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OFFICE COMMUNICATIONS SYSTEMS: MEASURING THEIR IMPACT ON PERFORMANCE : proposal

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OFFICE COMMUNICATIONS SYSTEMS: MEASURING THEIR IMPACT ON PERFORMANCE : proposal

Prepared for

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I

INTRODUCTION

A. GREAT EXPECTATIONS

Rapid development of communications and computer technology is changing traditional approaches to office work. The "office of the future" is quickly becoming the "electronic office of today." This new technology can -- indeed, is intended to -- impact on the efficiency and effectiveness of its users.

Typical descriptions of the electronic office include:

- Internal and external electronic messaging.
- Store and forward voice messaging.
- Records management capability.
- Word processing (text editing).
- "Intelligent" telephone systems.
- Personalized computing functions.
- The capability to interconnect the various components in use.

Several authors have suggested potential areas for performance improvement. The format and wording of these predictions vary, but the similarities in theme and content soon become apparent. For instance, Uhlig et al (1979) list five impact areas which could lead to improved performance:

- Reducing media transformations.
- Reducing "shadow functions" or non-productive activities.
- Replacing manual processes through automation.
- Labour savings and faster decisions through improved timing.
- Improved control through better communications and feedback.

Connell (1981) suggests that office automation can:

- Save time on routine tasks.
- Redistribute workload to free up productive time.

- Expand information bases and their access to improve analysis and decision-making.

- Speed up communications.

A study reported by Bell-Northern Software Research Inc. (1981) looked for improvements in time use, project control, communication, information, job design and quality of working life.

These sources reflect the general expectation that new office technology will improve performance in an area where labour costs are high and continually escalating. To determine whether the implementation of automated systems can realize these expectations requires careful evaluation and measurement.

B. EVALUATING IMPACTS ON PERFORMANCE

The Department of Communications (DOC) guidelines for participation in the Office Communications Systems (OCS) Program recognizes this need by recommending that selected field trial sites spend some time and effort evaluating the impact of these systems. But assessing change is a complex task. Those involved with new office systems experience difficulty choosing what to measure and how.

For some routine clerical functions, expected impacts may be obvious and relatively straightforward to measure. In other cases, however, one cannot simply count the number of outputs. For example, indicators such as the number of reports generated by a professional are useful, but they do not reflect the quality or effectiveness of the author's work.

Selecting or developing a methodology to determine whether system and user goals have been achieved also depends on equipment and time constraints, as well as the relative weighting of quality of measurement information versus the cost of gathering it.

This proposal explores these issues in more detail and outlines how we would develop a user's manual for measuring impacts in an OCS site.

- Chapter II discusses problems in deciding what to measure and how to measure it.

- Chapter III presents our approach to developing an evaluation manual.

- Chapter IV proposes the project team, schedule and costs.

- Chapter V provides some background on our company.

- Chapter VI summarizes our relevant project experience.

- Resumés and references are appended.

II

MEASURING IMPACT: PROBLEMS AND DECISIONS

A. THE UNDERLYING PROBLEM

Office automation introduces technology to the office which promises to revolutionize the way we work. Potential benefits and marvels of this technology have been widely extolled in the popular press. As a result, many people are willing to accept the promise of what office automation will achieve for them, rather than actually examining how it affects the work they do.

Accepting the benefits of large equipment purchases without evidence, however, is contrary to the tenets of getting the best value for your money. But while many sites may wish to evaluate impact, few will have the skills and knowledge needed to do this job properly. Particularly in unstructured environments, they will be unable to identify:

- What the likely consequences are of their equipment.
- How they can choose impacts to measure.
- How to measure the impacts they have identified as relevant.
- How to structure a research study to provide the best information for the money they wish to spend.

Getting an evaluation started would be much simpler for these new sites if a manual were available to help them tackle these problems and make some decisions about how to run their evaluation. A manual to fill these needs will be the basic product of our study.

B. DECIDING WHAT TO MEASURE

For most organizations, deciding what things are appropriate to measure is a difficult task. While they may not be able to verbalize their problems, measurement specialists would list several primary reasons:

- They don't know what impacts should result from the OCS they are getting.
- They don't know whose point of view should guide the choice of evaluation questions.

- They believe the characteristics of their office are different from other offices and are unsure how to adjust to this (e.g., structured versus unstructured work environment, location of office, office hours, workload, etc.)

- They are unsure how to balance off the constraints of time, money, people and political considerations against what they want to know.

1. **Whose point of view?**

Whose point of view should be considered in an impact evaluation is a fundamental question which cannot be resolved without further discussion. There are, however, two opposing points of view on this subject. One suggests that you should look for universally accepted impact measures and only measure these things (goal-free measures). The other viewpoint says that measurement should be based on what people intend to accomplish for themselves, rather than what we may think they want to accomplish (goal-based measures).

We recommend a combination of goal-free and goal-based approaches. We believe that participants at each site will have a slightly different view of what they want a system to help them accomplish. These views should be identified and an attempt made to measure them. These are indicators of how the unit will judge its own success with an OCS. If you fail to measure or recognize these goals or expected impacts, you threaten the acceptance of your evaluation study.

In addition, there should be some indicators which are more or less appropriate in all settings (goal-free). These provide you with continuity and standards which you can use to examine and compare implementation experiences. A number of potential candidates for goal-free measurement are discussed in Chapter III.

We note that goal-free measures tend to be derived from the research literature, the description of equipment capabilities provided by manufacturers, and discussions with the systems analysts. The goal-based measures derive from the points of view of expected users, people making the decisions to implement an office system, and those people actually involved in assessing user needs and implementing the OCS. Typically, an evaluation in a structured office tends to have a larger proportion of universally acceptable performance measures than an evaluation of performance change in an unstructured office.

2. **What are the likely impacts?**

Regardless of point of view, what to measure must be based on the likely impact of an OCS. Likely impacts are a result of the technology and the people who use it.

From a technology point of view, fundamental technical processes such as word processing or electronic mail can be linked to likely impacts such as better document throughput or faster decision-making. A chart which links technology

with expected outcomes (and corresponding measures) would help new sites to select the most appropriate evaluation products from a kind of "supermarket" of potential impacts which could be examined in an evaluation.

From a people point of view, selection of impacts is more difficult. It depends on:

- Participants -- What parties are involved in the study?
- Goals -- What do the different parties expect the office system to achieve?
- Mechanisms -- How do people see the system as achieving its goals?
- Values -- What kinds of changes will people consider to be good or bad?

Despite the variety of possible answers to these issues, a uniform procedure for dealing with them would be helpful. In particular, a step-by-step procedure for identifying, prioritizing and selecting impacts to study and evaluate would help each new site to develop an evaluation plan tailored to its own needs.

C. A BLUEPRINT FOR AN EVALUATION

Deciding what to measure is only part of the evaluation problem at most sites. They also need a strategy for implementing the measures. This strategy or evaluation blueprint should describe:

- Who is responsible for gathering each type of information.
- Who is responsible for providing each type of information.
- When the information will be collected.
- Where the information will be collected.
- How much time it will take to collect the information.
- What the information will cost to gather.
- How the information will be used after it is gathered to resolve an evaluation question.

The purpose of an evaluation blueprint is to:

- Make sure that all needed information is collected.

- Assure that the best use is made of your evaluation resources.

- Eliminate alternative explanations for what is observed.

1. **Alternative explanations**

Any strategy to assess the impact of an OCS must look at people's work both before and after the system is implemented, in order to know what has changed. There are, however, many more issues involved in an evaluation blueprint -- particularly issues centering around the problem of alternative explanations for what you have observed.

Simply observing changes in performance before and after introduction of your system will not assure that these changes are due to the new system. There are always a number of alternative explanations available. If performance improves, people will often attribute the improvement to:

- Experience -- Most people believe our work gets better as we gain more experience.

- Other events -- Perhaps other unplanned changes are taking place in the group such as changes in political structure or organization. Or performance evaluations may be on the horizon.

Other types of events can also be cited as alternative explanations for change:

- Seasonal changes in workload -- Productivity may change because work demands change with the season. For example, we all know that less office work gets done in the summer and around Christmas time.

- Reactivity -- People react to having their performance measured, usually by paying extra attention to the things they are being measured on.

- Special case -- The site may be seen by others as the most receptive group in the organization for an OCS. If this is the case, positive changes could be attributed to their eagerness.

The problems of experience, other events, seasonal changes and reactivity can be solved by introducing a control group. This would result in what is called a non-equivalent control group design for the measurement plan (Campbell and Stanley, 1963).

The problem with being a special case cannot be readily solved. Only by evaluations in less eager units at some later date can you truly resolve this alternative explanation.

2. **Hawthorne effect**

The Hawthorne effect is a well-known effect in industrial psychology. It basically indicates that intervention in the work environment can lead to temporary improvements in productivity which are side-effects of the change process -- rather than anything resulting from the actual intervention. The suggested technique for dealing with this problem has traditionally been to introduce a second control group which receives some intervention unrelated to the intervention you wish to test. For office automation studies, the suggested second control group is a group in which some kind of manual improvements are being implemented.

We believe, however, that this is unnecessary. There is little evidence for the impact of the Hawthorne effect in field settings such as a government department (Cook, 1967; Diamond, 1974). What we recommend instead, is that a unit measure its post-implementation performance at least six months (and preferably longer) after its introduction. This period of time should be long enough for people's work habits to stabilize again.

3. **Rosenthal effect**

This is a lesser known effect coming out of educational studies. This effect is commonly called "self-fulfilling prophecy". Basically, if people believe an intervention will have a particular effect on them, they tend to colour their perceptions of what happens to make this seem the case.

This is a difficult effect to deal with. It requires thorough discussion with people before implementation to find out what they think will happen and why. Then, an analyst must look for misperceptions, try to measure them in the course of the study, and separate them out in the final analysis. There are also a series of techniques for spotting people who are unduly positive, negative or extreme in their opinions. These techniques can be brought into play in the subsequent data analysis.

4. **Gauging improvement**

Gauging improvements in performance minimally requires measurement before and after the system is introduced. More importantly though, it requires that the people in the evaluation study can specify before-hand what kind of changes they will consider to be for the better.

5. **Developing the blueprint**

A manual could provide a great deal of information to help a group develop its research strategy. A good manual should allow a site wishing to do an evaluation, to make the major decisions they need to make, in order to design their evaluation study. At worst, their need for outside expertise will be limited. At best, they will be able to proceed with some awareness of the problems they are expecting without any further outside assistance. We would consider this to be a

desirable function of a manual -- one which could offer considerable savings at new evaluation sites.

D. HOW TO MEASURE IMPACT ON PERFORMANCE

How a new site will actually measure the impact of an OCS on their performance will depend upon:

- The relevant impacts.
- Political constraints in their environment.
- Time commitments from their staff.
- The level of effort for their project.

Suffice it to say that there are a plethora of measures available for examining impact. These include such techniques as:

- Behaviourally-anchored rating scales, simple rating scales.
- Counts on observables such as budget performance, on-time performance, etc.
- Work time measurement.
- Document analysis: analysis of memos, letters, telephone calls, time sheets, etc. for content and patterns of communication.
- Computer tracking of information, i.e., information gained directly through the terminal and recorded by your OCS.
- Interviews with system users.

We believe that a manual identifying the best measuring techniques for each impact with their relative cost and the relative quality of the information they yield would be of tremendous value to sites planning an evaluation of the impact of their OCS. This information would allow them to balance the quality of information with the cost of information to arrive at the best combination of measures for their purposes.

III

DEVELOPING AN EVALUATION MANUAL

A. AN OVERVIEW OF OUR APPROACH

We believe that evaluations of the impact of office communication systems (OCS) would be more common, better done and more economical if new sites had a manual to work with for designing their evaluation. This manual would provide them with the kind of information they need to get an evaluation started. While expert help might still be needed in some phases of the work, this need would be considerably moderated. In addition, an evaluation manual could:

- Save the costs of digging up the information needed at each site.
- Help people understand what they can and can't learn from an evaluation.
- Help people decide what to measure and how to measure it.
- Help people quickly grasp their problems and priorities.

The evaluation manual should be designed to provide an overview of the evaluation process and then a detailed step-by-step approach to designing and executing an evaluation.

We see the manual as slowly leading people to an evaluation blueprint by successive decisions about their needs and priorities. The process would have five major steps:

- One: Selecting the impacts appropriate to the equipment being installed and its capabilities.
- Two: Asking relevant people to identify impacts they consider important at the current site. People-related impacts mentioned at other sites would form a starting point for this step.
- Three: Putting the impacts from steps one and two together and seeing how much sense they make for a given site. This would be followed by setting priorities for the most important impacts and getting rid of less important ones.
- Four: Stating the constraints for the evaluation study and using these constraints to select the appropriate measuring instruments for each impact.
- Five: Developing a research strategy using standardized action plans.

We see each step as being clearly guided in the manual. Each step would have forms included to structure the gathering of information for the step and the decision-making based on the information gathered. For some steps, the decision-making would be strictly guided by the manual (steps one and four). For other steps, we would provide procedural guidelines to standardize the decision-making process as much as possible.

These steps are described in more detail in subsequent sections of this chapter.

B. STEP ONE: TECHNOLOGY-RELATED IMPACTS

Our assumption here is that a systems analysis has been done and equipment has been chosen which best meets user needs. We recognize, however, that there are additional considerations:

- Some user needs may not be satisfied by the equipment chosen.
- Some impacts the technology can provide will not be known or anticipated by users.
- Equipment may satisfy user needs in a way which produces unintended side-effects.

We believe that the first step in the evaluation plan is assessing the potential impacts of the technology on performance, whether those impacts be intended or unintended. To help the user site identify these impacts, we would develop a checklist which identifies major processes with their likely impacts and possible side-effects to be guarded against. Major processes we would consider include:

- Word processing.
- Automated file handling.
- Search and file retrieval capabilities.
- Storage and forwarding of voice messages.
- Electronic messaging (electronic mail).
- Personalized computing functions such as budget planning, scheduling, desk top calculator capability, financial modelling, etc.
- Access to major reference data bases.
- Computer conferencing.

- Other teleconferencing.

Of course, we would also consider other major processes identified as real possibilities in the literature.

Our idea of what a page in the manual might look like for Step One is illustrated in Exhibit III-1. We chose text editing for this example because it is a process which is familiar to most office workers at this point. Of course, a similar page could be developed for any other process we identify.

In the course of our preparation of this portion of the manual, we would identify the common processes mainly by reference to the research literature and discussions with groups involved in the implementation of office communications systems. We would identify likely impacts in the same manner, but we believe that considerably more thinking and consultation will be involved in pinpointing the impact and side-effects of each process.

C. STEP TWO: PEOPLE-RELATED IMPACTS

When we talk about people-related impacts, we mean those things which people at a site believe the system will do for them and how they think the system will achieve this. By people, we mean three groups at each site: systems analysts, the decision-makers who decided to implement the system and system users.

We believe that unique people-related impacts may be formulated at each site, but that there will be a large overlap among sites in their choice of impacts. The nature of the overlap will probably depend on whether their work is structured or unstructured in nature. By structured, we mean work which is largely pre-defined in nature in terms of inputs, processes and outputs. This refers to functions which are largely clerical in nature. In an unstructured environment, the work is not well defined at all. This would be applicable to functions such as policy formulation or other ill-defined activities.

We believe that a list of people-related impacts should be provided in our manual, as well as a set of procedural guidelines for supplementing this list. The people-related impacts will be stated in the same way as the technology-related impacts (see Exhibit III-1). We will, however, attempt to identify impacts which are uniquely related to structured, unstructured and hybrid environments.

To identify these impacts, we propose to spend some time interviewing and surveying people in these three types of environments. We are aware of several office automation projects in the federal government which might be appropriate for this work. Preliminary contact with the people involved indicates some willingness to allow us to work with them in their studies. Assumedly, other groups would also welcome our participation in their evaluations.

Exhibit III-1 **An example of a process-impact chart (for text-editing)**

Process: Text-Editing

Likely impacts:

Structured work:

- faster document throughput
- fewer errors in final documents
- more attractive final documents
- faster typing speeds
- reduction in the scrap rate of the documents

Unstructured work:

- improved document histories
- reduced proofreading time
- improved distribution and routing
- improved access to documents
- reduced workload fluctuation
- improved organization of documents
- less time spent preparing reports
- fewer delays in obtaining documents
- improved writing clarity, lower "fog index"
- fewer "late" reports

D. STEP THREE: SETTING PRIORITIES FOR YOUR EVALUATION STUDY

At the end of Step Two, the user group has a list of processes and impacts to consider in an evaluation study. In fact, there may be too many to look at. In order to pare down the list of impacts to a manageable size, the department needs to decide on its priorities in the evaluation study. By setting its priorities, sifting through the list of impacts, and making decisions the department can arrive at a small, manageable number of impacts to examine.

We will suggest several bases in our guidelines for paring down the list of potential impacts. These might include:

- Potential cost-benefit of the impacts.
- The mission of the group or department.
- Time, money, personnel or political constraints on the evaluation process.
- The desire to make this evaluation comparable to previous evaluations.
- Emphasis on the goals of internal users versus more universal criteria for judging impact.
- Voting procedures for choosing the impacts that are of greatest interest.

In addition to suggesting bases for paring down the list of impacts, we will develop procedural guidelines for how the process of prioritization should be conducted. We will also try to develop some rules-of-thumb relating the number and types of impacts studied to the cost of an evaluation. This will not be done in dollar terms since potential changes in dollar values are too great to reckon, but rather in relative terms such as high, medium or low cost.

Using our procedural guidelines, an evaluation site should be able to better define their priorities. With the small set of impacts mandated by their priorities, they can then develop an evaluation blueprint. Some notion of the kind of product this step should yield is shown in Exhibit III-2. This Exhibit shows some particular impacts which an office might wish to examine and the sub-questions associated with those impacts in order of their priority. For the sake of variety, we will illustrate this with some impacts probable in an unstructured environment.

Exhibit III-2 An example of a selected impact chart

Priority	Impact product/process	Nature of impact
1.0	Policy position papers	(.1) quality of technical solutions (.2) document organization (.3) writing clarity -- fog index
2.0	Report preparation	(.1) time spent writing (.2) time spent editing (.3) speed of reviewer response
3.0	Client satisfaction with reports	(.1) overall client satisfaction with final document (.2) client satisfaction with communications leading to the report (.3) client satisfaction with the documentation of facts leading to the policy position

E. STEP FOUR: SELECTING IMPACT MEASURES

By the end of Step Three, we've decided what to measure. Now, the user needs to decide how to measure each impact. This is a major stumbling block for most user groups. We suggest that our manual contain some remedy to this problem. Specifically, we will provide for each major type of impact a list of alternative strategies for measuring the impact. We will further describe the relative cost of using the technique properly and the relative quality of the information likely to be gathered if the technique is properly applied. An example of the type of chart we envision in this step is shown in Exhibit III-3.

Typically, the user can consider cost to be a proxy for the level of personnel and/or the hours needed to do the data-gathering. We would also provide the user with some forms to help decide which measurement techniques are best used to measure each impact, given the constraints of budget and priorities.

So the user can be aware of the problems associated with each technique, we will also provide some appendices describing common problems encountered when using each major technique. The major measurement techniques we will consider will include:

- Document-based measures: these include analysis of the content of memos, letters, telephone call slips, timesheets, printouts, etc.

- Direct observation: this involves standing in the vicinity of users and directly observing how they spend their time.

- Non-reactive measures: these include all measures which are not detectable by the person being measured, and which are thus unlikely to have an effect on the person's behaviour.

- Computer tracking of information: this is information which is gained directly through the terminal and is recorded somewhere in the OCS for later retrieval.

- Paper questionnaires: questionnaires which intrude on people's time to some extent, but gather information not available by other means.

- Interviews: here we are talking about formal one-to-one interviews.

- Rating scales: either external or internal review or use of rating scales.

We present a possible description of how we might tackle one of these techniques (see Exhibit III-4). For the purpose of discussion we will look at an industrial engineering-type technique, direct observation (work-time measurement).

A summary table showing all major techniques with their associated strengths and weaknesses should also help the user select the most manageable measurement technique.

Exhibit III-3 An example of an impact measurement chart

	Impact		Measure	Relative Quality	Relative Cost
(1.0)	Improved communications with clients	(.1)	Content analysis of written documents	M	H
		(.2)	Client rating scales	M	M
		(.3)	Observed time spent communicating with clients	L	H
		(.4)	No. of successful client-initiated contacts (i.e., messages received)	M	L
		(.5)	Observed time spent trying to arrange communication between client and principal	M	H

Exhibit III-4 An example of a "Measurement Problems" chart

Measurement Techniques	Problems
Work time measurement	- Increases or decreases in activity time are difficult to evaluate in isolation - Large variations in time for a few people can easily mask shifts in average work time for most people - Difficult to specify exactly what constitutes the beginning and end of an activity - Expensive to gather - Presence of observers doing "timing studies" is disruptive **Strengths** - Doesn't make demands on system user's time - Very objective evidence - Measurements are reliable - Widely accepted techniques - Measuring of observations is clear to everyone - Easy to train people to do

Combining the information in our three documents:

- Impact versus measurement technique versus quality versus cost.
- Measurement technique -- associated problems and strengths.
- Measurement techniques -- summary of strengths and weaknesses for all techniques.

With the priorities of the group and these documents, we believe that user groups should be able to formulate a detailed measurement description. Our guidelines would indicate several strategies to be used in defining the evaluation blueprint.

For important impacts, we recommend several measures of the impact so that we may corroborate the information.

For impacts which are not too important, we tend to use weaker and less expensive measures.

We also use a variety of sources of information to avoid the bias of any single source. In addition, we use several different types of measurement to avoid the biases inherent in any single measurement technique.

F. STEP FIVE: FINALIZING THE EVALUATION BLUEPRINT

Finalizing the evaluation blueprint is largely a question of satisficing. We suggest that our manual provide some guidelines for translating the measurements chosen in Step Four into an evaluation blueprint. We will provide information to aid in this process including:

- A brief description of selected data-gathering strategies with their strengths and weaknesses.
- Some rules-of-thumb about data-gathering.
- Some forms (action plans) to help people formulate their strategy.
- A step-by-step listing of the decisions needed to translate measurements, impacts and resources into an evaluation plan.

While we cannot provide guidelines which say "If you are looking at A, then you should do B", we can provide guidelines which say "If you do A, you are open to alternative interpretation B, C and Q -- if you think these are unlikely, this is a good choice."

We believe that most people will understand their environment well enough to use this type of guideline to structure their evaluation blueprint. The exact details of when, where, how, and who gathers measurements provide the remainder of the structure needed for doing the job. Through development of good forms for recording "plans for action," we believe that we can help people structure their evaluation blueprint effectively and efficiently.

G. THE FINAL PRODUCT

The final product of our proposed study is a manual to help people design an evaluation of the impacts of an OCS on the performance of users in their office. The manual will be simple and easy-to-use, relying on a step-by-step approach to making the decisions needed. But, there are some things the manual will not do:

- It will not construct the measuring instruments needed.
- It will not analyze the data or describe how to analyze the data collected.
- It will not make decisions for users when priority setting and subjective decision-making is needed.

Despite these limitations, we feel that this type of manual will be useful throughout government for evaluating the impact of OCS. To assure this, we would like to work through the process with at least one group implementing an OCS. This pilot project would serve as a development and testing ground for our materials. It would help ensure their clarity and their relevance. Since we expect unstructured environments to be more difficult to describe, we would prefer that an unstructured environment be our pilot project site.

Of course, if additional funds are available (see Option II in Chapter IV, Section B), we would prefer to pilot-test our manual in at least one unstructured, one structured and one hybrid environment. This would help ensure that our approach was equally applicable to all environments. We believe that you may find this incremental investment to be readily justifiable for a project of this nature and generalizability.

H. ADDING A SIXTH STEP: AN OPTION TO CARRY OUT THE IMPACT EVALUATION

An option that you might wish to consider at any project site is to have us work through the rest of the evaluation process. That is, given the evaluation blueprint we would also:

- Meet with users about their plans.
- Design the actual content of the measuring instruments.
- Supervise in data-collection and coding.
- Analyze the impact data.
- Write a report on the impact of the OCS at that site.

Since data-collection and analysis tend to be time consuming procedures, this would add considerably to the cost of our work. Nonetheless, we believe that this cost is justifiable. In particular, we would be readily capitalizing on the earlier work done on the site. Furthermore, it would allow several key people at each site to develop some experience in evaluation which they might be able to transfer to other sites. We believe that this learning experience ending in a completed project report, would more than compensate for the extra costs incurred.

IV

STAFFING, SCHEDULE AND COSTS

A. THE PROJECT TEAM

Dr. Ed Weinstein will be the principal investigator for the study. Dr. Weinstein's background includes extensive experience in developing performance measures in various contexts. For both clerical and professional functions, he has developed highly reliable techniques geared to widespread use. As well, he has conducted a number of more general evaluations of programs or other interventions. Dr. Weinstein will assume primary responsibility for the measurement plan, instrument development and testing in a field setting.

Ms. Sharon Varette will carry out much of the work involved in identifying technology and people-related impacts. Having completed several evaluation studies, Ms. Varette has considerable experience in the process of identifying intended and unintended impacts and determining evaluation constraints related to implementation. As the functional liaison for Abt Associates with the interdisciplinary Advanced Office Concepts Group (see Chapter V), she is familiar with and has conducted research on the technology and its impacts.

Ken Grant, Principal in charge of the Advanced Office Concepts Group, will provide technical advice to the study in terms of likely impacts. With a background in information systems and office technology in both North American and Europe, Mr. Grant is presently acting as project advisor to the Advanced Office Project of the Ontario Ministry of Government Services. He has also managed and conducted many assignments covering specification, selection and implementation of office technologies.

Other staff with experience in conductig evaluation and office studies are available to assist with field testing and data-collection.

B. SCHEDULE AND COSTS

Exhibit IV-1 sets out a preliminary schedule for the six steps outlined in Chapter III. The exact timing would depend on the number of sites in which our approach is tested, their individual progress and whether an actual evaluation is conducted in one or more sites. Note that a complete evaluation could only be initiated after a project site installation has been implemented for at least six months. For each step, we have allowed time to document our findings to date.

Exhibit IV-2 shows the estimated costs for the project broken down by optional strategies. The cost to conduct a full evaluation assumes that the respective project site would make some staff time available for data preparation

and coding. As well, we have assumed that costs include the use of computer time at the site being evaluated. Otherwise, estimated costs for keypunching and computer time would be $4,000.

In selecting an option, the OCS Program might want to consider a cost-sharing arrangement with project site departments, with the latter funding site-specific work (i.e., an evaluation).

Exhibit IV-1 **Preliminary project schedule**

STEP	TASK	ELAPSED TIME (WEEKS) 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Orientation	Start-up discussions with DOC and OCS site(s)																				
1.	Identify technology-related impacts																				
2.	Identify people-related impacts																				
3.	Set priorities for evaluation																				
4.	Select the impact measures																				
5.	Finalize the evaluation blueprint																				
6.	Carry out the impact evaluation(s)																				

▼ Project meetings

Exhibit IV-2 Project costs

OPTION	I	II	III	IV
	Develop manual and test at one project site.	Develop manual and test at three (types of) project sites.	Develop manual, test and conduct a complete evaluation at one site.	Develop manual, test and conduct complete evaluations at three sites.
COST	$55,000	$75,000	$80,000	$150,000

V

COMPANY PROFILE

A. ABT ASSOCIATES OF CANADA

Abt Associates provide social research services to clients in the public and private sectors.

Our business centres on the development and delivery of social research projects. The question being addressed may involve program impact, policy alternatives, program implementation, or a demonstration project. Briefly, the key steps are:

- Formulate the research program, developing issues and hypotheses.
- Decide what aspects of the situation can be measured, considering that not all aspects are measurable and not all measurement is cost-justified.
- Design program to accomplish measurement.
- Execute design, typically capturing primary data.
- Analyze results, using appropriate statistical techniques.
- Prepare reports summarizing technical findings and/or presenting results in non-technical language.

Depending on client needs, we will conduct projects involving one of these steps or a number of steps together. Related services include:

- Formative research, considering details of program implementation to improve evaluability and/or program design.
- Technical studies, assessing the feasibility of a research task or the technical adequacy of a research program.
- Simulation models, seeking insight into complex relationships and consequences of alternative courses of action.

Under the terms of a licensing agreement, Abt Associates of Canada adheres to the quality standards, rules, regulations, procedures and programs of Abt Associates Inc. of Cambridge, Massachusetts. The close working relationship means that each makes available to the other all non-confidential and unrestricted research materials, reports and working papers. Members of staff of each company are available to the other's clients at normal rates.

B. THORNE STEVENSON & KELLOGG: MANAGEMENT CONSULTANTS

Thorne Stevenson & Kellogg is an independent Canadian firm of consultants that has been serving government, public institutions and private firms in commerce, industry and agriculture for almost forty years. Today we have offices in eight cities in Canada.

We have no business interests other than management consulting. While we number Chartered Accountants and Professionals Engineers among our principals and consultants, we are neither a department nor subsidiary of either of these two types of organizations. Thorne Stevenson & Kellogg is owned by its professional staff.

In May 1980, Stevenson & Kellogg acquired the management consulting practice of Thorne Riddell, Canada's largest firm of public accountants. As a result of this acquisition, the company's name was changed to Thorne Stevenson & Kellogg. The goal of our two companies is that, while they will continue to operate as separate and independently owned entities, they will work closely together to their mutual benefit. The arrangement gives Thorne Stevenson & Kellogg an unexcelled range of depth and full service capability.

Our consultants are grouped within their specialty or profession -- transportation, resource management, economic development and planning, industrial management, management science, financial controls, office technology, computer sciences and personnel administration. Each group is headed by a principal of the firm -- a recognized leader in his/her field. We have, in addition, other groups specializing in certain industries.

Our approach is flexible. It is tailored to the needs of each project or client. Many of our projects require only one or two consultants. On the other hand, we often provide, co-ordinate and manage efficiently a wide range of skills on more complex projects. In this respect, the affiliations of our staff with major Canadian and U.S. universities are helpful. They enable us to assemble the best mix of talent for each assignment.

Thorne Stevenson & Kellogg has served business, government and other organizations in the following areas of management: general management and organization, corporate planning, marketing, financial administration, economic and resource management, economic development, regional planning, manufacturing management, industrial engineering, physical distribution, office automation, computer science, personnel policies and practices, training, industrial psychology and occupational counselling.

Thorne Stevenson & Kellogg is a member of the Canadian Association of Management Consultants, the MTM Association for Standards and Research, and the Travel Research Association.

C. CANADIAN FACTS

Canadian Facts is Canada's largest and most experienced research organization, having served marketing and opinion research needs for over 40 years. The company has led in the rapid development of research in Canada. Throughout, it has maintained its pioneering spirit and problem-solving skills in the sophisticated business of translating research data into actionable information for decision-making and policy formulation.

Canadian Facts' success and reputation are based on a commitment to professionalism and integrity in all aspects of business. Its primary emphasis is quality and value. It guarantees the highest standards on all research studies -- from private, confidential studies to studies subject to public and legal scrutiny.

More than 20 professionals devote their full time to serving clients' needs. They are organized into project teams, a system which assures every client of continuing attention at a senior level. Allied to expert client service, the company offers a comprehensive range of research services, technical expertise, and specialized facilities catering to the broadest spectrum of research needs.

Toronto is the Head Office and control centre for the national field staff, sampling, quality-control and data processing departments. Canadian Facts, Vancouver, offers knowledge and expertise to clients interested in Western markets. Realites Canadiennes, Montreal, is completely bilingual and provides specialized expertise to clients interested in the French-Canadian market. The Ottawa office provides specialized assistance on assignments for the federal government.

D. ABT ASSOCIATES INC.

The company was founded in Cambridge, Massachusetts, in 1965, with an original focus on simulation and games in education. In 1981, the company has 750 employees devoted to social and economic research in the fields of health, education, employment, criminal justice, housing, and technology transfer. Technologies or groupings of problem-solving techniques include:

- Quantitative social program evaluations, including social and economic impact evaluation, process evaluation and formative evaluation. These are both retrospective and program accompanying evaluations.

- Social and economic experiments of rigorous statistical design to assess pilot program implementation and prospective evaluation of public response, benefits and costs to government.

- Social audits estimating net social benefits generated by organizations for their constituencies.

- Analysis and interpretation of quantitative and qualitative (categorical) data.

E. CORPORATE STRUCTURE

The linkages between these various operating groups should be explained. Thorne Stevenson & Kellogg and Canadian Facts merged practices in 1973. In 1979, we established a third operating division called Abt Associates of Canada. All three operate as divisions of one company with a single Board of Directors and common shareholding. The three operate as profit centres of one employee-owned Canadian company.

This organization means that our project team can be drawn from members of staff of any of the three divisions. Each of the divisions can reach into the other in order to assemble a project team that possesses the requisite skills for the task at hand.

This interdisciplinary approach is illustrated by our Advanced Office Systems Group. This group has the following responsibilities:

- Working directly with our clients on those assignments primarily concerned with office automation.
- Providing technical advice and support to other groups within Thorne Stevenson & Kellogg when their assignments contain a significant office component.
- Conducting general research into the evolution of office technology and its impact on user organizations.

Project teams for advanced office studies may include personnel from any of the sister divisions, as well as specialized associates. As explained, we have an agreement with Abt Associates Inc. of Cambridge, Massachusetts that allows us to exercise a similar facility with respect to AAI staff.

VI

THE TASK AND OUR QUALIFICATIONS

A. OVERVIEW

We can speculate that a series of steps would be undertaken to move from the status quo in any given site, through design, implementation and evaluation of an office communications system. For example, a preferred generic approach might involve:

- Describing the status quo in the subject organization.
- Specifying the new system, taking advantage of available technology.
- Designing pre-post measurements.
- Implementing the new system.
- Conducting post-implementation measurement.

Our experience with evaluation studies is relevant to those components involving performance measurement.

The discussion in Chapter II emphasized the importance of capturing before and after pictures of performance and eliminating alternative explanations. This process is one which we have followed in projects described in the following section -- eg., evaluations of the implementation of the Metropolitan Order Processing System and the Unemployment Insurance "On-Line" System.

The design and conduct of these pre-post studies has given us a useful insight into means of controlling for intervening variables and into the challenges of maintaining the integrity of our research design in the face of alterations in implementation schedules and, to some extent, modifications of stated system performance. Measures such as user reaction, impact on quality and timeliness of reports were considered in both studies.

The importance of selecting or designing indicators which are rationally linked to the stated goals of a given intervention underlies all our evaluation work. Also critical is the careful monitoring of performance during the implementation period. We have conducted implementation reviews of a number of government programs. This type of research has provided data that have helped explain a number of program outcomes.

Our sister division, Thorne Stevenson & Kellogg, can also offer expertise through related studies carried out by the Advanced Office Systems group, as well as interdisciplinary teams.

The following project descriptions highlight our combined experience in the key skill areas.

B. RELEVANT EXPERIENCE — ABT ASSOCIATES OF CANADA

CANADIAN EMPLOYMENT AND IMMIGRATION COMMISSION

EVALUATION OF THE METROPOLITAN ORDER PROCESSING SYSTEM (MOPS)

The Metropolitan Order Processing System (MOPS) is being introduced in Montreal and Toronto in 1980. The system provides automated record keeping for both job openings and clients seeking jobs. The objectives of the system are:

- To improve the functioning of the Metropolitan labour market.
- To improve service to employers and work clients.
- To improve the efficiency of the Canadian Employment Centre operation.

This Abt Associates evaluation utilizes a pre/post design to assess the impact of the Order Processing System. Performance indicators are gathered from internal records and enhanced by data from a random selection of 700 job orders placed during each of the pre- and post-test periods. Jobs are categorized into six groups and monitored to capture accurate and comparable data on various indicators of performance of the manual and automated systems.

In addition, the study assesses the work content of the manual and automated systems to evaluate the cost saving that may be involved. This study considers the utility of the detailed labour market information available from a system such as MOPS. The evaluation considers the impact on CEC staff, gathering reactions as to the adequacy of training in the use and manipulation of the system, the functioning of the computer system and overall, the perceived impacts of MOPS. Finally, the evaluation considers the technical performance of the computer system.

The most sensitive overall measure of the performance of the system is interviews of a random selection of 100 employers from among the 700 selected for monitoring. Telephone follow-up interviews are conducted to assess overall reactions to performance of the CEC, with and without the MOPS system.

Technical Reviewer:

Dr.Charles Rodgers
Abt Associates Inc.

Client Contact:

D. Upex
Canadian Employment and
Immigration Commission
Place du Portage
Hull, Quebec

CANADIAN EMPLOYMENT AND INSURANCE COMMISSION

EVALUATION OF THE INSURANCE ON LINE SYSTEM IN THE ATLANTIC PROVINCES

The Insurance On-Line System (IOLS) was pilot tested in Hull from 1976 to 1978 and introduced in Ottawa in 1978. It is being extended to the Atlantic Provinces in the first half of 1981. Its purpose is to improve the speed and quality of service to UIC clients and improve the efficiency of providing this service.

This Abt Associates evaluation uses a pre-post design to assess the impact of IOLS on a broad range of measures of performance. Performance indicators are collected regarding the operation of 15 test Canada Employment Centres (CEC) prior to and following the introduction of IOLS. The data collection is from two primary sources:

- UIC internal records.
- On-site technical observation activities.

The data are then analyzed statistically to determine the impact of IOLS on speed of response to enquiries, work load on various categories of CEC personnel, error factor, work load on Regional Computer Centre personnel, overpayments and detection of disqualified claims.

The statistical analysis is extended to a full cost benefit analysis to assess whether IOLS should be extended to all areas of Canada.

Lastly, the analysis is supported by a statistical opinion survey of CEIC personnel to assess reactions and attitudes to the new system.

Client Contact:

R. Corbeil
Canadian Employment and
Immigration Commission
Place du Portage
Hull, Quebec

DESIGN CONSIDERATIONS IN THE EVALUATION OF THE ECONOMIC IMPACT OF TRAINING

The client recognizes the increasing importance of being well informed about alternative ways of evaluating the economic impact of its training programs.

This study provides a useful guide that will:

- Assist discussion of the economic impact of its programs.
- Help specify the structure and level of complexity of evaluations of the economic impact of training programs.

The research program has two distinct phases. Based on the characteristics of the major training programs implemented by the client, the key outcomes and key process variables that influence the technical design of the evaluation will be identified.

From this description of program outcomes and characteristics, the study provides a detailed investigation of each of the characteristics and outcomes. This entails:

- Description of major program variables and their relationships, stated in non-technical terms.
- Discussion of the evaluation approach, summarizing the key features of the evaluation design and presenting them in a useful, non-technical form. This will include some discussion of the different measures that can be used, the direction of bias associated with each, and some indication of the relative costs of the alternative methods.

The overall objective of the study is to create a document which will serve as a useful guide for specification of future evaluation.

Client Contact:

A Government Department

CANADA EMPLOYMENT AND IMMIGRATION COMMISSION

EVALUATION OF THREE JOB CREATION PROGRAMS

In 1980 the Federal Government introduced a number of job creation programs. The objective of this Abt Associates study is to evaluate three of these: the Canada Community Development Projects (CCDP), which give employment preference to specific groups; the Canada Community Service Projects (CCSP), similar to CCDP but aimed at the not-for-profit sector; and the New Technology Employment Program (NTEP). Specifically, the evaluation measures:

- The impact of the programs on participants (wage levels, skills, duration and type of subsequent employment, etc.).
- The appropriateness of the job training received under the program.
- The labour market impact, including the opportunity cost of individual participants in the programs, as well as the net job creation of the program.
- The value of the output.

In addition, we conduct an implementation review to document the actual program activity that occurs, trace qualitative and quantitative changes in the programs throughout their development and measure the degree to which expected "treatments" actually occur.

Many research techniques are brought to bear in this major evaluation effort:

- Survey research to study the experience of participants.
- Economic modelling, using a very large data base of departmental records.
- On-site evaluation to review program design, assess project selection, and determine community effects.

The results are brought together in a number of technical reports as well as a final report capturing the highlights of our presentation in non-technical language.

Technical Reviewer:

Dr. Charles Fairchild
Abt Associates Inc.

Client Contact:

D. Upex
Program Evaluation Division
CEIC
Hull, Quebec

DEPARTMENT OF SUPPLY AND SERVICES

EVALUABILITY ASSESSMENT OF THE CANADIAN GOVERNMENT PRINTING OFFICE

The Canadian Government Printing Office (CGPO) has about 1,600 employees and a budget of approximately $150,000,000 per annum to provide, in various ways, printing products and allied services to the Government of Canada. This organization, through various units, is involved in:

- Supply Management Activities.
- Procurement Activities.
- Production Activities.
- Computer Services.
- Training and Design.

The objectives of this Abt Associates study are to define the program's detailed evaluability, to establish areas in which problems may be expected, and to provide the basis for detailed planning of the overall program evaluation.

Interviews with senior management of CGPO together with documents such as Estimates and Operational Plans are used to formulate program models for each branch of CGPO. These models illustrate the linkages between the program activities and objectives/effects and lead to the formulation of basic evaluation questions.

The program models, basic evaluation questions and discussions with the client, provide a structure for the evaluation plans for the various components of CGPO.

Client Contact:

O.S. Davidge, Director
Program Evaluation Branch
Department of Supply and Services
Place du Portage
Hull, Quebec

DEPARTMENT OF SUPPLY AND SERVICES

EVALUATION OF MAIN PLANT BRANCH AND TEXT EDITING AND PHOTOCOMPOSITION BRANCH (CANADIAN GOVERNMENT PRINTING OFFICE)

The Main Plant Branch (MPB) provides a printing service to government. This includes: Parliamentary printing (Hansard, committee reports, bills), "Must" (material that cannot be sent to the private sector because of urgency, security or sensitivity) and "Fill" (other government printing that is used to fill MPB capacity when the volume of House or Must work is low).

The Text Editing and Photocomposition Branch (TEPB) provides: photocomposition service to the MPB Composition Department, text editing, data storage and photocomposition services to Parliament and government departments and computer facilities for Canadian Government Printing Office administrative purposes.

This Abt Associates study of both the MPB and the TEPB investigates:

- Price comparisons with the private sector.
- Price/cost comparisons.
- Validity of cost distribution between customers.
- Profiles of Branch workloads and workload characteristics.
- Assessment of Branch capability and utilization.
- Relationship of equipment adequacy to workload.
- Assessment of client satisfaction, need and future requirements.

The MPB study also assesses the availability and type of fill.

Client Contact:

O.S. Davidge, Director
Program Evaluation Branch
Department of Supply and Services
Place du Portage
Hull, Quebec

SECRETARY FOR SOCIAL DEVELOPMENT

EVALUATION OF THE ONTARIO EXPERIENCE PROGRAM

Ontario Experience is one of four youth employment programs sponsored by the Government of Ontario. It is intended to supplement the government's regular employment of summer students. The program employed 13,000 in the summer of 1979 in provincial and municipal agencies.

Evaluation focusses on the outcomes for students with primary emphasis in these areas:

- Does the program provide career-related experience?
- Does the program improve employability of participants, improve awareness of career choice?
- Do participants develop skills transferable to the private sector?

Aspects of these questions and others are examined in a research design which gathers data from three populations:

- Students who participated in the program.
- Students who applied to the program but were not accepted.
- A random sample of students across Ontario.

Analysis of data from these three populations and from sponsors, provides a description of the characteristics of participants and non-participants, and allows examination of impact of the program in terms of benefits to the students.

Abt Associates is also involved in the evaluation of the Experience '81 programs through the design of a survey questionnaire, coding instructions, data analysis package and survey sampling frame. These tools will be used to survey participants in the program with the aim of improving the program and evaluating how well program objectives are being achieved.

Technical Reviewer:

Dr. George Farkas
Abt Associates Inc.

Client Contact:

W.G. Wolfson
Executive Secretary
Secretary for Social Development
Government of Ontario

CANADIAN EMPLOYMENT AND IMMIGRATION COMMISSION

SUPPLY AND SERVICES CANADA

EVALUATION OF U.I. JOB CREATION: PRINCE EDWARD ISLAND FORESTRY PROJECTS

The P.E.I. Forestry Project is designed according to the Economic Growth Model for Unemployment Insurance funded job creation projects. The major objectives of these projects are to provide:

- Finance of development projects which will make a lasting social and economic contribution to the community.
- Opportunities for productive activity on the part of the workers whose short-term alternative prospects appear to be poor.
- Direct or indirect help to improve prospects of permanent employment for those employed on the project.

This Abt Associates evaluation is designed to assess the costs and benefits of the projects in P.E.I. It examines compliance with program criteria, as well as capturing the on-site experience of project managers.

Data on success or failure are assessed through the job creation outcome. The project assembles data for participants and a matched sample of non-participants. The progress of each group is recorded by the Canada Manpower Centre counsellors through the use of a coding form containing significant information on the participants and the corresponding matched sample. These samples are used in an overall evaluation of the Economic Growth Model.

Client Contact:

D. Upex
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Hull, Quebec

OFFICE OF THE COMPTROLLER GENERAL

EVALUATION OF THE FINANCIAL OFFICER RECRUITMENT AND DEVELOPMENT PROGRAM

Working in cooperation with the Public Service Commission and departments, the OCG provides person years and arranges for the recruitment, selection and training of university graduates to fill junior financial officer positions in departments and agencies. The FORD program responds to the need for improvements in the financial management community within the federal government.

The planning process now requires an evaluation of the program. Our study examines a number of evaluation questions, with particular emphasis on program rationale. Key issues include verification of the stated shortage of qualified personnel and analysis of whether the recruitment and training activities can plausibly lead to the expected outcomes. The study will draw on government-wide information systems for vacancy and demographic data. As well, we will conduct personal interviews with senior government officials and experts from the private sector, and carry out focus groups as well as personal interviews with program participants.

Client Contact:

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Ottawa, Ontario

CANADA EMPLOYMENT AND IMMIGRATION COMMISSION

EVALUATION OF CANADA WORKS, ECONOMIC GROWTH COMPONENT

The Economic Growth Component provides for sponsorship, by Federal Government Departments and agencies, of projects that satisfy the various program criteria. Often this is done in conjunction with private sector sponsors. Thirty-seven projects had been authorized as of the beginning of this evaluation study.

The overall objectives of the study are to:

- Assess the degree to which continuing jobs have been or are likely to be created and determine the extent to which the short-term jobs and the future, continuing jobs are incremental.

- Assess the contribution of Economic Growth Component activities to determine if they occur in areas of high unemployment and match local market needs.

- Compare the cost effectiveness of the Economic Growth Component to other job creation models for which data are available.

- Assess the impact of the criteria for selection of projects with particular reference to whether they may assist or impede development of proposals.

This Abt Associates study provides a process evaluation, considering the implementation of the Economic Growth Component among federal government departments and agencies. Interviews with both sponsoring and non-sponsoring departments yield data on the implementation process.

The second phase of the evaluation investigates a number of projects in the field. Information on local labour market conditions, previous employment history of incumbents, and the actual cost of the projects in relation to proposal estimates is gathered.

A "value of output" analysis is presented, based on the social opportunity cost of labour as calculated from data on the probability of employment for job types in a region. Benefit cost ratios and cost per incremental work year, in the long-term, are calculated on those projects where data are available to support the analysis.

Technical Reviewer:

Dr. Charles Rogers
Abt Associates Inc.

Client Contact:

D. Upex
Program Evaluation Division
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Hull, Quebec

DEPARTMENT OF ENERGY, MINES AND RESOURCES

CANADIAN HOME INSULATION PROGRAM (CHIP) EVALUATION ASSESSMENT STUDY

CHIP is to be the subject of a major program evaluation. Abt was retained to develop the design of the methodology for the evaluation.

Abt performed a thorough review of the program. Items covered were:

- Program features and changes.
- Program model.
- Program costs.
- Program take-up.
- Previous evaluations and research.
- Changes in the context of CHIP since its inception.

Working with EMR, other government officials and industry groups, Abt isolated and ranked five important policy questions. These research questions and a survey of available data led to a detailed evaluation methodology and strategy stated in a readily implementable format. Some of the implementation has begun in the form of pilot surveys.

Client Contact:

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CHIP Evaluation Officer
CREB
Energy, Mines and Resources Canada
500 Booth Street
OTTAWA, Ontario

CORRECTIONAL SERVICE OF CANADA

EVALUATION OF EMPLOYMENT OF INMATES: PROGRAMS VS. JOB MARKETS

The Inmate Employment Branch offers federal inmates work and training opportunities which are intended to enhance the employability of released offenders. The C.S.C. work and training opportunities cover a wide range of occupational categories. The crucial question is whether these opportunities produce or enhance generic skills which the labour market demands, now and in the future.

This phase of a larger evaluation effort resembles an evaluation assessment, examining program activities and assumptions to provide input to program design. The work plan begins by developing an inventory of inmate training and work opportunities and cross-classifying C.S.C. occupational codes into four-digit C.C.D.O. codes. Where possible, we will identify generic skills -- i.e., those skills tranferable to other occupations when the inmate re-enters the work force. Then data on present and future job markets will be gathered from a number of sources. Analysis will indicate how inmate opportunities relate to occupational demand nationally and regionally. Our report will emphasize that these are apparent linkages based on estimates involving a number of assumptions. Consequently, we will also identify other factors which must be considered in evaluating actual employment outcomes.

Client Contact:

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K1A 0P9

ONTARIO MINISTRY OF TRANSPORTATION AND COMMUNICATIONS

THE USE OF TELECOMMUNICATIONS AS A COMPLEMENT TO OR SUBSTITUTE FOR TRANSPORTATION

There has been a revival of interest in the prospect of using information technologies to help solve transportation-related problems. The Ontario Ministry of Transportation and Communications requires an assessment of the use of recent telecommunication developments to substitute for or complement transportation. Several areas of opportunity are examined through a literature review and consultation with experts:

- Mass distribution of traffic and transit information.
- Driver skills training.
- Automated guided roadways.
- Dispatching and control of fleet vehicles.
- Tele-conferencing.
- Electronic mail.
- Electronically automated offices.
- Tele-shopping and electronic funds transfer.

This Abt Associates report analyzes likely impacts in terms of their potential for substituting for, stimulating, or complementing transportation.

Technical Reviewer:

Marda F. Mayo
Abt Associates Inc.

Client Contact:

Dr. R.M. Rosenbaum
Ministry of Transportation
and Communications
1201 Wilson Avenue
Downsview, Ontario

ONTARIO MANPOWER COMMISSION

THE IMPACT OF MICROCHIP TECHNOLOGY ON EDP MANPOWER DEMAND

This study was commissioned by the Labour Market Research Unit of the Ontario Manpower Commission to provde a qualitative assessment of the changing demand for computer services personnel. This changing demand is anticipated to be dramatic in the next few years, a result of the influence of microchip technology. This study was conducted as one component of a large microchip impact assessment which is being undertaken by the OMC.

Our investigation used a Delphi-type of inquiry, a technique which offers excellent capability for evaluating the opinion of experts about future change, particularly in areas where good precedents are lacking. Early in the study, a panel discussion with several experts in the computer industry was held in the Thorne Stevenson & Kellogg offices. The purpose of this discussion was to resolve the issues which should be focussed upon, and theay the questions should be positioned. A questionnaire was developed from this discussion, reviewed with the client and pre-tested.

We began the questionnaire by discussing two major areas influenced by microchip technology: process control and word processing. Both of these areas are expected to exhibit major growth throughout the next decade. Finally, we asked about overall predictions of the demand for computer personnel.

C. RELEVANT EXPERIENCE — THORNE STEVENSON & KELLOGG

ONTARIO MINISTRY OF GOVERNMENT SERVICES

THE ADVANCED OFFICE PROJECT

We are presently acting as advisors to the Advanced Office Project of the Government of Ontario. This project, within the Ministry of Government Services, involves the installation of a distributed office system, to be built in an evolutionary manner, using off-the-shelf and "prototype" components. The focus of the project is the identification of the benefits obtainable to "principals" working in an advanced office environment. At this time, we have completed the project planning, identified the functions required by each of the principals, and selected the equipment to be used in the project. Installation of the facilities is largely completed.

We have participated in the project by:

- Providing advice and guidance as requested in all aspects of the study.
- Providing project team members to take a major role in the execution of the project.
- Assisting in the determination of user requirements, specification of the requirements and selection of vendors.
- Preparation of a user guide to the various facilities.
- Supervising the installation and user training for much of the equipment and services being used (executive terminals, electronic mail, word processing, personal computing, local area networking).
- Assisting in the performance measurement activities.

KLYNVELD KRAAYENHOF AND CO.

DEVELOPMENT OF AN AUTOMATION METHODOLOGY

Our Dutch Associate, Klynveld Kraayenhof and Co., has conducted a two year study of office automation. Specialists in technical, behavioural and general management, along with user representatives, participated in a task force.

The study included a literature search, case studies and discussions with a number of European experts in the field. A methodology was developed to analyze administrative organizations for potential automation. The methodology --a Social Technical Approach to Automation (STAA) -- also covers the implementation process that follows the analysis and decision-making phases.

STAA is an integrated approach in which human aspects are balanced with the rational, economic and technical aspects. In the analysis phase it deals with issues such as:

- Perceptions and expectations.
- Human needs.
- User requirements (content, information format, ergonomics of hardware).
- Impact on jobs (degrees of freedom, utilization of skills and knowledge, growth and career prospects, motivation and challenge).

The implementation manual pays attention to:

- Project management.
- Skills.
- User responses and participation.
- The roles and responsibilities of the specialists.
- Project phases and effects on team members.

The STAA methodology has since been tested in many projects conducted by our Dutch associates. Mr. Peter Van der Laan is a senior consultant working with us for two years on an exchange program. Through Mr. Van der Laan, we have full access to the methodology and field experiences.

APPENDIX B

REFERENCES

REFERENCES

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