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THE EFFECTS OF AN ENTERPRISE RESOURCE PLANNING SYSTEM (ERP)

IMPLEMENTATION ON JOB CHARACTERISTICS

A STUDY USING THE HACKMAN AND OLDHAM JOB CHARACTERISTICS MODEL

By

Aareni Uruthirapathy, B.Comm.

**A Thesis submitted to
the Faculty of Graduate Studies and Research
In partial fulfillment of the requirements for the degree of
Masters of Business Administration**

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

May, 2001

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The undersigned recommend to
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acceptance of the thesis

**The Effects Of An Enterprise Resource Planning System (ERP) Implementation On
Job Characteristics - A Study Using The Hackman And Oldham Job
Characteristics Model**

Submitted by Aareni Uruthirapathy, B.Com. (Hons.)
in partial fulfillment of the requirements for
the degree of Master of Business Administration

Thesis Supervisor

Director, Eric Sprott School of Business

Carleton University
May, 2001

*This research is dedicated to the worship of Lord Siva for His gracious assistance
showered on me in the pursuit of my studies*

Abstract

Many organizations have implemented Enterprise Resource Planning (ERP) systems to replace their legacy systems. ERP implementation changes the roles, responsibilities, and job characteristics of organizational participants. This study will examine two issues, firstly, to what extent does enterprise resource planning implementation lead to work redesign and secondly, what is the impact of ERP initiated work redesign on employee job satisfaction. The Integrated Financial Management System (IFMS), a core group operating under the Treasury Board of Canada chose SAP R/3 software as the enterprise system to be implemented in Canadian Government organizations. Nine government organizations located in the Ottawa-Carleton area that have implemented the SAP R/3 enterprise resource system made up the sample frame for this research. The Job Characteristic model proposed by Hackman and Oldham was used to analyze the work redesign. The research found that ERP implementation brought significant structural and cultural changes to these organizations.

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Chapter one - Introduction

An Enterprise Resource Planning System (ERP) is, in essence, an integrative mechanism connecting diverse departments through a shared database and compatible software modules (Hammer and Stanton, 1999). Companies use ERP software to facilitate the exchange of information throughout their organizations. When an organization successfully implements an ERP system, it speeds up business processes, reduces costs, increases selling opportunities and improves quality and customer satisfaction (Piturro, 1999). Enterprise resource planning systems developed by companies such as Baan, People Soft, SAP and Oracle are some of the popular applications used in businesses. A report from industry analysts, Advanced Manufacturing Research (AMR) found that in the mid – 1990's vendors of Enterprise Resource Planning (ERP) software experienced unprecedented global expansion (Logistics Management, September 1997). An annual survey of critical issues in information technology by the Management Consulting branch of El Segundo, a California-based Computer Sciences Corporation, found that system integration, particularly through the use of enterprise resource planning software was the top information system priority of computer and electronics companies (Elliot, 1997).

ERP systems are typically implemented by large and medium sized companies, government departments and related organizations to obtain efficient business processes. For example, Owens Corning adopted an enterprise resource system to coordinate order-management, financial reporting and supply chain processes around the world. Canadian Blood Services implemented an enterprise system to enable the quick flow of information

to its purchasers and suppliers across Canada. By implementing an enterprise system, the Department of Foreign Affairs and International Trade is now able to exchange data and speed up communications with its 150 embassies abroad.

The Integrated Financial Management Systems (IFMS), a core group which operates under the Treasury Board of Canada chose SAP R/3 software as the enterprise system to be implemented in selected Canadian federal government organizations. To date, SAP has been implemented in eighteen such organizations. The core group works on common business practices which are then applied across participating departments. This group makes program changes and, from time to time, releases new SAP modules.

Enterprise resource planning systems were implemented in these organization to achieve three main objectives. The first objective was to build a Y2K compliant system to help solve year 2000 problems. The Standing Committee on Industry had been examining Canada's progress in solving Y2K computer problems for several years. A complete inventory was taken of all applications and systems with embedded chips (Standing Committee on Industry, May 1999). In the process, many applications had to be replaced. SAP implementation was found to be a quick fix for the Y2K problem.

Secondly, government financial policy makers wanted to introduce the accrual method of accounting into government transactions and needed a workable accounting system. They were attempting to bring all government financial operations into a uniform pattern, parallel with the accounting methods used in the private sector. With the financial

module (FI) of the SAP system, government organizations were able to consolidate budgets, make reports and get information from across the country within minutes. The ability to distribute information to everyone simultaneously was the biggest advantage gained by implementing a process system.

Thirdly, the federal organizations had to reengineer business processes and increase flexibility in their functional units to meet the challenges of the business world and to be competitive with the private sector. An SAP implementation was considered the best way to bring about this integration and flexibility.

Survey results based on data collected from 186 companies from a broad cross section of industries where SAP implementation had taken place highlighted eight important reasons why organizations initially chose to implement SAP. These reasons were: to standardize company processes, integrate operations or data, reengineer business processes, optimize supply chain, increase business flexibility, increase productivity, support globalization and help solve year 2000 problems (Cooke and Peterson, 1998).

Implementation of SAP changed the way organizations function. Government organizations are typically bureaucratic and centralized. When an integrated system is implemented, organizational and management structures have to be changed in fundamental ways (Hammer and Stanton, 1999). A new, more collaborative organizational culture is needed for the functional units to work with the integrated

system. When the organizational structure changes, people have to be moved from some jobs to jobs with different roles and responsibilities.

Government organizations that have implemented ERP systems have had to redesign work in their functional units in order to accommodate process and infrastructure changes. Managers have had to send their employees for SAP training and to redesign work to suit the process system. While redesigning work around the process system they have had to analyze the skills and abilities of the work force. Some who had skills most suited to a process system were given new jobs while other employees were given jobs that did not interact with the integrated system. To enjoy the benefits of an enterprise system, managers had to change the basic nature of work and integrate organizational participants to the process system. At the same time, they had to provide challenging, meaningful work for every employee who was now interacting with the system (Davenport, 1999).

Researchers argue that a healthy organizational setting is created for an enterprise resource planning system only when the employees have a positive relationship with their work, a relationship that will make them efficient and give them a sense of job satisfaction (Davenport, 1999, Hammer and Stanton, 1999). They further state that matching the human resources with the process system is a critical issue in the whole implementation process. The ultimate success of an enterprise system lies in how the employees accept and adapt to the new process system.

This thesis will study the effects of an ERP system implementation on job characteristics and try to understand how work has been redesigned in Canadian federal government organizations during an enterprise system implementation. Chapter two presents the literature review on enterprise systems and theories on work redesign. Chapter three discusses the research design, objectives, questions and research methodology. Chapter four will provide data analysis of the data collected through the questionnaire and through face-to-face interviews. Chapter five presents a detailed discussion on the findings of the research, outlines areas for further research and makes some recommendations.

Chapter Two – ERP Systems and Theories of Work redesign

2. Overview

The first section of the literature review examines literature on enterprise systems. This literature explains the history and development of enterprise systems to date. It also discusses the benefits of implementing an enterprise system and the importance of redesigning work around the process system in organizations.

The second section of the literature review defines work redesign and elaborates on the importance of work redesign in organizations. Theories on work redesign, from Elton Mayo's Hawthorne experiments to William Scott's activation theory, are discussed. The job characteristics model proposed by Hackman and Oldham presents a comprehensive model for effective work redesign in organizations. The literature review concludes by discussing this model in more detail.

2.1 History of ERP systems

The roots of ERP systems can be traced to the manufacturing resource planning systems of the 1980's. ERP's forefather, material requirements planning (MRP) was developed in the 1970's to help manufacturing companies manage their processes and resources (Levine, 1999). The main function of MRP in manufacturing companies was to produce a master production schedule based on the materials at hand and to alert the production manager when materials needed to be reordered (Levine, 1999). Later, the more sophisticated MRP II was introduced to the manufacturing companies which generated

“what-if” scenarios that could track the effect of various occurrences, such as a materials shortages or the start of another project (Levine, 1999). Today, enterprise systems link processes, people, suppliers and customers globally within minutes.

2.2 Enterprise Resource Planning Systems (ERP) - Today

As stated previously, an ERP system is an information system that enables a company to integrate the data used throughout the entire organization. Finance, human resources, operations, logistics, sales and marketing are some of the many functions supported by ERP systems (Davenport, 1999). When a company's system is fragmented, its business is fragmented (Davenport, 1999). Large organizations implement ERP systems to integrate information and facilitate cross-functional coordination. ERP offers a great variety of standard solutions to individual business problems. When data is entered in one unit of the organization, an ERP system allows this information to be shared by all other units and automatically updates the data in the entire organization (Bingi, Sharma and Godla, 1999). This flexibility allows companies to respond quickly to changing technology and market demands (Norbert Welti, 1999). For example, R/3, a popular ERP software package produced by the leading ERP vender, SAP of Germany, strives to support all the processes in a firm's value-added chain (Scott and Kaindl, 2000). It covers over one thousand predefined processes that represent financial, logistic and human resource practices in a repository called “business engineer.”(Scott and Kaindl, 2000) Globalization, mergers and acquisitions, short product cycles and aging legacy systems are additional factors for ERP system implementation.

2.3 Benefits and Limitations of an Enterprise Resource Planning System

Enterprise resource systems promise huge financial benefits to business organizations by reengineering business processes. The ERP customer list is long and includes exploration and production companies such as Apache Corp with its \$1 billion in revenues and 1,200 employees and Amoco Corp with \$42 billion in revenues and 45,000 employees (Amidei, 1998). In addition to the financial benefits, an ERP system offers organizations a wide range of technical benefits. These benefits include replacement of previously hard-to maintain interfaces, fewer technology capacity constraints and improved IT architecture. Redundant data entry, with its concomitant errors and difficulties in analyzing data, are reduced or eliminated (Markus and Tanis, 2000).

Enterprise systems are designed to provide seamless integration of data across functions and locations. For example, if a product or service is selling quickly, this information is simultaneously passed to the production department so that they can accurately forecast future sales. With access to revenue data, expenses and human resources, managers in different locations can analyze historical trends and understand the financial impact of their decisions (Levine, 1999). The ERP system also allows organizations to accommodate business growth, acquire multilanguage and multicurrency IT support, and improve informal business processes. (Markus and Tanis, 2000) By electronically connecting customers to information about products and services, ERP becomes an essential ingredient in successful e-commerce. It offers a single solution that allows carriers to standardize processes and create better channels of communication (Levine,

1999). Such standardization cleans up data recording and reduces inventory carrying costs and stockouts (Markus and Tanis, 2000).

In addition to these benefits, in large organizations with complex structures, an ERP system creates standardized procedures across different locations, allowing for worldwide “available to promise” capability, streamlined financial consolidation and improved company wide decision making support (Markus and Tanis, 2000).

Although Enterprise Resource Planning implementation provides organizations with many benefits, it has some shortcomings. Organizations have had to deal with many serious problems associated with ERP implementation. Some of these problems include limited functionality, high total cost of ownership and implementation and upgrading difficulties. (Markus, Petrie and Axline, 2000).

In order to benefit from ERP systems, an organization’s business processes should match the business process supported by the system. When there is a mismatch, the system will only provide limited functionality. Many organizations have found that unusual business processes are not well supported by the software. In such situations, the organization has had to customize the system to reflect its own organizational features (Markus, Petrie and Axline, 2000). An ERP system collects, but does not analyze the data, therefore it does not provide any additional support for the decision making process. One of the prime motives for companies to adopt integrated packages is to acquire the data they need for

sophisticated decision-making support (Markus, Petrie and Axline, 2000). This may be a disappointing realization.

ERP systems are offered in functional modules. Most organizations implement these modules one at a time, however, modules are not independent. The way the finance module is configured will have implications on the purchasing module's implementation. Internal integration must be tight and accurate. Organizations may find it difficult to configure the modules to suit their particular organizational structure. ERP implementation problems are further aggravated when the vendors release upgraded modules and versions. Organizations may find it more difficult to configure these upgrades to their existing ERP systems.

Finally, the total cost of ownership of an ERP system is very high. There are four levels of costs involved in the acquisition and implementation of an ERP system such as SAP R/3 software . These are: the cost incurred in buying the software license, the cost of the associated hardware, fees for internal and external consulting and education, and the cost of management change (Doane, 1999). Many companies experience more expense than they originally estimate. Very large firms have frequently spent in excess of \$100 million on ERP efforts, and smaller firms (those with less than \$ 1 billion) have spent up to \$12 million on ERP initiatives (Cooke and Peterson, 1998).

2.4 Enterprise Resource Planning and Job Redesign

Work redesign occurs whenever a job is changed. Whether it occurs because of new technology, internal reorganization, or a whim of management it can be said that work redesign has taken place (Hackman and Oldham, 1975). A number of authors argue that an ERP implementation requires redesign of organizational structure, processes and resources. An integrated ERP solution is not as much a technological exercise but an “organizational revolution” (Bingi, Sharma and Godla, 1999 ; Davenport, 1999 ; Wah, 2000). They emphasize that enterprise system implementation is not only an IT change but also a major business change. This understanding is critical to organizations and their employees, because only then will the issue of communicating change and its effects to employees take equal standing with the technical changes that are to be implemented. To achieve these results the business process of an organization has to be modified and reworked. ERP's have embedded processes which imposes their own logic on a company's strategy, organization and culture (Davenport, 1999). Companies have to reconcile the technological imperatives of an enterprise system with the business needs of the organization (Davenport, 1999). Companies have to understand the critical success factors for their business and set their business goals for ERP (Wah, 2000). Only when this is achieved, can an ERP system bring in the promised benefits.

During an Enterprise System implementation organizations have to reallocate human resources to the implementation. Some existing jobs have to be scrapped and new jobs created (Norbert Welti,1999). Employees have to be trained in new skills and assigned to work along with outside consultants in a bid to transfer knowledge about the systems and

the processes. This exposure will tend to give participants new, highly marketable skills. Consequently, organizational participants must be given challenging jobs so they will be motivated to use the newly acquired skills (Norbert Welti, 1999). People resigning, unavailability of people and insufficient knowledge and training are the topmost risk factors threatening the success of ERP implementation (Norbert Welti, 1999). The human resources of the organization should understand the system and must be guided in the whole process of implementation as they are directly involved in the decision making in an enterprise system. An entry-level clerk is made into a businessperson (Koch, 1999). Work around the process system has to be designed in such a way that it is enriched to create motivation and greater job satisfaction. When employees acquire new skills their value in the labor market also increase, therefore when an organization fails to provide enriched jobs with the ERP system the possibility of employees leaving the organization increases, resulting in high turnover rates and the loss of valuable human resources. 'An ERP requires a new more collaborative style of management because the system forces collaboration between functions, departments and locations. The way managers interact with one another and with other workers changes dramatically after the implementation, authority is split, supervisory control widened and negotiation and cooperation are unavoidable. (Hammer and Stanton, 1999).

A distinctive feature of an Enterprise System is the existence of process owners (Hammer and Stanton, 1999). Norbert Welti, the author of *Successful SAP R/3 Implementation – A practical management of ERP project*, states that process ownership is a permanent role, charged with guiding the change from the old organizational structure to the new, open

organizational structure. The existing organizational structure would not be suitable for the implementation of the enterprise system. Inefficiency would have been rooted in this structure, complicating decisions and communication lines. Further, hierarchy levels are reduced or increased to accommodate steering committees and project teams to coordinate the integrated system. Strong top management commitment is very important during and after the implementation. The new organizational structure should allow the top management to have a stronger influence in the organization's integrated functions

An Enterprise System also has a paradoxical impact on a company's organizational culture (Davenport, 1999). Before the ERP implementation the different functional units in a business may not have many transactions between them, thus the links between the functional units may have not been strong. An integrated system increases the pressure for strictly functional organizational culture to be eradicated. A new, more collaborative organizational culture would emerge as the functional units work through an integrated system.

With an ERP system, organizations have to change the approach to measuring productivity, compensation, facilities, training, development and career paths (Hammer and Stanton, 1999). In the traditional management style, employees' tasks are well defined and there are clear-cut yardsticks to measure individual performance. Hammer and Stanton further state that with the process organization, managers conduct a thorough analysis to determine which aspects of process performance are most directly linked to achieving the overall organizational objectives. Compensation packages are designed

based on team membership and on methods of achieving the goals set for them. Additional rewards and bonuses are awarded for those employees who make outstanding contributions. Employees who have been housed in vertical departments according to function, region and business units were relocated. Employees are located in one place where they can work as a team. For example, all those involved in order fulfillment are located together to share the same facility and get a better view of the entire process and to more easily exchange ideas.

Authors Hammer and Stanton stress the importance of employees understanding the whole process and how their efforts contribute to the integrated enterprise system. Employees undergo training to take up more responsibilities and broadened roles. The dominant ERP vendor, SAP, recommends that 12% of an integration and implementation budget be dedicated to education and performance support (Eline, 1999). An integrated approach to training is very critical. It should include instructor-led, computer based learning, advice from internal consultants and system experts, the use of training tools such as knowledge management, performance support and information such as online references, job aids, and intranets (Eline, 1999).

Finally when the organizational style, culture and structures undergo the dramatic changes brought about by the implementation of an enterprise resource planning system, the career path offered to employees also changes. Organizations assign more complex tasks to employees and demand greater knowledge and skills. The career models in such organizations provide a career path through many parts of the company (Hammer and

Stanton, 1999). Employees who simply do not understand the system have to be given jobs that do not interact with the system. Performance evaluations and career advancements should reflect the changes the organization has undergone.

So far we have tried to understand the many changes ERP implementation brings to an organization and its members. Resistance to change is a natural reaction and part of the process of adaptation (Osland, Kold and Rubin, 2000). In most organizations where an implementation of an ERP system has taken place, employees have used a legacy system and the work routine and responsibilities were designed in accordance with the legacy system. But when the process system is introduced, people have to change not only the way work is done but also their concept of what their job is. There is a level of frustration when new processes replace old habits. Often, in traditional organizations, people work with the idea that they belong only to that particular department and their work activities will only affect that department. This thinking has to change with the process system. Organizational participants cannot have such boundaries because a single data entry by an individual in one department can affect the entire organization.

Resistance to a process system can come from all levels of management. The process system integrates functions across the organization. This will give rise to fear among managers that the company wide availability of information will challenge their authority (Wah, 2000). During a SAP implementation, middle level managers, are put in different projects while others are assigned different jobs. Some managers may see this as a threat

because some will win power while others lose it. Leaving comfort zones and moving to an unknown system will create resistance to change (Wah, 2000).

People may also resist change, actively or passively, when the process is not carefully managed (Osland, Kold and Rubin, 2000). This type of resistance can be seen in organizations where an SAP implementation has taken place. In the organizations that participated in this research, many employees were given little time to mentally adjust to the changes brought by the process system. Many managers and employees did not know where the changes were leading and felt a loss of control. Although training in SAP systems are given to employees, it is often only on the technical side and does not include strategies to manage change.

The above discussion suggests that, when an organization introduces a process system, it is a total change in the way it functions. Jobs have to be redesigned to accommodate the process system. Let us now look at the theories that have been put forward on work redesign.

2.5 Theories on Job redesign

How can individuals be motivated at work? Researchers in human behavior science have been trying to answer this question for a long time. It has been a difficult question to answer because individuals are different from one another. Factors that motivate one individual may not motivate another. In the mid-1970s redesign of work was considered the solution to motivate employees at work. Cases studies of successful work redesign projects indicate

that work redesign can be an effective tool for improving both the quality of the work experience of employees and their on- the-job productivity (Hackman,1975). Work redesign is also considered to be a tool to introduce planned change in organizations. There are many theories which examine the motivational processes associate with redesigning jobs. Some of them are discussed below.

Elton Mayo –1933

Mayo's two colleagues carried out a series of experiments at the Hawthorne Plant of the Western Electric Company. These experiments were initially conducted to understand the link between productivity and factors such as illumination, fatigue, monotony and wage incentives. However, these experiments also provided insights as to how organizational systems work and how individuals behave at work. Mayo concluded that informal work groups have strong influences on the organization, despite attempts by management to increase productivity though task specialization and economic incentives these groups establish their own production norms (Mayo, 1933). He also found that individual recognition, security and group acceptance have strong effects on individual work performance. Research at the Hawthorne plant also pointed out that the increased routinization of tasks brought about by the industrial revolution had drastically reduced the possibilities of employees finding satisfaction in the task itself (Mayo, 1933).

Frederick Herzberg – 1959

The central question of Herzberg's study was to find answers to the question, "What do people want from their job?" Herzberg and his associates interviewed 200 accountants and engineers, in order to find an answer to the above question. They found that what made people happy with their jobs turned out to be different from the factors that made people unhappy with their jobs (Herzberg, Mausner and Snyderman, 1959). When respondents reported feeling happy with their jobs, they most frequently described factors related to their tasks, to events that indicated to them that they were successful in the performance of their work and to the possibility of professional growth (Herzberg, Mausner and Snyderman, 1959). Unhappiness was reported not with the jobs itself but with conditions that surrounded the doing of the job (Herzberg, Mausner and Snyderman, 1959). Factors involved in these situations were classified as hygiene and motivation factors. According to Herzberg hygiene factors are extrinsic and are related to the job context. These factors are pay, benefits, job security, physical working conditions supervision policies, relationships with co-workers, and company policies. Improvements of these factors of hygiene will serve to remove the impediments to positive job attitudes (Herzberg, Mausner and Snyderman, 1959). When these factors fall below the expectations of the employee, job dissatisfaction sets in.

Motivating factors are intrinsic to the content of the job itself. These are factors, such as achievement, advancement, recognition and responsibility. It is these factors that bring job satisfaction and the kind of improvement in performance that industry is seeking from its work force (Herzberg, Mausner and Snyderman, 1959).

Herzberg's two-factor theory presents a clear model for work motivation, however, there are some difficulties in using this theory in practice. Determining motivating factors and hygiene factors in a clear fashion is difficult. Some aspects of the workplace can serve at times as motivators and at other times as hygiene factors (Hackman and Oldham, 1975). For example, an year end raise in pay, would not be classified as motivating factors according to the theory, but this would definitely increase the motivation of the employees because the rise is a recognition for achievement. Thus, the motivating factors are not concretely defined and largely depend on the organizational situations (Hackman and Oldham 1975). The two-factor theory also does not take individual differences into consideration. Individual growth needs differ greatly. Some individuals are more likely to respond positively to an enriched, complex job than are others. It simply assumes that all employees approach an enriched job the same way (Steers and Porter, 1983).

Douglas McGregor – 1960

McGregor identified two different sets of assumptions about human behavior at work. He named them Theory X and Theory Y. McGregor's Theory X assumes that employees are lazy and unwilling to produce above the minimum requirements (McGregor, 1960). Employees have to be directed, motivated and their actions should be controlled. The theory suggests that supervisors should modify employee behavior to fit the needs of the organizations. Without this active intervention by management, people would be passive even resistant to organizational objectives (McGregor, 1960). By contrast, Theory Y assumes that people are not by nature passive or resistant to organizational objectives (McGregor, 1960). They have become so as a result of their experience in organizations.

According to McGregor the essential task of management is to arrange organizational conditions of operation in such a way that employees achieve their own goals by directing their efforts towards organizational objectives. Theory Y also emphasizes employee participation in decision-making and personal control over work process. McGregor states that this would improve efficiency, reduce conflict, and build greater commitment to organizational objectives. During 1960's Theory Y perspectives gained considerable popularity. Particularly, interest was shown in improving interpersonal competence to produce an organizational climate that encouraged the expression of innovative or risky ideas, eliminating mistrust and rejuvenating organizational effectiveness.

Rensis Likert - 1962

Likert proposed four different management systems namely system 1, system 2, system 3 and system 4. He identified organizational characteristics for effective and ineffective management systems. According to Likert system 1 and 2 are authoritative management systems. In these two management systems managers have little confidence and trust vested in their subordinates. Fear, threat, punishment and occasional rewards are used to motivate employees (Likert, 1962). Interaction and communication between the different organizational units are limited. Employees overtly accept but covertly resist organizational goals. Top management controls all the work process and is highly centralized. By contrast, system 3 and systems 4 are more participative management systems. In these systems management has substantial or complete confidence and trust in their subordinates. Economic rewards are based on a compensation system developed

though participation. Personnel at all levels feel responsible for organizational goals and behave in ways to implement them (Likert, 1962). Employees accept organizational goals fully and work hard individually and in groups to achieve them.

Turner and Lawrence – 1965

Turner and Lawrence presented their requisite task attributes model in 1965. A Requisite Task Attribute Index (RTA) was calculated to represent a weighted total of six requisite task attributes. The six requisite task attributes are variety, required interaction, knowledge and skill autonomy, optional interaction and responsibility (Turner and Lawrence, 1965). The researchers calculated RTA indices for 47 jobs in 11 companies and found strong links between attendance, worker's involvement and attributes of the work (Turner and Lawrence, 1965). They also discovered that high seniority people find higher job satisfaction on higher rated tasks and low seniority people expressed more job satisfaction on the low rated tasks (Turner and Lawrence, 1965). In addition, individual variables and situational variables were also included in this research. The individual variable is background, whether the workers come from either urban or rural and the situational variables are both the supervisory style and coworker relations. Turner and Lawrence believed that these variables also have an impact on job satisfaction and absenteeism. The acknowledgement of the role of individual and situational variables being linked to job satisfaction and increased attendance contributed significantly to the modern views on job redesign and its effects on employees attitudes and behavior (Steers and Porter, 1983).

William Scott – 1966

Scott proposed his activation theory in 1966. According to Scott, individuals become familiar with their surroundings and learn the responses required in a repetitive task. This leads to a decline in activation level. Activation, defined as the degree of excitation of the brain stem reticular formation, has been found in laboratory experiments to have a curvilinear relationship to performance (Steers and Porter, 1983). If the activation level falls below the characteristic norm, the individual will experience a negative effect and will attempt to increase stimulus impact (Scott, 1966). If the individual is successful in increasing stimulus impact, the result is an increase in the activation level, which would lead to a high quality of work performance (Scott, 1966). Thus, when jobs are dull or repetitive it leads to low levels of performance because dull jobs fail to activate the brain. But when jobs are enriched, it leads to a state of activation and enhances productivity. Further, the activation theory suggests that “job enlargement” requires the individual to attend to the stimulation of greater variety or complexity or both. This will have a more positive effect on long run productivity and satisfaction than the variation extrinsic to the task (Scott, 1966).

Trist and Davis - 1974

Trist and Davis were the first to put forward the idea of interaction between the technological and social dimensions of organizations which became the sociotechnical theory. Researchers emphasized that to achieve overall performance, organizations should have “joint optimization” of technology and social system (Trist and Davis, 1974).

In addition, organizational structure, management methods, and job content can be developed to create cooperation, commitment, learning, growth, ability to change, high work satisfaction and improved performance (Trist and Davis, 1974). When responsible autonomy, adaptability, variety, and participation are present, they lead to learning and positive behavior which improves the organization and enhances the quality of working life for individuals (Trist and Davis, 1974). When jobs are designed to have these features they provide the necessary psychological requirements for an individual to feel that they are performing an enriched job. This will bring adaptability and commitment which produces positive results in all levels of the organization. This work redesign recommendation by Trist and Davis became significant because the theory combined productivity and quality of working life. It also pronounced that increasing one of them does not necessarily decrease the other.

The theories presented above clearly examine the factors that would increase employee motivation at work. Monetary rewards motivate employees to a particular extent, however, these theorems demonstrate that motivation at work can be significantly increased by making changes to the job itself. Thus, jobs should be designed to provide increased challenges, responsibilities, recognition and personal growth. These theorems also suggest, when jobs are enriched with these characteristics it can lead to quality of work, improved job satisfaction and lower turnover.

In 1975 Hackman and Oldham proposed a job characteristics Model, which was based on the early research work by Turner and Lawrence (1965). Hackman and Oldham (1975)

argued that task dimensions could represent the motivating potential of jobs. They selected task variety, autonomy, feedback, identity and significance as the most critical task dimensions. Detailed discussion on the job characteristics model is given in the following section.

2.6 Hackman and Oldham Job characteristics Model (1975)

Hackman and Oldham proposed that individuals will be motivated towards their job and feel job satisfaction only when they experience certain psychological states. They identified these critical psychological states as experienced meaningfulness of work, experienced responsibility for outcomes of the work, and knowledge of actual results of the work activities. The positive effect created by the presence of these psychological states is believed to be reinforcing and serves as an incentive for continuing to do the task. In order to provide these psychological states, a job should have certain core characteristics. Hackman and Oldham found that the experienced meaningfulness at work is facilitated by skill variety, task identity and task significance. The level of autonomy in a job increases the feeling of personal responsibilities for work outcomes. They also found that when a job has good feedback, it provides the employee with increased knowledge of the actual results of the work activities.

Hackman and Oldham Job Characteristics Model

source : J. R. Hackman and G.R. Oldham, work redesign (Reading, MA: Addison-Wesley Publishing Co.,1980)

According to Hackman and Oldham, Growth Need Strength (GNS) can moderate employees' reactions to their work. People have different levels of personal accomplishment. Some are happy with the present condition at work while others would like to advance themselves beyond their present level of attainment. The latter group are said to have strong "growth needs" and are predicted to develop high internal motivation when working on complex, challenging job (Hackman and Oldham, 1975). Others have less strong needs for growth and are less eager to exploit the opportunities for personal accomplishment provided by a job. These individuals may not be ready for such

advancement. They may even find advancement demotivating or threatening and balk at being “pushed or stretched too far by their work” (Hackman and Oldham, 1975).

According to the job characteristics model, the growth need strength (GNS) moderator affect employees in two ways. First, employees are affected through the link between the objective job dimensions and their psychological state. Second, they are affected by the connection between their psychological states and their internal motivation. The first link specifies that people with high growth need strength will experience the psychological states more strongly when the job is enriched by the job dimensions discussed earlier. The second link is created when individuals with high growth strength respond more positively to the psychological states than their lower growth need counterparts. Individuals with strong growth needs do react more positively to complex jobs than individuals with weak needs for growth, but the signs of the relationship between the job characteristics and the outcome measures are positive even for people in the bottom quartile of the growth need measure (Hackman and Oldham, 1975). Such individuals may not be primed and ready to respond enthusiastically to a job that is more complex and challenging than the one they hold at present (Hackman and Oldham, 1975).

Hackman and Oldham tested their model through a Job Diagnostic Survey (JDS) which measured each of the variables in the job characteristics model. They also administrated a Job Rating Form . The Job Rating form measured the characteristics of the focal job as viewed by individuals who do not work on that job. It was given to supervisors and researchers who had observed the jobs. The JDS was used and data was obtained from 658 employees working on 62 different jobs in seven organizations.

Hackman and Oldham identified many shortcomings with the job diagnostic survey. Firstly, job characteristics measured by the JDS were not independent of one another. When a job is high in one characteristic, it tends to be higher in other characteristics as well. Thus, positive intercorrelations between job characteristics may reflect problems in how they are measured in the JDS (Hackman and Oldham, 1975). When job characteristics are not independent of one another they may cause misinterpretation of JDS scores. The validity of some JDS scales remains unestablished (Hackman and Oldham, 1975). Secondly, the JDS is not appropriate for use in diagnosing jobs of single individuals. Five or more individuals who work in the same job are averaged, and the scale reliabilities are only valid for such grouped items. JDS scores for single individuals are not sufficient to substantiate work redesign for individuals (Hackman and Oldham, 1975). It was recommended that JDS should be conducted during working hours in a separate room and requires a job rating form which should be filled out by the supervisors of the participants. A large amount of cooperation is required from participants and management for the successful administration of a JDS.

2.6.1 Distinguishing Features of the Job Characteristics Model

The Job characteristics model designed by Hackman and Oldham is the first model that combines the effects of three classes of variables. All three classes of variables can be directly measured using the job diagnostic survey. This model gives good insight into job redesign by defining a framework, as to what types of changes are most likely to increase work performance and productivity. However, the validity of this model has not yet been tested in a real work redesign program.

The model focuses exclusively on the relationship between individuals and their work. It does not take into consideration the views of the socio-technical theorists, nor does it address the interpersonal, technical, or situational moderators affecting how people react to their work (Hackman and Oldham, 1975). Oldham later found, in another study, that people who work on complex jobs feel greater internal motivation when they are satisfied with on the job relationships than when they are not (Hackman and Oldham, 1975).

2.6.2 Limitations Of The Job Characteristics Model

The first limitation of this model is that it only deals with the issue of individual internal motivation, and does not directly address the dysfunctional aspects of repetitive work (Hackman and Oldham, 1975). Further, the job characteristics model is more suitable to individual work and does not provide guidance for interacting work teams (Hackman and Oldham, 1975). It does not state the relationship between job characteristics on the level of individual jobs and higher levels of the organizational unit or the organization as a whole (Algera, 1990). Finally, the job characteristic model does not differentiate between objective and perceived properties of tasks, and it is not known whether the motivational benefits of enriched work derive primarily from task characteristics (even if those characteristics are not perceived by the performer) or from employees' perceptions of task characteristics (even if those perceptions are influenced by non job factors) (Algera, 1990).

2.6.3 Further Research Done On The Model

It is difficult to identify all the job characteristics that create motivation at work. The Hackman and Oldham model summarizes the earlier theories and attempts to use them in one framework. In their model Hackman and Oldham hypothesized that autonomy is the only dimension that leads to the critical psychological state of experienced responsibility, but this was not clearly signified in the survey. In a subsequent survey Kiggundu proposed that task interdependence is one dimension that is related to a person's experienced responsibility for work outcomes (Kiggundu, 1981). According to Kiggundu, initiated task interdependence is the degree to which work flows from a particular job to one or more other jobs. The performance of a person in a job characterized by high initiated task interdependence directly affects the jobs of others.

Autonomy leads to experienced responsibility for one's own work outcomes, whereas initiated task interdependence lead to experienced responsibility for the work outcomes of others for whom one initiates work (Kiggundu, 1981). That is, autonomy and initiated task interdependence lead to total experienced responsibility. In order to ascertain the validity of the role of the initiated task interdependence, data was collected from 138 head office employees in a large Canadian life insurance company. JDS was used to collect the primary data but modifications were made to collect data on the task interdependent component (Kiggundu, 1983). The empirical results were supportive of the argument that task interdependence is an important aspect of job with significant motivational effects.

A study was done by Lee-Ross on the validity and rationale of the job characteristic model among seasonal hotel workers (Lee-Ross, 1998). The job diagnostic survey was used and data was collected from a 163 seasonal hotel employees in the U.K. The data analyses chosen were similar to those used by Hackman and Oldham. In general the reliability scores were similar to those found in the original research, with some exceptions (Lee-Ross, 1998).

Although there are some advanced alternative theoretical formulations on work redesign, Hackman and Oldham's theoretical framework has not been refuted (Griffin, 1991). In spite of the many shortcomings discussed in the previous section, it still remains popular and stimulates research. This motivates us to use the job characteristic model as a tool to analyze work redesign initiated by an ERP system.

Chapter Three - Research Design and Methodology

3. Research Design

This research is exploratory and its purpose is to try to understand the nature of work redesign initiated by an Enterprise Resource System. The research uses the Hackman and Oldham job characteristics model as a tool to understand the work redesign initiated by an SAP implementation. The data analysis will attempt to answer the two research questions given in section 3.5. This chapter will discuss the research design of this study and outline the methodology used to collect data from ERP users in the government sector.

3.1 Research Area

The research area for this thesis is organizations which have implemented the Enterprise Resource Planning systems in recent years. This research will attempt to establish how ERP systems have redesigned work in these organizations with a special focus on providing information on how jobs have changed as a result of the implementation of the enterprise system.

3.2 Research Objectives

The overriding objective of this research is to develop a clear understanding of how the implementation of an Enterprise Resource System initiates work redesign in organizations and whether such work redesigns provide the organizational participants

with job satisfaction. However, this understanding can be broken down into more specific objectives when analyzed through the job characteristic model as follows:

1. To examine the core job characteristics of the work design created by an Enterprise System implementation. These core job characteristics are: skill variety, task identity, task significance, autonomy and job feedback.
2. To examine whether work redesign initiated by an Enterprise System facilitates the critical psychological states that produce internal motivation in employees and give them satisfaction in their jobs. These critical psychological states are experienced meaningfulness of the work, experienced responsibility for outcomes of the work, and knowledge of the actual results of the work activities.
3. To ascertain whether individual growth needs are accommodated in work redesign created by an ERP implementation.
4. To determine whether jobs are more or less satisfying following an ERP implementation.

3.3 Research Questions

The preceding literature review has provided the basis for this study in seeking to understand whether and how Enterprise Resource Planning Systems initiate work redesign. Thus, this research attempts to answer the following questions:

1. To what extent does enterprise resource planning implementation lead to work redesign?
2. What is the impact of ERP initiated work redesign on employee job satisfaction?

3.4 Methodology

This study uses both qualitative and quantitative methods of data collection. Quantitative methods require the use of standardized measures so that the varying perspectives and experiences of the people can be fit into a limited number of predetermined response categories to which numbers are assigned (Patton, 1990). A major advantage of a quantitative approach is that it allows measuring the reactions of many people to a limited set of questions, thus facilitating comparison and statistical aggregation of data. By contrast, qualitative methods permit the evaluator to study selected issues in depth and detail (Patton, 1990). It typically produces a wealth of detailed information about a much smaller number of people and cases. By using both these methods we were able to collect data for statistical analyses that increased the understanding of the situations studied and were also able to capture people's personal perspectives and experiences on ERP implementation.

3.4.1 Sampling Design

Given the scope of this research, finding a sample where all the ERP users actually do the same job and identify their supervisor to fill out the job rating forms was difficult. Instead, data for this research was collected from ERP users through a questionnaire that

will be discussed in detail in the following sessions. As previously stated, the enterprise systems in the government organizations where this research was conducted is SAP R/3 version. Thus, the sample of this study is SAP users in government departments.

3.4.2 Population Definition

The population for this study consists of employees from the Canadian Federal Government organizations where an SAP has been implemented.

3.4.3 Sampling Frame

The sampling frame for this research is government organizations from the Ottawa – Carleton area who have implemented an SAP system in the past three years. These organizations were contacted and employees from the human resources, logistics and finance departments were asked to volunteer for this research.

3.4.4 Sampling Instruments and Procedures

In order to facilitate qualitative and quantitative data analysis two different types of sampling methods were used in this research. First, five face-to-face interviews were held with managers who were actively involved in the SAP implementation process in their organizations. The interview process was guided by an open-ended questionnaire which had twenty-eight questions (Appendix 1). These questions were on components of the job characteristics model, the ERP system and questions on the demographic details of the interview participant. Two other questions were on the organizational change process that had been taking place in these organizations since the introduction of the

enterprise system. Apart from these twenty-eight questions, during the interview managers were asked to describe the whole SAP implementation process which took place in their organization. These descriptions provided us with valuable information to understand the effects of the SAP implementation experience. The interviews were recorded with the permission of the respondent and later transcribed.

Secondly, another questionnaire (Appendix 2) containing twenty-eight questions was distributed to SAP users from the human resources, logistics and finance departments of federal organizations. The respondents were given a full description of the purpose and nature of the research and participated voluntarily. Of the twenty-eight questions seventeen were on the components of the job characteristics model (nine were on job dimensions, four on psychological states, three on personal and work outcomes and one on the growth need strength of the individual). The questionnaire also had four questions on the ERP system and five questions on the demographic details of the respondent. The questionnaire used five point Likert scales to collect responses. A Likert scale is a widely accepted technique to indicate the amount of agreement or disagreement with a variety of statements about some attitude, person or object (Davis and Cosenza, 1993). In Likert scaling the strength of a person's preference about all the psychological objects replaces the direction and intensity of the specific objects that a respondent has judged (Dunn-Rankin, 1983). In this scaling, objects are chosen and unit values are assigned to each ordered category.

The questionnaire also had two open ended questions. The first question was to understand other organizational changes (e.g. organizational restructuring, a change in organizational policies, mergers, downsizing), which have take place during the SAP implementation. The second open question asked the respondents about other significant influences (e.g. change in work supervisor, a change in work location, personal issues) on the work environment of the respondent. The respondents had to choose between a “yes” and a “no” answer. When the answer was “yes”, they had to briefly comment on the type and extent of the changes. By asking these two questions we were able to get some insight into the change process that had taken place in these organizations when the process system was introduced. We were able to distinguish the change initiated by the process system from the changes brought by other organizational factors.

3.4.5 Measurement of Variables

Questions which probe the component of the job characteristics, questions about the ERP system and the demographic questions were defined as variables to facilitate data analysis. The questions and their assigned variables are given in the following pages.

Job characteristics and Other Components	Variables	Questionnaire
Psychological States Experienced Meaningfulness	Meaning Exmean	8. Meaningfulness in a job is something that counts in one's own system of values. A sense of accomplishment at work. Given this, to what extent do you agree or disagree with the following statement? I desire meaningfulness in my job. 9. To what extent do you experience the above mentioned "meaningfulness" in your work?
Experienced Responsibility	Responsou	12. Do you feel responsible for the outcomes of your work?
Knowledge of results	Knowwork	13. To what extent do you agree or disagree with the following statement. I know the actual results of my work activities.
Outcome Variables Internal motivation	Jobmotiv	17. After the implementation of the ERP system how is your motivation towards your job?
General satisfaction	Gensatis	18. If a good friend of yours told you (He/She) was interested in working in a job like yours, what would you tell your friend?
Growth Need	Growthne	15. To what extent do you agree or disagree with the following statement: I have a high desire for growth advancement within my organization.
Enhanced Career	Careerpa	14. Does your organization provide you opportunities to enhance your career, that is, is there a clear career path that you can achieve with good work performance?
Liking towards the job	Likejob	16. Since the implementation of the Enterprise Resource System do you like your job more than before?
Opinion about the ERP System	Erpop	20. What is your opinion on the impact of this work redesign on the performance of the employee?

Other Variables	Variables	Questions
Amount of Interaction with the ERP System	Interact	21. How much of your time do you interact with the ERP system for your daily work routine?
Work Experience	Yexper	22. How long have you been working in this organization?
Age	Age	23. Your age group is?
Gender	Gender	24. What is your gender?
Area of Work	Areaw	25. Indicate the area that you work
Job category	Category	26. Which job category best describes your job?

The two open-ended questions on organizational changes in the federal organizations at the time of the SAP implementation were not assigned values. The answers to these open questions were tabulated and analyzed.

3.5 Data Collection

All eighteen government organizations, where SAP implementation took place were contacted. Some organizations, which were in the initial stages of the implementation declined to participate in the research. They felt that the study is premature for their departments. Over a period of three months more than one hundred questionnaires were sent to the organizations through emails and by personal delivery. Forty-seven SAP users from nine government organizations responded to the survey. Five project managers from two federal departments participated in the interviews.

3.6 Pretest

A pre-test was conducted at a prominent government organization in Ottawa, which implemented the ERP system in 1998. A set of questionnaires was given and feedback was obtained. Except for one respondent, those who volunteered to respond to the survey instrument answered all questions. After reviewing the feedback two issues became apparent. Firstly, the respondents should be asked how much they interact with the ERP system in their daily work routine. The respondent should have to choose the percentage of interaction with the ERP system from 0% to 100%. Answers to this question would allow for a deeper analysis of the strength of the other responses. Secondly, it is important to include questions that give some insight into the other organizational changes (e.g. organizational restructuring, a change in organizational policies, mergers or downsizing) that have taken place in the organization as a whole, and significant influences on the work environment of an individual employee (e.g. change in work supervisor, a change in work location or personal issues).

3.7 Data Analysis

Firstly, a qualitative analysis was done on the interview responses. Qualitative analysis is a source of well-grounded, rich descriptions and explanations of processes occurring in local contexts (Miles and Huberman, 1994). Counting, noting patterns, themes, seeing plausibility, clustering, making metaphors, splitting variables, subsuming particulars into the general, factoring, noting relations between variables, finding intervening variables building a logical chain of evidence and making conceptual theoretical coherence are the twelve tactics for generating valuable conclusions in a qualitative analysis (Miles and

Huberman, 1994). Out of these techniques, counting, noting patterns, making metaphors, subsuming particulars into the general, building a logical chain of evidence were used to analyze the interview responses were. The qualitative analysis allowed us to explore the issues of this research further and gain an in-depth understanding of the characteristics of the data that we have collected through the questionnaire.

Secondly, the responses from the questionnaire were coded into an SPSS file to facilitate statistical analysis. The questions were assigned appropriate variables and were defined with value labels. For example, “strongly agree” was given a rating of five, “strongly disagree” a rating of one, with the other options falling in between. Scores were reversed where necessary to have all scales in the same direction. Responses for the two open-ended questions were analyzed to find the most common features.

Hackman and Oldham collected data for their study through the job diagnostic survey using a sample of 654 participants. Their data analysis illustrates inter-item correlations and multiple regressions to prove the assumptions and the validity of the model. Since this research did not use the job diagnostic survey the data analysis is different and cannot be compared. However some of the same statistical analyses as the original study were done. For example, we were able to calculate the correlation between the job dimensions and the psychological states. Multiple regressions were done with each of the three outcome measures, namely internal motivation, general satisfaction and growth satisfaction where the three critical psychological states were the predictors. The following chapter elaborates the findings of our research.

Chapter four - Results

4. Results

The following section will examine the findings of the research. The results are presented in three major parts. The first part describes the distribution of the variables and their relationships to the demographic variables. The second part presents an analysis of the data through correlations and multiple regressions. These statistical tests will allow us to examine how the findings of this research relate to the findings of the well-established job characteristic model. The chapter concludes by analyzing the qualitative data collected through interviews.

4.1 Findings from data collected through questionnaires

4.1.1 General description of the data

In order to clearly understand the respondent's views on job characteristics, questions on autonomy, task identity, and skill variety were asked in two different ways. Simple correlations were done to see how these variables correlate with one another.

Table 1 : Correlations Between Two Similar Variables

	Autonomy Two	Skill Variety Two	Task Identity Two
Autonomy One	.466**		
Skill Variety One		.325*	
Task Identity One			.338*

Valid Cases = 47

According to the above correlation table, the correlation between skill variety one and two is .325. The correlation between task identity one and two was .338. Both correlations were significant at the .05 levels. Autonomy one and two correlated at .466 which was significant at the .01 level. When there are moderate to high intercorrelations among the predictors, as is the case when several cognitive measures are used as predictors, the problem is referred to as *multicollinearity* (Stevens, 1996). Since the intercorrelations between these variables are significant, to avoid multicollinearity, only one of each variable was chosen to be included in the data analysis.

First, descriptive statistics such as frequencies, percentages, means and standard deviations were calculated for all variables. This analysis allowed us to understand the nature of the data. The tables below indicate the results.

Table 1.1 Variable : Autonomy

Does your job permit you to decide on your own how to go about doing the work? That is, give you autonomy in your work

Responses	Frequency	Percentage	Cumulative Percent
Strongly Disagree	1	2.1	2.1
Disagree	2	4.3	6.4
Neither agree Nor disagree	4	8.5	14.9
Agree	32	68.1	83.0
Strongly Agree	8	17.0	100
Sample Mean = 3.94		Standard Deviation = .79	

Valid cases = 47

Seventeen percent of the sample strongly agreed that the SAP system provides the users with autonomy while 68.1 percent of the sample agreed. However, 4.3 percent of the sample disagreed. About 8 percent of the sample was undecided as to whether the system provides the user with autonomy. One person, representing 2.1 percent of the sample, strongly disagreed. These findings indicate that, overall, more than 80 percent of the sample agreed that work with SAP provided them with autonomy. The correlation between autonomy and work experience was .296 which was significant at the .05 level. The correlation between autonomy and age was .501 and was significant at the .01 level. These significant correlations indicate that the amount of independence the SAP users experienced was also influenced by their work experience and age.

Table 1.2 Variable : Skill Variety

Does the job require you to do many different things at work, using a variety of your skills and talents which you have acquired through your education and work experience?

Responses	Frequency	Percentage	Cumulative Percent
Much too little	-		
Few	3	6.4	6.4
About the same	7	14.9	21.3
Many	33	70.2	91.5
Much too Much	4	8.5	100
Sample Mean = 3.81		Standard Deviation = .68	

Valid cases = 47

More than 70 percent of the sample indicated that with an SAP system used many of their skills and talents while 8.5 percent of the sample indicated that they use their skills and talents to a greater extent with a SAP system. However, 14.9 percent of the sample

showed no change in the use of their skills and talents and 6.4 percent report that they use few of their skills when working with an SAP system. Therefore, we conclude that 75 percent of the sample agreed that SAP allows them to use more skills and talents. Skill variety did not correlate significantly with any of the demographic variables.

Table 1.3 Variable : Task Identity

When a product or service is produced in your organization, to what extent can you distinguish the work you have done from the work done by other people?

Responses	Frequency	Percentage	Cumulative Percent
Not at all	2	4.3	4.3
Seldom	4	8.5	12.8
Sometimes	15	31.9	44.7
Often	14	29.8	74.5
Very often	12	25.5	100
Sample Mean = 3.64		Standard Deviation = 1.09	

Valid cases = 47

More than 25 percent of the sample agreed that the SAP system very often provided them with task identity. This was supported by 29.8 percent of the sample who felt that the SAP system often provided an individual with task identity. However, 31.9 percent of the sample felt that they could only occasionally distinguish the work done by them with an SAP system, and 8.7 percent of the sample indicated that task identity was seldom experienced. Further, 4.3 percent of the sample pointed out that the SAP system did not provide any task identity at all. Overall, 60 percent of our sample agreed that they often know their work in the process system. Task Identity did not correlate significantly with any of the demographic variables.

Table 1.4 Variable : Task Significance*How significant is your work for the entire organization?*

Responses	Frequency	Percentage	Cumulative Percent
Not at all Significant	1	2.1	2.1
Not significant	2	4.3	6.4
About right	17	36.2	42.6
Fairly Significant	14	29.8	72.3
Very Significant	13	27.7	100
Sample Mean = 3.77		Standard Deviation = .98	

Valid cases = 47

More than 27 percent of the sample felt that the work they did with the SAP system was very significant to the organization. This was supported by 29.8 percent of the sample who stated that their job was fairly significant. However, 36.2 percent of the sample indicated that job significance with the SAP system was about right and 4.3 percent of the sample indicated that the work they did with the SAP system was not significant to the organization. This means that over 55 percent of our participants felt that their work with the SAP was significant to their organizations. There was no significant correlation between task identity and the demographic variables. However, correlations between task significance and system interaction was strong. The correlation was .373 and was significant at the .05 level. This indicates that task significance was influenced by the amount of interaction the SAP users had with the system.

Table 1.5 Variable : Meaningfulness

Meaningfulness in a job is something that counts in one's own system of values. It is a sense of accomplishment at work. Given this, to what extent do you agree or disagree with the following statement: "I desire meaningfulness in my job?"

Responses	Frequency	Percentage	Cumulative Percent
Strongly Disagree	-		
Disagree	2	4.3	4.3
Neither agree Nor disagree	3	6.4	10.6
Agree	18	38.3	48.9
Strongly Agree	24	51.1	100
Sample Mean = 4.36		Standard Deviation = .79	

Valid cases = 47

More than 50 percent of the sample strongly agreed and 38.3 percent of the sample agreed that they desire their work to be meaningful; that it should provide them with a sense of accomplishment. However, 6.4 percent of the sample remained undecided and 4.3 percent of the sample disagreed with the view that they desire meaningfulness from their work. These results suggest that 89 percent of our participants wanted their jobs to be meaningful. There was no significant correlation between meaningfulness and the demographic variables.

Table 1.6 Variable : Experience Meaningfulness

To what extent do you experience "meaningfulness" in your work?

Responses	Frequency	Percentage	Cumulative Percent
Not at all	--		
Not very much	3	6.4	6.8
Slightly	4	8.5	15.6

Responses	Frequency	Percentage	Cumulative Percent
Moderately	29	61.7	80.0
Very Much	9	19.1	100
Missing Data	2	4.3	
Sample Mean = 3.98		Standard Deviation = .75	

Valid cases = 45

More than 19 percent of the sample felt that they very much experienced meaningfulness working with the SAP system and 61.7 percent of the sample indicated that they moderately experienced meaningfulness at work. However, this was contradicted by 6.4 percent of the sample who did not experience meaningfulness in their work. Two SAP users did not answer the question which amounted to a 4.3 percent of missing data. These findings indicate that, overall, 80 percent of the participants experienced meaningfulness at work. This variable did not indicate significant correlation with any of the demographic variables.

Table 1.7 Variable : Feed back from supervisor

To what extent does your supervisor or team leader provide you with information about your work performance?

Responses	Frequency	Percentage	Cumulative Percent
Never	3	6.4	6.5
Seldom	6	12.8	19.6
Not very often	18	38.3	58.7
Often	14	29.8	89.1
Very Often	5	10.6	100
Missing Data	1	2.1	
Sample Mean = 3.26		Standard Deviation = 1 .04	

Valid cases = 46

About 29.8 percent of the sample stated that they often received feedback from supervisors when working with the SAP system and 10.6 percent indicated that they very often received feedback from supervisors. However, this is sharply contradicted by 38.3 percent of the sample who felt that they didn't very often get feedback from supervisors when working with the SAP system. More than 12 percent of the sample indicated that they seldom received feedback from supervisors when working with the SAP system and 6.4 percent of the sample indicated that they never received feedback. Thus, the number of participants who said they received feedback from supervisors is less than 50 percent. The correlation between this variable and opinion on ERP systems was .335 which is significant at the .05 level. This finding suggests that feedback from the supervisor influenced the SAP users opinion about the system.

Table 1.8 Variable : Feedback from the job

Does the job itself provide you with information about your work performance?

Responses	Frequency	Percentage	Cumulative Percent
Never	2	4.3	4.3
Seldom	4	8.5	12.8
Not very often	10	21.3	34.0
Often	25	53.2	87.2
Very Often	6	12.8	100
Sample Mean = 3.62		Standard Deviation = .97	

Valid cases = 47

About 12.8 percent of the sample indicated that they very often received feedback from the job itself when working with the system, and 53.2 percent of the sample stated that they often received feedback from the SAP system. More than 8 percent of the sample

indicated that they seldom received feedback from the job while 4.3 percent of the sample said that they never received any feedback from the work they performed with SAP. The overall results indicated that 60 percent of the participants felt that they often received feedback from their jobs. Out of the demographic variables, area of work and opinion on ERP systems had strong correlations with this variable. The correlation with area of work was .327, which is significant at the .05 level. The correlation with opinion was .305 and was significant at the .05 level. These findings suggest, that the departments where the SAP users worked influenced the amount of feedback they received from their jobs. Furthermore, the amount of feedback from the job influenced the SAP users' opinions about the system.

Table 1.9 Variable : Responsibility for outcome

Do you feel responsible for the outcomes of your work?

Responses	Frequency	Percentage	Cumulative Percent
Never	-		
Occasionally	-		
About half of the time	2	4.3	4.3
A good deal of the time	16	34.0	38.3
Most of the time	29	61.7	100
Sample Mean = 4.57		Standard Deviation = .58	

Valid cases = 47

About 60 percent of the sample felt responsible most of the time for the outcome of their work with the SAP system. This view was also supported by 34 percent of the sample

who indicated that a good deal of the time they felt responsible for their work with the SAP system. Exactly 4.3 percent of the sample indicated that they felt responsible for their work half of the time. This variable did not indicate significant correlation with any of the demographic variables.

Table 1.10 Variable : Knowledge of results

To what extent do you agree or disagree with the following statement: "I know the actual results of my work activities?"

Responses	Frequency	Percentage	Cumulative Percent
Strongly Disagree	-		
Disagree	2	4.3	4.3
Neither agree Nor disagree	4	8.5	12.8
Agree	29	61.7	74.5
Strongly Agree	12	25.5	100
Sample Mean = 4.09		Standard Deviation = .72	

Valid cases = 47

More than 25 percent of the sample strongly agreed and 61.7 percent of the sample agreed that they knew the actual results of their work activities with SAP. However, 4.3 percent of sample disagreed with this view. The sample had 8.5 percent of undecided participants. This variable did not indicate significant correlation with any of the demographic variables.

Table 1.11 Variable : Enhanced career

Does your organization provide you opportunities to enhance your career, that is, is there a clear career path that you can achieve with good work performance?

Responses	Frequency	Percentage	Cumulative Percent
Does not provide at all	2	4.3	4.3
Provides little opportunities	13	27.7	31.9
Fair amount of opportunities	13	27.7	59.6
Good opportunities	16	34.0	93.6
Excellent Opportunities	3	6.4	100
Sample Mean = 3.11		Standard Deviation = 1.03	

Valid cases = 47

About 6.4 percent of the sample pointed out that excellent career opportunities were provided by the organizations with the SAP system. This was further supported by 34 percent of the sample who indicated that there were good career advancement opportunities with the SAP system. However, 27.7 percent of the sample felt that the organizations provided employees with little or only a fair amount of career advancement opportunities. Two participants representing 4.3 percent of the sample felt that the system did not provide any career advancement at all. This variable did not indicate significant correlation with any of the demographic variables.

Table 1.12 Variable : Growth need

I have a high desire for growth advancement within my organization

Responses	Frequency	Percentage	Cumulative Percent
Strongly Disagree	-		
Disagree	5	10.6	10.6

Responses	Frequency	Percentage	Cumulative Percent
Neither agree Nor disagree	8	17.0	27.7
Agree	22	46.8	74.5
Strongly Agree	12	25.5	100
Sample Mean = 3.87		Standard Deviation = .92	

Valid cases = 47

About 25.5 percent of the sample strongly agreed that they had high desire for growth advancement and 46.8 percent of the sample agreed that they had high growth need. However, 17 percent of the sample were not able to decide whether they had high desire to advance within the organization. Five participants, representing 10.6 percent of the sample disagreed on the view that they had a high desire for growth advancement. Growth need strength had strong negative correlations with participant's age and work experience. The majority of our participants were between the ages of 30 to 40, and most of them had 2-4 years of work experience in their current job. In ordinary circumstances, individuals in these categories will correlate positively with growth need strength. Nevertheless, in this sample these two variables have negative influences with growth need strength. This is further discussed in 5.2.10.

Table 1.13 Variable :Liking towards the job

Since the implementation of the Enterprise Resource System, do you like your job more than before

Responses	Frequency	Percentage	Cumulative Percent
Strongly Disagree	-		
Disagree	3	6.4	6.4
Neither agree Nor disagree	23	48.9	55.3

Responses	Frequency	Percentage	Cumulative Percent
Agree	14	29.8	85.1
Strongly Agree	7	14.9	100
Sample Mean = 3.53		Standard Deviation = .83	

Valid cases = 47

More than 14.9 percent of the sample strongly agreed and 29.8 percent of sample agreed that they liked their job better with the SAP system than they did before its implementation. This was contradicted by 6.4 percent of the sample who disagreed on the view that they like their job better after the SAP implementation. There were twenty-three SAP users representing 48.9 percent of the sample who were undecided. They were unable to distinguish whether working with the process system influenced their job liking. Strong correlations were found between this variable and opinion about ERP systems. This was also found with job category. The correlation was .318 with opinion about ERP systems. This was significant at the .05 level. The correlation between job category was .314 and was significant at the .05 level. These findings suggest that opinion about the ERP system and the job categories had positively influenced the jobholders' liking towards their jobs with the SAP system.

Table 1.14 Variable : Job Motivation

After the implementation of the ERP system how is your motivation towards your job?

Responses	Frequency	Percentage	Cumulative Percent
Much worse	-		
Worse	2	4.3	4.3
About the same	23	48.9	53.2

Responses	Frequency	Percentage	Cumulative Percent
Higher	18	38.3	91.5
Much higher	4	8.5	100
Sample Mean = 3.51		Standard Deviation = .72	

Valid cases = 47

About 8.5 percent indicated that their motivation at work was very high and 38.3 percent say that their motivation towards their job was high with the SAP system. A full 48.9 percent of the sample indicated that their the motivation level remained the same even after the SAP implementation. In contrast, 4.3 percent of the sample felt that motivation towards the job had become worse after SAP implementation. The correlation between job motivation and ERP opinion was .314 and is significant at the .05 level. This finding suggests that the jobholders' opinion about the system had influenced their job motivation.

Table 1.15 Variable : General satisfaction

If a good friend of yours told you (he/she) was interested in working in a job like yours, what would you tell your friend?

Responses	Frequency	Percentage	Cumulative Percent
Will not recommend at all	--		
Will not recommend	3	6.4	6.7
Would have doubts	4	8.5	15.6
Moderately recommend	25	53.2	71.1
Highly recommend	14	29.8	100
Missing Data	1	2.1	
Sample Mean = 4.09		Standard Deviation = .81	

Valid cases = 46

High recommendations for their current jobs with the SAP system came from 29.8 percent of the sample. A moderate level of recommendation came from 53.2 percent of the sample. Some participants had doubts about recommending a job which included SAP and this represented 8.5 percent of the sample. These views were contradicted by 6.4 percent of the sample who felt that they would not recommend their current job with the SAP system. This variable had strong correlations between ERP opinion and area of work. The correlations with ERP opinion was .462 and with area of work it was .408. Both were significant at the .01 level. This indicates that, for this particular sample, opinion about the system and the area of work had a positive influence on overall job satisfaction.

Table 1.16 Variable :Growth satisfaction

In general, how well would you say that your current work measures up to the kind of job that would bring the best out of you at work?

Responses	Frequency	Percentage	Cumulative Percent
Not very much the job	1	2.1	2.1
Have doubts	3	6.4	8.5
Fairly alright	18	38.3	46.8
Good amount	21	44.7	91.5
Very much the job	4	8.5	100
Sample Mean = 3.51		Standard Deviation = .83	

Valid cases = 47

About 44.7 percent of the sample felt that their current job was very much the job that would bring out the best in them. More than 38 percent of the sample indicated that, in

general, their current job was fairly all right and 6.5 percent of the sample indicated that they have doubts whether their current job measures up to the kind of job that would bring out the best in them. One person, representing 2.1 percent of the sample felt that the job they now hold is not the job they would like the most. Growth satisfaction had a strong correlation with opinion about ERP system. The correlation between these two variables was .407 and was significant at the .01 level. This indicated that opinion about ERP had a strong influence over the jobholder's growth satisfaction.

Table 1.17 Variable: Opinion about the ERP System

You have experienced work redesign by the implementation of an Enterprise System. What is your opinion of the impact of this work redesign on employee performance?

Responses	Frequency	Percentage	Cumulative Percent
Very Poor	1	2.1	2.4
Poor	8	17.0	21.4
Fair	15	31.9	54.8
Good	15	31.9	90.5
Excellent	4	8.5	100
Missing Data	4	8.5	
Sample Mean = 3.30		Standard Deviation = .96	

Valid cases = 43

About 85 percent of the sample indicated that work redesign initiated by the SAP implementation was excellent, while 31.9 percent of the sample indicated that the work redesign was either good or fair. This view was contradicted by 17 percent of the sample that indicated that work redesign initiated by SAP was poor and 2.1 percent who said that it was very poor. Four SAP users who participated in this study did not answer this

question. This amounted to a 4.8 percent of missing system. There was no significant correlation between this variable and the demographic variables.

Table 1.18 Variable : Amount of interaction with the ERP System

How much of your time do you interact with the ERP system in your daily work routine?

Responses	Frequency	Percentage	Cumulative Percent
0 - 20%	14	29.8	31.1
21% - 40%	3	6.4	37.8
41% - 60%	8	17.0	55.6
61% - 80%	10	21.3	77.8
81% - 100%	10	21.3	100
Missing Data	2	4.3	
Sample Mean = 2.98		Standard Deviation = 1.57	

Valid cases = 45

About 29 percent of the sample interacted with the SAP system between 0 to 20 of their daily work routine. A full 21.3 percent of the sample worked with the SAP system between 61 to 80 percent or 81 to 100 percent of the time, and 17 percent of the sample interacted with the SAP system between 41 to 60 percent of the time. This variable had a strong negative correlation with the participants' age. The correlation was $-.376$. This indicated that, in this group of SAP users, as the participant's age increases, their level of interaction with the system significantly decreases.

Table 1.19 Variable : Work Experience*How long have you been working in this organization?*

Responses	Frequency	Percentage	Cumulative Percent
2- 4 years	21	44.7	45.7
5 – 7 years	8	17.0	63.0
8 – 10 years	2	4.3	67.4
10 years and more	15	31.9	100
Missing Data	1	2.1	
Sample Mean = 2.24		Standard Deviation = 1.34	

Valid cases = 46

SAP users who had worked between 2 to 4 years in their organizations represented 44.7 percent of the sample, 17 percent of the sample had worked for 5 to 7 years and 4.3 percent of the sample had between 5 and 7 years of work experience. Individuals who had 10 years or more work experience represented 31.9 percent of the sample. One SAP user did not fill in the question on work experience which amounted to 2.1 percent of missing data.

Table 1.20 Variable : Age*Your age group is?*

Responses	Frequency	Percentage	Cumulative Percent
20 – 30 years	11	23.4	23.4
31 – 40 years	14	29.8	53.2
41 – 50 years	13	27.7	80.9
51 –60 years	9	19.1	100

Valid cases = 46

About 29.8 percent of the sample were between 31 and 40 years of age, 27.7 percent were between 41 and 50 years of age, 23.4 percent were between 20 and 30 years of age and 19.1 percent were between 51 and 60 years of age. There was a strong correlation between participants' age and work experience.

Table 1.21 Variable : Gender

What is your gender?

Responses	Frequency	Percentage	Cumulative Percent
Male	24	51.1	51.1
Female	23	48.9	100

Valid cases = 47

About 51.1 percent of the sample were male and 48.9 percent of sample were female. There was no significant correlation between this variable and any of the other demographic variables.

Table 1.22 Variable : Area of work

What is your area of work?

Responses	Frequency	Percentage	Cumulative Percent
Computer System Support	2	4.3	4.3
Human Resource Management	1	2.1	6.4
Administration	3	6.4	12.8
Finance	22	46.8	59.6
Marketing	-		
Production and Operations	4	8.5	68.1
Research and Development	-		

Responses	Frequency	Percentage	Cumulative Percent
Management Information System	2	4.3	72.3
Others	13	27.7	100

Valid cases = 47

Initially, this research was planned to be carried out in only three functional areas with in finance, human resources and logistics departments of the Canadian federal organizations. However, it was difficult to find such a sample, thus, it was administrated to SAP users in all departments. In this sample, 46.8 percent of the respondents were from the finance department, 8.5 percent from production and operations, 6.5 percent from Administration, 4.3 percent from Computer system support and 27.7 percent from other departments such as purchasing and management consulting.

Table 1.23 Variable : Job category

Which job category best describes your job?

Responses	Frequency	Percentage	Cumulative Percent
Senior Management	-		
Middle Management	11	23.4	23.9
First Level Position	15	31.9	56.5
Entry level Position	4	8.5	65.2
Owner	-		
Professional	10	21.3	87.0
Others	6	12.8	100
Missing Data	1	2.1	

Valid cases = 46

A full 31.9 percent of the sample were SAP users occupying first level positions, 23.4 percent were from middle management positions, 23.4 percent worked in middle management, 21.3 percent were professional and 12.8 percent were from other positions. A participant did not answer this question which amounted to a 2.1 percent of missing system.

4.1.2 Analysis by correlation

Three sets of simple correlations were done to analyze the relationships between different variables. First, correlations between critical psychological states and the affective outcomes were calculated. According to the job characteristics theory, when a job is enriched with certain job dimensions it will lead to psychological states that in turn result in certain affective outcomes. The correlations between the job dimensions, psychological states and the affective outcomes will allow us to analyze whether it is the same with the SAP users. The results of these correlations are given below.

Table 2: Correlations For Core Job Dimensions And Critical Psychological State With The Affective Outcomes

	Internal Work Motivation	General Satisfaction	Growth Satisfaction
Critical Psychological States			
Experienced Meaningfulness	.271	.564**	.449**
Experienced Responsibility	.115	.316*	.280
Knowledge of Results	.294*	.478*	.436**

Core Job Dimensions	Internal Work Motivation	General Satisfaction	Growth Satisfaction
Autonomy	.250	.077	.051
Task identity	.268	.285	.160
Skills Variety	.115	.031	.138
Task Significance	.173	.302*	.309*
Feedback - job	.287	.576**	.357*
Feedback- Supervisor	.118	.344*	.350*

** . Correlation is significant at the .01 level (2 tailed).

*.Correlation is significant at the .05 level (2 tailed).

In the job characteristics model, the psychological state of experienced meaningfulness leads to internal motivation. However, in this study there was a strong correlation only between knowledge of results and internal work motivation. This was .294 and is significant at the .05 level. The other psychological states of experienced responsibility and experienced meaningfulness did not have a strong correlation with internal motivation. This result suggests that, for this group of SAP users, the psychological state, knowledge of results produced internal job motivation.

Strong correlations were found between general satisfaction and the three psychological states. The correlation between experienced meaningfulness and general satisfaction was .564 and is significant at the .01 level. Correlations between experienced responsibility, and knowledge of results with general satisfaction were .316 and .478 respectively. These two correlations are significant at the .05 level. The results suggest, that for this

sample of SAP users, general satisfaction was the outcome of all three psychological states.

Two psychological states had strong correlations with growth satisfaction. Correlations between experienced meaningfulness and knowledge of results with growth satisfaction were .449 and .436 respectively. Both were significant at the .01 level. The job characteristic model predicts that experienced responsibility leads to growth satisfaction, but this was not found in this study.

In the correlations between job dimensions and affective outcomes, task significance and general satisfaction correlated at .302. The correlations between task significance and growth satisfaction was .309. Both correlations were significant at the .05 level. These findings indicate, for this sample of SAP users, when a job was enriched with task significance, it led to general and growth satisfaction. The correlation between job feedback and general satisfaction was .576. It was .357 for growth satisfaction. Correlations between feedback from the supervisor and general satisfaction with growth satisfaction were .344 and .350 respectively. These strong correlations indicate that receiving feedback from the job and from the supervisor provided general and growth satisfaction to the SAP users.

There were some job dimensions which did not correlate well with the affective outcomes. Correlations between skill variety and the three outcome variables were poor. Correlations between autonomy and two outcome variables general satisfaction and

growth satisfaction were also poor. These variables did not contribute significantly to the three affective outcomes. These findings suggest that, for this sample of SAP users, knowing the outcome of their job was more motivating than using more skills in their work. Further, having independence as how they work and the ability to use more skills in their work did not influence their job satisfaction. Job satisfaction was significantly influenced by task significance, feedback from the job and feedback from the supervisor.

A second set of simple correlations were calculated between core job dimensions and the critical psychological states. In theory, a job which is enriched with the given job dimensions creates the three critical psychological states. These correlations enabled us to examine whether the job redesign initiated by the SAP system created the given critical psychological states in employees who interacted with the SAP system.

Table 2.1 Correlations Between Job Dimension and Core Psychological State

	Experienced Meaningfulness	Experienced Responsibility	Knowledge of Results
Autonomy	.263	.176	.201
Task identity	.154	.335*	.512**
Skill Variety	.080	.285	.346*
Task Significance	.451**	.317*	.183
Feedback - job	.510**	.207	.455**
Feedback- Supervisor	.384*	.008	.202

** .Correlation is significant at the .01 level (2 tailed).

*.Correlation is significant at the .05 level (2 tailed).

The correlation between task significance and experienced meaningfulness was .451. This is significant at the .01 level. The correlation between job feedback and experienced meaningfulness was .510 and is also significant at the .01 level. The correlation between supervisor feedback and experienced meaningfulness is .384, which is significant at .05 the level. According to the job characteristics model, employees experienced meaningfulness at work when the job was enriched with task identity, skill variety and task significance. In this study, only task significance correlated strongly with experienced meaningfulness. Task identity and skill variety did not indicate significant correlation. However, although not predicted by the model, feedback from job and supervisor correlated strongly with experienced meaningfulness. These strong correlations indicated that for this sample of SAP users, experienced meaningfulness came not only because of task significance but also from receiving feedback from both the job and from the supervisor.

According to the job characteristics model, when a job has autonomy, employees feel responsible for their work outcomes. It is interesting to note that in this study, autonomy did not have a strong correlation with experienced responsibility. Furthermore, it did not correlate with the other psychological states either. The correlations between this variable and the psychological states were very poor. The descriptive statistics for the variable autonomy indicated that more than 80 percent of the sample said that they enjoyed autonomy in their job with the enterprise system. This leads us to conclude that, for this group of participants, although the employees enjoyed autonomy it did not have any impact on their psychological state. However, task identity, and task significance

correlated strongly with experienced responsibility. Task identity and skill variety correlated at .335 with experienced responsibility and task significance correlated at .317. Both were significant at the .05 level. These findings indicated that for this particular sample of SAP users, experience of responsibility was provided by task identity and task significance.

In the job characteristic model, feedback from the job and from the supervisor leads to the psychological state of knowledge of results. The correlations between job feedback and knowledge of results were .455 and were significant at the .01 level. However, feedback from supervisor did not correlate significantly with knowledge of results. Although not predicted by the model, task identity and skill variety correlated strongly with knowledge of results. Correlations between task identity and knowledge of results were .512. This was significant at the .01 level. The correlation between skill variety and knowledge of results was .346 and was significant at the .05 level. These results indicated that SAP users were able to find out the results of their work not only from the job itself but also being able to identify their task and to use more skills at work.

Table 2.2 Correlations Between Other Variables And The Three Affective Outcome Variables

	Internal motivation	General satisfaction	Growth satisfaction
Enhanced Career	.337*	.310*	.317*
Growth Need Strength	.133	.426**	.143
Opinion on ERP system	.314*	.462**	.407**
Liking towards the job	.701**	.289	.449**

	Internal motivation	General satisfaction	Growth satisfaction
Interaction with The system	.289	.079	.181
Area of work	.243	.408**	.148

** .Correlation is significant at the .01 level (2 tailed).

*.Correlation is significant at the .05 level (2 tailed).

Correlations between career path and the three outcome variables were significant at the .05 level. They were .337 for job motivation, .310 for general satisfaction and .317 for growth satisfaction. This was a significant finding because it indicated that when SAP users found career advancement within their organization it produced positive outcomes. Growth need strength was strongly correlated with general satisfaction. It was .426 and was significant at the .01 level. It was not significantly correlated with the other outcome variables.

The correlation between the variable opinion about the ERP system and the three outcomes was strong. The correlation between this variable and job motivation was .314. This was significant at the .05 level. The correlation with general satisfaction was .462 and growth satisfaction was .407, both of which were significant at the .01 level. These results indicate that when employees had positive views about the enterprise system they had positive outcomes at work.

The correlation between the variable liking towards the job and motivation was .701. The same variable correlated at .499 with growth satisfaction. Both of these correlations were significant at the .01 level. This variable did not correlate well with general

satisfaction. These results indicated that, for these group of SAP users, their liking for the ERP system had an impact on internal motivation and growth satisfaction.

Correlations between the variable that measures employee interaction with SAP and the outcome variables did not produce strong results. The only variable that had better correlation with this variable was internal motivation. These results pointed out that, for this group of SAP users. The amount of interaction did not have any impact on work outcome.

The correlation between area of work and general satisfaction was .408, this was significant at the .01 level. This result indicated that the work domain and the different SAP system models could have had an impact on job satisfaction. These findings also indicated that managers should understand that the experience of one department regarding job satisfaction and ERP implementation might not be the same in other departments. Work experience, age and gender did not have strong correlations with the outcome variables.

A set of correlations were done to understand the relationships between the different areas of work and the components of job characteristics model. Responses from the functional units were divided into three groups. Computer system, human resources and administration were grouped together. Since majority of the responses were from the finance section they were put in the second group. Responses from production and

operations, management information system and others formed the third group. The following tables illustrate the correlations and the findings.

Table 2.3 : Correlations Between The Job Characteristics And Psychological States For Group One, Group Two And Group Three

Job Characteristics	Psychological states	Group one n = 6 (Computer system, Human resources & Administration)	Group Two n = 22 (Finance)	Group Three n = 19 (Production and operations, management information system and others)
Task Significance	Experienced Meaningfulness	-.134	.205	.765*
Job Feed Back	Experienced Meaningfulness	-.086	.604*	.491*
Supervisor Feedback	Experienced Meaningfulness	-.294	.380	.517*
Task Significance	Responsibility of outcome	.500	.470*	.077
Task Identity	Responsibility of outcome	-.250	.452*	.504*
Supervisor Feedback	Responsibility of outcome	-.876*	.248	.075
Job Feed Back	Knowledge of work	-.775	.591**	.589**

Production and operations, management information system and other departments produced strong correlations between some job dimensions and the psychological states.

The correlations between task significance, job feedback , supervisor feedback and experienced meaningfulness was .765, .491 and .517 respectively. These correlations were significant at the .05 level. Responses from the finance department also indicated strong correlations between job feedback and experienced meaningfulness of work .The correlation was .604 and was significant at the .05 level. Responses from the computer system, human resources and administration showed negative correlations. These results indicate that SAP users from production and operations, management information system

and finance experienced meaningfulness at work more than their other counterparts. Furthermore, for SAP users from computer system, human resources and administration, job dimensions such as task significance, job feedback and supervisor feedback had a negative impact on experienced meaningfulness. The results also lead us to believe that jobs from group two and three were more enriched than group one. This may be due to the fact that each SAP modules is different from one another and users have to interact with them differently. Different functional units were given different amount of trainings as well. These would have influenced the responses. Correlations between task identity, task significance, supervisor feedback and the physiological state - responsibility of outcome also support the above finding. Strong correlations were found between task identity, task significance and responsibility of outcome for the finance department. They were .452 for task identity and .470 for task significance. Strong correlations were also found between task identity and responsibility for outcome for group three. The correlation was .504 and was significant at the .05 level. However, the correlations between these job dimensions and psychological states were mostly negative for group one. These results indicate that work may have been redesigned better for departments from group two and three than for department in group one.

Table 2.4 : Correlations Between Psychological States And The Affective Outcomes For Group One, Group Two And Group Three

Psychological states	Outcomes	Group one n = 6 (Computer system, Human resources & Administration)	Group Two n = 22 (Finance)	Group Three n = 19 (Production and operations, management information system and others)
Experienced Meaningfulness	General Satisfaction	-.408	.499*	.736**

Psychological states	Outcomes	Group one n = 6 (Computer system, Human resources & Administration)	Group Two n = 22 (Finance)	Group Three n = 19 (Production and operations, management information system and others)
Experienced Meaningfulness	Growth Satisfaction	-.375	.258	.764**
Responsibility for outcome	General Satisfaction	-.632	.496*	.074
Knowledge of work	General Satisfaction	-.632	.502*	.408
Knowledge of work	Growth Satisfaction	.400	.297	.611**

Correlations between the psychological states and the affective outcomes were also better for group two and three. Responses from the finance department indicated strong correlations between experienced meaningfulness and general satisfaction. It was .499 and was significant at the .05 level. The correlation between responsibility for outcome and general satisfaction was .496 and was significant at the .05 level. Strong correlations were also found between knowledge of work and general satisfaction, which was .502 and was significant at the .05 levels. Responses from group three had strong correlations between psychological state and the affective outcomes. Correlations between experienced meaningfulness and general satisfaction, experienced meaningfulness and growth satisfaction, knowledge of work and general satisfaction and knowledge of work and growth satisfaction showed strong correlation. All three correlations were significant at the .01 level. Correlation between psychological states and the affective outcomes were not significant for departments from group one. These results also may indicate that SAP users from group two and three had better work redesign and experienced positive psychological states which lead to positive affective outcomes than the respondents from

group one. The level of training these three group received may have played a significant role in influencing the users responses.

Growth need strength is a moderating variable in the job characteristics model.

Individuals from different functional units may react to this moderating variable differently. Correlations were done to understand how individuals from different functional units react to the moderating variable. The results are shown below.

Table 2.5 : Correlations Between Different Variables And The Moderating Variable For Group One, Group Two And Group Three

Variables	Moderating Variable	Group one n = 6 (Computer system, Human resources & Administration)	Group Two n = 22 (Finance)	Group Three n = 19 (Production and operations, management information system and others)
Job Feedback	GNS	.840*	.240	.409
Supervisor Feedback	GNS	.951*	.227	.284
Task Significance	GNS	-.542	.471*	.489*
Responsibility for work outcome	GNS	-.759	.734**	.160
Experienced meaningfulness	GNS	.000	-.213	.486*
General Satisfaction	GNS	.686	.291	.517*

In all three groups some job dimensions and physiological states correlated strongly with growth need strength. However, we do not know how individuals differ within these three groups on growth need strength (whether individuals were high or low in GNS). Consequently, a cross sectional comparison was not possible.

4.1.3 Multiple Regression Analysis of Critical Psychological States

According to the job characteristics model, the three critical psychological states mediate between the core job dimensions and affective outcomes. Hackman and Oldham tested this proposition by asking the following questions:

1. Are the predictions of the affective outcomes for, the critical psychological states maximized when all three critical psychological states are used or are equally strong relationships obtained using the critical psychological states singly or in pairs?
2. Are the relationships between the core job dimensions and the affective outcomes empirically dependent on the critical psychological states, or do the core job dimensions predict the affective outcomes equally well if the critical psychological states are ignored?

A parallel analysis was done for this research. Firstly, a regression analysis was done to find out whether predictions of the outcome measures from the critical psychological states were maximized when all three critical psychological states were used.

Regression analysis was done with one, two and three predictors and R^2 was obtained.

Regressions predicting the outcome measures are shown in table 2.6.

Table 2.6 : Comparison Of Average Variance Controlled In Regression Predicting Outcomes Measures From One, Two, And Three Critical Psychological States

Number of Predictors used	Internal Motivation	General Satisfaction	Growth Satisfaction
One (EM, ER, KR)	.271	.316	.436
Two (EM+ER, EM+KR, ER+KR)	.272	.623	.446
Three (EM+ER+KR)	.332	.625	.516

EM - Experienced Meaningfulness

EX - Experienced Responsibility

KR - Knowledge of Results

R^2 , in a regression analysis, measures the percentage of variance in the dependent variable which is accounted for by the independent variable. A regression analysis was done with internal motivation as the dependent variable and experienced meaningfulness as the independent variable. The R^2 obtained was .271. This indicated that a 27 percent change in the dependent variable (internal motivation) was accounted for by experienced meaningfulness. A second regression was done with the two psychological states – experienced meaningfulness and experienced responsibility as predictors. The R^2 obtained was .272. This was a slight increase from the previous R^2 . When all three psychological states were used as predictors, the R^2 increased to .332. The same analysis was done where general satisfaction was the dependent variable and experienced responsibility as the only predictor. The R^2 obtained was .316. When experienced meaningfulness and knowledge of results were introduced to the regression analysis the R^2 increased to .623. Later, all three psychological states were included in the regression and the R^2 increased to .625. Next, a regression analysis was done with growth satisfaction as the dependent variable. R^2 obtained with knowledge of results as a single predictor was .436. When experienced meaningfulness and experienced responsibility

were added to the multiple regression the R^2 increased to .516. Thus, through this analyses we conclude that when all three psychological states are used as predictors they produce a strong relationship with the psychological states. This indicates that three psychological states have a mediating effect between the job characteristics and the affective outcome.

In order to establish this finding further, another set of regression analyses was done to understand whether the core job dimensions would predict the outcome measures just as well if the critical psychological states were ignored. For each of the outcome measures, three critical psychological states were introduced into a multiple regression equation to serve as primary predictors. Next, the job dimensions were added to the regression to act as secondary predictors. The regression results are given below.

Table 2.7: Multiple Regressions Predicting The Outcomes Measures From All Prior Variable Compared To Predictions From The Psychological States Only

	R^2 For Three Critical Psychological Variables	R^2 For All Nine Variables (job dimensions + critical psychological variables)	Increase In R^2
Internal work Motivation	.332	.525	.193
General Satisfaction	.625	.719	.094
Growth Satisfaction	.516	.568	.052

In the first regression analysis the internal motivation was the dependent variable, and the three psychological states, namely experienced meaningfulness, experienced responsibility and knowledge of results, were the predictors. The R^2 obtained was .332. Then, the six job characteristics were added to the regression as secondary predictors.

The R^2 was .525, an increase of .193. The same analysis was done with the other psychological states where general satisfaction and growth satisfaction were dependent variable. When the six job characteristics were introduced into the regression equation, the R^2 increased by .094 and .052 respectively. If the psychological states do mediate the job dimension - outcome measure relationships as predicted, the introduction of the six job dimensions into the equation (as additional predictors) should not substantially increase the amount of dependent variable variance controlled. In these multiple analysis when the secondary predictors were introduced the R^2 increased but it was not larger than the R^2 obtained when the psychological states variables were used alone. Introducing the core job dimensions did not substantially increase the amount of variance. This indicates that the relationship between the core dimensions and the affective outcomes empirically depend on the critical psychological states.

Through these multiple regression analyses we concluded that the three psychological states of the SAP users had a mediating effect between the job dimensions and work outcomes. When a job was enriched, it predicted the affective outcomes more strongly when the three psychological states were present than when they were not. This finding is similar to the predictions made by Hackman and Oldham.

4.1.4 Moderating effect of growth need strength

Growth need strength is a moderating variable in the job characteristics model. According to Hackman and Oldham, growth need strength can moderate employees' reactions to their work. Individuals with high growth need strength react more positively

to enriched jobs and feel the critical psychological states more than individuals with lower growth need. They are also able to respond more favorably to the critical psychological states, resulting in high affective outcomes. To test the moderating effect of the growth need strength, Hackman and Oldham selected the top and bottom quartiles of their sample and used correlations to identify the relationship between the variables in both groups. Since we did not use the JDS and had a small sample we analyzed the effects of the moderating variable differently.

Based on the responses to the growth need strength variable, the data were classified into two groups. When the value label for growth need strength was equal to three or less those variables were selected to form the lower group. When the value labels for growth need strength were equal to four or more they were grouped into the higher group. Out of the 47 SAP users, 13 respondents were selected to form the lower group and 34 were selected for the higher group.

In order to test whether these two groups react differently to the moderating variable, simple regressions were performed for all possible combinations of the different components of the model. A *t* test is a test to discover whether the group means are equal. Since the regression formulas produced different degrees of freedom the standard *t* test which is used to measure the differences between two means was not used in this study. Instead, we used the *t* test formula given on the following page which tested whether the two regression coefficients were equal in value, that is, it tested whether they were drawn from the same underlying distribution.

$$t = \frac{b_1 - b_2}{S_{b_1 - b_2}}$$

where

$$S^2_{b_1 - b_2} = S^2_E \left(\frac{1}{\sum_{i=1}^{n_1} (X_{1i} - \bar{X}_1)^2} + \frac{1}{\sum_{j=1}^{n_2} (X_{2j} - \bar{X}_2)^2} \right)$$

$$S^2_E = \frac{\sum_{i=1}^{n_1} (Y_{1i} - \hat{Y}_{1i})^2 + \sum_{j=1}^{n_2} (Y_{2j} - \hat{Y}_{2j})^2}{n_1 + n_2 - 4}$$

The degrees of freedom used in this t distribution were $(n_1 + n_2 - 4)$ (Ostle, 1954). The b_1 and b_2 in this formula were substituted with the beta values from the regressions that were done in the higher and lower groups. Sums of squares were substituted the two group residuals. Mean variance of the independent variables from both groups was calculated for each variable using the descriptive statistics subroutine in SPSS. The null hypothesis that we were testing with the t test was:

H_0 = The Pooled b estimates of lower group and the higher group are equal

This means that the two b 's are both drawn from the same underlying β values. If growth need strength plays a moderating effect in how individuals react to an enriched job, then the b estimates of the two groups will not be equal. They will be different for lower groups than in the higher groups, so the null hypothesis stated above will be rejected. The t tests that were done to test this hypothesis are as follows:

Table 3 : *t* Tests For Different Combinations Of Dependent Variables And predictors

Dependent Variable	Predictors	Beta values from the regression equations		<i>t</i> - test results
		High	Low	
Experience Meaningfulness	Skill Variety	.162	-.120	.80
	Task Identity	.244	-.070	1.60
	Task Significance	.409	.231	.82
Internal Motivation	Experienced Meaningfulness	.291	.000	.78
Responsibility of Results	Autonomy	.119	.250	-0.60
General satisfaction	Responsibility of Results	.208	.530	-0.84
Knowledge of Results	Job Feedback	.517	.000	.23
	Supervisor Feedback	.142	.092	.20
Growth Satisfaction	Knowledge of Results	.292	.875	-1.84
Internal Motivation	Skill Variety	.102	.146	-0.12
	Task Identity	.271	.0457	1.19
	Task Significance	.287	-.179	.466
General Satisfaction	Autonomy	.202	-.500	1.88
Growth Satisfaction	Job Feedback	.232	.400	0.56
	Supervisor Feedback	.211	.364	.550

The table value for *t* distribution at $\alpha = .05$ with $(n_1+n_2 -4)$ degrees of freedom is between 2.69 and 2.70. The empirical values of the *t* tests for these two groups fall below the significant value. Thus, we do not reject the null hypothesis. This leads us to conclude that the SAP users who were lower on growth need strength and those who were higher on growth need strength reacted the same way to job dimensions and the

core psychological states. Thus, the growth need strength variable did not play a moderating effect.

4.2 Findings from the interviews

Five interviews were done with managers and team members who were actively involved in SAP implementation in their organizations during the fiscal years 1997 to 1999. Their responses to questions regarding the components of job characteristics and on the ERP system are given below.

Table : 4 Responses of the interview participants.

Questions	Respondent One	Respondent Two	Respondent Three	Respondent Four	Respondent Five
Skills variety	Depends on the skills	Depends on the skills	Yes	Yes	Yes
Task identity	No	Yes	Yes	Yes	Yes
Task significance	No	Yes	Yes	Yes	Yes
Autonomy	No	No	No	Yes	Yes
Job, supervisor Feed back	Often	No	No	No	Yes
Experience Meaningfulness	Moderately	Yes	Yes	Yes	Yes
Experience responsibility	Moderately	Yes	Yes	Yes	Yes
Knowledge of actual outcome	Yes	Yes	Yes	Yes	Yes
Growth Need Strength	Yes	Yes	-	Yes	No
Enhanced Career	Yes	Yes	Yes	No	No

Questions	Respondent One	Respondent Two	Respondent Three	Respondent Four	Respondent Five
Internal motivation	About the same	Yes	Yes	Yes	Medium
General satisfaction	Marginal	Yes	Yes	Yes	Medium
Growth satisfaction	Good amount	Yes	Yes	Yes	No
Liking towards job	About the same	Yes	Yes	Yes	Yes
Opinion about the ERP system	Good	Interesting system	Interesting System	Brought in many difficult changes	Becomes better as time passes
Amount Of interaction with the ERP system	41% – 60%	80%-100	80%-100%	80% -100%	60%-75
Age	31-40 years	41-50 years	41-50 years	51-60 years	51-60 years
Work Experience	1.5 years	-		10years or more	10years or more
Area of work	Finance	Production and Operations	Finance	Computer system support	Finance
Job category	Middle management	Middle Management	Senior management	Senior management	Middle management

The interview participants held, middle and senior management positions in their organizations. Three interviewees were from the finance department and the others were from production, operations and computer system support. On average, the interviewees interacted with the SAP system for 60 percent of their work activities. Two participants had joined their organization during SAP implementation while the others had worked in their organizations before the implementation.

The participants generally felt that the SAP system allowed the employees to use their skills and talents more than they had before, but felt that it depended on what skills and

talents the individual employee possessed. A majority of the interviewees felt that the system provided task identity and task significance to employees while working on the system. However, when it came to whether the SAP system provided independence or autonomy to individuals regarding their work, the response was negative. The participants also felt that the system did not provide users with feedback either from the job itself or from the supervisor. This is different from the results that we found from the data collected from the SAP users. More than 80 percent of the sample felt that they experienced autonomy in their jobs. Although only 40 percent of the sample indicated that they received feedback from their supervisor, 55 percent felt that their jobs gave them feedback.

The majority of the interviewees experienced the three critical psychological states while interacting with the system. Four interviewees had a high level of growth need strength. They felt that there were career advancement opportunities within the organization. Two interviewees had worked in the government sector for a very long time and had reached the highest career positions they could. Working with the system would not provide them with any more advancement. The majority of the interviewees agreed that they felt an increase in internal motivation, general satisfaction and growth satisfaction in their jobs after the implementation of the SAP system.

4.3 Findings on the other changes that have taken place in the federal organizations during the SAP system implementation.

Responses for these two open- ended questions on the change process were very limited. In addition to the five interview respondents, only eight respondents took time to give us detailed answers.

Apart from the activities of the SAP implementation, the other significant changes that took place in the federal organizations we researched can be classified as accounting policy change, downsizing and change in management orientation. These changes were not initiated by the SAP system but existed in these organizations because of other factors.

Question 27

During the SAP implementation were there any other organizational changes taking place at the same time?

Accounting policy change

At the same time as the SAP implementation, all government organizations had to change their accounting practices to an accrual basis. This was one of the major policy changes that took place at that time. Employees working with the financial module of the SAP had to work not only with a new process system, but also had to account for transactions using different methods.

Downsizing

When the SAP system was implemented most of the government organizations had undergone downsizing. From the responses that we received in one organization, a particular department was downsized from a 138 staff members to 85 and in another organization staff was downsized by 20%. After downsizing, work was redistributed among the remaining staff members, who were overworked clearing the extra work load.

A change in the management orientations in organizations

At least three organizations that took part in this research had undergone total change as an organization. For example, one company changed from a federal crown corporation to a commercialized nonprofit organization and another organization was managed by one governing body but separated from that government body just before the SAP implementation. It is apparent that for the employees of these organizations, there had been constant change taking place in their work environments.

As we investigated the other changes in these organizations during SAP implementation it was also important to understand the significant influences on individual employee's work environments. These influences were captured through question 28. The most common findings identified were changes in supervisor and physical relocation

Question 28

Aside from the SAP implementation activities, were there any other significant influences on your work environment?

Change in work supervisor

Most of the respondents to this question had worked with different supervisors. This was the case for two reasons. Either the individual employee had been assigned new duties and responsibilities, or the supervisor has been seconded from one position to another.

Physical relocation

Some of the respondents had been moved from one office location to another. One participant described the new working conditions as poor, crowded and badly ventilated. Although we can identify significant changes in the work environment of an individual employee, it is difficult to establish whether these changes were initiated by the process system implementation or by other organizational factors.

Chapter Five - Discussion and Recommendations

5. Discussion

The purpose of this chapter is to provide an interpretation of the results presented in chapter 4. First, the nature of the change process that took place in the federal organizations is presented. Then the findings of the components of the job characteristic model are discussed. In the conclusion, we will analyze the two research questions. Finally, the limitations of the research will be addressed and possible future research directions will be presented. The recommendations for a better work redesign when implementing an enterprise system are also discussed.

5.1 Discussion on the change process that took place in the federal organization during the SAP implementation

Prior to ERP implementation, federal government organizations had an information system which was mostly built and managed by in-house IT departments. These legacy systems were aging and were not Y2K compliant. When the decision was made to implement the SAP system, there was limited time to prepare the necessary foundations for a successful implementation. Federal organizations had little time to finish implementing the system before April 1, 1999. SAP project teams were formed in every functional unit and a speedy implementation began. These project teams worked along with outside SAP consultants and spent a great deal of time configuring the system to suit the particular needs of the industry. This was done mostly within the upper level of the organizations. The actual users of the system did not take an active role in this

configuration process or the testing of the system. The SAP users were given an average of two weeks' training. This training focused on how to interact with the system and to carry out their individual tasks within the system.

Functions that were decentralized across Canada had to be centralized. This resulted in splitting and merging departments. Departments were realigned and new work groups were set up. People were taken from their jobs and put into new jobs with new roles and responsibilities. For example, a cost accountant became a system administrator because the old position did not exist within the process system. Employees were moved from one location to another so they could work closely with peers from other departments. The normal routines of work were disturbed, which frustrated many employees. They struggled to start off with the process system. When the process was centralized, jobs were removed from many different parts of Canada and brought to one location. Employees were so used to the old system that they did not understand what the process system brought to the entire organization. When the old information system was changed, the employees lost their old familiarity with their jobs. In a normal hiring process, the employees' skills, abilities and responsibilities are matched with the job profile. However, such matching did not take place when jobs were reassigned during SAP implementation. There was no time to match people with jobs. Whomever management thought could do the job was assigned that job. Employees just did not understand the change process. They were not given any preparation for this major change. When they tried to understand the process, it was very difficult because the system was so complex.

The managers were not in a position to help their subordinates because they were overworked and were busy configuring the system to suit their business objectives.

The nature of the change that took place in the government organizations during the SAP implementation was a hard one. It was a huge change brought about in a short period of time. For the most part, it was unplanned. These organizations had very limited resources, which did not permit them to provide adequate training for all SAP users. Organizations were able to implement the system within six months, but it took years to make the different departments talk to each other.

During the interviews managers expressed that as time passed, employees came to understand their new roles and responsibilities within the process system more. Now, they like their jobs more and are more motivated. They are also trying different ways to interact with the system and improve efficiency.

5.2 Discussion on the components of the job characteristics model

5.2.1 Skills Variety

75 percent of the respondents agreed that they used more skills with SAP than they did before. With the legacy systems they had only to understand the processes they had to perform and then do them repetitively. With SAP they had to be very analytical and clearly understand their part in the whole process. For this reason, employees should be more analytical and have computer skills to successfully adapt to the process system.

In order to get employees with SAP skills, almost all organizations trained internal employees with SAP technologies. A SAP system provides opportunities for people who are not technically trained to learn to work with technology. SAP users employ their skills and talents when they try new processes and deal with the software. Based on this, we concluded that the SAP system provides more opportunities to use individual skills and talents. However, some managers said that using more skills and talents largely depended on the set of skills the employees possess. Employees who have more computer skills would use them much more than employees who do not have them.

5.2.2 Task Identity

In our study only 55 percent of the sample agreed that they often knew their work outcomes in the process system. Every transaction that is entered into SAP has a nametag attached to it. For example if a person is working with the accounting module and is in charge of the general ledger, that individual will be responsible for doing the ledgers, making changes and maintaining them. When this is fed into the process system, employees can identify their part of work interacting with the whole organization. Therefore, individuals know who is doing what and whether data is being processed correctly. The system will also detect errors made by individuals, but there are some security features that prevent employees from accessing all information. Some managers argue that this feature considerably reduces task identity for employees.

5.2.3 Autonomy

More than 80 percent of the respondents who answered the questionnaires agreed that the process system provided employees with autonomy and independence at work. An integrated system provides the users with all the necessary information to perform their work. When a new transaction takes place the information is instantly available company wide. Once the data is in the system, it is an easy matter for an employee to retrieve it. Managers prepare reports and then allow their employees to do their own queries. It is up to the individual employee to get on to the system and get the appropriate data. There is no need for them to know any programming code like SQL to extract data from the system. However, because of the complex nature of SAP, some managers raised doubts about whether the process system provided employees with autonomy. They considered SAP to be a highly standardized system and expected individual employees to work within the given framework. Once the process system was set up with rules, it provided little flexibility. For example, a receiver in the material department must immediately enter relevant data when products are received. The employee cannot wait until the next day to enter it because that would cause many mismatches in the system.

5.2.4 Task Significance

Because it is an integrated system, every interaction becomes very important. Simple transactions can have a huge impact on the organization. This may be the reason over 55 percent of the respondents felt that their work with the SAP was more significant to the organization than it was before. With the SAP system, individuals need to know what is driving the system and where it is been driven because it depends on individuals to

provide accurate and timely data . For example, before the integrated system, a payroll clerk counted the time for each employees and passed the information to the compensation section. But in a process system, this data drives the whole system. This fact makes the payroll clerk's task more significant than before.

5.2.5 Feedback from the job

More than 60 percent of the sample said that they often received feedback from their job. The general view was, that when you deal with the system on a day-to-day basis with different people doing different activities, and an individual makes a mistake it will be identified by another individual who will let the first individual know about the error. Thus, the feedback would be from individual to individual rather than directly from the system. The SAP system facilitates this quick error detection.

5.2.6 Feedback from the supervisor

While working on the SAP system individuals do not often get feed back from their supervisors. In our study more than 40 percent of the sample indicated that they received very little feedback from supervisors. Managers set the task parameters, but it was up to individual employees to complete the job. Employees did not report back to their supervisors because the transactions were all entered into the process system. Everyone who was involved in getting the job done knew who was doing what and the progress of the task. Thus, there was no formal feedback system in place with the SAP system. Organizations are working on setting up a formal feedback channel employees adapt to the process system.

On average, 60 percent of the sample agreed that their job with the process system provided them with an enriched job, that is a job that provides autonomy, task identity, task significance, skill variety and feedback from both the job and the supervisor. Some job characteristics, specifically autonomy, tasks identity and task significance were stronger than others.

5.2.7 Experienced Meaningfulness

In order to analyze this psychological state we must look at how many participants in this sample desired meaningfulness at work. About 89 percent of the participants stated this desire. More than 80 percent of the sample showed that they experienced meaningfulness in their work with the SAP system. This sense of accomplishment came when individuals overcame the challenges presented by the process system and learned to work around the constraints of the system. The process system also allowed users to work along with peers from other departments. SAP users were able to compare what they were doing and learn from each other, discovering correct functionality and developing the necessary solutions for problems. This experience was meaningful and employees felt satisfied with their work performance.

According to the model, a job needs to be enriched with skills variety, task significance, and task identity for individuals to experience meaningfulness. According to the correlations found between these variables and experienced meaningfulness, only task significance had significant correlation. This points out that, for this group of SAP users, meaningfulness was experienced when they felt that their job was significant to the whole

organization. Although individually task identity and skill variety showed high percentages, they did not correlate strongly with experienced meaningfulness. Therefore, we concluded that these two variables were important but did not relate to experienced meaningfulness for our participants. On the other hand, feedback from the job and supervisor had a moderate rating individually but correlated significantly with experienced meaningfulness (although not predicted by the model.) What we concluded from these findings is that, for this particular sample of SAP users, task significance led to experienced meaningfulness and even when they received moderate levels of feedback from job and supervisor, they still experienced meaningfulness.

5.2.8 Experienced responsibility for the outcome

The percentage of respondents who said that their work with the SAP system made them feel responsibility for job outcomes was very high. As we have illustrated previously, a single SAP user's activity is critical to the whole system. When the system is not integrated, and an individual does a job well or makes a mistake, it only affects one department. With the process system, it makes an impact on the whole organization. In this sense, SAP forces employees to become more responsible for their work outcomes.

According to the model, autonomy leads to the psychological states of experienced responsibility. The correlations between these two variables were very poor in this study and are not as predicted by the job characteristics model. However, there were other job dimensions that correlated more strongly with this psychological state. Task identity and task significance correlated significantly. The conclusion that we drew from this was

that, for this group of SAP users, experienced responsibility did not come from the level of independence they had, but from job dimensions such as task significance and task identity. Although, 80 percent of the sample felt that they had autonomy in their work, this job dimension did not have a strong correlation to any of the outcome variables or psychological states. This finding suggested that employees depended substantially on their own efforts and initiatives to work with the enterprise system. However, this job dimension did not have any influence on the psychological state or the affective outcomes of the jobholder.

5.2.9 Knowledge of outcome

More than 80 percent of the participants agreed that the SAP system let them know the results of their job. The system provided users with periodic feedback of transactions. Knowing the actual outcome of their work lets SAP users do things faster and better. One interviewee described the SAP system as “idiot proof”. Employees immediately know the results of their work.

According to the model, employees acquire knowledge of task outcome when they receive feedback from supervisors and from the job itself. In this research, the correlation between knowledge of results and feedback from the job was significant. This is the only job dimension that predicted the given psychological state as predicted by the job characteristic model. There was no significant correlation between knowledge of results and feedback from the supervisor. This finding further supported the low rating indicated for feedback from supervisor. Although not predicted by the model, other job

dimension variables such as skills variety and task identity had strong relationships with knowledge of outcome. These findings suggest that, for this particular sample of SAP users, skill variety and task identity provided them with knowledge of their work outcome as much as did feedback from the job. Nevertheless, the nature of the ERP system does not provide direct results from work. It only contains and provides updated information about the many transactions that take place within an organization.

5.2.10 Moderating effect of Growth Need Strength

In theory, growth need strength plays a mediating role between job dimensions and the affective outcomes. This moderating effect was not found in our research. The participants who had high growth need, and those who had lower growth need, both reacted the same way to job dimensions. Nor was there any difference in their psychological states. This may have been due to the fact that when the SAP system was implemented it collapsed all the working levels to support the software. Employees from all levels were taken from their jobs and put to work on the process system. Everyone got the same training and were treated the same way. As one interviewee put it “we have different levels of expertise but we are paid the same way like a herd of cattle.” These organizations did not have clear career advancement paths in place to identify talent in the process system. Career path issues of the SAP team members were not addressed. The people who worked with the system did not know if good work performance would affect their career paths. This may be the reason why growth need did not influence how individuals reacted to their jobs with the process system. In many of the organizations that took part in this research, personnel turnover during and after SAP implementation

was significant. One reason for this may have been that employees did not like the changes made to their jobs and they felt that their career issues were not addressed. A Conference Board research project on SAP Implementation Strategies and Results found that companies ranked the addressing of career path issues for SAP members as the second most important factor that should be dealt with when staffing for SAP implementation (Cooke and Peterson, 1998).

5.2.11 Discussion on Outcome Variables : Job Motivation, General Satisfaction And Growth Satisfaction

Only 46 percent of the sample indicated an increase in job motivation after the implementation of SAP. For most motivation came from arriving every day to work, logging on, checking things and getting the feel of the responses. Workers also feel content when they become familiar with the system, which allows them to deal with the many challenges at work. During the interviews, managers indicated that initially, employees were unhappy with the process system. Eventually, when the enterprise system became a part of their work routine and they got to know more about the system, they became more comfortable working with it.

Given the rapid change and many frustrations the SAP users faced, general satisfaction towards the job was moderate for our sample. When the SAP users get to know the system better their job satisfaction may increase. In contrast, the respondents felt high growth satisfaction with their current jobs.

When an employee has SAP skills, it makes him or her more valuable in the labor market. According to some managers, many employees leave their organization when they acquire SAP skills because they have a more rewarding career outside the federal organization. People who work with these process systems know that they are valuable in the labor market, which provides a sense of growth satisfaction.

When we try to relate critical psychological states to the affective outcome, according to the model, experienced meaningfulness is supposed to provide internal job motivation. However, this was not found in this sample. Although not predicted by the model, the correlation between knowledge of results and job motivation was very significant. This indicates that the participants felt more motivated when they knew the results of their work with the SAP system. In addition, none of the job dimensions correlated significantly with internal motivation. This indicated that for this particular sample, motivation probably did not come directly from these characteristics, but rather through knowing the actual results of their work with SAP. As prescribed by the model, experienced responsibility correlated highly with general satisfaction. However, it is interesting to note that all three psychological states correlated highly with general satisfaction. This indicated that, this sample of SAP users experienced all three psychological states and this contributed significantly to overall job satisfaction. Out of the six job dimensions, three correlated highly with general satisfaction. This showed that SAP users' general satisfaction also came from feelings of job significance and receiving feedback from the supervisor and from the job itself.

The other variables, which were not included in the job characteristics model, correlated very well with the three affective outcomes. Enhanced career growth, need strength, opinion on ERP systems and liking towards the job correlated well with affective outcomes, indicating that these variables also had a part in producing the outcome.

According to the job characteristics model, the psychological state of knowledge of results should be present for individuals to feel growth satisfaction. This was found in our study, too. There was a significant correlation between growth satisfaction and knowledge of results. There were also significant correlations between experienced meaningfulness and growth satisfaction. This indicated that, for our sample, growth satisfaction is initiated by two of the psychological states. In addition, most of the job dimensions were highly correlated with growth satisfaction. These findings are favorable for these organizations because they indicated that they are providing a conducive environment for personal growth. This makes the organizations more attractive to its participants.

5.3 Discussion on Hackman and Oldham's Job Characteristics Model

Firstly, according to the Hackman and Oldham's job characteristic model, certain job dimensions leads to particular psychological states in individuals. For example, a sense of job autonomy leads to the psychological state, experienced responsibility. In this study, out of the six job characteristics, task significance predicted experienced meaningfulness, and feedback from the job predicted knowledge of results. These were the two job dimensions that predicted the particular psychological states described in the

model. The other job dimensions did not predict the given psychological states as described by the model. Some job dimensions which had strong correlations with the psychological states were not predicted by the model. For example, task significance correlated strongly with experienced responsibility and task identity. Skill variety correlated strongly with knowledge of results. This indicated that employees experienced more responsibility for their job outcome when they felt that their job with the enterprise system had substantial impact on the organization. Furthermore, when employees were able to identify their tasks with the system and use more skills while working they were able to appreciate the actual results of their work.

Secondly, the job characteristics model states that the critical psychological states play a mediating role between the job dimension and the affective outcome. This mediating role of the critical psychological state was found in our study as well. According to the findings from section 4.1.3, when all three psychological states were used as predictors, R^2 significantly increased. In addition, it was also established that the relationships between the core job dimensions and the affective outcomes are empirically dependent on the critical psychological states. Thus, we concluded, in this study the psychological states played a mediating role as predicted by Hackman and Oldham.

The job characteristics model predicts that when employees experience meaningfulness in their jobs, it leads to internal motivation. This was not found in our study. However, experienced meaningfulness correlated well with the other two affective outcomes, which

were not predicted by the model. Experienced responsibility and knowledge of results predicted the respective affective outcomes as presented by the model.

Finally, the moderating effect of Growth Need Strength was not found in our study. This is discussed in detail in section 5.2.10. Thus, we can conclude that although this research did not use the JDS, some of our findings was similar to the predictions of the job characteristics model.

5.4 Limitations

Firstly, in an ideal situation, we would have preferred to administer our questionnaires in five federal organizations in three different departments which had undergone the SAP implementation at the same time. We were not able to do this because many who used the SAP system in these organizations could not allocate time for this research. We contacted all 18 federal organizations that had implemented the SAP system and were able to obtain only 47 questionnaires and conduct five interviews. If our sample size had been greater, we could have more strongly generalized our findings. In addition, the responses to the change process questions were very limited. This did not allow us to clearly distinguish the changes that SAP implementation had brought to these organizations.

Secondly, this research did not use the JDS for reasons discussed in section 2.6.2. The questionnaire that was used in this survey was based on an on-the-job characteristics model but the questions may not have tapped the entire work redesign which had taken

place in these organizations. It may have been possible to have overcome this problem if we had been able to schedule more interviews with SAP users.

Thirdly, it was difficult to capture all the characteristics of organizational change in a short time period. In order to accurately do this, questionnaires should have been administered to the same individuals before and after SAP implementation. This would have clearly indicated the changes in their work. When we administered the questionnaires after implementation, the respondents had to remember what they did in their previous positions and had to compare it to their new jobs with the process system. This may have led to some inaccurate predictions.

5.5 Implications of the study

This study provides an understanding of how work redesign took place during SAP implementation in some Canadian federal organizations. The findings of this research will help managers from the federal organization to understand some of the effects of an ERP system implementation. By doing so, they can better prepare their employees to cope with the huge organizational changes that take place and will gain vital support for the process system implementation. Many more government organizations will implement ERP systems in the coming years. These organizations can learn from the experiences of the organizations that went before them and may have a more favorable process system implementation.

5.6 Suggestions for Future Research

An important suggestion for further research would be to replicate this survey after a year or two, during which time the federal organizations that participated in this research would have finished implementing all the modules of SAP. Many organizations would have SAP up and running and the nature of the change it had brought would be more evident. By that time, the organizations will also be in a position to tell us whether SAP enabled them to achieve their business objectives more efficiently and effectively.

5.7 Recommendation for a better work redesign when implementing SAP

Firstly, organizations have to implement change management strategies during various phases of SAP implementation. Change management strategies will favorably affect employees and give them information on how their jobs are going to change. This will reduce the level of resistance. When management decides to implement ERP, they should communicate this decision to all organizational levels. Change strategies should also include information sessions to educate organizational members that the process system implementation is not an IT change, but a business change. Employees should understand the business objectives an organization is trying to achieve through implementing a process system. This will allow the functional units to prepare for the major changes to come. This preparation is critical for a successful ERP implementation. A change agent should be working with all functional units to address the concerns of the employees who will undergo major work changes. These change agents should have good communication and negotiation skills and be able to influence the thinking of the employees and create a favorable response to a process system.

Secondly, organizations should keep the SAP project within the scope of a stronger project management process. When organizations implement many SAP modules at the same time, each modules should have a subproject manager. There should be a clear structure in assigning work to people within the process system. When assigning responsibilities, skills, talents and experience should be matched with job profiles. Management should evaluate employees and discuss with each individual how his or her job is going to change and whether the individual is willing to take up new responsibilities. They should also explain the guidance and help that will be available for individuals to cope with the changes.

In many government organizations, high level management spent considerable time testing the modules. Actual users should also participate in the testing process. This would allow them to understand the process system, giving them opportunities to try transactions in different ways.

Thirdly, an SAP implementation budget should allocate sufficient funds for SAP training. Prospective users should be given training in the particular module in which they are going to work. Some government organizations used the concept of training the trainers. Training was given to a group of employees and then they trained other users. This type of training is not suitable for a complex system like the SAP. In some federal organizations, some departments were given more training than others. This is also not suitable to an integrated system because all departments should have the expertise for a

successful adaptation of the process system. All departments should be given equal training. When organizations have a short time frame in which to implement the system, it is the training phase that is often cut short. This should not be the case. Users should know how to operate the system in order to work comfortably with it. SAP users should be given manuals that clearly teach them about the system. These manuals should clearly document the many processes in the system. This will reduce some of the difficulties the users encounter and facilitate self-learning. Post implementation training also needs to be given to SAP users. This will allow the users to find solutions for their own unique problems.

Finally, when the federal organizations hire SAP consultants, they must take time to investigate whether the consultants have the expertise and knowledge in particular industry practices. Hiring consultants with SAP knowledge alone is not enough to solve the day-to-day problems of SAP users. The consultants must understand the internal business environment of the organization. Also, the services of consultants should be engaged in different phases of the SAP implementation. In some organizations where this research was done, the consultants were available only at the initial stages of SAP implementation. When the SAP users got to know the system and had questions and doubts, there were no consultants to help them. They had to spend more time in figuring things out for themselves. Organizations should have control over what the consultants are doing, periodically auditing the services of the consultants and making sure knowledge has been transferred to the users.

5.8 Conclusion

Many researchers have tried to develop frameworks for the factors which create internal work motivation and work effectiveness in employees. Redesigning work in organizations is a very challenging undertaking because every individual should be given a job profile that matches his or her skills and knowledge. Even if one job is changed in an organization, many of the interfaces between that job and the related ones should be changed, causing a chain of changes. So far, there is no acceptable criteria for measuring work redesign. One type of work redesign may be useful for a particular organization, but may not be effective for another.

The “People Factor” has been identified as critical in determining the success of an enterprise system. This research tried to capture the impact that SAP implementation made on individual employees. The two research questions, “To what extent does enterprise resource planning implementation lead to work redesign?,” and “What is the impact of ERP initiated work redesign on employee job satisfaction?” tried to capture the impact the SAP implementation on individual employees. The findings of this research leads us to conclude that the effect of work redesign initiated by SAP implementation was moderate. If the work redesign had been carried out in a more planned manner, much of the initial employee frustration could have been avoided. The job characteristics model proposed by Hackman and Oldham accommodates many aspects of work. The five core job characteristics and the three critical psychological states allow us to analyze the work redesign from many different perspectives.

In his 1975 paper Man and Work in Society, Hackman pointed out four features of work redesign which make it a strategy for initiating organizational changes. Let us analyze whether these four features exist in the work redesign initiated by SAP.

The first feature Hackman pointed out was that, work redesign alters the basic relationship between a person and what he or she does on the job. When all the outer layers are stripped away, many organizational problems come to rest at the interface between people and the tasks they do. When a job is redesigned, it may have a powerful influence on employee motivation, satisfaction and productivity. During an SAP implementation in the federal government, many organizational structures were stripped away and organizational problems came to rest between people and the work they did. Initially, this did not affect internal motivation or productivity in these organizations, but, as time passed and SAP users became more comfortable with the integrated system and got to know their exact roles and responsibilities, they became more internally motivated in their jobs. Secondly, a successful work redesign permanently changes behavior. To change individual behavior, work redesign should be very much on-site, every hour of every day. When a work redesign is successful, it changes the behavior of the individual worker in a way that gradually leads to a more positive set of attitudes about work. The nature of work redesign initiated by SAP implementation changes individual behavior at work.

When SAP was implemented in federal organizations, employees were not able to go back to their old ways of doing things. The legacy systems disappeared as the new

system took over. The whole work environment forced employees to change their behavior towards work. If we recall our previous example, where the employee who receives materials has to enter it as soon as he or she receives it to avoid mismatches in the system, employees work with peers from other departments and solve problems in their work. This simple example shows how the process system changes individual work behavior both positively and permanently. Thirdly, work redesign offers numerous opportunities for initiating other organizational changes. According to Hackman, when work is redesigned in an organization, and work activities are done in different ways, it causes problems as well as opportunities. Individuals can make use of the opportunities that work redesign provides and can achieve personal advancement. Work redesign initiated by the process system provides employees with opportunities for personal growth. The findings of our research indicate that employees experience more meaningfulness in their work with the SAP system. It gives them an opportunity to work with globally popular integrated systems and acquire skills that increase their value in the labor market. Finally, a work redesign that is successful should result in long term rehumanizing of organizational participants. The job satisfaction at issue here is a unique one that develops only when individuals are given a work environment which allows them to learn and try new things and provides them with a sense of competence and self-worth. Managers who took part in the research reported that after a year of SAP adoption, employees were happier with the system and complaints had reduced tremendously.

The answer to the second research question is derived from the first . It tried to find the impact of ERP initiated work redesign on employee satisfaction. Federal organizations are purely bureaucratic, their organizational structure cannot accommodate huge changes like those brought about by process system implementation. As we have discussed, many fundamental changes had to be made. Initially, employees did not understand how their jobs were going to change and could not perform their tasks effectively. Employees struggled to carry out their responsibilities with the process system. When work units went live with the system, the error rates were high. When employees discovered they had performed poorly, they experienced unhappiness and were not satisfied with their jobs. As employees successfully overcame the constraints of the process system, they experienced more satisfaction at work.

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Appendix A

NO.....

Questionnaire

1. Does your job permit you to decide on your own how to go about doing the work?
That is, give you autonomy in your work

☐ Strongly agree ☐ Agree ☐ Neither agree nor disagree ☐ Disagree
☐ Strongly disagree

2. Does the job require you to do many different things at work, using a variety of your skills and talents which you have acquired through your education and work experience?

☐ Much too Much ☐ Many ☐ About same ☐ Few ☐ Much too little

3. When a product or service is produced in your organization, to what extent can you distinguish the work you have done from the work done by other people?

☐ Very Often ☐ Often ☐ Some times ☐ Seldom ☐ Not at all

4. To what extent do you agree or disagree with the following statements

It is hard to tell what impact my work makes on the whole product or service.

☐ Strongly agree ☐ Agree ☐ Neither agree nor disagree
☐ Disagree ☐ Strongly disagree

5. It is basically my own responsibility to decide how my job gets done

☐ Strongly agree ☐ Agree ☐ Neither agree nor disagree
☐ Disagree ☐ Strongly disagree

6. My job lets me to use my skills and talents that I have acquired through education and work experience.

☐ Strongly agree ☐ Agree ☐ Neither agree nor disagree
☐ Disagree ☐ Strongly disagree

7. How significant is your work for the entire organization?

- ☐ Very significant ☐ Fairly significant ☐ About right ☐ Not significant
☐ Not at all significant

8. Meaningfulness in a job is something that counts in one's own system of values. A sense of accomplishment at work. Given this, to what extent do you agree or disagree with the following statement.

I desire meaningfulness in my job.

- ☐ Strongly agree ☐ Agree ☐ Neither agree nor disagree
☐ Disagree ☐ Strongly disagree

9. To what extent do you experience the above mentioned "meaningfulness" in your work?

- ☐ Very Much ☐ Moderately ☐ Slightly ☐ Not very much ☐ Not at all

10. Does the job itself provide you with information about your work performance?

- ☐ Very Often ☐ Often ☐ Not very often ☐ Seldom ☐ Never

11. To what extent does your supervisor or team leader provide you with information about your work performance?

- ☐ Very Often ☐ Often ☐ Not very often ☐ Seldom ☐ Never

12. Do you feel responsible for the outcomes of your work?

- ☐ Most of the time ☐ A good deal of the time ☐ About half of the time
☐ Occasionally ☐ Never

13. To what extent do you agree or disagree with the following statement

I know the actual results of my work activities.

- ☐ Strongly agree ☐ Agree ☐ Neither agree nor disagree ☐ Disagree
☐ Strongly disagree

14. Does your organization provide you opportunities to enhance your career, that is, is there a clear career path that you can achieve with good work performance?

- ☐ Excellent Opportunities ☐ Good Opportunities
☐ Fair amount of Opportunities ☐ Provides little Opportunities
☐ Does not provide at all

15. To what extent do you agree or disagree with the following statements

I have a high desire for growth advancement within my organization.

- ☐ Strongly agree ☐ Agree ☐ Neither agree nor disagree ☐ Disagree
☐ Strongly disagree

16. Since the implementation of the Enterprise Resource System you like your job more than before.

- ☐ Strongly agree ☐ Agree ☐ Neither agree nor disagree ☐ Disagree
☐ Strongly disagree

17. After the implementation of the ERP system how is your motivation towards your job?

- ☐ Very high ☐ High ☐ About the same ☐ Worse ☐ Much Worse

18. If a good friend of yours told you (He/She) was interested in working in a job like yours, what would you tell your friend?

- ☐ Highly recommend ☐ Moderately recommend ☐ Would have doubts
☐ Will not recommend ☐ Will not recommend at all

19. In general how well would you say that your current work measures up, to the kind of job that would bring the best out of you at work?

- ☐ Very much the job ☐ Good Amount ☐ Fairly Alright ☐ Have doubts
☐ Not very much the job

20. Finally, you have experienced work redesign by the implementation of an enterprise system, What is your opinion on the impact of this work redesign on the performance of the employee?

- ☐ Excellent ☐ Good ☐ Fair ☐ Poor ☐ Very Poor

21. How much of your time do you interact with the ERP system for your daily work routine?

- ☐ 0% - 20% ☐ 21% -40% ☐ 41% - 60% ☐ 61% - 80% ☐ 81% - 100%

22. How long have you been working in this organization?

- ☐ 2-4 years ☐ 5-7years ☐ 8-10years ☐ 10 years & more

23. Your age group is?

- ☐ 20-30 years ☐ 31-40 years ☐ 41-50 years ☐ 51-60 years

24. What is your gender?

- ☐ Male ☐ Female

25. Indicate the area that you work in

- ☐ Computer Systems Support ☐ Human Resource Management
☐ Administration ☐ Finance ☐ Marketing ☐ Production and Operations
☐ Research and Development ☐ Management Information System
☐ Other _____

26. Which job category best describes your job?

- ☐ Senior Management
☐ Middle Management
☐ First level position
☐ Entry level position
☐ Owner
☐ Professional
☐ Other (Please describe) _____

27. During the SAP implementation were there any other organizational changes taking place at the same time? (E.g. organizational restructuring, a change in organizational policies, mergers, downsizing)

☐ Yes

☐ No

If yes, briefly comment on the type(s) and extent of the change(s)

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28. Aside from the SAP implementation activities, were there any other significant influences on your work environment? (E.g. a change in work supervisor, a change in work location, personal issues)

☐ Yes

☐ No

If yes, briefly comment on them.

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Thank you for completing this questionnaire.

Appendix B

Interview Questionnaire

Firstly, I would like to thank you for this interview. And would like to start the interview by giving you a brief introduction about our research.....

Now, I like to know specifically how your job changed, since the implementation of the ERP system.

1. When did the SAP system implementation take place in your organization?
2. What were the objectives of implementing this system?
3. What were the major changes that took place during the SAP implementation?
4. Does your job allow you to decide on your own how to go about doing the work, that is give you autonomy in your work?
5. Is it basically your responsibility to decide how you get about your work?
6. Now, to what extent can you identify your part of the job in your organization?
7. Do you use more skills and talents in you current job than before? When I say more skill that is the skill that you have acquired through your education and work experience? Could you elaborate on it for us please?
8. So, does this makes you feel that you're totally responsible for the outcomes of the work?
9. Do you feel that your part of work is more significant to the organizations?
10. Meaningfulness in a job is something that counts in one's own system of values. A sense of accomplishment at work. Do you feel this sense of accomplishment in your Work?
11. How do you get feedback about your performance?
12. To what extent does the work itself gives you feedback?
13. How do you feel when you know the actual results of the your work activities?
14. Do you like your job more than before?

15. Is career development very important for you? I mean how do you rate this among your expectations from a job?
16. Does your current job provide you with enough opportunities to develop in your career?
17. Are you motivated towards your job more than before?
18. After the implementation of the enterprise system do you see improvement in your work performance? If a good friend of yours told you that he or she is interested in working in a job like yours what would your recommendation?
19. In general how well would you say that your current work measures up, to the kind of job that would bring the best of you at work?
20. Finally, as you have experienced work redesigns by the implementation of an enterprise system what are your comments on this issue?
21. How long have you been working in this organization?
22. How much of your time do you interact with the ERP system for your daily work routine?
23. During the SAP implementation were there any other organizational changes taking place at the same time?
24. Aside from the SAP implementation activities, were there any other significant influences on your work environment?
25. You belong to which age group?
- ☐ 20-30 years ☐ 31-40 years ☐ 41-50 years ☐ 51-60 years
26. What is your gender? (Please circle)
- ☐ Male ☐ Female
27. Indicate the area that you work in
- ☐ Computer Systems Support ☐ Human Resource Management
- ☐ Administration ☐ Finance ☐ Marketing ☐ Production and Operations
- ☐ Research and Development ☐ Management Information System
- ☐ Other _____

28. Which job category best describes your job?

☐ Senior Management

☐ Middle Management

☐ First level position

☐ Entry level position

☐ Owner

☐ Professional

☐ Other (Please describe) _____