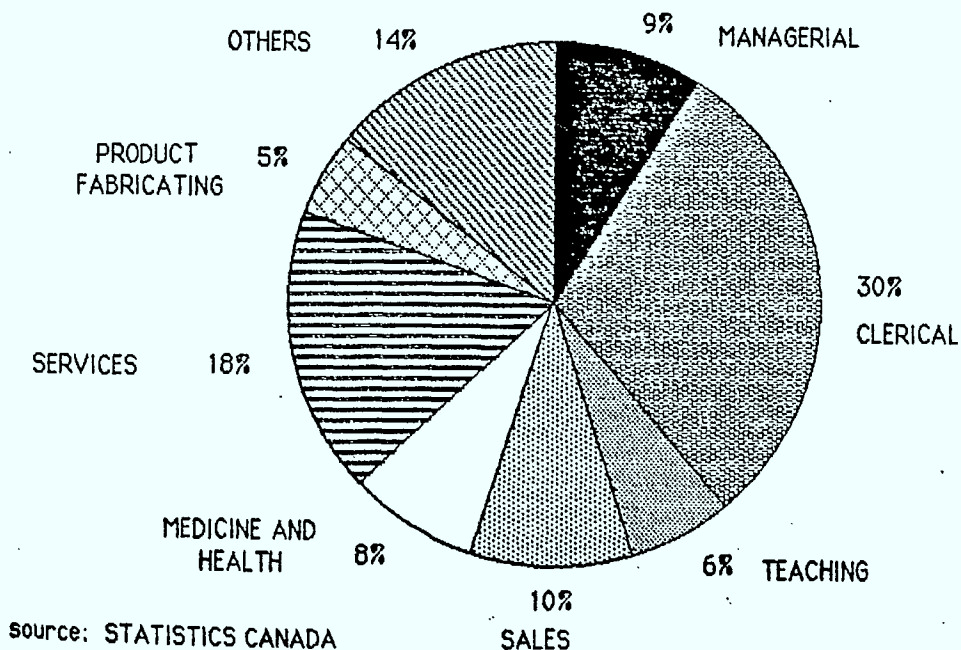
(d) Labour Force by Occupation and Sex

Most women continue to work in occupations in which women have traditionally been the majority. In 1986, 72% of all female employees worked in just five occupational groups - clerical, sales, service, teaching, medicine and health. This was only a seven percentage point drop from what the proportion had been in 1975.

The largest concentration of women in the labour force in 1986 was in clerical occupations. Almost one out of every three employed women held a clerical position. Next in importance were services and sales categories - at 18% and 10% respectively. Other traditional female occupations of medicine and health, and teaching accounted for another 14% of female workers. In the managerial and administrative category, women have increased their share of these positions from 3% in 1975 to 9% of total female employment in 1986. As shown in Figure 3, women remain concentrated in traditionally female jobs and in only a few occupational groups.

FIGURE 3:

**LABOUR FORCE DISTRIBUTION BY OCCUPATION
WOMEN, CANADA, 1986**

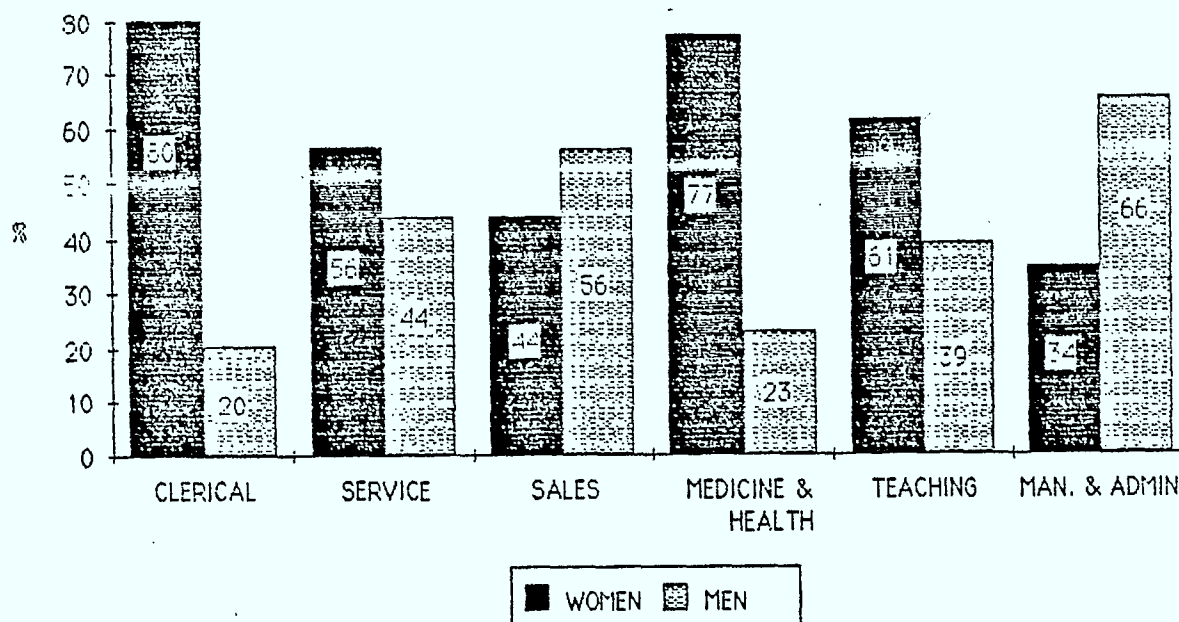


In comparison with the occupational distribution for men, it is clear that women are more heavily concentrated in a few occupations. The largest occupational category for women is clerical at 30%, whereas the largest group for men is processing occupations at 19%. The top four occupation groups for women account for almost 70% of women workers. For men, the top four occupations comprise about 50% of their total employment.

The disproportionate representation of women and men in occupations of importance to women's employment is shown in Figure 4. In clerical work, women accounted for 80% of the workers. Similarly women dominated in medicine and health, and teaching. The distribution for services and sales was about equal. In managerial and administrative positions, men clearly dominated at 66%.

FIGURE 4:

**WOMEN AS A PERCENTAGE OF TOTAL EMPLOYED
SELECTED OCCUPATIONS, 1986**



source: STATISTICS CANADA

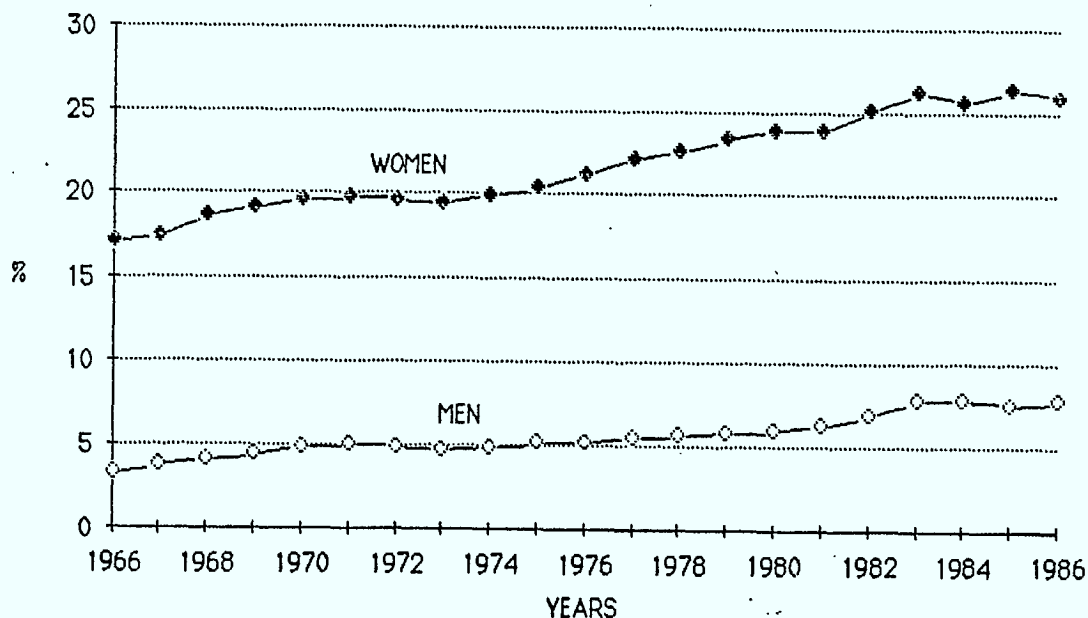
(e) Full-time and Part-time Employment by Sex

Much of women's employment is part-time in comparison to men. In 1986, almost 1.3 million women worked part-time; which represents 26 percent of all employed women compared with only 8 percent of men. (Figure 5) Since 1966 the proportion of both men and women has increased although more noticeably for women (from 17% in 1966 to 26% in 1986)

In 1986 married women comprised 62 percent of the females employed part-time. Their higher proportion is likely due to family responsibilities and perhaps a preference for part-time work.

FIGURE 5:

PERCENTAGE EMPLOYED PART-TIME BY SEX



A comparison of the reasons given for working part-time indicates some significant differences between the sexes. Of all women who work part-time, almost 40% reported they did not want full-time work. This compares to 16% of men not wanting full-time work. Another 13% of women reported they work part-time because of personal or family responsibilities. Less than 1% of men indicated family responsibilities as a reason for part-time work. Twenty percent of women reported going to school as a reason, whereas 49% of men gave this reason for working part-time. The other reason for both sexes was that they could only find part-time work - 27% of women gave this reason and 31% of men.

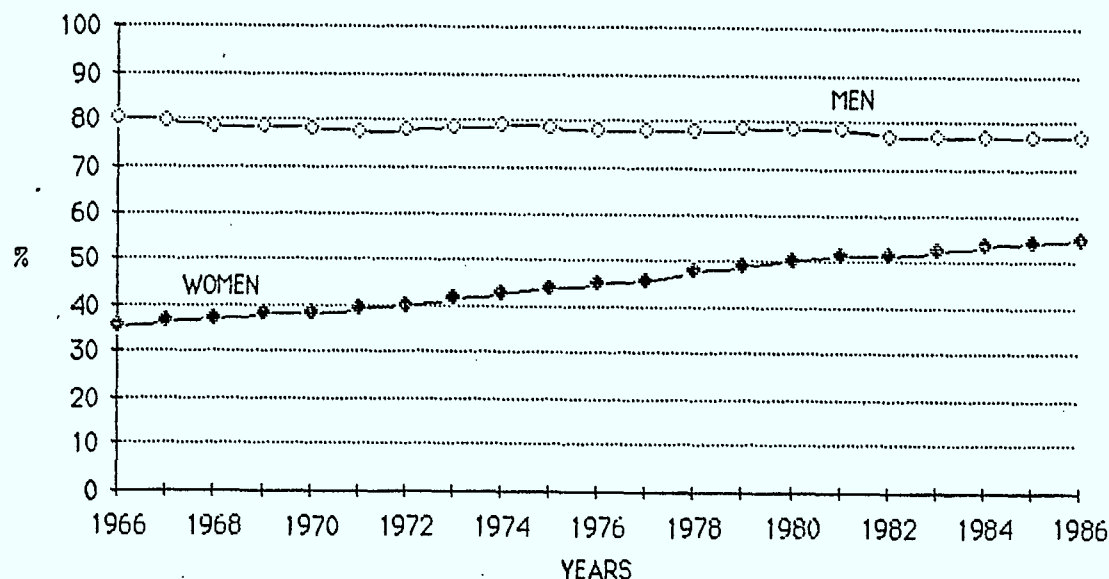
2.2 Labour Force Participation

(a) Growth in Female Participation

The female participation rate - that is, the number of women in the labour force as a proportion of all females aged 15 years and older, increased from 35% in 1966 to 55% in 1986. The male participation rate during the same time period declined very slightly to 77%. (see Figure 6).

FIGURE 6:

PARTICIPATION RATES



source: STATISTICS CANADA

Some of the factors accounting for this significant increase in female participation in the labour force are discussed in the Economic Council's report, *Innovation and Jobs in Canada*.¹

"On the one hand, the service industries have grown rapidly, from 44 percent of employment in 1951 to over 66 percent in 1981. Accompanying service-sector growth has been the growth in female employment. Also associated with rising female employment are declining birth rates and the rising incidence of single-parent families, which are headed mainly by women. Furthermore, women, including those who are married and with children at home, are showing stronger labour-market attachments. The latter is related to educational levels; better-educated women tend to form a more permanent attachment to the labour force. Last, for many families, the rising cost of living has made two earners a necessity." (p. 129)

(b) Participation by Age Group and Sex

The labour force participation rates between 1975 and 1986 increased for women of all ages except those 65 and over. (Table 3) Women in the 25 to 54 age range had the largest increases. Participation was up 20 percentage points for women aged 25-34 and 35-44, and 15 percentage points among those aged 45-54. For women aged 15-24 years, the increase was nine percentage points, and for those 55 and over, the increases were less than 3 percentage points. In contrast, labour force participation rates declined slightly for men of all ages except those 15-24. However, the participation rate for men aged 25-44 is about 95%.

TABLE 3: Labour Force Participation Rates , by Age Group and Sex

	1975	1980	1986
<u>Age Group</u>			
15-24 Years			
Women	56.8	62.6	65.6
Men	68.8	71.8	71.7
25-34 Years			
Women	52.9	62.7	73.0
Men	95.2	95.4	94.3
35-44 Years			
Women	51.5	61.6	72.1
Men	96.1	96.0	95.0
45-54 Years			
Women	46.1	54.1	60.7
Men	92.7	92.6	91.5
55-64 Years			
Women	30.8	33.7	33.4
Men	79.3	76.2	68.5
65 Years +			
Women	4.9	4.3	3.7
Men	18.5	14.7	11.1

Source: Statistics Canada, Catalogues 71-201 and 71-001

(c) Participation by Marital Status

Another significant change in the female participation rate has been the increase for women who are married and with children at home. In the past, few married women and particularly women with children worked outside the home. The data in Table 4 show that this has changed

dramatically. Between 1975 and 1986 the labour force participation rate of married women rose by 14 percentage points, about twice the growth recorded for single women. In 1986 the participation rate of married women was 56 percent, compared to a rate of 66% for single women and 35% for divorced, separated, or widowed women.

TABLE 4: Female Labour Force Participation Rates by Marital Status

	1975	1980	1986
<u>Marital Status</u>			
Single	59.2	63.3	66.1
Married	41.6	49.0	56.1
Other	31.5	35.1	35.3

Source: Statistics Canada, Catalogue 71-201

(d) Participation by Age of Youngest Child

Increases in the participation rate of women with young children were even more impressive (Table 5). In the period 1975-1986, the participation rate of women with children under 16 years increased from 42 percent in 1975 to 63 percent in 1986 -up 21 percentage points. As would be expected, women with children less than 3 years and 3-5 years had lower participation rates than those with children aged 6-15 years.

TABLE 5: Labour Force Participation of Women by Age of Youngest Child

	1975	1980	1986
<u>Youngest Child</u>			
Less than 3	31.2	41.7	56.0
3-5 years	40.0	50.1	61.7
6-15 years	48.2	58.2	68.4
Total with children under 16 years	41.6	51.8	63.4

Source: Statistics Canada, The Labour Force Survey

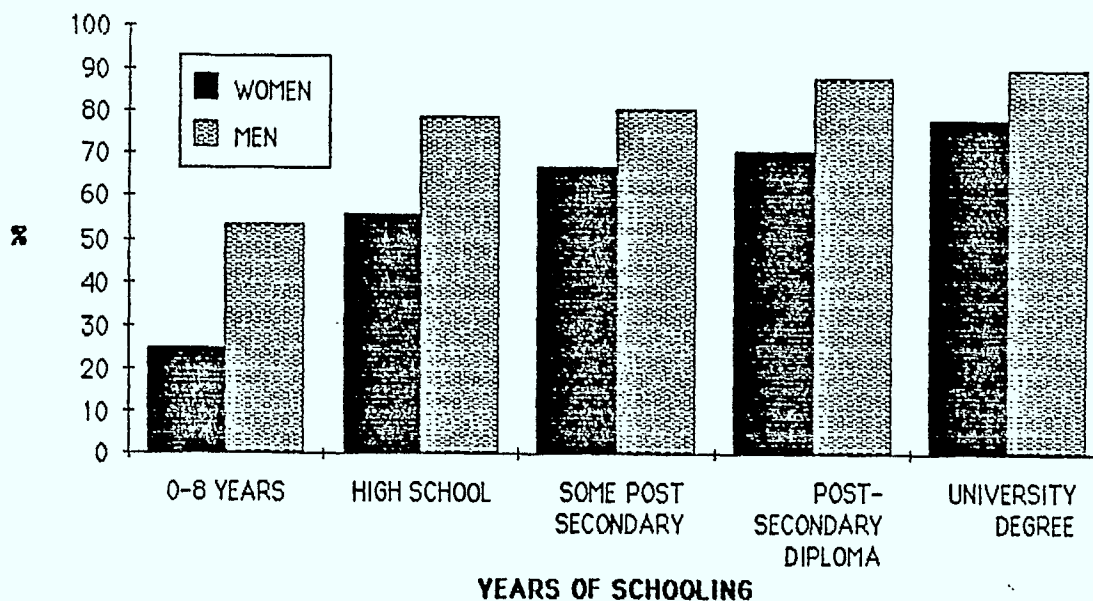
(e) Participation by Education and Sex

The level of educational attainment exerts a strong influence on the labour force activity of women. Women who are university or college

graduates have higher participation rates and a stronger attachment to the labour force than less educated women. In 1986, the participation rate for women with a university degree was 78% compared to 25% for women with less than grade nine education; 56% for high school graduates; and around 70% for those women with some post-secondary or a post-secondary certificate or diploma. However, as shown in Figure 7, the participation rate for women in all categories of educational attainment is less than that of men.

FIGURE 7:

**PARTICIPATION RATES BY EDUCATION AND SEX
1986**



source: STATISTICS CANADA

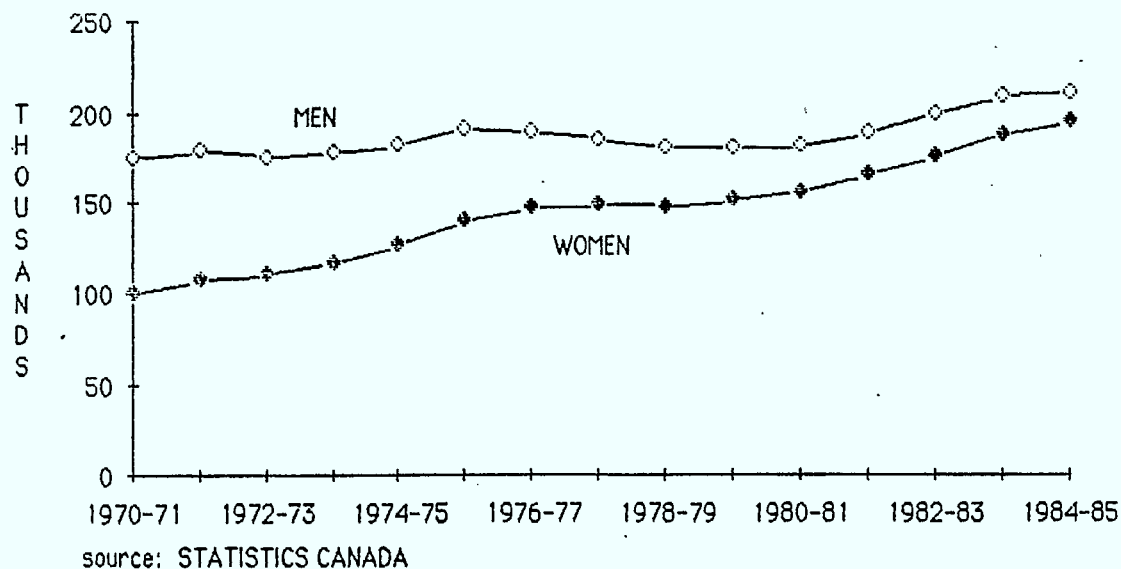
2.3 Educational Attainment

(a) University Enrolment by Sex

Education has been viewed as one of the keys to better jobs, higher earnings, and career advancement. Women have made significant improvements in their educational qualifications. The number of women attending university and college has increased considerably. As a result the gap between the educational attainment levels of women and men has narrowed between 1970-71 and 1984-85 as shown in Figure 8.

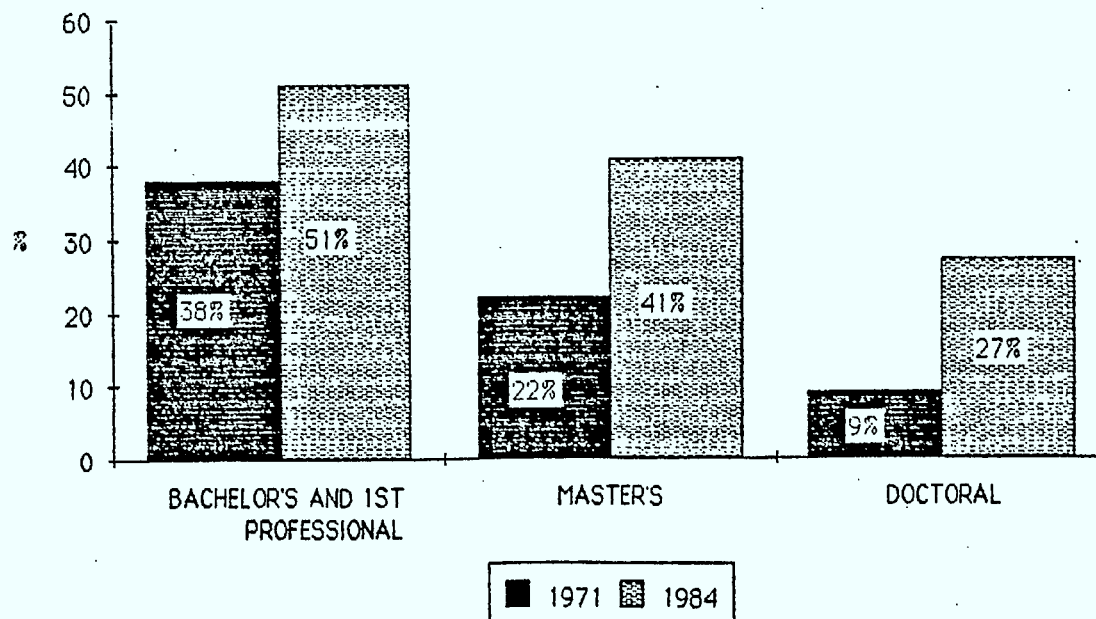
Men still are in the majority (52%) for full-time undergraduates. But women account for 60% of the part-time undergraduate university enrolment, which means that total enrolment is about the same for men and women.

FIGURE 8:
FULL-TIME UNDERGRADUATE ENROLMENT



Given the shift in the sex distribution of university enrolment, it follows that women are now receiving a growing proportion of the degrees. However, the more advanced the degree, the smaller the percentage of women. (Figure 9) In 1984, women received 51% of bachelor's degrees, 41% of master's degrees, and 27% of doctorates. The corresponding percentages in 1971 were 38%, 22% and 9%.

FIGURE 9:
WOMEN AS A PERCENTAGE OF UNIVERSITY GRADUATES

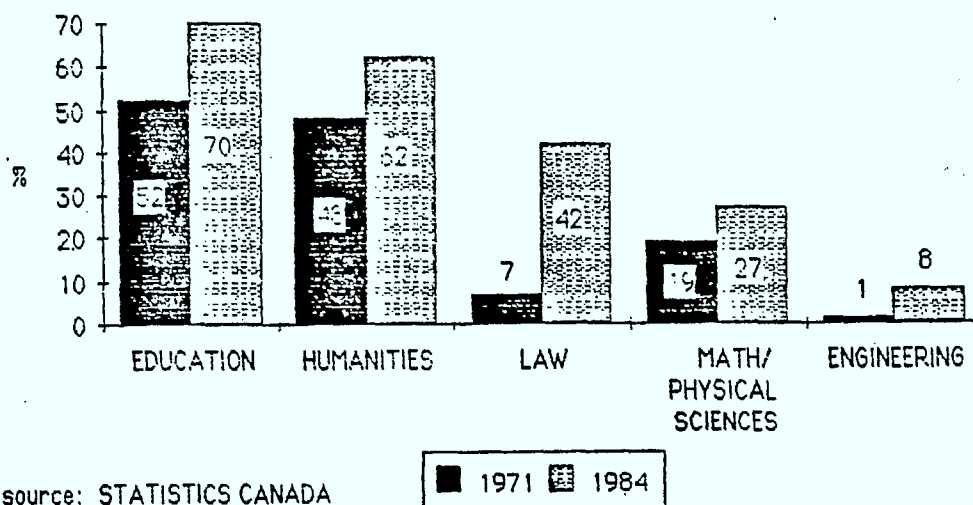


(b) Degrees Granted by Field of Study

Although a larger percentage of women are earning degrees, and are making progress in traditionally male disciplines, women are still more concentrated in traditional female fields such as education and humanities. (Figure 10) For example, between 1971 and 1984, the percentage of law graduates who were women went from 7% to 42%. Similarly, women have been increasing in mathematics and engineering disciplines, although not as dramatically as in law.

FIGURE 10:

**WOMEN AS A PERCENTAGE OF BACHELOR
DEGREE RECIPIENTS BY DISCIPLINE**



2.4 Earnings

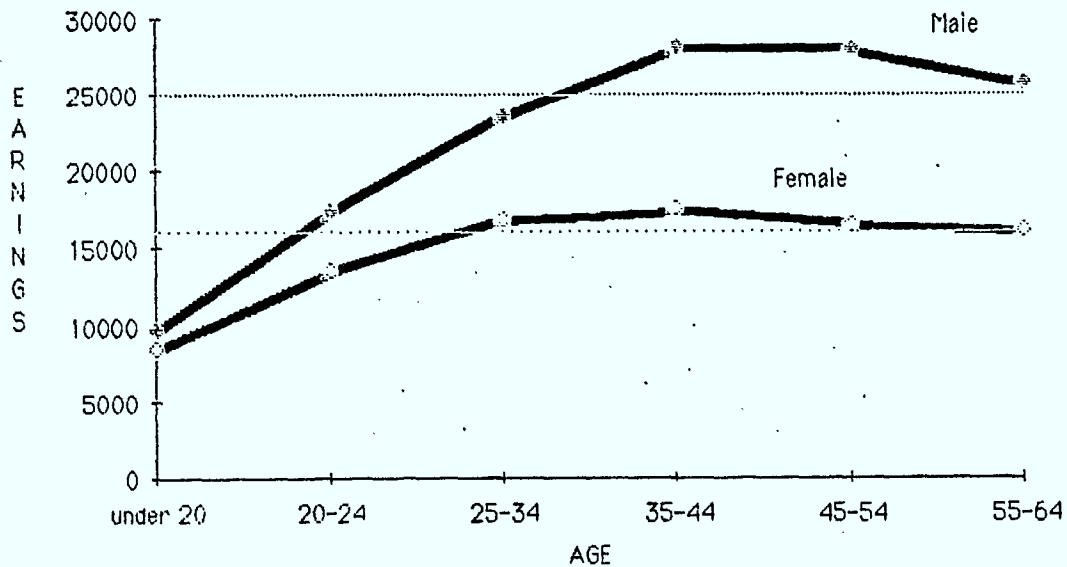
(a) Earnings Gap by Sex

Women earn considerably less than men in both full-time and part-time employment. In 1985, women employed full-time earned only 64.9 percent of the average earnings of men, down from 65.5 percent in 1984. Women working part-time made 69.9 percent of the average earnings of their male counterparts, up from 69.5 percent in 1984.

Data from Statistics Canada for 1982 indicate that the largest absolute differences in employment income occur for those female and male workers aged 35-44 and 45-54 - differences of about \$11,000. (Figure 11) Although the absolute and percentage differences are less at ages less than 25, it is evident that a significant earnings gap exists between men and women.

FIGURE 11:

**AVERAGE ANNUAL EARNINGS OF FULL-TIME WORKERS
BY AGE GROUP AND SEX, 1982**



(b) Earnings by Occupation and Sex

Many reasons can be suggested to explain the difference in earnings between men and women. The issue is how much of the income gap is explained by economic factors such as occupational or educational differences and how much reflects discrimination? The statistics for average annual earnings by occupational categories show substantial differences in income between men and women. (Table 6) There were no occupational categories where the average earnings of women exceeded those of men.

TABLE 6: Average Annual Earnings of Full-Time Workers, by Occupation and Sex, 1985

Occupation	Women \$	Men \$	Women's as % of Men's
Professional	22,372	37,141	64%
Managerial	22,414	37,467	60%
Clerical	15,927	23,915	67%
Sales	12,771	25,040	51%
Service	10,740	20,949	51%
Transportation	14,575	24,610	59%
Processing & Machining	18,061	27,649	65%
Product Fabrication	14,672	25,616	57%

As shown in Table 6, the largest discrepancies occurred among those working in managerial, sales, service, transportation, and product fabrication. Even in clerical occupations which are dominated by women, women's earnings are only 67% of men's. Several factors may account for income differences. Education and occupation are important determinants of income and earnings potential, but work experience, seniority, full-time or part-time hours also play a large part.

Changing life styles and family structures have made an adequate income of increasing importance to women. Women in traditional husband-wife families have made increasing contributions to the family income. At the same time, growing numbers of women are living without the support of a spouse. In fact, families headed by women and women who live alone, particularly elderly women, make up a disproportionately large share of those with low income. In a recent Goldfarb report, "An Analysis of Working Women," the responses indicate that women work first and foremost because they need the income, either to support a family or procure a degree of independence for themselves from their families.

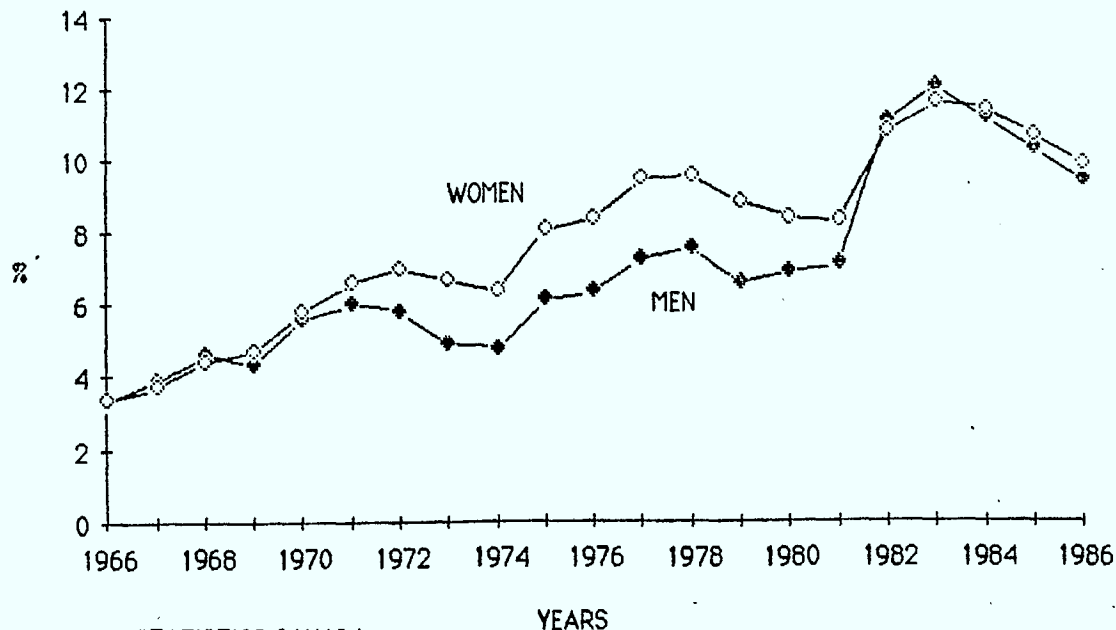
2.5 Unemployment

(a) Unemployment Rates by Sex

Throughout the 1970's the unemployment rate of women was one to two points higher than that of men. In 1982 and 1983, however, the unemployment rate of men exceeded that of women. (Figure 12) This shift can be partly explained by the higher unemployment in the goods-producing sector of the economy which is male oriented.

FIGURE 12:

UNEMPLOYMENT RATES



Unemployment patterns also vary with the occupational categories of men and women. In 1986 women had higher unemployment rates than men in the occupational groups where women are concentrated as shown in Table 7.

TABLE 7: Unemployment Rates by Occupation and Sex, 1986

Occupation	Male %	Female %
Clerical	7.4	8.2
Services	11.6	12.6
Sales	6.3	8.9
Managerial	3.5	6.2
Medicine & Health	2.8	3.6
Teaching	3.2	5.3

(b) Unemployed by Reason for Leaving Last Job

The reasons why men and women become unemployed differ. In 1986, 71 percent of unemployed men had either lost their job or were laid off, while this was the case for 52 percent of unemployed women. (Table 8) Women, on the other hand, were much more likely than men to be unemployed on account of personal responsibilities. As well, 11 percent of women, compared with 5 percent of men, had either not worked in the last five years or never worked.

TABLE 8: Unemployed by Reason for Leaving Last Job, 1986

	Women 000s	Men 000s	Women %	Men %
Lost job or laid off	283	492	51.8	71.3
Personal responsibilities	44	6	8.1	0.9
Not worked in last five years	33	13	6.0	1.9
Never worked	26	23	4.8	3.3
Own illness	23	19	4.2	2.8
School	26	33	4.8	4.8
Retired	--	11	--	1.6
Other reasons	107	93	19.6	13.5
Total	546	690	100.0	100.0

CHAPTER III: EFFECTS OF INFORMATION TECHNOLOGY ON WOMEN

3.1 Employment Projections for Women

(a) The Debate

The effect of information technologies on women's employment has been the subject of debate for many years. Numerous studies have been carried out by a variety of organizations but with no definitive results.

A 1979 analysis of OECD reports on this issue, concluded that the no one really knows what the net employment outcome of the new wave technological change will be. However, there seemed to be an emerging consensus that "overall, it is the women, who form the bulk of information manipulators in Canada, who are expected to bear the brunt of the impact."²⁵

One of the first study's to address the question of present and foreseeable impacts of office automation on employment of women was the 1981 work of Heather Menzies' entitled "Women and the Chip".²⁵ Based on four scenarios of probable outcomes from informatics diffusion, the study projects a mismatch between skills and jobs that could result in alarmingly high rates of unemployment among female clerical workers. Women are particularly affected since they are concentrated in occupations where information manipulation and related clerical-type operations constitute much of their work.

In 1982, the Canada Employment and Immigration Advisory Council was asked by the Minister of Employment and Immigration to look at the issue of new technologies and their impact on employment.²¹ Based on a survey of Canadian organizations, there appeared to be no general agreement on what the net employment outcome would be. Opinions expressed ranged from extreme pessimism to moderate optimism.

The Canadian Advisory Council on the Status of Women was also concerned about the problems facing women which arise from the increasing automation of labour force activity. Their 1982 report, "Microtechnology and Employment: Issues of Concern to Women",²⁰ predicted the number of jobs lost in the service sector as a direct result of automation would be 20 to 40 percent. There is evidence from several case studies that the number of clerical workers employed in offices and banks is already being eroded. Surveys showed that the majority of young women are still expecting and wanting jobs in traditional "women's work", which indicates a lack of awareness of present and future job market possibilities.

Labour Canada's 1982 task force on Microelectronics and Employment¹⁹ held public discussions in six cities across the country, meeting with business associations, labour unions and women's organizations. In terms of employment the task force concluded that

technology, in itself an inanimate tool, is neither good nor bad. The benefit or harm it brings is dependent on how people employ it. But microelectronics affect many sectors of the economy and cause positions such as clerical workers, typists, secretaries, telephone operators, and bank tellers to disappear or be modified. All these occupations are dominated by women.

A 1983 study by Diane Werneke, "Microelectronics and Office Jobs: The Impact of the Chip on Women's Employment", examined the issue of the rate of diffusion of new technology.¹³ According to this study, the new office technology has not resulted in widespread labour displacement but has rather been reflected in slowing of demand for some workers such as clerical staff. In part, the employment impact has been muted by the moderate rate of diffusion of new technology evidenced to date. With the strong pressure to reduce costs and raise productivity to remain competitive in world and domestic markets, the spread of new technology may become more rapid. This, combined with sluggish economic activity, could adversely affect employment.

In 1984, the Equal Opportunities for Women task force on Microtechnology¹² and its impact on women public servants stated the primary question for an organization is automation with what goal? Increased effectiveness, extended services, enriched tasks and decreased labour costs, fewer employees to perform the same tasks? In terms of job loss and deskilling of jobs for women as a result of the impact of technology, the available information does not provide definitive answers. An adequate database is a fundamental tool in the evaluation and monitoring of the impact of technology.

Internationally, the Commission of the European Communities, in 1984, studied office automation and work for women.¹⁰ The study consisted of carrying out actual cases studies, using a qualitative approach, of businesses in different sectors and then analysing these on the basis of hypotheses. Evidence from the case studies support the hypotheses that office automation mainly affects jobs held by women. The general attitude of those responsible is to deny any loss of jobs, and to speak of redeployment and natural wastage. But the introduction of word processors made it possible not to have to take on extra staff.

A 1985 survey by the Ontario Task Force of Employment and Technology found that the majority of employers used attrition to reduce their surplus clerical workers (such as typists, bookkeepers, library file clerks, general office clerks, and data entry operators).⁴

A recent (1986) United States study with the catchy title, "Computer Chips and Paper Clips: Technology and Women's Employment", concludes that technological change is likely to contribute to employment problems for women, but that massive job loss is unlikely to occur.⁶ Clerical jobs will experience slower growth in the aggregate than they have in the past.

In a 1987 study of the case of secretaries and new information technologies, the Canadian Workplace Automation Research Centre observed that competency in new information technologies will be indispensable in keeping one's job in the future.³ Although it is often claimed that office automation is mainly aimed at improving the productivity of managers and professionals, it is the routine duties, performed for the most part by women, that are the first to be automated.

(b) Employment Projections to 1995

The recent (1987) work of the Economic Council, "Innovation and Jobs For Canada" presents future employment projections to 1995 as a result of computer-based technological change. The Economic Council's research is empirical and involves analysis of actual observations, statistical models, a survey of 1,000 Canadian establishments about their introduction of computer-based technologies and a few case studies of women and office automation in the federal government.

According to the Working with Technology Survey, the most common types of computer technologies introduced by Canadian establishments between 1980 and 1985 were word processors and personal computers/workstations. The predominance of office automation in the 1980s has meant that women, who represent a large proportion of office workers, have, to date, been directly affected by these technologies to a greater extent than men.

In order to address the concerns about the future impacts on employment, a model was constructed to indicate which specific occupations are likely to be adversely affected and which are likely to be favourably affected by computer-based technological change. Table 9 presents the detailed projections by occupation, and the percentage of 1981 employment which will be displaced or re-employed as a result of computer-based technological change.

TABLE 9: Projected Labour Displacement and Re-Employment, by Occupation, Canada, 1981-95

Occupations:	1981 Employment (Thousands)	Proportion of Employment in 1981	
		Displacement (Percent)	Re-employment (Percent)
Managerial, Administrative	548.9	8.7	9.0
Professionals	597.3	6.1	9.4
Clerical	1,557.9	13.8	8.5
Sales	1,081.0	3.8	10.0

Service	851.2	-3.9	13.3
Primary	656.5	-1.3	6.7
Processing	405.0	6.4	6.8
Machining & Related	272.9	94.4	0.4
Product fabricating, assembling & repairing	813.1	7.1	7.9
Construction & transport equipment operators	1,025.7	-2.4	9.4
Material handling, equipment operators, & crafts	314.7	8.6	7.3
Total	8,124.2	7.9	8.8

Labour displacement indicates the gains in labour productivity derived from computer-based technological change, and thus potential labour unemployment with no possibility for re-employment. Re-employment indicates the "potentially" displaced workers who are "simultaneously" re-employed in the same sector, i.e. the productivity gains from computer-based technological change feedback to increased real incomes and to increased final expenditures.

It is evident that there are some potential problems in the labour market as a result of computer-based technological change. Over 70% of (net) labour displacement falls within two occupations: clerical and machining & related occupations. Labour re-employment, by occupation, is much less concentrated. The services occupations experience the largest gain - a re-employment of 13.3% compared to the average of 8.8% for all occupations. Machining jobs will be cut by 94% between 1981 and 1995. Also clerical occupations are expected to experience a significant net loss of employment: displacement is greater than re-employment. Conversely, occupations in sales, services, and construction trades are "winners" with significant net job expansion. For many occupations, the magnitude of labour displacement and re-employment coincide.

Table 9 indicates serious problems of labour market adjustment as a result of the potential mismatch of labour displacement and labour re-employment. Also all re-employment opportunities are for only those workers capable of working with the new technology in the industries directly affected by the new technology. So, not only will technological change force some women to seek employment in new occupations as the number of clerical positions decreases; they will also have to learn how to use the new technologies in the workplace.

In summary, the earlier studies on the impact of office automation on women's employment were either pessimistic (Menzies) or undecided on what the net employment outcome would be. Opinions expressed ranged from extreme pessimism to moderate optimism. The Werneke study suggested that the employment impact of new office technology had been

mutated by the moderate rate of diffusion to date. More recent studies conclude that technological change is likely to result in employment problems for women and that clerical jobs will experience slower growth in the aggregate (U.S. report, Computer Chips and Paper Clips, 1986) or a significant net loss of employment (Economic Council of Canada, 1987) and serious adjustment problems.

3.2 Structural Change in Female Employment

In terms of structural employment and female occupational employment, the Economic Council's report, "Innovation and Jobs in Canada"¹ indicated major winners as follows: electronic data processing equipment operators; managerial occupations; social sciences; social workers; law; and library occupations; tellers and cashiers; and system analysts and computer programmers. Among the major losers were: sewing machine operators; electrical and electronic equipment fabricators, textile processing, and resource-related occupations.

In addition to the slowdown of growth of clerical employment, occupational shifts can be expected.⁶ The fastest growing clerical jobs are computer operators, electronic data processing equipment operators, medical insurance clerks, credit clerks in banking and insurance, credit authorizers, insurance checkers, receptionists, claims adjusters, cashiers, and survey workers. This list reflects in part the obvious technological impacts of computers, but it also reflects the continuing or increased importance of interaction between a worker and a customer being served. The occupations expected to experience the largest percentage declines are central office telephone operators, postal service clerks, data-entry operators, stenographers, security workers, purchases and sales clerks, and postal mail carriers. These changes reflect both the use of new technologies to perform the same work and the capability of new technologies to shift work to others (for example, consumers or professional and managerial staff).

Research findings on office automation indicate a widening gap between workers in the clerical hierarchy. There is a trend in many organizations toward the integration of managerial/professional jobs, such as tracking sales and handling department budgets, with high level clerical positions. As senior clerical jobs are being upgraded, there is an increase in the qualifications for these jobs. For example, at IBM Canada you now require a university degree to be hired into a clerical job. Prior to computerization, at least some women were able to move up the clerical hierarchy based on years of experience. In many cases, clerical workers must now return to school before they can even qualify for the new higher skilled positions. The career ladder in clerical work has in effect been broken.⁴

There is also a trend to reduce traditional medium level clerical functions (such as typists, bookkeepers, general office clerks); and to develop a pool of low level data entry and routine clerical positions that

are particularly vulnerable to further automation. Because educational qualifications are being upgraded for the higher level clerical positions, there are fewer opportunities for women to move from low to high level clerical jobs. Women at the bottom of the clerical hierarchy are particularly disadvantaged because they do not have access to the training necessary to qualify for new, more professional clerical jobs.⁴

3.3 Changes in the Quality of Work

In addition to the issue of the numbers and types of jobs that would be replaced or created by technological change, the effects of new information technologies on the quality of employment are of concern. The literature is rich with examples in which technology has been associated with either increased or decreased job quality.

To some extent employment quality is subjective, but three important factors seem to be: job content; working conditions; and economic considerations.⁶

- Job content reflects the skills required, mental challenge and factors such as learning, creativity, responsibility, variety, and autonomy.
- Working conditions are both physical and social. For example, concerns have been expressed about eyestrain, tension, vision problems, and back aches in workstation design and operation. Social considerations include concern about the extent to which the worker is isolated from co-workers, either at terminals or by working at home, and possible close supervision by electronic monitoring.
- Economic considerations include both the absolute level of wages and salaries, fringe benefits, security, and promotion possibilities, and the fairness of these factors compared with education, skill, and seniority that a worker possesses.

(a) Job Content

Some studies argue that the new technology will enhance jobs, upgrade skills, and vary the tasks of the information worker. Others argue that the technology will de-skill information-handling jobs and will make them more monotonous by fragmenting tasks, lead to more stressful work, employer monitoring of employees, and work speedups. Using the research to determine which trend prevails is difficult because of the different stages of technology and its rapid changes, the variety of uses of new technology, and the differing economic and social circumstances of the workplace studied.

Some examples of where the introduction of information technology lead to a decrease in the skill levels required are as follows:

- In the insurance industry, the skilled work of assigning risks or assessing claims has increasingly been codified into computer software, so that less skilled, less experienced, and less educated clerks can perform the work once performed by skilled clerks and professionals.
- In supermarkets, knowledge of brands, in-store promotions, and arithmetic is less necessary to a checkout clerk using a bar-code reader and an intelligent cash register.
- In the airline industry, computers are now programmed to research, process and store travel information, and to print an airline ticket. This has reduced the amount of knowledge airline clerks need to perform their job.

In contrast to these cases, new technologies can require more skill and responsibility from workers. For example,

- If most routine banking operations are performed by customers using automatic teller machines, human tellers can do non-routine tasks, e.g., handling problem inquiries that may require considerable knowledge of banking procedures, problem-solving skills, and skill at dealing with people.
- Using workstations, managers can have greater control over more stages of their work through tools for searching corporate databases, calculating the consequences of investment strategies, creating illustrations, outlining and writing.
- As managers and professionals learn to create their own documents, some clerical workers are beginning to take on more responsibility and moving into junior sales and marketing roles.

The Economic Council's 1987 case studies in the federal government departments of Employment and Immigration and Statistics Canada¹ found that the introduction of technology had either a neutral or an upgrading effect in terms of skills. Many respondents indicated that innovation had enhanced the "interesting nature of the work" and the "opportunity to make full use of abilities and skills." Most respondents felt that "control over work scheduling" was good after the change, but a small proportion felt it had deteriorated.

A similar survey conducted in the U.S. in 1986 suggests that workers who use information technology are generally satisfied with it, because it allows them to do their work better and because it improves the jobs themselves or, at a minimum, does not degrade them significantly.⁶ The study cautions in generalizing from large-scale surveys because of likely biases in their sampling procedures, their sketchy detail about how and how much technology is used in jobs, the retrospective nature of the questions they asked, and the vested interests of some of the sponsoring organizations.

The 1984 report from the Equal Opportunities for Women Task Force on Microtechnology and its Impact on Women Public Servants¹² found that with careful planning technology can lead to job enrichment. Many clerical or service jobs can be value-added - i.e. use the technology to free them from the routine and time-consuming tasks and then use the time gained to take on more executive and administrative roles.

While these studies did not find evidence of technological change deskilling women, other studies have.

According to the Commission of the European Communities study, "Office Automation and Work for Women", office automation has not provided women their "historic opportunity" to achieve equality of job opportunity with men.¹⁰ Although the introduction of word processors and computers require new skills and additional qualifications on the part of women users, the outcome is rarely a step-up in pay or promotion for women. The capability to use office automation tools will in the future be almost a necessity to hold on to one's job, but it may not be that useful for one's career path. There seems to be a "sexualisation" of the hardware (word processors for women, micro-computers for men) which reflects the image of so-called "men's" and "women's" jobs, and the prejudice conveyed by society that women have no aptitudes for technology and aren't interested.

Similarly, the Economic Council's case studies¹ found that in terms of opportunity for promotion the results were more controversial. Most of those relocated with a higher job status ranked this aspect highly, while the ones who were laterally transferred (with the same status) felt very negative about it. Clearly, higher status (with better pay) comes with job re-evaluation, not with technology. Clerical workers in the survey felt that technology is now an established fact. They said they had to learn it in order to keep their jobs but could not rely on it for promotion.

The lack of agreement and uneven quality of the studies prevents a definitive conclusion about the effects of technology in terms of skills and job content. However, two recent studies both suggest that women who are better educated or in managerial positions stand to benefit most. The American study "Computer Chips and Paper Clips" concluded that managerial workers generally fared better than clerical workers. The Economic

Council's case studies show that in the process of adapting to technological change, the better educated and higher skilled women stand the best chance of benefiting, though even at the lower skill levels new technologies may bring more challenging and less monotonous jobs.

(b) Working Conditions

Users of video display terminals (VDTs) and microcomputers have complained about eye strain, chest pain, tension, vision problems, muscular discomfort, and pregnancy problems. A recent U.S. National Research Council report concluded that the radiation levels emitted by current VDTs are far below current U.S. occupational radiation exposure standards, and are unlikely to be hazardous. The panel was less sure about issues of visual fatigue, muscular discomfort, and stress and the causal role that VDTs play in their occurrence versus the occupational effects (i.e. some of the problems are due to the tasks people perform, not to the technology).

The physical environment in which the VDT is used may also cause problems. Improper lighting and glare may make the screen hard to read, tables may be at the wrong height for reading and typing, and seats may be uncomfortable for extended periods of sitting. Manufacturers and designers of office equipment should consult users about ergonomic and other features, and the development of technical standards.

The 1984 Equal Opportunities for Women Task Force on microtechnology and its impact on women public servants recommended that Treasury Board review occupational health and safety standards to determine whether they are adequate in the context of the new automated office, should bring pressure to bear to have new standards developed and should be responsible for ensuring application of these new standards within the Public Service.

Another area of concern is the technical capability to monitor and assess the amount of work employees do and thus place pressures on workers to meet production standards. The report "Computer Chips and Paper Clips" notes that those who reported computerized work monitoring had higher frequencies of a number of stress-related physical and psychological symptoms, including headaches, nausea and dizziness, digestive problems, chest pains, and depression. As in the case of deskilling, the data on the overall extent of computerized monitoring are both sketchy and contradictory.

Telecommuting or remote work is the use of computers and telecommunications to do office work from homes or other locations away from the centralized office. The increasing numbers of women in the labour force with young children, the decreasing costs of computer and telecommunications equipment and services, the increasing amounts of information available in electronic form, and the increasing proportion of the work force doing information work are all trends consistent with

increased teleworking. A debate exists between those who see telework as an alternative for women to combine paid employment with family and child care responsibilities, and those who see electronic working at home as exploitation of isolated, unprotected, home-based workers. Because so little telecommuting exists it is hard to get convincing evidence.⁶

Pilot projects found that home-based professionals (primarily men in these samples) retain their salary and benefits and job security, while home-based clerical workers (predominately women) experience decreased pay, benefits, and job security. Thus in some cases the flexibility of home-based work may be gained at the price of decreased income. Because telework may be increasing through the use of technology, the extent of telework and the terms and conditions need to be carefully studied, so that it does not become damaging professionally, socially, or physically.

(c) Economic Considerations

It is important to consider whether the new jobs being created in the economy provide women with opportunities to improve their economic position.

First, do they provide an adequate income for women? Although higher education levels are being attained by more women than in the past, the occupational structure of the labour force is only slowly reflecting these gains. Gains have been made in the management and administrative occupations, but in other professional fields female representation is low. Women are still heavily concentrated in clerical occupations. The introduction of new technology requires employees to acquire new, specific skills. However, managers often argue that with computerization work is neither more nor less skilled, it is just different and therefore workers need not be compensated for learning computer related skills. Another new responsibility associated with the introduction of new technology is training other workers - again, this may not be directly compensated. As well, many managers do not seem to acknowledge the skills and knowledge that clerical workers often need to do their job such as writing ability, interpersonal communications and co-ordination skills, and knowledge of departmental policy and practises.⁴

Besides salary, an important dimension of job quality is the hours worked. The proportion of women who are working part-time is growing. In 1986, 26 percent of all employed women worked part-time, and women accounted for over 70 percent of all part-time workers. Growth in part-time employment is particularly evident in three traditionally female occupations: clerical, sales, and services.

The pros and cons of part-time work are discussed in the Economic Council's report, "Innovation and Jobs in Canada".¹ In terms of advantages, it offers individuals who cannot, or prefer not to, work full-time the opportunity to earn an income and maintain some attachment to the labour force. For employers, the use of part-time employment can reduce costs and permit flexibility in scheduling and in responding to fluctuations in production.

The disadvantages in using part-time employment for employers centre on the higher per capita cost of supervising, hiring, and training the additional workers. For the employees, part-time work often means poorer fringe benefit coverage and pensions, being paid less on an hourly rated basis than full-timers with equivalent jobs and seniority. In addition, part-time workers tend to have less job security, less seniority, low unionization, and relatively few opportunities for training and career advancement.

According to the Economic Council, recent developments show some job-quality deterioration for women in terms of hours worked. Occupations with traditionally high proportions of female part-time workers, such as services and sales, have experienced an increase in the numbers of part-time female workers. There has also been a significant increase in part-time employment in clerical occupations since 1981.

Given the overall slow growth predicted in clerical occupations generally, the rapid increase predicted in part-time and temporary work may constitute a shift in clerical employment from permanent to temporary work.

While the majority of female part-time workers prefer that type of work for many reasons, there is an increasing number of women who work part-time because they cannot find full-time work. The growing importance of part-time work should receive serious consideration with special attention to legislation that will protect workers accordingly.

3.4 Wage Disparity

According to a 1986 study for Labour Canada,⁵ there is no question that wage differentials between the sexes do exist, that they have existed for many years, and that there has been little change in the ratio of 60 cents (female) to 1 dollar (male). Part of the explanation for the earnings gap is the occupational structure of female employment. Women tend to be concentrated in clerical, sales, and service occupations which are characterized by low pay, high turnover, and low union penetration. Even when women are in the same occupation as men, they are often employed at different levels of responsibility and allocated different tasks than men.

The economics literature on the occupational distribution of women provides three possible explanations for the differences between male and female occupational distributions. These are that:

- 1) differences in female and male labour force participation patterns and women's childrearing responsibilities lead women to choose occupations requiring less human-capital investment than those chosen by men;
- 2) discrimination against women in the labour market makes it difficult for them to enter certain better-paid occupations;
- 3) differences in female and male socialization patterns lead women to differ in their occupational choices.

There is convincing empirical evidence that each of these factors plays some role in determining differences in female and male occupational distributions. But it is difficult to evaluate the relative importance of each factor because there is considerable scope for interaction between them.

Similarly, a recent U.S. Census Bureau study says that the big gap between the earnings of men and women can largely be attributed to clustering of females in certain occupations and in their lack of work experience and differences in fields of study in college. The study, based on earnings in 1984, found that among full-time workers, average hourly pay was \$10.82 for men and \$7.52 for women. Women continue to earn only 70 cents (U.S.) for every \$1 taken home by a man. Based on a survey of 20,000 U.S. households, the report concludes that working in an occupation that has a high proportion of women has a negative effect on earnings.

The Economic Council's 1987 survey into the effects of innovation on job satisfaction discussed opportunities for promotion. Most of those relocated with a higher job status ranked this aspect highly, while the ones laterally transferred (with the same status) felt very negative about it. Clearly, higher status (with better pay) comes with job re-evaluation, not with technology.

Government is perceived as having the lead role in effectively implementing wage equality legislation. Labour Canada's 1984 report, "Equality in the Workplace: Wage Discrimination and Women Workers", examined the concept of equal value legislation and some of the concerns expressed by opponents of the principle. Equal value legislation is designed to achieve the objective of eliminating income differentials between men and women by ignoring the segregation which stems from sex-typing certain categories of jobs. Equal value policies, because they permit comparisons between dissimilar jobs, have the potential to raise the low pay of women workers. Factors considered are the skill, effort, conditions of work, and responsibility in performing the work itself.

The major area of resistance to equal value legislation seems to centre on the job evaluation procedure. Although job evaluation may establish equitable wage structure within an establishment, its use is questionable because it fails to take into account the structure of external wage rates. There is also confusion as to how broadly the evaluation system ought to apply. Another argument is that the law of supply and demand in the labour market ought to override social justice considerations. Opponents of equal value legislation argue that the cost of administering equal value would be excessive both to government and to business.

Despite this opposition, the principle of equal pay for work of equal value is being studied by governments. In Canada, a complaint by librarians yielded a settlement of \$2.3 million in equalisation payments, compared to historical researchers in the public service.⁹ In the months to come, a study will be conducted in the Public Service to determine if occupational groups in which women predominate receive equal pay for work of equal value to that of groups in which men predominate. Nine groups in which women predominate will be compared to 53 in which men predominate. This study will be carried out jointly by the Treasury Board and all Public Service unions.

This initiative supports the following recommendations from the Labour Canada study:

- A major information program should be developed and directed specifically to women workers within federal jurisdiction.
- Equal wages implementation will be meaningless without the concomitant development of statistical information to gauge the amount, kind, and location of wage discrimination and to measure the progress being made in its elimination.

CHAPTER IV: SOME RESPONSES TO TECHNOLOGICAL CHANGE

The literature has shown that women will be facing employment problems and serious adjustments in moving into different areas of work. First, they generally lack specific skills training for non-traditional jobs. In particular, they are much less likely than men to have a science or math background and they also lack technical and industrial skills. Second, they are often faced with traditional attitudes on the part of many employers. And third, most women themselves continue to look for work in traditional spheres. **Studies have found that the disproportionate problems which women workers face are caused not only by the new technologies, but also by occupational segregation and discrimination in the labour market, which creates a barrier to movement into jobs with greater security and career prospects.**

A number of issues and recommendations are contained in the literature. Some of the key points of discussion in the areas of training and education, government roles, and further research are noted below.

4.1 Implications for Training and Education

The literature on office work and automation found that training and skill development among clerical workers is becoming increasingly important for the following reasons:

- a) Routine clerical work is being increasingly automated reducing the overall demand for clerical workers at the junior level.
- b) Employers are hiring senior clerical workers from outside rather than training junior clerical workers because the new skills required are more theoretical and cannot be easily learned on the job. For example, senior clerical workers with a background in business administration, college level accounting, data processing and/or a high level of both verbal and written communication skills are preferred by employers.
- c) As more managers and professionals learn to create their own documents on personal computers, demand in clerical work is shifting from basic word processing skills to more complex formatting and specialized applications that require more training and technical expertise.
- d) As jobs continue to change with new innovations in office automation, it is important for clerical workers to have flexible and general analytic skills - skills that make it easier for workers to adapt to new and changing job requirements.⁴

As new technologies are introduced, training programs are crucial for women, because of their lack of basic technological skills. Women faced with technological change have to learn how to operate the new equipment if they wish to keep their jobs or seek employment in new occupations. The specific work skills that they have are becoming redundant, or in less demand. This mismatch between available workers and available jobs is likely to pose a particular hardship for those with low levels of education or training usually women in minority groups and older women. Because of changing skill requirements, women seeking to re-enter the labour market and new entrants who have been trained only in traditional skills may be faced with increasing difficulties.

In the process of adapting to technological change the better-educated and higher-skilled women stand the best chance of benefiting, though even at lower-skill levels new technologies may bring more challenging and less monotonous jobs.¹

A recently completed study for the Economic Council found that female and male participation in training programs differs greatly.⁵ Women are almost entirely absent from apprenticeships, one of the largest and cost successful components of training programs. They are also underrepresented in the industrial training program. Under the institutional training program, they form a high percentage of trainees in educational equivalency courses and, general job-skill courses, and a relatively low percentage of those in skill training for specific occupations.

The study also found that course choices were strongly influenced by previous jobs. Women train largely for typically female occupations, especially clerical occupations, and men for blue-collar occupations. In particular, women have less on-the-job training and less job tenure, the forms of work experience that pay the highest returns. Training programs cannot drastically reduce the differences between female and male occupational distributions. Differences in the occupations for which women and men train reflect differences in the occupations in which they work. This implies that women in federal-government sponsored training programs are not in fields of study which would lead to new opportunities, and may even be training for fields threatened by automation. Thus, the study recommended that:

- Training and counselling programs should be aimed more at areas of growth and opportunity - computer knowledge, communication, and advanced office automation - and at developing general skills in order to maintain as wide a range of opportunities as possible.
- New and innovative work and training schedules should be adopted so that women are not disadvantaged in the workplace or in training programs, because of their additional family responsibilities.

- Training programs should be demonstrably free of discrimination based on sex.
- CEIC should actively seek out employers who are willing to train women in predominately male occupations in return for subsidies.
- The CEIC set up a task force with the explicit responsibility of investigating discriminatory practices in training programs.⁵
- The evaluation of training programs also needs to consider the type of job entered and the effects on occupational segregation.⁹

What about the young women entering the labour market? How well prepared are they to face the changing job market? Chapter II of this paper showed that women have made significant improvements in their educational qualifications. The number of women earning university and college degrees has increased considerably.

The labour market has been slow to respond to these changes. However, women have increased their share of managerial and administrative positions, and undoubtedly part of the reason for this success is the increased representation of women in business and commerce studies. In 1985, women who work in the sciences in universities, research facilities and in industry united to form the Canadian Federation of Women in Scholarship, Engineering, and Technology. According to Margaret Ann Armour, who helped set up the organization: "We need to network and lobby if women in science are going to move ahead. We're starting by publishing a listing of 1,500 biographies of women in the profession in order to let potential employers know we are out there, so that when openings occur, qualified women do not escape everyone's notice".

It is still true that the majority of women study traditionally female disciplines, such as social sciences and education. But according to a national survey of 1982 graduates, the areas of study that offered the best chances of getting a full-time job (with its attendant higher wages and better benefits) were those with direct or indirect ties to science and business administration.

Earlier surveys showed that the majority of young women were still expecting and wanting jobs in traditional "women's work". This indicates a need for an extensive information and education campaign to inform women of present and future job market possibilities. Changing the traditional attitudes and perceptions which tend to limit the career choices made by girls and women is one of the challenges. High school

girls should be counselled about job opportunities and promotion possibilities and should be actively encouraged to pursue mathematics, science, and technical studies.

4.2 Legislation and Government Policy

The lead role of government in effectively implementing wage equality legislation is held to be crucial. In the 1984 Labour Canada report, "Equality in the Workplace: Wage Discrimination and Women Workers", it is proposed that a tripartite forum be established to advise on the development and operation of all programs connected with equal value and equal opportunity. A set of guidelines defining what wage discrimination is, how to detect its existence, and what to do to eliminate it be developed for the use of employers. A major information program should be developed and directed specifically to women workers within federal jurisdiction. Both compliance and enforcement activities ought to be directed from Labour Canada.

Unions have been a major driving force in achieving recognition and acceptance of some fundamental women's demands. At present only the provincial labour codes of British Columbia, Manitoba and Saskatchewan, and the Canada Labour Code have any provisions for technological change. In 1982 the Technology Committee of the Canadian Labour Congress prepared a statement on "Technological Change and Work" for the national convention. This document explains the kind of legislation changes and contract language needed in Canada to ensure that the benefits to technological change are distributed more equitably. In addition to improvements to the provincial and federal labour codes proposed in this statement, employment standards legislation is also needed to protect workers in the non-unionized sector.⁴ The government may need to review the current labour codes and the provisions for technological change.

The positive and negative effects of office automation on hierarchical structures, re-employment, training, re-training, transfer, work patterns, and the quality of work for women should be monitored. Government agencies should support or conduct case study research and survey research to improve the ability to generalize about the effects of technological change on the quantity and quality of work life. Reports on the access of women to training and specifically to computer-related training should be analyzed. Treasury Board should encourage continuous consultation, liaison, and cooperation in the development of departmental implementation strategies.

A number of federal departments already have initiatives or programs which address various women's issues. Appendix A provides a brief description of each department's programs and services for women. Provincial and territorial governments as well have women's secretariats or directorates. A list of contacts is provided in Appendix B.

4.3 Further Research

A summary of the various issues examined by the studies reviewed is provided in Table 10. It is evident that there has been considerable concern over the years about the effects of automation on women's employment and the implications for education and training, health and safety, wage disparity and working conditions. Further research requirements are noted in the following areas.

The speed of introduction of new technologies is crucial to its qualitative and quantitative impact. With the strong pressure to reduce costs and raise productivity to remain competitive in world and domestic markets, the spread of new technology may become more rapid. This, combined with sluggish economic activity, could adversely affect employment.

Research should be undertaken to determine the speed of diffusion of new technologies in various sectors of the economy and the likely employment implications.

A high proportion of part-time jobs are in predominantly female sectors of the labour market. The growing importance of part-time work should receive serious consideration with special attention to legislation that will protect workers accordingly.

Similarly, the tendency toward the introduction of telework or home work should be monitored with attention and study of the terms and conditions of work, so that it does not become damaging professionally, socially, or physically.

TABLE 10

ISSUES EXAMINED IN THE LITERATURE REVIEWED
(see attached references*)

REFERENCES	EMPLOYMENT PATTERNS	OFFICE AUTOMATION & EMPLOYMENT	EMPLOYMENT PROJECTIONS	WAGE DISPARITY	HEALTH & SAFETY	WORKING AT HOME	LABOUR RELATIONS/ UNIONS	EDUCATION & TRAINING	RESEARCH REQUIRED
1	X		X					X	
2		X					X		X
3		X							
4	X	X		X			X	X	
5	X							X	
6	X	X	X		X			X	X
7	X	X				X		X	
8	X			X	X			X	
9	X	X		X				X	
10		X						X	X
11				X					X
12		X			X			X	X
13	X			X	X	X		X	
14	X	X					X		
15	X	X							
16	X				X				
17	X	X	X		X		X		
18	X	X			X			X	
19	X				X	X		X	
20	X	X			X			X	
21	X				X			X	
22	X			X					X
23	X								
24	X	X					X		
25	X	X	X					X	

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1987
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12. Report from the Equal Opportunities for Women Task Force on Microtechnology and its Impact on Women Public Servants
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Diane Werneke.
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1982
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Canadian Centre for Policy Alternatives
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LIST OF FIGURES

- FIGURE 1: Labour Force Distribution by Sex, 1966-1986
- FIGURE 2: Distribution of the Labour Force by Age Group, Women, 1970, 1975, 1980, 1986
- FIGURE 3: Labour Force Distribution by Occupation, Women, 1986
- FIGURE 4: Women as a Percentage of Total Employed, Selected Occupations, 1986
- FIGURE 5: Percentage Employed Part Time by Sex, 1966-1986
- FIGURE 6: Participation Rates, 1966-1986
- FIGURE 7: Participation Rates by Education and Sex, 1986
- FIGURE 8: Full-Time Undergraduate Enrolment, 1970-71 to 1984-85
- FIGURE 9: Women as a Percentage of University Graduates, 1971, 1984
- FIGURE 10: Women as a Percentage of Bachelor Degree Recipients by Discipline, 1971, 1984
- FIGURE 11: Average Annual Earnings of Full-time Workers by Age Group and Sex, 1982
- FIGURE 12: Unemployment Rates by Sex, 1966-1986

LIST OF TABLES

TABLE 1:	Population and Labour Force Growth by Sex, 1976-1986
TABLE 2:	Labour Force by Industry and Sex, 1986
TABLE 3:	Labour Force Participation Rates, by Age Group and Sex, 1975, 1980, 1986
TABLE 4:	Female Labour Force Participation Rates by Marital Status, 1975, 1980, 1986
TABLE 5:	Labour Force Participation of Women by Age of Youngest Child, 1975, 1980, 1986
TABLE 6:	Average Annual Earnings of Full-Time Workers, by Occupation and Sex, 1982
TABLE 7:	Unemployment Rates by Occupation and Sex, 1986
TABLE 8:	Unemployed by Reason for Leaving Last Job, 1986
TABLE 9:	Projected Labour Displacement and Re-Employment, by Occupation Canada, 1981-95
TABLE 10:	Issues Examined in the Literature Reviewed

APPENDIX A

FEDERAL PROGRAMS AND SERVICES FOR WOMEN

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FEDERAL PROGRAMS AND SERVICES FOR WOMEN

1. MINISTER RESPONSIBLE FOR THE STATUS OF WOMEN

A. Canadian Advisory Council On The Status Of Women

The Canadian Advisory Council on the Status of Women was established in 1973 to advise the federal government on issues affecting women and to promote public awareness of those issues. The Council liaises with national women's groups and provincial advisory councils on the status of women on a regular basis.

The Council undertakes research into women's issues in order to make recommendations to the government and to inform the public. As well, the Council informs women's groups, federal and provincial government bodies, special interest groups, the media and concerned individuals about its activities and current women's issues.

B. Status of Women Canada

This office monitors federal department policies and programs to promote equality between the sexes, co-ordinates measures at the federal level to improve the status of women, and ensures federal-provincial and non-governmental consultation on status of women questions.

2. LABOUR CANADA - WOMEN'S BUREAU

The Women's Bureau provides information regarding equal opportunities and the status of women in the work force.

The Women Bureau's Grants Program, with an annual budget of \$25,000, was established in 1985 to provide financial assistance for projects that focus on improving the situation of women with respect to equity in the workplace. It supplies grants to a maximum of \$5,000 to individuals, women's organizations, unions and other interested groups to assist in the study of workplace and related women's issues, to defray the costs of holding or attending conferences and seminars and to permit the publication of materials dealing with women's workplace issues. Federal, territorial and municipal government or agency projects are not eligible for funding. The Women's Bureau evaluates applications for grants on their ability to contribute to equity for women in the workplace, and gives preference to projects that focus on issues in federal jurisdiction.

The Department of Labour also promotes the elimination of sex discrimination in pay within industries under federal jurisdiction (i.e. equal pay for work of equal value).

3. SECRETARY OF STATE: WOMEN'S PROGRAM

A. Women's Program

It promotes the full participation of women in Canadian society by providing grants and other resources to women's groups and other voluntary organizations for activities to improve the status of women in Canada.

B. Multiculturalism Canada

This helps immigrant and visible minority women, through community projects, to acquire skills for their integration into the mainstream of society. At the governmental level, it undertakes initiatives that create a wide response to socio-economic issues.

C. Aboriginal women's program

This program supports and encourages projects and activities for the participation of native women in contemporary society.

D. Constitution review program

This provides constitutional funding to the four national native representative organizations and four territorial organizations for research, consultation, and participation costs related to their participation at the First Ministers' Conference. It also provides additional funding to the national organizations for including native women's issues in their preparation.

4. EMPLOYMENT AND IMMIGRATION CANADA

The Job Entry program is designed to integrate formal training and work experience. There are five program options.

- * The Entry option assists unemployed young men and women making a transition from school to work.
- * Re-entry assists women making a transition from home to the labour market.
- * Co-operative education provides school-based work-study programs for students.
- * Future Summer Programming will provide training and work experience related to the career path of students planning to return to school.

- * The Direct Purchase Training option provides training purchased from public or private institutions to those entering or re-entering the labour market. In addition, this option provides language training to immigrants, interprovincial migrants and natives who are not fluent in either official language.

5. HEALTH AND WELFARE CANADA

A. Health/Information and education programs

The Health Promotion Directorate, in co-operation with provincial governments and non-government organizations, develops and supports health promotion, information and education programs, and provides training, program and organizational development and community action programs in such areas as alcohol use, drug use, tobacco use, nutrition, safety, general health, children and youth, **women**, the elderly and the disabled.

B. National Council of Welfare

This Council is a citizens' advisory body to the Minister of Health and Welfare. It publishes and makes available, free of charge, reports on poverty and social policy including the topics of the aged, community organizing, employment policy, income security, legal services, low-income consumers, medicare, nutrition, pension reform, poverty lines and statistics, social services, taxation, and **women and children in poverty**.

6. PUBLIC SERVICE COMMISSION

A. Women's Programs Centre

This centre encourages the career development of women public servants and supports affirmative action. It is open to all women public servants and women interested in working in the public service.

B. Women's Career Counselling and Referral Bureau

It offers both counselling and referral services to ensure that women at the middle management level who have the potential to become senior managers are identified and have opportunities to advance their careers.

C. Equal Opportunities for Women

The PSC ensures that the same opportunities for employment are available equally to both men and women.

7. DEPARTMENT OF JUSTICE

The Department, through the Access to Legal Information Fund, provides start-up funding to public legal education organizations and to community associations which provide information to special groups such as the disabled, ~~women~~, native people, youth or visible minorities.

APPENDIX B

WOMENS' ORGANIZATIONS IN THE GOVERNMENT

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WOMENS' ORGANIZATIONS IN THE GOVERNMENT

BRITISH COLUMBIA

Woman's Secretariat and Youth Council
Executive Director, Fran Norris 387-3613

ALBERTA

Alberta Women's Secretariat
8th Flr., Kensington Place
10011-109 St., Edmonton, T5J 3S8

Executive Director, Dr. Sheila Wynn 422-5074

Minister responsible for Women's Issues
The Hon. Dennis Anderson 427-4928
103 Legislature Bldg.,
Edmonton, T5K 2B6

SASKATCHEWAN

Department of Human Resources, Labour and Employment
Women's Branch
1855 Victoria Ave., Regina, S4P 3V5

A/Director, Janet McGregor 787-7405

MANITOBA

Manitoba Women's Institute
Provincial Office,
219-880 Portage Ave., Winnipeg, R3G 0P1

President, Mrs. Audrey Turbett 633-2106

NORTHWEST TERRITORIES

NWT Advisory Council on the Status of Women
P.O.Box 1320, Yellowknife, X1A 2L9

Contact: Dara Henderson 920-8775

YUKON

Women's Directorate
P.O.Box 2703, Whitehorse, Y1A 2C6

Minister, The Hon. Margaret Joe 667-5974
Director, Bobbi Smith 667-5182

ONTARIO

Ontario Advisory Council on Women's Issues
5th Flr., 880 Bay St., Toronto, M7A 1N3

Minister responsible,
The Hon. Ian G. Scott 965-1664
President, Sam Ion 965-5824

Ontario Women's Directorate
900 Bay St., 4th Flr.,
Mowat Block, Toronto, M7A 1C2

Minister responsible,
The Hon. Ian G. Scott 965-1664
Asst. Deputy Minister,
Dr. Elaine Todres 965-7785
Policy and Research Branch,
Director, Naomi Albiom 965-7785
Public Education Programs and Services
Director, Bev Wybrow 956-7785
Consultative Services Branch,
Director, Jane Marlatt 965-7785
Program Development Branch,
Director, Alison Roberts 965-7785

Associations:

Federated Women's Institutes of Ontario
Guelph Agriculture Ctr.,
P.O.Box 1030, Guelph, N1H 6N1
President, Mrs. R.B. Johnson 272-5588

QUEBEC

Secrétariat à la Condition Féminine
875, Grande-Allée est,
Edifice H, 2e ét.,
Québec, G1R 4Y8

Ministre, Monique Gagnon-Tremblay 643-9460
Directeur de cabinet, Marc Lacroix 643-9460

Conseil du statut de la femme
8, rue Cook, bur., 300,
Québec, G1R 5J7

Présidente, Francine C. McKenzie 644-9269

NEW BRUNSWICK

Women's Directorate
Asst. Deputy Minister, Ellen King 453-2143

NOVA SCOTIA

Advisory Council on Status of Women
Rm. 115-117, 1657 Barrington St.,
P.O.Box 745, Halifax, B3J 2T3

Minister responsible,
The Hon. Brian A. Young 424-6647
President, Debi Forsyth-Smith 424-8664

PRINCE EDWARD ISLAND

P.E.I. Advisory Council on the Status of Women
180 Richmond St., P.O. Box 2000
Charlottetown, C1A 7N8

Minister responsible,
The Hon. Joseph A. Ghiz, Q.C. 368-4400
Chairperson, Diane Porter 894-8973
Executive Director, Heather Orford 894-8973

NEWFOUNDLAND

Department of Career Development and Advanced Studies
Women's Policy

Asst. Deputy Minister,
Luanne Leamon 576-5098

FEDERAL

Canadian Advisory Council on the Status of Women

110 O'Connor St., 9th Flr.,
P.O.Box 1541, Stn. B,
Ottawa, K1P 5R5

President, Sylvia Gold 992-4975

Montreal Office

800, boul. Dorchester Ouest, piece 1026,
Montreal, H3B 1X9

Vice-President, Clarisse Codere ... (514) 283-3123

Winnipeg Office

269 Main St., Ste. 600,
Winnipeg, R3C 1B2

Administrator, Renee Legal (204) 949-3140

Calgary Office

220 Fourth Ave. S.E., Rm. 270
P.O.Box 1390, Stn. M,
Calgary, T2P 2L6

Vice-President, Pat Cooper (403) 292-6668

Status of Women Canada

151 Sparks St., Ottawa, K1A 1C3

Minister responsible,

The Hon. Barbara McDougall 957-2621

Co-ordinator, Kay Stanley 995-7838

Social Policy, Director, D. Wood 995-3810

Economic Policy, A/Director, E. Hornby . 995-3848

**Inter-Governmental and Non-Governmental
Relations,**

Director, L. Bergeron deVilliers 995-7853

Legal Policy, A/Director, J. McCann ... 995-4049

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Technology, Policy and Planning
Branch
300 Slater Street
Ottawa, Ontario
K1A 0C8

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