

EMPLOYER-SPONSORED TRAINING: AN ANALYSIS  
OF THE  
BRITISH COLUMBIA ELECTRONICS INDUSTRY

By

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ABSTRACT

Training and human resource development sponsored by the private sector has become increasingly important and topical in North America. Yet, the attention devoted to it by policy-makers, academe and industry itself has not risen accordingly. Government and industry are faced with the challenge of formulating effective public and private policy to facilitate the qualitative and quantitative development of employer-sponsored training. There is a paucity of information on employer-sponsored training. Therefore, the intent of this study was to determine the nature and extent and qualitative issues of the phenomenon in one industry: the British Columbia electronics industry.

The literature on employer-sponsored training was reviewed from three perspectives. First, the theoretical, historical and conceptual roots of the topic were presented. Second, the quantitative data on employer-sponsored training in North America was summarized. Third, an overview of the most pressing qualitative issues related to the subject was presented. As a result of this process, five main research questions were derived relating to the following aspects of

the B. C. electronics industry: human resource requirements; sources of human resources; nature and extent of training; training decision-making; and public policy.

A 15-page open-ended and closed questionnaire was developed and sent to 80 electronics companies in British Columbia. Forty-eight or 60% of the companies responded to the survey. The responses to individual questions yielded several interesting patterns in the data. The small sample size and the nominal nature of the data collected prevented any extensive statistical analysis of the results to test for relationships between variables. The chi-square test for independence was utilized and identified a few plausible relationships between key variables.

A list of specific conclusions derived from the results painted an overall picture of the training and human resource activity in the British Columbia electronics industry. The limitations of the study and its implications for future research and public policy were outlined.



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## CHAPTER I

### INTRODUCTION

As the economic problems in North America have become more acute, the relationship between a nation's effective development and utilization of human resources on one hand, and its economic performance on the other, has become manifested in several ways. Unemployment, inflation, skill shortages, the effects of new technologies and productivity are just some of the economic issues which relate directly to the quality and quantity of our labour force. In fact, some authors suggest that human resources are now the critical determinant of the economic health of a country. In Human Capital: A High Yield Corporate Investment (1983), Carnevale makes a strong case for the relative and growing importance of our human resources to the economy:

The historical record attests to the importance of the human factor in promoting economic growth. In fact, the evidence suggests that the history of the modern world has been characterized by a relentless and accelerating shift from natural and machine resources to acquired human skills as the basic building block for production. Human resources are

not only becoming more valuable, they are also progressively diminishing the relative importance of natural and mechanical resources. (p. 28)

Ginzberg and Volta (1981) cite Edward Denison as having estimated that two-thirds of the economic growth in the United States between 1948 and 1973 was attained as a result of the increased numbers and knowledge of workers, so-called "human capital".

The development of a country's work force is seen as an important means of attaining its economic and social goals. The main source of the production of human capital is a nation's education and training infrastructure. Most discussions about such matters, especially in an adult education context, focus on the adequacy of the provision of human resources development (HRD) by the public sector. This is represented mainly in programs delivered by educational institutions and government. Relatively little attention has been devoted to education and training provided by the private sector of our economy, the so-called "parallel education system". This system, termed so because of its recent growth relative to the public system, consists of HRD provided by labour organizations, private employers, professional associations, proprietary schools, and combinations of each. According to Wagner (1982), these four sources of privately delivered adult education account for 45% of the total amount of instructional costs for job-related adult education in the United States.

### The Problem

In terms of the amount of money invested, individuals participating, and absolute growth, the training and education sponsored by private firms for their employees represent the largest source of private job-related adult education.

This form of adult education, coined the "shadow educational system", is represented by several labels often used interchangeably: employee training, employer-sponsored training, industrial training, job-related training, on-the-job training, training in industry, workplace training, etc. In spite of such terms having similar meanings, there are subtle differences among them. All of these terms involve some form of instruction. Any definition of them must include such information as the provider or sponsor of the instruction; the location of the instruction; the nature of the instruction itself; the status of the learners; and the intent of the instruction. The term that will be used here is "employer-sponsored training" and is defined as follows: Any job-related (present or soon-to-be job) instruction financed by a private firm for its employees; regardless of the location, method, organizational level, content and duration involved and who delivers it. When using the term here reference will be made to employer-sponsored training in the private sector. This definition will be discussed in more detail in a later section. The key points are that the



definition adhered to here includes: training that takes place outside the workplace and be delivered by someone other than the employer; training that is informal and take place on-the-job; training that includes such things as tuition aid, mandatory continuing education and apprenticeship programs, providing that these are job-related and that they meet the criteria of the definition.

Employer-sponsored training accounted for 33.9% of the total monies spent on job-related adult education in the United States in 1980 (Wagner, 1982). This represents the largest single source of such adult education. Estimates of the total amount of money spent on training by private industry range from \$2 billion (Lusterman, 1977) to \$100 billion (Gilbert, 1976). A more accepted estimate (Carnevale and Goldstein, 1983) of \$43 billion has been made by Craig and Evers (1981). A discussion of the limitations of such estimates will follow shortly, but if actual expenditures are anywhere near these figures, they represent a very significant investment in human capital.

Education and training in industry have grown significantly in both absolute figures (Medoff, 1982a) and relative terms (i.e., their share of the overall public and private investment of the adult education "pie"). At the same time, there is no hard evidence that the training rate--that is, the proportion of firms providing training--has increased. Many persons argue that there are reasons to

believe that employer-sponsored training will play an even more important role in the near future due to such factors as reduced government spending, perceived inadequacies in public education, effects of new technologies, and shifting demographics (e.g., Carnevale and Goldstein, 1983; Medoff, 1982b; Stromsdorfer, 1979). Yet, in spite of the present and projected future importance of employer-sponsored training by the private sector, the phenomenon has received relatively little attention from educators, economists, academics and policy-makers: all of whom should have vested interests in the study of it.

### The Rationale

There is a serious lack of information on, and empirical analysis of employer-sponsored training. Considering the significance of this form of adult education, and its implications for the economy, such a lack is troublesome. Due to this lack of attention, and in spite of there being a handful of studies on the topic in Canada and the United States, there is little known about the nature and extent of the phenomenon and its qualitative parameters. The obvious questions which come to mind are: Why do we need to know more about this type of business activity and what are the implications of acquiring such knowledge? The main application of such knowledge is for the development of public

policy. In recent years, governments at the provincial, state, and federal levels in North America have become more concerned with meeting labour market needs quantitatively and qualitatively. This is evidenced by the several recent task forces, committees, inquiries and pieces of legislation addressing labour market issues. These governments have been forced to seek alternatives for equipping the work force with the needed flexible and relevant skill bases.

Employer-sponsored training, as a source of skill development, is an obvious business activity for policy-makers to consider facilitating. At a conference sponsored by the American Society for Training and Development (1983), Craig outlined the importance to policy-makers of acquiring more data on employer-sponsored training:

...the government and the economists who work with national policy need a lot more information about what employers are doing to develop the quality and productivity of the nation's work force. Frankly, we find that employer investment in education and training is largely ignored by most people who influence public policy or human capital and occupational education and training legislation....The people who develop federal legislation appear to see the key to skill shortages and other work force quality issues only in terms of public education or as federal "employment and training" programs such as CETA. (pp. 20-21)

Several recent Canadian task force reports stress the need for more information on employer-sponsored training (e.g., Adams, 1979; Allmand, 1981; Canada Employment and Immigration Commission, 1981; 1983). These inquiries will be discussed more in the next chapter.

In order to determine priorities, in terms of the types of skills, industries and methods, that should receive government attention, policy-makers must have better intelligence data. Harack Hayne, Pearson and Sweet (1983) make the following observation:

The degree to which government can influence the direction of training within the private sector depends, to a considerable degree, upon its understanding of the nature and extent of current training practices. The scope of human resources--people--is notoriously difficult to quantify...The lack of such basic data is one deterrent to the development of policy and incentives to industrial training. (p. 5)

An assumption of this study was that the state of training and education sponsored by industry is not at an optimal level in Canada. Therefore, policy-makers must decide whether government should exert a role to foster it. In doing so, we might consider how to optimize the quality and quantity of employer-sponsored training. Such intervention may take the form of direct and extensive involvement (e.g., wage

subsidies, capital grants, regulation, etc.) or more indirect, facilitative approaches (e.g., tax credits, consultative assistance, public education, etc.). A clear and in-depth understanding of the phenomenon is required before serious consideration can be given to the direction of public policy on employer-sponsored training. At present, this knowledge does not exist. What little research is available is not cumulative in that comparisons among studies are difficult due to definitional and methodological differences as is the case with participation research in adult education generally. Also, the data from such research is not concise enough to address specific questions. Finally, there has been very little emphasis on qualitative investigations into the problem.

Better data on employer-sponsored training has implications for more than just public policy. For instance, Craig (1983) offers some practical uses for such information: for assessing return on training investment; for examining trends in training expenditures; for use as a catalyst in improving relations between educators and employers; and for use as market information for sellers of training services (pp. 19-20).

Additionally, what is going on in industry is of interest to adult educators in the public sector because what training does or does not occur in the private sector will influence the demand for publicly delivered job-related adult

education. Also, state-of-the-art methodologies and strategies which are introduced and tested in industry can serve as models for educators in public institutions. Industry and industry associations, themselves, could find aggregate data and research on the nature and extent of private training useful for developing training policy and planning to develop their employees. Lastly, evidence from research into employer-sponsored training could increase or reduce support for certain theoretical assumptions (e.g., human capital theory).

#### Purpose and Scope

The premise of this study was that three basic questions have to be addressed in order to develop effective policy on training in the private sector. First, what is, in qualitative and quantitative terms, the present state of employer-sponsored training? Second, should governments intervene in some form, or should they simply rely upon market forces and why? Third, if governments should play a role in skill development by industry, what should it be?

These three questions prescribe the need for three types of information presently lacking in Canadian literature. First, we require an overall picture painted of the nature and extent of training sponsored by industry (i.e., the who, what, when, where, why and how). Second, we need to justify why

governments should or should not intervene in employer-sponsored training; not just from an economist's, academic's or bureaucrat's perspective, but from an industry decision-maker's point of view. Finally, we should know exactly what type of incentives or removal of barriers, if required, will prompt firms to develop their employees.

Before these types of information are collected and, hence, these questions answered, informed public policy on employer-sponsored training cannot be formulated.

While a major research effort is needed in Canada to examine the nature and extent of training sponsored by private sector employers as a whole, the purpose of this project was to consider the aforementioned three questions by focusing on one industry in British Columbia and studying it in-depth, as opposed to an economy-wide, massive survey. Barton (1982) advocates this approach:

While there is some attractiveness to the idea of regular national surveys of all industries in a single massive survey, it is unlikely that truly quality data could be obtained in this way. The nature of training varies tremendously among industries, as does the structure of production and delivery of services. It is likely that more usable information would be produced on an industry-by-industry basis, taking each separately and working with industry advisory committees. (p. 107)

In Canada, Harack Hayne, Pearson and Sweet (1983) also recognize the need for collecting information about employer-sponsored training on a regional and sectoral basis in Canada:

One key element in making this third route [co-operation] work would be assembling information about existing skills, training, needs and discrepancies on a regional basis....[governments] can tackle an understandable segment of the problem of valuing human capital and survey, in a practical context, the state of the human resources industry in their area. (p. 16)

Given the limited amount of time and resources available to invest in this study, it was decided to concentrate efforts on one sector of industry in British Columbia. The next decision was, of course, which industry to study.

The task of choosing one particular industry over another to study may appear somewhat arbitrary; but it was decided to study the electronics industry in British Columbia for several significant reasons. This industry is defined simply as encompassing those firms whose primary activity is one or more of manufacturing, engineering and designing, research and development in and/or servicing electronic components, equipment and/or systems. Those firms involved primarily in sales or distribution of such goods, or software development were not included in this definition. The technologies involved included computers, microelectronic circuits,



microprocessor control devices, power electronics, process control systems, robotics, telecommunications, etc.

The rationale for looking at the B.C. electronics industry involved the following considerations. First, the industry is a relatively discrete and identifiable entity. Second, it is representative of the economy in general in that the companies are diverse in size, business activity and type of technology produced. Third, relative to other sectors of the Canadian economy, the electronics industry, regionally and nationally, is a high growth area, and may therefore create some interesting and novel labour market demands. Fourth, the industry, itself a producer of new technology, is affected demonstrably by technological change, including the impact of such upon its human resources. Lastly, the B.C. electronics industry involves a range of possible occupations and skills to study.

While the electronics industry is set apart from others and is useful for studying the problem in question for the above reasons, at the same time it was hoped that the research design would shed light on training across all industries; and that at least some of the findings could be applied to and compared with those of other sectors of the economy.

The aim of this study was to discover how much and what kind of training is occurring in the British Columbia electronics industry; and to determine the perceptions about and attitudes toward training and public policy on training held by the decision-makers of that industry.

### Summary and Outline

Training sponsored by private firms for their employees has become an important and topical business activity. It has recently been the subject of several government-sponsored reports in Canada. In order to inform public policy-makers and provide important data to business leaders, educators and economists, the phenomenon needs to be subjected to much more rigorous empirical inquiry. This study represents a potential contribution to that inquiry, and to what should become a major research effort, by focusing on the electronics industry in British Columbia.

This paper will proceed with a review of relevant literature relating to the theoretical and conceptual bases of the topic including the history and function of employer-sponsored training; public policy on it; and its relationship to the discipline of adult education. Then a comprehensive review of both the qualitative and quantitative aspects of the problem will be undertaken. This section will culminate with a presentation of and rationale for the specific research questions. All elements of the methodological considerations will follow, and then the research findings will be presented and discussed. Finally, the last section will include a discussion of the implications of the findings for training policy and further research.

The specific research questions are presented here. This inquiry did not start out with these specific questions. They were more a result of studying the literature on employer-sponsored training within the context of public policy and the present state of the phenomenon. The questions are specified here to serve as an advance organizer with which to read and analyze the rest of this paper.

The specific research questions were as follows:

1. What skills and knowledge does and will the B. C. electronics industry require?
2. How do and will firms in the B. C. electronics industry meet their human resource requirements (i.e., in addition to training)?
3. What is the nature and extent of employer-sponsored training in the B. C. electronics industry?
4. What are the characteristics and content of the decision-making process regarding the investment in training by firms in the B. C. electronics industry?
5. What are the attitudes toward and experiences with the government's role in employer-sponsored training held by representatives of firms in the B. C. electronics industry?

## CHAPTER II

## REVIEW OF THE LITERATURE

The literature on the nature and extent, conceptualization and theoretical issues of employer-sponsored training is difficult to synthesize into a coherent "whole" for three important reasons. First, conceptualization of the phenomenon originates from the study of a variety of disciplines: economics, business administration, adult education, sociology and public administration, etc. Literature from one of these does not necessarily incorporate that from others; and each discipline considers the problem from a different perspective. Second, the nature of employer-sponsored training makes it difficult to make generalizations about it. This is because of what Barton (1982) concludes is its "uniform diversity":

About the only uniformity that can be found in the industrial training system is the certainty that, whatever the area of inquiry, there will be diversity in industry's theory and practice...This merely illustrates that generalizations about the extent and character of training in American industry are very difficult to make. (pp. 98-100)

Third, because of the different ways the problem is approached, and the methodological and definitional differences in research on the phenomenon, it is like "comparing apples and oranges" when attempting to generalize across studies and analyses of data. There are significant differences in the operational definitions, research designs, and sampling techniques used that have to be considered when comparing literature on the topic.

Generally, the literature on employer-sponsored training can be categorized into three areas: the research on or discussion of qualitative issues: the same on or of quantitative data; and the theoretical and conceptual parameters of the subject. The latter area will be discussed first to present a context within which to place the topic in perspective. Then the quantitative data on employer-sponsored training will be presented to give the reader an overall impression of the scope and characteristics of the phenomenon. A discussion of the qualitative issues and problems concerning the topic will follow.

### Contexts of Employer-Sponsored Training

Before this study proceeds with a review of the research literature, a discussion of the conceptual and theoretical bases of employer-sponsored training is in order. This will include a summary of the origins, development and role of training in industry as well as the economic theories

relating to it. This section will also include an analysis of the traditional role of government in employer-sponsored training. Lastly, a brief discussion of the relationship between employer-sponsored training and adult education will be included.

### Origins

Before the advent of the industrial age in North America, work consisted largely of agriculture-based activities and services performed by craftsmen. During the colonial era in Canada and the U.S., the acquisition of vocational skills existed mainly in early forms of apprenticeship training, crafts training and the formation of guilds. The purveyors of knowledge and skills were either family members or "master workers." This period included the origin of lyceums, mechanics institutes and labour academies in Canada and the U.S. where working class people received instruction in farm mechanics and basic crafts.

The beginning of the industrial era brought about a greater prevalence of factories. The mechanization of production created a greater demand for skills training. In the mid-to-late 19th century large corporations came into being and were instrumental in the creation of several factory schools such as those set up by Westinghouse in 1888 and General Electric company in 1901 (Steinmetz, 1976). Nadler (1979) reports that the "increasing complexity of industrial

production also encouraged the development of factory schools designed to produce a workforce trained for a particular employer" (p. 22).

World War I provided the impetus for the mobilization of the nations' human resources to produce the goods and machinery needed overseas. The crisis helped create an awareness in industry of the need for training to provide the additional skills and people required. For the first time, federal governments of both countries (e.g., the Smith-Hughes Act of 1917 in the U.S. and the Technical Education Act of 1919 in Canada) appropriated relatively large amounts of funds for vocational education including that provided by private industry.

By the early 1900s, modes of industrial production were becoming increasingly complex and companies were striving to acquire economies of scale via huge quantities of production and specialization. A new movement known as "scientific management" had evolved. Frederick Taylor had advocated this systematic and reductionistic analysis of the organization of work with the aim of producing a standardization of production methods as early as 1911. He asserted that all job functions could be reduced to sequential "tasks"; and that in using this form of analysis, one could discover the simplest, least expensive, and quickest means of performing a job. "Taylorism" had a tremendous impact on the industrial engineering and personnel management practices of the day

(e.g., time-motion studies, task analysis). His work influenced the way work was to be conceptualized and organized for years to come.

By the 1930s, professionalism in training evolved and several training and personnel associations were created (Steinmetz, 1976). Job Instruction Training (JIT) programs were offered to teach foremen, lead hands and supervisors the "show-and-tell" method. Industrial training was still largely informal, on-the-job and "learning alongside Nellie."

World War II demonstrated how a large reservoir of human resources--primarily women, young people and the unemployed with little experience--could be tapped to support the huge war machine. Governments poured millions of dollars into industry to train such people. Training became somewhat systematized. A lot of innovation in training methods occurred during this period. It was the beginning of a technology of instruction with the introduction of audiovisual media, programmed learning, etc. which were well-tested in military applications.

In the 1950s, supervisory training became much more prevalent. Training became more specialized. The so-called "Sputnik Era" created more of an awareness in the populace generally of the need for education and training. More and more corporations created training departments and specialized units to develop human resources. Between the end of World War II and the early 1960s governments became increasingly



involved in employer-sponsored training, mainly in the area of creating employment opportunities for the disadvantaged (i.e., compensatory).

This progression has led to the present state of employer-sponsored training which will be discussed in detail in the next chapter.

### Role

In an ad hoc way an informal division of labour has evolved between the public and private providers of post-compulsory education and training. Due to the recent pattern of relatively high growth in the parallel educational system--especially that provided by employers--and because of various pressures mentioned earlier, there has been a blurring of this split in responsibilities. The roles of each are unclear and there is no mutually exclusive arrangement between industry's training effort and that of the public sector. This may be, in some measure, the basis for an inefficient and inequitable distribution of public and private resources.

In spite of this, a general rule of thumb determining the private sector's role in training evolved. The workplace--whether it is in or outside the production setting--is regarded as an effective context within which to develop skills for some obvious reasons. Emphasis is on the practical learning ("hands on", "learning by doing"); although it can sometimes lead to unstructured "learning by osmosis".

The environment contains the same machinery, equipment and processes that the trainee will utilize after training. As well as learning job-related skills, the learner can undergo work socialization and acquire social skills and positive work attitudes, all of which have been found to be positively related to productivity (Tjosvold and Falkenback, 1979; OECD, 1982a). Certain types of skills (e.g., welding, machine operation and maintenance) lend themselves better to being acquired in the workplace.

Generally, employers feel it is their responsibility to train workers in firm-specific skills. According to Lusterman, company officials surveyed "regard all or most of their companies' education and training activities as legitimate and necessary business functions" (1977, p. 1). Human capital theory, which will be discussed later, maintains that firms will only pay for training in specific skills. They may also provide, but not pay for, general skills training. This is assuming the existence of a clear delineation between general and specific skills and a free market context. Today, because of rapid and frequent changes in work qualifications and organization, what constitute "general" and what constitute "specific" skills are transitory. Few skills are completely general or totally specific in nature. Due to externalities, market imperfections and other factors (Stromsdorfer, 1979), firms often choose to pay for and provide training in general skills

or may choose not to do so with respect to specific ones. Also, the traditional public/private education dichotomy of basic, general versus specific skills has broken down because of industry's dissatisfaction with the publicly provided human capital product and the greater need for basic and general skills to adapt to changing occupational requirements. Industry is getting more involved in providing general skills training for remedial and upgrading purposes (Lusterman, 1977). For these reasons, human capital theory, though it provided a much needed economic perspective on training, accounts for a limited range of conditions under which firms train employees.

In essence, the private employer offers something that is difficult to simulate by others: the workplace environment--production process, work organization, and social setting. This can provide for a more efficient transition from training to production. On the other hand, it is interesting to note that in many OECD countries there has been a movement of initial skills training away from on-the-job and out of the employment relationship (Woodhall, 1983). At the same time, Medoff (1982c) argues that evidence demonstrates "in-house training" is associated with higher labour productivity than that training occurring off-site.

Industry also plays a very important role in training related to new and advanced technologies. Doeringer (1981) points out that the workplace is the "logical setting to start

training in the application of a new technology or production of a new product and then once a market for a skill is established, schools can often take over training responsibilities" (p. 8). Schools, by contrast are not driven by market demand, do not conduct as much research and development, and cannot always afford state-of-the-art equipment and materials.

From this discussion we see that there is an historical and philosophical, yet practical, rationale for the role of private sector training. It is important to understand this role when considering questions concerning the nature and extent of the phenomenon.

### Theoretical Considerations

Employer-sponsored training, by virtue of being a business activity, is an economic phenomenon. Therefore, it is not surprising that the most significant theoretical contribution on the subject emanates from labour market economics; especially in human capital theory, an extension of neoclassical economic theory.

The concept of human capital places emphasis on the quantification of a worker's skills and abilities which contribute to the productivity of a firm. Thurow (1970) defines human capital as "an individual's productive skills, talents, and knowledge" (p. 1). The concept considers investment in the development of an individual's skills and

productive capacity as analogous to investment in physical capital. An important difference between human and physical capital is that the product of the investment in the former is retained within the individual, and is his or hers to control; whereas with the latter, it remains the property of the investor.

Although the concept was not formulated into a comprehensive theoretical framework until the early 1960's, Adam Smith, in his The Wealth of Nations (1776), as cited by Blaug (1970), recognized the contribution of the development of worker's skills to marginal productivity:

A man educated at the expense of much labour and time to any of those employments which require extraordinary dexterity and skill, may be compared to one of those expensive machines. The work which he learns to perform, as must be expected, over and above the usual wages of common labour, will replace to him the whole expense of his education, with at least ordinary profits of an equally valuable capital. It must do this too in a reasonable time, regard being had to the very uncertain duration of human life, in the same manner as the more certain duration of the machine. The difference between the wages of skilled labour and those of common labour is founded upon this principle. (p. 2)

In 1964, a "pioneer" of human capital theory,

Gary Becker, conducted an economic analysis of the investment in and acquisition of human capital. Becker focused on the differences between institutional and industrial training, and originated the distinction between investment in general and specific training. In addition to providing a micro-economic perspective on investment in human capital, Becker's work represents the first economic analysis of establishment training.

Human capital theory provides theoretical answers to such questions as "what prompts a firm to provide training," and "what determines the nature and extent of such training?" Becker postulated that investment in training by individuals and/or firms is analogous to that in physical capital. Further, all decisions regarding training are oriented towards maximizing the return on such investments, namely, increasing productivity and profits.

As mentioned earlier, Becker distinguished between investment in two types of training which are a function of the transferability of skills. "General" training refers to that instruction which increases the worker's marginal productivity for the investing firm as well as other firms. The skills acquired from such training are highly transferable and firms investing in it cannot capture all of the returns: the employee has marketable skills which allows him to go to another firm. Therefore, establishments do not pay for all of the general training. They may provide such training, but

would transfer some of the costs of general training to the employee in the form of reduced wages during training (e.g., apprenticeship training). In "specific" training, worker productivity is increased more within the firm providing the training than in other firms. Completely specific training would have no effect on the productivity of trainees that would be useful in other firms. The skills resulting from such training are firm-specific and low in transferability.

Of course, this dichotomy of training is a simplification. Little training is completely specific or general in nature; and the nature of the skills acquired (i.e., degree of transferability) is transitory over time due to industrial adjustments and new technologies. Skills required to operate a state-of-the-art machine may be firm-specific today, but highly transferable within a year. The main tenet of Becker's distinction is that the nature (general versus specific) of skills resulting from any particular training will determine a firm's propensity to invest in training and the degree to which they do so.

Since Becker's analysis, human capital theory has been applied to account for the growth of western economies. The argument that there is a direct relationship between investment (public and private) in human capital and economic growth, in part, stimulated the increased emphasis and spending on education during the "Sputnik Era", especially in the United States (Stager, 1972).

In spite of its pragmatic appeal, human capital theory is not without its limitations and critics. A philosophical reaction to it reflects an opposition to the treatment of human beings as mere "capital" or a commodity. Further, it is argued that it is reductionistic to perceive education and training as an investment determined by the expected economic returns. Neo-marxist or conflict theory postulates that such an economic perspective ignores the social issue of access to such training and the equitable distribution of opportunities (Braverman, 1974).

A more technical argument is that, because of its theoretical nature, human capital theory assumes that a perfectly competitive market economy exists. Thus, when we consider market imperfections, externalities and the risk of, and uncertainty about returns on investment, human capital theory does not accurately predict a firm's or individual's behavior. An important extension of this concern is the need to consider how firms perceive potential costs of and returns from investment in training. Human capital theory assumes the firm's decision-making process is rational, systematic and based upon accurate and adequate information (i.e., labour market supply/demand, costs, benefits, etc.) This is not always the case.

The assumptions of neoclassical theory are clearly outlined by Levitan, et al. (1981):



...on the supply side: (1) workers have perfect knowledge of the market, including information on wage rates and available opportunities; (2) workers are rational and respond to differences in rates of return...; (3) workers are perfectly mobile; and (4) workers are not organized and make their own decision on accepting jobs and wages offered...on the demand side...(1) full and perfect knowledge of the labour market by employees; (2) employers are rational and attempt to maximize profits; (3) no employer represents a large enough part of the total demand for labour to affect wages; and (4) employers act individually, and not in concert, in fixing wages. (pp. 99-100)

Human capital theory assumes the presence of a single competitive labour market. Probably the most developed alternative theoretical view to human capital theory, involves the assumption of a segmented or stratified labour market structure. The concept of segmented or dual labour markets implies the existence of two labour markets. The primary or internal labour market within firms involves higher-level, specialized jobs where promotion and upgrading are quite prevalent and clearly delineated (i.e., job ladders); and job security and tenure are well-established. In the secondary or peripheral (external) labour market, jobs are not tied to

promotional opportunities, and involve low-level skills. Jobs in such a market are usually characterized by low wages and high turnover. Firms employing persons in such a labour market provide little training and the little they do provide is informal and on-the-job. Much of this market is made up of young, inexperienced and unskilled workers; and women and members of minorities (Doeringer and Piore, 1971). The significance of this distinction between two labour markets is that, depending on the market in which they are employed, workers' access to training will vary. In human capital theory, the existence of one perfectly competitive labour market is assumed, where those in it compete freely for jobs. Dual labour market theory refutes this assumption, as Paquet (1983) suggests:

Indeed, the assumption of a uniform labour market in perfect competition, which forms the basis of the neoclassic theory, does not seem to be validated by the empirical studies which used this approach. Thus, we consider invalid the statement suggested by human capital theory that employees can make a rational decision to invest in training by counting on the necessary and immediate relationship between the level of training attained and the job benefits derived from it in terms of wages. (p. 71)

Radical economic theory, drawing heavily from Marxist tradition, also advocates multiple labour markets; but as

Levitan (1981) et al. explain, its proponents assume, "in addition to the technological and market forces producing labour market segmentation..., that capitalists segment labour markets in order to divide the proletariat and keep it from working as a unit in opposition to capitalism" (p. 110).

The purpose of this discussion is not to promote one theory over another. In summary, both human capital and dual labour market theories have a contribution to understanding the behavior of workers and employers towards training. Some of the concerns about human capital theory mentioned have to be considered when analyzing such decisions. The fact remains that human capital theory has influenced significantly the way governments and researchers have conceptualized education and training. It also seems responsible for an increased emphasis on investment in education and training (public and private). At the same time, dual labour market theory accounts for market imperfections not accounted for by human capital theory. Dual labour market theory, because of its focus on the "balkanization" of markets and disadvantaged workers, addresses the issue of access to jobs and training more so than does human capital theory. Both theories provide a framework within which to organize research, and represent an approach to understanding the essence (at least economic) of the phenomenon in an area where neither research nor understanding are evident. Collecting data on the nature and extent of employer-sponsored training may test the relative

merits of each. Labour market theories hold important implications for understanding the phenomenon of employer-sponsored training. Levitan et al. (1981) articulate a few of these:

The fundamental generalizations or principles about causal relationships are more important to our understanding of the basic factors at work than a detailed description of real situations. This is true because the facts change constantly...Theory can also play an important role in policy formulation. Indeed, with inadequate theories or conceptual frameworks, correct policies can be formulated only by chance. (p. 97)

#### The Government Role in Employer-Sponsored Training

As mentioned earlier, a basic assumption of human capital theory is that an underinvestment in training by firms occurs because of market imperfections and externalities. The resultant sub-optimal amount and type of training in turn justifies intervention by the state. Governments can provide incentives and reduce barriers in order to minimize risks to firms and to encourage them to provide training for their employees in situations where they would not otherwise do so. The interventions involve a continuum of possible actions ranging from unobtrusive activities such as providing information and resources, to tax credits and subsidies for training, to direct and extensive intervention such as

regulation and training taxes.

Until recently, governments in North America have not attempted to implement policies and programs to redress the inefficiencies and inequities present in employer-sponsored training. The Comprehensive Employment and Training Act of 1973 in the United States and the Adult Occupational Training Act of 1972 in Canada represented legislation directed at providing on-the-job training costs to private employers (as well as other areas) for the training of the disadvantaged, minorities, youth and the unemployed. More recently, the Job Partnership Training Act of 1982 in the U.S. and the National Training Act of 1982 in Canada placed even more emphasis on private sector training and, particularly in Canada, manifested the general shift away from support for institutional training (Simpson, 1983).

In the United States, federal policy has focused on "compensatory" training (Carnevale, 1982) with respect to the workplace. There has been no direct intervention in employer-sponsored training except for manpower programs for disadvantaged and minority citizens, indirectly through tax deductions for employee education and training, and through regulation of apprenticeship training at the state level.

Workplace training subsidized by the U.S. federal government amounted to a total of 51,500 workers in 1977. This is insignificant considering there were an estimated 3.7 million workers participating in employer-sponsored training

in 1975 (Stromsdorfer, 1979). Compared to an estimated \$40 to \$50 billion spent on training in industry in 1975, Comprehensive Employment and Training Act funds for workplace training amounted to \$1.8 million in 1977 (Stromsdorfer, 1979).

With the advent of the new Job Partnership Training Act in 1982, U.S. industry may see the effects of more attention from the federal government. The legislation is intended to allow for a larger decision-making role on the part of industry in the distribution of public funds for training. At this time, it is safe to say little attention has been paid to employer-sponsored training at the national level in the United States (Craig and Evers, 1983).

In Canada, the federal government has taken a more active and direct role in private sector training. As Simpson (1983) observes, in recent years there has been a shift in emphasis from institutional training to that sponsored by private employers: "Expenditures on industrial training jumped from less than 3 percent of total training expenditures in the years prior to 1972 to about 10 percent between 1972-77 and to about 18 percent in 1980-82" (p. 21).

Total federal expenditures on private training for 1981-82 amounted to \$110 million. Fifty percent of General Industrial Training Program funds were spent on the training of unemployed persons (approximately \$36 million). Ninety percent of Critical Trades Skills Training Program funds went

toward the upgrading and retraining of employed workers approximately \$33 million). These figures are from the National Training Program's Annual Statistical Bulletin: 1982-83 (Canada Employment and Immigration Commission, 1984a).

In spite of these relatively large sums of money invested in employer-sponsored training, the effect of this policy has had a relatively small impact on the overall training effort in industry. Two studies (Betcherman, 1982; Canada Employment and Immigration Commission, 1981) found that only 20% and 7% respectively, of companies sponsoring training utilized government funds for their training endeavors. Also, of all federally funded industrial training in 1979-80, only 10% was in shortage occupations, and 27% was in surplus skills training. Additionally, an inordinate amount of it was informal, on-the-job training of questionable quality (Canada Employment and Immigration Commission, 1981). Further, concern has been expressed over how much of government-subsidized training would occur anyway, and not as a result of incentives (ibid).

Canadian policy has had virtually the same effect as that of the United States' policy on employer-sponsored training. Based on aggregate figures, direct federal subsidization of job training has not had much of an impact on the nature or extent of training sponsored by industry. For certain occupations (i.e., skill shortages), industries or workers (i.e., retraining), there have been positive exceptions to

this in Canada. The recently proclaimed National Training Act (1982) has instituted some definite changes in the manifestation of federal policy, but it is yet to be seen to have any positive effects on workplace training. A new federal government has recently released a discussion paper on Training (Canada Employment and Immigration Commission, 1984) to initiate a consultative process to consider policy changes.

In North America, just as employer-sponsored training is considered to be less than optimal, so has been government policy concerning it.

A crucial question for any government in a market economy is when, why and how to intervene, if at all, in the market; and whether the intervention should be direct or indirect, financial or fiscal, an incentive or "stick" approach, facilitation or control. In the context of employer-sponsored training, these questions are all pertinent.

The premise here is that employer-sponsored training is an integral and necessary component of the education and training effort in North America. Further, the pivotal assumption is that the state of the phenomenon, and available information about it, is not optimal: low participation rates for certain firms, trainees and occupational groups; aggregate figures "skewed" by a minority of enterprises who conduct a lot of training; and current skill shortages, etc. It is documented that the education and training system in North America has been inadequate. The private sector, as part of



this larger system, has to accept its share of the responsibility. The key questions are: What aspects of the phenomenon are not optimal; what causes this situation; and what should the responses be?.

Governments seem to have a good case for intervention in enterprise training. There are inherent, structural problems associated with investing in employee training as well as conjunctural phenomena which present barriers to training in industry. These will be discussed later.

The specific perceived inadequacies of Canadian public policy on training in industry will be discussed in more detail in the next chapter.

### Adult Education and Employer-Sponsored Training

Employer-sponsored training is a type of adult education, one of those forms in which training is subsidiary to the sponsor's primary goal or activity. As a formal process, employer-sponsored training involves program planning (identification of needs, curriculum development, selection of instructional agents, provision of facilities and program evaluation) and instruction (instructional design, design/acquisition of instructional resources, instructional delivery and evaluation of learning outcomes). The lack of information about employer-sponsored training available to the discipline of adult education represents a significant gap in understanding of a major area of its domain.

The discipline of adult education could advise and support the field of practice more effectively if reliable research on employer-sponsored training could identify the variables influencing its incidence, participation and outcomes. Currently, issues such as access and public policy, among others, are impacting reciprocally on employer-sponsored training and the institutional training system. Trends toward limited access to institutional programs may promote expansion of employer-sponsored training in both scope and volume. Further, the subsidies provided for this type of training under national policy could alter the funding for institutional training positively or negatively, depending upon the extent of communication and co-operation between the two training agencies.

Considerable potential exists for complementary action between industry and educational institutions, however, achievement of this hinges on sound theory and research generated by the discipline of adult education. Both agencies require operational data about the characteristics of adult learners, efficacy of instructional techniques and optional approaches to evaluation of learning outcomes. Trainers in both institutional and industrial settings are acquiring the mantle of "professionals", and require the support of the discipline of adult education through development opportunities at the level of degree programs, diploma programs, certificate programs, instructional programs,

diploma programs, certificate programs, instructional skills seminars, etc. The outcomes of professional development of trainers would heighten their awareness of adult training in the context of lifelong learning, which would have the effect of broadening their goals respecting the client groups they serve beyond their immediate training objectives.

Employer-sponsored training programs offer fertile territory for adult education research in that the territory has characteristics peculiar unto itself. Industry, especially large corporations, is in the forefront of innovative instructional technology. In addition, employer-sponsored training endeavors must be accountable to "bottomline" imperatives which impose the challenge of achieving outcomes through instructional processes not conforming to prescribed "ideal" methods. The client group is characterized by its inclusion of many individuals for whom employer-sponsored training is the only available development opportunity due to barriers of access and funding presented by institutional programs. Via survey research, the discipline of adult education could identify more precisely the role of employer-sponsored training on the continuum of lifelong learning. The Faure Report (UNESCO, 1973) recommendations imply the validity of this role:

A great variety of educational activities and institutions fall between the two extremes. They include on-the-job training....(p.2)

Responsibility for technical training should not fall exclusively on the school system. It should be shared by schools, business, industry and out-of-school education. (p.5)

There is more than sufficient justification for the discipline of adult education to turn its attention to the area of employer-sponsored training in theoretical and empirical enquiries as a means of adding to the research base of the domain, and also of embracing more closely those widely dispersed practitioners of employer-sponsored training to their mutual benefit and the benefit of the adult learners they serve.

### Summary

By considering the conceptual and theoretical bases of employer-sponsored training, we can more readily construct an overall framework within which to organize and study issues and problems concerning the topic. Each section in this chapter contributes to this end. An analysis of the history and role of employer-sponsored training helps in clarifying the relative purpose(s) of the phenomenon and its "uniqueness" in role; and provides a philosophical and conceptual perspective. A presentation of the theoretical antecedents of employer-sponsored training suggests hypotheses to test empirically and offers an economic perspective. A discussion

of the government role in private employer training considers the political implications of the problem in that decisions have to be made as to the direction and scope of training policy. Finally, a discussion of the functional relationship between employer-sponsored training and adult education conceives the former as an educational process and form of adult education. This has implications for the types of questions asked about the problem.

These conceptual and theoretical contexts will reoccur as themes throughout the review of research literature on employer-sponsored training which will follow.

### The Nature and Extent of Employer-Sponsored Training

There are several dimensions of the scope and characteristics of employer-sponsored training which may be studied, all of which could potentially provide data with which to direct further research and public policy. These dimensions have been examined in several studies and analyses to varying degrees of specificity and sophistication. The dimensions relate to the following types of information about employer-sponsored training:

- The overall volume and incidence of the phenomenon in terms of numbers and percentages of firms and employees participating and money invested.
- The characteristics of the firms which do or do not provide training (i.e., size, industrial sector,

geographic location, union/no union, etc.).

- The characteristics of the employees who do or do not participate in training (i.e., demographics, organizational level, occupation, etc.)
- The nature of the training itself (i.e., setting, methods, duration, content, etc.).
- The actual and perceived costs of training (per hour, trainee, method, occupation, etc.) and how these are determined (i.e., methods of collecting data and definition of training costs).

Any of the above dimensions could be variables in research on the problem. Within each of them are several specific questions and issues which could be useful to policy-makers and others. These will be elaborated on in subsequent sections.

The following summary of research literature on employer-sponsored training represents a review of the most significant sources of data on the topic in Canada and the United States. These data sources entail three methods of research: (i) aggregate estimates of the overall incidence and costs of the phenomenon, based on analyses and syntheses of existing data; (ii) data from surveys of employers--either economy-wide or for a select group of industries; and (iii) data from census surveys of households. Table 1 includes, in chronological order, the titles, authors and sponsors, dates of research and publication, and methodologies and samples used for each source of data.

## A Summary of Sources of Data on Employer Sponsored Training

Title	1. Author 2. Sponsor	1. Research Date 2. Publication Date	1. Methodology 2. Sample
Canada			
Organized In-Service Training for Four Major Industries	1. Statistics Canada 2. Department of Labour	1. 1963 2. 1965	1. Employer survey 2. Manufacturing, public utilities, mining, transportation industries
Organized Training in Four Industry Groups	1. Statistics Canada 2. Department of Manpower and Immigration	1. 1965 2. 1967	1. Employer survey 2. Four industries as above
Training in Industry	1. Statistics Canada 2. Department of Manpower and Immigration	1. 1969-70 2. 1973	1. Employer survey 2. All industries
Labour Force Survey: Training in Industry	1. Statistics Canada 2. Department of Manpower and Immigration	1. 1973 2. 1975	1. Household census survey (part of regular Labour Force Survey) 2. All regions
Barriers to Employer Sponsored Training in Ontario	1. Edward Harvey 2. Ontario Ministry of Colleges and Institutes	1. 1978-79 2. 1980	1. Employer survey 2. Ontario; all industries; attitudes towards training
Education and Working Canadians: Commission of the Enquiry on Educational Leave and Productivity	1. Roy Adams 2. Labour Canada	1. 1979 2. 1982	1. Employer survey 2. All industries; re educational leave and training and development
Meeting Skill Requirements: Report of the Human Resource Survey	1. Gordon Betcherman 2. Economic Council of Canada	1. 1979 2. 1982	1. Employer survey 2. All industries; part of overall human resources survey
Technological Changes and the Demand for Skilled Manpower in Canada	1. Stephen Peitchinis 2. Department of Industry, Trade and Commerce	1. 1979 2. 1980	1. Employer survey 2. All industries
Employer-Employee Interest in Job Training	1. Pierre Pacquet 2. Skill Development Leave Task Force	1. 1980-81 2. 1983	1. Employer survey 2. Quebec; all industries
A Study of Skill Development Leave Programs in Canadian Business and Industry	1. Social Programs Evaluation Group, Queen's University 2. Skill Development Leave Task Force	1. 1982 2. 1983	1. Employer survey 2. All industries; re educational leave and training and development
A Survey of Adult Education in Canada	1. Statistics Canada 2. Secretary of State	1. 1983 2. 1984	1. Household survey 2. All regions
United States			
Occupational Training in Selected Metalworking Industries	1. Bureau of Labour Statistics 2. Department of Labour	1. 1974 2. 1977	1. Employer survey 2. Metal products, machinery, electrical machinery, transportation equipment; related to "structured" training
Education in Industry	1. Seymour Lusterman 2. Conference Board	1. 1974-75 2. 1977	1. Employer survey 2. All industries; 500 or more employees
Survey of Participation in Adult Education	1. Bureau of Census 2. National Center for Educational Research	1. 1981 2. 1982	1. Household census survey 2. All regions
U.S. Training Census and Trends: 1982	1. Ron Zemke 2. Training Magazine	1. 1982 2. 1982	1. Employer survey 2. All industries; 50 or more employees
U.S. Training Census and Trends: 1983	1. Ron Zemke 2. Training Magazine	1. 1983 2. 1983	1. Employer survey 2. All industries; 50 or more employees

In addition to the above sources of data, the following authors have contributed useful overall estimates of expenditures on the prevalence of training in industry: Mincer (1962); Gilbert (1976); Lusterman (1979); Goldstein (1980); Craig and Evers (1981).

### Limitations of the Research

Before this section proceeds with a summary of available data on employer-sponsored training, a discussion of how (i.e., methodology and sampling), and within what parameters (i.e., definitions), such data was collected is necessary.

There are two obvious loci of data on employer-sponsored training: employer representatives and employees. The former source is tapped by survey questionnaires and interviews (both by telephone or mail) and case studies. The latter source is usually part of a large census survey of households. There are concerns regarding the validity and representativeness of both types of data-gathering. Employer surveys assume that firms have mechanisms to keep track of training activity; and that they are willing to relinquish such information. Data from such surveys may be based on responses as a function of memory and poor/inaccurate records. Also, a firm's willingness to report such data will affect a survey's response rate and, therefore, the representativeness of it. Many researchers argue that census data--for example, that from the Survey of Participation in Adult Education (SPAЕ,



1982) collected by the Bureau of the Census' (U.S.) Current Population Survey--underestimates the participation in adult education and training. Tierney (1982) offers two examples of this:

...the person at home at the time of the survey may not have responded positively to any of the six "trigger" questions in the primary May instrument, even though a member of the household did, in fact participate in such an activity... Finally, persons involved in employer-sponsored education and training may not recognize it as such. (p. 7)

We have to be cognizant of these inadequacies with such methodologies when comparing research findings from various studies.

The definition of "training" used is a critical determinant of the data collected. For instance, findings will vary depending on whether or not the definition includes informal instruction, off-site instruction, and "education" and "development". Smith (1983) outlines nine questions to consider when operationalizing the concept:

- What is the purpose of the activity?
- Who is the trainee?
- Who is the instructor, administrator or facilitator?
- Who is the sponsor who pays for the activity?

- Who decides which trainee should participate in which activity?
- How is the activity structured?
- Where is the activity located?
- Must the activity exceed a minimum time (e.g., one hour) to be counted as training?
- Must the activity exceed a minimum cost to be counted as training? (p. 139)

Several surveys of employer-sponsored training use different operational definitions of training which make comparison of results difficult.

Another definitional issue is represented by what surveys consider a training cost. Do they include indirect costs such as administrative overhead, and foregone earnings and production; or just direct training costs? Also, does employer-sponsored training refer only to instruction provided by employers or is the criterion "who pays for such training?"

Concerning characteristics of sample populations, there are two main differences among surveys of employer-sponsored training. First, they vary by the size of firms included in the sampling. Most Canadian surveys include firms with twenty or more employees. In the U.S., some surveys include only firms with 500 or more employees (e.g., Lusterman, 1977) or with 50 or more employees (e.g., Zemke, 1982, 1983). Second, some studies concern themselves with only certain industries or economy sectors (e.g., Bureau of Labour Statistics, 1977;

Statistics Canada, 1965; 1967)). Again, for these reasons, caution is required when making comparisons between survey results. It is important to note that census survey data does not suffer by the above two biases in sampling. Carnevale and Goldstein (1983), in the context of the SPAE, emphasize this:

Other than the effect of memory on what episodes of training are reported, the survey (SPAE) is free from biases associated with size of firm, industry, employment in central offices or in branch plants, reluctance or inability of firms to report all the training they do, the tendency of firms to respond to surveys in proportion to their interest in training and other bias-creating factors that affect surveys of employers. (p. 41)

Other differences among samples are sample size (ranging from a few hundred to a few thousand) and response rate (ranging from 25 to 90 percent). Each of these can affect the representativeness of the survey findings involved.

The following analysis of available data on employer-sponsored training will summarize the most significant findings and patterns from sources identified in Table 1. This analysis will be organized according to the five dimensions outlined earlier. This review of the research literature includes findings from surveys and analyses in the United States. The assumption here is that because of similarities and interdependencies between the two economies,

we can make broad generalizations from findings in the U.S. to the Canadian context. Even if this assumption is questionable, we can learn much from the methodology, definitions, problems, etc. of American surveys in planning research on employer-sponsored training in Canada.

### Overall Volume and Incidence

In terms of aggregate figures of expenditures, estimates have ranged from \$2 billion (Lusterman, 1977) to \$100 billion (Gilbert, 1976) spent annually on employer-sponsored training in the United States. The former estimate referred to investment by firms with 500 or more employees. Mincer (1962) estimated that 1.35 billion "1958" dollars were invested in on-the-job training. Craig and Evers (1981) projected that \$30 to \$40 billion was spent on training and development annually during the late seventies. Stromsdorfer (1979) offers an estimate of \$46 billion based upon the following logic:

In view of the estimates by Jacob Mincer of 13.5 billion dollars of on-the-job training costs in 1958, it is more likely that on-the-job training costs in 1975 were closer to 46 billion if the proportional relationship between national output and on-the-job training in 1975 was the same as in 1958. (p. 3)

Carnevale and Goldstein (1983) suggest that Craig and

Ever's estimate "has gained wide currency among researchers and practitioners as the most reliable among imperfect measures" (p. 35). All of these estimates refer to United States industry activity. No such aggregate figures are available for Canada, with the exception of figures for government-sponsored industrial training and provincial apprenticeship statistics. Both of these types of activity represent a very small piece of the "pie" (Betcherman, 1980). The above estimates, if at all close to actual expenditures, reveal a significant investment in human capital.

Concerning the relative volume of expenditures on training by private firms, Wagner's (1982) data shows that, as mentioned earlier, training by industry is the largest single delivery system for adult education. It amounts to one-third of the total investment in job-related adult education. This figure would be one-half of the total if outside (of the firm) training was included in the estimate.

Regarding the proportion of firms and employees participating in training and education provided by industry, estimates are based on various employer and census surveys. The Bureau of Labour Statistics (BLS) Survey of Metalworking Industries (1977) found that 41% of such firms provided classroom or "structured" on-the-job training in 1970. This was for firms with 50 or more employees. Lusterman (1977) found that 55% of firms with 500 or more employees provided training in 1975 in the U.S. In Canada, three consecutive

surveys of employer-sponsored training (firms with 20 or more employees) by Statistics Canada for 1963, 1965 and 1969-70 (1965; 1967; 1973), indicated that the incidence of the phenomenon was 16.8, 20.5 and 22.9% respectively. The first two surveys included only four industry groups: manufacturing, public utilities, mining and transportation (including communications and storage). In a study conducted by Peitchinis (1980), 60% and 40% of the companies surveyed provided "in-house" training or paid for "external" training, respectively in 1979. In the same study, 7.5% of respondents relied entirely on training to meet their needs for qualified human resources; whereas 52.9% of the companies indicated they relied on both training and hiring trained workers in the domestic market. Adams (1979) and Betcherman (1980) found that approximately 20% of firms surveyed provided training (of at least one year's duration in Betcherman's study). In the latter research, 61.7% of the respondents provided at least some training. Pacquet (1983) found that 83.3% of companies surveyed in Quebec in 1980 provided some training activity. Results from a study on skill development leave programs (Social Program Evaluation Group, 1983) in Canada showed that 52.2% of responding firms indicated the existence of some form of skill development (day or block release or extended leave) for 1982.

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In terms of the proportion of the North American labour forces participating in industry-sponsored training, the

Survey of Participation in Adult Education (1982) revealed a participation rate of four percent of the workforce (17 years of age and older) in 1981. Wagner (1982) indicates that 10.85% of all post-compulsory education and training participants were from training in industry. In 1981, 2.6 million of the 17 million adult education participants in the U.S. were involved in industry training (SPAЕ, 1983). Canadian census' revealed that 7% and 7.9% of the labour force took part in employer-sponsored training in 1969-70 and 1973, respectively (Statistics Canada, 1973; 1975). Pacquet's survey (1983) indicated that 36.2% of the labour force represented in the study participated in training in 1980; while A Study of Skill Development Leave Programs in Canadian Business and Industry by the Social Program Evaluation Group (1983) revealed a participation rate of 18% in such programs for 1982.

Most recently, A Survey of Adult Education in Canada, jointly sponsored by Statistics Canada and the Secretary of State (1984), found that 18% of all adult education participants were employer-sponsored. Forty-two percent of all job-related adult education was employer-sponsored. It was not indicated what proportion of these were private sector organizations.

These figures themselves tell us very little in terms of how less than optimal the extent of employer-sponsored training and employees' participation in it. However, when

one looks at the nature of this training and the characteristics of the firms and employees involved, the data is more revealing.

What is lacking in this data on training and participation rates of firms and employees, respectively, is an indication of how far from optimal these levels are and how they change from year to year and across geography, using consistent definitions and methodology.

Another gap in information is that no aggregate estimates of expenditures on employer-sponsored training exist in Canada.

Also, many of the aforementioned statistics refer to "some" training, training of a specific duration or form, etc.; and are, therefore, difficult to compare. This will become more apparent when we discuss the nature of the training and the firms and employees involved.

#### Characteristics of Firms Sponsoring Training

Most employer surveys on employer-sponsored training reveal the same general pattern. The extent of training varies with the size of firms, in terms of numbers of employees. All studies show that the larger the firm, the greater the frequency of some training being reported. Smaller firms do not have as many resources to provide training nor do they experience the demand to warrant it. The training provided by smaller firms tends to be more of an



informal, on-the-job nature; they cannot apply the economies of scale that warrant spending time and resources on developing formal training. Often too, firms with limited resources provide tuition aid for outside courses and seminars as an alternative to providing their own training. Not surprisingly, lower paying firms, in terms of wages or salaries, provide less training (Betcherman, 1982). Lastly, larger firms are most likely to provide long-term training

The nature and extent of employer-sponsored training also varies as a function of industry sectors. This is due to differences in demand, internal labour markets and historical developments. Applying industrial sector as a factor affecting the incidence of training, Carnevale and Goldstein (1983) speak of the "training-intensiveness" of industries: "An industry may be called 'training-intensive' if it trains a higher proportion of its employees than other industries do" (p. 44). An even more interesting indicator is the incidence of training within a given industry in proportion to the relative number of employees in the total labour force it employs. While most surveys reveal the first type of information, few relate it to the latter type. For example, in the U.S., the mining industry was responsible for 2.4% of the total work force receiving training in 1981, yet the industry only represents 1.2% of the total workforce (Carnevale and Goldstein, 1983).

Another important point is that there can be a

significant difference between the amount of training by certain firms and industries and the access each provides to it. Pacquet (1983) distinguishes between "potential" and "real" access to training. The former refers to the firms that provide training, while the latter refers to the actual percentage of employees in those firms that receive some training (i.e., "concentration" of training). The implication of making this distinction is that an industry may have a relatively high training incidence rate, but have most of its training concentrated within a small population of its employees (e.g., managerial and professional occupations or in apprenticeable trades). This is true of the construction and manufacturing industries with regard to apprenticeship training (Betcherman, 1982).

In Canada, the most recent data (Statistics Canada, 1975; Betcherman, 1982; Social Program Evaluation Group, 1983) indicate that training is more prevalent in the mining and finance, insurance and real estate industries and least prevalent in the construction and transportation, communication and utilities industries. Interestingly, in terms of programs lasting at least a year, the construction and manufacturing industries have the highest training incidence rates (Betcherman, 1982). This is probably due to the relatively high prevalence of apprenticeship programs in these industries.

According to Betcherman's (1982) and the Social Program

Evaluation Group's (1983) surveys, the existence of unions in firms does not affect the likelihood of them providing training.

Lastly, geography, in two ways, may affect a firm's propensity to provide training. First, firms in the western provinces and Ontario provided more training than those in Quebec and the Atlantic regions in 1979 (Betcherman) and 1982 (Social Program Evaluation Group, 1983). Second, Betcherman found that firms in large metropolitan areas (i.e., 500,000 people or more) were less likely to provide long-term training than those located in smaller or rural areas. This reflects the larger labour pools in the former areas.

Concerning the characteristics of firms who provide or do not provide training for their employees, much more qualitative data is required. The two most recent inquiries into the phenomenon in Canada--by Pacquet in Quebec (1983) and the Social Program Evaluation Group at Queen's University (1983)--are a start. Pacquet's work focuses on the determinants of access to training in firms, as well as the existence of training policies and the control (over access) of training in such firms. In the latter research, the firms' criteria for selection of participants in training is studied.

One of the most important issues relates to the incidence of training in small firms. Most of the surveys mentioned exclude firms with less than 20 employees and some exclude even larger firms. This is usually a function of the database

from which the researchers draw their samples. In spite of the low rate of training in small businesses it still exists, (perhaps in a different form), and data on it is important for two reasons. First, small businesses, as a whole, employ the majority of the labour force. Second, in order to optimize the quantity and quality of training in small firms, we have to consider the specific characteristics of and barriers to training of such firms. This will be discussed further when addressing firms' decisions to provide training. At any rate, training in small business is a potential target for public policy intervention.

#### Characteristics of Employees Participating In Training

The figures on employee participation in workplace training are consistent with adult education research. The lower-skilled, lower-salaried, non-white (in the U.S.), youth and less-educated are under-represented in the employer-sponsored training statistics (Lusterman, 1977; Betcherman, 1982; SPAE, 1982; Social Programs Evaluation Group, 1983).

Employees in the upper end of the organizational hierarchy receive more training; also, training increases with skill content of occupations and their hierarchical standing in firms, i.e., executive, managerial, professional, white-collar jobs (Betcherman, 1982; Zemke, 1982, 1983; SPAE, 1982). As well, women received less training in proportion to their share of the labour force, though this trend is slowly

decreasing (SPAEE, 1982). The 25 to 44 year old age cohort has the highest participation rate, as Carnevale and Goldstein (1983) remark:

In the final stages, about age 25, the more successful youth settle into "primary" jobs characterized by good wages, job-specific training and promotional opportunities in the "internal labour markets" of private firms. Unlucky youth workers fall into the "secondary" labour market where jobs are temporary, low paying and offer little job-specific training or promotional opportunity. For "primary" workers, the period between 25 and 44 years of age are peak productivity years when job-specific training and career mobility are the greatest. (pp. 54-55)

The characteristics of employees who participate in employer-sponsored training poignantly portray the "access" or "equity" issue; and epitomize the segmentation of the labour market as represented in dual labour market theory. The employees with relatively low participation rates (in establishment training) represent the peripheral or secondary labour market.

Defining this secondary group of employees who tend to have less access to training provided by their employers is useful in itself; but what is more revealing is an analysis of the mechanisms and factors in their environment that determine

the existence of degree of access. As well, an analysis of factors in the psychological make-up of such individuals may be useful. In participation research in adult education much emphasis is placed on the motivation, among other factors, of individuals. What is lacking in surveys on employer-sponsored training because of their very nature (i.e., methodology), is an indication of employees perceptions and attitudes towards the activity--how they perceive the control of it, its return on investments, etc.

If it has not been evident until now, the interaction of variables such as employee and firm characteristics and the nature of the training is significant. It is difficult to speak about one of these in isolation from the others. At the same time, because of this, it is difficult to get a clear picture of employer-sponsored training by looking at all the variables together (i.e., Barton's "uniform diversity"). For example, we cannot simply ask "who receives training?" We have to ask "who receives what training?"

As equity is a critical issue in adult education and for policy-makers, the aforementioned data on participation in employer-sponsored training could identify possible targets for public policy attention in order to enhance access to training in industry. More qualitative studies on participation in this kind of activity are required before this can happen.

### The Nature of Employer-Sponsored Training

Data on the nature of employer-sponsored training can be categorized as relating to the duration, method, location/setting and content of instruction.

The duration of this training tends to be short term, a matter of a few days to a few weeks (Lusterman, 1977; Adams, 1970; Betcherman, 1982; Peitchinis, 1980). Training for trades and technical skills and in larger firms tends to have a higher prevalence of long term training; the former because of long term apprenticeship programs and certification programs for technicians, and the latter because of internal labour markets and career paths.

A large percentage of employer-sponsored training is informal, on-the-job and difficult to measure and separate from the production process (BLS, 1977; Lusterman, 1977; Betcherman, 1982). Under-represented participants such as minorities, the unskilled, youth and women received proportionately more on-the-job training in the U.S. in 1981 according to SPAE (1982). As mentioned earlier, formal, structured training increases proportionally with the skill content (SPAE, 1982). In the U.S. in 1974, 43% of the metalworking industry firms surveyed provided "structured" training (BLS, 1977). The content of training is an obvious determinant of its duration and methods.

The content of employer-sponsored training programs is largely concentrated in professional, executive, managerial,

supervisory and technical skills (Carnevale and Goldstein, 1983). The skilled trades--welders, flamecutters, machinists, electricians, and plumbers--receive more training, in terms of duration and frequency (BLS, 1977; Statistics Canada, 1967, 1973). Product fabrication and repair firms provided more training than those in other industries in 1980 (Betcherman, 1982). A Training magazine survey (1982) found that supervisors, managers and customer service personnel were most likely to receive training and general office, clerical and processing workers were least likely.

Thirty-seven percent of training conducted by firms with 500 or more employees in 1975 was for remedial purposes (Lusterman, 1977), while other surveys reveal smaller firms provide little access to remedial or general education (Carnevale and Goldstein, 1983; Pacquet, 1983).

In summary, figures on the nature of employer-sponsored training are largely skewed by a disproportionate amount of short term, informal training, located on the job, within the production setting. While the quantity of employer-sponsored training in a given geographic and industrial context may be adequate, the quality of it leaves much more to be desired. Some research indicates that informal, on-the-job instruction is less effective than more formal types held outside the production setting (Canada Employment and Immigration Commission, 1981; Betcherman, 1982). More research on this issue is needed. "On-the-job training" is a frequently used



term; but it is not evident that everyone understands the process and its subtle dynamics and economic implications (i.e., relative effectiveness and relationship with productivity). More specific data on this form of instruction could guide public policy, as better (more conclusive) information on the nature of employer-sponsored training in general.

### The Costs of Employer-Sponsored Training

The information on the costs of employer-sponsored training can be organized into three types: what constitutes a "training cost" (i.e., criteria used); the actual figures on training costs per hour/trainee/program; and the distribution of costs. Overall costs for such training were discussed earlier and will not be addressed here.

The first point that should be made is that little information is available on the costs of training by private firms in the research literature. This is not surprising since relatively little information is available in industry, itself--especially when training is compared to other business activities. Weinstein (1982) offers the following reasons for this:

There are a variety of reasons why only limited information is available. One explanation is that training is not considered by employers to be a primary function of the organization. Even though

its impact is substantial, training is judged peripheral to the main objectives involving production, sales, and profit goals. A second factor is that until recently, education has been regarded by management as a low priority need...Costs were assumed to be so minimal that no one thought to keep a record of them...It is difficult to aggregate all the costs...because the programs are decentralized, with expenses scattered into many different cost centers. (pp. 264-265)

Another problem in cost accounting of training concerns on-the-job training. It is difficult to separate learning and instruction from the production process and, therefore, to allocate the respective costs of each.

Betcherman (1982) presents a relatively detailed picture of training costs. He divided responses in the survey into three types of cost factors: wage and salaries (trainees and instructors); production costs (machinery, power, materials, and wastage); and administrative costs (tuition, travel, bookkeeping). Betcherman found that there was a wide variation in how costs were calculated. Such a variance will produce data on costs that are virtually meaningless because of the lack of comparability. This variance demonstrates the lack of accounting procedures for and ignorance of training cost accounting for employer-sponsored training. In a

discussion of "human resource accounting", Harack Hayne, Pearson and Sweet (1983) observe that "there exists at present no generally accepted means of recording expenditures on human resources, or of relating them to corporate income, or to productivity" (p. 5).

Simpson (1983) identifies cost items that tend to be ignored by firms when estimating their training costs: the cost of substandard workmanship by trainees; the proportion of supervisory labour costs and of personnel management expenditures attributable to training; and the cost of the capital equipment (classrooms, workshops, etc.) (p. 10).

After attempting to specify a definitive cost model in an intensive study of cost factors in twelve American firms, Weinstein (1982) concluded that it was presently not feasible:

The delineation of such a model is impractical because...the definition of what constitutes a cost depends on the context and purpose to which the cost data will be put. The effort to develop a universal cost paradigm was frustrated by complexities of a training maze of seemingly endless proportions. These complexities exist because of major differences with respect to the function or purpose of the training, the learners served, the level at which training takes place and the content and method of delivery. (p. 267)

Some information is available on actual expenditures on

training as reported by individual firms. Lusterman (1977) estimated that firms with 500 or more employees surveyed spent an average of \$60 per trainee per year in 1975 (U.S.); while a Training magazine survey (Zemke, 1982) estimated that \$90 per trainee was spent annually. Betcherman (1982) found that the average cost of training programs was \$2,551 per trainee. Betcherman's results include apprenticeship training and, therefore, cannot be readily compared with most other surveys. Suffice to say that all cost figures from these surveys vary significantly depending on the nature of the training. Costs of training are related positively with duration and skill content (i.e., complexity); and increase for classroom and structured training as opposed to on-the-job instruction.

No studies have clearly outlined the relative distribution of training costs and how these vary depending on the duration, method, content and location of training in industry. A significant finding, though, is that foregone earnings (of employees) and lost productivity during training account for a significant portion of the overall investment in training. Lusterman quoted one of the firms surveyed in his study as saying that 70 to 90% of the firm's training costs were for foregone wages and salaries. Weinstein (1982) found that "participant compensation" accounted for 35% of the total training costs; and that direct and indirect (e.g., administration, development) costs represented approximately

33 and 32%, respectively, of the total costs. In conclusion, she emphasized that "the data suggest that consideration of participant compensation may have significant implications for managers and policymakers responsible for resource allocation decisions" (p. 291).

The area of training cost accounting has several important implications as a topic for research and public policy analysis. First, since little is known on how costs are determined, a more in-depth analysis of this should be conducted (i.e., more qualitative approaches). Second, one minor policy intervention activity should involve working with/educating employers on how to determine and document training costs. Third, studying training costs as they vary with factors concerning the nature of training in industry will provide a clearer picture of the interaction amongst such variables. Last, as perceived costs (and benefits) of training are often a deterrent to firms to pay for it, accurate data on actual/real costs may alleviate any misunderstandings such firms have about training costs and benefits. This will be discussed further in a later section of this chapter.

### Summary

A review of the preceding quantitative data on employer-sponsored training should provide at least a superficial and generalized understanding of the nature and extent of the

phenomenon in Canada and the United States.

Regardless of which estimates are considered, a significant proportion of business capital is devoted towards employer-sponsored training. The training rate varies by industry, geographic location and size of the establishment. The format of the training is largely on-the-job, particularly for small companies, and of a relatively short duration. Management, supervisory and technical personnel receive more training than those in other occupations. The content relates mostly to technical, interpersonal (communication) and management subject matter. The prevalence of training increases with the size of the firm. Costs per unit of training vary with the method and content of it, as well as the cost criteria adhered to.

In sum, employer-sponsored training in industry is a multifaceted entity which does not lend itself to generalizations. This is one of the challenges in developing effective public policy that addresses employer-sponsored training in all its forms and contexts.

#### Qualitative Issues in Employer-Sponsored Training

Considerably more qualitative research is needed on skill development by industry in Canada. This is not intended to minimize the importance of the small amount of quantitative evidence on the subject available in Canada. Despite building

a solid base of quantitative evidence, until some of the qualitative issues are studied, effective public and private policy on employer-sponsored training will not be developed. As Barton (1982) suggests, at present we rely largely on "folk knowledge" about this business activity.

This section will include a review of the pertinent literature on qualitative questions concerning the topic. The exercise will help place the quantitative evidence in perspective and lead into the discussion of the research questions for this study.

### The Training-Investment Decision

Since this question implies a qualitative analysis, little data related to it exists. The data that does exist relates to perceived and actual "barriers" and "deterrents" to training in industry.

In Harvey (1980), non-training firms cited the following deterrents as the most prevalent reasons for not training their employees: uncertainty about the return on investment; the conflict of training with production; the cost of trainers and administrative staff. In order of prevalence, Betcherman identified the following deterrents to training: vacancies can generally be filled by outside hiring; workers leave during or after the training period; adequate financial resources do not exist to develop or implement programs; in-company training hinders production (p. 52).

One of the most important and unexplored areas regarding the phenomenon of employer-sponsored training is the decision-making process in a company as to when and why it provides training. This has very important implications for public policy. If the government is considering some sort of intervention in employer-sponsored training, it has to have knowledge of what determines whether a given firm will train; and what is perceived as an "incentive" in this context (Booth and Gordon, 1981).

In adult education participation research, heavy emphasis is placed on the motivation of individuals. In human capital theory the focus is on the perceptions (of costs and benefits) of the individual employee. Likewise, the individual decision-makers in industry have to be "placed under a microscope", and, as Vermeulen (1981) argues, training decisions have to be viewed in the context of overall staffing policies as well as in the context of business policies in general.

The face-value response to the question, "when and why do employers invest in training", is that they do so when they perceive benefits as exceeding costs: a return on investment, usually improving productivity and profitability. Sometimes it is less a question of training to maximize productivity, and more one of training to retain present productivity or maximize returns on it. Also, firms in certain contexts will train when it is not economically sound to do so: to "attach"



employees to the firm; to realize long-term benefits; to maintain control of an internal labour market; or because it may be a tradition of the company or industry. A weakness of human capital theory is that it assumes the training investment decision process is a rational one with individuals having all the information and knowledge necessary to make such decisions. In this sense, a phenomenological perspective should be taken, with emphasis on decision-makers' perceptions.

What precipitates a firm to invest in training? When it has a need for more human capital (quality or quantity) and cannot, or does not want to, acquire it by other more cost-effective means such as recruiting, promoting, reducing production, subcontracting, instituting overtime, etc. Even if some of these alternatives are available, for example reducing production, they are not healthy for the economy. Employers train in response to turnover, to utilize new equipment, techniques or technologies, to control their labour supply (i.e., retain employees), to improve employee performance and ultimately productivity, to improve job satisfaction, and to comply with government regulations (e.g., affirmative actions legislation and safety standards).

The most important aspect of the training-investment decision--because of the economic implications--is the perceived costs and benefits of training. This may seem like a simple statement, but in fact, not much is known about intangible costs and benefits, and the value of such are

perceived differently by individual firms (Kearsley and Compton, 1981). Further, as Woodall (1978) emphasizes, it is not just the costs of training, per se, that are informative, but how they are distributed among and absorbed by companies.

When discussing underinvestment in human capital on the part of industry, we have to consider when and why firms do not train and the inherent barriers and disincentives involved (Harvey, 1980; Betcherman, 1982). In small and medium-sized businesses the lack of economies of scale is a definite impediment. Traditionally, viable supply alternatives to training have existed--poaching from other firms, school graduates and immigrants--but these stocks are being depleted. The risk of not realizing a return on investment, due to turnover and ineffective training, is a deterrent to training. Training is also perceived to conflict with the production process: trainers or trainees have to be taken off the line, or learning interrupts the process (especially in the case of on-the-job training). Also, a lack of information concerning future company demand for skills and labour market supplies can delay a training decision; human resources planning is an integral part of any HRD strategy and requires more analysis in conjunction with training in industry. These are the kinds of barriers that governments use to justify their intervention in training in industry.

One last point is that the gross cost side of training seems to overshadow the net cost side (minus benefits) because

the benefits of training tend to be more difficult to measure, there is a controversy over what constitutes a "benefit", and company accounting systems are not set up to incorporate such benefits. This can result in a conservative attitude towards training.

It is important that research on employers' training decisions focus on perceptions, as well as reality. The intent and effect of government incentives, for example, could vary as a function of these. In other words, perhaps a "social reality" approach should be utilized in studying the phenomenon of training in industry. Understanding the economics of training is one thing; knowing how employers perceive the economics of training is another, as Ziderman suggests (1978).

### The Costs and Benefits of Training

As mentioned in the preceding section, it is important to consider how individuals in firms perceive costs and benefits of training. This section deals more with the evidence on actual costs and benefits of training in industry. As Betcherman (1982) found, "this [costs] is a subject on which no information is available, at least within the public domain" (p. 58). The Social Programs Evaluation Group (1983) concluded that the "majority of Canadian firms are unable to supply the pertinent information for a cost-benefit analysis of their training programs...(p. 84).

A major dichotomy in industry exists in how training is perceived. Traditionally, the prevailing concept of training has been as an operational "cost", part of the production costing. Far fewer business people view training as a concrete "investment" in human resources. The trend in business toward human resource accounting methods is growing (Harack Hayne et al., 1983). Any research that documents the specific costs and benefits--both tangible and intangible, short term and long term--will better inform us, and allow governments and industry to set training policy with more efficiency.

At the beginning of this paper the evidence on the macroeconomic value of studying training was discussed. Microeconomic data on training costs at the enterprise level is also required. More unambiguous information on training costs is needed, using consistent definitions and measures. Such analysis should address the issues of indirect costs, the distribution of costs, and how costs vary with the content, duration and method of training. Simpson (1983) specifies certain types of costs commonly not quantified: the cost of substandard quality of work by trainees; the proportion of supervisory labour costs and personnel management expenditures attributable to training; and the cost of capital equipment (e.g., classrooms, workshops, machinery) used in training. The Dodge Report (CEIC, 1981) suggests that an analysis of training costs should include research and development of

human resource accounting mechanisms and the provision of technical and methodological assistance to industry in the area of evaluation of and budgeting for training (i.e., seminars and consultations). Additionally, such an analysis should include an examination of how governments could most effectively offset some of firms' training costs. Finally, Betcherman (1982) suggests a particular strategy when studying industrial training costs:

In light of these difficulties [in measuring costs], perhaps a helpful approach for looking at this question of training costs is to consider separately packages of programs that are similar in terms of skill, method, duration, and accounting procedures (p. 60).

The most frequently discussed potential benefit of industrial training is the increase in productivity. In theory, training involves improving, qualitatively and/or quantitatively, the skills, knowledge or attitudes--and, in turn, performance--of workers and should therefore contribute to productivity gains. Unfortunately, not much empirical evidence of this sort exists. Barton (1982) asserts that not much hard evidence exists to link training positively with productivity and that there is a serious need for "more complete information on how different approaches and levels of training affect productivity, unit labour costs, job

satisfaction, and the like" (p. 109).

In a macroeconomic context, the work of Edward Denison and John Kendrick, as cited by Ginzberg and Volta (1981), has isolated a relationship between education and training, on one hand, and annual national productivity gains on the other. For example, of a factor productivity rate of 2.7% per year from 1948 to 1966, Kendrick attributes 0.6% (or three-tenths of 2.7) to education and training. For the period 1966 to 1977, he ascribed 0.7% of 1.3% productivity growth to education and training. Denison maintains that the increase in the aggregate educational attainment levels of American work force during the post-war era was the major factor in the unprecedented growth in the nation's gross national product. No such aggregate evidence for Canada is available.

In one of the few empirical studies on the relationship between training and productivity at the enterprise level, Medoff (1982c) found that formal training contributed to labour productivity in a select sample of the U.S. manufacturing sector of industry; and that "in-house" employer-sponsored training was associated with higher labour productivity than "out-of-house" employer-sponsored training. He concluded that "we must be able to ascertain the relationship between various training outputs and the inputs that go into producing these outputs" (p. 9).

A major problem in measuring productivity gains that temporally follow training is that a large portion of

employer-sponsored training is on-the-job and of an informal nature (i.e., not a "program", per se) and occurs in the form of a joint product. Most types of employer-sponsored training occur in the production setting and may be regarded as output produced concurrently with the goods of the companies in question. In this case it is difficult, if not impossible, to separate the costs of training from those of production.

### The Process of On-The-Job Training

The training process, itself, especially that called on-the-job, is not well understood or easily quantifiable. From the quantitative evidence on training, one can see that on-the-job training is by far the most prevalent form of employer-sponsored training. In spite of the term "on-the-job" seeming self-explanatory, what exactly does it mean operationally? How does one separate it from the production process? What is the operational difference between "structured" and "informal" on-the-job training? What is the relative (to other methods) effectiveness of on-the-job training? The majority of training by small firms is informal and on-the-job--more so than in large firms. How can small companies be encouraged to provide more formal training? What should the government's role be with regard to on-the-job training, as opposed to other types of training? In order to answer these questions, an empirical understanding of on-the-job training is required.

In one of the few studies on the subject, Newton (1976) compared the costs and benefits of institutional training and on-the-job training for the same occupation and suggested a reallocation of resources in favour of on-the-job training. At the same time, Currie, Coopers and Lybrand (1978) found that a lot of on-the-job training they studied was of a substandard quality. Often workers in the secondary or peripheral labour market are subject to poor quality, informal on-the-job training as their only form of development.

The point here is that the literature contains a lack of information on on-the-job training. There is little theoretical treatment of on-the-job training to build upon. Since it is a highly prevalent form of instruction, it should receive much more empirical attention.

### Training and Work Organization

Training within the firm is a complex and dynamic process. It occurs within a context of several interacting variables, and therefore has to be studied within this context. One important aspect of work, the content and organization of work--due to the changing nature of skills required in the workplace--has to be considered because of its implications for training.

The advent of the new technologies--biotechnology, fibre-optics, laser technology, microelectronics, and



robotics/automation technology--have, among other factors, produced significant changes in work content and the organization of production in both the office and factory. In turn, these changes have produced major implications for training needs. As an Organization for Economic Co-operation and Development (OECD) document (1982a) suggests:

...work content will be more influenced by high level technology, requiring considerable analytical and logical skills rather than physical dexterity and precision...A growing part of those in employment will be involved in the conception, planning, organization and control of work processes whilst its material execution will be increasingly transferred to machines (p. 2).

In light of this development, workers will have to possess a more flexible base of knowledge and skills and they will require access to training at different times throughout their careers to adapt to workplace changes. The OECD advocates research not only on the development of human resources, but also on the different modes of human resource utilization through work organization at the enterprise level. There is a choice with regard to how new technologies are implemented in the workplace and in how human resources are utilized in the new production processes. To this end the OECD (1982c) is pursuing the following objective:

...the CERI [Centre for Educational Research and Innovation] work will aim to enrich this by an empirical analysis of how the utilization of the education and training of human resources at the enterprise level is related to the functioning of education and training systems at the national level (p. 7).

The first phase of an OECD pilot study entitled The Development and Utilization of Human Resources in the Context of Technological Change and Industrial Restructuring has been completed involving five major automobile manufacturers in the world. The results have not yet been published.

Related to the work organization issue is the sociotechnical aspect of work life. The degree to which this perspective of human resource utilization is taken has direct implications for training and the organization of work. Wenig and Wolansky (1983) describe the sociotechnical approach as conceiving of workers as not just mere labourers, but as competent and creative human resources who possess the potential to increase productivity. Further, they assert that if workers are to realize this potential they must be trained both to perform their job functions and to achieve personal growth. Much has been said about the management technique of "quality circles" which originated in Japan and is constantly being adapted for use in organizations in North America. This

and other teamwork strategies (especially in the high technology sector) are becoming more widespread and have definite implications for the content, objectives and atmosphere of training in industry.

### Access to Employer-Sponsored Training

Based upon the overview presented earlier of the characteristics of employees participating in job-related training, the under representation of the low-skilled, minorities, women and older workers--many of which belong to the secondary or peripheral labour market--is very noticeable.

The question of equal opportunity or access to educational activities has been a "burning" issue in adult education, particularly if the idea of lifelong learning is to be realized. The problem is more acute in training in industry because there is the potential for more impediments than in publicly sponsored education. Whether or not an individual can take part in a training program may be a function of arbitrary management, union regulations, job classification, production needs, or organizational status. This is especially true in occupations that require strict government regulation, such as apprenticeships or licensed occupations.

The question of access to training relates to the efficiency versus equity issue. Private employers behave according to economic rationalism and, therefore, have a

tendency to select for training those individuals who they feel have the greatest potential to benefit from it: generally younger, well educated, middle-class male workers in white-collar occupations. Structurally disadvantaged members of the work force--women, youth, indigenous peoples and the disabled--enjoy far less access to jobs in the primary labour market and are relegated to so-called "job ghettos" involving clerical, manual and service functions characterized by low wages, poor working conditions, arbitrary management, low job security and minimal opportunity for advancement (Doeringer and Piore, 1971). Pacquet's (1983) findings on job training in Quebec support this assertion:

Executive, professional and managerial employees have much easier access to training than the unskilled employees at the other end of the organization who can be called the "rejected" of the training system. It would seem that establishment training tends to increase rather than reduce inequality in the work force and that discriminatory effects due to the characteristics of the establishments and their employees are cumulative.

(p. 75)

This negative experience with access to training tends to create negative attitudes towards learning and increases stratification within the labour force and society (e.g., Rubenson, 1980).

In adult vocational training a common complaint has been that the gap between educational "haves" and "have nots" is becoming larger: Most participants in adult education have participated before (American Society for Training and Development, 1982). In industry, according to a recent survey in the U.S. (Training, 1982), management and supervisory employees--those with the highest educational attainment levels--have the highest participation rates in employer-sponsored training.

The dynamics of the decision-making process in firms concerning who has access to training and who participates in it requires much more empirical investigation. This relates to a company's training policy and objectives, whether or not a union exists in the firm, how training needs are identified and followed up on, whether or not training is perceived in a positive light by employees, etc.

### Institutional versus Industrial Training

The activity of institutional training, particularly in technical-vocational subject matter--to what extent it exists, in what form, and how industry perceives it--has a direct effect on training in industry. The two do not exist in isolation from each other. Traditionally, in preparing individuals for the workforce there has been an informal division of labour: Institutions prepare people for "work" with emphasis on general, transferable competencies; and

industry prepares employees for "jobs" specific to an industry and employer. This is even more true today in that institutions train students in generic skills and core occupations and industry trains employees in more specialized skills. This distinction has recently become blurred, however.

If the institutional training system is not, or is perceived to be not, doing a good job at what it is supposed to be doing, there are important implications for employer-sponsored training. If the institutions are perceived as not addressing a need, industry may attempt to address it. Many surveys quote industry officials complaining that the public vocational education system is not responsive to their human resource needs; that it is not adequately preparing individuals for work. Specifically, industry thinks institutions should put more emphasis on training individuals in work attitudes, basic computational and communication skills and prerequisite job skills. Many corporate leaders emphasize the necessity for a new stress on far more basic skills. Work attitudes--showing up, being on time and getting along with co-workers--are among them. Less so are reading and writing (Newsweek, October 18, 1982, p. 91). Maguire (1981) suggest the emphasis should be on sound education and good work habits rather than narrow vocational skills: acquiring a solid base of information, learning to apply such information and acquiring new knowledge; being able to adapt

to a changing environment; analytical, expressive, communication and computational skills. Tjosvold et al.(1979) found similar sentiments in a survey of employer attitudes toward general education.

Another aspect of the relationship between institutional training and that in industry is the degree of cooperation or collaboration between the two. Many institutions, through industry services and continuing education departments, are delivering and planning employer-sponsored training. This is an effective strategy because it increases the responsiveness of the institutions to industry needs by applying flexibility (time, location, content), and by operating on a cost-recovery basis. Freeborne, according to Tjosvold et al. (1979), asserted that institutions have to prove four things to industry in order to be responsive: that the programs are relevant, that graduates have necessary skills; that the skills are basic and transferable; that placement records are impressive. If they do not, industry, themselves, may do more training in the "basics", or more remedial training. In a recent study by Eurich (1985) yet to be published, data was collected on the extent of corporate training in the U.S. and the researcher remarked at the extent of basic and remedial education in large corporations, and asked why they should be intruding in what has traditionally been the public educational sector's domain.

### The Impact of Public Policy on Employer-Sponsored Training

Government intervention in employer-sponsored training has been justified as an attempt to redress the sources of market failure that are perceived to produce an underinvestment in training leading to a suboptimal quality and quantity of human capital. This represents the "efficiency" rationale for intervention. Woodhall (1978) suggests other reasons for state involvement in training by firms:

- a desire to redistribute training opportunities among different social groups...;
- a desire to redistribute the costs of training among different firms, industries, or sectors of the economy;
- attempts to increase expenditure on training as a means of achieving the objectives of economic policy...;
- the need to overcome cyclical fluctuations in training...;
- providing unemployed workers with new skills to overcome structural unemployment...(p. 13).

Since the advent of the Adult Occupational Training Act of 1972 (AOTA), federal policy on employer-sponsored training was administered through the Canada Manpower Industrial Training Program (CMITP). In 1980, the Critical Trades Skills Training Program (CTST) was implemented to address extreme



skill shortage occupations. The National Training Act now covers the General Industrial Training Program (GIT), which will be phased out this year, and CTST. Both programs involve a reimbursement to employers for a portion of direct training costs as well as trainee wages for periods up to one and two years for the GIT and CTST programs, respectively. In 1983-84, \$130 million was spent on the two federal programs (CEIC, 1984). Provincial governments in most regions also provide wage subsidy programs for job creation and training in the private sector.

The most recent reviews of federal policy on occupational training have been by the Economic Council of Canada (ECC) (1982), the Parliamentary Task Force on Employment Opportunities for the '80s (Allmand, 1982); and the Dodge Report or Ministerial Task Force on Labour Market Development in the 1980s (CEIC, 1981). These studies focused on the inadequacies of the labour market and training systems at the time and offered several recommendations for changes to federal policy and the administration of it.

All three reports analysed the AOTA and identified weaknesses in it. The ECC and Dodge Reports saw it as having multiple objectives which impeded its efficiency: "The AOTA programs have tried to serve both efficiency and equity considerations; and, at least as far as market-oriented training is concerned, this has posed problems" (ECC, p. 84). The studies perceived the legislation as being too inflexible

to allow responses to changes in economic and educational needs (i.e., 52 weeks maximum training durations, funding restricted to middle and lower skill levels).

All three studies emphasized the lack of adequate labour market information on supplies of skills and valid occupational projections of demand in the federal system to achieve the goal of addressing labour market demands. The Dodge Report emphasizes that this was particularly true in the case of data on employer-sponsored training.

Parts of the Dodge and Allmand Reports focussed on the Canada Employment and Immigration Commission (CEIC) programs and services and identified several problems. They included: a large number of programs which users have difficulty tracking; a highly centralized administrative structure which does not allow for regional needs; an emphasis on quantity, as opposed to quality of programs and services; conflict between some federal and provincial programs; and a bad public image of CEIC programs and services (Allmand, 1981, pp. 54-56).

The studies all expressed a concern over the lack of effective and co-operative federal-provincial relations in planning and delivery of training and other manpower services.

The Dodge Report concluded that Canada's skills training system is not adequate for meeting future skill demands, but that the total public contribution to the training system is adequate to address the skill requirements of the 1980s.

A number of program-related problems in federal

industrial training policy was identified in these reviews. A large amount of government subsidies was directed at specific, minimal quality on-the-job training of short duration--training for which firms least require assistance (CEIC, 1981). The ECC report concluded that government assistance to industry for training was often directed at skills unrelated to labour market demands. The Allmand and Dodge Reports found that federal policy included an insufficient focus on the retraining of older workers and considerations for an overall recurrent education strategy. The authors of the Dodge Report also observed that federal programs for employer-sponsored training apportioned little of their funds to middle-level skill training (i.e., technicians and technologists).

In summary, these reviews of federal policy on training recommended better co-operation among business, labour and government in setting policy and objectives; better co-ordination between federal and provincial governments; the provision of more meaningful and timely labour market and training information; and the development of flexible and adaptable mechanisms for financing employer-sponsored training.

Following these reviews, the National Training Act of 1982 was proclaimed. This legislation led to a few immediate changes such as an increase in the maximum allowable period of funding (to two years), placing priority on nationally designated occupations, an absolute increase in the training

budget, etc. However, it remains to be seen whether this legislation and the new federal government will resolve some of the inadequacies identified here to provide more effective policy on training and, in turn, optimize the quantity and quality of employer-sponsored training.

In the U.S., the federal role in private sector training has been even more insignificant than in Canada. The Comprehensive Employment and Training Act of 1973 (CETA) created a myriad of programs directed at the employment and training of the disadvantaged, the minorities, and the "hard-core" unemployed. Stewart provides the following observation concerning the scope of federal policy in the U.S.:

There is the priority given in CETA to employability for the disadvantaged, with some secondary attention to skills training and job placement of more experienced unemployed workers. The focus is largely on jobs in the secondary labour market or on entry-level jobs in firms in the primary labour market. Training of employed adults, for skills enhancement and job promotion, is outside the scope of this major American labour market training program. (p. 60)

The Job Partnership Training Act of 1982 (JPTA) replaced CETA and, though it still focuses on the disadvantaged, it places more emphasis on the administration, planning and

delivery of programs by local employers. Each region organizes a local Private-Industry Council which has to be made up of at least 51% of its members from industry. Whether or not this legislation will produce more private sector involvement in federal programs and make for more and better training in the U.S. has not been determined to date. The CETA suffers from a bad reputation amongst private sector employers. As a recent editorial stated, "So what difference does any of this make to trainers in private industry, most of whom wouldn't touch any CETA-like program with a long stick" (Training, October 1983, p. 10).

#### Financing Mechanisms for Employer-Sponsored Training

What financial mechanisms are most effective in encouraging the best allocation of resources for training? What role should government play in this? These questions have to be answered to address the following fact: Firms which train bear an undue proportion of the total costs of training when those employees they have trained go to jobs in firms that have provided no training. From the perspective of business, this is the essential risk of training: losing the trained employee before the company can realize a return on investment.

The most-discussed alternative for financing training in Canada has been the levy-grant system. This arrangement provides, by law, for a compulsory levy on employers employing

those with transferable skills. The funds are paid back in the form of grants to those companies that provide training according to specified standards. The levy fund is collected, administered and dispensed by some public or central agency (e.g., Industry Training Boards). This system was first introduced in Britain by the Industrial Training Act of 1964 and has since been dismantled there. The aim of the levy-grant scheme is to increase the overall incidence of employer-sponsored training, at least in selective occupations or geographic areas, and to distribute the costs of training equitably among all companies, and in turn reduce the problems caused by "poaching" (i.e., somehow provide an incentive for non-training firms to provide training). Arguments against such a financing arrangement include that it is another form of taxation, that it creates further bureaucracy and regulation, and that it has relatively little support among the employer population (CEIC, 1981).

Adams (1980) proposes a variation of the levy-grant system called a levy-tax credit system. According to his proposal, firms would pay a training tax on payrolls and if they provided acceptable training they would receive a credit against corporate taxes for an amount equal to or greater than their training costs.

Another variation of levy-grant financing is for governments to contribute to a central employer levy-grant fund in an amount proportionate to private employer

contributions. A risk with this alternative is that government money may replace, rather than supplement, private investment in training.

Another financing arrangement, as practiced in France, is one in which firms are required to spend a certain amount, as a percentage of their annual payroll (e.g., 1.1% in France), on training or else pay that amount to the public treasury. West Germany had a law which gave the federal government the power to implement a levy-grant scheme when the amount of training is below a certain level. This law was subsequently repealed after it was declared unconstitutional in 1980 (OECD, 1982b).

As in Canada, government financing of training can be provided by direct subsidies from public funds for firms providing training. This arrangement does not distribute costs evenly among firms, and will not automatically induce firms to train. An alternative to this is for government to provide grants or project subsidies out of general revenue to be used by industry for establishing or upgrading training facilities.

More innovative options for financing training have recently been offered. One is to consider the direct support of individual workers by, for example, giving them "drawing rights" on a common fund (Levin and Schutze, 1983). The Canadian government has considered issuing educational or training vouchers to students and workers to "cash in" at

their discretion (CEIC, 1983).

There are some important questions concerning the relative effectiveness of each of these financing alternatives. First, though a given financing mechanism may distribute training costs more evenly across firms and industries, does it necessarily increase the overall quantity and quality of training in a given jurisdiction? Second, will the effect of government support for training be to increase the net amount of resources available, or will government funds only replace private resources? Last, will a mechanism that has been proven to be effective at one time be flexible enough to respond to changes in work content due to technological and other changes and still be effective?

Woodhall (1978) suggests several criteria for evaluating different methods of finance. These include whether they promote:

- adequate volume of training;
- satisfactory quality of training;
- equitable distribution of costs and benefits of training among government, employers and individuals;
- equitable distribution of costs among firms and industries;
- mobility of labour between different regions;
- adequate response to changing labour market conditions;



- participation in training by particular groups;
- greater parity of treatment for those receiving general education and vocational training.

As opposed to the regulation and delivery of training, the financing of it appears to hold the most promise for governments to promote the activity. The success of any public policy or program will be a function of the quality of its mechanisms for financing training.

### Summary

There are several other qualitative issues concerning employer-sponsored training. Those presented here were what the literature identifies as the most salient and important ones for study. This was not meant to be an exhaustive list of problems. All of these qualitative issues extend directly from and relate to the quantitative data presented earlier and, thus, provide a dual approach to the subject. After studying this review of the literature, one should see how the research questions extend from the data and issues presented.

### Research Questions

An earlier section discussed the merits of adopting a

descriptive, in-depth approach to studying the subject of employer-sponsored training in an attempt to provide an overall picture of training, and related issues, in one specific industry: the British Columbia electronics industry.

The main applications for such information are for directing public policy and informing industry and other interested parties. Several variables have been identified that require further study. The first obvious question relates to the present state of employer-sponsored training: What is the scope and what are the characteristics of this business activity? This would involve, as much as possible, factual data. The next variable involves the perceptions about and attitudes toward training and public policy on it that representatives of firms in the industry hold. Another important question, and as yet unanswered, involves the need for a thorough understanding of the training-investment decision-making process in industry. In other words, what factors, factual or perceived, determine whether a firm provides training in a given situation and what will be the nature of that training? Lastly, it is important to consider training in an overall human resource context: What creates the demand for training and what are the alternatives to training? These questions form the basis of this study.

The specific variables relating to the research questions will be discussed in more detail in the next chapter (Selection of Variables). The specific research questions for

the study were as follows:

1. What skills and knowledge does and will the B.C. electronics industry require?
2. How do and will firms in the B.C. electronics industry meet their human resource requirements (i.e., in addition to training)?
3. What is the nature and extent of employer-sponsored training in the B.C. electronics industry?
4. What are the characteristics and content of the decision-making process regarding investment in training by firms in the B.C. electronics industry?
5. What are the attitudes toward and experiences with the governments' role in employer-sponsored training held by representatives of firms in the B.C. electronics industry, and how might these affect the firms' future plans to participate in government programs, and be influenced by them in their training practices?

The intent of this study was to determine the incidence and characteristics of, and attitudes toward employer-sponsored training in the B.C. electronics industry, and to evaluate public policy directed at such training.

## CHAPTER III

### METHODOLOGY

A number of important quantitative and qualitative questions concerning employer-sponsored training were identified and applied to the British Columbia electronics industry. After a careful analysis of the variables, research questions were developed and a data collection instrument was constructed. A group of industry representatives reviewed a draft of the instrument and it was modified accordingly. A plan for data collection and analysis procedures was developed and a sample was selected. Finally, the data collection was implemented. This chapter outlines the instrument development, sample selection, data collection, response rate, and plan for data analysis.

#### Instrument Development

##### Selection of Variables

The review of the literature introduced several questions concerning the subject. The intent of this study was to provide a broad picture of training in one industry; but the length and scope of the data collection instrument had to be

within reason. The central focus of this inquiry was the incidence and nature of training in the electronics industry. Additionally, the training-investment decision and attitudes toward training and public policy on it were considered important qualitative issues. When considering training practices in an organization, it is essential to do so in the context of human resource practices in general. Training is definitely affected by the skill requirements of a firm as well as by the alternative supplies of human resources available to the company. Other important issues on the subject do exist, but time and resource restrictions, as well as the attentiveness of prospective survey respondents, limit the scope of the study. Therefore, data was collected on the variables represented by the research questions. All aspects of each variable could not be examined exhaustively because of the above constraints. An outline of the aspects of each variable that were considered will follow.

Human resource requirements. The demand for certain skills and competencies will obviously affect the degree and nature of training for a given firm. Therefore, quantitative data on the amount and type of skills required and reasons for this was collected. The specific questions asked related to:

1. The number and type of skills required in the present and future (projected);
2. The occupational structure of the organization;
3. How skill requirements are determined;

4. What events produce the demand for certain skills;
5. Changes in employee job content or work organization;
6. Problems resulting from unmet skill requirements.

Sources of human resources. A firm's willingness to provide, and hence the incidence of, training is directly affected by the alternatives to training available to it. Of particular interest are the external (to the firm) sources of human resources and external sources of human resource development available to the firm. Special emphasis was placed on companies' attitudes toward and utilization of public educational institutions as sources of human resources. The specific questions asked concerned:

1. The number and type of skilled persons recruited from post-secondary educational institutions;
2. The relative number and type of skilled persons recruited from institutions, unions, local and national labour markets, respectively;
3. The existence of firms' formal relationships with post-secondary educational institutions;
4. Firms' attitudes toward the quality, relevance and comprehensiveness of the curriculum in post-secondary educational institutions.

Nature and extent of training. "Training" was defined as "The systematic process of providing instruction to develop skills, knowledge and attitudes in an individual to enable him/her to perform adequately a given task or job."

"Employer-sponsored training" was defined as "The process of training in skills, knowledge and attitudes which are related to an employee's present, or soon-to-be job, and which is financed by the employer; regardless of where the instruction occurs, of who delivers it, or of the skills/occupations involved." At the core of this study was the intent to determine the present state of training in the electronics industry (B.C.). Therefore, the following information was solicited concerning the nature and extent of training in industry:

1. Whether any training had been financed in the last twelve months;
2. The total amount spent on any such training;
3. The occupations of those participating in the training;
4. The content of the training;
5. The methods utilized to conduct the training;
6. The duration of training;
7. The number of employees participating in the training;
8. Who delivered the training;
9. Whether any other human resource development programs, in addition to training, exist in the firm;
10. Whether the nature or extent of the firm's training has changed over the last three years and the reasons for this;

11. Whether changes in the nature or extent of the firm's training are expected over the next three years.

Training-investment decision. Any information that will inform us about the variables that influence how and why individuals in firms decide whether to train will impact on public policy initiatives, as well as "rationalize" a rather secretive process. This section also addresses firms' attitudes toward training. The decision-making process (and factors that affect it) as well as company attitudes, were considered in terms of the following items in the data collection instrument:

1. The existence and nature of training policy within the firm;
2. The existence and nature of a training budget within the firm;
3. The relationship between training decision-making and overall business planning and decision-making;
4. The criteria used for costing training;
5. The individuals (titles) involved in the training decision-making and their respective roles in it;
6. The events that precipitate training in a firm;
7. The determination as to whether the decision to train/not train varies, and how it varies with the portability of skills in question (i.e., general versus specific);
8. The determination and methods for systematically



identifying training needs in a firm;

9. The method(s) of selecting employees for participation in training programs;
10. The perceived deterrents to a firm's investment in training;
11. The effects of unions and collective agreements on the decisions concerning training.

Public policy on Employer-Sponsored Training. Obviously the attitude toward and experiences with government training programs and policy of decision-makers in industry will determine, in part, the effectiveness of any government and company collaboration in public programs. Therefore, the data collection instrument included questions on:

1. The role(s) government should play concerning employer-sponsored training;
2. The specific government financing mechanisms, if any, for employer-sponsored training that are most attractive to firms and the reasons for this;
3. The kinds of training (i.e., methods, occupations, skills) government should support and why;
4. The companies' experiences with government training programs and the extent of their utilization of such;
5. The positive and negative attributes of government training programs.

As part of the data collection instrument, a section on company background information was included. It included

basic demographic information such as:

1. The size of the company (number of employees);
2. The geographic location of it;
3. The number of years it has been in operation;
4. The business activities the company was involved in and the technology it utilized;
5. The question of whether a union or employee association represented the company's employees.

#### Questionnaire Development

It was determined that a questionnaire was the only practical method of collecting the data, given the scope of the variables and the time and resource constraints of the study.

The items in the questionnaire were designed specifically for this study. The style and intent of a few questions were borrowed from studies by Harvey (1980), Betcherman (1982) and the Social Programs Evaluation Group (1983). Certain suggestions from the literature regarding the development of questionnaires were followed. As suggested by Oppenheim (1966) and Sudman and Bradburn (1982) the questionnaire began with simple factual questions. The first half of the questionnaire used in this study was mostly quantitative, involving "Yes/No", numbers and proportions. The last half was largely attitudinal, involving attitudes toward, perceptions about, and observations on training and public policy. Berdie and

Anderson (1974) suggest that a questionnaire should begin with a few interesting and non-threatening questions and avoid ending with the most important questions. The most difficult and potentially threatening, as well as the most important, questions were in the middle third of the questionnaire used in this study.

Sudman and Bradburn's suggestions concerning the proper and effective formatting of the questionnaire were followed: a title page, with instructions and for identification; designed and produced on a letter-quality word processor; a clear and logical numbering and sequence to questions and sections; branching of responses; adequate room for responses; a glossary of terms; and a "Thank you, very much!"

To address ethical concerns and meet University of British Columbia requirements for research on human subjects, the questionnaire included a covering letter with title page outlining the purpose of the study, its potential benefits, the procedures for completing and the returning the questionnaire, an explanation of anonymity of the study, the requirement of their consent, and time requirements for participation.

The overall length of the questionnaire was of concern, particularly considering the designated respondents--high level management and executives of firms in a growth industry with very little time to devote to such matters (of relatively low priority). After consultation with representatives of the

industry, it was decided to retain the length (15 pages). As Sudman and Bradburn (1982) suggest, "on highly salient topics and with well-educated respondents, questionnaires of twelve to sixteen pages are possible without serious losses of co-operation" (p. 227).

### Pilot Study

The original draft of the study was circulated and discussed with ten individuals representing government and firms in the industry. This included discussions with a representative of the Electronic Manufacturers' Association of British Columbia (EMABC) who endorsed the idea (see Appendix A). A pilot study, per se, was not conducted because of time constraints. A draft questionnaire was circulated to and reviewed by six individuals from industry (see Appendix B). These individuals were asked to provide specific feedback concerning the data collection method; the content, format, scope and length of the questionnaire; and sampling procedures. Upon receipt of their valuable input, the questionnaire was shortened and modified accordingly.

### Survey Sample

The electronics industry was defined, for the purposes of this study, as encompassing those firms whose primary activity

entails one or more of manufacturing, engineering and design, research and development, and/or servicing of electronic components, equipment or systems. This definition did not include those firms primarily involved in sales, distribution of electronics or software development.

### Selection of Sample

A database of electronics firms in British Columbia was compiled from a combination of three sources: the Electronic Manufacturers' Association of British Columbia Directory: 1983-84 (EMABC, 1984a); a list of Electrical/Electronics Companies in B.C. (Ministry of Industry and Small Business Development, 1984a); and the British Columbia Manufacturers' Directory: 1984 (Ministry of Industry and Small Business Development, 1984b). Ministry and Association officials estimated that the database would account for approximately 95% of all electronics companies in B.C.

In contrast to most other Canadian and American surveys of training, it was decided to include smaller firms in the sample for reasons discussed earlier. Most recent and projected employment growth has and will occur in businesses with less than 50 employees (Vancouver Sun, February 28, 1985). Additionally, many smaller firms who presently cannot apply the economies of scale to provide or sponsor much training are growing (particularly for the industry in question), and will soon be forced to consider training as a

matter of survival.

From the compiled database of electronics firms, all known firms with 10 or more employees were selected. This amounted to 75 businesses. As well, five firms with less than 10 employees were randomly selected for the sample. The latter group was included to allow for a possible comparison between firms of that size and larger ones. The total sample size was 80.

#### The B. C. Electronics Industry

There is very little data available on the British Columbia electronics industry, per se. What little information that is available is scattered throughout government documents. For example, Statistics Canada collects and analyses industrial data by industry according to the Standard Industrial Classification (SIC). Most of the electronics industry firms would be considered part of the "manufacturing" industry SIC designation. Under this heading companies in the electronics industry would fall under one of the following SIC categories: "miscellaneous machine and equipment manufacturers" (315), "office and store machine manufacturers" (318), "communications equipment manufacturers" (335), etc.

One of the best sources of information specifically on the B. C. electronics industry is the industry's Association, itself: the Electronic Manufacturers' Association of British Columbia (EMABC). The Association's membership accounts for

approximately 85 to 90% of all electronics firms in B. C.

According to an EMABC news release (EMABC, 1984b) on the results of a recent membership survey, the industry has experienced substantial growth in the last few years and is projected to continue doing so in terms of sales, exporting, employment and assets. Table 2 summarizes these figures. The gross sales for the membership was estimated at almost \$470 million, an increase of 11.5% over 1983. For the manufacturing sector of the membership (as opposed to distributors and those providing consulting and other services) the increase in sales over 1983 was 23%. The gross sales for 1985 were forecasted at over \$640 million, an increase of 35% overall. Export sales, as a percentage of overall sales, grew from 23% in 1983 to 41% in 1984, and were projected to grow to 48% of total sales in 1985. Employment grew a little (3.7%) over 1983, but is forecasted to jump 24% by the end of 1985.

EMABC President, Bill Chester, summarizes his industry's growth: "Our industry's sales figures may now have topped the commercial fishing industry in terms of fiscal activity contributing to the provincial economy, and we expect sustained growth for 1985" (EMABC, 1984b).

One need only study recent business and professional magazines and newspaper and television copy to see the amount of growth and activity in the B. C. and Canadian electronic industries. This sector is partly leading the way in

Table 2

EMABC 1984 Membership Survey Summary and Projections

	1983	1984	1985
Gross sales	\$420,660	\$468,895	\$641,866
Sales distribution(000's)			
Canada	\$323,310(77%)	\$275,335(59%)	\$331,295(52%)
Export	97,350(23%)	193,560(41%)	310,571(48%)
Employment(Persons)	4,659	4,833	5,993
Gross assets(000's)	\$180,505	\$248,627	\$221,865

Note. From "1984 Membership Survey Summary and Projections" by Electronic Manufacturers' Association of British Columbia, 1984. Adapted by permission.

increasing international trade and exploiting new markets. As Chester states, "B. C. already has some companies that lead in their particular technology in the world, and some outstanding international product successes" (EMABC, 1984b).

Response Rate

In a sample of this nature it is difficult to determine whether the responding firms differ significantly from non-responding firms. The time and resource constraints of this study did not allow for a secondary study to determine whether any such differences exist.

For a questionnaire of this nature and length, a response



rate of 60% is deemed quite satisfactory. All questionnaires not returned were followed up. The reasons given for refusal to participate in the survey can be categorized as follows:

1. Those individuals contacted that indicated during the follow up they were too busy to respond.
2. The appropriate individual was not available to respond during the data collection period.
3. Some persons declined to respond to the survey because they felt it was "a waste of time", "a low priority", etc.

Of main interest would be the differences, between respondents and non-respondents, in size (number of employees), age (years of operation), their human resource requirements, and whether they have recently financed employee training. A quick estimation of the size of non-responding companies was performed by referring to industrial directories and by telephone contact. The estimated mean number of employees per firm for the twenty non-respondents sampled was 47.7. This is just a little smaller than the mean size (53.3) for responding companies when the largest firm (900 employees) was not included.

Nevertheless, because of the relative lack of available data of non-respondents, one cannot say with absolute confidence that the respondents as a group are totally representative of the target population. The respondents may

be more interested in training and related issues and/or they may finance more employee training.

### Procedures

In the middle of October 1984 a circular was sent to all EMABC members outlining the research project and asking them to participate in the survey (see Appendix C).

A fifteen-page open-ended and closed questionnaire, including an identification and instruction sheet and glossary of terms (see Appendix D), was mailed to 80 companies during the first week of November, 1984. The front of the questionnaire included instructions for completing the questionnaire, references to the anonymity and consent of the respondent, and spaces for identification and coding. The glossary located at the end of the questionnaire defined terms contained in the questions ("training," "human resource development", etc.). The mailed package included two copies of the questionnaire, a covering letter (see Appendix E), and a self-addressed, stamped envelope. The covering letter introduced the topic, the purpose of the study, the potential benefits to the industry and others, etc. The packages were addressed to specific individuals with their respective titles. The most senior person responsible for human resource matters was sought. The individuals included senior executives, managers, human resource staff. The name, title,

address of each person was confirmed by telephone before packages were mailed.

Beginning the first week of December, 1984, a series of follow ups on questionnaires not returned was initiated. The initial deadline for return of the questionnaire was November 30, 1984, but this was quickly changed. The follow ups were conducted during the following periods:

First follow-up - December 3 to 7

Second follow-up - January 7 to 11

Third follow-up - February 11 to 15

Last follow-up - February 25 to March 1

Once a person indicated an unwillingness to respond to the survey, no further follow-ups were conducted for that company.

On March 1, 1985, "Thank You" letters were sent to all respondents and those individuals that assisted in the planning of the survey (see Appendix F).

### Data Analysis Strategy

Data analysis is obviously constrained by the type of measurement used in collecting research data. Almost all the data collected via the questionnaire in this study was nominal; very little was ordinal or interval data.

The first step in the data analysis will be to summarize the questionnaire responses in terms of frequency distributions and measures of central tendency (mostly the

mean and median).

In addition to a descriptive presentation of the data, the analysis will examine possible relationships between variables. Since much of the data is nominal, sets of data were compared as frequencies in two or more categories. The statistical test usually employed for examining such data is the chi-square statistic. Its application for purposes of this study was for testing independence or determining whether two variables are statistically independent. Possible relationships between variables within each of the research questions--those of interest in the context of the purpose of this study and emanating from the literature--will be explored using the chi-square statistic.

As the chi-square statistic does not measure the degree of any relationship, whenever possible the Pearson product moment correlation coefficient will be used to examine the data as paired sets of scores. As an alternative, the Spearman rank difference correlational technique will be used to measure the degree of association between pairs of ranked data.

## CHAPTER IV

## RESULTS

The main intent of this study was to provide an overall understanding of the characteristics of and issues related to employer-sponsored training in the British Columbia electronics industry. Implicit in this aim was to also identify any relationships between the significant variables contained in the research questions. These objectives dictated the methods of analyses of data that were used. The majority of this chapter will entail a descriptive presentation of the survey results. This will involve the use of measures of central tendency, frequency distributions and percentages. The descriptive analysis will be followed by the statistical analysis of relationships between variables implicit in the research questions. This will involve the use of the chi-square statistic to test for the independence between variables and the Product moment correlation coefficients whenever possible, calculating the degree of association between variables. A discussion of the survey results, in light of these statistics, will follow in the next chapter.

### Respondent Characteristics

Basic demographic information about the responding companies was collected on the survey questionnaire. Sixty percent or 48 of 80 companies responded to the survey. All firms responded to the questions in this section of the questionnaire. (It should be noted here that not all companies responded to all questions. With the exception of a few instances, the response rate for each questionnaire item ranged from 87.5 to 100%. The exceptions will be noted accordingly. Percentages given reflect the proportion of only those firms responding to a particular question.)

The companies ranged in size from three employees to 900. The mean number of full-time employees per firm was 71.0. If the largest company with 900 employees is not included, the mean is 53.3 employees per firm. Table 3 shows the distribution of firms by size. Sixty-seven percent of the firms employed less than 50 employees. In such a skewed distribution, the median is a more revealing measure of central tendency. The median number of employees per company was 33 for this distribution.

When the sample was first selected, only five firms with less than 10 employees were included. The reason for more than this number being reported by respondents is that some firms have recently adjusted their complement of staff downward.

Table 3

Number of Full-time Employees Per Firm

Number of Employees	Number of Firms	Percent of All Firms
1-4	1	2.0
5-9	8	16.7
10-19	13	27.0
20-49	10	20.8
50-99	9	18.7
100-199	3	6.2
200-499	3	6.2
500+	1	2.0
Total	48	100.0

Establishment Age

The firms surveyed had been in operation an average of 11.5 years, ranging from eight months to 100 years (See Table 4). The median age was nine years.

Forty-two percent of companies surveyed had been in business five years or less, while 18.6% had been in operation more than 20 years.

Geographic Location

Geographically, the firms in the sample were concentrated in the Lower Mainland of B. C., particularly in Vancouver (31%), Burnaby (18%) and Richmond (16%). Eleven percent of the respondents were located on Vancouver Island and no company was located outside of the Vancouver Island - Lower Mainland region.

Table 4

Number of Years in Operation Per Firm


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Number of Years in Operation	Number of Firms	Percent of All Firms
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Less than 1 year	1	2.0
1-5	19	39.5
6-10	9	18.7
11-20	10	20.8
21-50	7	14.5
50+	2	4.1
Total	48	100.0

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Union Representation

Fourteen percent of the companies surveyed employed workers represented by a union or an employee association. This amounted to 12.1% of all employees in surveyed firms. According to 1983 figures, 46.1% of all paid workers in British Columbia belonged to a union or employee association (Ministry of Labour, 1983). Therefore, that portion of the electronics industry represented in this sample includes a relatively low degree of unionization. This is probably partially a function of the small company size, the low number of years in operation and the high proportion of professional/technical and sales personnel in the industry.

Corporate Location

Eighty-eight percent of the companies were local,



autonomous operations or head offices with branch offices in the rest of B. C. and/or Canada. The balance represented branch offices or subsidiaries with headquarters in or outside Canada.

### Business Activity

Based upon the activities of those companies responding to the survey, the industry represents a diverse array of services. Table 5 summarizes the type of business activities firms were involved in.

Table 5

### Business Activities of Firms

Business Activity	Percent of All Firms
Manufacturing	77.2
Research and Development	65.9
Sales/Distribution	65.9
Engineering	56.8
Service/Repair	56.8
	(n=48)

### Product Technology

The recent increase in telecommunications and digital electronics activities is reflected in the type of technology involved in products respondents developed, made, or sold.

Table 6 shows that 68.1% and 43.2% of the companies utilized microprocessor/control electronics and telecommunications technology, respectively.

Table 6

Product Technology of Firms

Type of Technology	Percent of All Firms
Microprocessor/control electronics	68.1
Telecommunications	43.2
Microelectronics	22.7
Instrumentation/process control	22.7
Power electronics	15.3
Robotics	11.3
Electrical	9.1
	(n=48)

Financial Information

Companies were also asked to specify their latest annual revenue and asset figures if possible. Twenty firms reported a mean gross annual revenue of \$4.53 million and 11 companies reported a mean asset value of \$738,000.

Human Resource Requirements

What skills and knowledge does the B. C. electronics industry require presently and in the near future? The

existence and nature of skill requirements in a given company are obviously factors that may affect the propensity of a firm to finance training.

### Occupational Category

The respondents were first asked to describe the composition of their present skill inventory. Responding firms employed a total of approximately 3,400 people. Thirty-eight percent of these were in the professional/technical occupational category, with a mean of 20.4 such employees per firm (see Table 7). This group is made up mostly of engineers, scientists, accountants, technologists and technicians. The next largest categories of employees were office/clerical workers (14.3% of all employees or a mean of 7.6 per firm); and skilled trades (13.2% or 7.0). The balance of employees were spread relatively evenly among the unskilled/labouring, managerial, supervisory and sales/marketing categories. Apprentice positions accounted for only 0.4% of the sample's workforce or 0.2 employees per firm. This corresponds to statistics which show a low apprenticeship training rate (all industries) in Canada relative to other countries (Reubens, 1979).

### Unmet Skill Requirements

Forty-four percent of companies surveyed indicated they currently have unmet skill requirements. These requirements

Table 7

Employee Composition by Occupational Category

Occupational Category	Mean Number of Employees per Firm	Percentage of Employees per Firm
Professional/Technical	20.4	38.4
Office/Clerical	7.6	14.4
Skilled Trades	7.0	13.2
Unskilled/Labouring	5.1	9.5
Managerial	4.7	8.9
Supervisory	4.3	8.1
Sales/Marketing	3.8	7.1
Apprentice	0.2	0.4
Total	57.7 <sup>a</sup> (n=46)	100.0

Note.

<sup>a</sup> This does not include the largest firm or one other company, neither of whom specified the numbers of employees by occupational category.

reflected the need for 54 to 58 skilled personnel (2.94 per firm experiencing skill shortages). Seventy-six percent of these vacancies were for occupations in the professional/technical category. The balance fell into the sales/marketing and managerial occupational categories. The professional/technical skills required were mainly electrical and electronic engineers and technologists relating to specialized areas such as RF circuit design, acoustics, robotics, signal processing, etc.

The respondents were asked what the reasons were for the unmet skill requirements. Of those firms with such needs, 56% indicated the shortfall was simply due to the lack of qualified personnel available in the B. C. labour market. Eighteen percent of those responding to this question stated that, though the skilled personnel were available, their companies' cash flow restrictions prevented them from hiring. The same proportion of firms had just identified their unmet need and were in the process of addressing it; and twelve percent indicated that there was little or no training available in B. C. for the skills they required (e.g., quality control technology, RF circuit design). A few companies reported the lack of sales/marketing and management personnel with "hi-tech" experience. One company official observed that there was a lack of qualified technical people--in their case, senior software engineers--with experience in large (5000+ mandays) projects.

Respondents were asked to indicate their firms' response(s) to skill shortages. These are summarized in Table 8.

#### Production/Operational Problems

The companies that reported skill shortages were asked if their firms had "experienced any production/operational problems as a result of these shortages." Fifty-two percent of such firms responded affirmatively. Twenty-six percent of

Table 8

Firms' Responses to Skill Shortages


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Response	Percentage of Firms Responding
Provided in-house training	73.9
Recruited	52.1
Subcontracted	43.4
Invoked overtime	39.1
Curtailed production	8.6
Reduced qualifications	8.6
Overloaded others	8.6
	(n=26)

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companies with unmet skill requirements reported that their new product development, company expansion or specific project schedules were delayed. Fifteen percent of such companies reported specific operational inefficiencies resulting from the lack of people with certain skills. A company indicated it had difficulty in instituting a quality control program due to the lack of available qualified personnel. One company respondent stated that "incorrect and/or inappropriate parts [were] used in production due to lack of knowledge of same."

Another firm reported cost overruns due to unmet skill requirements. Still another company experienced an "inability to react to changes in technology with new, improved products."

Firms generally observed that it is difficult to manage

staffing requirements in this industry because of the sudden shifts in demand for specialized skills.

### Future Skill Requirements

The responding companies were asked two questions concerning future projections. First, they were asked to indicate whether or not the firm anticipated any problems in hiring personnel required over the next three years. Sixty-six percent of the respondents anticipated no problems in this regard. For the 34% of firms expecting this to be a problem, the projected shortages related mainly to hardware and software engineers, sales/marketing personnel, and specialized areas such as fibre-optics, laser technology and RF circuit design.

In the second question, companies were asked if they had any specific business plans that would directly or indirectly affect their demand for certain skills. Seventy percent of the firms answered "yes". A few of these businesses did not specify their plans for proprietary reasons, but of those that did, their responses related to the application of digital electronic techniques to their products, the development of new, more sophisticated products (e.g., data communications), or the improvement of manufacturing processes (e.g. computer-aided manufacturing, surface mount technology). One company cited the conversion of manual to computer-aided design (CAD) of microelectronic circuits as an example of an activity affecting the demand for certain skills.

### Human Resource Planning

Related to any discussion of skill requirements is the subject of human resource planning (HRP) practices. In the "Human Resource Requirements" section of the questionnaire, survey participants were asked about the existence and nature of their HRP practices. Twenty-three percent of respondents reported that they conduct formal HRP. The demand for and supply of skills in these companies were projected for a period ranging from six months to five years. Of those responding, 18.6% forecasted supply and demand for six to 12 months. An equal proportion of different companies formally integrate their HRP with strategic business planning, often in the context of budget forecasting and project scheduling. Only 4.6% of surveyed companies conducted HRP for all categories of employees. The balance of companies that conduct HRP did so mainly for sales, professional and technical occupations. Some 13.9% of all respondents indicated they relied on external sources of data--such as private consultants, government studies and/or statistics, market research, and subscribed reports--to project demand for various skills.

### Work Organization and Content

The companies were asked about the overall organization of work, work content and changes in the like. First, they were asked to indicate if, and in what ways, their employees, as a



rule, "perform specialized tasks with definite divisions of labour between each other or [if] there is a lot of overlap between jobs." Overall, the responses leaned toward varying degrees of overlap among staff responsibilities. Forty-five percent of the firms that responded to the question indicated anywhere from a little--employees are encouraged to know at least one other person's job function--to a high degree of overlap among all employees or among all employees in a given department of a company. Twenty-one percent of the firms indicated a combination of overlap and job specialization mostly as a function of occupational category. In most cases, the production or operations units in the companies--involving assembly, testing, service, machine operations, etc.--contain a high degree of task specialization. Relatively more overlap was reported for managerial, engineering, research, and administrative functions. Thirty-three percent of respondents reported a significant degree of specialization in the way work was organized and performed.

Many of the firms that reported one extreme or the other in work organization indicated specific exceptions to the rule. Therefore, it is difficult to speak in absolute terms, one way or the other. The degree of overlap or specialization seems to be a function of the type of job tasks and business activities involved. Implicit in the firms' responses was that this dichotomy (overlap versus specialization) is transitory and changes according to the content of projects

and products in progress as well as changing with time according to the growth pattern of the company. Obviously, in the very small business, employees experience relatively more overlap among their functions. The possible relationships between size of firm and the degree of overlap/specialization will be explored in the Statistical Analysis section.

The change in the nature of work in the companies surveyed was the subject of the second question in this area. Firms were asked whether their employees had experienced any changes in their job content over the last three years and about the nature of such changes. Fifty-seven percent of responding companies answered affirmatively. Companies' new products, new technology (e.g., automation and computers), and increased frequency of research and development were responsible for the greater incidence of job specialization, task complexity, changes in job responsibilities, formalization of procedures and, generally, a greater need for adaptability in the workplace.

### External Sources of Human Resources

How do and will firms in the B. C. electronics industry meet their human resource requirements? The degree to which firms utilize means other than training will directly affect a company's propensity to sponsor training for its employees. The questions in this section of the questionnaire attempted

to determine firms' external sources of human resources with particular emphasis on the public post-secondary educational system.

### Sources

Respondents were asked to specify the relative degree to which they relied on various sources of skilled workers. They assigned a proportion (out of 100%) to each of the following potential sources: educational institutions; the local labour market; the national labour market (excluding B. C.); other firms; sources from outside Canada; and unions. Table 9 shows the mean proportions assigned to the potential sources of skilled/qualified labour.

The alternative sources were mutually exclusive. In other words, the local labour market, for example, did not include immediate graduates of institutions or those in other firms. The largest sources of human resources were from the local labour market (45.6%) and educational institutions (33.1%). Very few were drawn from unions (2.6%), partly because of the small degree of unionization in the industry, or from locations outside B. C.: 4.2% from the national labour market and 2.3% from outside Canada.

### Post-Secondary Educational Institutions

The rest of this section of the questionnaire concerned the prevalence of recruiting from the various post-secondary

Table 9

Relative Utilization of Sources of Human Resources

Source	Mean Percentage Per Firm of Total Number of Employees Recruited
Local labour market	45.6
Educational institutions	33.1
Other firms	12.8
National labour market	4.2
Unions	2.6
Outside Canada	2.3
Total	100.0 (n=46)

education levels. Ninety-seven percent of the companies surveyed indicated that they recruit post-secondary graduates. Of these firms, 97% recruited from technical institutes: 71.4% "frequently" and 26.1% "seldom". Table 10 also shows that 92.8% of the firms recruited university graduates: 57.1% frequently and 35.7% seldom. Respondents reported a relatively low incidence of recruiting from private schools, high schools and community colleges.

The responding companies also indicated the types of disciplines from which they recruit graduates, by type of institution. As Table 11 indicates the disciplines most frequently recruited from were electrical engineering (90.4%) and electrical/electronics engineering technologies (73.8%).

Table 10

Prevalence of Recruiting by Type of institution

Type of Institution	Percentage of Firms That Recruit:		
	Frequently	Seldomly	Any
Technical Institutes	71.4	26.1	97.6
Universities	57.1	35.7	92.8
Vocational Schools	19.0	50.0	69.0
Community Colleges	7.1	35.7	42.0
High Schools	7.1	26.1	33.3
Private Schools	0.0	4.7	4.7
			(n=48)

Table 11

Disciplines From Which Graduates Were Recruited

Discipline	Percentage of All Firms	Type of Institution
Electrical Engineering	90.4	Universities
Electrical/Electronic Engineering Technologies	73.8	Technical Institutes
Electrical/Electronics Technician	26.1	Vocational/Technical Institutes
Computer Science	21.4	Universities
Business	11.9	Universities
Physical Sciences (Chemistry, Mathematics, Physics)	9.5	Universities
Mechanical Engineering/Engineering Technology	9.5	Universities/Technical Institutes
	(n=48)	

In terms of the appropriateness of programs relevant to their needs, 58.1% of the companies indicated the need for a greater emphasis on "practical" content within the curriculum (see Table 12). Fifty percent of the firms indicated more emphasis should be put on acquiring "social skills" in relevant post-secondary programs; while 23% of them wanted to see more program content relating to "basic" skills.

Sixty-five percent of firms rated their overall satisfaction with full-time post-secondary educational programs relevant to their needs as "good; and 14% rated them as "excellent". No company rated the relevant programs as "poor".

Table 12

Appropriateness of Relevant Post-Secondary Curriculum

Type of Program Content	Percentage of Firms Stating:		
	More is Needed	It is Adequate	Less is Needed
Theory	14.2	83.3	2.3
Practical	58.1	39.5	2.3
Basic Skills	23.2	76.7	0.0
Social Skills	50.0	50.0	0.0

(n=46)

Relationships with Post-Secondary Institutions

The companies were asked to identify their satisfaction with and the extent of any relationship they have with

post-secondary educational institutions. Fifty-nine percent of respondents reported an established relationship with at least one institution. Of these companies, 26% and 35.7% indicated the relationships were "excellent" and "good", respectively. Seventy-three percent of the businesses stated that they had "collaborated" in human resource programs with post-secondary institutions. Seventy-five percent of these firms had co-operative education/internship programs; 31.8% represented advisory committee membership; and 29.5% participated in offering work experience for students in short term (unpaid) practicums. Thirteen percent of respondents loaned their facilities or resources for use by institutions, and the same proportion of firms provided training services to educational institutions. Some companies gave cash donations and equipment donations, 6.8% and 9.1% respectively.

Survey participants were asked if there should be a definite division of labour between industry and institutions for the delivery of education and training. Of the 34 firms responding to the question 81% answered "no." Twelve firms indicated they did not understand the question. The balance of companies expressed the idea that institutions should provide the general education--basic theory and skills--and that industry should provide the specific skills training and practical work experience.

#### Suggested Changes to the System

The respondents were asked to suggest specific changes

that should be made to the post-secondary educational system in B. C. in order that it more effectively and efficiently meet their needs. The responses related to one or more of the following suggestions, in order of frequency, concerning the need for:

- more co-operative education and work experience programs as components of students' education to allow for the application of what they have learned at school and to expose them to the workplace environment before graduation;

- more practical, "hands-on" approaches to curriculum content in technical and professional disciplines;

- post-secondary curriculum to include an emphasis on learning basic communication skills (interpersonal and written);

- program content to be more relevant to the industry's technical needs (i.e. some specialized areas);

- the need for more state-of-the-art equipment and processes to be used and studied in schools; and

- more effective and frequent interaction between representatives of companies and institutions.

### Nature and Extent of Training

What is the nature and extent of employer-sponsored training in the British Columbia electronics industry? The answers to this question represent the central aim of this study.



### Overall Incidence of Training

A significant proportion of firms surveyed reported at least some training. Seventy percent of them indicated they had sponsored (financed) job-related training for their employees in the last twelve-month period for which they have records. Eighty percent of such companies (or 57% of all respondents) provided more detailed information on training they sponsored. Table 13 summarizes the data the companies provided on overall figures.

Table 13

### Summary of Total Volume of Training

Data (For last documented 12-month period)	Mean (Median)	Range	
Number of employees participating in training per firm	15.3 (8.5)	1-100	(n=27)
Percentage of total employees per firm	33.7 (38.5)	3-60	(n=26)
Total training expenditures per firm (thousands) <sup>a</sup>	58.7 (15.6)	1-1000	(n=26)

#### Note.

<sup>a</sup> If the company which sponsored training worth approximately \$1 million was not included, the mean would be 17.7 and the range would be 1-121.

The end of the twelve-month period reported ranged from December 1983 to January 1985. Eighty-eight percent of the

companies that provided such information did so for periods ending between August 1984 and January 1985.

The firms that provided detailed information (57% of all respondents) financed training for an average of 15.3 employees per firm; or 8.3 per firm if all firms are included. The mean percentage of total employees per firm participating in training was 33%. One company financed training for 60% of its staff. The total training expenditures for the companies was \$1.52 million, an average of \$46,060 per firm of those that sponsored training; or \$31,600 per all firms. The mean training expenditure per firm was \$12,870 if the two largest spenders on training (approximately \$1 million and \$121,000, respectively) are not included; or \$8,600 per all firms. The median values for these three data are more useful to consider: 8.5 employees per firms sponsoring training; 38.5% of total employees per firms sponsoring trainees; and \$15,600 invested in training per firm. Tables 14 and 15 break these figures down further.

The ratio of training investment per employee can be calculated by dividing the total amount of funds spent on training by the total number of employees participating in training. If the largest training investor (in terms of dollars) is included, the investment/trainee rates was \$3,600; if it is not included in the calculation, the investment per trainee was \$1,440. The overall investment, including firms that did not indicate financed training, is estimated at \$127

Table 14

Number of Employees per Training Firm

Number of Employees Trained	Percentage of Firms Reporting Training
1-5	45.8
6-10	25.0
11-25	16.6
26-50	4.1
51-	8.3
Total	100.0 (n=26)

Table 15

Training Expenditures per Training Firm

Training Expenditures	Percentage of Firms Reporting Training
Less than \$5,000	33.3
\$5,000-10,000	20.8
\$10,001-50,000	33.3
\$50,001-	12.5
Total	100.0 (n=26)

per employee. In comparison, for all industries, Betcherman (1982) found the mean cost of training programs to be \$2,551 per trainee; and Lusterman (1977) and Zemke (1982) estimated

the ratio to be (of all employees, including those who did not participate in training) \$60 and \$90 per trainee, respectively. Table 16 shows the number of programs per "training" company.

Table 16

Number of Training Programs per Training Firm

Number of Training Programs	Percentage of Firms Reporting Training
1	16.0
2	20.0
3	12.0
4	16.0
5+	20.0
Total	100.0 (n=27)

The responding firms who financed training were asked to provide more details about the nature of their training. This information included the occupational category, job title, and number of trainees; the content, methods and duration of programs; and the source of delivery of programs.

Occupational Category

Table 17 summarizes the training programs financed by respondents by occupational category.

Table 17

Training Programs by Occupational Category

Occupational Category	Percentage of All Training Programs	Percentage of All Trainees	Percentage of All Firms Financing Training
Professional/Technical	28.7	37.7	76.9
Sales/Marketing	10.3	13.3	19.2
Skilled Trades	19.5	12.6	53.8
Managerial	12.6	12.0	38.4 <sup>a</sup>
Supervisory	8.0	9.5	7.6
Unskilled/Labouring	3.4	8.9	11.5
Office/Clerical	12.6	4.9	34.6
Apprentice	4.5	1.2	15.3
Total	100.0	100.0	N/A (n=28)

Note.

<sup>a</sup> For example, 38.4% of firms providing this information financed some training for employees in managerial occupations.

As the Table indicates, just under one-third (28.7%) of the training programs involved employees in professional/technical occupations. A significant proportion of the programs was for employees in skilled trades occupations (19.5%). Most of the balance of the programs were relatively equally distributed among employees in office/clerical and managerial occupations (12.6% each), sales/marketing occupations (10.3%), and supervisory occupations (8.0%). Those in unskilled labouring (3.4%) and

apprentice (4.5%) occupations received relatively little training. If one considers the percentage of all trainees, apprentice occupations fared even worse (1.2%); while professional/technical employees received even more representation (37.7%). Finally, 76.9% of companies financing training did so for professional/technical employees (or 52% of all respondents); and 53% financed training of employees in skilled trades (or 37% of all firms surveyed).

#### Job Title

Not all of the respondents clearly specified the job titles of employees participating in training. The unskilled/labouring positions were assembly, machine operation and labouring functions. The skilled trades involved mainly maintenance, electrical, mechanical, machinist and metalwork functions. Office/clerical workers participating in training were receptionists and secretaries, warehouse personnel, accounting and purchasing clerks and word processing/computer operators. Sales/marketing staff receiving training ranged from customer sales representatives and marketing analysts to technical sales persons. The most prevalent recipients of training, those in the professional/technical category, involved mostly technicians, technologists and engineers in hardware design, testing, quality control, and research and development; and software programming and systems design. A few trainees from this category were involved in mechanical engineering functions.

### Content of Training

Table 18 summarizes the specific content of the training programs financed by respondents. Companies surveyed included such information on 80% of the training programs. Most of the content (41%) related to technical subject matter. This included such topics as fibre optics, acoustics, signal processing, microprocessors, control systems, product knowledge, military specifications, quality control techniques, etc. Some of those companies specifying they financed technical training simply wrote "technical" in the content column. Eighteen percent of the training programs were for content related to production or operations in the firms: assembly, service, installation, testing, machine operation, etc.

Table 18

### Specific Content of Training Programs

Subject Matter	Percentage of All Programs
Technical	41.0
Operations	18.0
Computers	11.5
Management/Supervisory	11.5
Administrative	8.2
Sales/Marketing	4.9
Project Management	3.2
First Aid	1.6
Total	100.0 (n=26)

As shown, 11.5% of the programs involved the application of computers for computer-aided design, programming, operator training and word processing. The same proportion of programs was for training in management and supervisory skills.

### Methods of Training

The most prevalent method of training reported was formal off-the-job training (seminar, classroom, tutorial), which was used for 70% of the programs. The balance of programs were on-the-job. Informal on-the-job training represented 20% of the programs and formal on-the-job training accounted for 9% of them. One program involved the use of distance learning.

If we look at the method of training by distribution of employees, a different impression exists. 57.6% of the employees participating in training did so in programs utilizing on-the-job methods. Therefore, the ratio of employees per program is larger for the programs involving on-the-job training than those involving off-the-job methods.

### Duration of Training

Table 19 displays the distribution of training durations sponsored by responding firms.

Fifty-seven percent of the training programs were one week or less in length; and 82% of the programs were a duration of two months or less. The median duration of training was 4.2 days per program. Most of the training lasting more than



Table 19

Duration of Training


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Duration of Training Program	Percentage of All Firms Financing Training
Less than one week	41.1
One week to two months	41.1
Between two and 5 months	12.5
Greater than six months	5.3
Total	100.0 (n=26)

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three weeks was of an informal nature (85%), occurring on the job. This data is consistent with that found by Betcherman (1982) and Statistics Canada (1969).

Number of Employees

A mean of 4.7 employees per program participated in training financed by companies surveyed. Forty-five percent (see Table 20) of the programs involved one employee. Eighty-five percent of the training programs involved five or less employees.

Source of Delivery

Respondents were asked to specify the source of delivery of the training they sponsored. Fifty-two percent of these

Table 20

Number of Employees Per Training Program

Number of Employees in Program	Percentage of Total Programs	Cumulative Percentage
1	44.9	44.9
2	21.7	66.6
3	11.6	78.2
4	5.8	84.0
5	1.5	85.4
6-10	7.2	92.6
10-20	5.8	98.4
More than 20	1.5	100.0
Total	100.0	

training programs were delivered by the firm itself. The balance, of course, were delivered by external sources: 13% by schools; 11.5% by private consultants; 8.6% by manufacturers' representatives or suppliers; 5.7% by government agencies and 4.3% (each) by professional associations and private agencies.

Other HRD Programs

The companies were also asked if they had other human resource development (HRD) programs such as paid educational leave and tuition assistance. Seventy-three percent of respondents answered affirmatively. Sixty-two percent of all companies had some form of a tuition assistance scheme or policy for developing their employees. Most indicated such

assistance was conditional upon the courses being "job-related", "relevant to company needs", or "approved by the company". Some companies paid for the employees' courses in advance; others reimbursed them upon successful completion; and a few paid a percentage before and the balance upon successful completion. The assistance ranged from 50% to 100% (the majority) of course fees. No firms indicated any involvement with paid educational leave, although one firm reported that they would approve "education without pay for up to six months with no loss of seniority".

#### Changes in Training

The last part of this section of the questionnaire related to changes in the firms' training practices.

First, 39% of companies responding to the question indicated that the nature and/or extent of training had changed over the last three years. Fifty-six percent of these firms reported qualitative and/or quantitative improvements in training (increases in training expenditures, more commitment toward training, "greater recognition of the value of training", and new types and longer durations of training.) Many companies observed how changes in technology have precipitated growth in training. Only 12.5% of those companies that reported a change in training indicated a decrease in volume of and/or expenditures on training.

Companies were also asked to project if they expected any

changes in their training during the next three year period. Forty-one percent of firms surveyed expected differences in their training in the near future. They cited new training methods, formalization of training, specialized technical training and enhanced training technology as expected changes to what they will sponsor.

### The Training-Investment Decision

What are the characteristics and dynamics of the decision-making process regarding investment in training by firms in the British Columbia electronics industry? The answer to this question relates to what and who determines, not just whether a given company sponsors training, but who participates in the training, and when and how.

### Training Policy

Thirty percent of respondents had a written training policy. The policy in these companies generally stated that they would provide at least a certain portion of funding for employee training, or for external courses employees wish to attend where the content of either type of instruction is job-related or approved by the company in advance. In 69.2% of these companies--or 20.9% of all respondents--the training policy was part of an overall human resource policy and the role of training was seen as a means to meet both employee and

corporate needs, as well as to aid in the overall advancement and growth of the company. For example, one response read, "to upgrade/maintain skills to ensure that the company becomes/remains competitive in the marketplace".

Thirty-five percent of companies surveyed had a training budget, per se. The types of training costs included in their estimations varied considerably. Table 21 summarizes the types of costs included in the companies' training cost calculations.

Table 21

Items Included in Training Cost Calculations

Cost Item	Percentage of All Firms That Include the Item
Tuition, Travel, Accommodation	82.8
Wages, Salaries, Benefits of Trainees	60.0
Wages, Salaries, Benefits of Trainers	37.1
Administrative Costs	34.2
Development Costs	22.8
Lost Production	28.5
Industrial Costs	17.1
Replacement Costs	11.4
	(n=38)

The majority of respondents included trainee wages (60.0%) and tuition and travel costs (82.8%). Administrative costs, including clerical and data processing costs, were included by

34.2% of companies. The wages of trainers were included by 37.1% of them. Lost production and replacement costs--identified by Anderson and Kasl (1982) as a significant portion of "real" training costs and often overlooked--were included in the cost calculations of 28.5% and 11.4% of the companies surveyed, respectively.

### Training Decision-Makers

Respondents were asked to specify who (by title) in their companies assumes overall responsibility for human resource management policy. This varied with the size of company. In smaller companies (1-19 employees), the owner or principal often performs this function. In 36% of the companies surveyed, the "owner" assumed the responsibility. In the larger firms (100 or more employees), a human resource or personnel manager/director played such a role. This included 13% of all respondents. In many companies, senior administrators--executive or senior management--were responsible for human resource management policy (38% of firms). Operations management such as production supervisors or plant managers in 11% of the companies assumed the responsibility.

The range of specific individuals (by title) actively involved in making decisions about training was quite diverse across firms. Only 66% (32) of respondents addressed this question. Of these companies, 82% involved more than one

person in the process. The company president was involved in the process in 44% of the establishments responding. Sixty-five percent of responding firms involved managers, other than those in Personnel or Human Resources (e.g., General Manager, Department Manager, Branch Manager), in the training decision-making process. Only a few companies included supervisors, technical personnel or the employee(s) in question in training decisions.

#### Reasons for Training

It is important to examine the "stimulus" that provides the impetus for a firm to decide to invest in training its employees. Survey respondents were asked to indicate the specific reason(s) for any training they financed in the last two years. They were instructed to identify this for each program they sponsored according to a list of items in the questionnaire. As Table 22 indicates, the most common precipitant of training was the introduction of new technology. This was experienced by 64% of the firms responding to the question. It accounted for 20% of all training programs reported. The specific types of technology reported were as follows: digital communications, computer vision, electronic diagnostics and testing processes, fibre optics, microcircuits, specialized software, microprocessors, sputtering, surface mount technology, new key and PBX equipment, special manufacturing processes and electronic

instrumentation. The use of new equipment, tools or materials precipitated training in 59% of the companies, involving 26 programs, or 19% of all programs.

Table 22

Reasons for Training in the Last Two Years

Reason	Percentage of Firms Training For This Reason	Percentage of All Training Programs
Application of New Technology	64.1	20.2
Use of New Equipment or Materials	58.9	18.8
Staff turnover or attrition	28.2	7.9
Increased production demand	23.0	6.5
Sub-Standard work	12.8	3.6
Safety/industrial hygiene problems	15.3	4.3
Government Regulations	10.2	2.9
Poor morale or staff relations	5.1	1.4
New policies or regulations	2.5	0.7
Total		100.0
	(n=39)	

Other somewhat frequent reasons for training, in terms of proportion of firms, were staff turnover (28%), increased production demand (23%), safety/industrial hygiene problems (15%), substandard work performance (13%) and government regulations (10%).



### The Initiation of Training

As to who or what initiates training programs, 62% of the companies indicated management/corporate policy dictated such action. Thirty percent indicated that training was initiated as a result of an agreement between management and nonunion employees; and the training in 7.5% of the firms was a result of collective bargaining with the union. Twenty percent of the firms reported that the training they sponsored was initiated as a result of some government requirement or request; twelve percent as a result of an individual's initiative (employee, supervisor or department head); and 10% as a result of professional association requirements or initiative. Many of the firms offered more than one response to this item.

In considering the initiation of training programs it is interesting to note that in only 30.7% of the companies surveyed were training needs regularly and systematically analyzed and defined. All of these firms reported that this was done at least annually; most of them (83%) did so at least biannually. The process was performed by Personnel, supervisors, managers or committees.

Related to the question of how training is initiated is the matter of how requests for training by employees are handled or processed. In most cases employee training requests were handled on an individual basis. Quite often the supervisor or a manager of an employee initially processes

(discusses) and screens the request. Subject to his or her discretion, the request is forwarded by this person to Personnel or senior management. In some cases this procedure is formal (in writing), adhering to prescribed policy and procedures. In other cases, the process is more informal, involving discussions and discretions of the supervisor or manager. In "proactive" situations, where a firm has a needs analysis mechanism, the procedures are different: co-ordinated by Personnel, certain needs are regularly identified, validated and acted upon.

### Skill Portability

Theoretically, firms' decisions to invest in training are supposed to depend, at least in part, on the portability or transferability of the content of the skills or knowledge acquired. Forty-one percent of the companies responding indicated that such decisions do vary according to how general or specific the skills to be learned are. These firms' responses were somewhat contradictory at first glance. There was a balance of responses: those stating that the company was more apt to invest in training to acquire relatively specific skills and a similar number who expressed a preference for sponsoring training of employees to acquire transferable (in their words) skills. When the comments are studied more closely, most of the latter group meant "transferable" within their own organization, as opposed to

transferability across firms or industries.

Company representatives were asked to specify how useful the skills are that their employees acquire in training they sponsored. Fifty-two percent of them indicated that such skills were "useful, just as effectively, in other companies in [their] industry only". For 50% of the companies, the skills were useful in other industries also; 13% indicated the skills were useful in other companies in their industry, but not as effectively. Finally, no respondent indicated such skills were not useful in other companies.

#### Selection of Employees

The respondents were asked how employees are chosen for training programs they sponsor. Most companies (67%) indicated this is a supervisory decision. Over one-third (35%) of the firms judge the individual merits of the situation in terms of both company and employee "needs". Also, 18% and 15% of the businesses rely on the educational level and rating of employees (job performance), respectively, in determining employee participation in training.

#### Training Deterrents

Companies surveyed were asked to specify what factors have been deterrents to them investing in employee training. As outlined in Table 23, the "major deterrents reported were: the conflict of training with production (35.8%); the cost of

developing the program (33.3%); the threat of turnover of staff participating in training (30.7%); and the potential return on investment (30.7%). It is interesting to note that though certain "cost" factors were identified as deterrents, no respondent mentioned the cost of employees' absence from production while participating in training (i.e. replacement costs and lost production). Perhaps, these may be implied in the "conflict with production" deterrent.

Table 23

Deterrents to Training

Factor	Percentage of Firms Considering it a:		Total
	Major Deterrent	Minor Deterrent	
Conflict with production	35.7	35.8	71.6
Cost of developing program	33.3	33.3	66.7
Threat of staff turnover	30.7	30.7	61.4
Lack of return on investment	30.7	33.3	64.0
Cost of trainers	25.6	25.6	51.2
Unavailability of trainers	25.6	33.3	58.9
Unavailability of training aids	20.5	33.3	53.8
Unavailability of administrative staff	15.3	41.0	56.3
Cost of training aids/ materials	12.8	48.7	61.5
Lack of availability of space	10.2	28.2	38.4
			(n=46)

### Union Impact on Training

As only a small proportion of the responding sample were unionized, very little data was collected about the effects of unions on the training-investment decision. A few companies reported provisions in their collective agreements prescribing when training was required, the selection of employees, and the type of evaluation.

### Public Policy and Utilization of Government Programs

What are the attitudes toward and experiences with the governments' role in employer-sponsored training held by representatives of firms in the B. C. electronics industry; and how might these affect the firms' participation in government programs and their training practices?

### Government Roles

In this section of the questionnaire, respondents were asked what role, if any, government should play concerning the financing, delivery, regulation of and dissemination of information about employer-sponsored training. Eighty-three percent of the company representatives expressed the view that government should contribute toward the financing of such training. Most who responded affirmatively thought the financing should be shared between industry and government--many said "50/50". The form of the financing suggested

varied: tax credits, wage subsidies, etc. (This will be discussed in detail later.) A few companies thought the government support should be just for training in skill shortage areas or for small businesses.

Regarding the delivery of training, 59% of the respondents indicated that government should not be involved in the delivery of that training sponsored by industry. Their main argument was that government cannot effectively provide job-specific training, and that it is not their responsibility. Firms felt that government should play an indirect role in training delivery in the form of providing resources--personnel, materials, information--for employer-sponsored training.

Thirty-four percent of companies surveyed thought government should regulate training mainly to ensure quality and accountability, as well as for specific types of training in some safety-related areas, professions and trades. Almost two-thirds (65%) of the responding firms rejected the idea of any government regulation of employer-sponsored training.

A majority, (63%) of firms, thought government should play an integral role in the dissemination of training information: available resources, training opportunities, government subsidies and programs, etc.

(Note that for the aforementioned questions on government roles only 68% [33] to 84% [40] of the response sample answered them.)

### Financing Alternatives

Respondents were asked to indicate the relative desirability of specific alternatives for financing employer-sponsored training. Seven alternatives plus an "other" category were provided with explanations. Table 24 summarizes the firms' responses.

Table 24

#### Alternatives for Financing Employer-Sponsored Training

Alternative	Percentage of Firms Indicating the Alternative is:			
	Highly Desirable	Somewhat Desirable	Highly or Somewhat Desirable	Not Desirable
Employer tax credits	59.5	16.6	76.1	4.7
Wage and training subsidy	57.1	23.8	80.9	16.6
Levy/credit system	28.5	26.1	54.6	28.5
Deductible employee contributions	16.6	26.1	42.7	30.9
Joint contribution to UIC-like plan	4.7	28.5	33.2	54.7
Deductible employer and employee contributions	2.4	19.0	21.4	38.1
Levy/grant system	2.4	7.1	9.5	71.4
				(n=48)

The most striking response was that 71% of the firms did not find the levy/grant system desirable. Another relatively undesirable alternative for financing employer-sponsored training was the idea of a program similar to the Unemployment Insurance plan where both employee and employer make regular contributions to a central fund each year. It was considered "not desirable" by 54.7% of the respondents. Little interest was manifested in a program similar to the Registered Retirement Savings Plan where contributions are tax deductible: 16.6% of firms thought it was highly desirable without employer contributions and 2.4% with employer contributions.

On the positive side, 59.5% and 57.1% of the companies found employer tax credits and wage subsidy programs, respectively, to be "highly desirable". Seventy-six percent of the firms thought the former option was at least "somewhat desirable", while almost 81% of them found the latter option to be the same.

Finally, the levy/credit system (highly desirable for 28% of firms) financing was a little more palatable and less undesirable to the respondents than the levy/grant scheme (highly desirable for 2.4% of companies). The levy/credit system, as discussed in an earlier section, involves employers paying a levy and then receiving a tax credit when they sponsor training.



According to comments accompanying these ratings, wage subsidies and tax credits for employer-sponsored training were favoured because they were considered more direct, immediate, flexible and they provided an "incentive" to train (particularly for smaller firms). Ironically, neither of these alternatives would necessarily increase the overall quantity of training or distribute it more equitably among firms.

#### Government Program Priorities

The companies surveyed were asked to indicate what types of training--in terms of occupations, skills, and trainee characteristics--should receive a higher priority from government initiatives. The strongest responses were for the professional/technical (61.7%) and skilled trades (52.9%) occupational categories; design/engineering (67.6%) and research/development (67.6%) skills; and youth (41.1%). The occupational and skill priorities speak for themselves given the nature of the industry. Youth exerted a higher priority because (according to comments) of the acuteness of their employment problem and because of, as one respondent put it, their "longer payback period".

#### Utilization of Government Programs

The survey respondents were asked about the extent to which they have used government financial support for the

training of their employees over the last three years. Fifty-seven percent of the firms indicated they had utilized such assistance, at least a few times, in the last three years; 33% in the last 12 months. Of these companies, 67% (17) provided more details on this assistance. For these firms, government support was received for a mean of 33% of their total number of training programs during the last 12 months.

During the last twelve months, government assistance to these companies amounted to a mean of \$35,000 per firm for a total of \$525,000. The companies reported an average 11.8 training positions per firm funded by government for a total of 178 employees.

#### Deterrents to Utilizing Government Programs

Firms were asked to indicate whether or not certain aspects of government programs for employer-sponsored training affected their utilization of the like. Forty-seven percent, 42% and 39% of the companies thought that the "clarity of government guidelines", "amount of paperwork", and "time required for government to respond", respectively, had negative impacts on their utilization of such programs and on their training. Firms were also concerned about, though to a lesser degree, the suitability of durations allowed (usually "too short"); limited amount of funds available; general inflexibility in and lack of information about such programs;

lack of continuity and consistency between programs and personnel who administer them; and the delay in the reimbursement process. A few companies indicated a philosophical aversion to government being involved in business activities at all: for example, "we believe government interference distorts the normal demand-supply relationship for people as well as products". One company representative made the important observation that government financial assistance would be helpful under better economic conditions, but that it (training) "still represents additional company costs that cannot be warranted under present economic conditions."

#### Suggestions for Improvement

A last question required respondents to suggest ways government could improve its support for employer-sponsored training. The responses related to things mentioned in earlier questions. They included government:

- making more funds available;
- streamlining the application process;
- providing more clear guidelines;
- providing more flexible mechanisms for financing training;
- providing better information on programs and resources available;
- simplifying the paperwork;

- making equipment, training aids and facilities for training available to firms;
- facilitating more flexible modes of delivery of instruction;
- making programs responsive to the real and unique needs of the firm and industry; and
- emphasizing continuing education and retraining.

One respondent asserted that government should assume a more "aggressive" role, making direct contact with companies that may qualify for government assistance for training.

### Statistical Analysis

#### Limitations of the Data

The analysis of data was acutely limited due to the relatively small sample size and the nature of the data. Particularly with questionnaire items that had low response rates, there were a lack of sufficient numbers in the different categories into which data were divided (i.e., chi-square crosstabulation). A large portion of the data involved nominal measurement. Therefore, a sophisticated multivariate statistical analysis could not be performed. An assumption of the chi-square statistic--which tests for the independence between two or more variables--is that a given sample should be large enough to yield an expected or theoretical frequency of five per category when there is more

than one degree of freedom; and ten when there is only one degree of freedom (Isaac and Michael, 1983, p. 177). Therefore, the chi-square statistic was deemed the most suitable index to examine relationships between variables in this study. In some cases, an attempt was made to increase the frequency for each category by decreasing the number of categories for each variable.

### Statistical Analysis of Variables

Mainly two variables were tested for their relationships with other variables. Company size (number of employees) and whether the company sponsored training in the last 12 months were studied as to their effect on other variables. Obviously, when studying relationships between variables, the correlational techniques--particularly the Pearson Product moment correlation coefficient is stable and contains the smallest standard error (Borg and Gall, 1983, p. 587)--are the most attractive, as they reveal information on the degree of the relationship between variables. There was little interval data collected in this questionnaire. For any of the questions about relationships between variables that were thought to be important for purposes of this study, variables in these relationships never both involved interval data. The point-biserial correlation statistic is a viable alternative when one variable is continuous and the other variable is a "true" dichotomy; but as Isaac and Michael (1983, p. 168)

state, it yields a lower correlation than the product-moment correlational technique.

Chi-square statistics were computed to test for the relationship between these and the following variables (significant [ $p < .05$ ] chi-squares are denoted by an asterisk and are identified in Table 25):

Existence of Training and:

- existence of training policy\*
- existence of training budget\*
- existence of human resource planning\*
- existence of training needs assessment
- received government funding
- unmet skill requirements\*
- changes in job content\*
- desirability of levy/grant system
- transferability of skill
- changes in past training
- projected changes in future training
- degree of job specialization
- perceived training deterrents:
  - return on investment
  - conflict with production
  - costs of development
  - threat of staff turnover

Size of Company and:

- existence of training\*
- existence of training policy\*
- existence of training budget\*
- existence of human resource planning\*
- existence of training needs assessment\*
- received government funding
- degree of specialization
- unmet skill requirements
- training expenditures
- receipt of government funding
- changes in past training
- training method

Chi-square statistics were also computed to test for the relationship between:

- occupational category and training method
- age of company and degree of job specialization
- existence of training and composition of the firm's workforce (i.e. occupational categories);
- training expenditures and the receipt of government funding;
- duration and method of training;
- source of delivery of training and method and duration of training.

Table 25

Variables with a Significant ( $p < .05$ ) Chi-Square Value

Variable	Existence of Training $\chi^2$	Company Size $\chi^2$
Training policy	6.95, $p < .01$	5.998, $p < .05$
Training budget	5.081, $p < .02$	6.018, $p < .05$
Training needs assessment	-----	6.18, $p < .05$
Human resource planning	5.41, $p < .02$	11.079, $p < .01$
Unmet skill requirement	3.94, $p < .05$	-----
Changes in job content	4.564, $p < .05$	-----
Existence of training	-----	11.886, $p < .01$
Occupational Category and Training Method		26.8, $p < .01$

The following relationships were found. Larger companies were more likely to finance training than smaller companies. Companies that financed training were more likely to have a written training policy, a training budget, and to conduct formal human resource planning. Companies with present unmet skill requirements were more likely to have financed training in the last 12 months. Firms that experienced changes in job content were more likely to have financed training.

Larger companies were more apt to have a training budget, training policy, regular training needs assessment, and to conduct human resource planning.



The occupational category of employees was related to the method of training. Those employees in unskilled/labouring, skilled trades and office/clerical categories participated in proportionately more training occurring on-the-job (as opposed to off-the-job).

These variables will be discussed further in the next chapter.

## CHAPTER V

## DISCUSSION OF RESULTS

The preceding presentation of the survey results and statistical analysis will be discussed and summarized including an interpretation of the findings. This will be organized according to the respective research questions, keeping in mind that there will be overlap among each.

Human Resource Requirements

While an examination of the occupational profile and requirements of an industry can be a topic of study unto itself, the overview acquired from this section of the survey contains some significant information.

The preponderance of employees in the professional/technical occupational category (38.4%) reflects the high amount of research and development, design and engineering and new technology prevalent in the electronics industry. Further, this occupational group represents an inordinate proportion of the unmet skill requirements (76%) in the industry. This has obvious implications for the provision of education to acquire such skills, particularly if the findings

apply to the manufacturing sector as a whole. The education of technologists and engineers, particularly, is apparently of utmost concern to companies in this industry. In previous government-sponsored research on labour market requirements, emphasis has often been on the need for skilled tradespersons. While a significant proportion of workers represented by this survey sample are from the skilled trades category (13.2%), this is just over one-third of the volume of workers in the professional/technical category. This is not surprising given the nature of the industry. Whybrow (1984) found in a review of a study originating in the U.S., firms involved in high technology consider the on-going availability of workers, particularly in technical and professional occupations (96.1% and 87.3% of respondents, respectively), in a given geographic area to be the most important determinant of where they locate.

The occupational profile found in this industry is significant considering the relative proportion of occupations found in other surveys. Consider two studies cited by Whybrow (1984). For manufacturing companies in Massachusetts as of June 1980 the profile was: professional and technical - 13.8%; service and labourers - 5.7%; production and maintenance - 61.0%; clerical - 13.8%; sales - 2.4%; and managers - 7.4% (p.18). In a projection of the occupational composition of the Silicon Valley in California, the workforce profile for 1980-85 is: "professional and technical workers

- 33 percent; operators - 26 percent; clerical workers - 15 percent; craft workers - 13 percent; managers, officials and proprietors - 9 percent; and sales workers, service workers and labourers - 4 percent" (pp. 19-20).

The proportion of professional/technical workers reported here by the B. C. electronics industry (38%) exceeds that of the "high tech" capitol of the United States!

Given the incidence of changes in technology and job content reported by respondents, particularly for technicians, technologists, engineers and managers, more attention may have to be paid to the upgrading and updating of workers' knowledge by the industry, researchers and policy-makers. To date, the development of professional and technical human resources has occurred mostly in institutional settings due to the long durations required and the theoretical and complex nature of the subject matter. More flexible--whether on- or off-site sources of delivery are used--mechanisms for the delivery of instruction to upgrade these workers will have to be developed.

There was a significant prevalence of skill shortages reported (by 44% of firms) despite the present economic conditions. By comparison, Betcherman (1982) found that 43% of his sample expected or experienced shortages from 1980-84 (p.11). This industry has performed well in the last few years relative to other sectors of the economy (Electronic Manufacturers' Association of B.C., 1984b). This has been

due, in part, to research and development stimulated by recent government incentives for research as well as by growth in domestic and export markets. While many companies reported unmet skill requirements, several were for fairly specialized skills possessed by highly qualified people. We cannot interpret such data to mean this industry will necessarily generate significant quantitative growth in employment, but it is a good example of our present labour market imbalance: high unemployment among the relatively low-skilled and skill shortages for the highly-skilled. No significant chi-square was found between company size and the existence skill shortages.

The firms' responses to skill shortages varied. The prevalence of providing in-house training, recruiting and involving overtime were similar to those found by Betcherman (1982, p. 33) with the exception of subcontracting. Forty-three percent resorted to the latter means as a response to skill shortages; whereas in Betcherman's study only 20% of manufacturing firms did so. The proportion of firms in the survey responding to shortages by providing in-house training and recruiting suggest a significant amount of human resource activity in this industry.

The impact of skill shortages upon production posed some very real--as opposed to theoretical--problems for the industry. The companies indicated that product development, project schedules, expansion or production had been impacted.

To think that even more growth or business activity would have been generated in an already active sector of the economy had the human capital been available makes a poignant yet concrete point about the importance of human resources.

Considering the above and the fact that many companies observed that it is difficult to manage human resource requirements in this industry due to sudden changes in demand, one must remark at the fact that only less than one-quarter of the firms conduct formal human resource planning (HRP). In an industry where change is so prevalent and the supply of highly-skilled persons important, one would think more staff planning would occur. According to the chi-square value ( $p < .02$ ) there was a significant association between HRP and a firm's propensity to finance training. Are firms that conduct HRP more apt to finance employee training, or is this simply a function of company size: The chi-square for the association between company size and training was significant ( $p < .01$ ). In theory, more HRP may produce more training, depending upon the alternative sources of skilled persons. In sum, companies still do not integrate HRP with other types of planning, as Peitchinis (1980) laments:

...."this is often more indicative of a shortage of competent management than of skills." If management were to manage the manpower requirements with the effort, attention and analysis that is applied towards the management of finance, marketing,

inventories, material and capital equipment, there would be no manpower problems. (p. 5)

No definite pattern of work organization--either toward specialization or overlap--was detected. The chi-square values were not significant. It seemed as though this was a function of the size of the firm and the nature of its work as well as possibly establishment age (i.e. increasing specialization with growth). At the research and engineering levels, there was a relatively high prevalence of project team approaches to work and, hence, overlap. Specialization was much more prevalent at the production and service level. According to the reports of firms the degree of job specialization will increase in this industry. We may see more and more of a split between the following two extremes: overlap and control over work by higher-level professional technical "knowledge" workers; and specialization and simplified work at the production level (i.e. two labour markets). The latter may be more susceptible to technological change and job loss.

A majority of the firms reported changes in job content over the last three years. This has obvious implications for HRD. Not surprisingly, the chi-square revealed an association between these changes and a firm's propensity to finance training in the last 12 months ( $p < .05$ ). The companies project more changes to this effect and this has definite implications

for the type of workers required in terms of having good basic and general skills, and an overall ability to adapt to workplace change and learn or relearn new competencies.

In summary, four main points can be derived from this section of data. First, there is a high proportion of professional/technical workers in the B. C. electronics industry. Second, a substantial level of skill shortages exists, despite poor economic conditions. Third, the amount of recent and projected change in technology and job content in the industry may create more demand for upgrading and retraining. Lastly, in light of the above, the relatively low importance placed on planning human resource requirements needs to be addressed.

### External Sources of Human Resources

Just under half of the firms' recruitment needs were served by the local labour market. While only approximately one-third of the firms' total recruitment needs were met by educational institutions, nearly every company (97%) recruited from post-secondary educational institutions. According to the data, this industry relies heavily on technical institutes and universities. This relates to the substantial proportion of professional/technical workers in the industry, since most of them would have been educated in these two types of schools; and to the importance of the



existence of such institutions in high technology centers (Whybrow, 1984).

An examination of the types of disciplines from which students are recruited, demonstrates a heavy dependence upon the training of engineers and technologists in electrical, electronics, computer and mechanical technologies. Whybrow (1984) extrapolated an employment profile from data collected in an Ontario study on advanced technology labour requirements in 1981. By academic program, the largest proportion of employment was held by electrical engineering 21.0%, electronics engineering technician 15.8%, and electronic engineering technologist 11.2%. Whybrow concludes that such studies "confirm the evidence from U. S. studies of the high dependence of high technology industry on professionals and skilled technologists in the electronics field" (p.25).

While there is a general satisfaction with the post-secondary schools--at least those providing programs relevant to their needs--respondents were concerned about the content of such. This has concrete implications for post-secondary curriculum, in terms of providing a balance between theoretical and practical emphases and developing specific and general competencies.

The cry for industry-education collaboration is a relatively recent phenomenon. The incidence of it seems reasonably prevalent within the B. C. electronics industry through a variety of means. Co-operative education programs

and work experience practicums are well-represented in the industry. It seems as though these companies have realized it is in their best interests to maintain ties with the educational sector and vice-versa, particularly for engineering and business faculties or departments.

It is somewhat surprising that, though only 34 firms responded to the question--and 12 other firms did not understand the question--over 80% of the firms did not think there should be a definite division of labour in the delivery of education and training. While a few did respond according to the general versus specific skills dichotomy, the low proportion of such a response is in contrast to the traditional thought that schools should prepare students with general education and knowledge and industry should train workers in job-specific skills.

The emphasis of this section dealing with external sources of human sources was on the educational system. The data clearly indicates a "symbiotic" relationship between the electronics industry of B. C. and the network of post-secondary educational institutions.

#### Nature and Extent of Human Resource Development

The incidence and characteristics of training in the B. C. electronics industry, according to this survey, are comparable to the pictures painted by previous research. For example,

Betcherman (1982) found that 68.1% of manufacturing firms provided some training. At first glance, 70% of the firms financing training seems quite substantial. On closer analysis, a majority of such training is short term with most of the employees participating in on-the-job training. Yet the training reported in this survey still represents a significant proportion of the companies' human resources (33%).

Considering the growth and needs of the industry, it is not surprising that almost two-thirds of the employees participating in employer-sponsored training are in professional/technical, skilled and sales/marketing occupations. At the same time, only 15% of all "trainees" fell into the unskilled, office/clerical and apprentice categories. Those employees in the higher skill levels appear to receive or have access to more training. Those people with the most education are more likely, than others, to receive more. This relates to the potential problem in our society of the widening gap between the educational "haves" and "have nots". The chi-square value was significant ( $p < .01$ ) for the association between training method and occupational category. More of the on-the-job methods were concentrated in clerical, unskilled and trades areas. Therefore, the lower-skilled employees appear to participate in quantitatively and qualitatively less employer-sponsored training. Unless those employees in the secondary labour

market have access to more job-related training, they will be most susceptible to adjustments in labour utilization.

A significant proportion of the training involved the utilization of off-the-job methods. This was for programs delivered by educational institutions, professional associations, government, manufacturers, suppliers and consultants. In terms of the number of employees participating, most employees did so in on-the-job training. A lot of the off-the-job training involved only one or two employees at a time attending an outside job-related course or seminar; whereas on-the-job training tended to be concentrated in larger numbers at one time.

Significant chi-square values were found for associations between the existence of training in a firm and the existence of training policy and a training budget ( $p < .01$ ). Firms that had a training policy and a budget were more likely to invest in training. Since these factors are also associated with company size, they may simply be a function of economies of scale in a company. Private training policy will be discussed further in a later section. Company size is also associated with propensity to train. Whether this is a function of the increased potential for training in larger firms (i.e. more employees), the existence of training policy, or some other factor, remains to be seen. In this industry there are quite a few small companies with approximately 30 to 60 employees that have generated a lot of growth recently.

While many companies had tuition assistance programs for employees, not one firm had a paid educational leave scheme. For an industry with so many highly-skilled workers who may require more than just short term courses to update their knowledge, this may produce problems in the future. The changes in technology and job content in this industry may require the participation by certain workers in prolonged educational or training programs. At this time, government takes no affirmative action to foster paid educational leave in industry in Canada.

Twenty-two percent of the companies reported growth in their training over the last three years, while 11% reported a decline in it; and 41% of the respondents projected qualitative improvements in training in the next three years. These reported and projected positive changes reflect favourably on the electronics industry considering the state of the economy in recent years.

In summary, the training financed by businesses in the survey was largely of short duration, involving a few employees per program; concentrated in larger companies and professional/technical, sales and trades occupations; and involving employees mostly in on-the-job training.

### The Training-Investment Decision

The decision-making process varies across companies mostly

as a function of size. Larger companies have training policy, in addition to HRP and Personnel or Human Resource departments. More systematic needs assessment occurs in larger establishments. The more informal and less documented the process, the more influence exerted by line managers or supervisors in terms of the discretion they exert in processing training requests and thus determining who participates in training. Without formal training policy, individual whims or biases could be manifested, leading to ineffective training or the blocking of access to training for certain employees.

The variance in training cost calculations across firms brings into question the validity of companies' reporting on training expenditures. True costs of training will not be realized if lost production and worker replacement costs are not part of the calculation. The variance in costing of training has been recognized by many researchers (e.g., Betcherman, 1982; Social Programs Evaluation Group, 1983).

According to survey responses, firms did not base their training decisions on the degree of transferability of skills acquired. Only a few companies indicated their employees acquired specialized skills not useful outside the company. This bodes well for employees who participate in training in this industry since most of what they learn is transferable to other companies and, often, to other industries.

Chi-square values were computed between potential training

deterrents and the existence of training in firms. No significant values were found. If there was a relationship, one might find that firms that reported a particular deterrent to training were less apt to finance employee training. Regarding the deterrents themselves, they prescribe possible directions for government programs and those that deliver training to this industry. The fact that training conflicts with production suggests that flexible delivery mechanisms and arrangements are required to minimize the potential conflicts. The risks of turnover and not realizing a return on investment may be a reality of training. Perhaps all governments can do is to provide incentives to try to offset the risk.

#### Public Policy and Utilization of Government Programs

A majority of firms surveyed thought government should play a role in the financing of training and disseminating information about training. Basically, they wanted the benefit of financial assistance, involving direct subsidies or tax credits with little control on the part of government. In this sense, the "carrot" seemed more appealing than the "stick". Due to the relatively small sample size, the categories were not all large enough (at least five) to compute a reliable chi-square value to test for any association between company size and the desirability of certain policy options. It would be interesting to know if

the attractiveness of the various alternatives for financing employer-sponsored training varies with characteristics of the firm.

The degree of utilization of government training subsidies reported in this survey is relatively high. This amounted to 33% of all firms and 33% of all training programs in the last year. Betcherman (1982) found that 20.2% of all programs reported by respondents benefited from government aid. A study cited by Dodge (Canada Employment and Immigration Commission, 1981) found that seven percent of companies sampled received government funding for employee training. The higher level of utilization of government aid by the electronics companies in this survey may be a function of a greater demand for training, or the fact that many of the occupations required by this industry are on government priority lists as "nationally designated occupations" (e.g. electronics engineers and technologists, computer technicians, etc.). The question of central importance to government should be what proportion of this subsidized training would have occurred without government aid.

An important consideration in designing government programs to encourage employer-sponsored training is the fact that cost-sharing programs still exert impact upon company cash flows as firms have to usually pay the expenses "up front" and invoice for a reimbursement from government. Perhaps training "grants" should be available to, and the



cost-sharing ratio be higher for, smaller companies who do not have the economies of scale to offset the deterrent of training costs.

Based upon the comments in this section of the questionnaire, there still appears to be a divergence of opinion on the government role in training in industry: from an emphatic "no involvement" to a heavy financial involvement, with a lot of attitudes between the two extremes. The firms' recommendations for improvements in government programs reflected greater consensus: mainly better information, greater flexibility and more of an understanding of the phenomenon of employer-sponsored training.

## CHAPTER VI

## SUMMARY AND CONCLUSIONS

This final chapter will summarize the content, findings and conclusions of the study; discuss the study's limitations; and specify the implications of its findings for public policy and further research on the problem.

Summary

Employer-sponsored training has been a relatively unexplored area of study. Policy-makers have been challenged to develop effective initiatives to increase the incidence and quality of such training. Most inquiries into the problem have focused mostly on all industries, aggregate figures, and quantitative questions. It was decided that an in-depth analysis of one industry, including qualitative issues--perhaps in combination with similar studies on other industries--could add to the small base of available data on employer-sponsored training in Canada.

A review of the literature on the quantitative and qualitative dimensions of the problem revealed numerous potential research questions. While it was thought that a

quantitative analysis of the nature and extent of training, and the human resource sources and requirements in the British Columbia electronics industry would be worthwhile, an attempt was also made to explore the dynamics of the training-investment decision and companies' attitudes toward and utilization of, government training programs.

A fifteen-page questionnaire was developed to collect data on the above questions and distributed to 80 companies in the industry. A response rate of 60% (48) was attained. As the research strategy was essentially a descriptive analysis of ex post facto data involving mostly nominal measurement, a limited statistical analysis using the chi-square statistic was performed.

### Conclusions

All comments here refer to the electronics industry in British Columbia only to the degree that the sample represented in the responses to the questionnaire reflects the target population. No attempt has been made to generalize the findings to other sectors of the economy, as this was not the intent of the study. The author exerts special caution to avoid inferring too much from descriptive, nominal data involving a relatively small sample size. Therefore, the conclusions derived from the results of this study will be summarized, without elaboration, in short, succinct statements:

1. The industry contains a high proportion of workers in the professional/technical occupational category.

2. The industry presently has a significant number of unmet skill requirements which have impacted negatively on the production, expansion, planning and growth of companies.

3. The nature of job content and organization of work have undergone and are projected to continue to undergo significant changes.

4. The industry contains varying degrees of job specialization/overlap as a function of company size, business activity and job content. Overlap is more prevalent at higher skill and higher hierarchical levels and specialization is more frequent at lower skill, production and lower hierarchical levels.

5. Many companies in the industry are planning new business activities that will impact directly on the demand for certain skills and knowledge. Just as companies are producing new, state-of-the art technology, in turn they and their workers are being affected by the application of new technology.

6. The industry relies heavily on the quality and number of post-secondary graduates, particularly from technical institutes and universities in computer, electrical/electronics, mechanical and business disciplines.

7. The industry advocates changes in the relative emphases of certain aspects of post-secondary curriculum as

well as more and better interaction between the industry and institutions.

8. Most training financed by the industry in approximately the last 12 months was short in duration and on-the-job, involving few employees per program learning technical content. It was largely represented by workers in the professional/technical, skilled trades and sales/marketing occupational categories; with few apprentices or people in unskilled/labouring positions.

9. The incidence of and commitment to employer-sponsored training increased in the industry over the last few years and is expected that this trend will continue.

10. The main reasons for training were related to the application of new technology and the use of new equipment, materials or processes.

11. The transferability of skills acquired does not seem to affect firms' decisions about whether to invest in training.

12. While tuition assistance arrangements are highly prevalent, no provisions for paid educational leave exist in the industry.

13. The formalization of the human resource management function--existence of policy, budgets, planning and systematic analysis related to human resource matters--is not very prevalent in the industry. At the same time, this formalization is associated with size of company and

propensity to train.

14. The decision-making process concerning training matters in the industry is largely informal, ad hoc and at the discretion of a few individuals in most firms. This is especially true in the absence of human resource policy or a training needs assessment mechanism.

15. The industry feels that government should play a direct role in the financing of employer-sponsored training and, juxtaposed to this, that financing of such training should not be administrated through a levy/grant system, or that it should not imply any government control over the nature or incidence of training.

16. A significant volume of training in the industry has benefited from government aid in terms of the proportion of programs, employees, firms and expenditures.

This is not an exhaustive list of conclusions from the survey findings, but it represents the most striking, significant and relevant elements, for the purposes of this study, within a pattern.

#### Limitations of the Study

Several characteristics of this study limit the ease with which one can put weight on the interpretations of, and generalizations from, the data collected.

The relatively small sample size, particularly in the case

of questionnaire items with lower than maximum response rates, made it difficult to use chi-square statistics. The small sample also creates a tendency for data to be distributed closely around the mean in such cases. Also, when there are several, mutually exclusive categories to choose from, it is difficult to compare and compute the difference between the means of each.

In spite of the response rate (60%) being very satisfactory considering the length of the questionnaire, the lack of information about non-responding companies brings into question the representativeness of the response sample. The chance exists, therefore, that the findings reflect the practices and attitudes of only those firms that are more apt to invest and that are interested in employer-sponsored training.

Due to the time and resource constraints of the study, a bona fide pilot project was not undertaken. No matter how well one plans and designs a questionnaire, certain inadequacies with the instrument cannot be detected until after a trial run. This resulted in some errors that affected what data could be accepted for analysis and to a small degree the validity of a few responses. The responses to certain questions, due to their complex nature, cannot be predicted beforehand and, therefore, the categories initially used may not be totally appropriate.

Most of the data collected was nominal. This prevented

any significant statistical analysis of the degree of potential relationships among variables and, therefore, reduced the potential of the findings to provide any more than purely descriptive information (which can be very worthwhile in itself).

The reliability and validity of the data collected may be questioned on a few grounds. Some of the questions required respondents to provide specific, detailed, and quantitative answers that would involve referring to documents. The degree to which respondents relied specific, accurate and comprehensive records in all cases is not known. Some companies do not necessarily keep records on training-related matters, and some of the responses may be based on memory.

Another factor that could affect the validity of responses is the degree to which the individual respondents reflect the true feelings (in the case of attitudinal questions) of the training decision-maker(s) in their respective organizations. Special effort was made to direct the questionnaires to the most appropriate person(s) in each firm.

Finally, the overall scope or breadth of the survey--the fact that many questions and issues were studied--limited the degree of depth of analysis per question given the time and resource limitations of the study.

### Implications For Research

The implications of the results in this study for further



research relate to both the process (i.e., research design and methodology) and content (i.e., research questions) of inquiry.

Similar studies--perhaps improving upon any inadequacies of this one--could be implemented for different industries or geographic areas for comparison sake. The in-depth analysis strategy should be maintained, perhaps with a more limited scope, to develop an overall understanding of training in a given industry; and to compare training data across industries (particularly for qualitative issues).

At the initiative of government and industry, a mechanism should be established to regularly collect data on employer-sponsored training. This could be part of an existing structure such as the recently established Canadian Labour Market and Productivity Centre in Ottawa. Each industry sector, under the guidance of government should be encouraged to participate in this research process. Statistics Canada's mandate may be too broad to regularly collect data on specific and qualitative training practices and attitudes.

To study the complex dynamics of certain qualitative issues, the case study approach should be utilized. For example, it would be a useful tool to better understand the training-investment decision-making process. Several

open-ended responses in the questionnaire used in this study revealed interesting and informative data; but because of the overall length of it, respondents could not elaborate. In a representative sample of case studies, one would be free to pursue questioning in response to interesting remarks and observations.

The design of the study did not allow for it, but future research in this area should also rely on the reports of employees to describe some of the phenomena studied here: particularly concerning the limitations of training, determinants of employee participation and characteristics of employees participating in it. Failing reports by employees, themselves, data should at least include more information (in addition to occupational) on employee characteristics (e.g., age, sex, educational background, etc.). Further, the same questions in a given study should be asked of more than one member of the training "system" (usually an employer representative). It should be multi-dimensional in the sense that representatives of employers, employees, professional associations, governments, and educational institutions all answer the same questions. The possible divergence in their respective responses could be quite revealing.

The experience of this study could benefit others in reconstructing some of the questions to arrange data in more valid patterns and in ways that are more useful for statistical analysis. Also, for certain questions, a

questionnaire could be designed to collect more interval data allowing stronger correlational techniques.

The research design employed by Harvey (1980) should be applied to more empirical research into the nature of employer attitudes towards and perceptions of employer-sponsored training. Specifically, "training" and "non-training" firms should be compared across several dimensions to determine the characteristics related to positive attitudes toward such training. This line of enquiry should focus on employer perceptions that determine business behaviour with the objective to determining how to reduce barriers to employer-sponsored training and to encourage "non-training" firms to invest in training.

The interrelationships among the incidence of training, the organization of work and the utilization of human resources requires empirical study. In fact, little to date has been conducted. These issues cannot be studied in isolation from each other. As the survey in this study indicated, there is a lot of "change" in industry in the form of new technology, economic adjustment and growth, etc. The effects of this change will vary according to how workers are trained, how the work they perform is organized and new technology is implemented, and how their skills are utilized. These phenomena may vary according to employee level and other factors. The reasons for and effects of these need to be determined.

This study briefly addressed the issue of costs of training, but did not examine the perceived benefits of it. Further research should solicit the perceptions of firms' decision-makers to identify these perceived benefits, the reasons for them and how they relate to government incentives for and deterrents to training. It should also attempt to determine the "real" costs of training and practical methods to document these.

The relative participation in training by employees in various occupations should be examined, as well as the determinants of this and the issue of access to and control over training. How participation varies (quantitatively and qualitatively) according to other employee characteristics should receive more empirical attention.

Developmental research should be initiated on ways of assisting, particularly smaller companies to incorporate human resource policy and planning, and training needs analysis, and planning and evaluating training into their routine business planning practices and cycles.

Some form of empirical research is required into the actual (as opposed to intended) impact of government programs directed at employer-sponsored training. This may be in the form of program evaluation, policy research, or possibly pilot-testing various innovative policy options. A present example of the latter is the new Youth Training Option initiated by the Canada Employment and Immigration Commission.

Experimental research should be attempted to test the relative efficiency and effectiveness of different methods and durations of training for the same content. Surveys compare methods and durations and only make assumptions about the relative effects of different types of each. Further to this, developmental research should explore the possibilities of delivering flexible, innovative employer-sponsored training on- and off-the-job. Related to what was mentioned concerning methodology, the decision-making process concerning training requires much more analysis. It should be studied in the context of overall business planning and decision-making and not as a discrete and unique entity. Too often the latter has occurred and this has done a disservice to the training phenomenon.

Due to the breadth of this study, in-depth analyses of qualitative issues identified in the review of literature could not be conducted here. In addition to large aggregate surveys on the nature and extent of employer-sponsored training, government and industry should initiate smaller studies on specific qualitative issues: for example, the degree with which access to training varies among employee and company characteristics; the relative effectiveness of on-the-job training; evaluation of innovative training methods; the relationship between training and productivity.

When comparing training and human resource development across industries, research should incorporate the historical

and structural differences among the industries and their implications for training and HRD. This comparative line of enquiry should be extended to the study of employer-sponsored training and public policy in other countries. By using the empirical data for analyses in other countries, we can learn from the success or mistakes of others.

More emphasis should be put on constructing a more complete profile of the highly-skilled labour supply and requirements on an industry-by-industry basis. This should be a regular, on-going effort with periodic updates of information. At the same time, an analysis of requirements at all skill levels should be carried out, comparing the relative access to training and other benefits as a function of skill level (to test dual labour market hypotheses).

Finally, research strategies should be developed to empirically test theoretical frameworks which may form bases for the phenomenon of employer-sponsored training. For reasons discussed earlier, human capital theory contains certain inadequacies in terms of explaining and predicting the form and incidence of employer-sponsored training. Yet, little theoretical treatment of the subject has been attempted (e.g., Simpson, 1983). Part of this may be because the phenomenon is still searching for its conceptual "roots" as, though many disciplines touch upon the subject of employer-sponsored training, no single discipline has laid sole claim over it.

This list of potential research topics is by no means exhaustive. There is, of course, a lot of scope to this problem. Only the most evident and relatively important implications have been presented here. Basically, the message presented here advocates a combination of historical, comparative, developmental, theoretical and experimental research strategies to study employer-sponsored training.

### Implications For Public Policy

An assumption of this study has been that government should play an integral role in employer-sponsored training in Canada. This has been somewhat confirmed by the responses to the survey by companies in the electronics industry. This discussion of the implications of the results will reflect what the role should include.

Government should initiate their own research, as well as facilitate the research of others into some of the questions mentioned previously. This includes the experimental provision of pilot programs and evaluation of their own programs directed at employer-sponsored training. Also, government should provide funds for individuals, firms or industries to conduct research into such training.

As a recent federal discussion paper on Training (Canada Employment and Immigration Commission, 1984b) advocates, government policy on employer-sponsored training should

include flexible, innovative and responsive programs. These should include financial assistance that is flexible in terms of the duration, content and methods (e.g. distance education, computer-assisted instruction, etc.) funded, and cost-sharing that is adaptable to individual company needs. This flexibility will allow for shifts in priorities (of the government) and encourage innovation and diversity in the means of training.

Government should provide some sort of incentives targeted specifically at encouraging private sector employers to establish paid educational leave policies for their employees. The need for this was reflected more than ever in the industry studied here. The B. C. electronics industry has a high degree of "knowledge workers" who require an up-to-date base of technical competence. At the same time, the industry has experienced growth and technological change which have increased the need for up-dated knowledge.

Due to the unique needs of the respective regions and industrial sectors in Canada, more policy formulation and implementation should be conducted at the local level, incorporating the needs and concerns of all parties whenever possible. Perhaps the U.S. Job Partnership Training Act (1982) could be used as a model in its establishment of "private industry councils" at the local level. The policy formulation process, itself, should undergo careful scrutiny and be modified to regularly canvass the opinions of interested parties.



The implicit message of the industry studied here advocated the establishment of more links between school and work. Many of the companies studied were involved in co-operative education, work experience and internship programs for students in post-secondary educational institutions. Government should actively encourage institutions to establish a comprehensive network of co-operative education in all disciplines and levels of the post-secondary system.

Given the present scarcity of resources, and to minimize overlap and duplication among jurisdictions, more collaboration in education and training between the public and private sectors should be encouraged by government policy. While there should be sharing in responsibility among government, educational institutions and industry concerning training, the roles, as indicated by some survey respondents, should be clearly delineated as much as possible.

As responses to the survey indicated, information about training assistance and resources and educational opportunities is of interest to most firms. Perhaps an experimental "brokering" service should be set up in selected regions where someone would devote full time to informing businesses about the availability of such information as well as educating smaller companies on training and HRP, helping them identify their human resource and training needs, and to seek out external sources to meet

these. Also, as was indicated in the survey results, companies want simple, more understandable programs to access.

The post-secondary education system provides an important source of human resources for the industry studied. As well as producing graduates needed by the electronics and other industries, post-secondary institutions could offer many other useful services to industry. In light of the large amount of professional/technical workers in the industry, and given the change and growth occurring in it, technical upgrading and continuing professional education should be in high demand. Educational institutions can exchange and share personnel, equipment and other resources with industry, leading to more effective human resource development and utilization. Therefore, government should create incentives for both parties, education and industry, to participate in such activities. Not only do these considerations have implications for the colleges, institutes and universities of the province, but they may suggest priorities in programs and methods of delivery for government.

The main challenge to government concerning employer-sponsored training remains the issue of how, with the most efficiency, to ensure the most effective means of financing such training. The sample in this survey was mostly against the levy/grant scheme. On the other hand, the majority of companies desired tax credit or direct subsidy mechanisms. Yet previous research cited earlier has put into question the

utility of wage subsidy programs for on-the-job training. To date, government has continued to offer such programs as its only form of intervention in employer-sponsored training. These are going to have to be rethought in terms of priorities and the types of training government encourages and sponsors. The fact remains that wage subsidy or tax credit schemes do not necessarily resolve the problems of distributing training equitably among firms and increasing the absolute quantity of employer-sponsored training. This is juxtaposed with the fact that these schemes were apparently the most appealing to firms in the industry surveyed.

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Appendix A:

EMABC Letter of Support

Appendix B:

List of Planners From Industry

Appendix C:

Circular for Distribution to EMABC Members



September 17, 1984

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RESEARCH ON ELECTRONICS INDUSTRY TRAINING

Kerry Jothen, a Master of Arts degree candidate in U.B.C.'s Department of Administrative, Adult and Higher Education, will be conducting a survey of the training practices and needs of firms in the B.C. electronics industry this fall.

Kerry plans to begin the project in early or mid-October and would appreciate your assistance in answering some questions about the nature and extent of your firm's training; your attitudes toward employer-sponsored training, public policy on training, and training delivered by public institutions; and the industry's skill requirements.

Kerry has discussed this project with some of EMABC's members and executive and early indications are that there is a lot of interest in the above topics. The potential for finding some useful information from this research is great.

Specifically, the study could shed light on the incidence and characteristics of training provided by and for the electronics industry; the skill needs of the industry; barriers to providing training; and recommendations for public policy and post secondary educators.

All information will be confidential and Kerry will provide the EMABC with a complete research report upon completion of the project. As spokespersons for the EMABC, we fully endorse this project and ask that you support it by giving Kerry a few minutes of your time when he calls.

Appendix D:  
Survey Questionnaire

HUMAN RESOURCE SURVEY  
B. C. ELECTRONICS INDUSTRY

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Participant Name and Address Details\*

Code \_\_\_\_\_

Name \_\_\_\_\_  
(Surname) (Given)

Title \_\_\_\_\_ Company \_\_\_\_\_

Address \_\_\_\_\_

Telephone \_\_\_\_\_ I would like a summary of the survey findings sent to me?

Yes \_\_\_\_\_ No \_\_\_\_\_

\*Upon receipt of the survey a code will be assigned and this section detached and placed in the researcher's private file and destroyed upon completion of the project

Code \_\_\_\_\_

This survey is in six sections:

Please review each section before you begin the survey.

- I. Company Background Information
- II. Company Human Resource Requirements
- III. External Sources of Human Resources
- IV. Company-Sponsored Training
- V. Company Decision-Making Concerning Training
- VI. Public Policy on Company-Sponsored Training

The identity of the individual completing this survey, and that of his/her firm, will be kept strictly confidential at all times during and after the research.

This survey should take one to two hours to complete. Feel free to do it bit-by-bit as you have a few minutes here and there.

You have the right to refuse to answer any or all of the questions. If you complete and return this questionnaire, it will be assumed that you have given your consent to participate in this survey.

Before you begin the questionnaire, please consider these points:

- if you run out of room for your response, continue it on another piece of paper and specify that you have done so;
- if an item is not relevant to your situation, respond to that effect or leave it blank;
- terms with an asterik (\*) beside them are defined in a glossary at the end of the questionnaire.

GOOD LUCK AND THANK YOU!

# I. COMPANY BACKGROUND INFORMATION

1. How many years has your firm been in operation? \_\_\_\_\_ years

2. Is your firm's operation a: \_\_\_\_\_ head office \_\_\_\_\_ branch office  
 \_\_\_\_\_ local operation

If a branch office, where is your head office? \_\_\_\_\_

3. Indicate the type of business activity(ies) your firm is involved in:

\_\_\_\_\_ research and development \_\_\_\_\_ sales/distribution  
 \_\_\_\_\_ manufacturing \_\_\_\_\_ engineering  
 \_\_\_\_\_ service/repair \_\_\_\_\_ other (specify)  
 \_\_\_\_\_

4. What type of technology or application of technology is your firm involved in making, developing, selling, etc.?

\_\_\_\_\_ instrumentation \_\_\_\_\_ telecommunications  
 \_\_\_\_\_ electrical \_\_\_\_\_ microelectronics  
 \_\_\_\_\_ robotics \_\_\_\_\_ micro processor/control electronics  
 \_\_\_\_\_ power electronics \_\_\_\_\_ other (specify)  
 \_\_\_\_\_

5. Specify the city, town or municipality in which your firm is located:

6. Indicate the number of full-time and part-time personnel currently employed by your firm:

# of full-time staff \_\_\_\_\_ # of part-time staff \_\_\_\_\_

7. a) What number and percentage of full-time employees in your firm are currently covered by a collective agreement?

# of employees covered \_\_\_\_\_; Percentage of total staff \_\_\_\_\_%

7. b) What occupational categories are covered by the agreement?

<input type="checkbox"/> Supervisory	<input type="checkbox"/> Skilled/Trades
<input type="checkbox"/> Professional/Technical	<input type="checkbox"/> Office/Clerical
<input type="checkbox"/> Sales/Marketing	<input type="checkbox"/> Unskilled/Labouring
	<input type="checkbox"/> Other (specify) _____

8. If you are willing to comment, specify your firm's annual gross revenue (for the last fiscal year) and the value of its assets (as of the most recent financial statement):

Annual revenue \$ \_\_\_\_\_; Year ending \_\_\_\_\_

Asset value \$ \_\_\_\_\_; As of \_\_\_\_\_

## II. COMPANY HUMAN RESOURCE REQUIREMENTS

1. Specify the number of employees in your firm employed in each of the following occupational categories:

<input type="checkbox"/> Managerial	<input type="checkbox"/> Office/Clerical
<input type="checkbox"/> Supervisory	<input type="checkbox"/> Skilled Trades
<input type="checkbox"/> Professional/Technical	<input type="checkbox"/> Unskilled/Labouring
<input type="checkbox"/> Sales/Marketing	<input type="checkbox"/> Apprentice
	<input type="checkbox"/> Other (specify) _____

2. Do your firm's employees, as a rule, perform specialized tasks with definite divisions of labour between each other, or is there a lot of overlap between jobs and employees transferring among jobs? Explain your response:

3. In the last three years have there been any significant changes in your employees' job content (e.g. task variety, task complexity, task significance, employee autonomy, etc.)?

Yes \_\_\_\_\_ No \_\_\_\_\_

If yes, describe or give examples:

4. a) Does your firm conduct formal human resource planning?\*

Yes \_\_\_\_\_ No \_\_\_\_\_

- b) If yes:

For what occupations/skills is such planning done?

For what length of periods does your firm forecast the supply of and demand for the above occupations/skills?

Is your firm's human resource planning formally integrated with its strategic planning?

Yes \_\_\_\_\_ No \_\_\_\_\_

If yes, in what ways:

What external (to the firm) sources of data does your firm use to project supply and demand?

5. Does your firm currently have any unmet skill requirements?

Yes \_\_\_\_\_ No \_\_\_\_\_

If yes, specify the types and number of skilled personnel for which your firm has a shortage:

Type of Skill

Approximate Number

6. What are the reasons for the above skill shortages:

7. Has your firm experienced any production/operational problems as a result of these shortages?

Yes \_\_\_\_\_ No \_\_\_\_\_

If yes, describe the problems:

8. What has your firm's response been to such skill shortages?

- |   |  |
|---|--|
| <input type="checkbox"/> provided in-house training | <input type="checkbox"/> invoked overtime                |
| <input type="checkbox"/> recruited                  | <input type="checkbox"/> did nothing                     |
| <input type="checkbox"/> curtailed production       | <input type="checkbox"/> reduced qualifications required |
| <input type="checkbox"/> subcontracted              | <input type="checkbox"/> other (specify)                 |
- 

9. In the next three years, does your firm anticipate any problems in hiring personnel due to a shortage of qualified personnel?

Yes ☐ No ☐

If yes, what types of skilled personnel and for what reasons:

10. Does your firm have any specific business plans (e.g., application of new technology), that will directly or indirectly affect the demand for certain skills?

Yes ☐ No ☐

If yes, describe the plans and specify what skills/occupations would be affected:

### III. EXTERNAL SOURCES OF HUMAN RESOURCES

1. Does your firm recruit post-secondary education graduates?

Yes ☐ No ☐

If yes, indicate the type of institutions, frequency (frequently - F; seldom - S; not at all - N), and disciplines from which the graduates come:

<u>Type of Institution</u>	<u>Frequency</u> <u>(circle one)</u>	<u>Discipline</u>
High Schools	F   S   N	
Vocational Schools	F   S   N	
Community Colleges	F   S   N	
Technical Institutes	F   S   N	
Universities	F   S   N	
Private Schools	F   S   N	

2. Specify the approximate relative percentage of sources your firm utilize for recruiting:

Educational institutions	_____
Other firms	_____
Union halls	_____
Local labour market	_____
National labour market	_____
Outside Canada	_____
	_____

Total 100%

3. Does your firm have an established relationship with any post-secondary educational institutions?

Yes \_\_\_\_\_ No \_\_\_\_\_

If yes, rate the quality and extent of the relationship(s):

Excellent \_\_\_\_\_ Good \_\_\_\_\_ Satisfactory \_\_\_\_\_ Fair \_\_\_\_\_ Poor \_\_\_\_\_

4. Has your firm collaborated in human resource programs with post-secondary educational institutions?

Yes \_\_\_\_\_ No \_\_\_\_\_

If yes, indicate the type of collaboration:

\_\_\_\_\_ Co-operative education/internships\*  
 \_\_\_\_\_ Short term practicums  
 \_\_\_\_\_ Industry-Institution personnel exchange  
 \_\_\_\_\_ Cash donations  
 \_\_\_\_\_ Equipment donations  
 \_\_\_\_\_ Lending facilities or resources  
 \_\_\_\_\_ Providing training services  
 \_\_\_\_\_ Advisory committee membership  
 \_\_\_\_\_ Other (specify)  
 \_\_\_\_\_

5. Rate your firm's overall satisfaction with the full-time post-secondary educational programs relevant to the firm's skill requirements:

Excellent \_\_\_\_\_ Good \_\_\_\_\_ Satisfactory \_\_\_\_\_ Fair \_\_\_\_\_ Poor \_\_\_\_\_



6. Do the relevant programs in question have the appropriate proportion of theory, practical, basic skill and social skill content?

	<u>More needed</u>	<u>Adequate</u>	<u>Less needed</u>
Theory	_____	_____	_____
Practical	_____	_____	_____
Basic skills	_____	_____	_____
Social skills	_____	_____	_____

7. Should there be a definite division of labour in the delivery of education and training between your industry and post-secondary educational institutions?

Yes \_\_\_\_\_ No \_\_\_\_\_

If yes, what should the division of labour be (e.g., according to the type/level of skills, duration of training, transferability of the skills, etc.):

8. What specific changes should be made to the post-secondary education system in B. C. for it to more effectively and efficiently meet your firm's/industry's human resource requirements?

#### IV. COMPANY-SPONSORED TRAINING\*

1. In the last twelve month period for which you have records, has your firm financed job-related training for its employees?

Yes \_\_\_\_\_ No \_\_\_\_\_

If yes, indicate the number and percentage of total employees who participated in such training, and the total amount of company funds spent on it. Specify the period:

For twelve month period ending \_\_\_\_\_  
 Number of employees participating in training \_\_\_\_\_  
 Percentage of total employees \_\_\_\_\_ %  
 Total training expenditures \$ \_\_\_\_\_

2. For each of the occupational categories listed in the chart on page 8, indicate whether your firm financed job-related training in the last twenty-four months; and describe the characteristics of such training in terms of the following types of data for each occupational category.

- i) job title - of those participating in training;
  - ii) specific content - the course/program title or some appropriate one or two word description of the training content;
  - iii) methods - the typical or most frequent among formal off-the-job training\*, formal on-the-job training\*, informal on-the-job training\*, distance learning\*, or self-paced learning\*;
  - iv) duration - average number of hours (for part-time training) or weeks (for full-time training);
  - v) number of employees - the approximate number or in terms of a percentage of the total number of employees in a given occupational category;
  - vi) delivery - who typically conducted the training: the firm, a school, a consultant, a manufacturer's representative, a professional association, or a government agency.
3. Does your firm have any other human resource development\* programs such as paid educational leave\*, tuition assistance\*, or co-operative education\*?

Yes \_\_\_\_\_ No \_\_\_\_\_

If yes, describe the nature of these:

4. Have the nature and/or extent of training financed by your firm changed over the last three years?

Yes \_\_\_\_\_ No \_\_\_\_\_

If yes, describe the changes and the reasons for them:

5. Do you expect the next three year period to be different with regard to your firm's training?

Yes \_\_\_\_\_ No \_\_\_\_\_

If yes, how will the training be different and what will the reasons for this be?

Occupational Category	Job Title	Specific Content	Methods	Duration	Number of Trainees	Delivery
Unskilled/Labouring Yes ____ No ____						
Skilled/Trades Yes ____ No ____						
Office/Clerical Yes ____ No ____						
Sales/Marketing Yes ____ No ____						
Professional/Technical Yes ____ No ____						
Supervisory Yes ____ No ____						
Managerial Yes ____ No ____						
Apprentice Yes ____ No ____						
Other (specify) Yes ____ No ____						

## V. COMPANY DECISION-MAKING ABOUT INVESTING IN TRAINING

1. Does your firm have a written training policy? Yes \_\_\_\_ No \_\_\_\_

If yes, what does this policy state with regard to the conditions under which your firm will finance training?

Is this training policy part of an overall human resource policy?

Yes \_\_\_\_ No \_\_\_\_

If yes, how does training "fit" into the overall human resource policy (i.e., what is the purpose/goal of training within your firm)?

2. Describe the decision-making process your firm goes through to determine whether or not to invest in training with regard to the following aspects:

a) What individuals are usually involved? Specify their positions in the firm and their roles in the decision making:

b) Who assumes the overall responsibility for human resource management policy?

\_\_\_\_\_ Personnel Manager or  
\_\_\_\_\_ Industrial Relations Manager

\_\_\_\_\_ Plant Manager or  
\_\_\_\_\_ Production Supervisor

\_\_\_\_\_ Senior Administrator

\_\_\_\_\_ Owner

\_\_\_\_\_ Other (specify)

---

c) Who or how is a given training program initiated?

\_\_\_\_\_ Management/corporate policy

\_\_\_\_\_ Federal government

\_\_\_\_\_ Management/union collective  
bargaining

\_\_\_\_\_ Provincial government

\_\_\_\_\_ Agreement between management  
and non-union employees

\_\_\_\_\_ Professional association

\_\_\_\_\_ Other (specify)

---

3. Specify the reasons for any job-related training your firm financed in the last two years. Place a check mark beside each of the following reasons for each time it precipitated training:

\_\_\_\_\_ the use of new equipment, tools, processes or materials

\_\_\_\_\_ the application of new technology (specify) \_\_\_\_\_

\_\_\_\_\_ to develop new skills and/or knowledge

\_\_\_\_\_ sub-standard work performance

\_\_\_\_\_ poor morale or staff relations

\_\_\_\_\_ increased production demands

\_\_\_\_\_ safety/industrial hygiene problems

\_\_\_\_\_ staff turnover or attrition

\_\_\_\_\_ new policies or regulations

\_\_\_\_\_ government regulations

\_\_\_\_\_ other (specify)

---

4. Does your firm's decision whether or not to invest in training for a given situation vary according to how general\* or specific\* the skills to be learned are (i.e., transferability, portability)?

Yes \_\_\_\_\_ No \_\_\_\_\_

If yes, how does your firm's decision vary?

5. How useful outside the firm are the skills employees acquire when participating in training financed by your firm:

\_\_\_\_\_ useful, just as effectively, in other companies in your industry only  
 \_\_\_\_\_ useful, just as effectively, in other companies in and outside your industry  
 \_\_\_\_\_ useful in other companies in your industry, but not as effectively as in your firm.  
 \_\_\_\_\_ not useful in other companies

6. Are training needs regularly and systematically analysed and defined in your firm?

Yes \_\_\_\_\_ No \_\_\_\_\_

If yes, describe the frequency and extent of this process:

7. How are requests for training from employees handled or processed?

8. How are employees chosen for training programs financed by your firm?

_____ a minimum period of employment	_____ seniority
_____ union recommendations	_____ admission tests
_____ the rating of job performance	_____ educational level
_____ a supervisory decision	_____ other (specify)

\_\_\_\_\_

9. Indicate the extent to which the following factors have been a deterrent to your firm financing training:

	Effect as a deterrent		
	<u>Major</u>	<u>Minor</u>	<u>None</u>
Return on investment	_____	_____	_____
Conflict of training with production	_____	_____	_____
Cost of trainers	_____	_____	_____
Cost of developing the program	_____	_____	_____
Availability of space for training	_____	_____	_____
Availability of trainers	_____	_____	_____
Cost of training aids/materials	_____	_____	_____
Availability of training aids/materials	_____	_____	_____
Availability of administrative staff	_____	_____	_____
Threat of turnover of staff	_____	_____	_____
Other (specify) _____	_____	_____	_____

10. Does your firm have a training budget? Yes \_\_\_\_\_ No \_\_\_\_\_

11. What costs does your firm include in its training cost calculations?

_____ wages/salaries and benefits of trainees	_____ wages/salaries and benefits of instructors
_____ administrative costs (e.g., clerical labour, data processing, etc.)	_____ industrial costs (e.g., machinery, power, materials and other overhead)
_____ tuition, travel and accomodation	_____ development costs (e.g., course design, developing course materials, etc.)
_____ lost production	_____ other (specify)
_____ replacement costs (labour)	

12. Earlier questions referred to your firm's decision to finance training. What determines whether or not your firm actually delivers the training?

_____ the firm's ability to do so	_____ the nature of the training content
_____ the time available	_____ availability of external resources to provide training
_____ other (specify)	

13. If your firm has any employees covered by a collective agreement or an employee association, does this affect whether or not, for a given situation, your firm finances training?

Yes \_\_\_\_\_ No \_\_\_\_\_

If yes, how is such a decision affected?

Over what aspects of your firm's training does the union have any input or control:

_____ selection of employees for	_____ rotation during layoffs
_____ for training	_____ number of people at a time
_____ ability to alter program	_____ type of evaluation
_____ length of training	_____ other (specify)
_____ accreditation of trainees	_____

#### VI. PUBLIC POLICY ON COMPANY-SPONSORED TRAINING

1. Specify what role, if any, governments should exert concerning the following aspects of company-sponsored training (and how any of these should be shared with industry):

Financing? Yes \_\_\_\_\_ No \_\_\_\_\_ What kind of role?

Delivery? Yes \_\_\_\_\_ No \_\_\_\_\_ What kind of role?

Regulation? Yes \_\_\_\_\_ No \_\_\_\_\_ What kind of role?

Information? Yes \_\_\_\_\_ No \_\_\_\_\_ What kind of role?

2. Which of the following policy options, if any, should be used to finance company-sponsored training in your industry:

	<u>Highly Desirable</u>	<u>Somewhat Desirable</u>	<u>Not Desirable</u>
Wage and training subsidy reimbursements to employers	_____	_____	_____
A program similar to the Unemployment Insurance plan where both employee and employer make regular contributions each year	_____	_____	_____
A program similar to the Registered Retirement Savings Plan where contributions are tax deductible:			
- without employer contributions	_____	_____	_____
<u>or</u>			
- with employer contributions	_____	_____	_____
A levy/grant system where firms which spend less than a specified percentage of its annual payroll on training would be required to remit the difference to the government or some central agency, and which is given back to firms requiring it for training	_____	_____	_____
A levy/credit system which is similar to the above except those firms who train receive a tax credit	_____	_____	_____
Employer tax credits where:			
- firms' training costs would be tax deductible	_____	_____	_____
<u>or</u>			
- firms' tax deductions would exceed their training costs	_____	_____	_____
Other (specify)			
_____			
_____			
_____			

For those options you specified as "highly desirable", explain why they are:



3. What kinds of company-sponsored training support should receive a higher priority from governments? Explain your responses.

a) Occupations:    ☐ managerial    ☐ supervisory    ☐ Sales/marketing  
                          ☐ professional/  
    technical    ☐ office/  
    clerical    ☐ skilled/trades  
                          ☐ unskilled/  
    labouring    ☐ other (specify) \_\_\_\_\_

b) Skills:    ☐ repair/maintenance    ☐ design/engineering  
                  ☐ sales/marketing    ☐ research/development  
                  ☐ production    ☐ other (specify) \_\_\_\_\_

c) Trainees:    ☐ women    ☐ youth    ☐ natives  
                  ☐ unemployed    ☐ disadvantaged  
                  ☐ displaced/redundant workers  
                  ☐ post-secondary graduates

4. a) To what extent has your firm used government financial support for its training programs in the last three years?

none at all ☐    a few times ☐    frequently ☐    always ☐

b) If known:

What percentage of your firm's total training programs have received government financial support? \_\_\_\_\_ %

What is the approximate total amount of funding received from governments for your firm's training in the last twelve months? \$ \_\_\_\_\_

How many training positions have been funded by governments for your firm's training in the last twelve months? \_\_\_\_\_

5. To what extent have the guidelines in government support programs affected your firm's training?

Affect

	<u>Positive</u>	<u>None</u>	<u>Negative</u>
Amount of paperwork	_____	_____	_____
Length of program allowed	_____	_____	_____
Clarity of government guidelines	_____	_____	_____
Time required for government to respond	_____	_____	_____
Firm's ability to alter program	_____	_____	_____
Ability of firm to teach several skills	_____	_____	_____
Other (specify)	_____	_____	_____
_____	_____	_____	_____

6. What has your experience been with government programs for your firm's training?

Excellent\_\_\_\_\_ Good\_\_\_\_\_ Satisfactory\_\_\_\_\_ Fair\_\_\_\_\_ Poor\_\_\_\_\_

Explain the reason(s) for your response. What have the negative and positive aspects of this experience been?

a) Positive aspects:

b) Negative aspects:

7. If your firm has utilized government support programs for training very little, or not at all, explain why:

8. In what way could government support programs for company-sponsored training be improved to be more useful to your firm and industry?

THANK YOU, VERY MUCH!

## GLOSSARY

### Co-operative Education -

An organizational plan or instructional delivery system that formally (i.e., for credits) combines work-related learning in the community with academic instruction in an educational institution.

### Company-Sponsored Training -

The process of training in skills, knowledge and attitudes which are related to an employee's present, or soon-to-be, job, and is financed by the employer; regardless of where the instruction occurs, who delivers it, or the skills/occupation involved.

### Distance Learning -

A learning process conducted through the postal services, radio, television or newspaper, without face-to-face contact between instructor and learner.

### Formal Off-The-Job Training -

The process of training that occurs outside the production process in an organization; physically located on company premises or off-site at another location; is planned with prescribed objectives, location and scheduling, and has someone assigned to provide instruction.

### Formal On-The-Job Training -

The process of training that occurs in the production process, on company premises; is planned, with prescribed objectives, location and scheduling, and has someone assigned to provide instruction.

### "General" Training -

Training that provides an employee in a given firm with skills that are useful (productive) in other firms.

### Human Resource Development -

Any process involving organized learning experiences in a given period of time to bring about the possibility of performance change or general growth for the individual within an organization (i.e., training, education, development).

### Human Resource Planning -

The process by which an organization ensures that it has the right number and kinds of people, at the right places, at the right time, capable of effectively and efficiently completing those tasks that will aid the organization in achieving its overall objectives. It involves formally identifying and projecting supply of human resources and projecting future demand for human resources.

### Informal On-The-Job Training -

The process of training in which employees "pick up" skills and knowledge under normal production conditions with an experienced worker or under the direction of supervisory personnel; and is not formally planned, nor scheduled with specific objectives.

### Paid Educational Leave -

Leave (from work) granted to an employee for educational purposes for a specified period during working hours with adequate financial incentives.

### Self-Paced Learning -

A learning process by which the learner, through self-study of print, audio, video and other media material, learns skills and knowledge at his/her own pace.

### "Specific" Training -

Training that provides an employee in a given firm with skills that are useful (productive) only in that firm.

### Training -

The systematic process of providing instruction to develop skills, knowledge and attitudes in an individual to perform adequately a given task or job.

### Tuition Assistance Program -

An agreement between employer and employees through which an organization offers financial assistance to some or all of its employees to encourage them to complete courses of study either at outside educational institutions or educational vendors.

Appendix E:

Questionnaire Cover Letter

I am conducting a survey of training practices and needs in the B. C. electronics industry, and I would very much appreciate your assistance.

The purpose of the survey is to identify the human resource requirements, training practices and policy, and attitudes toward company-sponsored training and public policy on it in your industry.

How can you help? Attached is a questionnaire that I would like you, as a senior administrator or human resource manager in your industry, to complete. I invite you to participate in this process so that I may attempt to address the following issues:

- how firms decide if and when to invest in training;
- the incidence and characteristics of company-sponsored training in your industry;
- the present and projected skill requirements of your industry;
- the quality and relevancy to your industry of post-secondary educational programs; and
- your attitudes toward public policy on private sector training.

As you are well aware, human resources are a critical factor in your business operations. The results of this survey, thanks to you and others, could be very informative for policy-makers to deliver and direct their programs and services in a more effective and efficient way. It may also provide information for individual firms and the industry as a whole to better plan their training and human resource utilization. Additionally, the survey result may suggest changes for the post-secondary educational system. You can be sure that the results of this research will be forwarded to the appropriate government, educational and industry officials. The final report will be sent to the Electronic Manufacturers' Association of B. C. for its review.

Appendix F:

"Thank You" Letters