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***THE USE OF PORTABLE OFFICES:
AN EXPLORATORY ANALYSIS***

by

**Nancy Corbett
(Bachelor of Science (Honours))
Queens University)**

**A thesis submitted to
the Faculty of Graduate Studies and Research
in partial fulfilment of
the requirements for the degree of**

Master of Management Studies

**School of Business
Carleton University
Ottawa, Ontario**

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**THE USE OF PORTABLE OFFICES:
AN EXPLORATORY ANALYSIS**

submitted by Nancy Corbett, B.Sc. (Hon)
in partial fulfilment of the requirements for
the degree of Master of Management Studies

Thesis/Supervisor

Chair, School of Business

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ABSTRACT

This research was designed to examine the adoption of portable offices through interviews with about 60 individuals who use them and with some of their managers. There were three questions explored in the study: (1) why do people use portable offices?; (2) how do individuals use portable offices?; (3) what are some of the individual and organizational outcomes of the use of portable offices? Comparisons were done on users who had high and low "extent of portability", as determined by whether they had a portable phone or at least three pieces of portable technology.

The research was based on the theory of adoption of innovations, as well as personal computing, end user computing, telework, and stress. The findings of this study indicate that portable offices are an example of an innovation that is being adopted as predicted by the theory. They appear to be a successful innovation, as indicated by responses on outcomes, satisfaction, intent to continue use and advice to potential adopters. Potential drawbacks are identified for attention.

The findings fit with the other studies that found work with computer and communications technology along with flexibility in location and time is particularly well-suited to those in managerial and professional work. The perceived benefits are primarily related to improved work performance and productivity, which are seen as significant organizational benefits. There are also significant individual and family benefits seen to result from added work flexibility and good tools. Respondents in this sample were taking advantage of the portability, using the technology in a number of locations as well as for a significant amount of supplementary work at home.

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Finally, I would like to thank my husband and daughter for their encouragement and patience through this thesis, and for being an example of a family making increasing use of portable offices.

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Chapter 1: The Research Problem

1.1 Introduction

The man walking out the office door carries only a sturdy lightweight case for a laptop computer and cellular phone, slung over his shoulder. The woman waiting in the airport departure lounge opens her briefcase, revealing a notebook computer and portable fax machine. The hotel guest returns from a day of appointments, unpacks the notebook computer with modem, plugs into the hotel room's telephone jack, connects to the corporate computer in another city to check electronic mail and download current information from a corporate database, and tears the pages off his portable printer. These people are all users of "portable offices".

Portable offices have evolved into powerful, compact and multi-functional work tools which are becoming accepted and essential equipment for some businesses and individuals. People can now carry portable offices as they move around, allowing them to continue working with familiar tools and information and to maintain contacts with the base office and with other individuals, including clients and colleagues.

Articles on developments and uses of portable offices appear with increasing frequency in the trade, professional, and popular press, including specialized magazines with names such as "Mobile Office" and "Portable Office" (Anderson, 1991; Badgett and Sandler, 1991; Borchardt, 1989; Delottinville, 1991; Gates, 1991a, 1991b; Purdie, 1991).

The following excerpt from the Financial Post (Purdie, 1991) illustrates:

"U.S. and Japanese manufacturers are promising to offer by early next year laptop computers with greater capabilities than existing desktop personal computers.

This, along with improvements and reductions in size and weight for fax machines, copiers, cellular telephones, answering machines, and information storage and retrieval systems, ushers in the first generation of full-service portable offices. The first integrated portables - two, three or more office systems in one compact unit - are already available and more are in development".

The Financial Post (1991) included a special Focus section on Laptop Computers on June 7, 1991. Canadian sales figures provided by Evans Research Corp. of Toronto showed total sales of portables at \$596 million in 1990, up 53% from 1989, with predicted sales of \$820 million by the end of 1991. The more compact "notebook" computer is expected to show the most growth in future years, with 44,236 units in 1991, an increase of 45% from 1990 and 123% from 1989 (Gates, 1991a).

The concept of "portable offices" goes beyond end-user computing and beyond working-at-home or working at some other fixed location out of the office. Portable offices provide the ability to do work at (and possibly, "keep in touch" from) varying sites as the individual moves around. Home is just one of the sites where the portable office may be used. Communication may be among any number of sites, only some of which are fixed (e.g. the base office).

This thesis is an exploratory study of the adoption of portable offices. Three main questions are addressed in this study. First, why do people use portable offices? Second, how do individuals use portable offices? Third, what are some of the individual and organizational consequences of the use of portable offices?

The study will look at people who use this technology and at management in the organizations they work for. In addition, the perceptions of individuals who use portable

offices will be compared with their organization's perceptions, as represented by the managers interviewed.

The effects of different levels of portability on the adoption process will be examined during the course of the analysis. The extent of portability will be treated as a continuum, increasing from a minimum of a portable computer with access to a telephone, through the addition of telecommunication modems, cellular phones, portable fax, and other devices, to a "fully" portable office. Differences in uses and outcomes are expected to exist, depending on the extent of portability.

This research into the use of portable offices offers numerous potential benefits. It expands the body of knowledge on impacts of technology, as it incorporates ideas from several fields (i.e. end-user computing, cellular phones, electronic briefcase, and work-at-home/telework). For management in organizations considering adoption of portable offices, this study can provide information to assist in their decision-making, and help make the adoption a more positive experience. Individual employees can learn from the experiences of others how to get increased benefits from the technology more easily and quickly. They may also learn how to avoid the pitfalls experienced by early adopters. For vendors and suppliers of portable office technology and services, this research could help them to target their marketing and encourage potential customers. Consultants who provide expertise on the management of change or assist clients in implementing technology may gain increased understanding and awareness of the use of portable offices. For academics and researchers, this piece of exploratory research will provide some initial findings and suggest points for further research.

The first chapter of the thesis develops the theoretical framework on which the research was based and provides definitions for the concepts that will be used throughout the thesis. The second chapter details the research questions and includes a review of the relevant literature. The third chapter outlines the research methodology which includes the sample, the survey instruments and the process of gathering data, the survey measures, and the techniques used for analysis. Chapters 4 through 12 each deal with one research question, presenting a detailed report and discussion of the findings. The final chapter outlines the conclusions and implications of the findings, then lists the strengths and weaknesses of the research.

1.2 The Research Problem

Given that there is little research and established theory to date on the concept of "portable offices", it is necessary to present the definitions that have been adopted for this study.

"Portable office", as defined in this study, requires employees to have access to computer and telecommunications equipment which they use outside of the fixed base office environment. These employees may also use this technology in the office environment.

The "extent or degree of portability" is considered in this analysis to be a continuum, ranging from a minimum of a portable computer (laptop or smaller) with access to a telephone, up to a maximum, where several pieces of equipment are combined. Extent of portability is considered to be an important construct as additional pieces of

computing and communication equipment, built into the computer or carried separately (e.g. a modem, cellular phone, printer, compact disk, fax), may add to the functionality and sophistication of the portable office.

Four aspects of "use" are considered in this study:

- (1) "how much use" includes both the frequency and amount of time.
- (2) "timeframe for use" classifies the use as being some combination of:
 - (a) during regular working hours.
 - (b) during daily commuting time to and from work,
 - (c) during travel time outside of regular working hours, and
 - (d) after-hours.
- (3) "where the portable office is used" includes a number of pre-defined sites:
 - (a) the base office.
 - (b) home.
 - (c) private motor vehicle (car/van).
 - (d) public transit (bus, train, plane).
 - (e) hotels.
 - (f) other offices of own organization.
 - (g) client sites.
 - (h) supplier sites.
 - (i) shared satellite office.
 - (j) "other sites" (as specified by the respondent).

- (4) "complexity and functions of use" is a continuum, ranging from simple functions of word processing up through data analysis and communication. This continuum is based on research done by Gorry and Scott Morton (1971) and Cale & Curley (1987) which describes five categories of end user computer activities: handling data; processing data; reporting data; communicating information; and making decisions.

1.3 Description of the Research Framework

The research framework that has been developed to guide this research is shown in Figure 1. The model postulates that when potential adopters become aware of portable office technology that could be applied to their work, they gain knowledge of its attributes, including "extent of portability". They develop perceptions about the portable office, its "perceived characteristics". Potential adopters go through a process resulting in the "adoption decision". The "extent of portability", "adoption decision" and "perceived characteristics" of the portable office are hypothesized to be determinants of the "extent of adoption" or, more simply, "use" (i.e. how the portable office is actually used). It should be noted that if the user decides not to adopt the technology, use will be zero. Use, in turn, is seen as influencing the "perceived benefits and drawbacks" experienced by the employee. The "perceived benefits and drawbacks", as well as their relation to those anticipated originally within "perceived characteristics" (i.e. greater, less), are seen as direct contributors to the adopters' overall "satisfaction" with the use of the portable

office. Such "satisfaction" is believed to confirm or disconfirm the adoption decision and may feedback to affect use.

In the exploratory analysis which follows, we test the relationship between extent of portability and the remaining stages in the model, but we do not test the other relationships shown in the figure. The linking arrows are for the sake of completeness, to demonstrate the roles played in conceptual terms. They could form the basis of subsequent research.

Figure 1 - Research Framework

Chapter 2: Literature Review

Because portable offices are a recent and evolving innovation, there is little research literature devoted specifically to this topic. Media and professional press references to portable or mobile offices and their components often focus on details of the technology itself and the rapid advances in this technology rather than on uses and impacts.

Literature reviewed for this research is drawn from four sources: adoption of technological innovations; use of personal computers, end-user computing, and related communications technologies; telework and portable technology; and research on work stress. The first three bodies of literature are highly interrelated. For instance, a number of papers explore the implementation stage of the adoption of an innovation called personal computers. The literature on work stress is referenced for only the section on benefits and drawbacks.

While this literature provides a useful background on the adoption of technology in general, it is limited with respect to its ability to predict how evolving technologies will be adopted and used. For instance, the personal computers introduced in the early 1980's that are the subject of the early adoption studies are simply not comparable to the smaller powerful units that are components of today's "portable office". Nor is the environment where computers have become common tools comparable in many aspects to that of almost a decade earlier.

The literature review begins with a review of the general innovation literature to support the proposed research framework. This is followed by a review of the literature

on the adoption of communication technology innovations, including personal computers. The next section of the literature review is organized around the stages in the research framework. For each stage in the framework, the most relevant literature in each of the following areas is reviewed: communication technology innovations, end-user computing, telework and portable technologies, and, for benefits and drawbacks only, work stress. Proposed questions for investigation are outlined for each stage in the framework.

Possible differences in perceptions between employees and management are discussed at the end of the review. The proposed questions for investigation are then extended to include this factor.

Two sections of the model, how the knowledge on the portable office is gained and how the detailed decision-making process works, have not been included as part of this exploratory study on portable offices as the scope of such an all-inclusive study would be too large for a Master's thesis.

2.1 The Adoption Process

The research framework is based on Rogers' (1983) model of stages in the innovation-decision process, shown as Figure 2. Rogers defines an **innovation** as "an idea, practice, or object that is perceived as new by an individual or other unit of adoption" (p. 11). He sees the innovation-decision process as "essentially an information-seeking and information-processing activity in which the individual is motivated to reduce uncertainty about the advantages and disadvantages of the innovation" (p. 13).

Figure 2 - Rogers' Model of Stages in the Innovation -Decision Process

(Rogers, 1983, p. 165)

Rogers outlined the five stages of the innovation-decision process, as he conceived them:

- "1. *Knowledge* occurs when an individual (or other decision-making unit) is exposed to the innovation's existence and gains some understanding of how it functions.
2. *Persuasion* occurs when an individual (or other decision-making unit) forms a favorable or unfavorable attitude toward the innovation.
3. *Decision* occurs when an individual (or other decision-making unit) engages in activities that lead to a choice to adopt or reject the innovation.
4. *Implementation* occurs when an individual (or other decision-making unit) puts an innovation into use.
5. *Confirmation* occurs when an individual (or other decision-making unit) seeks reinforcement of an innovation-decision already made, but he or she may reverse this previous decision if exposed to conflicting messages about the innovation." (Rogers, 1983, p. 164).

He identifies five key characteristics of an innovation, as perceived by individuals, which determine its rate of adoption. These characteristics are:

- "1. *Relative advantage* - the degree to which an innovation is perceived as better than the idea it supersedes.
2. *Compatibility* - the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of potential adopters.
3. *Complexity* - the degree to which an innovation is perceived as difficult to understand and use.
4. *Trialability* - the degree to which an innovation may be experimented with on a limited basis.
5. *Observability* - the degree to which the results of an innovation are visible to others" (Rogers, 1983, pp. 15-16).

Social Impacts or Consequences are "the changes that occur to an individual or to a social system as a result of the adoption or rejection of an innovation" (Rogers, 1983, p. 31). He sees at least three classifications of consequences:

- "1. Desirable versus undesirable consequences, depending on whether the effects of an innovation in a social system are functional or dysfunctional.

2. Direct versus indirect consequences. depending on whether the changes to an individual or to a social system occur in immediate response to an innovation or as a second-order result of the direct consequences of an innovation.

3. Anticipated versus unanticipated consequences. depending on whether the changes are recognized and intended by the members of a social system or not." (Rogers, 1983, pp. 31-32).

Consequences that are desirable, direct and anticipated are expected to occur together, but often they are accompanied by some that are undesirable, indirect and unanticipated.

Rogers (1983) has extended his theories beyond diffusion to individuals, to consider adoption by organizations. In many cases, an individual cannot make a decision on adoption of technology until after the organization has adopted it. In particular, an individual may not be able to use certain computer and communications technology until the organization has decided to acquire it and has made organizational resources available. Rogers sees the individual playing "an active, creative role in the innovation process by matching the innovation with a perceived organizational problem, and perhaps in reinventing the innovation" (Rogers, 1986, p. 138).

2.2 Application of Rogers' Model to the Present Research Framework

Figure 3 shows how the research framework for this study relates to Rogers' model of stages in the innovation-decision process. It should be noted that the research framework was derived from Rogers' model, but does not correspond in every detail and does not attempt to test Rogers' model. At the time of this study, portable offices can still be considered to be in the innovation state. The variable, "Extent of Portability", is considered in this study to be an attribute of the innovation (how it functions), of which

Figure 3 - Relation of Research Framework to Rogers' Innovation-Decision Process

potential adopters gain knowledge in Rogers' first stage, "Knowledge". Rogers identified characteristics of the decision making unit, including socio-economic characteristics and personality variables, as affecting the "Knowledge" stage.

The perceived characteristics included in the model represent the "Persuasion" stage, with attitudes based on perceived characteristics of the innovation. Since this study looks only at adopters, "Use" / "Extent of Adoption" in this model combines Rogers' "Decision" stage and "Implementation" stage. The perceived benefits and drawbacks experienced are seen as corresponding to part of the "Implementation" stage. The question of overall satisfaction is seen as the "Confirmation" stage.

Two decision-making units are studied in this thesis: the individual and the organization (as represented by several management individuals). The focus of the study, however, is adoption by individuals, rather than the organization.

2.3 Adoption of Communication Technologies

Rogers (1986) extended his earlier work on diffusion of innovations to explore the specific field of adoption of communication technologies. He sees adoption of new communication technologies as differing in three key aspects from the adoption of other types of innovations. First, a critical mass of adopters of an interactive communication technology are necessary for the utility of the new idea to be sufficient for an individual to adopt (e.g. an electronic mail system is useful only if individuals frequently communicated with are also users of the system) (Rogers, 1990). Second, the new communication media are tool technologies, representing techniques that can be applied

in a variety of ways to diverse situations. These are frequently characterized by a relatively high degree of re-invention, as the adopter customizes the innovation to fit his or her conditions. Third, the degree of use of the innovation becomes important to focus on, rather than just the decision to adopt or even implement. This is particularly true for the innovation process within organizations where the decision to adopt an innovation may be made by one or several individuals and the implementation would be handled by another set of individuals. Rogers (1986) sees the ultimate measure of success of the adoption as being in the continued use by even more individuals. The present study focuses on the degree of use of the innovation of portable offices, referring to it as "Use" or "Extent of Adoption".

Many researchers have built on the ideas of Rogers in their innovation studies, and have looked at uses of computers and communication technologies in the home and in organizations (eg Burkhardt and Brass, 1990; Dutton, Rogers and Jun, 1987; Mahajan, et al., 1990; Vitalari et al., 1985; Venkatesh and Vitalari, 1992). It has been found that the nature of technological innovations, especially those involving communication technology, requires the establishment of new behavioral patterns (Dickerson and Gentry, 1983; Robertson, 1971; Rogers, 1983). Adopters of computer and communication technology must become active participants with the technology, with higher levels of interaction and involvement (as compared, for example, to adopters of other technologies such as television) (Dickerson and Gentry, 1983; Rogers 1983, 1986; Vitalari et al., 1985). Three characteristics of the computer have been found to partially determine the nature of the adopter: the complexity of the computer; the familiarity needed to be cognizant of its

relative advantage; and the need for some other type of computer-oriented experience before it can be perceived as compatible (Dickerson and Gentry, 1983).

Studies of the adoption of home computers (often referred to as personal computers) have found early adopters to be different from late and non-adopters. Early adopters tend to be middle-aged males with higher incomes, more education, and higher status occupations. They also tend to be opinion leaders, information seekers, "logical introverts", and more experienced users of other technical consumer products and services (Dickerson and Gentry, 1983; Mahajan et al., 1990; Rogers, 1983).

Early adopters in organizations have been found to have similar characteristics, along with previous computer training and favourable attitudes towards computers (Burkhardt and Brass, 1990). The users interviewed in this study of portable offices are also early adopters. Since using portable offices may mean working independently, away from organizational support, it is likely that some of the findings on early adopters in both homes and organizations will hold.

2.4 Extent of Portability

This study explores the role of the capabilities of the technology in the adoption of portable offices. The literatures on innovation and computing, reviewed below, recognize that the technology itself is a factor contributing to successful implementation of computer and communications technologies. Advances in technology have made possible portable offices, which are different from earlier location-dependent computing and communications tools.

Journals such as that for Chartered Accountants in Scotland include articles on what equipment and features to consider for what purposes when setting up a mobile office (Harnett, 1991). Advertisements in magazines and newspapers, such as Fortune and the Financial Post, give an indication of what functions are currently available in the marketplace through combinations of portable equipment (the "extent of portability"). The available functions provide the technical potential for the portable office to address the adopter's job needs. This provides a range of tools which users can choose to apply in various ways to diverse situations (Rogers, 1986; Venkatesh and Vitalari, 1992).

Vitalari et al. (1985) found the role of computing in the household to be a function of both the technology and the social environment. Dutton, Rogers and Jun (1987) found in their meta-research on diffusion of home computers that technical features of computing have been identified as important. Survey researchers, however, have paid little attention to them as factors in explaining variations in use and social impacts of home computers.

The literatures on use of personal computers, end-user computing and related communications technologies identify the goodness of fit between the technology and the job need (i.e. usefulness or functionality) as important for utilization and satisfaction (Davis et al., 1989; Kraut, 1989; Mawhinney and Lederer, 1990; Rice et al., 1989; Venkatesh and Vitalari, 1992). Bikson (1987) found that features of the technology play a role in the successful introduction of office technology (multi-function interactive computer systems to support white-collar work in offices). Kraut (1989) and Venkatesh

and Vitalari (1992) found a particularly good fit between the work of managers and professionals and the technology for remote computing.

The telework literature recognizes that increased technological capabilities and flexibilities make possible and facilitate such changes in work organization as telework. Other factors such as social, organizational and cultural ones, however, are found to be more important determinants that have tended to limit the extent of adoption and continued use (DiMartino and Wirth, 1990; Duxbury et al., 1987; Goodrich, 1990; Kinsman, 1989; Kraut, 1989; Olson, 1987; Risman and Tomaskovic-Devey, 1989; Venkatesh and Vitalari, 1992; Yap and Tng, 1990).

Olson (1987) suggests that technology may play a greater role in the future when highly integrated office systems exist which provide greater location independence. Highly integrated office systems will likely include inexpensive and portable computing power, access by computer to all required information resources, and access to other people in the organization through communication networks linking all locations, office and home. Venkatesh and Vitalari (1992) likewise predicted a greater impact from Information Technology through the combination of computers and remote telecommunications. Kraut (1989) wrote of offices changing so more information would be available in electronic form, and e-mail and file transfers would be more widely used.

Marketing materials and the popular press suggest that significant progress has been made towards just such systems. The present study looks for some indication of whether the capabilities of portable offices in the 1990's are in fact contributing to such work changes. It may support earlier findings that technology itself continues to be less

important in successful implementation than are social or other factors (e.g. Carlsson, 1990; Danziger and Kraemer, 1986; DiMartino and Wirth, 1990; Rice et al., 1989). Alternatively, it may be that respondents in this sample have a type of home work arrangement that effectively balances various factors, such as professionals who normally work many extra hours doing supplementary work at home (Kraut, 1989).

2.5 Perceived Characteristics

The interrelated innovation, end-user computing and communications literatures have found three of Rogers' characteristics of innovations to be particularly relevant to the adoption of technology: relative advantage; compatibility; and complexity (Robey and Zmud, 1990; Rogers, 1986; Tornatsky and Klein, 1982).

The literature suggests that the relative advantage of portable offices may be the significant characteristic for individuals who are already experienced users of computer and communications tools and who spend time out of the corporate office location. For example, work by Dickerson and Gentry (1983) suggests that one relative advantage personal computers have over earlier single-function products is the ability to perform multiple functions. This advantage can be increased with the addition of communication functions through networks.

It is also possible that portable offices, providing multiple functions without location constraints, will be seen to have a relative advantage over similar configurations that remain in a fixed location. Portable offices may increase the potential for telework by overcoming limitations of certain information resources and reference materials not

being accessible from home (Kraut, 1989; Ramsower, 1983; Venkatesh and Vitalari, 1992). For example, portable compact disks for the computer can now store enormous reference documents. Portable faxes provide rapid transmission of additional documents.

Telework has been found not to be appropriate for work requiring frequent face-to-face interactions with associates or clients (Cross and Raizman, 1986; Kinsman, 1989). Portable offices would seem to have a relative advantage by allowing the individual to go when and where desired to meet others, carrying equipment that provides desired information and communication linkages immediately (Howard and Schneider, 1989).

Compared to using clients' equipment on site and perhaps interfering with the clients' work activities and productivity, portable equipment taken to a client site could provide additional temporary capacity, either alone or linked into the clients' facilities (Delottinville, 1991).

The perceived characteristics of the portable office, both contributing to the adoption decision and during implementation and continued use, can be expected to offer a partial explanation of why organizations and individuals use such technology. There will likely be additional factors, such as corporate management decisions, that make individual use mandatory for corporate information processing and communication.

2.6 Uses of Portable Offices

The focus of this study is on portability in technology. Details of how individuals are using portable technology are needed in order to explore the extent to which adopters exercise the potential of portable offices to provide location- and time-independent

computing and communications support, and the impacts of that. Four dimensions of use have been selected: (1) how much is the portable office used (i.e. frequency and amount of time in a given period); (2) in what timeframes is the portable office used; (3) where is the portable office used.; and (4) what are the complexity and functions of use of portable offices.

The literature suggests that how portable offices are used may be related to the extent of portability and to their perceived characteristics (anticipated benefits and drawbacks), and may affect the outcomes and overall satisfaction with their use. The innovation literature and others abound with research on many facets of implementation and uses of technology. There are studies on the uses of computers in the office (end-user and desktop computing) (e.g. Bikson, 1987; Danziger and Kraemer, 1986; Kling et al., 1990), and in the home (i.e. personal computing, telework, supplemental work-at-home) in various timeframes (e.g. DiMartino and Wirth, 1990; Duxbury et al., 1992; Huws et al., 1990; Kraut, 1989; Venkatesh and Vitalari, 1992; Vitalari et al., 1985). The literature also covers the uses of related communication functions, such as electronic mail, messaging, and cellular phones (e.g. Rice et al., 1989; Rogers, 1990; Vervest, 1987).

Dutton et al. (1985) identified amount of time and diversity of use as two major dimensions of computer use. These two dimensions were then found useful by Dutton et al. (1987) for their meta-research to identify patterns of computer use in the home. Rice and Manross (1987) included both amount of time and number of functions used to study the level of adoption of intelligent telephones. In his study on skewed use of Information Systems tools, Panko (1990) noted that operational measures of use could

include frequency, amount, and sophistication. He suggested that research on use should probably depend on multiple operationalism, with measures used in parallel or built into an overall index.

The measures of complexity and diversity of functions have been used by many researchers when studying uses of technology. The literatures show that computer and communications technologies are used for a variety of information tasks, as well as social functions (Mahajan et al., 1990; Rogers, 1986; Vitalari et al., 1985). Danziger and Kraemer (1986) reviewed studies of end-user computing, and noted findings that "modes of use were linked more often to the task-related information needs of the role, not to personal traits." (p 204). Kraut (1989) found that managers and professionals tended to perform social tasks (talking, meetings) at the office and cognitive tasks (read, write, do computer programming) that needed sustained concentration at home. Venkatesh and Vitalari (1992) found that managers and professionals, as knowledge workers, had types of work that tended to be portable, permitting flexibility in work location. The extent of portability may be expected to be an important determinant of the diversity of functions used.

The concepts of location- and time-independence and flexibility in the use of computer and communications technology are important in the telework literature. Often articles include a definition of telework or telecommuting based on the substitution of computer and telecommunications technology for travel to a central work site (Nilles et al., 1976). Then they discuss briefly the potential for work at various locations or for "nomadic" work such as that of insurance agents (DiMartino and Wirth, 1990; Huws et

al., 1990; Kinsman, 1989). Howard and Schneider (1989) described the World Bank's experience with their teams of professionals using portable computers when travelling into the field on missions, and reported benefits to clients and the Bank. Articles in the accounting profession's press describe how some accountants use portable technology for work in the field that requires flexible hours (Delottinville, 1991; Harnett, 1991). Most telework research, however, narrows into work at one location only, the home, for study (e.g. Christensen, 1988; Goodrich, 1990; Risman and Tomaskovic-Devey, 1989). Vitalari et al. (1985) found work life (as measured by computer use for work) to be a dominant feature of home life in technical and professional/ managerial households. It may be that such individuals, already accustomed to working at home after hours, would have more positive attitudes to portable technology which could be used at home as well as other locations (Kraut, 1989; Venkatesh and Vitalari, 1992). As such, they may be heavier users and more aware of the benefits of this work style.

The home is one of the locations where portable offices can be used. In fact, for some users it may be the only location. It differs from some other locations where portable offices may be used in that, once established, it remains fixed and is probably equipped with some other necessary resources such as reference files. It is a known and fixed contact point for communication with the office and management. Therefore, the telework findings on uses of technology may be expected to have some relevance to research on uses in a broader range of locations, some of which may be fixed.

2.7 Benefits and Drawbacks

The literature describes impacts of the use of computer and communications technology in general, as well as of personal computers in the home (personal use, telework, supplemental work at home) and at work (end-user or desktop computing). For this study, the impacts of interest are those that may be experienced or changed because of the portability of the technology.

The literature suggests ten impacts of technology (both positive and negative) which may be particularly relevant for users of portable offices.

1. Portable technology may allow individuals to work with greater autonomy, by granting employee independence and responsibility (Rogers, 1986; Karasek, 1990; Venkatesh and Vitalari, 1992).
2. Portable technology may allow individuals to feel more in control of their work and lives and more satisfied with their own performance (Duxbury et al., 1992; Karasek, 1990; Kraut, 1989; Venkatesh and Vitalari, 1992).
3. Portable technology may increase stress on employees if used by management to restrict employees' control over their work, supervise work closely, or gather performance monitoring data (DiMartino and Wirth, 1990; Karasek, 1990).
4. Portable technology may cause changes in the use of time, such as rearranging work schedules once it is no longer necessary to return to the main office to do certain activities, shifting personal or "idle" travel time to work activities, and replacing social or cultural activities with technology activities (Delottinville,

1991; Dutton et al., 1985; Huws et al., 1990; Venkatesh and Vitalari, 1992; Vitalari et al., 1985).

5. Use of portable technology may become addictive, and cause individuals to have problems separating work and personal lives (Duxbury et al., 1992; Huws et al., 1990; Rogers, 1986; Vitalari et al., 1985).
6. Portable computer systems may affect the nature of communication patterns on the job and, thus, social relations at work (e.g. broadening the circle of those communicated with, or creating dependencies and forced social relations when an individual feels inferior to others who must be consulted for support in using the technology) (Karasek, 1990; Rogers, 1986; Sproull and Kiesler, 1986).
7. Portable technology may increase individual accessibility through communications networks (e.g. electronic mail) (Rice et al., 1989; Sproull and Kiesler, 1986) or encourage social isolation (Vitalari et al., 1985) and reduce interpersonal contacts (Bush, 1990; Duxbury et al., 1987; Kraut, 1989).
8. Use of portable technology may improve negotiation processes, improve the quality of discussion through immediate analysis of information, and encourage a mutual learning experience (Howard and Schneider, 1990).
9. Portable technology may allow knowledgeable users to acquire and maintain control of more information and the access to it with their special expertise, and thus increase or reinforce their influence, power and centrality, creating more of an "information elite", and widening existing gaps (Burkhardt and Brass, 1990; Danziger and Kraemer, 1986).

10. Having access to portable technology may be seen as a status symbol or privilege for individuals, especially if the organization allows them the flexibility in order to retain them and keep them motivated (Kraut, 1987; Rice and Case, 1983; Risman and Tomaskovic-Devey, 1989; Rogers, 1986).

The telework literature suggests a number of additional benefits and drawbacks that employees with portable technology may experience. Specific benefits for individuals who telework include reduced travel time and costs, reduced distraction and interruptions, avoidance of office politics, increased ability to handle both work and family responsibilities, flexibility in working hours, feeling more a part of their neighbourhood, and reduced stress (DiMartino and Wirth, 1990; Kinsman, 1989; Kraut, 1987; Kraut, 1989; Olson, 1983; Olson, 1987; Venkatesh and Vitalari, 1992). Drawbacks may include lack of access to some office resources (Ramsower, 1983), difficulty in separating work and domestic lives, lack of interaction and social contact, and reduced career prospects (DiMartino and Wirth, 1990; Duxbury et al., 1987; Kraut, 1987; Kraut, 1989; Olson, 1983; Olson, 1987; Venkatesh and Vitalari, 1992).

For portable offices, the relevance of some of these findings may depend on the extent to which the portable office is used in the home or in a variety of other locations. It is possible, for example, that some of the limitations identified for work-at-home situations (e.g. the need to interface with clients) could be overcome by portable offices.

From the organizational perspective, new computer and communications technologies may improve the company's competitive position by: (1) increasing

productivity, (2) improving information accessibility and completeness, (3) assisting in planning and decision-making, (4) reducing overhead costs (through telework) (DiMartino and Wirth, 1990), (5) helping organizations retain scarce personnel resources and skills (through telework), and (6) motivating staff (Kinsman, 1989; Goodrich, 1990; Olson, 1987). Effective use of the technology may also help organizations deliver faster, better and more personal service to clients, and increase their rapport and credibility with clients (Howard and Schneider, 1990). Companies may realize increased enterprise flexibility and cost savings despite related equipment costs and problems of supervision and management (DiMartino and Wirth, 1990).

2.8 Overall Satisfaction

An adopter's overall satisfaction with the use of portable offices may be complex to define and measure, as indicated for instance by many studies on satisfaction with end-user computing (Bikson, 1987; Davis et al., 1989; Igbaria and Nachman, 1990; Mawhinney and Lederer, 1990).

The innovation literature shows most home computer owners become very satisfied with their purchase, after periods of initial frustration, with high degrees of "reinvention" as they fit the innovation to their particular situation (Dutton et al., 1987; Rogers, 1986). It may be that an individual's overall satisfaction with use of portable technology is related to how well this fit has been achieved, how much need for re-inventing the individual was prepared to tolerate, and also for how long they have used the technology.

There are numerous studies on satisfaction with end-user computing that have taken varying approaches and have reported divergent findings. Igbaria and Nachman (1990) identified 5 factors as being positively and significantly related to user satisfaction (leadership style of Information Systems managers; hardware and software accessibility and availability; computer background of the users; user attitudes towards end user computing; system utilization), 2 as being negatively related (computer anxiety; user age), and 3 to be not significantly related at all (gender; education; organizational levels).

Mawhinney and Lederer (1990) found managers' satisfaction with personal computer usage to be most strongly correlated with the computer system's contribution to job performance and with the user's level of competence with the system. Bikson (1987) found customized software and user modifiability (at the expense of perceived user friendliness) made a significant positive contribution to overall satisfaction with the technology and to user-assessed performance benefits. Davis et al. (1989) had similar findings on the importance of truly useful technology. Bikson also found a balanced social and technical approach to implementation to be a strong predictor of satisfaction, especially to tool acceptance and to adoption levels (i.e. the actual number of users as a percentage of the total number of potential users) as well as to managers' assessments of both productivity and value-added gains. Venkatesh and Vitalari (1992) found organization work and technology factors were most important for successful supplemental work at home.

The telework literature reported experience with this work arrangement to be less than satisfactory (e.g. Duxbury et al. 1987; Kraut, 1987). Fears and concerns about

reduced career opportunities discouraged some individuals (Kraut, 1989). Researchers found telework was often discontinued after an initial period or not extended to more of the workforce (Huws et al., 1990; Olson, 1987).

2.9 Proposed Questions for Investigation

The following set of research questions is proposed for investigation in this exploratory study.

- RQ 1. Who uses a portable office? What are the characteristics of the individuals, their work, and their organizations?
- RQ 2. What are the characteristics of their portable offices?
- RQ 3. What is the history of the portable office acquisition and start-up?
- RQ 4. How are portable offices used?
- RQ 5. What factors are involved in the decision to adopt this innovation?
- RQ 6. What are the perceived outcomes of using portable offices?
- RQ 7. What is the overall satisfaction with the decision to use the portable office?
- RQ 8. What are the effects of "extent of portability" on subsequent stages in the adoption process? Specifically :
 - RQ 8a. How is "extent of portability" associated with the perceived characteristics of portable offices?
 - RQ 8b. How does "extent of portability" affect the use of portable offices?
 - RQ 8c. How does "extent of portability" affect the perceived benefits and drawbacks of using portable offices?

RQ 8d. How does "extent of portability" affect overall satisfaction with the use of portable offices?

2.10 Organizations and Individuals

The literatures suggest that there may be numerous issues on which organizations (management) and their individual employees have different attitudes, motivations and perceptions with respect to portable technology. The preceding sections have noted several, such as benefits from telework arrangements (Olson, 1987). The telework literature found differences in attitudes towards work at home between managers and their employees, with managers being more negative (Duxbury et al., 1987; Huws et al., 1990).

Karasek (1990) described differences in expectations raised by the ways computer systems are introduced. To managers, the computer is to be an employee's tool and servant. Thus, the computer may increase skill-levels and autonomy for high-status workers. Lower level employees must follow the dictates and requirements of the computer system. Their use and method of operation are mandated by organizational policy. Computers may then diminish skill levels and autonomy for low-status workers.

Kling et al. (1990) reported early findings from their ongoing longitudinal studies of desktop computing in extensively computerized work groups of professionals and clerical staff. Professionals were found to attribute larger increases in job enrichment to their desktop computer use, and also to report larger increases in their supervisors' expectations of increased work performance.

The press has included articles recently which highlight differences in perceptions and objectives between top management and employees. A Fortune poll of large American companies found Chief Executive Officers thought morale in their organizations was much higher than employees reported (Fisher, 1991). A global survey on office environment issues conducted for a major office furniture designer and manufacturer found Canadian executives to be most in touch with how office workers feel. It found Japanese executives significantly underestimated the importance attributed by their office workers to many characteristics. These included the company's sensitivity to balancing job and family needs (Ramsay, 1991). A telecommunications company newspaper reported on a trial of a home-based dispatch service for installation and repair technicians. It listed distinctly different advantages for the individual technicians (job-related and personal), the company (quality, visibility, and operational savings) and the environment (less traffic, lower gas consumption) (BellNews, 1991). Unions raise specific concerns about employees being exploited through telework arrangements (DiMartino and Wirth, 1990).

It is suggested that there will be differences in perceptions on the adoption of portable technology between organizations and individual employees. Identification and analysis of such differences could contribute to implementations that prove more positive for both.

2.11 Additional Questions for Investigation

The literature suggests that it may be worthwhile to extend the above set of research questions to see what differences in perceptions may exist between organizations (management) and employees relating to use of portable offices. The following questions are proposed for investigation.

RQ 9. Are there differences between perceptions of management of the organization and of individual employees in the associations identified in research questions RQ 1 through RQ 8 ?

Chapter 3: Methodology

This chapter reviews the methodology which was used for this research. The first section describes the sample, the second discusses the survey instruments and the process of gathering data, the third reviews the survey measures, and the fourth explains the techniques used for analysis.

3.0 Population

The population was defined as "people who work in National Capital Region-based organizations who make use of portable computers".

3.1 The Sample

The sample consisted of 62 individual users and 12 managers of users working for organizations in the National Capital Region. Interviews were conducted over a 5-month period, beginning in late February, 1992, with about two-thirds completed by the end of March.

The sample, as shown in Table 3-1, was drawn from a variety of organizations, ranging from self-employed consultants or marketing representatives, and employees of high-technology companies to those in the federal public service.

The basic requirement for this research was to cover a range of portability options. Snowball and convenience sampling techniques were used to identify sufficient appropriate subjects. Initial identification was done through contacts with suppliers/vendors, colleagues, individuals in organizations and associations, consultants, newspaper articles and listings in the telephone yellow pages. Initially these techniques identified respondents who were mainly users of only portable computers. Extra efforts

were required to find people who used additional pieces of portable equipment, such as cellular phones. A further constraint on the selection of subjects was that the materials were in English only.

Contact was made with an individual in each firm, either through a referral or through cold calls to ask for participation. A number of phone calls were not returned. The contact person within each organization was given a description of the research project either verbally, in person or over the telephone, or as a written summary (Appendix 1). The description included selection criteria for the research. Contacts were asked to include females as well as males, if possible. To encourage participation we offered to provide a summary of the study results to participating organizations.

Depending on the size and management style of the organization, the decision to participate and identification of individuals were made either immediately or after internal consultations. Interviews were arranged by the contact in some organizations, and directly by the researcher in others.

Two large organizations with many users, one in the private sector and one public, did not follow through on initial positive responses. Participation at larger organizations was generally 4 or 5 individuals, rather than the target of 10 to 12. Managers indicated it would be too costly in terms of lost employee time to provide more and to coordinate the scheduling. Several organizations indicated that it was too busy a time for them to participate. The contact person at one high-technology firm was surprised to learn that employees were not generally using portable offices, and that the president preferred using a tape recorder to capture his thoughts. One company refused to participate, except to talk

with the coordinator, as the users in question are field service staff whose time is all billable for client services.

Senior managers of two organizations expressed concern about asking employees personal questions, such as job satisfaction. In one of these, where the relationship with unions seemed to be a significant concern, the manager requested a copy of the questionnaire and interview questions for consultation, then did not respond to follow-up calls. For the other, it was indicated that employees should be told that such personal questions could be optional. It should be noted that when employees in this organization were interviewed, they displayed no such concerns and replied to all questions.

In the end, sampling difficulties required that we include more organizations than originally planned. This did not provide enough matched groups of employees and supervisors for in-depth study of management attitudes compared to employees.

An insufficient number of females were identified to allow gender comparisons. There were 50 males and 12 females. All the managers were male. It should be noted that every effort was made during the sampling process to identify female users, but no organization included more than one. Observations during the on-site interviews suggests that there were fewer females in the study population, rather than that females were less likely than their male counterparts to use the technology. In fact, several females said that using the computer was essential for the job. They felt any serious professional in their field, regardless of gender, would be looking to use appropriate technology.

Sixty percent ($n=37$) of those interviewed worked in the private sector. This included marketing and technical staff at three telecommunications/ computer firms,

agents for four insurance / financial products companies, a chartered accountant from an accounting firm (working at home in the week before the birth of her first child), two real estate agents, and management/ information technology consultants representing eight firms or independent operators. Individuals in the public sector, representing 40% (n=25) of the sample, came from eight federal government departments or related organizations. In each sector, there were four to six respondents from each of four organizations, and only one or two from the others.

Table 3-1: Breakdown of Sample

Sector	Extent of Portability		Total
	Low	High	
Private	7	30	37
Public	19	6	25
Total	26	36	62

3.2 The Survey Instruments and Process

Reference copies of the covering letter, survey instrument, and interview schedules for users and managers are included as Appendices 2 through 4. It took users about an hour, and managers, about a half hour to complete the instrument. Pre-tests of the written questionnaire and interview were conducted with two individuals. Interviews were taped, as well as documented with handwritten notes. From the tapes and notes, a coded interview record was produced for each user. Given the limited number of manager interviews, they were not coded for computer processing. Contextual and background information about several organizations was gathered separately through discussion with the contact person or another representative.

In most cases, interviews were conducted at the respondent's work location, but several independent consultants found it more convenient to meet the interviewer elsewhere. One respondent was interviewed at her home as she awaited the imminent birth of her first child, and another, whose wife was due any day, carried his cellular phone so he could be reached.

When feasible, the written questionnaire with a covering letter was delivered to the participants for completion in advance of the interview. Otherwise, they were taken to the interview to be filled out then.

The questionnaire contained 30 questions and was divided into five sections. The first section gathered demographic information (sex, age, marital status, parental status, children's age and residence, other dependents, education, daily commute). The second section on stress and coping consisted of two standard scales from the literature for

measures of life satisfaction (Diener et al., 1985) and stress and coping (Cohen et al., 1983). The third section asked about the job and use of technology on the job (job satisfaction, type of work, size of work group, supervisory role, travel out of town, work at other local sites, requirements for communication with others, importance of computer and communication technologies for the job, self evaluation of competence and skills as a user, and formal training on computers). The measure of job satisfaction was a standard scale from the literature (Quinn and Staines, 1979). The fourth section gathered facts on the portable office (what pieces of equipment, for how long, availability of support, and overall satisfaction with the decision to use the portable office). The fifth section asked how the portable office had been used in the last regular work week (frequency and amount of time in each of four time frames, total time at various locations, and percentage of workday).

Interviews for individual users contained 21 questions and consisted of five sections. To allow respondents to express their views and opinions, many of the interview questions were open-ended or included a sequence of shorter questions to probe. The first section asked about their thinking before starting to use a portable office. The second covered perceived characteristics of the portable office (relative advantage, compatibility, complexity, observability and security). The third section included questions on use of the portable office (start-up, changes over time, changes to the way of working, comparison of actual uses to anticipated, and what the portable office had been used for in the previous week). The fourth section asked about the benefits and drawbacks they had experienced from using the portable office (work-related, individual or family-related,

for the organization, and a comparison to those anticipated). The fifth and final section asked about overall satisfaction (intent to continue use, encouragement and advice to potential users).

Interviews with managers contained 27 questions and consisted of 6 sections. Although the managers interviews were less extensive than the users, they contained comparable questions for common issues, such as outcomes of use. The first section asked about the group they managed and the work (need to travel, work locally outside the office, communicate internally and externally, rely on technologies). The second section asked about the portable offices being used, factors in the decision to start using them, management support and encouragement, and whether the manager personally used a portable office. The third section asked about the acquisition and start-up, while the fourth asked for their understanding about how portable offices were being used, whether the uses had changed over time, and how they compared to those anticipated. The fifth section covered benefits and drawbacks of use, and the final section covered overall satisfaction with the employees use of portable technology and advice to other managers.

3.3 Specific Survey Measures

This section lists the specific items which were used in the questionnaire and interview schedule. It provides an explanation as to why each item is included and what type of information was desired from the respondents.

Appendix 5 shows which questions were used to measure each of the constructs in the Research Questions. In some cases, research questions were addressed in both the survey instrument and the interview. Appendix 6 shows other data that were collected in the survey instrument and questionnaire.

3.3.1 Extent of Portability

Extent of Portability is the term used in this study to describe how much portable capability the user had. This was operationalized with the survey question: "Listed below are a number of pieces of equipment that could be included in a portable office. Please circle the letters corresponding to each piece of equipment you own." Two levels of Extent of Portability were defined for the purpose of data analysis: High and Low. To be included in the study, each respondent had to use at least a portable computer. There were two ways of classifying a respondent as High Portability: having a portable phone or having three or more pieces of equipment in their portable office. Low Portability respondents had one or two pieces of equipment, and no portable phone. It was felt that communication capability of a portable phone might add an extra dimension to investigate.

3.3.2 Perceived Characteristics of Portable Offices

Rogers' model (1983) suggested five perceived characteristics that might affect adoption and use of a portable office. Since a literature search revealed no standard scales for measuring these characteristics (Moore and Benbasat, 1990), it was necessary to develop measures for this analysis on Relative Advantage, Compatibility, Complexity, Observability, and Security.

Relative Advantage was described by content analysis of responses to the following: "In what ways do you see portable offices as being better or providing advantages over not having portable offices or technology?". Most of the answers cited advantages or benefits of use, but a few gave disadvantages.

Four aspects of **Compatibility** were measured: with the computer and communication systems that the respondent already used; with the way respondents liked to work; with the way the organization worked; with the user's communication needs. There were three codes used for portable office compatibility with systems already used: compatible, not compatible in some ways, or the respondent had not been using any other systems. The other three aspects were coded as 3-points: compatible, compatible but with conditions, or not compatible.

Complexity was coded as yes if the user reported having experienced some difficulty or complexity in using the portable office. **Observability** was coded as yes if the respondent had observed or was influenced by another portable office user.

Under perceived characteristics of the portable office, **Security** was added to those from Rogers' model because of special interest expressed by a participating public sector

organization. Respondents were asked "Do you think security is an issue with use of portable offices?" This was coded with two answers: no or not for us, and yes for us or generally. Some users gave both answers, that while they did not see security as an issue for them, they did see it as an issue generally.

3.3.3 Use of the Portable Office or Extent of Adoption

Four usage factors were measured in this analysis: when the portable office was used, where it was used, the type of use, and how much (frequency and amount of time). Facts were gathered through the questionnaire, and other information was obtained through discussion in the interview. Some questions measured two factors, such as how much in what timeframe. Respondents were asked to answer these questions based on their last regular work week.

Timeframes when the portable office was used were measured by asking the questions: "How frequently did you use your portable office" in four time frames, during regular working hours, during daily commuting time, during travel time outside regular hours, and outside regular hours. Responses were on a five-point scale, ranging from "never" to "very often". For simpler tabulations after reviewing the frequencies of responses, the scales were collapsed into three categories: never or infrequently, occasionally, and very often. Respondents were also asked: "What was the average amount of time per session in each of these time frames?" This could give an indication of the type of work session in various timeframes, for example, whether just to keep in touch or for an undisturbed period of concentration.

Where the portable office was used was measured by asking the question about their last regular work week: "For how much time in total did you use your portable office at each of the following locations?", followed by a list of nine possible sites. This information could be compared with the answers to other questions on whether time was spent outside the office locally, on trips, and at what other local sites. This would indicate whether there was potential to use the portable office in a variety of locations, and whether respondents were taking advantage of this potential.

Type of use was measured by asking : "Please think about what you used your portable office for (functions) in your last regular work week when you used your portable office. What did you use your portable office for? What was the average amount of time you used it for a session of that function? How important do you consider this use?" This last part, measured using a five-point scale with a high score being most important, gave an indication of whether the function was seen as an integral part of the job, as, for example, insurance agents doing product illustrations. Constraints of time and length of the instruments in this exploratory study did not allow for a thorough examination of this aspect.

Amount of use was measured in several ways, including estimates of the percentage of the workday spent using the portable office and of total time in the last week using it at various sites. Respondents were asked: "How frequently did you use your portable office" in four time frames: during regular working hours, during daily commuting time, during travel time outside regular hours, and outside regular hours. Responses were coded using a five-point scale, ranging from "never" to "very often".

Respondents were also asked: "what was the average amount of time per session in each of these time frames?" For each of the functions they named from the previous week, they were also asked: "How often did you use it (the portable office) for the function" (coded using a five-point scale, from rarely=1 to many times each day=5), and "what was the average amount of time you used it for a session of (the function)?"

Besides the four factors on extent of adoption, there was information gathered in the interview about the **acquisition** of the portable office. These included questions on whether there had been written justification of the decision to start using a portable office, who had bought the equipment, and whether start-up training was provided. Background information on the organization provided some insight on characteristics of the workplace such as the existence of a strong corporate technology support function, especially for non-technical users.

An interview question was included on whether the individual's **uses** of the portable office had **changed over time**, and if so, in what ways. The replies were coded into the following groups: no; decreased; increased - more sophisticated; volume; more comfortable / dependent; other.

3.3.4 Perceived Benefits and Drawbacks of Use

The outcomes of using a portable office were measured by combination of standard scales in the questionnaire and questions in the interview schedule. Four categories of outcomes were considered: work, individual, family, and organization. Job

satisfaction was a work outcome, while life satisfaction and perceived stress were individual outcomes.

Job (Work) Satisfaction was determined using a five-point scale from Quinn and Staines (1979). A high score indicates a high level of work satisfaction.

Life satisfaction was measured using a five-point scale from Diener, Emmons, Larsen and Griffin (1985). A high score indicates a high level of satisfaction.

The **perceived stress** scale developed by Cohen, Kamarck and Mermelstein (1983) was used in this analysis. A high score indicates a high level of perceived stress.

In the interview, respondents were asked: "Do you feel you have experienced any work-related benefits from using a portable office? What are they? ... any individual or family-related benefits?... work-related drawbacks? ...individual or family-related drawbacks? Do you feel there are any benefits for your organization from your using a portable office? ...drawbacks for your organization?" They were also asked: "Has your use of a portable office changed the way you work? If so, how?"

3.3.5 Overall Satisfaction

Satisfaction with the portable office was measured in five ways by asking : (1) "All things considered, how satisfied are you with your decision to use a portable office?" (2) "How do the actual benefits and drawbacks compare to those you had anticipated before starting to use a portable office?" (3) "Do you intend to continue using the portable office? If not, what alternative with you use? If yes, will you continue to use it as is, or make changes?" (4) "Would you encourage others to use a portable office?"

(5) "What advice would you offer others about using a portable office?"

3.4 Data Analysis

3.4.1 Interviews

Content analysis was used to analyze certain interview questions (Jones, 1985; Kassarian, 1977; Krippendorff, 1980). Responses were analyzed to identify common themes or ideas and grouped accordingly. Differences in frequencies were then compared for significance. Content analysis was defined by Berelson (1955) as "a research technique for the objective, systematic and quantitative description of the manifest content of the communication" (p. 55). Kassarian (1977) emphasized that it is the study of the message itself. One class of research problem where content analysis is seen to be useful is when the subject's own language and mode of expression is crucial to the investigation, including when subtle inferences are to be found in in-depth interviews (Kassarian, 1977). The interviews with users and their managers were intended to draw out individual expressions of attitudes towards the technology.

The content analysis procedure involves selecting a sample for the study, determining the unit of measurement (specific word, overall theme, etc.), categorizing content according to predetermined rules, then performing statistical treatment and analysis of the data. For this study, the unit of analysis of the responses was the overall theme emerging in a response to a question, rather than, for instance, counting occurrences of specific words. This seemed appropriate as issues, values, beliefs and attitudes tend to be discussed in this form (Kassarian, 1977).

The content analysis was done by the researcher, given available resources for a Master's thesis. From the interview tapes and notes, responses were broken down according to the ideas expressed. As a check, the open-ended questions in one interview were coded by two other listeners and in two more, by one other listener. A broad coding structure, at a fairly detailed level and with limited grouping, was built up, with new codes added as new ideas and perspectives were encountered.

For example, various job situations were recorded as reasons why the person considered using a portable office: period of extensive travelling, meetings where immediate production of minutes and documents was critical, job involved being on-call after-hours. Once all interviews were coded in a broad coding structure, the ranges of responses were analyzed in order to create a reasonable set of groups of responses. For example, the numerous individual job situations were covered by a grouped response of "required by job situation". In general, the grouped responses were reported only when given by 10 or more respondents. The category "other" was sometimes included when a number of other responses had been given, but by only a few respondents. Quotes from interviews will be included throughout the thesis to illustrate respondents' ideas and feelings.

Qualitative analysis was used for the limited analysis in Research Question 9, on differences between the perceptions of managers, gathered through interviews, and employees.

3.4.2 Quantitative Analysis

In the tables that follow, data are given for the following: the sample in total, and the sample split into groups of respondents with High and Low Extent of Portability. Extent of portability was selected, as described earlier, following the literature review. A split by Sector was considered because of apparent differences noted as the interviews progressed. However, this was not pursued once it was seen that the majority of respondents with high extent of portability worked in the private sector, while the majority with low portability worked in the public sector (see Table 3-1). The split by gender, as originally proposed, could not be done because of the small number of females in the sample.

The first step was to produce descriptive statistics for all variables - frequencies or means as appropriate. Crosstabulations and breakdowns were done, with Chi-square statistics and Student t calculated to test for significant differences between High and Low extent of portability samples. For the questions which had been coded into grouped responses during content analysis, chi-square tests were done on the percentage of the sample who gave each response. Scores on the three scales for stress and coping, life satisfaction, and job satisfaction were created by reverse coding certain items, then computing summed averages. These scores were compared with the population norms documented by Higgins et al. (1992).

Research Question 8 addresses the effects of extent of portability. For this, the splits by extent of portability were used to evaluate differences in the responses on each of the subsequent stages.

Chapter 4: Who Uses a Portable Office?

This chapter on Research Question 1 is divided into five sections. The first part provides information on the characteristics of the respondents, the second describes their work, the third looks at their organizations, the fourth reviews work factors that might support the use of portable offices. The final section is the discussion of findings reported in the preceding parts. The data tables, given at the end of each chapter, present responses from the questionnaires and interviews for the total sample (62 individuals) and the sample split by extent of portability. The discussion on extent of portability, which is Research Question 8, is found in Chapter 11.

4.1 Characteristics of the Respondents

The demographic characteristics of the sample are shown in Tables 4-1 (percentages) and 4-2 (means). Forty-two percent ($n=26$) of the sample had a low extent of portability, while fifty-eight percent ($n=36$) had a high extent of portability. Eighty-one percent of the respondents were male and nineteen percent, female. Mean age of the respondents was 38.7 years, with a range from 23 to 56 years. Over two-thirds had university education.

4.1.1 Family responsibilities

Most (89%) were married or lived with a significant other. Sixty-nine percent were parents. Parents had, on average, 1.5 children. The average age of the children was 11.4 years. Twenty-seven percent had children under six years of age (i.e., in school less than the full day) and 60% had children living at home. Thus, most had some family

responsibilities. None had responsibility for other dependents living with them, such as elderly parents.

4.1.2 Commute

Sixty-nine percent drove to work, while 18% took public transit, and the remaining 13% walked or biked. The mean length of time spent commuting daily was slightly over 1 hour. It was noted during interviews that those who drove a private car were likely to use it for work-related trips during the day and to use a cellular phone in the car. A consultant who lived out of town had a van fully equipped as an office so he could park and work between appointments. Another individual who had a long commute, business activities in various locations, evening and weekend appointments, and family responsibilities including medical emergencies, found the portable equipment essential for balancing work and personal demands. One urban-based consultant dealt with client organizations in rural areas.

4.2 Characteristics of Respondents' Work

Tables 4-3 and 4-4 provide information about the characteristics of the respondents' work, for the full sample and the sample split by extent of portability. The intent was to gather relevant background information on the type of work, amount of business travel, needs for communication, flexibility in work location, the role of technology in the job, and the technology-support environment in the organization.

As noted earlier, 60% of those interviewed worked in the private sector (businesses, companies, independent agents or consultants) and 40% in the public sector

(federal government departments, agencies, or closely linked organizations). Most respondents (73%) said their work was managerial or professional. There was a group in technical work (13%) and in sales/marketing (11%) and 2 people in clerical/administrative work.

The mean size of work group that the respondents were part of was 14 people. There was a broad range in work group size between those who were self-employed and those who worked in larger organizations. Over 45% supervised the work of others. Those who did not supervise the work of others were self-employed consultants, sales and marketing staff, and technical specialists. Those who supervised were responsible for a mean of 5.25 persons.

People with portable offices tend to work away from their main office (i.e., higher number of trips out of town, higher need to work locally at other sites). Almost three-quarters (71%) of the respondents indicated that their job required them to travel. Several respondents travelled extensively in Canada or internationally, including consultants, auditors, and public servants representing Canada in international organizations. Those who travelled reported a mean of 3.7 days per month in travel, with an average trip length of 4.2 days. Thus, many respondents were spending time in airports, on planes, and in hotels.

Eighty-four percent worked locally outside their own office. The average percentage of the workday spent outside the office locally was 39%. The local sites at which the most respondents worked were client sites (71%) and home (67%). Several respondents had to drive an hour or more to support clients located in other centres.

Eighty-six percent indicated their jobs required a high level of communication internally in their organization. A slightly lower proportion (79%) saw their jobs requiring a high level of communication externally, outside their organization. Almost all respondents (95%) said that computers and communication technologies were essential work tools and an integral part of their job.

4.3 Characteristics of Implementing Organizations

Although there was no formal data gathering about the implementing organizations, it was possible in some cases to gather background information from the contact person or in the course of the interviews. Interview data suggested that a number of the organizations decided to introduce portable technology to encourage employees to spend more time away from the office, at client sites or at home, or enhance productivity when travelling. In many cases, organizations were driven to adopt this work style by the need to reduce overhead, such as accommodation costs and support staff, or to speed up the delivery of products and service to clients. High computer literacy did not appear to be a prerequisite for this work style. In the sample there were organizations whose staff were already very computer literate as a requirement of their work (computer consultants) as well as organizations where the staff had to be introduced to computers as tools for the job. In several cases, managers said they had no objections to employees using the equipment at home for family, personal or volunteer activities, as they felt that this could increase employees' computer skills.

The only organization that did not have some standards on the computing and data communications elements of the portable office was the alliance of independent consultants. Several also had standard special-purpose application software. Selection of portable phones and electronic organizers seemed to be individual choices, as these tended to be purchased by the individual.

At several organizations, management had decided that this was how business would be done, changing from a specialized central mainframe computing approach to a more distributed end user computing approach where employees could do more for themselves and respond faster to clients. These organizations had special application software developed (e.g., for audits, account management, sales or billing purposes), and either provided employees with portable computers or set up special purchasing arrangements for their independent agents. They also provided training and ongoing support. For example, a financial products company introduced special software for agents to follow up with clients when appropriate, demonstrate product options to clients, and ultimately complete and submit an application form. In the branch office, only one agent out of more than 30 had not acquired a portable computer, but the manager was not concerned as the agent was about 70 years old. New agents in the office heard from others how essential the tools were. In one high technology business, follow-up sessions were held after client visits to discuss how the portable equipment had been used and how the use could be improved next time. One fairly new organization that had main offices in different parts of the country had been set up with very little support staff. New employees had to be comfortable with the idea of using technology to support themselves.

to work extended hours when required to deal with time zone differences, and to use portable equipment to be more productive on trips to other offices.

Several organizations had provided a limited number of portable computers to be shared by a group, but were fighting to get more because of employee demands and complaints with respect to the inconvenience of not having a personally customized tool, including current files, ready to go at short notice.

For a number of organizations and independent consultants, the computer was the base of their work and an essential tool for the business. In some cases they had to provide their own equipment, and in others they felt there was a competitive advantage in being able to provide it. For small firms and independent consultants, the portable technology was essential for the business to exist as they often did not have support staff in a base office, and had to be readily accessible to clients and colleagues. For small firms and independents, the individual made the decision to adopt portable technology.

4.4 Work Factors Supporting the Use of a Portable Office

Table 4-5 shows responses to the questions examining various factors that could encourage use of portable offices, such as personal skills and technical support. Nearly four-fifths of all respondents said they felt very competent using the technologies. About two-thirds considered they had a high level of basic skills in using the technologies. Two-thirds had at some time received formal training in the use of computers. These levels of self-confidence are interesting to note when recalling that a number of the users had little or no computer background before starting to use the portable office. This fits with the

literature (Dickerson and Gentry, 1983; Rogers, 1983, 1986) which suggests that computer and communications technology innovations require adopters to become more active participants with the technology, with higher levels of interaction and involvement than was required by innovations such as television.

More than three-quarters had help available for the portable office during regular office hours, but less than one-third had help available outside regular office hours. In several organizations, respondents who tended to have less background in technology spoke very positively about their Information Technology support structure and the importance of such support in enabling them to use portable offices well. In contrast, respondents at an organization with poor corporate computer and communications structures criticized it, but were using portable offices on their own, relying on their personal experience and expertise in technology.

The data suggest that introductory training coupled with self-learning and ongoing technical support enable even inexperienced users to feel competent in using the tools to meet their requirements.

4.5 Discussion

Respondents tended to be middle-aged, well educated, married, with children. Most drove to work, and many drove during the work day for appointments and work at other sites. Daily commuting time averaged over one hour. Most of the respondents were in managerial, professional, technical, or sales and marketing work, similar to those in other studies (Kraut, 1989; Venkatesh and Vitalari, 1992). Their jobs did not seem to

require continuous close supervision, but rather gave autonomy and required individuals to work independently, and as required. These jobs often included little or no responsibility for supervising others. Respondents tended to spend time away from their main office, travelling both locally and farther afield, and to perform work at client sites and at home. Often this reflected the organization's emphasis or the nature of their work. This is consistent with the findings of Venkatesh and Vitalari (1992) on primary users of supplemental work at home arrangements, for whom some aspects of their type of work were portable. They suggested that managerial and professional occupations were "characterized by significant autonomy, control over schedules, and work tasks that can be transported easily" (p. 1702) and perhaps had more incentives (reward schemes) to work additional hours than did clerical, para-professional, and hourly employees. The sample also included a number of people in 'nomadic jobs' such as real estate agents and sales/marketing agents. These findings are consistent with the literature on early adopters of personal computers and teleworkers (Burkhardt and Brass, 1990; Dickerson and Gentry, 1983; DiMartino and Wirth, 1990; Kraut, 1989; Mahajan et al., 1990; Rogers, 1983). Portable offices could offer such employees the potential to make use of driving and travel time, and to continue working with technology at other sites.

Respondents also regarded their work as requiring high levels of communications, both internally and externally, and saw computer and communications technology as essential tools and an integral part of their job. Some tasks involved following standardized procedures, such as calculating rates, performing technical diagnostic tests

or performing steps in an audit, which had been captured on the portable computer and network and could be accessed from various locations.

The data suggest that the following job characteristics are associated with the use of portable technology: (1) a high need for work-location flexibility; (2) a high need to be in communication with clients and colleagues; (3) a high need to have tools at hand to provide client service and to close a deal.

All the organizations in this study were motivated by business reasons to introduce portable technology. In the case of small businesses, it was seen to be essential for the existence of the business. In many cases, it was seen to have potential to reduce support and overhead costs. Increased productivity and enhanced ability to meet customer needs faster were important motivators, seen to contribute to a competitive advantage.

The data suggest that certain work factors are essential to encourage effective use of portable offices. The most important seem to be feelings of competence in using technology and having technical help available during regular working hours, followed by feelings of high basic skills and some formal training in use of computers. The data suggest, however, that high computer literacy is not necessarily a prerequisite for portable office use. Rather it would appear that the necessary literacy can be gained.

Some of these implementing organizations appeared to play a strong supportive and encouraging role in the adoption of the innovation. The organization can encourage adoption of the technology innovation by planning and providing good training and ongoing support.

Respondents saw technology as being integral to their jobs, and generally felt comfortable and confident about using it. This is consistent with the suggestions by Dickerson and Gentry (1983) on characteristics of the computer that partially determined the nature of the adopter: the complexity of the computer, the familiarity needed to be cognizant of its relative advantage, and the need for some other type of computer-oriented experience before it could be perceived as compatible.

There appear to be two groups of employees who adopt the portable office: individuals who adopt on their own in response to a perceived organizational problem and individuals who adopt following adoption by the organization. These data are consistent with the work of Rogers (1983; 1986). In cases where the individual made the decision to adopt, the respondents were similar to earlier adopters of personal computers, who tended to be middle-aged males with higher incomes, more education, and higher status occupations (Rogers, 1983), and favourable attitudes towards computers (Burkhardt and Brass, 1990).

Table 4-1 Demographics - percentages

	Total (%) n=62	Extent of Portability				
		Low (%) n=26	High (%) n=36	Low vs. High		
				χ^2	DF	α
Number of respondents	100	41.9	58.1	-	-	-
Male	80.6	69.2	88.9	3.74	1	.05*
Married or living with significant other	88.7	96.2	83.3	2.48	1	.05
Parent	69.4	65.4	72.2	.33	1	.05
Have Children <6 years	27.4	23.1	30.6	.42	1	.05
Have Children at home	59.7	57.7	61.1	.07	1	.05
Education:				.11	1	.05
Community College or less	32.3	34.6	30.6			
University	67.7	65.4	69.4			
Mode of Transportation Work- home :				2.99	2	.05
Private car	69.4	57.7	77.8			
Public Transit	17.7	23.1	13.9			
Walk / bike	12.9	19.2	8.3			

Table 4-2 Demographics - means

	Total		Extent of Portability						
			Low		High		Low vs. High		
	Mean	SD	Mean	SD	Mean	SD	t	DF	α
Age	38.7	7.5	39.8	7.4	37.9	7.6	.96	60	>.05
Number of children	1.5	1.2	1.5	1.3	1.5	1.1	.13	60	>.05
Average age of Children	11.4 yrs	7.5	12.3	7.6	10.8	7.4	.61	41	>.05
Hours commuting daily	1.1	.8	1.0	.4	1.2	.9	-1.15	51	>.05

Key SD = Standard Deviation
 DF = Degrees of Freedom

Table 4-3 Characteristics of the Work - percentages

	Total (%) n=62	Extent of Portability				
		Low (%) n=26	High (%) n=36	Low vs. High		
				χ^2	DF	α
Sector:						
Private	59.7	26.9	83.3	19.96	1	.000*
Public	40.3	73.1	16.7			
Type of Work:						
Managerial/Professional	72.6	80.	66.7	8.30	3	.04*
Technical	12.9	11.5	13.9			
Clerical/admin	3.2	7.7	0.			
Sales/marketing	11.3	0.	19.4			
% Supervising	45.2	50.0	41.7	.42	1	>.05
Travel required	71.0	80.8	63.9	2.08	1	>.05
Work locally outside own office	83.9 (n=52)	84.6	83.3	.25	1	>.05
Other local work sites	% of 52					
Client sites	71.2	59.1	80.0	2.70	1	>.05
Home	67.3	68.2	66.7	.01 3	1	>.05
Other sites of own organization	36.5	50.0	26.7	2.98	1	>.05
Conference & course sites	34.6	31.8	36.7	.13	1	>.05
Suppliers Sites	17.3	22.7	13.3	.78	1	>.05

	Total (%) n=62	Extent of Portability				
		Low (%) n=26	High (%) n=36	Low vs. High		
				χ^2	DF	α
High Internal Communication	85.5	92.3	80.6	1.68	1	>.05
High External Communication	79.0	76.9	80.6	.12	1	>.05
Technologies an integral part of job: High	95.2	92.3	97.2	.79	1	>.05

Table 4-4 Characteristics of the Work - means

	Total		Extent of Portability						
			Low		High		Low vs. High		
	Mean	S.D.	Mean	S.D.	Mean	S.D.	t	DF	α
Size of Work Group	14.0	18.7	14.7	14.0	13.5	21.7	.24	57	>.05
No. persons Supervised	5.3	7.9	7.4	11.0	3.4	2.8	1.36	13	>.05
Days per month in travel	3.7	3.6	3.2	2.2	4.2	4.4	-.95	33	>.05
Average trip - days	4.2	3.8	4.2	3.3	4.1	4.2	.12	39	>.05
% day in region but outside office	38.5	32.1	26.5	29.4	47.6	31.4	-2.64	58	.01*

Key: S.D. = Standard Deviation
 DF= Degrees of Freedom

Table 4-5 Factors Encouraging Use of Portable Offices

	Total (%) n=62	Extent of Portability				
		Low (%) n=26	High (%) n=36	Low vs. High		
				χ^2	DF	α
Feel very competent using technologies	79.0	73.1	83.3	.96	1	>.05
High Basic Skills in using technologies	64.5	61.5	66.7	.17	1	>.05
Formal training on use of computer	66.1	73.1	61.1	.97	1	>.05
Help available during regular office hours	77.4	84.6	72.2	1.33	1	>.05
Help available outside regular office hours	30.6	23.1	36.1	1.21	1	>.05

Chapter 5: Characteristics of the Portable Office

This chapter discusses Research Question 2 on the technical components of the portable offices. Table 5-1 shows what pieces of equipment the respondents had in their portable offices and for how long. These responses were used to assign respondents to the groups of low and high portability, as described earlier.

5.1 Technical Components

The four most common pieces of equipment were the computer (100% of sample), modem (68%), cellular phone (42%) and printer (34%). The average number of pieces was 3. Eight respondents had only a computer, but more than half the respondents had 3 or more pieces of equipment. During the interviews, some individuals said that they had added pieces of equipment over time. Some had tried and rejected pieces, such as a portable printer, having decided the piece was not appropriate, was not readily accepted by other people in certain situations, or was not used enough to warrant carrying it along.

One of the criteria for inclusion in the study was that subjects have a computer that could be used in locations other than the base office. The average length of time that subjects had such a computer was 33 months, with individual responses varying from those who were quite new users to others who had been early adopters several years earlier. Over two-thirds of the sample had a modem (average period of ownership of modem was 34 months). Less than half had cellular phones (average period of ownership of nearly 2 years). About one-third of respondents had portable printers, which they appeared to have acquired about the same time as the computer. Most respondents said they made use of standard printers when they were in offices, either their own or clients.

About one-fifth of the respondents had electronic organizers. Several were enthusiastic self-admitted "techie junkies" who had been early adopters and had set up their configuration to transfer information between the organizer and the computer. They were ready to help colleagues, and were mentioned by others as leading the way.

Thirteen percent carried pagers, often used as well as a cellular phone. Again the majority of these were in the high portability and private sector groups (e.g., real estate agents and consultants). Having a cellular phone allowed individuals to respond to a pager call when most convenient while in transit and without having to hunt for a pay phone on some street corner or highway.

Only 4 respondents (6.5%) had an adapter to plug into the car cigarette lighter. It would appear that most expected to be at a site with regular power supplies frequently enough to not require a power source in the car.

Five respondents mentioned that they owned other pieces of equipment. These included tape recorders or dictaphones. One independent consultant who had a long daily commute highlighted the usefulness of this for capturing thoughts while driving. A number of individuals mentioned voice mail as an important service to rely on while they were moving around; this could be associated with either a fixed or portable telephone.

Although there was no question included about what other computer equipment the individuals had access to, it was learned that in many cases they also had desktop computers at the office and or at home. When these alternatives were available, people were less likely to use the portable computer in those locations, unless they wanted to have flexibility such as doing some work on the laptop computer while sitting comfortably

in front of the television. Some noted that the portable computer gave them extra "capacity" when other people (family, clients, colleagues) were using the non-portable equipment. In some organizations, the portable computer was the only one used, although it was sometimes supplemented by a monitor on the desk to give a better screen. One individual said she had bought a home computer after seeing how useful the portable was, and therefore she no longer had to carry the portable home, only on her frequent business trips.

5.2 Discussion

The most common pieces of equipment in the portable offices were the computer, modem, cellular phone and printer. Respondents on average had the portable equipment for more than two years, so many had a considerable base of experience with the innovation. They would have seen changes in the technology over that time. Rogers (1986) suggested that continued use by more individuals was important with innovations in communication technologies.

More than half the respondents had three or more pieces of equipment, which covered a wide range of functionality. It was noted as well that most respondents had access to other desktop computers at certain sites, and they generally used those rather than the portable, given the choice. Those with printers tended to be marketing agents and others who were concerned with delivering finished products at a site other than the base office, and had the printer as part of a standard company configuration.

The variety of components among individuals supports the idea of importance of goodness of fit for the individual situation (Danziger and Kraemer, 1986; Davis et al.

1989; Kraut, 1989; Venkatesh and Vitalari, 1992). It was also noted during the interviews that there were both enthusiastic early adopters in the sample as well as followers who used what was recommended and had proven useful to their colleagues (Rogers, 1983). The data suggest that individuals or organizations had been selective and prudent in their acquisitions and had not just rushed out and bought great numbers of high tech toys, although there were several 'techie junkies'. The element of social considerations, such as whether a portable computer was acceptable in interviews with certain individuals, as well as technical ones with respect to adoption of the technology emerged in the comments on what had been tried and found inappropriate with certain groups of colleagues or clients (Olson, 1987). There was also evidence of individuals being involved in reinventing and changing the configuration over time to find what was most satisfactory for them, in keeping with Rogers (1986) suggestion of communication technologies as tool technologies.

Table 5-1 Portable Office - Technical Components

Category	Total		Extent of Portability		Low vs High		
	N		Low	High	χ^2	DF	α
Computer	62	100%	100%	100%			
How long		33.2 mos.	29.0	36.3			
Modem	42	67.7%	50.0	86.6	6.45	1	.01*
How long		34.1	36.2	33.2			
Cellular Phone	26	41.9%	0.	72.2	32.33	1	.000*
How long		23.1	0.	23.1			
Printer	21	33.9%	3.8	55.5	18.02	1	.000*
How long		33.2	60.0	31.9			
Organizer	13	20.0%	7.7	30.5			
How long		24.1	10.5	26.6			
Pager	8	12.9%	3.85	19.4			
How long		51.6	12.0	57.3			
Other	5	6.1%	0.	13.9			
How long		35.2	0.	35.2			
Adapter	4	6.5%	11.1	0			
How long		22.5	0.	22.5			
Fax	2	3.2%	0.	5.5			
How long		25.0	0.	25.0			
High Extent of Portability	36	58.1%	0.	100.			

Chapter 6: What is the History of the Portable Office Acquisition and Start-up?

This chapter addresses Research Question 3 on how the individual acquired the portable technology and began to use it.

6.1 History

Table 6-1 presents information on the history of the portable office acquisition and start of use. This aspect of the research was done to learn something about the process followed to get the equipment, including the amount of detailed analysis. Respondents were asked whether some document had been produced to justify the portable office acquisition, in hopes that this would provide historical data to supplement recalls of perceived benefits and drawbacks. Although several respondents said the document could perhaps be provided, none were; it is likely that the request, made early in the interview, was forgotten. In about one-third of the cases, all for larger organizations, there had been some documentation involved. This ranged from a corporate-level study that recommended standard product sets, through specific proposal or approval forms outlining the individual's requests, to memos to supervisors asking for equipment to provide more work flexibility. In several organizations where the decision had been taken that this was the corporate approach, the equipment was provided without any action by the individual user. In the case of financial agents, they were able to take advantage of special purchase arrangements made by the company with which they were affiliated. Not surprisingly, self-employed individuals and those in small businesses simply decided the tool was needed, then went ahead and made the purchase, with no reason to spend time on paperwork and approvals.

In nearly half the cases, the organization had bought the equipment, while more than one-third of the users had bought it themselves, either as an individual or as a small business. In the remaining cases, the organization had bought some pieces and the individual had bought others, such as a cellular phone, electronic organizer, and dictating machine. In the case of the early adopters, even those working in larger organizations, most had bought their own portable computer several years earlier and used it to help in their work.

Half the subjects felt they had no need for initial training to start using the portable technology, already being experienced computer users or feeling confident to learn by trial and error. This fits with the questionnaire responses on positive feelings of competence and skills. It may be that many adopters of portable offices start with high levels of computer literacy from previous experience with technology. About one quarter of the subjects received some initial training to use the portable office (i.e., training on the computer, software and its communications tools). This ranged from training by a formal training and support unit, to being sent on courses, to being given learning materials, such as tutorials. This applied most for users in larger organizations who were not already experienced computer users and in cases where the organization had developed special purpose application software that was fundamental to the business and the way of working. Another quarter said they had been left on their own to learn what they could, say from manuals or colleagues, or to find what training they needed.

6.2 Discussion

The history of these acquisitions where about half of the respondents had bought some or all of the equipment themselves and felt no need of initial training suggests that they were enthusiastic involved adopters. The relatively high literacy level that this suggests fits with the findings on type of work and education level. The other group of respondents were those for whom the organization had bought the equipment. Venkatesh and Vitalari (1992) had selected for their study those who had bought their own computer, rather than having the employer provide it, based on research indications that worker initiated supplemental work might be different from management initiated.

The training that was received generally appeared to have been appropriate, considering the earlier responses on feelings of competence with the technology. It should be noted, of course, that these are the adopters who found enough positive outcomes to continue use; we have not interviewed any non-adopters or dissatisfied adopters who stopped using the portable office.

The differences in acquisition and justification documentation reflect differences that would be expected in bureaucracy and red-tape between large and small organizations. For large companies, the widespread acquisition of portable technology would represent a sizable investment, likely requiring more up-front analysis. It is interesting to note that the purchase was apparently straight-forward enough and in a price range such that self-employed individuals simply went ahead and bought it as an essential tool without a great deal of forethought, especially if they were enthused about technology and tools to help in their work. Additional pieces such as electronic organizers and

cellular phones were apparently cheap enough that individuals were prepared to buy them to experiment with and to have for personal convenience.

Table 6-1 Portable Office - Acquisition and Start-up

	Total (%) n=62	Extent or Portability				
		Low (%) n=26	High (%) n=36	Low vs. High		
				χ^2	DF	α
Justification document	36.4	36.8	36.0	.00	1	>.05
Who bought pieces:				16.41	2	.000*
Self / small business	37.1	23.1	47.2			
Organization	48.4	76.9	27.8			
Combination	14.5	0.0	25.0			
Initial Training:				1.94	2	>.05
None required	50.0	46.2	52.8			
Left on own	25.8	34.6	19.4			
Yes	24.2	19.2	27.8			

Chapter 7: How are Portable Offices Used?

For Research Question 4, respondents were asked the following questions about their use of the portable office: how much of the workday was spent using it, where they used it, when they used it, what they used it for, how important those functions were to them, how much it was used, and how the actual uses compared with those anticipated.. Data on each question is presented below. The first section describes how much of the workday was spent using a portable office, then the second discusses when the portable office was used and how much. The third section reviews where it was used and how much. The fourth section explores what the portable office was used for. The fifth section considers how the actual uses compared with those that had been anticipated. The final section is an overall discussion of the findings on use.

It should be noted that some of these questions proved difficult to answer and analyze, given the very different nature of, say, the use of a telephone, in short bursts, often on a demand basis, and a computer, for extended periods at times selected by the user. Some respondents said that they had the computer and phone turned on all day, and continually moved from one activity to another using the appropriate tools or combination, as and when required. Some respondents, generally the marketing agents, worked quite irregular hours in order to accommodate their clients, but it is assumed they had some frame of reference for answering the questions on use during and after regular working hours. The instruments had not included questions on the set of "regular hours" or the usual amount of time spent in work during the week. It is assumed that those individuals who work from home consider it their regular office. In many cases, the functions used,

such as word processing, could have been performed on either a desktop or portable computer, so it is important to consider also where and when they were used.

7.1 Use (How much)

Respondents said they spent 30% of their work day on average using a portable office (25.2% for low portability versus 32.1% for high ($t = -1.07(59) = .29$)). The following sections include further information on how much portable offices were used in various time frames and locations.

7.2 Use (Time)

7.2.1 When used: how frequently

Table 7-1 shows how frequently respondents used the portable office in four timeframes. Two-thirds of respondents used the portable office very often during the work day, while 20% used it occasionally, and 13% used it infrequently, if ever. This last group were those who took a computer home to work after-hours or on trips, and relied on desktop computers while at the office.

Almost one-quarter of the sample used their technology very often during their daily commuting time, 16% occasionally and 60% never or infrequently. Use during the commute involved use of the cellular phone and some dictating machines/ tape recorders. (One respondent called his office from his car phone to advise this waiting researcher that he would be late for the interview because of heavy traffic). It should be noted that this type of commute use may be sample dependent (i.e., most of the subjects commuted by

private car, and were based in an urban area). Commute use may be different for samples with commuter trains for lengthy commutes where one could perhaps use a computer.

Nearly 40% used the portable office very often and nearly 20% used it occasionally with respect to travel outside of regular hours. When these percentages are considered in light of earlier data showing that about 70% of the sample said that their job required them to travel, it would appear that most respondents who needed to travel were making use of the portable office at those times.

Ninety percent of the subjects said they used the portable office outside regular work hours, including 63% who used it very often. Only 10% used it infrequently or never after regular hours.

7.2.2 When used: How long spent using

Respondents were asked how long they had spent in the previous week using the portable office in the following time frames: during regular work hours, during daily commuting time, during travel time outside regular work hours, and outside regular work hours. Responses are shown in Table 7-2. The average time spent during regular work hours was about one and three quarter hours (105 minutes), during daily commute time was about 20 minutes, during travel time, over half an hour (37 minutes), and after regular work hours was one hour (60 minutes).

7.3 Use (Where)

7.3.1 Where used

Respondents were also asked how many hours they had used the portable office at specific sites during the previous week. About 10% of the sample had not taken advantage of the portability in the previous week to enable them to work at sites other than their regular office and home. One-third of respondents indicated they had used their portable office at only one or two sites during the previous week. Another one-third had used it at three sites, and one-fifth had used it at four sites. The remainder had used it at five or six sites. The four most common sites were home (73% of respondents), the regular/ base office (63%), client sites (60%), and private motor vehicle (39%). One individual had used it at his ski chalet to keep in touch during a vacation week. Other sites might have appeared on the list if the interviews had not taken place during the Canadian winter. Three individuals talked of taking the portable office on their boat on week-ends (one dual-career couple carted two portable computers on-board, and another couple shared one), and others mentioned taking it to the cottage or on family visits in other cities. All 4 individuals who had worked at shared satellite offices were in the private sector.

Of those who had not taken advantage of the portability to enable them to work at sites other than their regular office or home, two respondents had used the portable technology only at home, one had used it only at his regular office, and four had used it at only those two sites. Others who used it at only two sites apparently took advantage of the portability. Besides working at either their regular office or home, they had

worked at a second site, which was client sites (4 people), private vehicle (3), other sites of their own organization (2), hotels (1) or shared satellite office (1).

7.3.2 Where used: How long spent using

As shown in Table 7-3, users estimated that in the last week they had used their portable office for an average of 11 hours in total at their regular base office, 8 hours at client sites, nearly 6 hours in total at home, and 3 hours in private motor vehicles. As well, 29% reported using it for an average of over 6 hours in total at hotels, and 23% used it for over 3 hours at other sites of their own organization. A few individuals reported using the portable office on public transit, at shared satellite offices (all private sector) and at a course site.

7.4 Use (What for)

Given the exploratory nature of this study, the respondents were asked in an open-ended question during the interview to describe what they had used the portable office for and how important each function was to them, rather than selecting from a closed list of answers. Content analysis was used to identify patterns, such as computing functions, communication functions, specialized applications, standard office support functions, and combinations of functions.

The replies on what functions portable offices had been used for in the previous week are shown in Table 7-4. Most individuals had used the portable office for a variety of functions (average of more than 3). Few had used it for only one specific function.

such as using the word processor to work on a document at home at night. More than a third (37%) said that they had the portable office equipment turned on from the start of each day, and used it continually, switching between tasks such as electronic mail, document preparation with spreadsheets, data bases, word processing, graphics as required. These were the individuals whose portable computer served as a desktop computer when in the office, perhaps supplemented with a larger monitor and plugged into a local area network. Using cellular phones and pagers also fell into the category of equipment turned on and used whenever necessary during the day.

A question was included to learn which of the many possible functions the user found to be most important and valuable. Most respondents (83%) regarded the functions they used as being vital for their work. Many identified several functions that were essential, such as voice communications, word processing and custom applications, but could also identify less used ones that were nice to have but not essential, such as programming languages, charts and graphics, time managers, and personal applications.

The main categories of functions used are described in the following sections.

7.5.1 Word processing and document preparation

More than three-quarters of the respondents used their portable office for word processing and document preparation, including graphics, charts and presentation materials. In this way, the computer was an essential tool for their way of working. These work sessions were often quite long, lasting more than three quarters of an hour, supporting the idea that portable offices were often used for tasks that required a long period of concentrated work away from interruptions.

A few subjects (15%) relied heavily on the portable computer for taking interview notes or minutes during a meeting, than finishing them up shortly afterwards. A public servant representing Canada on international committees was able to revise Canadian submissions in the evening and distribute them in the following day's meeting. Auditors in travel status with rigid deadlines for submitting reports of their findings used the computer to produce the necessary reports while still at the site. A consultant, an early adopter of portable technology and an experienced user, had found some limitations in producing project documents while on extended trips in very hot climates because of computer malfunctions in the heat and humidity.

7.5.2 Electronic mail or connections to data bases

Almost half the sample used electronic mail or connections to data bases on another computer. This allowed some technical consultants to provide systems support from a distance on an on-call basis. One consultant had discovered that the mail capability and bulletin boards were very effective to keep in touch with his grown children scattered across the continent. Another who spent considerable time on software development for clients in the United States used the electronic mail and bulletin boards extensively to keep in touch with other team members. In one organization with very poor network and electronic mail capabilities, users complained of their inability to use little more than stand-alone word processing. Several supervisors appreciated the electronic mail functions in order to oversee project teams working at several sites and outside regular hours. One commented that, when working on the network from home at night, he liked to be able

to send a message of appreciation to staff who were also working in off-hours on the system.

7.5.3 Telephone communications

Forty percent of the sample used the telephone communications functions of a cellular phone or pager. Some users were organized to return calls and handle business on the phone as they drove between sites. The phone was also used for personal calls, to keep in touch with family and handle family responsibilities, for personal security, and to help others in emergencies by being able to call for help. Individuals who were moving around found the phone essential so they could be reached and not miss important calls or waste time returning calls. One consultant found his cellular phone useful when working at client sites where he sometimes retreated into a conference room with his portable office equipment for undisturbed work, knowing he could still be reached. With his own cellular phone he was able to make long distance calls in an office environment where the phone system did not permit access to an operator.

7.5.4 Custom applications

Nearly 40% of the sample used custom applications on the computer, some of which were regarded as leading edge proprietary tools giving them a competitive advantage. In fact, it was because of the confidential nature of such usage that one company was unwilling to participate in this study. Work sessions using custom applications generally lasted longer than a half hour. For example, auditors had custom audit and evaluation tools, reference materials, and time reporting systems. Consultants involved in software development and data base system support had specialized software

and tools, and sometimes used their portable computer to do client demonstrations and training of their software products. Agents marketing financial products relied heavily on the "illustrations" function from the company they represented to show clients the costs and benefits of the products, and interact with them to explore alternatives and options. They then had the capability to generate an application form to purchase products while on-site with the client. These marketing representatives also relied heavily on the customer data base applications to help in planning their activities, for example to generate letters to clients just before a birthday to suggest reviewing their coverage before premiums rose. Real estate agents could access listings. Respondents who provided on-site client support for their high technology products took portable computers loaded with special purpose testing and diagnostic aids.

7.5.5 Time management

About 10% of the respondents talked of using portable office capabilities for agendas, address and phone lists, time management, and time reporting for billing purposes. These were in the form of an electronic organizer sometimes or were on the computer or involved a combination, with links. In some cases these were individual initiatives by an enthusiastic early adopter that were being further developed and adopted in the organization. On this point, there were some concerns expressed by managers about the time that was spent on such applications rather than on high priority activities, such as calling on clients.

2

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS
STANDARD REFERENCE MATERIAL 1010a
(ANSI and ISO TEST CHART No. 2)

7.5.6 Home use

Portable computers were used at home as a learning tool both by the individuals (i.e. to learn a new application package) and by their family members. Children were able to learn about computers and do school assignments such as research papers. Several subjects used the portable computer for their volunteer activities in community organizations. They also used the portable computer for personal business, such as budgets, tax preparation, letters and writing a novel. Computer games were also used by individuals and family members.

7.6 Actual Uses Compared to Those Anticipated

When asked if their actual uses of the portable office corresponded to those they had anticipated, as shown in Table 7-5, more than half said they did correspond. More than one-third said there were differences. One-quarter of the total sample reported they were making more use than they had anticipated. Less than 10% (5 individuals) found their actual use was less than anticipated, and they were not exploiting the portable office to the fullest. They attributed their low use to the fact that: (1) they had not invested the time to learn how to use it well, or (2) they found the arrangement of taking equipment out from a shared pool to be unsatisfactory, or (3) they found it awkward to use while in transit. One individual commented that his use was different than anticipated in that he had expected to use it more with clients, but was in fact doing more useful work for himself with it.

It is interesting to note, as well, that more than 10% of the sample said they had no preconceptions when they began using their equipment and had not given any particular thought to what they would use it for. This group included individuals for whom the decision to acquire the technology had been made by someone else and who had been given the portable office equipment to start using, and individuals who simply decided it was an essential tool for someone in a small business and a natural extension to the technology they were already using.

7.7 Discussion

Time spent using the portable office added up to a significant amount during the week (i.e. the typical employee with a portable office spent, on average, 30% of the workday using it). The results suggest that the equipment was an integral tool for the jobs of many of the respondents. A number of respondents, for example, indicated that they regarded the portable office as a set of tools that was turned on and used in some way throughout the day. The responses also indicate that most respondents were actually taking advantage of the portability of the equipment, using it at sites besides the office and home.

The portable office seemed to be used to support working an extended day. The extent of use after hours will be recalled in later sections on outcomes of use and advice to potential users, where stress, need for balance and self-discipline appear.

The high proportion of respondents who used the portable office while travelling suggests that individuals who need to travel have indeed accepted the innovation, while

adjusting the use to fit their circumstances and preferences. It may be that they feel additional pressures to complete tasks in limited time frames, produce professional looking products while at other sites, and try not to fall behind when they are away from the regular office. A number in the sample travelled quite regularly, and for them, taking the portable equipment had become routine. From the data in this study, we cannot determine causality: it may be that these individuals had a high need for good tools when travelling, and therefore got a portable computer. Alternatively, they may have acquired a portable computer for other reasons and then made use of it while travelling.

From the interviews, it appeared that the respondents were using their portable offices primarily to address their task-related information needs (Danziger and Kraemer, 1986). Certain functions were used extensively and were regarded as essential and critical for doing the jobs (Rogers, 1986; Venkatesh and Vitalari, 1992). There were some standard sets of products and uses within professional groups, such as auditors, marketing agents, and consultants. Some functions, such as time reporting, accounting, and client database management, were seen as necessary activities for the business to exist. During the interviews as uses were described, individual personality differences were noted in the levels of interest, enthusiasm, creativity, and in the extent of personal uses.

The portable office was also used for some social functions, including phone, e-mail and work for volunteer activities, as suggested by the literature (Mahajan et al. 1990; Rogers, 1986; Vitalari et al. 1985). Some individuals had experimented with the technology and re-invented to fit their needs (Rogers, 1986). In some cases, they were

encouraging and supporting others to become users, in keeping with Rogers' (1983) characteristic of "observability".

How portable offices were used seemed to be influenced by factors in the work environment, such as insistence on standard automated tools, withdrawal of traditional support staff, a culture that encouraged widespread use of electronic mail, and a strong corporate technology support structure.

Overall, the responses on use indicate that portable offices have allowed the individuals greater location- and time-independence in doing their work, and that they use diverse functions to fit their needs. The combination of portable phone capability with portable computing and enhanced computer communications appears to have encouraged the adoption by more types of users. It appears that many of these users then develop the attitude that the portable office can be an essential tool, as predicted by the literature (Kraut, 1989; Olson, 1987; Venkatesh and Vitalari, 1992).

The findings on actual uses compared to those anticipated suggest that many potential users had reasonably good knowledge beforehand of what the portable office would do for them and what they wanted to do. There seemed to be a good match between their expectations and the reality. The findings also suggest that this particular innovation, or at least its components, may be sufficiently common, similar to familiar desktop tools, and relatively low priced now that it is indeed regarded as just a tool by some potential adopters, and acquiring it does not require an extended decision process. These findings may be useful to marketers. The portion who said there were differences from the uses anticipated fit with Rogers' (1983) mention of both anticipated and

unanticipated consequences of adoption of an innovation. Potential adopters might be advised to talk with experienced users to learn more about how they have in fact used the innovation and what they had not anticipated.

Table 7-1 Use - how frequently - Percentages

How frequently used	Total (%) n=62	Extent of Portability				
		Low (%) n=26	High (%) n=36	Low vs. High		
				χ^2	DF	α
During regular work hours				1.25	2	>.05
Never/Infrequently	13.3	8.3	16.7			
Occasionally	20.0	25.0	16.7			
Very Often	66.7	66.7	66.7			
During daily commuting time:				13.01	2	.002*
Never / Infrequently	60.7	90.5	42.9			
Occasionally	16.1	0.	25.7			
Very Often	23.2	9.5	31.4			
During travel time outside regular hours:				.35	2	>.05
Infrequently	43.1	47.8	40.0			
Occasionally	19.0	17.4	20.0			
Very Often	37.9	34.8	40.0			
Outside regular work hours				6.34	2	.04*
Infrequently	9.7	0.	16.7			
Occasionally	27.4	38.5	19.4			
Very Often	62.9	61.5	63.9			

Table 7-2 Use - when - means

	Total		Extent of Fortability						
			Low		High		Low vs. High		
	Mean	S.D.	Mean	S.D.	Mean	S.D.	t	D F	α
<u>Minutes per Session</u>									
- during regular work hours	104.2	131.5	60.9	65.5	133.1	155.6	-2.37	46	.02*
- during daily commute time	18.5	19.1	60.0	.0	14.8	15.1	-	-	-
- during travel outside regular hours	36.7	41.3	42.5	30.8	33.2	46.9	.61	30	-.05
- outside regular hours	60.5	42.7	57.9	32.7	62.5	49.3	-.41	53	-.05

Key: S.D. = Standard Deviation
 DF= Degrees of Freedom

Table 7-3 Uses - where - how much - means

<u>Total Time (hours) last week at site-</u>	Total		Extent of Portability						
			Low		High		Low vs. High		
	Mean	SD	Mean	SD	Mean	SD	t	DF	α
Home	5.6	6.7	3.6	3.0	7.0	8.1	-2.01	35	.05*
Regular/ Base office	11.1	9.5	9.1	7.6	12.5	10.5	-1.10	37	>.05
Client Sites	7.8	6.4	5.6	4.4	8.7	7.0	-1.36	35	>.05
Private Motor Vehicle	3.4	6.2	.3	-	3.6	6.3	-	-	-
Hotels	6.4	8.6	5.8	9.8	7.4	6.8	-.39	16	>.05
Own organization, other sites	3.4	3.8	3.8	3.7	2.7	4.1	.53	12	>.05
Public Transit	2.8	1.4	3.3	1.2	1.0		-	3	-
Shared Satellite office	5.6	5.2	.3	-	7.3	4.6	-	-	-
Course site	22.5	0.0	22.5		0.				-

Table 7-4 Functions Used in past week

	Total (%) n=62	Extent of Portability				
		Low (%) n=26	High (%) n=36	Low vs. High		
				χ^2	DF	α
See functions as vital	82.3	69.2	91.7	5.21	1	.02*
Used Word Processing	75.8	88.5	66.7	3.91	1	.05*
Used E-mail or connections to databases	46.8	42.3	50.0	.36	1	>.05
Used cellular phone or pager	40.3	7.7	63.9	19.8	1	.00*
Used custom application	38.7	34.6	41.7	.32	1	>.05
General use all day	37.1	42.3	33.3	.52	1	>.05

Number of functions used	Mean 3.1	2.9	3.3	t -1.20	60	>.05
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Table 7-5 Uses compared to Anticipated

	Total (%) n=62	Extent of Portability				
		Low (%) n=26	High (%) n=36	Low vs. High		
				χ^2	DF	α
Do these uses correspond to those you anticipated?				.20	2	>.05
Yes	53.2	50.0	55.6			
No preconceptions	11.3	11.5	11.1			
No - more	35.5	38.5	33.3			

Chapter 8: What is Involved in the Adoption of the Portable Office?

According to Rogers' (1983) model of the adoption process, individuals gain some initial awareness and knowledge of the innovation of portable offices before forming attitudes and choosing whether or not to adopt the innovation. In this study, "extent of portability" is used to describe one aspect of the portable office that individuals would learn about when they initially considered using one. This chapter on Research Question 5 reviews what individuals recalled of their thinking before deciding to use a portable office, what they saw as the impacts of adoption, the relevance of the perceived characteristics described in Rogers' model, whether the individuals intended to continue use, and what advice they would offer to potential adopters.

8.1 Decision to Adopt

Why did the respondents initially consider using a portable office? Table 8-1 shows the ten most common groups of responses, nine of which were cited by at least one quarter of the sample. The top reasons (given by nearly three quarters of the sample) were "work-location flexibility" and "type of work requires it". Nearly half of the sample noted that using the portable office allowed "more efficient use of time". Approximately one-third of the sample indicated: "personal style", "work-time flexibility", "productivity", "accessibility", "required by organization", and "driven by client needs". "Increased control over work" was mentioned by more than one-eighth of the sample. Details on each of these responses are presented below.

8.1.1 "Work- location flexibility"

This was the factor cited most often for why respondents initially considered using a portable office. Respondents wanted the flexibility to not have to be in their base office but to be able to work at client sites, at home, and wherever convenient if they were between meetings outside the base office. They wanted to be able to work while on trips, either business or personal. A frequent example was wanting to be able to do supplementary work at the cottage or on the boat on weekends. It was seen as highly desirable to not have to return to the office in order to work.

8.1.2 "Type of work requires it"

There were numerous responses that were grouped under this heading. Work such as auditing, consulting, off-hours computer operations support, and insurance sales required individuals to be out of the office frequently, spending time with customers, perhaps travelling a lot, using computers as "tools of the trade". In the case of small businesses with no support staff, having a portable office was seen as essential for the business to exist. Some individuals had first considered using a portable office when there had been a special project or situation, often involving much overtime or an assignment out of town .

8.1.3 "More efficient use of time"

This included several aspects. Carrying a portable office, the user would have information available at his fingertips for immediate access, rather than getting it later after returning to the office or spending time trying other ways to get it. There was the idea of efficiency, time savings and better use of time because there could be less time

spent on routine commuting to and from the office. Respondents also noted that carrying a portable office would allow an individual to use more constructively the time that might have been wasted between appointments outside the office, and that travel time and commute time would not be lost as "forced down-time". For some individuals, commuting and travel time considerations pushed them to seriously consider a portable office, since distances were too great between office, home and client sites to make the trip very often, or to return to the base office in between. Avoiding the commute time to do extra work in the evening or on weekends was also an important consideration; a person might willingly spend an hour on office work at home in the evening, but not also spend an extra hour or more commuting to the office to do so.

8.1.4 "Personal style"

Many individuals were drawn to the idea of a portable office because it seemed to suit their personal style. Some said they hated doing work twice, first with paper and pen while away from the office computer, then on the computer. They liked to be able to turn minutes around as soon as possible after meetings and complete trip reports quickly. Since they were used to working with the technology at the office, they saw adding portable technology as a natural extension to their current use. A few said they loved trying new technology, using technology and being with the trends. Some saw it as improving their image, lending an air of professionalism, adding status, and suggesting that they were indeed serious about their work.

8.1.5 "Work-time flexibility"

This was important to respondents who worked with offices located in other time zones and therefore had office hours extending several hours into our local evening. They felt that the portable office gave them the ability to communicate electronically with the other locations at convenient times. Those who travelled wanted to be able to continue working in the evenings. Generally the portable office would allow individuals to do work at home when they chose, needed to, or felt inspired. It could provide flexibility to cope with family situations, such as being at home until children had gone off to school in the morning. As one individual said, "a burst of creativity can hit anytime" and would not be lost if portable equipment were close at hand.

8.1.6 "Productivity"

Respondents had also considered using a portable office to increase their productivity, seeing them as good productivity tools. They foresaw faster completion of work while on trips and closing deals with clients. They also felt that in working with clients, they could access information to provide answers to questions immediately, without going away to find information, and they could possibly complete the paperwork for the deal right there using the portable computer. They saw the portable office as making them more competitive.

8.1.7 "Accessibility"

Respondents felt a portable office could increase their accessibility by providing the ability to stay in touch even as their location or the location of others changed. The

idea of accessibility was linked to the computer and voice communications components of portable offices.

8.1.8 "Required by organization"

In some cases, the portable office was required or made available by the organization, and use was actively encouraged. This was the case with the public service organization that provided portable computers to all professionals to use in the base office, at home and at client sites, where they spent considerable time, and provided custom software, reference materials, and a time reporting system over the network. One young public sector organization with units in two parts of the country had been set up with minimal support staff, and potential employees were told that they were expected to look after themselves with computers. This was one of the organizations where the Information Technology staff were praised for the quality of their support. In the private sector, high technology firms introduced portable offices so employees would spend more time out of the base office and with clients. The financial services industry selected a standard configuration, provided a purchase arrangement for independent agents, and supplied custom software for product information, sales, and client data bases. One individual had to get a portable office as a technical solution to wiring problems in building.

8.1.9 "Driven by client needs"

Many individuals were driven to acquire the technology by client needs and to increase customer satisfaction and service. Portable technology gave them the ability to interact with clients, doing demonstrations, trying "what if" scenarios, and completing

transactions. They felt it would be an advantage if clients or those visited did not have to provide work instruments.

8.1.10 "Increased control over work"

Another reason, mentioned by about 15% of respondents, was that they saw portable offices giving them increased control over their work and reducing stress. They would be able to work with more concentration and less interruptions. By carrying their own equipment, they would no longer have to worry whether the sites they visited had computers, or equipment compatible with their own, and they could maintain consistency. For example, trying to print out a file using someone else's computer and printer can be a major problem. This reason is consistent with increased work-time and work-location flexibility.

8.2 Impact of Adoption

Did respondents find that their uses of the portable office had changed over time? About one-sixth of the sample felt it had not, another one-sixth said it had decreased, while all others said it had increased in various ways. Has their use of a portable office changed the way they worked? About one-sixth said no, while the rest said yes. The responses to these questions are shown in Table 8-2 and discussed in detail below.

During the interviews, there were interesting reactions to the second question, as many people reflected on this for the first time and were indeed able to identify changes.

One individual who was a heavy user for business and personal activities was clearly stunned as he realized "it's completely blurred the boundary between work and play - and

I had not recognized that until now. I need some time to think about what that means for me."

8.2.1 Uses changed over time

Use increased: About two-thirds of the respondents found their use had increased, sometimes in several ways. Sixty percent of respondents felt they had become more sophisticated in their use. They noted that: (1) they were doing more tasks or functions, (2) their organization had added applications and tools, (3) they were making more efficient use of the portable office (e.g. loading all necessary files before leaving, being more skilled with the software, remembering to transfer their phone). They were made more effective by use of the portable office (e.g., reducing the number of visits needed to complete a piece of business). One individual said his use had changed "from the trivial to the substantive", as he used it less as just an office tool and more a technology tool.

Increased use was described in other ways. Nearly 20% of respondents said the time they spent using the portable office had increased. Fifteen percent felt more comfortable with the equipment and more dependent on it. Their confidence and skills had increased as they progressed on the learning curve. They had become more dependent on the portable office, so it was now essential rather than just nice to have. Nearly 20% mentioned other reasons their use had increased, such as: (1) they were now using it in more and different locations, rather than just at home, for example, as they had done in the beginning. (2) their role or situation had changed, for example, taking on different types of contracts.

Use decreased: About one-sixth said their use of the portable office had decreased. Instead of the portable, some were using desktop computers at home, the main office, or other sites. One woman had bought a home computer after becoming reliant on the portable, which she still used at the office and on trips. but now she needed to carry only diskettes home to continue working. In some cases, there were decreased requirements to use the portable office, as in the case of computer specialists who were receiving fewer system support calls as the systems matured and stabilized. Some individuals had intentionally reduced their use of the portable office and were selecting the situations more carefully. For example, they had found it was not worth the effort to carry the equipment on short trips, so took it only on longer trips that lasted several days. Some found they had not used it extensively while travelling, but they could easily access equipment at the destination site or hotel when needed for small jobs. Some found there were particular people who were not comfortable in interviews, meetings or client visits when the portable office was used, while others were quite intrigued by it. A consultant involved in national and international projects noted that he had become "sensitive to cultural differences that made it inappropriate to use technological aids with certain groups". Some respondents tried to limit the intrusions of phones and pagers when around others. Some replied that their use had decreased from earlier use in a previous workplace because the current situation was worse, with less access to machines or poorer network access.

8.2.2 Use changed the way they worked

When asked if use of the portable office had changed the way they worked, most respondents identified a number of changes. Less than 20% saw no changes or, as recent entrants in the workforce, said they had never worked any other way (see Table 8-2). Details on these responses are provided below.

"More efficient": Nearly 60% said they were now more efficient and better organized, with more productive work time. They found their time requirements to perform tasks had shortened, as faster responses and turnarounds were demanded. They were spending more time directly with clients. They were able to carry less when they went out with the portable office, instead of, for example, taking a box of disks to use at the customer site as they had in the past.

"How structure time": About 55% saw changes in how they structured their time, finding their flexibility had increased. When working with people in other time zones, they did not have to wait around at the office, but could go home and work from there when appropriate. They set their priorities differently, and no longer had to rush to answer the pager. They spent less time travelling. They were doing more data analysis with the computer, rather than doing it by hand. They had more time now for writing, rather than data collection activities. Users found they were more flexible in both time and location. One user found it changed how he thought and wrote, but could "turn you into a monk".

"Increased autonomy": Thirty percent said use of the portable office had increased their autonomy and control. They felt it empowered the worker and took some

pressure off by giving choices. Some felt more effective as they wrote better and were able to do better preparation and consider their approaches ahead of meeting and appointments, such as taking aids, being prepared for "what if " discussions. They were making less use of support staff and certain equipment, such as phones and dictaphones, and were thus less reliant on their organization. They found using the portable office gave them more confidence in the decision-making process, since it allowed (through electronic communication) more and faster consultation during the process, and increased their confidence that complete information had been sent.

"Extends work-day and expectations": One-fifth of respondents said using a portable office had changed the way they worked by extending the work-day and work expectations. Having a portable office meant work was always with them and they never stopped working. Other people came to expect that the portable office worker would be available in extended hours. It was easier to make changes to documents and other work, so they kept being asked to make more, or did so on their own, aiming for perfection.

8.3 Relevance of Rogers' Model to the Adoption Process

Rogers' (1983) model includes a "persuasion stage", with adopters' attitudes based on perceived characteristics of an innovation. It was not possible to know exactly what had been the attitudes of respondents at the time they were considering using the portable office, but efforts were made to learn something of their thinking. Respondents were asked what they saw as the advantages of portable offices over non-portable, about four aspects of compatibility and complexity, and whether they had been influenced by

someone else whom they may have observed using something similar. They were also asked whether they saw security of portable offices as an issue. This had been identified as a special interest by a central agency with responsibility for setting policy on use of technology. The results for this section are given in Table 8-3.

8.3.1 Advantages of portable offices over non-portable

There were 6 types of advantages that were identified by at least 10% of the respondents. The most frequently mentioned advantage, cited by 83% of the sample, was increased control over work. Increased efficiency and more work-location flexibility were noted by nearly two-thirds of respondents. One-third talked of more work-time flexibility, and one-quarter about increased effectiveness. Other advantages were named by 13% of respondents. Many of the ideas expressed here are similar to those that appeared earlier in the responses on why they had considered using a portable office. Although the question asked in what ways respondents saw portable offices as being better or providing advantages over not having portable offices/ technology, there was 13% of the sample who identified what they saw as disadvantages, as well as some advantages. Details on these responses are provided below.

Increased control over work: Respondents said using a portable office gave them immediate access to people and to the office, and they could stay in contact with clients and others in the organization. The portable office was compact and convenient, and could be taken to clients and to locations where they could work with fewer disruptions. They did not need to access others' equipment, and could know they were always equipped. With a portable office, they could have all important files available, the

same as at the office, including previous year files (e.g., for standard annual tasks and updating). The added flexibility gave them a sense of control over their workload.

Increased efficiency: Respondents felt that the portable office could provide immediate access to information and address the necessity for instant information, important in cases where "time is money". Travel time can be used and be productive, not lost or dead time. Work can be completed faster and without delays, and quicker responses are possible. When travelling, work such as completed audit reports can be sent in sooner and faster via e-mail. Work can be completed in fewer visits, improving the turn-around time. Portable offices can reduce travelling time (frequency) back to the office and other sites, giving more work time. They also save on duplication of effort eliminating the need to write while away and then type when back, or redo completely from the previous year.

More work-location flexibility: The portable office was seen as having everything the fixed office had, plus portability. Work location flexibility and access included being mobile and being able to work at home, where it was more comfortable. Users could still do urgent or important work at home, even if sick. They could do work they couldn't have done otherwise without returning to the office. The portable office allowed them to do work and to do personal things, too, such as going on trips and rearranging the schedule to accommodate other needs.

More work-time flexibility: This included being able to work when they felt most inclined and when they chose.

Increased effectiveness: Portable offices were seen to enhance productivity, enabling users to do better, more effective, and better quality work. Work could be completed immediately, and problems addressed while still fresh in the memory and when the users thought most clearly. Users could take better, more complete notes in meetings, provide better service to clients, and have more time available with clients. The portable office could also augment others' equipment, for example for testing to ensure a better quality product.

Other advantages: Respondents perceived they could use the portable computer for more than just work. Having a portable office exposed family to person's work life, and to computers and technology. It contributes to a positive image of professionalism and being more serious about work. With voice mail or pagers, users do not worry whether they have missed calls. In some cases, a portable office makes a business possible by allowing users to reduce their own office space costs and requirements by using space elsewhere (e.g., clients' place), or reducing office moving costs, such as relocating wiring.

Disadvantages: Those using a portable office perceived that they could perhaps lose their day-to-day peer relationships at the office. With people out of the office more, they felt there could be danger of loss of integrity, with each user off "doing his own thing". One individual saw disruptions if the group was not an "evolved team", all using the portable office. With the portable office always nearby, work time could easily blur into family and private time, and users might never get away from work. There could be the expectation that they would work 15-18 hour days. Others might have

little awareness of the time spent in making changes, and might demand too many. Portable offices were seen as less satisfactory than non-portable if they were missing some features, such as communications, or information and data bases. Some users missed quality printouts, and some commented on the problem of screen quality.

8.3.2 Compatibility with computer and communication systems already using

About 80% of the sample said their portable office was compatible with the computer and communication systems they were already using, while 11% said they were not compatible. Sources of incompatibility included: disk drives, versions of software, different applications, communications. Ten percent could not say as they had not been using any such systems before this. This group included some younger respondents who had begun using portable technology on their first job, one who had changed careers, and some who had never used computers in their work until they began with the portable office. One said he was attracted to his current job because of the opportunity to use technology, which had not been available with his previous organization.

8.3.3 Compatibility with the way liked to work

Everyone in the sample said their portable office was compatible with the way they liked to work, although 16% included some restrictions or reservations. Many individuals liked to be organized, do things only once (not writing out longhand, then entering it into a computer) and keep on top of their workload by for instance completing minutes of meetings or trip reports immediately, which the portable office enabled them

to do. The reservations included speed available, limited machine capacity, still too much paper.

8.3.4 Compatibility with the way organization worked

Eighty percent of the sample said the portable office was compatible with the way the organization worked. There were situations in which compatibility was assured since this was the way in which the organization had decided to work, or "the organization" was only one or two individuals. Compatibility was also assured when the portable computer was used as a terminal to access corporate data bases, applications, office automation tools and e-mail systems. Examples included the government agency with main offices in different parts of the country, small firms of information technology consultants, and auditors taking portable computers containing all their files to client sites, with links to corporate computer systems for information and reporting. Similarly, financial/ insurance firms provided special software for agents to use with clients at client sites. Sixteen percent said that while the portable office was compatible with the way their organization worked, there were certain exceptions. For example, there was not enough equipment; not everyone was using it; inadequate system linkages; non-supportive management style, leading to fears of "out of sight, out of mind". Only 5%, all low portability and public sector, said their portable office was not compatible with the way their organization worked. In some cases, this reflected frustration with the state of the corporate telecommunications network.

8.3.5 Compatibility with communication needs

This topic covered both voice and data communications, and questions of whom they needed to communicate with, when, and where. Two-thirds said the portable office was compatible with their communication needs, one-third said it was generally compatible but with restrictions, and 5% said it was not compatible. Several respondents commented on their reliance on voice mail, whether provided through their portable or desktop phone. Although voice mail is not necessarily a feature of portable offices, it is based on the principle of accessibility from anywhere at anytime, and indeed met the communication needs of some respondents without the need for a portable phone. A number of respondents talked of eventually adding a fax capability through a fax modem on the portable computer. This suggests that respondents had acquired the communication capabilities that fit their needs, but were looking for improvements or increased capabilities too. Common frustrations were with e-mail systems and gateways, and the problems of finding communication jacks in hotels and other locations.

8.3.6 Complexity or difficulty in using portable technology

While about two-thirds said they had experienced some difficulty or complexity in using the portable office (see Table 8.3), they did not perceive that the problems encountered were severe. Nor had these problems stopped the individuals from using their portable offices. They had, however, caused frustration and contributed to reduced or more selective use of the technology. The problems most often mentioned were with the hardware: the screen was too small and difficult to work with for extended periods:

the keyboard was small and uncomfortable; battery life was too short; memory was limited; diskettes posed problems when using several computers. Users also complained of the size and weight of the equipment and the space required, especially when combining several pieces. One had found his portable computer was too awkward to use in a cramped airline seat.

The ergonomics of the portable office were still not acceptable: the majority of the respondents complained of eyestrain, stiff necks, and discomfort from working in cramped conditions. Some mentioned problems with software and applications. The other main problem area was with compatibility and communications. Problems noted here included the time, efforts and costs of interfacing with other systems, working between centralized computers and distributed processing, printing through local area networks or at sites other than the base office, and interfacing with other systems. This group of problems could require considerable technical expertise on the part of a user or from a technical support person to solve. Several individuals acknowledged that they had experienced difficulties because of their own lack of computer literacy and skills.

8.3.7 Observability

Forty-four percent of respondents said that their use of a portable office had been influenced by someone else, either at work or elsewhere. Some had partners who were eager to use technology and encouraged others to do so. Some had been influenced by family members. Some had been influenced by reading articles and by advertising

However, several respondents indicated that they saw themselves as pioneers and early adopters, and that they themselves influenced others.

8.3.8 Security

When asked whether they saw security as an issue with portable offices, one-third said that they did not, or at least not for their own situation, or that it was no more an issue with portable offices than with traditional mainframe and desktop computers. They said their use of the portable office did not involve confidential information on the computer or sending sensitive messages. Their portable systems used the same structure of passwords for controlling access as did the non-portable. One individual pointed out that his portable equipment was locked in his cabinets each night, and was therefore more secure than desktop equipment.

Several said that they did not worry about theft - they had insurance for such situations; one had in fact had his computer stolen from his car. Along with others, they often went on, however, to identify a number of ways that they could see security as an issue. Overall, 79% identified ways that they saw security as an issue, with slightly higher proportions from the low portability group. The issues included the physical security and the danger of having the equipment stolen; the security of networks through unauthorized access; the security of data, which others should not access, and loss of data because of inadequate procedures, such as taking regular back-ups.

8.4 Intent to Continue Use

As shown in Table 8-4, all respondents said they intended to continue using the portable office, some saying so most emphatically. To some, it was a ridiculous question.

Almost half indicated they would upgrade the equipment with technology changes, and more than a third intended to add components, such as a fax modem, or applications. The remainder intended to continue using their portable office "as is " for the time being. When asked if they would encourage others to use a portable office, 95% said they would, depending on whether it was needed and fit the situation. The remaining 5% felt it was up to others to make their own decisions, or they would not offer advice to anyone.

8.5 Advice to Other Adopters

Table 8-5 summarizes the responses on advice these users would offer to others who were considering using a portable office. There were eight ideas that were frequently mentioned, with users generally offering several pieces of advice. Appendix 7 shows the types of statements that were included in these groups. More than half advised others to buy the equipment carefully, purchasing the best equipment that the budget would permit, seeking good advice, getting only what is needed rather than nice-to-have, and not to have the equipment shared. More than 40% emphasized the importance of learning and the need to recognize that it takes time to learn to use the portable office well. Nearly 40% talked about the importance of planning, to define the needs and objectives well and to buy to fit these needs, with potential for upgrades, including the possible installation of another phone line for working at home. They talked of the importance of selecting the right candidates for such work arrangements, recognizing personal factors and work styles. Nearly 40% would advise potential users to be prepared for both negatives and positives. This included a reminder of the added responsibility that comes with carrying around all

this information outside the base office. One-third encouraged new users to look for appropriate uses and opportunities to make use of the portable office. More than one quarter warned potential users about the need for self-discipline concerning time spent in work, work habits, and balancing work and family. Twenty percent pointed out that the technology has the potential to improve the quality of work life, morale and autonomy. Employees giving this response encouraged others to start using the portable office now and not wait so they could gain the benefits and be better prepared for the future. Nearly 20% talked of the need for strong organizational support and for realistic expectations from the organization. Several users urged potential users to be security conscious, and to remember to take back-ups of computer files. One home user talked of considerations in having a private space for a home office. One user emphasized the need to keep communicating with the base office while out using the portable office.

8.6 Discussion

Rogers' (1983) model with the persuasion stage appears to be relevant for these users of the innovation, portable offices. The responses on all the concepts included in this study were all positive (Robey and Zmud, 1990; Rogers, 1986; Tornatsky and Klein, 1982). Users had positive attitudes toward the innovation. They recognized significant advantages of portable offices over non-portable and generally found them compatible with their personal preferences and situations, and not overly difficult to use. Seeing others use the innovations productively had influenced some. This suggests that users saw the portable office as being appropriate and useful for their situation and needs, while recognizing negative points. Presumably, individuals who had decided not to use

a portable office would have given more negative responses, seeing portable offices as incompatible with their situation and perhaps not having been exposed to satisfied users in similar situations.

Respondents said they had initially considered using a portable office for a variety of reasons relating mainly to the demands of their work and the need to do more work better and faster, providing better service to clients. This emphasis on work requirements is consistent with the literature (Danziger and Kraemer, 1986; Davis et al., 1989; Kraut, 1989; Mawhinney and Lederer, 1991; Rice et al., 1989; Venkatesh and Vitalari, 1992). Respondents said they wanted accessibility and flexibility in work location and work time that portable offices could provide. They wanted tools to help them work more efficiently. They did not want to be wasting or losing time, but wanted to be more in control of their work and personal situations. They were trying to meet their own work demands and expectations, and those of their organization, clients and family. They were looking for ways to balance work and family responsibilities, so they could be at home with the family more, make weekend trips and still meet continuing work demands.

It appeared that respondents were aware of the differences that extent of portability could make in what they could expect to gain from using a portable office. For some, low extent of portability was fine, because their main requirement was to be able to do document preparation and keep in touch by e-mail while away from the base office. These findings are consistent with the findings of Kraut (1989) on the type of tasks that managers and professionals tended to perform when teleworking.

For others, the added functions associated with high extent of portability were critical to their adoption because their work required them to be generally accessible by telephone, especially by clients. This advantage of additional functionality of portable offices extends the suggestion from Dickerson and Gentry (1983) that one relative advantage of personal computers over previous single-function computers was their ability to perform multiple functions.

In some cases, a particular new situation, such as a contract out of town or increased travel requirements or their organization's decision to adopt the portable office, caused respondents to consider an innovative approach to their work. Only a few in the sample had initially considered using a portable office primarily because their organization had forced it, so this is mainly a study of individuals who had decided themselves to adopt an innovation..

The portable office fits with the description in the literature (Davis et al., 1989; Rogers, 1983, 1986) of types of innovation where users made changes and adjustments to get the right "fit" to their situation. Rogers (1983, 1986) wrote of tool technologies that were applied in various ways to diverse situations and of adjustments in the implementation based on the level of satisfaction from the outcomes. In some cases, change was driven by needs and in others, by preference. Both technical and social factors had influenced the changes. Recalling that those with low portability made extensive use of their portable offices to do document preparation, it may be that they felt this was sufficient to meet their needs and did not seek more sophisticated uses. On the other hand, the high portability group included individuals who had more pieces of

equipment, such as electronic organizers, which they had been working to integrate with the computer. They may have been the more enthusiastic users who continued to look for more interesting ways to use the office automation tools and other computer software. Those with cellular phones may have developed routines to make series of phone calls, as with the marketing representative who picked up his messages as he left the office and then returned the calls while in his car. This type of increasing sophistication of use suggests that the portable office work arrangement goes beyond the types of work arrangements that are generally the focus in the telework and end-user computing literature.

The majority of respondents identified some impacts of adoption, both positive and negative. From reactions to the questions on whether their way of working had changed, it may be that some of the outcomes had been unanticipated, as suggested by Rogers (1983), and perhaps not recognized until the interview. A high percentage saw as positives that their use had increased over time and that using the portable office had changed the way they worked, as they became more effective and were doing more and different things, such as writing papers that they had never had time for before.

Rogers (1986) had suggested that measures of the successful adoption of communication technology innovations should include the degree of use and continued use by more individuals. In this sample overall, there was increased use and increasing commitment, dependence and reliance on the tools. Many of the respondents had been using portable technology for several years, and spoke of taking advantage of advances in the technology over that time. This would appear to meet Rogers' consideration for

a successful innovation. The responses also support Olson's (1987) view that as highly integrated office systems evolved, they would play a greater role.

The responses on whether respondents intended to continue use and if so, with what changes, are also consistent with the work by Rogers (1986) that suggests users of technological innovations such as the portable office continue to reinvent the innovation, adapting it to fit their needs better as they learn more and become more familiar with it, and as their situations change. They also reflect Rogers' measure of continued use, in that the innovation succeeds as early adopters continue to use it, with satisfaction, and more adopters join in and also continue to use it. It was interesting to note the positive responses from users who were not very computer literate, but had a company approach of custom software and a good support structure, and were now committed users.

In contrast to telework, where the literature suggested that telework arrangements were often discontinued after a trial period of 6 months or more, or were not extended to more of the workforce (Huws et al., 1990; Olson, 1987), the portable office arrangement appears likely to continue, with more users, and to be adapted to user needs. Experiences with portable offices were positive, and the portable office technology was seen to be an integral part of the job. We might expect to see even more acceptance as advances and improvements in technology increase compatibility and reduce complexity and as the costs of the technology decrease. In advice to others, users emphasized that the tool should be needed and fit the individual situation, suggesting that they felt satisfied that they had arrived at this match for their own situations.

The key pieces of advice offered to potential adopters (i.e., the need for balance, good use of resources to get good value for money, recognition that the innovation is not suitable for everyone and definitely requires self-discipline in its use) support the work of Davis (1989) who stressed the importance of the innovations fitting the work needs and the social needs of individuals, and of continually re-inventing to make better use of it (also Rice et al., 1989; Mawhinney and Lederer, 1990; Danziger and Kraemer, 1986). The advice also points out that use of such innovations involves and impacts both the individuals and their organizations, as found in earlier work on personal computers (Dickerson and Gentry, 1983; Roger, 1983; Vitalari et al., 1985). It would appear to reflect the attitudes of professionals, committed to their work, taking responsibility for their work and personal decisions (Kraut, 1989; Venkatesh and Vitalari, 1992). The results also fit with the literature on stress and the benefits having access to home technology has on increased perceptions of control of one's work (Karasek, 1979, 1990). They also are consistent with findings from the telework literature that having equipment available at home and elsewhere increases the likelihood of spending more time on work, possibly to the detriment of family and personal life (DiMartino and Wirth, 1990; Duxbury et al., 1987). It should also be noted that a number of these pieces of advice would apply to use of computer and communications technology or alternative working arrangements in general.

It is interesting to note that while a number of respondents had done little advance planning themselves they offered strong advice to others to do so. It is also interesting

that it was low portability users (the less sophisticated users) who offered advice about recognizing the time for the learning curve.

Table 8-1 Why initially considered using a portable office

Why initially considered	Total (%) n=62	Extent of Portability				
		Low (%) n=26	High (%) n=36	Low vs. High		
				χ^2	DF	α
Work-location flexibility	72.6	84.6	63.9	3.26	1	.05
Type of work requires it	71.0	69.2	72.2	.07	1	.05
More efficient use of time	48.4	50.0	47.2	.05	1	.05
Suits personal style	37.1	50.0	27.8	3.19	1	.05
Work-time flexibility	35.5	38.5	33.3	.17	1	.05
Productivity	32.3	30.8	33.3	.05	1	.05
Accessibility	30.6	23.1	36.1	1.21	1	.05
Required by organization	27.4	34.6	22.2	1.16	1	.05
Driven by client needs	24.2	19.2	27.8	.60	1	.05
Increased control over work	14.5	15.4	13.9	.03	1	.05

Table 8-2 Impact of Adoption

	Total (%) n=62	Extent of Portability				
		Low (%) n=26	High (%) n=36	Low vs. High		
				χ^2	DF	α
Use changed over time?						
No	16.1	30.8	5.6	7.09	1	.007*
Increased:						
More sophisticated	59.7	34.6	77.8	11.69	1	.001*
Volume	17.7	15.4	19.4	.17	1	>.05
More comfortable/ dependent	14.5	19.2	11.1	.80	1	>.05
Other	17.7	7.7	25.0	3.10	1	>.05
Decreased	17.7	23.1	13.9	.87	1	>.05
Has use of portable office changed the way you work?						
No	17.7	11.5	22.2	1.18	1	>.05
More efficient	58.1	57.7	58.3	.00	1	>.05
How structure time	54.8	50.0	58.3	.42	1	>.05
Increased autonomy	30.6	26.9	33.3	.29	1	>.05
Extends work-day, expectations	19.4	15.4	22.2	.45	1	>.05

Table 8-3 How see portable offices

	Total (%) n=62	Extent of Portability				
		Low (%) n=26	High (%) n=36	Low vs. High		
				χ^2	DF	α
Advantages over non-portable offices:						
Increased control over work	82.3	88.5	77.8	1.18	1	.05
Increased efficiency	64.5	57.7	69.4	.91	1	.05
More work-location flexibility	62.9	73.1	55.6	1.99	1	.05
More work -time flexibility	33.9	30.8	36.1	.19	1	.05
Increased effectiveness	24.2	23.1	25.0	.03	1	.05
Other	12.9	3.8	19.4	3.27	1	.05
Disadvantages	12.9	11.5	13.9	.07	1	.05
Compatibility of portable office with:						
1. Computer and communication Systems already using						
Yes	79.0	76.9	80.6	.19	2	.05
No	11.3	11.5	11.1			
Not using any	9.7	11.5	8.3			
2. Way you like to work						
Yes	83.9	92.3	77.8	2.36	1	.05
Yes, but..	16.1	7.7	22.2			

3. Way your organization works				4.97	2	>.05
Yes	79.0	69.2	86.1			
Yes, but..	16.1	19.2	13.9			
No	4.8	11.5	0.			
4. Communication needs				.80	2	>.05
Yes	62.9	61.5	63.9			
Yes, but..	32.3	30.8	33.3			
No	4.8	7.7	2.8			
Experience some difficulty or complexity in using	62.9	61.5	63.9	.04	1	>.05
Had observed or was influenced by another user	43.5	46.2	41.7	.12	1	>.05
See Security as an issue?						
No / not for us	33.9	19.2	44.4	4.28	1	.04*
Yes- for us/ generally	79.0	84.6	75.0	.84	1	>.05

Table 8-4 Intent to continue use

	Total (%) n=62	Extent of Portability				
		Low (%) n=26	High (%) n=36	Low vs High		
				χ^2	DF	α
Intend to continue using portable office:	100					
Yes, upgrade with technology changes	46.8	46.2	47.2	.07	2	.05
Yes, add components or applications	35.5	34.6	36.1			
Yes, as is for the present	17.7	19.2	16.7			
Would encourage others to use a portable office	95.2	96.2	94.4	1.0	1	.05

Table 8-5 Advice to others

ADVICE	Total (%) n=62	Extent of Portability				
		Low (%) n=26	High (%) n=36	Low vs. High		
				χ^2	DF	α
Buy best equipment that budget will permit - don't share	53.2	38.5	63.9	3.92	1	.05*
Importance of training - existence of learning curve	43.5	53.8	36.1	1.93	1	>.05
Importance of planning	38.7	30.8	44.4	1.19	1	>.05
Negatives and positives	37.1	34.6	38.9	.12	1	>.05
Appropriate use opportunities	32.3	23.1	38.9	1.73	1	>.05
Self-discipline re time in work work habits work and family	27.4	19.2	33.3	1.51	1	>.05
Potential to improve quality of work life, autonomy, morale	19.4	19.2	19.4	.00	1	>.05
Need for strong organizational support, realistic expectations	17.7	19.2	16.7	.07	1	>.05

Chapter 9: What are the Perceived Outcomes of Using a Portable Office?

The discussion of Research Question 6 on outcomes of using a portable office is divided into four sections. First, the quantitative outcomes are presented, followed by the qualitative outcomes with respect to work, the individual and family, and the organization. It should be noted that subjects often named several benefits or drawbacks of the portable office, and that some of these spanned the different categories.

9.1 Survey Results

Job satisfaction, stress, and satisfaction with life scores are shown in Table 9-1. Population means were available for comparison and to determine percentages of those with high scores. On a five-point scale, a high level of job satisfaction was a score of 3.5, and low was 2.5 (Higgins et al., 1992). A high level of stress was a score of 2.8, and low was 2.0 (Cohen et al., 1983). A high level of satisfaction with life was 3.5, low was 2.5 (Diener et al., 1985). In this study, the mean score for job satisfaction was 3.88, for stress was 2.37, and for satisfaction with life was 3.72. The percentage of the sample with high job satisfaction was 73%, with high stress was 19%, and with high satisfaction with life was 61.3%. In other words, the users in this study were more positive about their jobs and their lives, and felt less stressed than the population norms (Higgins et al., 1992). These positive attitudes were noticeable during the interviews, as many of the individuals came across as very enthusiastic and feeling in control of the direction of their lives. It may be that portable offices contribute to these positive attitudes and the lesser stress levels of feeling in control. Perhaps innovations such as the portable office are more

likely to be adopted by individuals who feel positive about their jobs and lives, and seek out ways to keep control and balance. These findings are consistent with the theory of Karasek (1979) on increased feelings of control being linked to reduced stress.

9.2 Work related Outcomes

Tables 9-2 and 9-3 show work related benefits and drawbacks. There were eight groups of work related benefits and six groups of drawbacks. Percentages of respondents mentioning various benefits were far greater (from 20 to 82% of the sample) than those mentioning drawbacks (up to 26% of the sample). It should be noted through the following sections on categories of outcomes that respondents often mentioned numerous benefits and drawbacks.

9.2.1 Benefits

Details follow on the groups of work related benefits described by the respondents. "Increased efficiency and productivity" received the most emphasis, being mentioned by more than twice as many respondents (over 80%) as the next two benefits, "increased effectiveness" and "work-location flexibility". The other groups were "increased competitive advantage", "increased control over work", "improved morale, reduced stress", "increased work-time flexibility" and "enhanced image".

Increased efficiency and productivity: By far the most frequently mentioned benefit, given by 82%, was increased efficiency and productivity. Respondents felt better organized and were making better use of their time. Timeliness was improved, as they worked faster, had faster turnaround, were able to close sales sooner and deal with issues more quickly, resulting in better service. They recognized time savings, which could be

more quickly, resulting in better service. They recognized time savings, which could be constructively used, from not having to return to the office. With the portable office, they could continue to use familiar tools and the same information as at the office.

Increased effectiveness: The next most common benefit, mentioned by 42% of the subjects, was increased effectiveness. Users talked of being able to handle a greater variety of work and having increased scope of audits and projects. One consultant illustrated with a comparison of similar projects done before and after acquiring the portable office, where the second covered a much broader scope and volume for a fraction of the cost. Users felt the quality of their products improved from use of the portable office, including being more creative. They felt they were more effective because the portable office enabled them to stay informed and stay in touch, and there was more information sharing.

Increased work-location flexibility: The next most common benefit, mentioned by 39% of the subjects, was work-location flexibility. Respondents who noted this outcome felt that they were now more accessible and able to communicate quicker with clients and others, and to have information that was complete and right there to access when needed. They said they were able to link into technology at other sites, not just work there with only pen and paper. They could produce final and quality products, such as project, meeting and audit reports with location flexibility. The portable office also gave them the flexibility to keep working at home, for example, in inclement weather or if they were feeling too unwell to be at the office, as their work location was invisible to clients and others.

Increased competitive advantage: One-third of the subjects saw an increased competitive advantage from using a portable office. Having their own portable equipment made them more competitive, lowered their costs, and in some cases enabled them to get contracts. For some, it made their job and work possible, either because of the nature of the work (e.g., for computer consultants) or because of limited office and support staff. It allowed them to spend more time out of their own offices, with clients and to have more interaction and involvement with clients and colleagues. In general, they felt that using a portable office increased their contribution to the organization's bottom line .

Increased control over work: More than one-quarter of the sample said using the portable office gave them increased control over their work (e.g., increased independence and convenience). They felt they could choose to work at times and places where they could concentrate and miss interruptions. They also mentioned an increased sense of control over the work, the flow, and the environment.

Improved morale, reduced stress: More than one-fifth of the sample said they had improved morale, enjoyment of their work, job satisfaction, and piece of mind, along with reduced stress. This is consistent with the low stress and high job satisfaction scores noted previously.

Increased work-time flexibility: Nearly one-fifth of the respondents identified benefits of increased work-time flexibility, such as being able to work when they needed, when they were most inspired, or when they were at their best. Several people talked of working best either very early in the morning or late at night, and were able to do so with portable equipment at hand. Others were able to do some work such as checking

electronic mail from home early in the morning before getting children off to school or to a caregiver. Those who provided computer systems support were able to respond to after-hour calls at home or elsewhere. Several supervisors who used their portable equipment late at night or on weekends liked being able to recognize and credit the work of staff who were also working on the network at those hours.

Enhanced image: Nearly one-fifth of the sample felt that using a portable office enhanced their image by : owing professionalism and commitment to their work.

9.2.2 Drawbacks

Respondents also cited a number of work related drawbacks (see Table 9-3) which are described below. The most common ones, each noted by about one quarter of the sample, were "too much dependency on the technology", "interference between work and family" and "reduced ability to manage time/work efficiency". "Increased work expectation and stress" and "increased costs" were also identified as drawbacks.

Become too dependent on the technology: Over one-quarter of the sample suggested that it was possible to become too dependent on the technology. They felt that users could lose the basic understanding and recall of how to do things without the computer, such as calculations on insurance policies. Some had seen real problems when the equipment was not working or when problems arose, given the reliance on equipment being there and doing the job. They also felt that it could be easier to lose information from a portable office, especially if back-ups were not done. Some felt the equipment was not well used, and had been relied on when it was not really needed, especially the

portable phone. It was one more piece of equipment to bring as standard tools into meetings.

Interference between work and family: Nearly one-quarter said their use of a portable office had caused interference between work and family. They found a blurring of boundaries and difficulty in ensuring transition time between the two. With the portable office, they tended to work too much or work more. They found it had extended their work days or work weeks.

Reduced ability to manage time/work efficiency: Nearly one-quarter found their time was not well-used when they performed tasks that had formerly been done, often more efficiently, by support staff, such as typing reports and memos. They found there were some limitations to the portable office which meant they were less efficient when they were away. For example, some said their portable office had only half the capabilities of their regular office; the screen was hard to read; they missed the printing capability, both draft and higher quality. Time was lost because of possible incompatibilities with others' configurations and tools.

Increased work expectation and stress: Less than one-fifth said others expected more of them with their portable office capability, such as expecting them to work more in off-hours and expecting instant turn-around. Some reported experiencing stress and pressure from feeling they did not know when they would get off work. Some noted that they created pressure on themselves by striving for perfection in their outputs, and the portable office allowed them to keep making changes. Some felt that others perceived they were "not on the job", or were "goofing off", or resented time delays when the

portable office user was not available in the office. It was interesting to note, however, that some organizations were encouraging use of portable offices as part of an overall culture change to a view that employees should be in office less and out with clients more.

Other work disadvantages: About one-eighth of respondents gave drawbacks that could not be easily classified (i.e., were grouped under "other" in this analysis). One respondent complained that he was the last to get office equipment because he already had the portable office. Some had found the use of the portable office lessened peer interaction and synergy and reduced personal contact with others. They missed the personal involvement with others at the office. Some felt they had less visibility when they were working away from the base office.

Costs: About one-tenth identified costs, support and logistics as drawbacks. These costs included those incurred from constantly needing to upgrade their equipment and their skills.

9.3 Individual and Family Outcomes

9.3.1 Benefits

There were three main categories of benefits related to individuals, as shown on Table 9-4: having technology available for non-work use; feeling better and less stressed; and better use of time. Details on each are presented below.

Technology available for non-work uses: About 30% of the sample felt that having technology available for non-work uses, such as a learning tool for themselves and

for personal uses for themselves and family members (e.g. games, expenses, curriculum vitae, support for volunteer activities) was a major benefit of having a portable office.

Feel better; relieved stress: Over 20% said that using a portable office made them feel better and increased their self-esteem, morale, and quality of life. They also perceived that it relieved their stress. One respondent noted that less of his personal time was taken by overtime work, which had to be done, since his efficiency had increased through use of the portable office. Respondents indicated they enjoyed work more and did not feel as negative about overtime work when they could choose the location (i.e. in comfort at home or at the cottage). This is an example of a benefit that applies to work, the individual and the family. Having a cellular phone in the car gave some respondents a feeling of increased personal security. Some reported that they felt good because they had been able to help others (e.g., calling 911 on the portable phone if they saw an accident).

Better use of their time: Over 20% reported that they were able to make better use of their time because of the time flexibility introduced by the portable office. They were able to miss traffic congestion. They could work when they worked best, whenever inspiration struck, and when they needed to.

9.3.2 Family Outcomes

There were three main groups of family related benefits, as shown in Table 9-5: exposed family to technology and their work; time with family; and control the work-family interface. Each of these benefits is discussed below. It is interesting to note that

more respondents perceived family benefits (39 to 55%) than perceived individual benefits (21 to 29%).

Exposed family to technology and to their work: Nearly 55% of the respondents said that using a portable office exposed their family to technology and to their work. This was seen to be beneficial as a role model for children and giving them an opportunity to know about the importance of technology for careers. Family members were able, in many cases, to use the portable office equipment as well, sometimes for learning, and for doing things together, such as homework assignments and playing games. The portable office provided extra computing capacity for those families, along with existing home computers. The communications features of the portable office, cellular phone and electronic mail also made individuals more accessible to their family.

Time with family: About 45% of the sample said the portable office increased the amount of time they were available to the family, and made the time better since they were less worried about needing to be back at the office. Many respondents talked of being able to be at home for dinner and for time together before children's bedtime, rather than staying at the office. They then settled down to office work using the portable computer..

Control the work-family interface: About 39% of the sample talked of ways in which using a portable office increased their ability to control the work-family interface. They felt it gave them more flexibility to deal with their family situation, including emergencies, illness, and scheduling in dual-career situations. They noted that they could stay connected with family activities (e.g., those around the arrival of a new baby) or shift

time (e.g., to attend a school concert during the day and work later). The autonomy to make decisions on schedules would appear to be one of the features of work of managers and professionals that would not be available to other types of workers (Venkatesh and Vitalari, 1992). Some found it convenient to be able to keep in touch with work from home and do some work before children went off to school or daycare. They felt better knowing they were in the house and accessible if needed by the family. It gave them location flexibility in off-hours, and they could get necessary work done while out of town, visiting relatives, at the cottage, on the boat. They were able to go on personal trips, such as week-ends away and ski trips, yet still get work done and stay connected with activities. One individual had spent the previous week at his ski chalet, but regularly checked his voice mail and returned calls immediately. Respondents felt that family members understood their work situation better when a portable office was used at home, so they were more accepting when there was a need to work. Several individuals appreciated that the portable office allowed them to have a home base, rather than a dedicated one elsewhere.

9.3.3 Individual and Family Drawbacks

There were three groups of drawbacks identified that related to the individual and family, as shown in Table 9-6. They were: too much time in work; increased family and work-family conflict; and physical problems. Each is discussed in more detail below.

Too much time in work: Over one-third (37%) of the sample felt that access to the portable office had resulted in their spending too much time in work. They felt that

this took time away from other activities, especially family activities. Some called themselves workaholics, or said they took work home too much. They said they could never get away from work demands, that they were always accessible or always reminded about work. They felt guilty if they took time out from work. Some found that their stress had increased, as they used the portable office to create to-do lists, and blurred the boundaries between work and personal life.

Increased family and work-family conflict: Over 35% of the sample said using a portable office increased family and work-family conflict. It took time away from family, leisure time, or personal activities. Interesting problems included contention or competition among family members to use the portable computer, and difficulties when the family phone line was tied up with data transmission through the modem. The costs of the cellular phone were a problem when family members did not use it appropriately (e.g., making phone calls when they could have waited even a few minutes longer for the individual to get home). Users recognized that they needed to set some limits, since the phone or pager going off could disturb others. Some mentioned competition for their time and attention between impatient children and work demands especially when they had responsibility for the children. The most extreme case was a computer consultant who was suffering from a broken toe, received when he banged into a piece of furniture while running from his work area to deal with fighting children!

Physical problems: More than 10% had experienced physical problems such as eyestrain, back pain and stiff necks.

9.4 Organization outcomes

Respondents were asked if they felt there were benefits and drawbacks for their organization resulting from their use of a portable office. They identified more benefits than drawbacks, as discussed in the following section.

9.4.1 Benefits

Respondents felt there were significant benefits to their organizations from their using portable offices (see Table 9-7). The two main ones, each identified by two thirds of the respondents, were increases in the worker's efficiency (and therefore, in the organization's) and increased competitive advantage. Nearly half identified increases in the worker's effectiveness, while 30% identified increased customer satisfaction. Another 30% saw that the organization benefited by increased employees' ability to control work and increased work flexibility. About 15% said there was the benefit of increased employee work satisfaction and morale, while another 15% spoke of the increased accessibility of the workforce. Details on each of these benefits are given below.

Increased efficiency Respondents felt their productivity increased and they were more efficient. Portable offices provided them with excellent work tools. More timely input and reporting were possible. These improvements for the individual employees were seen by the respondents as benefiting the organization, especially when more people used portable offices.

Competitive advantage: Respondents felt their organization benefitted from the professional and up-to-date image of staff and from the more elaborate presentations they were able to make. They also felt that portable offices enhanced the visibility of the

organization. Clients were impressed when agents were able to generate the necessary paperwork on site, as with applications for insurance policies. They also indicated that the organization was more competitive in bidding when customers did not have to provide equipment. Use of portable offices enabled some small businesses to exist by providing the business basics such as financial information. Overhead costs for support staff and real estate could be reduced. Respondents felt business was growing as a result of use of portable technology.

Increased worker's effectiveness: Respondents felt the quality and completeness of their products and information had improved. This gave them more credibility with management and clients and enabled them to provide better service. They also found they had more time available for work (including overtime) and noted that with the portable office, they were now doing work that they would not have otherwise done, such as writing papers. Auditors in particular commented on their increased effectiveness, as they were able to do better audits with their portable tools.

Increased customer satisfaction: Respondents felt the organization benefitted from increased customer satisfaction, as they had more time for clients and providing service. Extended service hours were available to clients. Respondents were able to spend more time out of the office and more time working at client sites. At one high-tech firm, it was suggested that portable offices enabled employees, as end-users themselves, "to see it more as the client does". This promoted healthy feedback and enabled the employees to become more familiar with the high-tech products. They could also "access clients in their way of work and be on same wave length".

Increased ability to control work / increased work flexibility: Respondents also indicated that the use of portable technology allowed an organization to cope more easily with different time zones, as employees could use the equipment from home when appropriate. This enabled employees to keep in touch and in contact with other employees and have synergy, even when working in different locations. Portable technology was seen to provide flexibility from whatever location, with individuals able to merge their work with that of others, for example producing a group report or commenting on work in progress. One individual suggested that others became more self-sufficient if he was not there to be leaned on and consulted. By providing standard portable office equipment and applications, organizations were able to ensure employees followed the corporate direction and were able to improve quality, by providing established data bases and application software for checking input forms and performing calculations, as for insurance premiums and for time reporting systems.

Increased employee work satisfaction and morale: Respondents felt that organizations gained when employees were more satisfied and had higher morale as a result of using portable offices.

Increased accessibility of work force: Portable offices were seen to keep employees always accessible and to improve communications. Subjects had indicated that their jobs generally required a high level of communications internal and external to the organization. With portable offices, managers were able to better manage several teams at several sites, keeping in touch more easily.

9.4.2 Drawbacks

Three main drawbacks were noted by about 20% of the sample: the costs associated with the technology; communication problems for less face-to-face interactions; other drawbacks. These are shown in Table 9-8 and discussed below.

Costs associated with technology: Users cited the costs to the organization of equipment purchases, support and the continuing needs for upgrades and enhancements.

Communication problems; less face-to-face interactions: Respondents felt there could be drawbacks to the organization from less face-to-face contact and social interaction. The workplace could lose something of the human element, including "the ability to give a person a pat on the back". They also noted that communication was difficult if individuals were difficult to reach in some situations. There were also perceptions that individuals were not available to the organization when they were away, or that they should not be called and disturbed when working at home. While this may be the case for telephone communication, it should not be the same concern when sending messages by electronic mail. Some users suggested it could be difficult for managers to keep an overview when there was no central point, as in the central office with all employees physically present.

Other drawbacks for the organization: Another potential drawback noted by the sample was the loss of synergy and spontaneity. Users had seen difficulties in finding times when everyone was in the office for scheduling meetings. They had found that portable offices made it possible to accumulate too much information, resulting in overload, and noted that the technology could be overused, as in the case of one

individual who had four sets of phone lists on various pieces of equipment. One manager said that he demotivated his secretary by dumping too much new work on her in the morning after he had worked at home the previous evening. Workers also noted that although they were reluctant to use the portable office for work at home after hours, they often felt forced to use it.. They noted that the fact that management did work at home outside regular work hours could make others feel it was expected of them, which would result in their using portable offices by pressure rather than by choice.

9.5 Discussion

Use of the portable office appears to be a two-edged sword, as users generally identified both benefits and drawbacks. While some benefits for work and individuals were seen as rolling up into benefits for the organization, there was also a distinct set of benefits seen specifically for the organization. These included increased customer satisfaction and the ability to standardize and control how some work was done.

Some outcomes were presented as two-sided, perhaps with trade-offs. For example, having employees out of the office with their portable offices was seen to result in some loss of synergy and difficulty in scheduling meetings. On the other hand, organizations wanted employees out spending more time with clients, providing better service, and working more efficiently, while still being able to access them through the portable office. These employers hope, as noted by DiMartino and Wirth (1990), that the costs associated with portable technology are exceeded by the benefits of competitive advantage, increased customer satisfaction, and increased efficiencies. This would appear

to be the case, judging from the much higher percentage of respondents identifying benefits than those identifying drawbacks.

During the interviews, it was noted that users tended generally to be positive enthusiastic dedicated individuals, who took pride and found satisfaction in their work and their other activities, including family. They were busy people. Their views of the portable office seemed to consider how its use contributed to addressing their priorities. There was considerable repetition in the answers on work, individual and family outcomes, suggesting that they were not independent or isolated. For example, feeling better had positive effects on all aspects of life. A common theme among these respondents was that they expected to be doing additional work after hours anyway and that having the portable office allowed them to work more efficiently and increased their control over work. This is consistent with the findings of Kraut (1989) and Venkatesh and Vitalari (1992) on the commitment to their work of managers and professionals. It appeared that having access to a portable office made it easier for them to work more and be more absorbed in work, so they sometimes needed to set limits on their amount of supplementary work.

The nature of the work of respondents in this sample (i.e., generally professional, managerial or marketing) increased their ability to make their own work decisions which allowed them to control the work-family interface. This could be regarded as one of the advantages of higher status occupations that could be augmented by the introduction of portable offices. These options may not be as available to workers in many other types of work. Thus, relating to findings in the stress and control studies of Karasek (1979).

1990), these respondents whose work gave them more flexibility could choose to use portable technology and consequently, be expected to feel more in control and less stressed.

They would be less inclined than others to regard technology, such as a portable office, as a threat. They expressed no fears of having their work monitored or measured because of the portable office. They did not feel severe external pressure to work endless hours at home, as would be the cases in the "cottage industry" scenario predicted by labour unions (DiMartino and Wirth, 1990). There were suggestions, however, that senior managers who were heavy users of portable offices in after-hours, could set an example and demand immediate turnaround of documents and responses to their own messages sent over the network, and insist that employees be always accessible to colleagues by portable phone or electronic mail. This would be expected to make employees unwilling users of portable offices because of the uncontrollable intrusion into their personal lives. This would be different from the situation of users in client-oriented businesses such as real estate or computer systems support choosing to be available to clients at all hours.

During the interviews, another theme that stood out was the opportunities for the families of these higher status workers to be exposed to careers and the role of technology. It was regarded as a benefit for children to be able to learn how to use the portable computer, develop technology skills, and make use of it for doing school assignments. These children could then be seen to have gained an advantage and a head start for school and their futures. These benefits would not be available to families of workers in lower status professions, whose work and education would not generally lead

to availability and use of portable offices. From the sociological perspective, portable offices could be seen to widen and perpetuate gaps between classes in our urban centres.

Comparing these results on the impacts of the use of portable offices with those that were suggested by the literature, a very high proportion were identified by these respondents. Notable exceptions were increased stress resulting from management using the portable technology to monitor work more closely and measure performance (DiMartino and Wirth, 1990; Karasek, 1990); changing communication patterns on the job, and thus, social relations at work (Karasek, 1990; Rogers, 1986; Sproull and Kiesler, 1986); and knowledgeable users maintaining control of information and access to it, creating an "information elite" (Burkhardt and Brass, 1990; Danziger and Kraemer, 1986). More focused in-depth research might determine if the latter two are occurring. There was no particular concern raised about reduced career prospects, except for general concerns about job security in organizations that had felt compelled to introduce portable technology as a way of reducing costs. However, there was mention of others perceiving the absent portable office user as not really working and "goofing off", which might conceivably damage career prospects eventually. It would appear that portable technology is being used extensively at sites other than home and has indeed helped overcome some of the limitations identified for work-at-home situations, such as not being able to interface with clients.

Table 9-1 Outcomes - Scales

	Total		Extent of Portability				Low vs. High		
			Low		High				
	Mean	SD	Mean	SD	Mean	SD	t	DF	α
Job satisfaction	3.9	.7	3.8	.7	3.9	.6	-.46	58	>.05
Stress	2.4	.4	2.4	.4	2.4	.4	.00	60	>.05
Life satisfaction	3.7	.6	3.7	.6	3.7	.6	.12	59	>.05

Key: S.D. = Standard Deviation
 DF= Degrees of Freedom

Table 9-2 Work related Benefits

BENEFITS WORK	Total (%) n=62	Extent of Portability				
		Low (%) n=26	High (%) n=36	Low vs. High		
				χ^2	DF	α
Efficiency	82.3	84.6	80.6	.17	1	>.05
Effectiveness	41.9	53.8	33.3	2.61	1	>.05
Increased work- location flexibility	38.7	34.6	41.7	.32	1	>.05
Competitive advantage	33.9	26.9	38.9	.97	1	>.05
Increased control over work	27.4	23.1	30.6	.42	1	>.05
Increase morale, job satisfaction; reduced stress	21.0	15.4	25.0	.84	1	>.05
Increased work-time flexibility	19.4	19.2	19.4	.00	1	>.05
Enhances image>.05	19.4	7.7	27.8	3.90	1	.05*

Table 9-3 Work related Drawbacks

DRAWBACKS - WORK	Total (%) n=62	Extent of Portability				
		Low (%) n=26	High (%) n=36	Low vs. High		
				χ^2	DF	α
Become too dependent on the technology	25.8	11.5	36.1	4.76	1	.03*
Interference between work and family	24.2	23.1	25.0	.03	1	>.05
Reduces ability to manage time/work efficiency	22.6	23.1	22.2	.01	1	>.05
Increased work expectation / stress	17.7	23.1	13.9	.87	1	>.05
Other work disadvantages	12.9	11.5	13.9	.07	1	>.05
Costs	6.5	7.7	5.6	.11	1	>.05

Table 9-4 Individual related Benefits

BENEFITS - INDIVIDUAL	Total (%) n=62	Extent of Portability				
		Low (%) n=26	High (%) n=36	Low vs. High		
				χ^2	DF	α
Technology available for non-work uses	29.0%	53.8	11.1	13.38	1	.000*
Increases self-esteem/ quality of life/ reduces stress/ increases job satisfaction	21.0	19.2	22.2	.08	1	.05
Better use of time	21.0	23.1	19.4	.12	1	.05

Table 9-5 Family related Benefits

BENEFITS - FAMILY	Total (%) n=62	Extent of Portability				
		Low (%) n=26	High (%) n=36	Low vs. High		
				χ^2	DF	α
Exposes family to technology/ employee's work	54.8%	50.0	58.3	.42	1	.05
Increases amount of time available to family	43.5	26.9	55.6	5.03	1	.02*
Increases ability to control work-family interface	38.7	34.6	41.7	.32	1	.05

Table 9-6 Individual and Family related Drawbacks

DRAWBACKS- INDIVIDUAL & FAMILY	Total (%) n=62	Extent of Portability				
		Low (%) n=26	High (%) n=36	Low vs. High		
				χ^2	DF	α
Too much time in work (takes away from other activities, especially family)	37.1	23.1	47.2	3.77	1	.05*
Increases family and work-family conflict	35.5	26.9	41.7	1.43	1	>.05
Eyestrain, back pain etc. (poor ergonomics)	11.3	7.7	13.9	.58	1	>.05

Table 9-7 Organization Benefits

BENEFITS -ORGANIZATION	Total (%) n=62	Extent of Portability				
		Low (%) n=26	High (%) n=36	Low vs. High		
				χ^2	DF	α
Increases worker's efficiency and therefore, organization's	66.1	73.1	61.1	.97	1	.05
Competitive advantage	64.5	57.7	69.4	.91	1	.05
Increases worker's effectiveness	46.8	50.0	44.4	.19	1	.05
Increases customer satisfaction	29.0	15.4	38.9	4.05	1	.04*
Increases ability to control work / increases work flexibility	29.0	23.1	33.3	.77	1	.05
Increases employee work satisfaction, morale	16.1	23.1	11.1	1.60	1	.05
Increases accessibility of work force	14.5	11.5	16.7	.32	1	.05

Table 9-8 Organization Drawbacks

DRAWBACKS -ORGANIZATION	Total (%) n=62	Extent of Portability				
		Low (%) n=26	High (%) n=36	Low vs. High		
				χ^2	DF	α
Costs associated with technology	22.5	15.4	27.8	1.33	1	>.05
Communication problems : less face-to-face interactions	17.7	19.2	16.7	.07	1	>.05
Other	19.4	15.4	22.2	.45	1	>.05

Chapter 10: What is the Overall Satisfaction with Use of the Portable Office?

This chapter addresses Research Question 7: What is the overall satisfaction with the decision to use the portable office? First, there is a review of the responses, shown in Table 10-1, to the questions on overall satisfaction and how outcomes compared to those anticipated. This is followed by a discussion of other comments offered at the end of the interview.

10.1 Overall Satisfaction with Decision to Use a Portable Office

More than half of the sample (56%) said they were extremely satisfied with their decision to use a portable office, and more than a third (37%) were quite satisfied with the decision. Only a few (7%) were only moderately or slightly satisfied. These were the individuals in small businesses who were on call, with pager and phone, and felt the stress of always being accessible and not being able to control the intrusions. There were no respondents who said they were not at all satisfied with the decision.

10.2 Benefits and Drawbacks compared to those Anticipated

Respondents were asked how the benefits and drawbacks they experienced from use of a portable office compared to those they had anticipated. Some individuals gave multiple responses, such as advantages were as anticipated and there were more disadvantages. About one-third (32%) said the benefits and drawbacks they had experienced from using a portable office were as they had anticipated. Another third (32%) said they found more advantages than they had anticipated. More than a quarter

said they had no particular expectations, so could not compare them. Ten percent said they had foreseen the advantages but not the disadvantages, ten percent said they had found more disadvantages than anticipated, while eight percent said the benefits were less than anticipated.

10.3 Discussion

The data indicated that the majority of users started out with what appear to be fairly realistic expectations regarding the outcomes of using a portable office. However, about a quarter found there were more disadvantages or less benefits than anticipated. Apparently, when expectations existed they had been quite optimistic and possible negatives had perhaps been overlooked. It should be noted, however, that these unanticipated drawbacks were not serious enough to translate into dissatisfaction with the decision to use the technology or the decision to discontinue use. Portable office users might be even more satisfied if they were made aware beforehand of possible drawbacks and were prepared for them. This fits with Rogers (1983) identification of anticipated and unanticipated, and desirable and undesirable outcomes leading to possible changes in implementation in order to increase satisfaction.

Perhaps more interesting is the fact that more than a quarter of the users had begun with no particular expectations. This finding fits with the earlier responses on how carefully they had considered the decision to acquire a portable office. This may reflect the users for whom the decision was an organizational one rather than individual, or

those in small business who saw the portable office as a basic essential tool for the business to exist, much like the telephone.

These positive responses may also reflect the fact that the users in this study generally have enough control over their own work situations to decide on tools and set them up the way they want. This in turn is associated with an increased likelihood they will be satisfied with the outcomes (Venkatesh and Vitalari, 1992). It is also possible that less satisfied users have discontinued use, and thus would not have been included in this study.

Table 10-1 Satisfaction with the Decision to Use a Portable Office

	Total (%) n=62	Extent of Portability				
		Low (%) n=26	High (%) n=36	Low vs. High		
				χ^2	DF	α
Overall Satisfaction with Decision to use a Portable Office:						
Extremely	55.9	56.0	55.9	.58	2	>.05
Quite	37.3	40.0	35.3			
Moderately / slight	6.8	4.0	8.8			
How actual benefits and drawbacks compare with anticipated:						
As anticipated	32.3	38.5	27.8	.79	1	>.05
More advantages	32.3	26.9	36.1	.58	1	>.05
Had no expectations	26.2	24.0	27.8	.11	1	>.05
Foresaw advantages, but not the disadvantages	9.8	8.0	11.1	.16	1	>.05
More disadvantages	9.7	3.8	13.9	1.74	1	>.05

10.4 Other Comments

At the end of the interview, respondents were asked if they had other comments. A number expressed interest in the research, seeing it as a very timely subject. Some commented that they see the organization as the winner when its employees use portable offices, while others saw it as a win-win situation for both. Some spoke of the education system and the need to ensure that young people are being exposed to technology and receive good training for using it. Several highlighted the ability provided by portable offices to avoid or work around other problems, such as open offices, traditional postal services, long-distance phone system restrictions. These points could be considered ones that give the individual a feeling of increased control over the work situation.

There were some points of concern raised. These included the way the world is going, with increased demands for accessibility, extended work hours, and blurring of boundaries between work and private time. It was noted that users of portable technology should be sensitive to reactions of clients and others they are in contact with, and should be considerate of others, for example in not allowing phones and pagers to intrude in restaurants and theatres.

There was also mention of the concern of unions, and others, on the danger of workers being exploited or the advantages of portable technology being abused (i.e. workers may feel obligated to do unpaid overtime). This concern has also been raised in the literature (DiMartino and Wirth, 1990; Kraut, 1989). During the interviews, some respondents had identified as a drawback the possibility of feeling obligated to work longer days and be accessible in off-hours, but none in this sample had talked of whether

or not they were paid for the time. It may be that in this sample, and for workers in professionals and managerial positions, they expect to and already do put in extras hours without compensation. One user had commented that using the portable office allowed him to be more efficient and thus use up less of his own time on these office requirements. Some users who had to share their portable office equipment again emphasized "the hassles of having to share". One user observed that, although portable offices and telecommuting were seen to save energy by reducing the amount of commuting, he found that carrying the portable office meant he did not have the option of using public transit or walking, but had to take his private vehicle instead.

Chapter 11: Effects of "Extent of Portability" on the Adoption Process

Research Question 8 involves the results of the subsequent stages in the research model when the sample is split by Extent of Portability, as shown in the tables in Chapters 4 through 10. The first section discusses perceived characteristics of the portable office; the second looks at use; the third reviews perceived benefits and drawbacks of using a portable office; the fourth discusses overall satisfaction. The closing discussion section also looks at other differences between groups that might be helpful in examining the effects of extent of portability.

11.1 How is "extent of portability" associated with the perceived characteristics of portable offices?

There were no significant differences between low and high portability groups regarding the advantages of portable offices over non-portable or on the various aspects of compatibility, complexity or observability. There was, however, a significant difference on security of portable offices, where 44% with high portability felt security was not an issue, or at least, not for them, compared to 19% with low portability. However, more than three quarters of each group did identify possible security issues. It might have been expected that the high portability group, carrying more pieces of equipment, would be more concerned about security. Perhaps they did not consider portable phones to be high security risks. It is also possible that these were more sophisticated users, and they had their computer systems set up with security measures which they relied on (e.g., passwords). Having seen their acceptance of portable

technology as essential tools for the job and that they felt their use had increased and become more sophisticated over time, it may be that the high portability users simply proceeded to integrate the tools with their work and did not allow issues about security to be a deterrent. Many had already used the portable office for an extended period, but none spoke of any serious security problems encountered. In fact, those who had had portable equipment stolen were not particularly disturbed by that. Possibly the low portability users came from organizations that worried more about security.

In summary, "extent of portability" does not seem to affect the perceived characteristics of the innovation, portable offices. Users' perceptions were very similar and very positive, whether they had low or high portability. Overall they saw their portable offices as offering many advantages over non-portable, being very compatible with various factors in their environment, and not too complex to use. The consistent idea was the fit and the potential to contribute to their own situation (Davis et al., 1989; Rogers, 1983).

11.2 How does "extent of portability" affect the use of portable offices?

Significant differences between low and high portability groups were identified on all aspects of portable office use (i.e. when the portable office was used, where, how much and for what). The data indicates that respondents in the high portability group were heavier users. They spent more time using the portable office at work and at home, regarded more of the functions used as vital, and did less document processing. By definition, they used the communication functions of the portable phone, which low

portability users did not have, and thus used the portable office during commute time and in the car. All low portability respondents used the portable office outside regular work hours, but nearly one-fifth of high portability respondents used it infrequently, if ever, in that timeframe. From the data in this sample, cause and effect are unknown. It may be that high portability users make more use of the portable office because they have the capability, or that they acquired equipment which gave them a higher extent of portability because they had a greater need for it.

There were highly significant extent of portability differences in use during daily commute time. Of those with high portability (usually a cellular phone), close to 60% used the portable office during commute time, compared to less than 10% with low portability. They often made calls to the family on the way home.

All low portability respondents used the portable office outside regular work hours, more than 60% using it very often. While about the same portion (slightly higher) of high portability respondents used it very often, there was also 17% that used it infrequently, if ever.

There were significant differences between low and high portability groups on the length of an average session during regular work hours, with low portability users showing one hour compared to high portability users at two and a quarter hours. Again, cause and effect cannot be determined from this data.

For total time spent using the portable office at home during the previous week, there was a significant difference between low and high portability users, at 4 and 7 hours respectively. For a number of the sites, no test of significance was possible, given the

small number of responses or the uneven distribution which clearly showed a difference. For example, 23 high portability users reported using the equipment in their private motor vehicle, compared to only 1 low portability (likely talked into dictating machine while driving).

There were a number of significant differences found between groups concerning what the portable office was used for in the previous week. Over 90% of those with a high extent of portability regarded the functions of their portable office as vital, such as communication functions and custom applications for use at client sites, compared to less than 70% of those with low portability. Phone or pager functions had been used by 64% of the high portability group compared to 8% of the low portability group (by definition, pagers, not cellular phones). A significantly higher proportion of the low portability group (89%) had used word processing and document preparation functions than those in the high portability group (67%), although the percentages indicated that word processing is one of the main uses of portable computers regardless of extent of portability.

There were no significant differences between groups on how their actual uses of the portable office compared to those they had anticipated.

In summary, "extent of portability" affects the use of portable offices in all the aspects measured. Those with high portability appear overall to be heavier users than those with low portability. They are more reliant on the technology and appear to be more likely to have integrated it in their work as an essential tool. The communication capabilities associated with high portability seem to make portable offices a good fit to the situations and priorities of those who spend a high proportion of their days outside a

base office, focused on contacts with clients. Low portability users often seemed to rely on mainly the document processing capabilities to allow them to continue work at home after hours, where they could concentrate. They all said they used it at home after regular hours, some very often. In this sense, many of the needs of these low portability users could have been met, at less cost and without the physical effort of carrying it back and forth, with a desktop machine and modem at home, provided by the employer.

11.3 How does "extent of portability" affect the perceived benefits and drawbacks of using portable offices?

This section reviews what differences between groups were noted in various types of outcomes.

11.3.1 Scales: There were no significant differences between groups on the scales measuring job satisfaction, satisfaction with life, and stress levels. As noted earlier, people in this sample showed higher levels of satisfaction with their jobs and their lives, and lower levels of stress than the population norms. Considering the fact that many of the respondents work long hours, this suggests that use of the portable office may help reduce stress and increase job satisfaction and satisfaction with life regardless of extent of portability. This suggests it is access to portable technology rather than the type of technology that brings about these benefits.

11.3.2 Work-related outcomes: The lack of differences between groups on work outcomes is notable. The only statistically significant difference between the low and

high portability groups was that more high portability users identified the drawback of becoming too dependent on the technology. Given the fact that only one-quarter of respondents in total spoke of this drawback, it does not seem to be a major concern. There were several substantive differences that can be noted. First, increased effectiveness was mentioned by many more in the low portability group. Competitive advantage and enhanced image were cited by more high portability than low. Increased morale etc was mentioned by more high portability users. It would appear that providing portable offices could be a good strategy for companies wanting to attract, motivate and keep productive professional employees.

11.3.3 Individual and family-related outcomes: There was one highly significant difference on perceived individual benefits: 54% of low portability users appreciated having the technology available for non-work uses, compared to 11% of high portability respondents. This would suggest that having access to a personal computer at home was more likely to be seen as a real benefit for individuals with less portable systems. It may be that many high portability users already had other machines at home, and augmented them with the portable computer or some additional components. In cases where the company provided the equipment, employees might have been less willing to let family members use it. The groups were fairly close on their reporting of the other two groups of individual benefits, feeling better and using time better.

Under family-related benefits, there was also one significant difference between the groups: 56% of high portability users felt it increased the amount of time available to the family, compared to 27% of low portability users.

All groups of family-related benefits and of all drawbacks were identified by higher portions of high portability users than low. A difference approached significance for the perception that portable office use leads to spending too much time in work, and taking time away from other activities, especially family. Twice as many (47%) of high portability users as low (23%) identified this type of drawback. Similarly, 42% of high portability users said portable office use increased family and work-family conflict, compared to 27% of low portability users. This is consistent with the fact that high portability users spend more time in work.

These findings present an interesting picture of high portability respondents as individuals committed to meeting heavy demands from both work and family, not always succeeding, recognizing the potential of portable technology to help balance them, and continuing to search for innovative ways to improve the situation. The importance of work in their lives is consistent with the literature (Vitalari et al., 1985; Venkatesh and Vitalari, 1992). They acknowledged drawbacks as well as benefits, but were dedicated users, nonetheless. Through all this, they still felt generally positive about work and life, and more in control than stressed.

It may be that personality factors play an important role in work and life style choices, including willingness to adopt innovations that are seen to bring advantages. Individuals who have chosen to go into work such as sales, marketing, customer support,

and consulting seem to have accepted the accompanying heavy schedules and challenges of balancing that with a family life and personal priorities, that come as part of such occupations.

11.3.4 Organizational Outcomes:

There was one significant difference between portability groups, with almost 40% of high portability respondents seeing increased customer satisfaction as an organizational benefit, compared to 15% of those with low portability. This may be related to the fact that those with high portability were more often in jobs, such as marketing and consulting, in which contact with clients, and related revenues, was an integral part of the work. This consideration would be less relevant for respondents working in the public sector.

11.4 How does "extent of portability" affect overall satisfaction with the use of the portable office?

There were no significant differences between groups. In each, more than half were extremely satisfied, and more than one-third, quite satisfied with their decision to use a portable office. Responses on comparison of benefits and drawbacks to those anticipated were also quite similar. Again, it would appear that it is access to portable technology rather than extent of portability that is critical.

11.5 Discussion

"Extent of portability" does not appear to affect the perceived characteristics of the portable office or satisfaction with the decision to use the portable office. "Extent of

portability" does however seem to affect the use of portable offices and, to a lesser extent, the perceived outcomes of use. Overall, respondents with high portability tended to be heavier users of portable technology. They tended to seek opportunities to apply the innovation and to increase its usefulness in helping them to manage the heavy demands of work, personal and family life. In doing so, they seemed to experience more of both benefits and drawbacks, but felt positive overall about the technology. To this group, accessibility and ability to provide better client service were essential areas to which use of the portable office contributed. Low portability users, on the other hand, used the portable office quite regularly in more limited situations (i.e. working at home on document processing) and were less likely to seek opportunities for more sophisticated use. They valued the portable office for making them more effective and efficient, and helping balance work and family needs.

The data suggests that there is apparently a relationship between "extent of portability" and some stages in the adoption process, namely use and some outcomes. From this study, however, as noted earlier, we are unable to separate cause and effect. It may be that certain types of individuals need the high portability version of the portable office because of the demanding types of job and life styles they are committed to. They appear to thrive on challenges, and hunt for new ways to cope with them, and keep trying new tools and improving their ways of working. They are mobile and are often in contact with other people, rather than working more on their own, as an introvert. They were willing to invest their own time and money to try out the innovations, and encourage

others, such as business partners, to do so as well. Alternatively, having a very portable system may promote and legitimize this type of work style.

Low portability users, on the hand, seemed to be in work situations with more limited requirements for portable technology. This group appeared to be equally committed to improving their work performance and to balancing work and family situations. They seemed to be less inclined to seek out innovative and new equipment and uses, being satisfied with the basic pieces and function that met their more limited needs.

They seemed more cautious about experimenting with technology, and spoke more of recognizing needs for training.

11.5.1 Other differences by "extent of portability":

What other differences between groups were noted that could be helpful in exploring the effects of "extent of portability" on subsequent stages of the adoption process?

The only significant demographic difference was gender: the low portability group included a greater proportion of females. Thus, any differences in the model observed when examining Extent of Portability are probably not due to demographic differences in the sample. The low portability group included more managers and professionals, while all those in sales and marketing were in the high portability group. Those in the high portability group spent almost half their day outside their base office, which was twice as much time as low portability respondents. This type of employee would be more likely to be concerned with being able to keep in touch and easily accessible and need to continue their work with automated tools, as noted by Venkatesh and Vitalari (1992). We

cannot determine the direction of causality: the need to stay in touch more may have lead them to get high portability equipment, or perhaps, they can stay in touch now because of the technology and they do so.

There were some significant differences on what equipment made up the portable office, but none with respect to the average length of time that subjects had owned a piece of equipment. It should be noted that tests of significance were done only for those pieces of equipment owned by at least 20 respondents. The portable offices of high portability users included more modems and printers, as well as portable phones. This gave them the ability to use voice and computer communications for messaging and access to corporate application, information sources, and data bases, as well as to complete more work and transactions at other sites, such as printing reports and generating contractual papers to close deals with clients. More in the high portability group had taken the initiative to purchase some or all of their portable equipment, or, as independent agents or small businesses, had no choice if they wanted the tools. In contrast, more low portability respondents used equipment that had been purchased by the organization. In interviews, the cellular phone and organizers were most often mentioned as personal purchases, both fitting with the high portability group.

There were no significant differences in the work factors supporting use of portable offices. The high proportions of positive responses in the overall sample (generally more than two-thirds of respondents) suggested that certain factors, such as appropriate training and support, were essential to effective use of portable offices.

There were no significant differences in the reasons why respondents had initially considered using a portable office. There were no differences in whether they felt use of the portable office had changed their way of working, with most respondents identifying a number of changes. Responses on intent to continue use were almost identical: a definite "yes".

The differences on whether their use of the portable office had changed over time were interesting, in that more high portability users said it had indeed changed, and that their use had increased and become more sophisticated. This suggests that these users were continually seeking to improve the fit of the innovation to meet their changing needs, and were able to find opportunities for improvements. They were actively involved with continually reinventing and adapting the innovation. In comparison, low portability users who used it often for word processing and document processing seemed to have more static requirements. Since they spent a greater portion of their workday in the base office, it would appear that they would have less reason to be exploring tools for improved communication and accessibility.

Finally, employees with high extent of portability would offer different advice to others who were considering using a portable office than employees with low extent of portability. Significantly more high portability users offered advice about buying carefully and getting value for money. Although the differences were not significant, more high portability users encouraged others to seek appropriate uses for portable technology and look for opportunities to use it. This is consistent with other questions showing these groups were more concerned with meeting client needs, being accessible,

and being more competitive. High portability users also talked more of the need for self-discipline to keep work from taking over their lives. More low portability users on the other hand spoke of the need for training and to recognize the time for a learning curve. Perhaps this group was making more use of computer packages and custom applications and had required training and time to feel competent.

Chapter 12: Are Perceptions of Managers Different?

This chapter addresses Research Question 9 : Are there differences in perceptions of management of the organization and of individual employees in the associations identified in the previous research questions? It reviews the responses of managers on the work, why the organization was interested in portable offices, work factors encouraging use, uses of the portable office, perceived outcomes of use, how outcomes compared to those anticipated, overall satisfaction, and advice to others. It closes with the discussion.

12.1 Managers and the work

A total of ten managers in seven organizations who supervised portable office users (some of whom were included in the sample) were interviewed. Four from one organization were interviewed both as users and managers. There were three public sector organizations: one dealing with external organizations in different parts of the country, one with internal clients at their client sites, and one central agency. The four private sector firms included two insurance/financial products firms with independent agents or "producers", one high technology firm that provided field support for their equipment, and one alliance of independent management / computer consultants. The managers were responsible for groups of 6 to 35 "employees", in various organizational arrangements. One of the financial managers had only a small staff in his office, while the independent "producers" worked out of other sites such as home offices. Similarly, the manager of the alliance of consultants worked out of a small central office where the independent consultants sometimes visited, but they spent most of their time at home offices or client

sites, depending on the projects. A public service manager had most of his employees in dedicated office space at client sites.

All used computers themselves; several said they had their own home computer. All but one used a portable computer in various sites. Thus, they themselves were computer literate and took advantage of the portability for location flexibility. The one who did not use a portable computer did so deliberately, but used a portable dictating machine. Most of their staff who used portable computers were officers and professionals. One mentioned that all his staff, including support staff, also had their own home computers.

The managers all said, as did their employees, that the work required high levels of communications internally and externally, and that computer and communications technologies were an integral part of the job. Travel requirements and time spent locally outside the office were seen to vary among individuals.

12.2 Why the organization was interested in portable offices

Managers were asked why the organization had been interested in portable offices initially, and what considerations or factors had been most important in their decision. In some cases, as mentioned by employees, the nature of the business required it (e.g., employees who have many appointments out of the office). The managers cited company strategies that had forced the adoption of computers in general, and possibly portables. In the financial products firms, head offices were withdrawing paper support, no longer distributing rate books etc or client listings on paper. Some firms introduced special application software, on-line reference materials and time reporting systems that were

essential for the work. Other organizations cut back on support staff, so employees were forced to do their own document preparation. In some organizations, staff were required to travel and to meet stringent deadlines for submission of finished documents. Growing pressures to increase productivity, complete work faster, save time and money had led companies to consider tools such as portable offices. Several managers spoke of expectations that new (young) staff they hired would already have the required computer skills. There was increased emphasis on being out of the office and spending time with clients at their sites, while remaining accessible.

Managers identified a number of advantages seen to be offered by portable offices, all of which had been identified by the individual employees interviewed. These included the flexibility it gave (including allowing the individual to work at home); addressing individual work requirements, providing necessary tools; for use when travelling; reduced commuting and local travel time to clients, especially when distances were great; increased effectiveness; increased efficiency; increased customer satisfaction; increased ability to do demonstrations for clients; increased flexibility to move to a work location where able to concentrate; increased ability to communicate and stay in touch; making an extra computer resource available; gaining first-hand knowledge about technology on which they themselves provided support to clients. Some spoke of the compatibility with existing systems. Generally, they saw security as an issue, but it seemed to be satisfactorily addressed and did not prevent the use of portable technology.

Factors that had been important in their decisions included requirements of the individual, cost and security.

12.3 Work factors encouraging use

The managers provided examples of how management supported and encouraged use of portable offices, which were consistent with responses from individual users. They tried to give the best equipment they could buy, and tried to support reasonable requests when employees showed interest. In several, the managers were pushing to get more equipment, since they found that sharing was not satisfactory. There was emphasis that as professionals, the individuals were "expected to maintain the tools of the trade". One manager said he encouraged staff to think ahead for opportunities to use the portable office, and had discussions after the fact to review the situation, how it had gone, and how it might be improved. Several said they placed no restrictions on use of the equipment, and had no objections to personal use at home or for outside community involvement. This suggests that managers felt significant benefits were gained from using portable offices, including the additional time put on office work after hours and increased technology skills, and they were willing to allow personal uses in return.

Some managers emphasized that they encouraged their staff to use portable offices, but did not push. One had urged a reluctant employee to work at home during regular hours using the portable office, with limited success. Another sometimes insisted staff take a computer home in order to complete urgent assignments. All set an example by using a portable office themselves, but some were conscious of not allowing this to put pressure on employees to do the same. Several mentioned that they sometimes sent electronic messages of appreciation to and were able to communicate with staff who were also working on the system after hours.

12.4 Uses of the portable office

Managers' summaries of what they saw as the main uses of portable offices generally corresponded to those mentioned by individuals. The functions seen as more important included communications, doing "illustrations" of financial products, doing demonstrations at client sites, general all-day office automation support, taking minutes, producing letters and reports, remote system maintenance, data base access.

Their views on whether uses had changed over time and whether use had changed the way individuals worked were consistent with those given by users.

More of the managers felt the uses corresponded quite well to what they had anticipated. The one who had urged a reluctant employee to work at home found the uses were less than hoped for. One with limited technical background said he had really not anticipated anything, finding it all moved so quickly, trying "to keep up with where we are", and spoke positively of "a lot of leadership shown by the company".

12.5 Perceived outcomes of use

The managers identified benefits and drawbacks that were similar to those mentioned by individuals, although sometimes expressed differently. They placed particular emphasis on benefits to the organization. Managers generally talked more of benefits than of drawbacks, as did employees. Again, there was not a clear separation of work, individual and organizational benefits, as some had elements of all. In several cases, managers said they were not aware of or had not asked the users about work-related drawbacks or individual outcomes.

One manager suggested that work-related benefits fitted those sought by frustrated employees who had initially identified the need for portable offices. One spoke of benefits arising from increased accessibility and time flexibility, since there were only certain times when clients were available. The central agency manager found benefits of employees becoming more educated through hands-on experience with technology outside the office and being able "to focus on issues that used to be abstract, such as security, work-at-home" and the labour issue of additional work with no additional compensation. These issues were ones that they were to be addressing as part of their work. As work-related drawbacks, several managers spoke of the fact that the increased speed resulted in "lost cool-down time", issues being escalated too quickly, and reduced time to sit back and think, especially of the long-term. One noted that employees had told him they found they really needed weekends for themselves, rather than working on the portable office, or their productivity suffered afterwards. Another commented on the amount of effort needed to maintain several computers, including a portable, especially if there were incompatibilities among them.

One saw that, by "doing things while on the move", there was not so much work remaining for individuals to finish later at home. One suggested that using portable offices improved the agents' self-image, which increased their confidence, with the result that they were stronger in their positions. He saw this reflected as an organizational benefit, where agents took pride in their organization, seeing it as leading edge, and seeing incomes go up with effective use of the leading edge tools. This would be positive reinforcement for the decision to adopt portable offices, as shown in Rogers (1983)

model. Others talked as well of the improved morale and image, and perceptions of the organization.

One manager felt that some young employees were intimidated by the level of knowledge that was expected of them even at an early stage of their careers. He saw this being countered by training, encouragement, and experience.

Managers also seemed aware of the ergonomic difficulties of carrying heavy equipment and working with small screens. One felt individuals might have increased stress levels resulting from expectations and demands for instant and current data, when colleagues did not recognize the time and effort required. One manager had seen a backlash effect, when a user stayed away from using the portable office after satisfying certain turn-around requirements. The employee feared management would expect this regularly, and the portable office would become an intrusion in his life.

One manager saw that portable technology allowed individuals to be more independent, which they enjoyed. In fact, he saw this as a common personality trait in his organization. This is consistent with findings of Kraut (1989). The increased time flexibility made employees feel better. For example, they were able to enjoy an afternoon of skiing, and then work more productively at some other time of their choosing. The flexibility and sense of control resulted in more autonomy for the employee. One manager said "the portable office can be a major contributor to the project management approach", based on agreement with the employee on what is to be done, when, and what the milestones are. In other words, this manager was identifying the possible need to

change management style for dealing effectively with portable office users, to a style he wanted to encourage generally.

Another felt that portable offices gave individuals more freedom and let them have independent professional status. He saw drawbacks in an environment where all staff were out of the office, such as the lack of human contact, "esprit de corp" or team spirit, and the loss of "give and take" and sharing of information in a workgroup. However, he said these individuals wanted to be independent business operators, so they accepted these. This fits with the earlier findings that users with high extent of portability felt both more benefits and drawbacks, yet seemed quite satisfied with the situation.

All the managers saw that there were "definitely" and "absolutely" benefits to the organization from use of portable offices. This corresponds to the responses of most users, including those who said the organization clearly was the winner from adoption of this innovation. One added that these benefits were "not a small consideration when you are trying to stretch your resources". One summarized them as "increased productivity and ability to communicate, particularly in off-hours and from distant sites". Communications ease was emphasized.

When asked about drawbacks for the organization, managers tended to identify none or only minor ones. Several referred to a potential drawback for the organization of keeping employees focused, when the portable office could be a "toy" or distraction. Several spoke of reminding employees to remember what they were there for: clients, not the computer. Other drawbacks included the frustrations when systems were not really use, friendly, the network was weak, or equipment had to be shared.

12.6 How the outcomes compared to those anticipated

When asked how the outcomes compared to those anticipated, one manager said they were not really getting the portability, as the equipment was not taken out of the office that often. He felt desktop computers would be sufficient. Another saw all the benefits as extra to what had been anticipated. Another said, as did some users, that he had no expectations, and portable offices had "just happened". One noted that the set-up had been expensive, but because they did similar work each year, they were seeing benefits in later years.

When asked if they had experienced any difficulties managing users of portable offices, the answer was generally "no". One added that any difficulties he had were not because of portable offices. The only exception was that one manager sometimes had to insist that employees use the portable office in order to finish priority work. One manager had seen some cases where employees who used portable offices were so satisfied with their situation that they were reluctant to come into the office.

12.7 Overall satisfaction

The managers were all very satisfied with their employees uses of portable offices, with about half being extremely satisfied. Again, this corresponds to the overall satisfaction of users. The managers in this sample do not support the suggestions in the literature (Huws et al. 1990) that managers might feel threatened by an innovation which made it difficult to manage as before and forced changes in their management style. The fact that they themselves were quite computer literate and also used portable offices was likely to increase their comfort level, since they were not dealing with an unknown. Also,

given that they felt strongly about the benefits received, they might be expected to have overcome any fears and have positive attitudes. This is in contrast to findings on telework and work-at-home (Duxbury et al. 1987) in which managers expressed negative views about this work arrangement.

12.8 Advice to others

Managers offered some advice that was very similar to that of users, as well as some from the managerial and organizational perspectives on successful introduction of change. Advice heard earlier from users included: a valuable asset if travel; make sure training is the best; importance of systems support; can't survive in business without one; get one and use it, but not as the main part of job. Interesting advice from the managerial perspective included: not everyone needs one, so don't make it the standard; "it is important to get people who don't need to be managed" closely; identify likely resistors and plan how to handle them; user must be involved in the whole introduction, rather than having the innovation imposed; provide the culture: encourage those who want it, others can see it; not just technology, there are other issues; bring in portable offices over time; think about how to manage expectations; remember what you are here for - not as computer specialist - hire one.

These pieces of advice fit with the literature which talked of social as well as technical aspects being important in the introduction and use of computer innovations (e.g., Olson, 1987). Given the overall satisfaction levels of users and of managers, it would appear that managers in these sample organizations were quite well prepared to cope with technological innovations, being sensitive to both organizational and individual

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considerations. It is likely that those managers who were less sensitive would not have introduced portable office technology.

12.9 Summary

There were generally no differences in perceptions of the portable office between managers and employees. As would be expected, managers brought a broader perspective to the questions. Adoption of portable offices appeared to be a positive experience for users, managers and the organization in this sample. These managers were used to work arrangements in which employees were often out of the office, so there was no fundamental change introduced with the portable office. They had likely developed management styles that did not involve close supervision, and thus, did not feel forced to change management styles. Their attitudes seemed to be that portable offices helped employees do their work better (basically the things they were already doing) with more flexibility. There was a shared perception of a strong need for portable technology in the work, willingness to try something new, and of considerable benefits received, along with few drawbacks. The environment and the individuals involved seemed appropriate for successful adoption.

Chapter 13: Conclusions

The goals of this research were to learn why people use portable offices, how they use them, and what are some of the individual and organizational consequences of the use of portable offices. The first part of the conclusions chapter discusses who uses portable offices and why, the second examines how they use them, and the third reviews the consequences of use. The fourth section considers the effects of extent of portability. Implications of the findings are then discussed. The chapter ends with a discussion of strengths and weaknesses of the study and some suggestions for future research.

13.1 Who Uses a Portable Office and Why?

In this study of portable office users, a number of characteristics of employees and of organizations have emerged. Employees who use portable offices tend to be people with heavy work demands, and a desire to have it all, meaning time in work and family. They have a desire for flexibility with respect to when and where they work. They are ones whose personal style is comfortable with using technology. Generally, they are managers and professionals who have a high level of portability in their work and a high level of autonomy. They are people who have a high need to communicate with others and be accessible to others. High travel demands and time out of the office are part of the job. In some cases, they are people whose company has said they have to use a portable office.

Organizations that use portable offices tend to be ones that want to or must do more with less, improve client service, and be seen as progressive industry leaders.

Portable offices appear to be useful for companies who want to attract, retain, motivate and keep happy employees who fit the descriptions above, as suggested in the literature (e.g., DiMartino and Wirth, 1990; Kraut, 1989). This suggests that organizations should consider offering this type of technology to employees at the top and to those with the above type of work.

The findings on portability of work for managers and professionals, heavy work demands and commitment, and the use of technology is consistent with the literature (Kraut, 1989; Venkatesh and Vitalari, 1992).

It may be that having certain conditions of work, as found in this study, causes employees to adopt the innovation of portable offices. Alternatively, it may be that those who have adopted the portable office find that it allows them to change how they work and what they think is important.

These findings suggest that there is a need to determine whether there is a good fit before adopting portable offices or requiring employees to use them. This depends on the individuals' work and non-work demands and expectations.

13.2 How do People Use Portable Offices?

This study suggests that how the technology is actually used depends upon factors such as work and family situations, how long individuals have had the technology, whether they own or borrow it, and other access to technology. This is consistent with the findings in the literature on the goodness of fit between the technology and needs (Danziger and Kraemer, 1986; Davis et al., 1989; Mawhinney and Lederer, 1990).

Several trends emerge from this study. Portable offices are used to increase work location and work time flexibility. They extend the work day, in keeping with the findings of Kraut (1989) and Venkatesh and Vitalari (1992) on supplemental work by professionals. Again, it may be that these individuals adopt portable offices because they work extra hours and look for appropriate tools, or it may be that having portable technology available leads to their working longer hours outside the office. This extension of the work day should be recognized as a possible risk of adoption that needs to be addressed.

The portable technology is often used extensively for "simple "functions, such as word processing, rather than more complex ones. This fits with findings of Kraut (1989) and Venkatesh and Vitalari (1992) that managers and professionals tended to do such work outside the office in an environment where they could concentrate and be free of interruptions. Uses were said to change over time, generally increasing and becoming more sophisticated. It appears that organizations encouraging more complex use, including special applications that may be regarded as leading-edge competitive tools, need to provide additional support for start-up and ongoing use, especially if employees do not start with a high level of computer literacy.

It was seen that much of the use was based on standard off-the-shelf office automation tools. These portable office configurations may then be fairly standard tools, becoming more like appliances, that do not require extensive consumer research before purchase or specialized marketing or pre-sales preparation. Some users said they had not given much advance thought to the purchase, but rather had decided they needed the tool

and had just gone out and bought it. Organizations wishing to encourage adoption may decide that it is appropriate to define a standard portable office configuration and arrange to make acquisition easy. If there are more complex requirements, compatibility issues, and set-up with custom applications, organizations need to be prepared to offer help and training from a corporate technology support group.

The findings on individuals' changing and evolving uses of portable offices fits with Rogers' model (1983) and views (1986) that computer and communications innovations were essentially tool technologies, with users continually reinventing use to fit their needs better. It should be recognized by individuals and organizations that the initial investment in equipment may represent only a portion of the lifetime cost of the portable office. Marketers could use such information to encourage existing users to consider enhancements and upgrades.

13.3 What are the Consequences of Use of Portable Offices?

What are some of the individual and organizational consequences of the use of portable offices? Overall, respondents identified many more positive outcomes than negative ones. There were also much higher percentages of respondents identifying the benefits rather than drawbacks. These benefits corresponded closely to the reasons why users had initially considered adopting portable offices and the ways they saw portable equipment as being better than non-portable. This was reflected in the definite intent to continue use, the high level of overall satisfaction with the decision to use a portable office, and the advice to other potential users.

There was overall agreement that the organization was definitely a winner when employees used portable offices. By setting standards and providing special application software they could, in fact, set directions and ensure control over how employees performed certain tasks, while improving customer service and reducing time needed to provide services. Custom software could ensure consistency, accuracy and completeness, for example in calculations of costs for financial products and completing application forms.

The interviews with managers indicated that they shared the perceptions on outcomes of using portable offices. They felt that there were definitely benefits for their organization from adopting this innovation.

The three standard scales used in this study indicated that employees who used portable offices had higher levels of job satisfaction and satisfaction with life and lower stress levels than the population norms. These ratings were supported by the interviews, with a number of respondents talking about feeling better about themselves, feeling less stressed, having choices, being better able to control their work and to balance work and other parts of their lives. The findings are consistent with the work of Karasek (1979) that employees who felt greater control of their work situations had lower levels of stress.

The main benefits noted by employees included increased flexibility, increased productivity and efficiency, increased computer literacy of the family, competitive advantage at work, and increased accessibility. The main drawbacks were increased time in work, increased interference between work and family, and reduced face-to-face contact with colleagues.

Employees need to recognize that there are both pros and cons to this work arrangement. It appears that the good points outweigh the bad. However, awareness of the hazards should increase employers' ability to manage use of portable technology. Self-selection of portable office users would seem appropriate, so that only those with the self-discipline to control the technology, rather than having the technology control them, would adopt this work style.

In summary, supplying portable offices appears to provide benefits to organizations who are thus able to increase the productivity of their employees. Employees seem to be winners too as they gain increased flexibility and control.

13.4 Extent of Portability

The concept of "extent of portability" was used to differentiate users with the added communication capabilities of a portable phone or with at least three pieces of equipment in their portable office from those with only a computer and at most one other piece of equipment. "Extent of portability" was not found to be a significant factor in the model overall, although it did have effects on how the portable office was used and on the perceived outcomes.

These findings suggest that access to portable technology has more of an impact than the type of access. It seems that users can get many of the benefits (i.e. increased flexibility, increased control, increased productivity) with minimum technology (i.e. laptop computer only). Where extent of portability plays a role is in determining what type of work can be done. This makes sense because high extent of portability by definition

provides more ability to communicate. Also, those with high extent of portability perceived they were more productive, but cause and effect is again an issue.

Organizations need to recognize that a minimal configuration may be enough to recognize many of the benefits of adopting portable offices. There is a need to examine employees' needs to communicate before giving them a phone or modem. Individuals seem prepared to invest personally in some additional pieces, including phones, for their own convenience and security.

13.5 Implications

Overall, it appears that the portable office is a computer and communications innovation that is taking hold and being successfully adopted, as described by Rogers' model (1983). The users in this sample displayed a high level of overall satisfaction with the innovation and with their decision to adopt. This was reflected at levels of both the individual adopter and the adopting organization. There is evidence that adopters are continually involved in exploring ways to use the tool better and in reinventing to achieve even more positive outcomes and greater satisfaction. As well, the innovation itself continues to evolve with rapid improvements in technology, and adopters look to take advantages of these advancements.

Key areas cited as needing improvements include technical characteristics of the equipment (e.g. size, weight, battery life, screen quality), compatibility, and telecommunications capabilities and availability. Some components are cheap enough that individuals are willing to purchase them themselves to experiment and to augment the

office configuration. For some adopters, the portable office is regarded almost as an appliance, an essential tool for the job, needing to be compatible with other tools. For these individuals, it can be quite a straight-forward purchase. These points are relevant for designers, suppliers and marketers.

Stories in the popular press suggest that there will be more individuals and organizations adopting, based on satisfaction from existing users, wider use of electronic communications, increasing availability of information in electronic form and growing pressures for downsizing, competitive advantage and increased productivity. Rogers (1986) suggested the critical mass of users was a distinguishing feature of adoption of communications technologies such as electronic mail. Findings in this study suggest that portable offices, with reliance on voice and data communications, are developing a critical mass, which will make it more worthwhile for others to adopt, since those they need to be in contact with will likely be accessible through these systems.

The findings suggest some issues that organizations should consider for successful implementation of portable technology. Respondents indicated a need for certain styles of management, focused on results, rather than close supervision, and based on autonomy for employees. Attention is required to developing a culture where it is accepted that employees are often out of the office, focussed on customer service, yet remain an integral part of the organization.

Planning and evaluation of alternatives are important to ensure that appropriate technology is acquired to meet the requirements at good value for the money. Having equipment shared may prove to be false economy, since such arrangements appear to be

less than satisfactory. In some cases where portability is not required (e.g., strictly supplemental work at home), a desktop computer with modem may be a more economical yet satisfactory solution. Compatibility with the technical and social environment is essential. Levels of technical support for acquisition, implementation, training and ongoing support need attention, with more required for employees who do not begin with a high level of computer literacy.

There will be greater benefits if users are encouraged to share their experiences in using portable technology with others, to take advantage of innovative approaches and to help others avoid pitfalls. Potential adopters can begin with realistic expectations, and managers can be aware of the example and expectations they bring. Adopters need to be aware of the potential drawbacks of having work always so accessible with portable technology and the need for self-discipline to balance work and personal time.

13.6 Benefits and Limitations of the Research

There were a number of benefits and limitations of this research. The first benefit is that it provides some qualitative information about portable office users. Other studies have determined mainly quantitative information such as what segments mobile office users fit in (I.T. Magazine, 1993) and measured the growth of use. This study has added knowledge of the perceptions of users and explored personal as well as work related and technical considerations.

The second benefit is that through the interviews with users and managers, it provides information to assist in decision-making and implementation. Such information should help make the adoption a more positive experience.

The third benefit is that it provides insight for vendors and suppliers that could help target their marketing. For instance, it appears that to potential users in certain professions, the portable office has become more or less an "appliance" that is regarded as an essential tool and is bought without great analysis as long as it is compatible with their current office systems. As well, prices for portable technology have dropped to levels where users are willing to buy pieces, personally or through the organization, in order to experiment with them. Information from this study can be used to "sell" this work arrangement.

The fourth benefit is that it has expanded the body of knowledge, incorporating ideas that proved relevant from several fields (i.e. end-user computing, cellular phones, electronic briefcase, and work-at-home/ telework).

The final benefit was one cited during the interviews of causing the respondents to reflect on the impacts that adoption of a portable office had for them, and to recognize some significant impacts that could be shared with others.

The first weakness is that this study was exploratory research, not testing established theory or models. It explored a limited population and small study sample, and thus, cannot be generalized or directly related to other published research. The interview approach required an investment of time and resources such that organizations were unwilling to have many employees included.

The second weakness is that it explored a limited number of variables and made use of recall and self-report measures. This was deemed reasonable to keep the study within the scope of a Master's thesis and to keep the instruments to a reasonable length.

The third weakness is that technology changes so rapidly that the issues may change and the findings be rapidly outdated. The focus in the study, however, was not on the technical details of the portable offices, but on the human factors.

Future research should study larger samples, to allow splits by factors such as type of work, level in the organization, and gender. This study included mainly managers, professionals, and marketing agents. It would be interesting to study the growing number of users in other categories, such as blue collar and service industries. Following this exploratory study, subsequent research could be done on firmer measures developed from these and other findings, such as types of uses, benefits and drawbacks, which could be incorporated in survey instruments rather than more time-consuming interviews. The links among components of the model which were not tested in this study could be explored. It would be interesting to compare users of portable offices with people who had stopped using a portable office. A different type of research might explore the personality factors of portable office users, as suggested from the findings on users with high portability, or the effects on learning and careers of children who have been exposed to portable technology.

REFERENCES

- Anderson, B. (1991, February). Faring on the road: A traveler's guide to the portable fax. Mobile Office, pp. 80-86.
- Badgett, T. and Sandler, C. (1991, April). Cellular Data Transfer. Portable Office, pp. 35-40.
- BellNews (1991, November 18). Vol 21, no. 21, p 1.
- Berelson, B. (1952). Content Analysis in Communications Research. The Free Press, Glencoe, Ill.
- Bikson, T. (1987). Understanding the implementation of office technology. In R.F. Kraut (ed.), Technology and the Transformation of White Collar Work, 155-176. Lawrence Erlbaum, Hillsdale, N. J.
- Borchardt, J. (1989, September). How to make business travel more productive. Working Woman, pp. 99-104.
- Burkhardt, M. and Brass, D. (1990). Changing patterns or patterns of change: The effects of a change in technology on social network structure and power. Administrative Science Quarterly, 35, 104-127.
- Bush, Wm. (1990). Telecommuting: The case of research software development. Technological Forecasting and Social Change, 37, 235-250.
- Cate, E. and Curley, K. (1987). Measuring implementation outcome: beyond success and failure, Information and Management, 13, 245-253.
- Carlsson, S. (1990). Learning from non-use: The case of spreadsheeting. In K. Kaiser and H. Oppelland (eds.), Desktop Information Technology: Proceedings of the IFIP WG8.2 Working Conference on Desktop Information Technology and Organizational Worklife in the 1990's, Ithaca, New York, U.S.A., 2-4 July, 1989, 335-356. Elsevier Science Publishers, Amsterdam.
- Christensen, K. (ed). (1988). The New Era of Home-based Work. Westview Press, Boulder, Colorado.
- Cohen, S., Kamarck, T., Mermelstein, R. (1983). A global measure of perceived stress. Journal of Health and Social Behavior, 24, 385-396.
- Cross, T. and Raizman, M. (1986). Telecommuting: The Future Technology of Work. Dow Jones-Irwin, Homewood, Illinois.

Danziger, J. and Kraemer, K. (1986). People and Computers: The Impacts of Computing on End Users in Organizations. Columbia University Press, New York.

Davis, F., Bagozzi, R. and Warshaw, P. (1989). User Acceptance of computer technology: a comparison of two theoretical models. Management Science, 35, 982-1003.

Delottinville, P. (1991). The Portable Professional. CA Magazine, August, pp. 18-22.

Dickerson, M. and Gentry, J. (1983). Characteristics of Adopters and Non-adopters of Home Computers. Journal of Consumer Research, 10, 225-235.

Diener, E., Emmons, R.A., Larsen, R.J., & Griffin, S. (1985). The satisfaction with life scale. Journal of Personality Assessment, 49, 71-75.

DiMartino, V. and Wirth, L. (1990). Telework: A new way of working and living. International Labour Review, 129, 529-554.

Dutton, W., Kovaric, P. and Steinfield, C. (1985). Computing in the home: A research paradigm. Computers and the Social Sciences, 1, 5-18.

Dutton, W., Rogers, E. and Jun, S. (1987). Diffusion and Social Impacts of Personal Computers. Communication Research, 14, 219-250.

Duxbury, L., Higgins, C. and Irving, R. (1987). Attitudes of Managers and Employees to Telecommuting. INFOR, 25, 273-285.

Duxbury, L., Higgins, C. and Mills, S. (1992). Supplemental work at home and work-family conflict: a comparative analysis. Information Systems Research, 3, 173-189.

The Financial Post (1991, June 7). Laptop Computers Focus, pp 18-23.

Fisher, A. (1991). CEOs think that morale is dandy. Fortune, 124, 12, pp. 83-84.

Gates, B. (1991a, June 7). Smaller laptops packing bigger computing punch. The Financial Post, p. 18.

Gates, B. (1991b, June 10). Computers enter the wireless age: New technology can link terminals spanning globe. The Financial Post, p. 13.

Goodrich, J. (1990). Telecommuting in America. Business Horizons, July-August, pp. 31-37.

Gorry, A. and Scott Morton, M. (1971). A Framework for Management Information Systems. Sloan Management Review, Fall, 55-70. (Reprinted as an "SMR Classic Reprint", Sloan Management Review, 1989, Spring, 49-61)

Harnett, J. (1991). Technology on the Move. (Mobile Office). CA Magazine, 95, 47-48.

Higgins, C., Duxbury, L. and Lee, K. (1992). Balancing work and family: A study of the Canadian Private Sector. NCMRD. University of Western Ontario, London, Ont.

Howard, R. and Schneider, L. (1989). Portables in the field. Office: Technology and People, 5, 127-139.

Huws, U., Korte, W. and Robinson, S. (1990). Telework: Towards the Elusive Office. John Wiley and Sons Ltd, Chichester, England.

Igbaria, M. and Nachman, S. (1990). Correlates of user satisfaction with end-user computing: an exploratory study. Information and Management, 19, 73-82.

I.T. Magazine (1993, May). Mobile IT Market Shifting Gears, pp 45-46.

Jones, S. (1985). Depth interviewing: The Analysis of depth interviews. In R. Walker (ed), Applied Qualitative Research, 45-70. Gower Publishing Company Limited, Aldershot.

Karasek, R. (1979). Job demands, job decision latitude, and mental strain: Implications for job redesign. Administrative Science Quarterly, 24, 285-308.

Karasek, R. and Theorell, T. (1990). Healthy Work: Stress, Productivity, and the Reconstruction of Working Life. Basic Books, Inc. Publishers, New York.

Kassarjian, H. (1977). Content Analysis in Consumer Research. Journal of Consumer Research, 4(June), 8-18.

Kinsman, F. (1989). Telecommuting: An idea whose time has come. Accountancy, October, 167-169.

Kling, R., Iacono, S. and George, J. (1990). Occupational power, patterns of desktop computer use and quality of worklife. In K. Kaiser and H. Oppelland (eds.), Desktop Information Technology: Proceedings of the IFIP WG8.2 Working Conference on Desktop Information Technology and Organizational Worklife in the 1990's, Ithaca, New York, U.S.A., 2-4 July, 1989, 63-107. Elsevier Science Publishers, Amsterdam.

Kraut, R. (1987). Predicting the use of technology. In R.E. Kraut (ed.), Technology and the Transformation of White Collar Work, 113-134. Lawrence Erlbaum, Hillsdale, N. J.

Kraut, R. (1989). Telecommuting: The trade-offs of home work. Journal of Communications, 39, 19-44.

Krippendorff, K. (1980). Content Analysis: An Introduction to its Methodology. Sage Publications, Beverly Hills.

Mahajan, V., Muller, E. and Srivastava, R. (1990). Determination of adopter categories by using innovation diffusion models, Journal of Marketing Research, 27, 37-50.

Mawhinney, C. and Lederer, A. (1990). A Study of personal computer utilization by managers, Information and Management, 18, 243-253.

Moore, G. and Benbasat, I. (1990). An examination of the adoption of information technology by end-users: A diffusion of innovations perspective. Working Paper #90-MIS-012.

Nilles, J., Carlson, F., Gray, P. and Hanneman, G. (1976). The Telecommunications Transportation Trade Off. Wiley, New York.

Olson, M. (1983). Remote office work: changing work patterns in space and time, Communications of the ACM, 25, 182-187.

Olson, M. (1987). Telework: Practical experience and future prospects. In R.E. Kraut (ed.), Technology and the Transformation of White Collar Work, 135-152. Lawrence Erlbaum, Hillsdale, N. J.

Panko, R. (1990). Skewed Use in Groupware. In K. Kaiser and H. Oppelland (eds.), Desktop Information Technology: Proceedings of the IFIP WG8.2 Working Conference on Desktop Information Technology and Organizational Worklife in the 1990's, Ithaca, New York, U.S.A., 2-4 July, 1989, 177-191. Elsevier Science Publishers, Amsterdam.

Purdie, J. (1991, May 20). The 9-to-5 routine headed for extinction. The Financial Post, p. 15.

Quinn, R., & Staines, G. (1979). The 1979 Quality of Employment Survey. Survey Research Center, Ann Arbor, Michigan: University of Michigan.

Ramsay, L. (1991, November 20). Japanese workers world's unhappiest. The Financial Post, p. 35.

Ramsower, R. (1983). Telecommuting: the Organizational and Behavioral Effects of Working at Home. UMI Research Press, Ann Arbor, Michigan.

Rice, R. and Case, D. (1983). Electronic message systems in the university: a description of use and utility, Journal of Communication, 33, 131-152.

Rice, R., Hughes, D. and Love, G. (1989). Usage and outcomes of electronic messaging at an R&D organization: situational constraints, job level, and media awareness, Office: Technology and People, 5, 141-161.

Rice, R. and Manross, G. (1987). The Case of the intelligent telephone: the relationship of job category to the adoption of an organizational communication technology. In M. McLaughlin (ed.), Communication Yearbook 10, 727-742. Sage, Beverly Hills.

Risman, B. and Tomaskovic-Devey, D. (1989). The social construction of technology: microcomputers and the organization of work. Business Horizons, May-June, 71-75.

Robertson, T. (1971). Innovative Behavior and Communication. Holt, Rinehart, & Winston, New York.

Robey, D. and Zmud, R. (1990). Research on end-user computing: theoretical perspectives from organization theory. In K. Kaiser and H. Oppelland (eds.), Desktop Information Technology: Proceedings of the IFIP WG8.2 Working Conference on Desktop Information Technology and Organizational Worklife in the 1990's, Ithaca, New York, U.S.A., 2-4 July, 1989, 15-36. Elsevier Science Publishers, Amsterdam.

Rogers, E. (1983). Diffusion of Innovations. The Free Press, New York.

Rogers, E. (1986). Communication Technology: The New Media in Society. The Free Press, New York.

Rogers, E. (1990). The "Critical Mass" in the diffusion of interactive technologies. In M. Carnevale, M. Lucertini, and S. Nicosia (eds.), Modelling the Innovation: Communications, Automation and Information Systems. Elsevier Science Publishers B.V., North Holland.

Sproull, L. and Kiesler, S. (1986). Reducing social context cues: Electronic Mail in organizational communication. Management Science, 32, 1492-1512.

Tornatsky, L. and Klein, K. (1982). Innovation characteristics and innovation adoption implementation: a meta-analysis of findings. IEEE Transactions on Engineering Management, EM-29, No.1, 28-45.

Venkatesh, A. and Vitalari, N. (1992). An emerging distributed work arrangement: An investigation of computer-based supplemental work at home. Management Science, 38, 1687-1706.

Vervest, P. (1987). Innovation in Electronic Mail: Towards Open Information Networks. North-Holland, Amsterdam.

Vitalari, N., Venkatesh, A. and Gronhaug, K. (1985). Computing in the home: shifts in the time allocation patterns of households. Communications of the ACM, 28, 512-520.

Yap, C. and Tng, H. (1990). Telecommuting : Attitudes of female computer professionals in Singapore. In K. Kaiser and H. Oppelland (eds.), Desktop Information Technology: Proceedings of the IFIP WG8.2 Working Conference on Desktop Information Technology and Organizational Worklife in the 1990's, Ithaca, New York, U.S.A., 2-4 July, 1989, 193-207. Elsevier Science Publishers, Amsterdam.

Appendix 1 - The Research Proposal Summary

Thesis Proposal - Master of Management Studies program,
School of Business, Carleton University.

Thesis Supervisor: Professor Linda Duxbury.

THE USE OF PORTABLE OFFICES :

An Exploratory Analysis

This thesis is an exploratory study of the adoption of portable offices. Three main questions are addressed in this study. First, why do people use portable offices? Second, how do individuals use portable offices? Third, what are some of the individual and organizational consequences of the use of portable offices?

"Portable office", as defined in this study, requires employees to have access to office equipment which they use outside of the fixed base office environment. These employees may also use this technology in the office environment.

The concept of "portable offices" goes beyond end-user computing and beyond working-at-home or working at some other fixed location out of the office. Portable offices provide the ability to do work at (and possibly, "keep in touch" from) varying sites as the individual moves around. Home is just one of the sites where the portable office may be used. Communication may be among any number of sites, only some of which are fixed (e.g. the base office).

The study will look at people who use this technology and at management in the organizations they work for. Responses of individuals who use a portable office will be compared by gender ~~and by level in the organization~~. In addition, the perceptions of individuals who use portable offices will be compared with their organization's perceptions, as represented by the managers interviewed. Managers will be asked what problems they experience in managing in an environment where portable technology is used.

The effects of different levels of portability on the adoption process will be examined during the course of the analysis. The extent or degree of portability will be treated as a continuum, increasing from a minimum of a portable computer with access to a telephone, through the addition of telecommunication modems, cellular phones, portable fax, and other devices, to a "fully" portable office. Differences in uses and outcomes are expected to exist, depending on the extent of portability.

INTERVIEWS in ORGANIZATIONS

The target number of subjects for the study will be a total of 60 to 70 users from 4 to 6 organizations. Subjects from each organization will include users of portable offices and managers of these users (as representative of the company/ organization).

The target number of subjects per company/organization or work group will be approximately 8 to 12 users and several (2-4) managers, with approximately equal representation of males and females and of different levels in the organization, if possible. The estimated time commitment for each individual user is approximately 1 hour, consisting of 15 minutes for the written questionnaire and 45 minutes for the interview. For each manager, the time commitment is approximately 30 minutes for only an interview.

Structured interviews will be used to investigate people's thinking and attitudes about adopting this technology. The interviews will be supplemented by written questionnaires to gather some factual information and responses on scales. The instruments for users will be more extensive than those for managers but will contain comparable questions for common issues. Background information about the organization and its use of computer and communications technology will be gathered separately.

BENEFITS of THIS STUDY

This research into the use of portable offices offers numerous potential benefits. For management in organizations considering adoption of portable offices, this study can provide information to assist in their decision-making, and help make the adoption a more positive experience. It can help managers in organizations determine the best way to expand a current program of portable technology use. Individual employees can learn from the experiences of others how to get increased benefits from the technology more easily and quickly. They may also learn how to avoid the pitfalls experienced by early adopters.

January, 1992

Appendix 2 - The Survey Cover Letter and the Questionnaire

Carleton University
Ottawa, Canada K1S 5B6

Dear Sir/Madam:

Portable offices have evolved into work tools which are becoming accepted and essential equipment for some businesses and individuals. Because portable offices are a recent and evolving innovation, there is little research devoted specifically to this topic.

We are presently conducting an exploratory study on the use of portable offices. We are interested in why people use portable offices, how they use them, and what they see as the outcomes. This research is being undertaken for a thesis in the Master of Management Studies program in Carleton University's School of Business, under the supervision of Professor Linda Duxbury (613- 788-2385).

The study requires participation from a small sample of individual users and their managers. Your organization has agreed to participate, and has identified individuals who are being asked to provide information. We would very much appreciate your taking the time to fill in this questionnaire and be interviewed.

Enclosed you will find a questionnaire, which should take you approximately 15 minutes to complete. This will be followed by an interview, which should take approximately 45 minutes. If you are also a manager of other users, the interview may take approximately 1 hour. Please complete the attached written questionnaire before the time scheduled for the interview. The researcher will pick it up when you meet for the interview.

You can be assured that your answers will be **completely confidential**. First, your name does **NOT** appear on the questionnaire, envelope, or interview tape. The number on the right top corner of the questionnaire allows us to put your questionnaire and interview information together. It also identifies the organization you are working for so that we can provide your organization with a summary of our findings. The completed questionnaire is to be handed directly to the researcher when you meet for the interview. Finally, all reports will deal with group values only. Individual responses will **NOT** be identified.

The results of the research will be made available to your organization as soon as they are complete. We will be pleased to answer any questions you might have. I can be reached at 613- 794-0278.

Thank you very much for your assistance.

Sincerely,

Nancy Corbett,
Masters Student, School of Business, Carleton University.

WRITTEN QUESTIONNAIRE FOR INDIVIDUAL USERS

SECTION A: DEMOGRAPHICS

WE NEED SOME DEMOGRAPHIC INFORMATION ABOUT YOU TO HELP US INTERPRET THIS QUESTIONNAIRE. TO ANSWER THE FOLLOWING QUESTIONS, PLEASE CIRCLE THE LETTER OF THE ANSWER WHICH BEST DESCRIBES YOU AND/OR FILL IN THE INFORMATION REQUESTED.

1. What is your sex?
A. Male
B. Female
2. What is your age? _____ YEARS
3. What is your present marital status?
A. Married or living with a significant other
B. Divorced
C. Separated
D. Never married
E. Widowed
4. Do you have any children? _____ CHILDREN (If 0, Go to Q.6)
5. Please answer the following questions concerning your children.

	AGE	LIVING AT HOME (Please circle)
CHILD #1	_____ YEARS	NO YES
CHILD #2	_____ YEARS	NO YES
CHILD #3	_____ YEARS	NO YES
CHILD #4	_____ YEARS	NO YES
CHILD #5	_____ YEARS	NO YES
CHILD #6	_____ YEARS	NO YES
6. Do you have any DEPENDENTS other than your spouse/significant other or children living with you?
A. No
B. Yes (Please specify) _____ lives with me
7. Please circle the letter which BEST describes your educational background.
A. High school or less
B. Community college
C. A University degree
D. Post Graduate degree(s)

8. What mode of transportation do you use **MOST FREQUENTLY** to travel between home and work?
- A. Public transportation
 - B. Private car
 - C. Car pool
 - D. Walk
 - E. Bike
 - F. Other (Please specify) _____
9. How long do you usually spend commuting each day? _____ HOURS

SECTION B: STRESS AND COPING

THE FOLLOWING SET OF QUESTIONS ASK ABOUT STRESS AND METHODS OF COPING. PLEASE CIRCLE THE MOST APPROPRIATE ANSWER FOR EACH QUESTION.

10. Below are five statements with which you may agree or disagree. Please indicate your agreement with each item by **CIRCLING** the appropriate number.

	STRONGLY DISAGREE		NEUTRAL		STRONGLY AGREE
In most ways my life is close to my ideal.	1	2	3	4	5
The conditions of my life are excellent.	1	2	3	4	5
I am satisfied with my life.	1	2	3	4	5
So far I have gotten the important things I want in life.	1	2	3	4	5
If I could live my life over, I would change almost nothing.	1	2	3	4	5

11. How often in the LAST MONTH have you:

	NEVER	SOME- TIMES			ALWAYS
Been upset because something happened unexpectedly?	1	2	3	4	5
Felt that you were unable to control important things in your life?	1	2	3	4	5
Felt nervous or stressed?	1	2	3	4	5
Dealt successfully with irritating life hassles?	1	2	3	4	5
Felt that you were coping effectively with important changes that were occurring in your life?	1	2	3	4	5
Felt confident about your ability to handle your personal problems?	1	2	3	4	5
Felt that things were going your way?	1	2	3	4	5
Found that you could not cope?	1	2	3	4	5
Been able to control irritations in your life?	1	2	3	4	5
Felt you were on top of things?	1	2	3	4	5
Been angered because of things that happened that were outside of your control?	1	2	3	4	5
Found yourself thinking about things that you had accomplished?	1	2	3	4	5
Been able to control the way you spent your time?	1	2	3	4	5
Felt difficulties were piling up so high that you could not overcome them?	1	2	3	4	5

SECTION C: YOUR JOB AND YOUR USE OF TECHNOLOGY ON YOUR JOB

FOR THE FOLLOWING QUESTIONS, PLEASE CIRCLE THE APPROPRIATE RESPONSE OR FILL IN THE INFORMATION REQUESTED.

12. Please indicate how satisfied you are with:

	VERY DISSATISFIED		NEUTRAL		VERY SATISFIED
Your job in general	1	2	3	4	5
Your pay	1	2	3	4	5
The number of hours you work	1	2	3	4	5
The schedule of your working hours	1	2	3	4	5
The sorts of things you do on the job	1	2	3	4	5

13. Please circle the letter which BEST fits most of the work you do.

- A. Managerial
B. Professional
C. Technical
D. Administrative
E. Clerical
F. Other (Please specify) _____

14. What is the size of your work group? _____ PEOPLE

15. How many individuals report to you directly? _____ PEOPLE

16. Does your job require you to travel?

A. No -----> Go to Q. 18

B. Yes -----> How many days per month, on average? _____ DAYS/MONTH
How many days does an average trip last? _____ DAYS

17. What percentage of your work day do you spend working in the National Capital Region but outside of your office? _____ PERCENT. If ZERO -----> go to Q. 19

18. What other local sites do you work at? (please Circle all that apply):

- A. Other offices / operations sites of your organization
B. Conference and course sites
C. Client sites
D. Suppliers sites
E. Home
F. Other (please specify) _____

19. How much does your job require you to communicate with others

	VERY LITTLE		MODERATE AMOUNT		A LOT
A. Internally? (in your organization)	1	2	3	4	5
B. Externally? (outside your organization)	1	2	3	4	5

20. To what extent are computers and communications technologies (such as electronic mail, fax) an integral part of your job?

NOT AT ALL		MODERATELY IMPORTANT		ESSENTIAL TOOLS
1	2	3	4	5

21. How competent do you feel overall in using computer and communications technologies?

NOT AT ALL		MODERATELY COMPETENT		VERY COMPETENT
1	2	3	4	5

22. How would you describe your skills in using computer and communication technologies?

BASIC, SIMPLE SKILLS		AVERAGE		EXPERT, HIGH SKILLS
1	2	3	4	5

23. Have you ever received any formal training on use of a computer?

A. Yes
B. No

SECTION C. YOUR PORTABLE OFFICE

By "portable office", we mean technology that can be carried and used in a variety of locations, both inside and outside your main / base office. It includes at least a portable computer (e.g. laptop or notebook) and access to a telephone, with the possible addition of other equipment such as modem, cellular phone, fax unit, etc.

24. Listed below are a number of pieces of equipment that could be included in a portable office. Please **CIRCLE** the letters corresponding to each piece of equipment you own. For each piece you own, please indicate the length of time you have had that piece of technology.

A. Portable computer	_____	MONTHS
B. Modem	_____	MONTHS
C. Cellular phone	_____	MONTHS
D. Portable Printer	_____	MONTHS
E. Portable Fax	_____	MONTHS
F. Electronic organizer	_____	MONTHS
G. Pager	_____	MONTHS
H. Portable Photocopier	_____	MONTHS
I. Adapter to plug into Car Cigarette Lighter	_____	MONTHS
J. Other : please specify	_____	MONTHS
	_____	MONTHS
	_____	MONTHS

25. Is there someone you can call if you experience problems with your portable office
- A. During regular office hours? YES NO
- B. Outside of regular office hours? YES NO
26. All things considered, how satisfied are you with your decision to use a portable office?
NOT
AT ALL
SATISFIED		MODERATELY
SATISFIED		EXTREMELY
SATISFIED
1	2	3	4	5

SECTION D: HOW DO YOU USE YOUR PORTABLE TECHNOLOGY

PLEASE THINK BACK TO YOUR LAST REGULAR WORK WEEK WHEN YOU USED YOUR PORTABLE OFFICE.

27. How frequently did you use your portable office:
	NEVER	OCCASION-
ALLY	VERY
OFTEN
A. During regular working hours	1	2 3	4 5
B. During daily commuting time	1	2 3	4 5
C. During travel time outside regular hours	1	2 3	4 5
D. Outside regular work hours	1	2 3	4 5
28. What was the average amount of time per session in each of these time frames:
- A. During regular working hours _____ MINUTES
- B. During daily commuting time _____ MINUTES
- C. During travel time outside regular hours _____ MINUTES
- D. Outside regular work hours _____ MINUTES
29. For how much time in total did you use your portable office at each of the following locations:
- A. Your regular/ base office _____ HOURS
- B. Private motor vehicle _____ HOURS
- C. Public transit _____ HOURS
- D. Hotels _____ HOURS
- E. Other sites of own organization _____ HOURS
- F. Client sites _____ HOURS
- G. Home _____ HOURS
- H. Shared satellite office _____ HOURS
- I. Other: 1. _____ HOURS
2. _____ HOURS
30. On average, what percentage of your workday do you spend using your portable office?
- _____ PERCENT

THANK YOU.

Appendix 3 - The Interview Schedule for Users

Questions to be covered in **INTERVIEW with INDIVIDUAL USERS** :

Thank you for completing the written questionnaire. Now I would like to talk with you about your use of a portable office.

By "**portable office**", we mean technology that can be (carried and) used in a variety of locations, both inside and outside your main/ base office. It includes at least a (portable) computer (laptop or smaller) and access to a telephone, and the possible addition of other equipment such as modem, cellular phone, fax unit, etc.

A. **YOUR RECALL OF YOUR THINKING BEFORE YOU STARTED TO USE THE PORTABLE OFFICE:**

1. **Why** did you initially consider using a portable office?
2. Were there other considerations that influenced your decision to use a portable office? (eg, had no choice - whole group was told to use them)
- 2B. Was there written documentation produced to support or justify the decision for you to start using a portable office? -as individual, or part of group? If yes, was it written by you or someone else? Would it be possible for me to see it (afterwards)??

B. **PERCEIVED CHARACTERISTICS OF PORTABLE OFFICES**

3. (Relative advantage) In what ways do you see portable offices as being better or providing advantages over not having portable offices / technology? Please elaborate (as needed - Note: may see as disadvantages).
4. (Compatibility) How compatible is your portable office with
 - the information technology and computer systems you were already using?
 - the way you like to work ?
 - the way your organization works?
 - your communication needs? (where, with whom)
5. (Complexity) In what ways have you found your portable office difficult to use?
6. (Observability) Has your use of the portable office been influenced by someone else? Who? Why?
7. Do you think security is an issue with use of portable offices? Please elaborate.

C. USING THE PORTABLE OFFICE

8. How did you get started using your portable office?

Who bought what?

What training and support were provided?

9. Has your use of the portable office changed over time?
If so, how? and why?

9b. Has your use of a portable office changed the way you work?
If so, how?

10. Do your uses of the portable office correspond to those you anticipated originally? How do they differ?

11. Please think about what you used your portable office for (FUNCTIONS) in your last regular work week **WHEN YOU USED YOUR PORTABLE OFFICE.**

<Have list of functions available for prompting>

<For each function mentioned, ask the the following 4 questions:>

- 1. What (else) did you use your portable office for?
- 2. How often did you use it for ____ (function mentioned)?
1=Rarely(Once) to 5= many times each day
- 3. What was the average amount of time you used it for a session of ____ (function mentioned)? _____ (minutes)
- 4. How important do you consider this use? (1= min, 5= max)

D. BENEFITS and DRAWBACKS

12. Do you feel you have experienced any work-related benefits from using a portable office?
What are they?

13. Do you feel you have experienced any individual or family-related benefits from using a portable office? What are they?

14. Do you feel you have experienced any work-related drawbacks from using a portable office? What are they?

15. Do you feel you have experienced any individual or family-related drawbacks from using a portable office? What are they?

16. Do you feel there are any benefits for your organization from your using a portable office?
What are they?

17. Do you feel there are any drawbacks for your organization from your using a portable office? What are they?

18. How do these actual benefits and drawbacks compare to those you had anticipated before starting to use a portable office?

E. OVERALL SATISFACTION

19. Do you intend to continue using a portable office?

If "NO", why not?

What alternative will you use?

If "YES", will you continue to use it as is or make changes? <eg add a cellular phone>.

20. Would you encourage others to use a portable office?

21. What advice would you offer others about using a portable office?

END - THANK YOU. (Follow-up on documentation?)

Appendix 4 - The Interview Schedule for Managers

Questions for INTERVIEW WITH MANAGERS

A. WORK GROUP

1. How many individuals report to you?
Do you see this as one work group or several different ones?
2. How frequently do your employees need to travel as part of their jobs?
Please elaborate briefly.
3. How frequently do your employees need to work locally outside your main/ base office?
Please elaborate briefly.
4. How much does the work of your group require your employees to communicate with others
- internally (in your organization)? (eg "very little - work in isolation")
- externally (outside your organization)?
5. To what extent are computers and communications technologies (such as electronic mail, fax) already an integral part of the work of your unit?

B. WHY USE PORTABLE OFFICES:

By "portable office", I mean at least a (portable) computer (eg laptop or smaller) and access to a telephone, and the possible addition of other equipment such as modem , cellular phone, fax unit, etc.

6. What types of portable offices/ technology do people in your work group generally have?
Who decides?
Are there organizational /departmental standards?

Please think back to the time when you were considering whether your work group should be supplied with portable technology.

7. Why was the organization interested in portable offices?

What considerations or factors were most important in your decision to adopt?
(be prepared to probe re Rogers 5 characteristics
and anticipated benefits and drawbacks).
8. How does management support and encourage use of portable offices?
9. How frequently do you use a portable office personally?

C. ACQUISITION and START-UP

10. How long ago did employees in your group start using portable offices?

How many / what proportion of your employees use portable offices?
Which employees are they? (eg all one occupation and level, mixture in a whole work group)
11. What training and support is provided to those who use portable technology?

D. USE:

12. Please describe what you understand to be how your employees use their portable offices Include < prompt for > what they use them to do, when, where, and how much
What do you as management see as the most important/ valuable uses?
13. Do you feel that your employees' uses of portable offices have changed over time?
If so, how? and why?
- 13b. Do you feel that your employees' uses of portable offices have changed how they work?
If so, how?
14. Do the ways they use portable offices correspond to those uses you anticipated originally?

How do they differ?

E. BENEFITS and DRAWBACKS

15. Do you feel your employees have experienced any work-related benefits from using a portable office? What are they?
16. Do you feel your employees have experienced any other benefits from using a portable office?
What are they?
17. Do you feel your employees have experienced any work-related drawbacks from using a portable office? What are they?
18. Do you feel your employees have experienced any other drawbacks from using a portable office?
What are they?
19. Do you feel there are any benefits to your organization from use of portable offices? What are they?
20. Do you feel there are any drawbacks for your organization from use of portable offices? What are they?
21. How do these actual benefits and drawbacks compare to those you had anticipated?
22. Do you have concerns about security with the use of portable offices?
Please elaborate.

F. OVERALL SATISFACTION

23. Have you experienced any difficulties managing employees who use portable technology?
If YES: Please elaborate.
24. All things considered, how satisfied are you with your employees' use of their portable offices?
5 point scale. not at all to extremely
26. Do you intend to continue to encourage the employees in your work group to use portable technology?
If "NO", why not?
What alternatives would you use?
If "YES", will you continue use as is or make changes? <eg add cellular phones encourage use of more varied functions or in more locations>
27. What advice would you offer other managers who are considering introducing portable offices into their work groups?

Appendix 5 - List of Survey Measures

Appendix 5 -

List of Survey Measures

CONSTRUCT	RESEARCH QUESTION	HOW OPERATIONALIZED	SURVEY INSTRUMENT Qn #	INTERVIEW Qn #
Extent of Portability	2,8	Number of pieces of Equipment, especially Cellular Phone	24	
Perceived Characteristics of Portable Office	5,8	Rogers: -Relative Advantage -Compatibility -Complexity -Observability -Security		3-7
Adoption decision	3,8			1,2,8
Use of the Portable Office -how much -complexity and functions -timeframe -where	4,8		27-30	9-11
Perceived Benefits and Drawbacks of Use	6,8	1. Job Satisfaction Scale: Quinn & Staines 2. Life Satisfaction Scale: Diener et al 3. Stress and Control: Cohen et al	10-12	12-18
Overall Satisfaction	7,8		26	19-21

Appendix 6 - Other Data Sources

Appendix 6 - Other Data Sources

OTHER DATA	WRITTEN QUESTIONNAIRE	INTERVIEW	COMMENTS
Characteristics of Respondent	1-9		
Characteristics of Work	13-20		
Characteristics of Implementing Organization			Background discussions
Work Factors supporting use of Portable Office	21-23, 25		
Characteristics of the Portable Office	24		What pieces of equipment, for how long
Acquisition		8	
Decision to Adopt		1-2	
Impact of Adoption		9b: Changed way you work	

Appendix 7 - Advice to Others

Appendix 7 - ADVICE TO OTHERS

1. **Buy best equipment that budget will permit - don't share**
 - Buy best equipment for your budget
and don't get upset as prices drop afterwards
 - Don't scrimp, cut corners instead of quality, compatibility - get best value for \$
 - don't have them shared
 - get only what you need, vs nice-to-have
 - take your time in purchasing - trial if possible
 - don't pay a big price
2. **Importance of training - existence of learning curve**
 - Get adequate training - good, up-front - have it set up properly - learn to type
 - Recognize need for time to learn to use well - both managers and individual - "pain" to get up and going
 - Management need to recognize there will be differences if new staff are not computer-literate, ie productivity will be lower initially while learning
3. **Importance of planning**
 - Define needs and objectives well, and buy to fit, including phone lines (if for work at home)
 - Seek good unbiased advice/ assistance/ help network
 - have to be able to work by self - lose regular peer-to-peer contacts
 - select candidates carefully - how measure work : need specific management approach
 - compatibility and upgrades an important consideration
4. **Negatives and positives**
 - Remember it's just a tool - to be used: make it as easy as possible
 - Recognize there are limitations and trade-offs, incl hassles at airport security, eyestrain
 - can increase stress levels so be prepared
 - Recognize it may impact your family life negatively
 - Recognize it can increase stress levels if always on
 - recognize there are related responsibilities (security- this is eg government or client - information you are carrying around, accessing)
 - be prepared: can handle more workload
5. **Appropriate use / opportunities**
 - Balance use with spending time in main office, going out and seeing others vs stay isolated
 - Question how doing things - look for opportunities to apply tool well - use its power
 - Watch for improvements in the technology and take advantage
 - select uses - don't rely on portable office to do work you could do during the day - but rather for special requirements, or concentration
 - bring it when travel so can link with office
 - use to increase communications with other people - then use person-person (face to face) communication time more effectively

6.	Self-discipline re time in work/ work habits/ work and family - Recognize potential need for self-discipline re workaholic, work-family balance, worrying about whether will get calls - don't let it control you.- "expectations" that will handle increased work-load- spend time organizing your own time management for using portable office - self-discipline in this
7.	Potential to improve quality of work life, autonomy, morale - potential to improve quality of work life, autonomy, morale- don't be afraid : sooner get involved, better prepared for future (exciting) - more skills
8.	Need for strong organizational support, realistic expectations - Organization - recognize need for support / responsibility / planning esp if large scale use/ set-up time/ psychology (remote)- Management need awareness of time and effort to make changes in reports, results < not specific to portable offices>- management and peers mindset - "goofing off"- Pre-condition others - work with management - what can/ cannot expect- Management should trust employees to use portable as they want, with certain guidelines- worthwhile only if others are on the network

END

08-11-94

FIN